MOTT MACDONALD

Whittlesey Relief Road

Long List Options Assessment

12 June 2024

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Introduction

Introduction

- **<u>This report sets out how the long listed options for the Whittlesey Relief Road have been identified and assessed; concluding with the emerging short listed options.</u>**
- The development of a long list of options is a crucial step in scheme development and the business case development process, ensuring that a wide range of options are considered and assessed. The long list optioneering process thus demonstrates that a robust decision-making process has been carried out in arriving at a long list of appropriate and suitable options.
- The process adopted for identifying the long list of options for the Whittlesey Relief Road, and the assessment of these options to arrive at a short list of options, is shown below.

Identifying the initial long list

- Initial options identified during stakeholder workshop.
- Further options added following workshop from project technical advisors.
- **35 options** carried forward.

Grouping of similar options

- Options grouped or merged where it was deemed that they were similar, or it made sense as one option rather than multiple.
- **27 options** carried forward.

Pre-sift

- A pre-sift was undertaken to discount options that were deemed highly unfeasible to deliver, or fell within the remit of other projects currently in development.
- **15 options** carried forward.

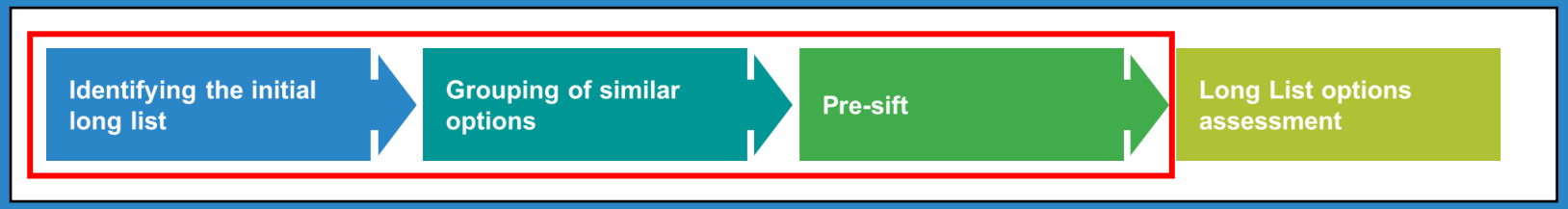
Long List options assessment

- Options assessed using a multi-criteria assessment approach to determine how well they performed against scheme objectives.
- **4 options** recommended to carry forward.

Reminder of scheme objectives (adopted by Project Board in April 2024)

Objective theme	Main objective	Sub-objective
Sustainable growth 	**1. Enable the transport network in Whittlesey to have sufficient capacity to support planned economic development and population growth in a sustainable manner.**	1a. Provide additional transport capacity to accommodate 16% growth in future trips in Whittlesey.
		1b. Reduce the average car journey time in the peak periods by 10% for journeys along the A605 through Whittlesey.
Connectivity and access to opportunity 	**2. Address the current transport network congestion and service constraints within Whittlesey to improve local and regional connectivity for all.**	2a. Increase the number of local and regional educational and employment opportunities accessible within 30 minutes for residents in Whittlesey.
		2b. Improve the integration of transport modes to provide viable sustainable travel options for all, leading to a 25% growth in public transport patronage.
		2c. Improve the resilience of the transport network within Whittlesey so that traffic speeds do not decrease by more than 25% during a road closure event along the A605.
Health, wellbeing and sense of community 	**3. Improve the health and wellbeing for all social groups along the A605 corridor through Whittlesey by reducing the impacts from poor air quality and poor road safety.**	3a. Improve health and wellbeing for all social groups along the corridor and ensure annual NO2 concentrations remain at, or below, current levels, despite growth in trips.
		3b. Improve the safety for the travelling public, with a 50% reduction in collisions involving pedestrians and cyclists within Whittlesey by 2030.
		3c. Enhance the public realm within Whittlesey so that it puts people first and promotes active lifestyles, improving public perceptions of Whittlesey town centre by 10%.
Environment 	**1. Reduce the impact of traffic upon the historic environment of the town and contribute to wider reductions in carbon emissions.**	4a. Reduce general through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.
		4b. Reduce HGV through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.
		4c. Reduce the carbon impact from transport emissions and limit the embedded carbon impact from the delivery of any solution.

Section 1: Identifying the Long List



Identifying the initial long list

Stakeholder Workshop – 15th May 2024

- **Purpose** – Building off the Case for Change and review of baseline evidence, the purpose of this workshop was to discuss and identify all potential options for the Scheme that could meet the Whittlesey Relief Road scheme objectives.

- **Attendees:** Stakeholders included representatives from Fenland District Council (FDC), Cambridgeshire & Peterborough Combined Authority (CPCA), Cambridgeshire County Council (CCC) and Peterborough City Council (PCC), Sustrans, Environment Agency, Stagecoach, Network Rail and Greater Anglia. In addition, individuals from Mott MacDonald's technical design team and business case specialists were in attendance.

- **Outcome: 35 options** were identified, covering a wide range of solutions, including but not limited to:
  - **Relief Roads** – various alignments, including to the north and south of the town.
  - **Public transport enhancements** – both infrastructure provision and service enhancements for bus and rail.
  - **Active travel enhancements** – including improved connections within the town and to Peterborough.
  - **Parking management** – including Park & Ride solutions, and parking control measures within the town.
  - **HGV re-routing** – based on both weight and time restrictions.
  - **Alterations to the A605** – speed limit restrictions, junction enhancements, pedestrian crossing enhancements.

- The full list of options captured are set out in **Appendix A.**

Grouping of similar options

- Due to the large number of options, and high similarity between options, a decision was made to consolidate some options in advance of any sifting or assessment.

- Options were grouped where it was deemed that the sifting process was unlikely to differentiate between options. This included:
  - Options related to restricting car use e.g. clean air zone and congestion charging, grouped into **Driving disincentives**
  - Options related to car parking management e.g. introducing car park charging and reducing car parking spaces grouped into **Park & Ride**
  - Options related to HGVs e.g. HGV restrictions based on weight or time grouped into **HGV re-routing**
  - Options related to local bus offer e.g. Demand Responsive Travel and local circular bus service grouped into **Localised Public Transport enhancements**
  - Various options for active travel enhancements grouped into **Active Travel infrastructure improvements**

- This resulted in the initial long list of options being reduced from 35 to **27 options**.

- The grouped options are shown in **Appendix B.**

Pre-sift

- A pre-sift was undertaken to discount options that were out of scope; against policy aspirations; do not sufficient address scheme objectives, are highly unfeasible; or fell within the remit of other projects and/or organisations. The options discounted, and the rational, is set out below:

Option	Reasons for discounting
Northern Relief Road	• There are significant environmental constraints to the north of Whittlesey, such as the Whittlesey (Nene) Washes, that would likely result in significant challenges to delivery, including likely significant opposition from key stakeholders such as Environment Agency. • Costs to implementing a northern relief road is likely to incur significant costs to mitigate negative environmental impacts. • In addition, a northern relief road does not serve the industrial estates to the south of the town, so would fail to address a key issue for the town which is HGV through traffic.
Clean Air Zone / Congestion Charging	• These options were considered unlikely to be deliverable on a small scale. • Examples of congestion charging in the UK are extremely limited, and no immediate example for a town. • Similarly with Clean Air Zones, these are used for large cities where there are issues with air quality exceeding legal limits. In Whittlesey, air quality legal limits are not currently exceeded and, therefore, it is unlikely that a Clean Air Zone would be warranted.
Removing traffic generators	• Removing traffic generators from Whittlesey, i.e. not building new housing or employment sites, and moving existing employment sites out of the town, would greatly impact the upon the towns economy and housing needs and would be extremely unlikely to be deliverable. • This approach is not within the existing Fenland Local Plan and would require significant changes to existing planning policy.
Improved signage	• Improving signage to direct traffic away from the town, for example via the A47, is consider to have limited impact in achieving the objectives of the WRR Scheme on its own.
Improvements to the A47	• Improvements to the A47 which is part of the Strategic Road Network is within National Highways scope, and outside of scope and influence of the WRR Scheme.

Pre-sift

Option	Reasons for discounting
Improved bus service frequency	• Service frequency is largely within control of bus operators who operate services on a commercial basis. For them to increase frequencies would require certainty over increased patronage that would cover the costs of the additional services. • The alternative to increasing frequencies would require funding from the CPCA to support additional buses: however currently there is limited funding and scope for this.
Improved rail service frequency	• The ability to influence and change the frequency of rail services at Whittlsea is deemed out of scope, as this would require wider changes to the rail network such as the Ely Capacity Enhancements. This is within the remit of Network Rail.
Promoting Whittlesea Station as a parkway station	• Works to improve the station and its car parking facilities are being progressed separately to the WRR Scheme. FDC have received funding from CPCA to deliver £3m of improvements as part of the Whittlesea Station Enhancement Programme. • Building a large parkway station would likely require a link road to serve it. Otherwise, there is a risk that traffic would be drawn down Station Road, thereby not alleviating issues on the A605 from through traffic and potentially adding more traffic to an unsuitable road. • Access to a parkway site from the A605 via a new link road to avoid traffic having to go through Whittlesey would be extremely difficult to deliver due to environmental and land constraints, i.e. access would have to go via Lattersey Local Nature Reserve
New river bridges	• This option is likely to have limited impact in addressing the scheme objectives due to the location of the river south of Whittlesey and the population it would serve.
Increase highway capacity by widening the A605 within Whittlesey	• To deliver this would require significant intrusive construction, reducing kerb space, and the need to acquire land or property for demolition. • This is considered significantly unfeasible and, whilst it would increase highway capacity on the A605, it would not address the issues of through traffic and associated impacts of traffic within the town.
Level crossing improvements	• As the level crossing is within Network Rail ownership, any changes would be in their remit, therefore out of scope for the WRR Scheme. However, changes to the level crossing are proposed as part of the Whittlesea Station Enhancement Programme.

Sifted long listed options

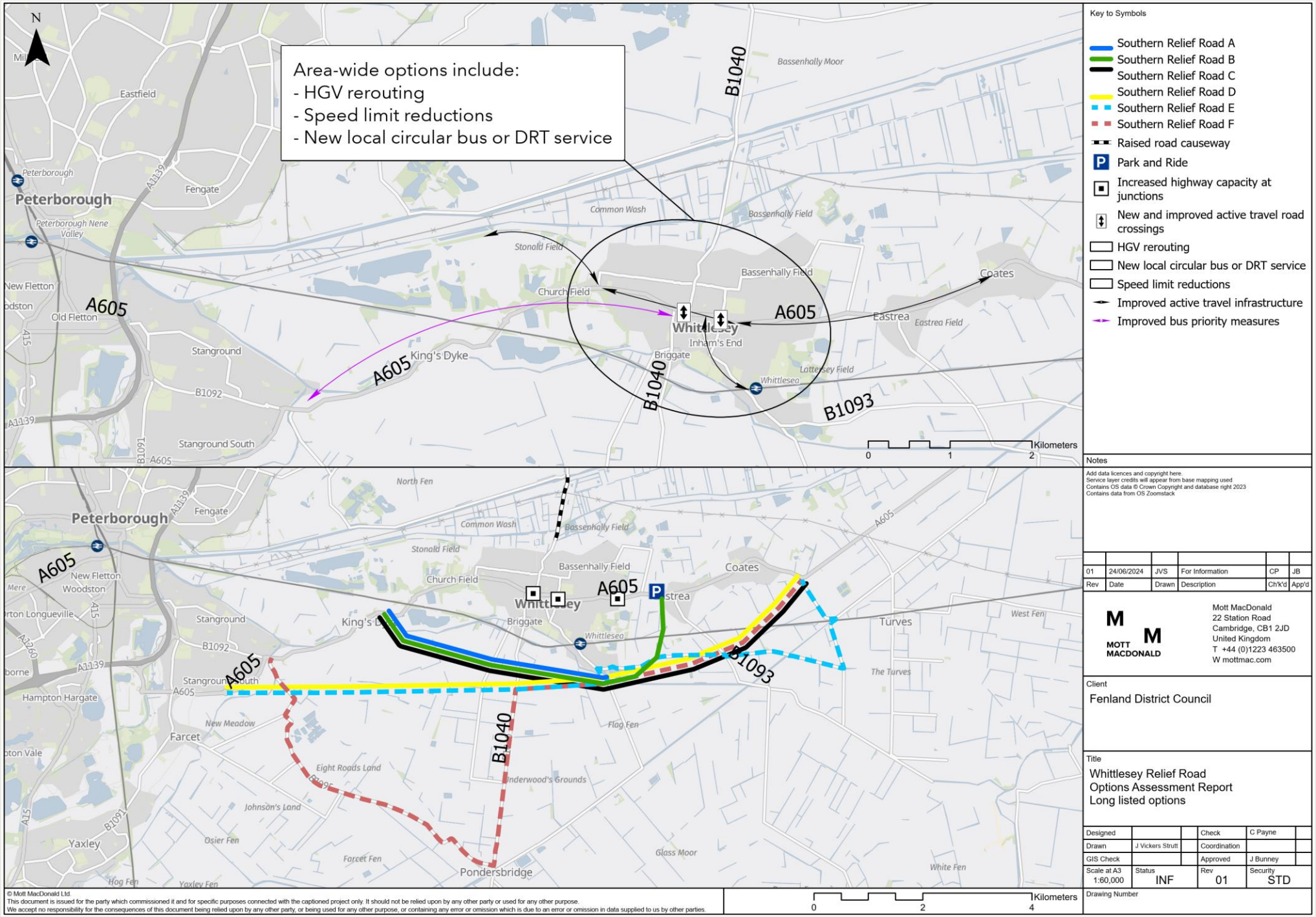
- The outcome from the pre-sift resulted in **15 options** being identified as the long list. These were progressed to more detailed assessment.

No.	Option name	Option description	Rationale for carrying forward
2	Southern Relief Road A (Blue route alignment)	Relief road to the south of Whittlesey between Ralph Butcher Causeway and B1093, near Whittlesea Station, linking to industrial areas.	Option could help to divert through traffic away from Whittlesey and serve industrial sites to the south and west.
3	Southern Relief Road B (Grey route alignment)	Relief road to the south of Whittlesey between Ralph Butcher Causeway and A605 Eastrea Road, west of Eastrea.	Option could help to divert through traffic away from Whittlesey and serve industrial sites to the south and west.
4	Southern Relief Road C (Black route alignment)	Relief road to the south of Whittlesey between Ralph Butcher Causeway and A605 March Road, east of Coates.	Option could help to divert through traffic away from Whittlesey and serve industrial sites to the south and west.
5	Southern Relief Road D (Yellow route alignment)	Relief road to the south of Whittlesey between A605 Whittlesey Road at Cardea Morrisons roundabout and A605 March Road, east of Coates.	Option could help to divert through traffic away from Whittlesey and serve industrial sites to the south and west.
6	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	Upgrade of existing roads to the south east (e.g. B1093) and construction of new relief road linking these to the A605 west of Whittlesey.	Option could help to divert through traffic away from Whittlesey.
7	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	Upgrade of existing roads to the south west (e.g. Ramsey Road and B1040) and construction of new relief road linking these to the A605 east of Whittlesey.	Option could help to divert through traffic away from Whittlesey.
19	Improved bus priority measures	Improving the attractiveness of bus services within Whittlesey through the introduction of bus priority measures along the A605, helping to improve journey time reliability and speeds.	Option would encourage greater use of public transport and reduce the need for people to travel by car.

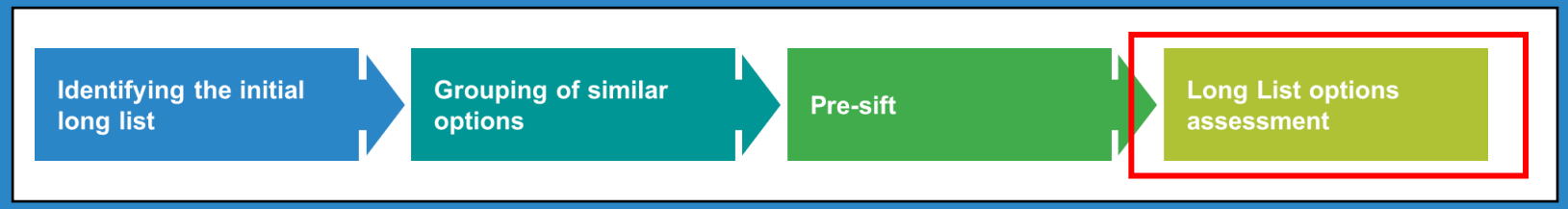
Sifted long listed options

No.	Option name	Option description	Rationale for carrying forward
20	Bus based Park and Ride	Park and Ride site to the east of Whittlesey, providing parking provision for car journeys from the east (Eastrea/Coates/March) with direct bus service into Whittlesey and Peterborough.	Option would encourage greater use of public transport and reduce the need for people to travel through Whittlesey by car to access Peterborough.
28	New and improved active travel road crossings of the A605	Additional signalised crossing points of the A605 to reduce severance for pedestrians and cyclists.	Option would shorten travel times and improve safety for those walking and cycling within Whittlesey, encouraging people to undertake active travel rather than driving.
29	Speed limits	Reduce speed limits along the A605 to improve safety for road users.	Option would improve safety for those walking and cycling within Whittlesey whilst increasing journey times slightly, encouraging people to undertake active travel rather than driving.
31	Increase highway capacity at junctions	Increase capacity of the main junctions through Whittlesey on the A605 (e.g. through roundabout signalisation).	Option would improve the flow of traffic through Whittlesey, therefore reducing congestion within the town.
33	Raised road/causeway road to the north	Construction of a raised road/causeway along existing B1040 road to limit impact of flood events.	Option would increase the resilience of the road network in Whittlesey, reducing the impact of flooding on the B1040 and eliminating need for affected road users to use A605.
36	Active travel infrastructure improvements	Improvements to the active travel infrastructure within Whittlesey to improve connectivity (e.g. shared-use paths; footway improvements; cycleways). Consolidation of options 22, 23, 24, 25 and 26.	Option would improve walking and cycling infrastructure within Whittlesey, encouraging people to undertake active travel rather than driving.
37	HGV rerouting	Rerouting of HGV travel within Whittlesey to limit the impact on the network. (e.g. time/weight restrictions). Consolidation of options 12 and 13.	Option could reduce the impact of HGVs on Whittlesey, encouraging HGVs to use alternative routes.
38	New local circular bus or DRT service within Whittlesey	Introduction of a local circular bus route within Whittlesey, providing connection between key locations. This includes the potential for the service to be demand-responsive. Consolidation of Options 15 and 16.	Option could encourage use of public transport for residents and reduce the need to have/use a private car.

Map of long listed options



Section 2: Options Assessment



Assessment of the long list

- Sifted long listed options have been assessed against a Multi-Criteria Assessment framework built using Mott MacDonald's in-house Investment Sifting and Evaluation Tool (INSET).
- INSET is a decision support process that helps manage information on investment options and to evaluate them. It is designed to be simple, flexible, replicable and transparent.
- Principally, INSET uses a set of assessment themes that group together homogenous criteria to appraise each of the options.
- The themes and criteria used for Whittlesey Relief Road match the scheme themed objectives and measurable sub-objectives.
- All scoring for the criteria were weighted the same, generally applying a 5-point scale.

  (note – the carbon assessment criteria was scored on 7-point scale to accommodate additional granularity between the options to be scored).

Assessment criteria scoring used

Sub-objective	Large negative -2	Small negative -1	Neutral 0	Small positive +1	Large positive +2
1a. Provide additional transport capacity to accommodate 16% growth in future trips in Whittlesey.	Option would result in a significant reduction in capacity	Option would result in a small reduction in capacity	Option will result in no change in capacity	Option will increase capacity, but unlikely to accommodate 16% growth in trips	Option will increase capacity to accommodate 16% growth in trips or greater
1b. Reduce the average car journey time in the peak periods by 10% for journeys along the A605 through Whittlesey.	Option will increase car journey times by 10% or more	Option will increase car journey times by up to 10%	Option will result in no change in car journey times	Option will reduce car journey times, but up to 10%	Option will reduce car journey times by 10% or more.
2a. Increase the number of local and regional educational and employment opportunities accessible within 30 minutes for residents in Whittlesey.	Option will significantly worsen access to education and employment opportunities	Option will slightly worsen access to education and employment opportunities	Option will not increase the number of accessible education and employment opportunities	Option will slightly improve access to education and employment opportunities	Option will significantly improve access to education and employment opportunities
2b. Improve the integration of transport modes to provide viable sustainable travel options for all, leading to a 25% growth in public transport patronage.	Option will significantly reduce public transport patronage by 25% or more	Option will slightly reduce public transport patronage between 1% and 25%	Option will result in no change in public transport patronage	Option will slightly increase public transport patronage, between 1% and 25%	Option will significantly increase public transport patronage by 25% or more
2c. Improve the resilience of the transport network within Whittlesey so that traffic speeds do not decrease by more than 25% during a road closure event along the A605.	Traffic speeds likely to decrease between 75% and 100% during road closure event	Traffic speeds likely to decrease between 50% and 75% during road closure event	Traffic speeds likely to decrease between 25% and 50% during road closure event	Traffic speeds likely to decrease by less than 25% during road closure event	Traffic speeds do not change during road closure event

Sub-objective	Large negative -2	Small negative -1	Neutral 0	Small positive +1	Large positive +2
3a. Improve health and wellbeing for all social groups along the corridor and ensure annual NO2 concentrations remain at, or below, current levels, despite growth in trips.	Option will contribute to a large increase in NO2 concentrations	Option will contribute to a small increase in NO2 concentrations	Option will contribute to annual NO2 concentrations remaining at current levels	Option will contribute to a small decrease in NO2 concentrations	Option will contribute to a large decrease in NO2 concentrations
3b. Improve the safety for the travelling public, with a 50% reduction in collisions involving pedestrians and cyclists within Whittlesey by 2030.	Large increase in the number of collisions and personal injuries, likely to be 50% or greater	Small increase in number of collisions and personal injuries, likely to between 1% and 50%	No reduction in the number of collisions and personal injuries	Small reduction in number of collisions and personal injuries, likely to be between 1% and 50%	Large reduction in the number of collisions and personal injuries, likely to be 50% or greater
3c. Enhance the public realm within Whittlesey so that it puts people first and promotes active lifestyles, improving public perceptions of Whittlesey town centre by 10%.	Perception of the public realm in Whittlesey likely to significantly worsen	Perception of the public realm in Whittlesey likely to marginally worsen	Perception of the public realm in Whittlesey unlikely to change	Perception of the public realm in Whittlesey likely to marginally improve	Perception of the public realm in Whittlesey likely to significantly improve
4a. Reduce general through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.	General through traffic levels increase by 15% of more	General through traffic levels increase by 1-15%	No change in General through traffic levels	General through traffic levels reduced by 1-15% or more	General through traffic levels reduced by 15% or more
4b. Reduce HGV through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.	HGV through traffic levels increase by 15% of more	HGV through traffic levels increase by 1-15%	No change in HGV through traffic levels	HGV through traffic levels reduced by 1-15% or more	HGV through traffic levels reduced by 15% or more

Sub-objective	Very large negative -3	Large negative -2	Small negative -1	Neutral 0	Small positive +1	Large positive +2	Very large positive +3
4c. Reduce the carbon impact from transport emissions and limit the embedded carbon impact from the delivery of any solution.	Significant increase in tail pipe carbon emissions and significant capital carbon emissions from implementing option	Slight increase in tail pipe carbon emissions and significant capital carbon emissions from implementing option	Slight increase in tail pipe carbon emissions and slight capital carbon emissions from implementing option	No reduction in tail pipe carbon emissions and small level of capital carbon emissions from implementing option	Small reduction in tail pipe carbon emissions, with a small level of additional capital carbon emissions from implementing option	Significant reduction in tail pipe carbon emissions, but with small level of additional capital carbon emissions from implementing option	Significant reduction in tail pipe carbon emissions and no additional capital carbon emissions from implementing option

Long listed options assessment results

Rank	Scheme	Sustainable Growth	Connectivity and Access to Opportunity	Health, Wellbeing and Sense of Community	Environmental	Total Score
1	Southern Relief Road B (Green route alignment)	1.00	0.33	0.67	0.33	0.58
1	Southern Relief Road C (Black route alignment)	1.00	0.33	0.67	0.33	0.58
1	Southern Relief Road D (Yellow route alignment)	1.00	0.33	0.67	0.33	0.58
4	Bus based Park and Ride	0.50	0.50	0.83	0.28	0.53
5	HGV rerouting	0.50	0.17	1.00	0.39	0.51
6	Improved bus priority measures	0.50	0.50	0.50	0.28	0.44
6	New local circular bus or DRT service within Whittlesey	0.50	0.50	0.67	0.11	0.44
8	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.75	0.17	0.33	0.28	0.38
8	Active travel infrastructure improvements	0.25	0.33	0.83	0.11	0.38
10	Southern Relief Road A (Blue route alignment)	0.50	0.00	0.50	0.28	0.32
11	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	0.50	0.00	0.33	0.28	0.28
11	New and improved active travel road crossings of the A605	0.00	0.17	0.83	0.11	0.28
13	Speed limit reductions	-0.50	-0.17	0.50	0.00	-0.04
14	Raised road/causeway road to the north	0.50	0.33	-0.50	-0.56	-0.06
15	Increase highway capacity at junctions	0.50	0.50	-1.00	-0.56	-0.14

Long listed options assessment results

- The options assessment outputs suggest that **no single option delivers strongly against all objectives**, instead the best performing options each have different areas of strength against individual themed objectives.

- A more detailed examination of how the options perform against each themed objective is presented on the following pages to help inform the overall process of decision-making for the shortlist.

Theme analysis

Objective theme	Main objective	Sub-objective
Sustainable growth	**1. Enable the transport network in Whittlesey to have sufficient capacity to support planned economic development and population growth in a sustainable manner.**	1a. Provide additional transport capacity to accommodate 16% growth in future trips in Whittlesey.
		1b. Reduce the average car journey time in the peak periods by 10% for journeys along the A605 through Whittlesey.

Rank	Scheme	Sustainable Growth
1	Southern Relief Road B (Green route alignment)	1.00
1	Southern Relief Road C (Black route alignment)	1.00
1	Southern Relief Road D (Yellow route alignment)	1.00
4	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.75
5	Southern Relief Road A (Blue route alignment)	0.50
5	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	0.50
5	Improved bus priority measures	0.50
5	Bus based Park and Ride	0.50
5	Increase highway capacity at junctions	0.50
5	Raised road/causeway road to the north	0.50
5	HGV rerouting	0.50
5	New local circular bus or DRT service within Whittlesey	0.50
13	Active travel infrastructure improvements	0.25
14	New and improved active travel road crossings of the A605	0.00
15	Speed limit reductions	-0.50

- The best performing options for sustainable growth is the **Southern Relief Road**. These options score well as they could provide the significant additional capacity whilst also allowing for reduced journey times along the A605. Analysis of ANPR data suggested that 20% of all traffic and 45% of HGV traffic could potentially utilise a Southern Relief Road which exceeds the 16% growth in future trips.

- Options that do not perform as well for this objective tend to be those focused on improving other modes such as active travel infrastructure and bus-based options. These options do not offer the potential to accommodate the predicted growth in trips as a result of new developments.

- Speed limit reductions scores poorly for this option as it may result in lower road capacity and throughput and could increase car journey times.

Theme analysis

Objective theme	Main objective	Sub-objective
Connectivity and access to opportunity	**2. Address the current transport network congestion and service constraints within Whittlesey to improve local and regional connectivity for all.**	2a. Increase the number of local and regional educational and employment opportunities accessible within 30 minutes for residents in Whittlesey.
		2b. Improve the integration of transport modes to provide viable sustainable travel options for all, leading to a 25% growth in public transport patronage.
		2c. Improve the resilience of the transport network within Whittlesey so that traffic speeds do not decrease by more than 25% during a road closure event along the A605.

Rank	Scheme	Connectivity and Access to Opportunity
1	Improved bus priority measures	0.50
1	Bus based Park and Ride	0.50
1	Increase highway capacity at junctions	0.50
1	New local circular bus or DRT service within Whittlesey	0.50
5	Southern Relief Road B (Green route alignment)	0.33
5	Southern Relief Road C (Black route alignment)	0.33
5	Southern Relief Road D (Yellow route alignment)	0.33
5	Raised road/causeway road to the north	0.33
5	Active travel infrastructure improvements	0.33
10	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.17
10	New and improved active travel road crossings of the A605	0.17
10	HGV rerouting	0.17
13	Southern Relief Road A (Blue route alignment)	0.00
13	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	0.00
15	Speed limit reductions	-0.17

- The best performing options for connectivity and access to opportunity are **bus-based options** as these provide benefits in accessing opportunities and are likely to result in increased public transport patronage. Increased highway capacity at junctions may also result in improved bus reliability as well as providing additional resilience and therefore also scores well.
- Whilst the relief road options score well against improving access to opportunities (2a) and improving the resilience of the network (2c), they do not score as well for supporting the integration of public transport and supporting the use of sustainable modes (2b), therefore the overall score against the main objective for connectivity is not as high.

Theme analysis

Objective theme	Main objective	Sub-objective
Health, wellbeing and sense of community	**3. Improve the health and wellbeing for all social groups along the A605 corridor through Whittlesey by reducing the impacts from poor air quality and poor road safety.**	3a. Improve health and wellbeing for all social groups along the corridor and ensure annual NO2 concentrations remain at, or below, current levels, despite growth in trips.
		3b. Improve the safety for the travelling public, with a 50% reduction in collisions involving pedestrians and cyclists within Whittlesey by 2030.
		3c. Enhance the public realm within Whittlesey so that it puts people first and promotes active lifestyles, improving public perceptions of Whittlesey town centre by 10%.

Rank	Scheme	Health, Wellbeing and Sense of Community
1	HGV rerouting	1.00
2	Bus based Park and Ride	0.83
2	New and improved active travel road crossings of the A605	0.83
2	Active travel infrastructure improvements	0.83
5	Southern Relief Road B (Green route alignment)	0.67
5	Southern Relief Road C (Black route alignment)	0.67
5	Southern Relief Road D (Yellow route alignment)	0.67
5	New local circular bus or DRT service within Whittlesey	0.67
9	Southern Relief Road A (Blue route alignment)	0.50
9	Improved bus priority measures	0.50
9	Speed limit reductions	0.50
12	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.33
12	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	0.33
14	Raised road/causeway road to the north	-0.50
15	Increase highway capacity at junctions	-1.00

- **HGV rerouting** is the best performing option for improved health wellbeing and sense of community.
- HGVs are large, loud and polluting and therefore rerouting these away from the centre of Whittlesey could see great improvements to public health and perceptions within Whittlesey.
- Highway options such as the relief road could result in traffic being taken away from Whittlesey, resulting in benefits along the A605. In comparison the raised road/causeway and increased highway capacity at junctions score very poorly as they could increase traffic levels, therefore contributing to increases in NO2 concentrations, reduced safety, and worse public perceptions of the town centre.

Theme analysis

Objective theme	Main objective	Sub-objective
Environment	1. Reduce the impact of traffic upon the historic environment of the town and contribute to wider reductions in carbon emissions.	4a. Reduce general through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.
		4b. Reduce HGV through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.
		4c. Reduce the carbon impact from transport emissions and limit the embedded carbon impact from the delivery of any solution.

Rank	Scheme	Environmental
1	HGV rerouting	0.39
2	Southern Relief Road B (Green route alignment)	0.33
2	Southern Relief Road C (Black route alignment)	0.33
2	Southern Relief Road D (Yellow route alignment)	0.33
5	Southern Relief Road A (Blue route alignment)	0.28
5	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.28
5	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	0.28
8	Improved bus priority measures	0.28
8	Bus based Park and Ride	0.28
10	New and improved active travel road crossings of the A605	0.11
10	Active travel infrastructure improvements	0.11
10	New local circular bus or DRT service within Whittlesey	0.11
13	Speed limit reductions	0.00
14	Increase highway capacity at junctions	-0.56
14	Raised road/causeway road to the north	-0.56

- The **rerouting of HGV traffic** is likely to reduce the level of HGV traffic through Whittlesey and therefore this option scores well. It is noted that emissions may increase elsewhere as HGVs undertake alternative (and potentially longer) routes and therefore this option does not score as well against carbon impact (4c).
- The three main **relief road options** also score well against the environment objective as these may contribute to the diversion of traffic away from the centre of Whittlesey. These options may have a high carbon impact (4c) however which reduces their overall performance against this objective.
- Options to provide increased highway capacity at junctions and a raised road score poorly as these could encourage additional tail-pipe emissions and may be carbon intensive to construct.
- Although active travel options may be thought to score well against an environmental objective, it is thought that these options may have no impact on general through traffic (4a) or HGV through traffic (4b).

Consideration of deliverability

- In providing an overall assessment of the long listed options, the case of Deliverability has also been considered.
- The results are included as a sensitivity test to consider what impact matters such as cost, land take, planning requirements, and environmental constraints may have on the overall scoring of the options and their feasibility to deliver.

Rank	Scheme	Sustainable Growth	Connectivity and Access to Opportunity	Health, Wellbeing and Sense of Community	Environmental	Deliverability	Total Score
1	HGV rerouting	0.50	0.17	1.00	0.39	0.50	0.51
2	New local circular bus or DRT service within Whittlesey	0.50	0.50	0.67	0.11	0.67	0.49
3	Active travel infrastructure improvements	0.25	0.33	0.83	0.11	0.56	0.42
4	Bus based Park and Ride	0.50	0.50	0.83	0.28	-0.25	0.37
5	Improved bus priority measures	0.50	0.50	0.50	0.28	-0.06	0.34
6	Southern Relief Road C (Black route alignment)	1.00	0.33	0.67	0.33	-0.64	0.34
7	Southern Relief Road D (Yellow route alignment)	1.00	0.33	0.67	0.33	-0.67	0.33
8	Southern Relief Road B (Green route alignment)	1.00	0.33	0.67	0.33	-0.72	0.32
9	New and improved active travel road crossings of the A605	0.00	0.17	0.83	0.11	0.42	0.31
10	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.75	0.17	0.33	0.28	-0.61	0.18
11	Southern Relief Road A (Blue route alignment)	0.50	0.00	0.50	0.28	-0.58	0.14
12	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	0.50	0.00	0.33	0.28	-0.64	0.09
13	Speed limit reductions	-0.50	-0.17	0.50	0.00	0.58	0.08
14	Increase highway capacity at junctions	0.50	0.50	-1.00	-0.56	-0.22	-0.16
15	Raised road/causeway road to the north	0.50	0.33	-0.50	-0.56	-0.78	-0.20

Theme analysis

Criteria		
Deliverability	a. Cost	d. Buildability
	b. Delivery timescales	e. Planning requirements
	c. Land requirements	f. Environmental constraints

Rank	Scheme	Deliverability
1	New local circular bus or DRT service within Whittlesey	0.67
2	Speed limit reductions	0.58
3	Active travel infrastructure improvements	0.56
4	HGV rerouting	0.50
5	New and improved active travel road crossings of the A605	0.42
6	Improved bus priority measures	-0.06
7	Increase highway capacity at junctions	-0.22
8	Bus based Park and Ride	-0.25
9	Southern Relief Road A (Blue route alignment)	-0.58
10	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	-0.61
11	Southern Relief Road C (Black route alignment)	-0.64
11	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	-0.64
13	Southern Relief Road D (Yellow route alignment)	-0.67
14	Southern Relief Road B (Green route alignment)	-0.72
15	Raised road/causeway road to the north	-0.78

- **Localised Public Transport, speed limit reductions, Active Travel Infrastructure and HGV rerouting** all score well due to their potential for quicker implementation times, lower costs and limited land acquisition requirements.
- Although HGV rerouting scores relatively well, it would be difficult to deliver this option without significantly affecting businesses in Whittlesey as there are no real viable alternative routes currently serving the industrial estates to the west or south of the town.
- Larger scale interventions, such as a relief road and causeway, score poorly for deliverability due to high assumed costs, land requirements and complexity of their construction.
- Of the relief road options, the black route is deemed the most deliverable.

Packaging options to enhance outcomes

- The options assessment shows that **no single option delivers strongly against all of the objectives**, with the better performing options each having specific areas of strength and weakness.
- By packaging the better performing options that complement each other across the themed objectives, the overall outcomes from investment can potentially be improved.

Scheme	Sustainable Growth	Connectivity and Access to Opportunity	Health, Wellbeing and Sense of Community	Environmental	Total Score
Southern Relief Road	1.00	0.33	0.67	0.33	0.58
Bus based Park and Ride	0.50	0.50	0.83	0.28	0.53
HGV rerouting	0.50	0.17	1.00	0.39	0.51
Improved bus priority measures	0.50	0.50	0.50	0.28	0.44
New local circular bus or DRT service within Whittlesey	0.50	0.50	0.67	0.11	0.44
Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	0.75	0.17	0.33	0.28	0.38
Active travel infrastructure improvements	0.25	0.33	0.83	0.11	0.38

Packaging options to enhance outcomes

- The **Southern Relief Road** may achieve the sustainable growth ambition but performs less strongly across the other three themes. **HGV rerouting** scores higher against Health, Wellbeing and Sense of Community, as well as the Environmental themed objective, but there are challenges with the viability of the option without a clear alternative route for HGV traffic.
  - Combining these two options helps to strengthen overall outcomes.

- The delivery of a **relief road** would also release road capacity to enable complementary public transport improvements, such as improved **bus priority**, and/or **active travel infrastructure** enhancements.
  - By packing these measures together, the overall scheme outcomes would improve in relation to Connectivity and Access to Opportunity, as well as Enhanced Health, Wellbeing and a Sense of Community and improved Environmental conditions for the town.

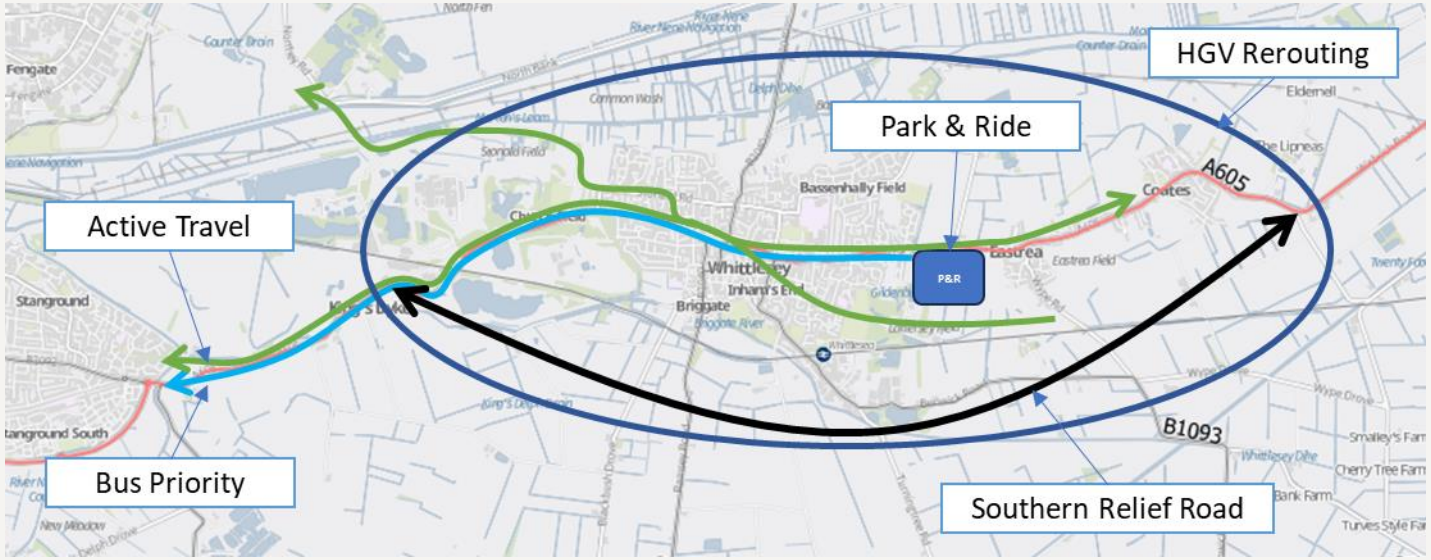
- For the purpose of packaging, the best performing relief road route alignment (Black route) is proposed to be taken forward. Further investigation of exact routing options will take place at later stages of the scheme development process.

Section 3: Emerging Short Listed Options

Emerging short listed options

For progression to concept design, more detailed appraisal and consultation:

1. **Option 1** - Relief road (black route alignment) including HGV re-routing
2. **Option 2** - Relief road (black route alignment) including HGV re-routing and bus improvements
3. **Option 3** - Relief road (black route alignment) including HGV re-routing and active travel improvements
4. **Option 4** - Bus based Park & Ride



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Section 4: Next Steps

Next Steps

Following the completion of the long listing stage, and Project Board approval, the following activities will be undertaken:

- **Concept designs** – for each of the short listed options a high level concept design will be produced.
- **Economic appraisal** – each option will be tested using the available modelling and appraisal tools to undertake a high level economic appraisal to understand performance of each option and their likely value for money.
- **High level costings** – building off the concept designs, high level cost estimates for each option will be produced.
- **Public consultation** – drawing together the outputs from above, the concept designs for the short listed options will be presented to members of the public for consultation.

Appendicies

Appendix A: Full list of initial long listed options

Option no.	Option	Description
1	Northern Relief Road (Red route alignment)	Relief road to the north of Whittlesey between Ralph Butcher Causeway and A605 March Road, east of Coates.
2	Southern Relief Road A (Blue route alignment)	Relief road to the south of Whittlesey between Ralph Butcher Causeway and B1093, near Whittlesea Station, linking to industrial areas.
3	Southern Relief Road B (Green route alignment)	Relief road to the south of Whittlesey between Ralph Butcher Causeway and A605 Eastrea Road, west of Eastrea.
4	Southern Relief Road C (Black route alignment)	Relief road to the south of Whittlesey between Ralph Butcher Causeway and A605 March Road, east of Coates.
5	Southern Relief Road D (Yellow route alignment)	Relief road to the south of Whittlesey between A605 Whittlesey Road at Cardea Morrisons roundabout and A605 March Road, east of Coates.
6	Southern Relief Road E (involving upgrade of roads to south east and new relief road to the west)	Upgrade of existing roads to the south east (e.g. B1093) and construction of new relief road linking these to the A605 west of Whittlesey.
7	Southern Relief Road F (involving upgrade of roads to south west and new relief road to the east)	Upgrade of existing roads to the south west (e.g. Ramsey Road and B1040) and construction of new relief road linking these to the A605 east of Whittlesey.
8	Clean air zone	Introduction of a cordon with charges for vehicles entering that do not meet emissions standards.
9	Congestion charging	Introduction of a cordon with charges for vehicles entering at certain times of the day.
10	Parking charging	Introduction of car parking charges at Fenland District Council car parks within Whittlesey Town Centre.
11	Parking management	Altering the number or location of parking spaces within Whittlesey
12	HGV weight restrictions	Introduction of additional weight restrictions to manage where HGVs can travel within the town.
13	HGV time restrictions	Introduction of time restrictions to manage when HGVs can travel within the town.
14	Removing traffic generators	Removing traffic generators such as industrial sites from the town to reduce the traffic accessing these.
15	Local circular bus	Circular bus route within Whittlesey, providing connection between Whittlesea Station, town centre, employment sites and residential areas.
16	Demand Responsive Transport (DRT)	Introduction of DRT to provide on-demand public transport service for residents to travel within Whittlesey.
17	Improved bus service frequency	Increasing frequency of bus services in Whittlesey.
18	Improved rail service frequency	Increasing frequency of trains serving Whittlesey.
19	Improved bus priority measures	Improving the attractiveness of bus services within Whittlesey through the introduction of bus priority measures along the A605, helping to improve journey time reliability and speeds.

Appendix A: Full list of initial long listed options

Option no.	Option	Description
20	Bus based Park and Ride	Park and Ride site to the east of Whittlesey, providing parking provision for car journeys from the east (Eastrea/Coates/March) with direct bus service into Whittlesey and Peterborough.
21	Promoting Whittlesea Station as a parkway station	Improved car parking provision at Whittlesea Station and promoting use as an option to Park and Ride. Including connection route (e.g. upgrading route between A605 and New Road via Aqua Park).
22	Shared use path along A605 in Whittlesey town centre	Shared use path along A605 in Whittlesey town centre to provide East-West connectivity and better link NCN 63 through the town.
23	Improvements to NCN Route 63 through Whittlesey	Upgrades to the existing NCN Route 63 within Whittlesey to improve attractiveness, wayfinding and accessibility.
24	Improved active travel connections to the station	Active travel improvements along Station Road to improve access and connectivity between Whittlesey town centre and the station.
25	Shared use path along A605 between Whittlesey, Coates and Eastrea	Shared use path along A605 between Whittlesey, Coates and Eastrea to provide better East-West connectivity.
26	PRoW Improvements	Improvement to the Public Rights of Way along the rivers to the south of Whittlesey.
27	New river bridges	Additional bridges across the rivers to the south of Whittlesey to reduce severance for pedestrians and cyclists.
28	New and improved active travel road crossings of the A605	Additional signalised crossing points of the A605 to reduce severance for pedestrians and cyclists.
29	Speed limits	Reduce speed limits along the A605 to improve safety for road users.
30	Increase highway capacity within Whittlesey	Upgrade of existing roads within Whittlesey to increase highway capacity.
31	Increase junction capacity	Increase capacity of the main junctions through Whittlesey on the A605 (e.g. through roundabout signalisation).
32	Level crossing improvements	Improvements/removal of the level crossing near Whittlesea Station to improve the operation of the highway.
33	Raised road/causeway road to the north	Construction of a raised road/causeway along existing B1040 road to limit impact of flood events.
34	Improved signage	Signage/wayfinding to encourage use of A47 over A605.
35	Improvements to the A47	Increasing resilience of A47 to reduce level of closures that may impact A605, and so people choose the A47 as preferred route over the A605.

Appendix B: Grouping of similar options

Option no.	Grouped option	Description	Options formed from
20	Bus based Park and Ride	Park and Ride site to the east of Whittlesey, providing parking provision for car journeys from the east (Eastrea/Coates/March) with direct bus service into Whittlesey and Peterborough.	10 / 11 / 20
36	Active travel infrastructure improvements	Improvements to the active travel infrastructure within Whittlesey to improve connectivity (e.g. shared-use paths; footway improvements; cycleways).	22 / 23 / 24 / 25 / 26
37	HGV restrictions	Restrictions on HGV travel within Whittlesey to limit the impact on the network. (e.g. time/weight restrictions).	12 / 13
38	New local circular bus or DRT service within Whittlesey	Introduction of a local circular bus route within Whittlesey, providing connection between key locations. This includes the potential for the service to be demand-responsive.	15 / 16

Appendix C: Pre-sift - discounted options

Option no.	Option	Reason for sifting out
1	Northern Relief Road (Red line route alignment)	There are significant environmental constraints to the north of Whittlesey such as the Whittlesey (Nene) Washes that would likely result in significant opposition to any scheme as well as high costs and negative environmental impacts.
8	Clean air zone	Discount as option is unlikely to be deliverable on a small scale. Air quality also not currently an issue to such an extent that it would warrant this.
9	Congestion charging	Discounted as option is unlikely to be deliverable due to small scale.
10	Parking charging	Discounted as similar to option 11 (parking management)
11	Parking management	Discounted as parking management included within option 20 (bus-based park and ride). This could include parking charges; a reduction in parking spaces and/or relocation of parking to the outskirts of the town centre instead.
12	HGV weight restrictions	Consolidated with HGV time restrictions (see Option 37).
13	HGV time restrictions	Consolidated with HGV weight restrictions (see Option 37).
14	Removing traffic generators	Removing traffic generators from Whittlesey would impact the town greatly. This is not in the Fenland Local Plan and would require significant changes to existing planning documents.
15	Local circular bus	Option has been consolidated with Option 16 for the Initial Sift (see Option 38).
16	Demand Responsive Transport (DRT)	Option has been consolidated with Option 15 for the Initial Sift (see Option 38).
17	Improved bus service frequency	Service frequency is within control of bus operators and therefore this is likely out of scope.
18	Improved rail service frequency	Rail frequency is out of scope. Would require wider changes to the network such as the Ely Capacity Enhancements.
21	Promoting Whittlesea Station as a parkway station	Separate to this scheme, FDC have received funding from CPCA to deliver £3m pound improvements to Whittlesea Station as part of the Whittlesea Station Enhancement Programme.

Appendix C: Pre-sift - discounted options

Option no.	Option	Reason for sifting out
22	Shared use path along A605 in Whittlesey town centre	Due to high similarity between options and for simplicity purposes, active travel infrastructure improvements have been grouped for the initial sift. (See option 36)
23	Improvements to NCN Route 63 through Whittlesey	Due to high similarity between options and for simplicity purposes, active travel infrastructure improvements have been grouped for the initial sift. (See option 36)
24	Improved active travel connections to the station	Due to high similarity between options and for simplicity purposes, active travel infrastructure improvements have been grouped for the initial sift. (See option 36)
25	Shared use path along A605 between Whittlesey, Coates and Eastrea	Due to high similarity between options and for simplicity purposes, active travel infrastructure improvements have been grouped for the initial sift. (See option 36)
26	PRoW Improvements	Due to high similarity between options and for simplicity purposes, active travel infrastructure improvements have been grouped for the initial sift. (See option 36)
27	New river bridges	Option would have a high cost and low impact. Location of the river to the south of Whittlesey means benefits would be limited
30	Increase highway capacity by widening the A605 within Whittlesey	Significant construction would be required, including potential demolition of houses which was determined to be unfeasible and have large impact on local character.
32	Level crossing improvements	As this is within Network Rail ownership, any changes would be in their remit, therefore out of scope for this project. Separate to this scheme, FDC have received funding from CPCA to deliver £3m pound improvements to Whittlesea Station as part of the Whittlesea Station Enhancement Programme.
34	Improved signage	This would have limited impact in achieving objectives on its own.
35	Improvements to the A47	As this is within National Highways operations, any changes would be in their remit, therefore out of scope for this project.

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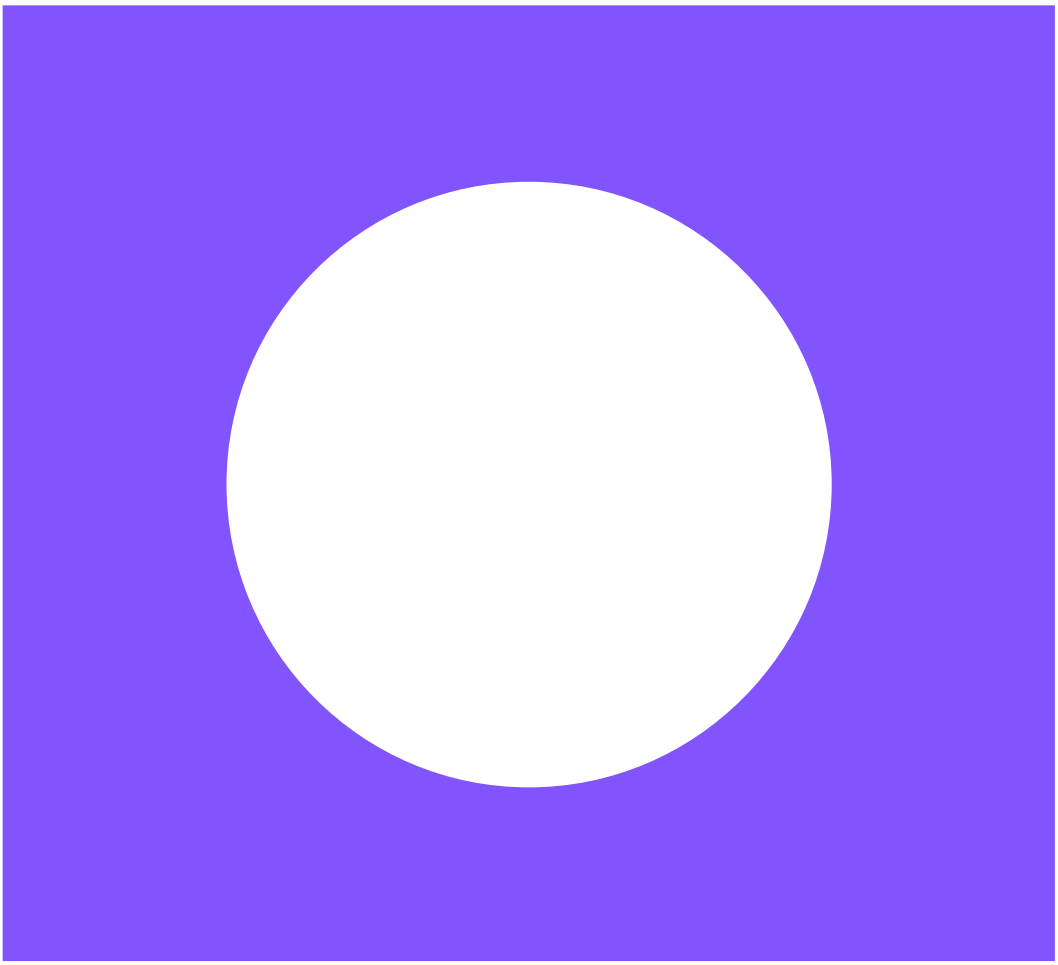

Whittlesey Relief Road

Appraisal Specification Report

August 2024

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Whittlesey Relief Road

Appraisal Specification Report

August 2024

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1 Introduction

This Appraisal Specification Report (ASR) has been prepared to accompany the Strategic Outline Business Case (SOC) for the Whittlesey Relief Road Scheme, hereafter referred to as 'the Scheme'. This ASR summarises the appraisal approach that will be adopted for the SOC to appraise the shortlisted options.

1.1 Purpose of the Appraisal Specification Report

This ASR forms part of the Transport Appraisal process as defined by the Department for Transport (DfT) in the Transport Analysis Guidance (TAG): The Transport Appraisal Process (May 2018), and the Cambridgeshire and Peterborough Combined Authority Single Assurance Framework (2023). In line with this guidance, this ASR sets out the:

- Proposed approach to demand forecasting; and,
- Proposed methodology for appraising impacts as presented in the Appraisal Summary Table (AST).

Included as part of this ASR is the Appraisal Specification Summary Table (ASST) (Appendix A) which summarises the proposed methodology for appraisal against each of the impacts that will be reported in the final AST and presented within the Economic Dimension of the SOC.

This ASR is reflective of the current appraisal approach adopted for the Scheme as part of the development of the SOC. This ASR will be reviewed and updated to capture any changes in the appraisal approach should reason to revisit the approach arise. For example, if there are changes to the proposed interventions, or if more appropriate alternative appraisal methods are identified, or if new guidance is published. Where any changes are proposed, these will be agreed with Fenland District Council (FDC) and the Cambridgeshire and Peterborough Combined Authority (CPCA).

1.2 Document structure

Following this introductory section, the report continues to discuss:

- Section 2: Scheme Background
- Section 3: Demand Forecasting Approach
- Section 4: Appraisal Approach

2 Scheme Background

Previous studies examining the issues within the town of Whittlesey have identified growing pressures from the growth in new housing and employment sites within and around the town. In particular the issues arising from traffic on the historic nature of the town, its people, and how this is leading to constraints on growth and the benefits of this growth being felt by residents and businesses.

The idea for a relief road as a solution that could help alleviate traffic in the town, in particular heavy goods vehicles, has been around for a number of years. However, whilst the background to this scheme is based on the concept that a relief road could be delivered; it has been highlighted by the Cambridgeshire and Peterborough Combined Authority (CPCA), Cambridgeshire County Council (CCC), and the Fenland District Council (FDC) that there is still a need to fully explore the issues and opportunities underpinning the concept of a relief road, and to explore more widely if there are other solutions that should be considered.

As such, an SOC is being developed to present the case for the Scheme and set out options that have been identified and considered, that could meet the needs of Whittlesey.

2.1 Geographic scope

The location context Whittlesey is shown in Figure 2.1, with the extent of the corridor under consideration extending from the east of Peterborough where the A605 meets the Cardea roundabout, to the east of the village of Coates.

Figure 2.1: Location of Whittlesey

2.2 Strategic context

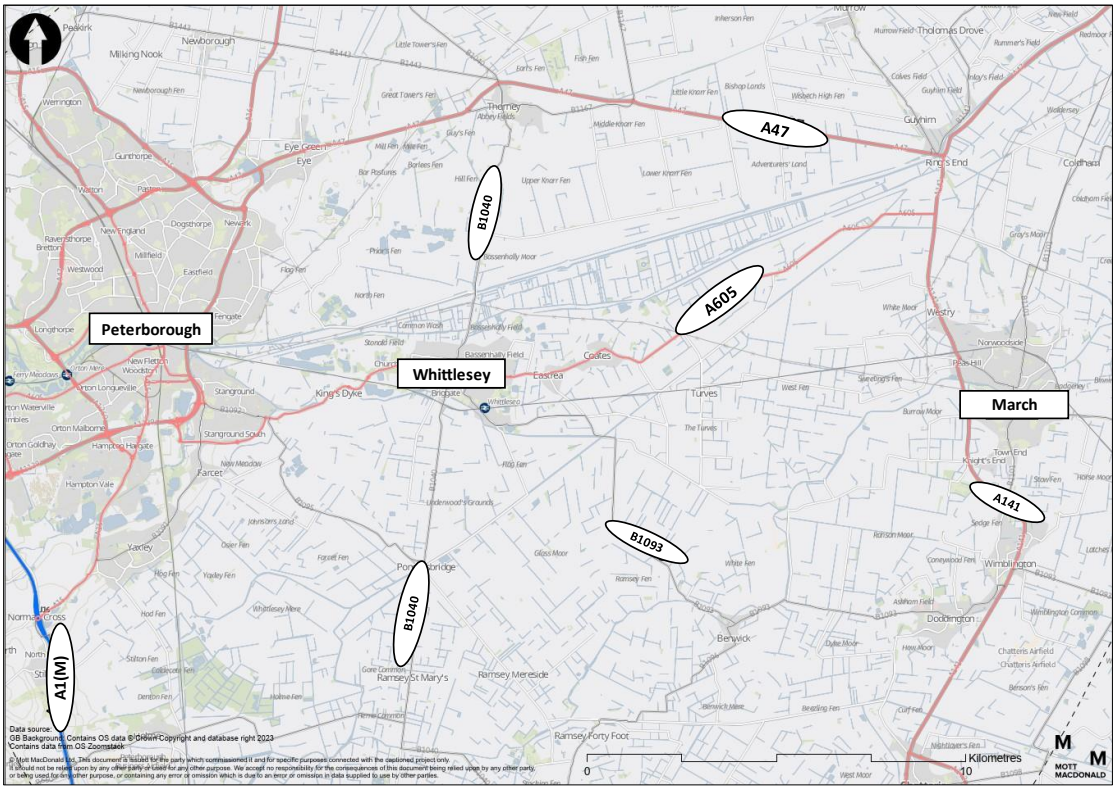
Whittlesey is a historic market town with an approximate population of 18,000 and is situated in Fenland to the east of Peterborough. The town has a rich heritage and culture, with a long-established history, even being mentioned in Anglo-Saxon documents that precede the Domesday Book. The town has many historical features at its heart, such as the 17th Century Buttercross, and Mud Walls dotted across the town that date back 200 years.

With its historic nature and many historic buildings and narrow streets, the town has a distinctive and attractive offer to those who live there, and those who choose to travel there for work and leisure opportunities. However, these same features that make the town attractive, also create some impacts that are less conducive with modern day living, particularly in relation to access and transport.

To the east there are the Fenland market towns of March and Wisbech, with the smaller villages of Coates, Eastrea, Pondersbridge and Turves situated in the area immediately surrounding Whittlesey. A lot of the surrounding area to the town is farmland, although closer to the edges of the town are substantial industrial areas. To the north lies the Fenland washes, which act as a natural flood water storage area.

The A47 and A605 are the most significant links between Peterborough and the Fenlands area, with the latter passing directly through Whittlesey. The B1040 is the main north-south route through the town, connecting to the A605 at one of the key town centre junctions, whilst the B1093 provides further connections to the southeast.

Figure 2.2: Whittlesey road network



Sourcehe town benefits from its proximity to Peterborough, which lies approximately 8km to the west. This is reflected in the Cambridgeshire and Peterborough Independent Economic Review (CPIER) 2018 which recognised that Whittlesey is considered much more a part of the Greater Peterborough economic geography, compared to the rest of Fenland. This creates opportunities

for residents to work, study, and shop in Peterborough, whilst still maintaining a proudly independent identity and distinct local culture.

Whittlesey can offer the 'best of both worlds' to current and future residents: the sense of community, calm and proximity to the countryside offered by a market town, alongside the benefits of being situated so close to a bustling and vibrant city, with everything that it has to offer. A key focus for the town is how it can further benefit from that connection, while also offering something distinct as a place to visit and spend time.

2.3 Case for change

2.3.1 The current situation

- Whittlesey sits on the A605 which is one of the key routes for east-west traffic between Peterborough and the Fenland market towns. Whilst the A47 to the north of the town offers an alternative route, it is not necessarily always more convenient, and itself can suffer from congestion, leading to traffic travelling across the region choosing to travel along the A605 and through Whittlesey.
- Car trips dominate travel within Whittlesey with 75% of all traffic along the A650 through the town being made up of cars[1]. Whilst there are local schools, shops and health centres within the town, there are also significantly larger trip attractors outside of the town in places such as Peterborough that induce trips. These are not well connected by alternative modes to private vehicles, with limited rail (12 trains per day to Peterborough) and bus services (14 per day to Peterborough) serving the town.

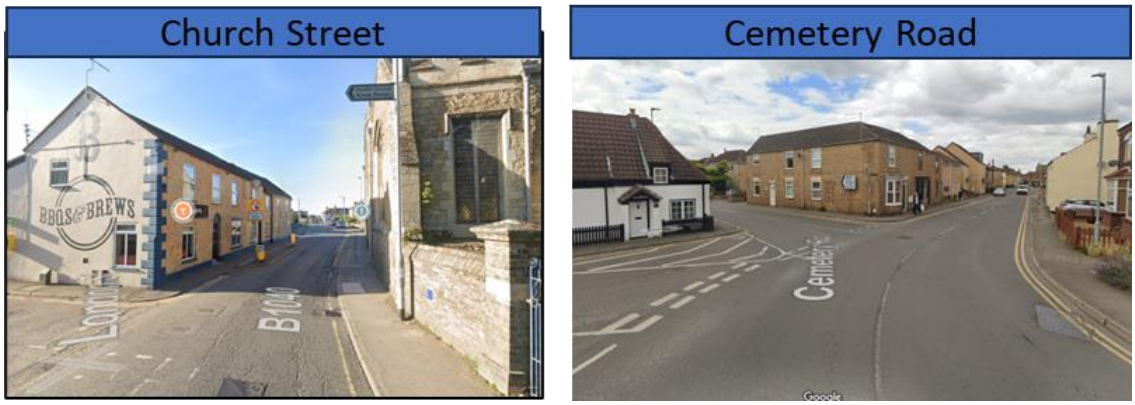
Photo 2.1: A605 / B1040 Junction

Source: Mott MacDonald – Site Visit October 2023

[1] CCC - Traffic Monitoring Report (2021)

- As well as vehicle trips originating from the town, around 40% of general highway traffic is recorded as passing through and not stopping during AM Peak[2]. For Heavy Goods Vehicles (HGVs) this is even greater, with 68% of HGVs not stopping in the centre itself[3].
- The cause for the HGV movements is due to there being a number of large industrial employment sites located around the town, as well as the fact that the A605 forming part of the National Highways diversion route, therefore being a key route for freight, with few restrictions.
- A key issue with the traffic moving along the A605 through Whittlesey, is that the road network in the town is not best suited to the high level of car and HGV movements. The images below show the types of roads that HGVs transverse through the town.

Photo 2.2: Street view of Church Street and Cemetery Road



Source: Google Street View

- The A605 segregates the town, and does not contribute to the sense of place, the historic environment and market town identify, which is so important for a market town such as Whittlesey.
- Further to this, the negative impact of this traffic can be seen whereby the clusters of collisions at key junctions in the town, in particular at the A605/B1040 junction, which has seen 1 fatal pedestrian accident in past 5 years, and 3 serious accidents involving cyclists[4].
- Road closures are also an issue on the wider network, that impact the A605, including on the A47 when there are road traffic accidents, and the B1040 when there are flooding events. These are reported as contributing to higher levels of traffic diverting through the town further contributing to the negative impacts associated with traffic.

2.3.2 The future situation

Considering the current issues, it is important to examine the future situation, and ask the question how the town of Whittlesey may be impacted. The key points to highlight that will impact on the future situation are as follows:

- There is large growth planned within the region during the next decade. This includes 5,550 new houses and 212ha of new employment to the east of Whittlesey, and 875 new houses and 31ha of new employment planned for the town itself.[5]

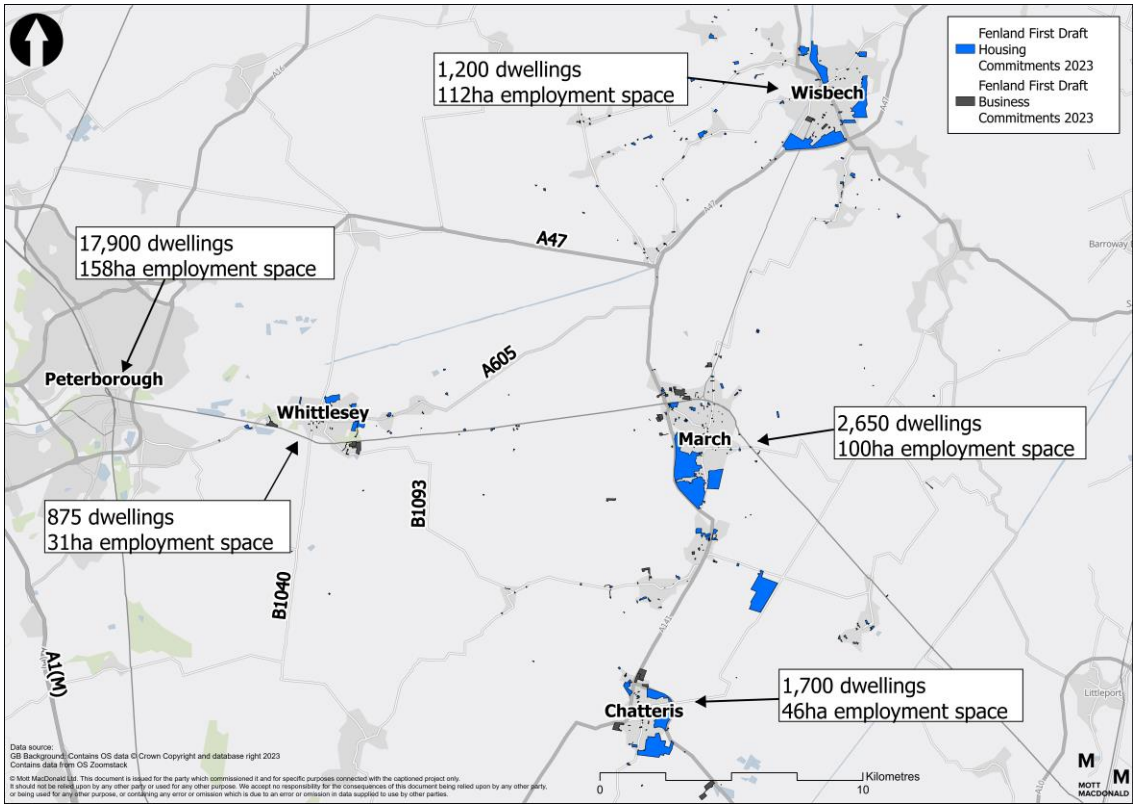
[2] Automatic Number Plate Recognition (ANPR) Surveys (November/December 2023)

[3] ANPR Surveys (November/December 2023)

[4] CCC - Road traffic collision records in Whittlesey (January 2017 – August 2023)

[5] FDC Draft Local Plan

Figure 2.3: Housing and employment plans (2023)



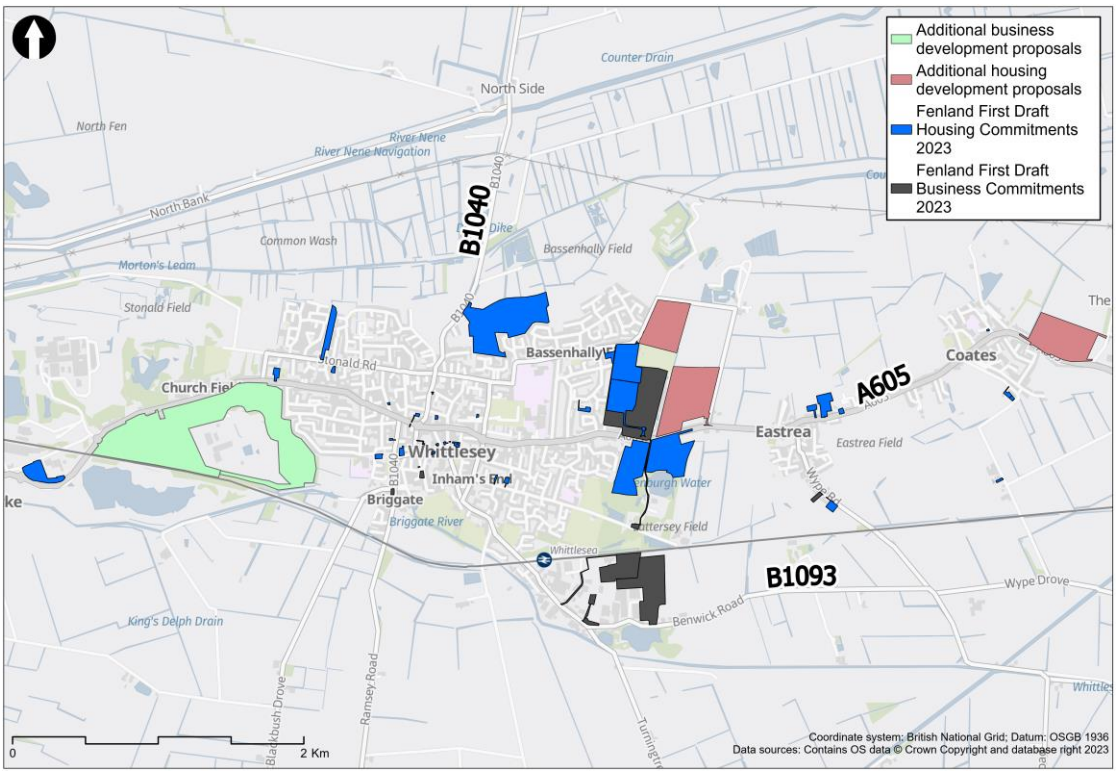
Source: FDC Draft Local Plan; Peterborough Local Plan* (*Includes City centre and urban area allocations only)

- Fenland's population is forecast to grow by 16% by 2040.[6] This growth is likely to exacerbate known issues on the transport network due to scale and the location of proposed development, which is primarily located to the east of town, furthest from Peterborough which is a key destination for trips.
- Whilst there is currently a high proportion of people aged 65+, the growth in new housing and employment sites offer great opportunities for employment and for younger families to relocated to the town. This is likely to result in a change in local demographics, and whilst this will contribute to the economic growth of the local area, this expected growth in Whittlesey and the surrounding area will place more strain on the local transport system.
- Key junctions along the A605 through Whittlesey are currently reaching capacity and are unlikely to cope with significant further growth of vehicle trips. Previous studies have identified capacity issues at the A605/B1040 roundabout. A Transport Assessment written to accompany a commercial planning application in 2020 forecasted that the junction is already over capacity in the 2020 baseline model and would exceed capacity in the 2025 and 2030 future years. The assessment forecast an increase in delays from 47.57s to 246.23s between 2020 and 2025 along the A605 Syers Lane during the AM peak, with delays worsening and the junction also operating over capacity along A605 Syers Lane and B1040 Broad Lane during the PM peak[7]. These delays would likely lead to larger queues and more congestion in the centre of Whittlesey.
- Whilst air quality as a result of traffic is not a significant issue at present, air quality could worsen if future growth in the demand for travel from / to and through the town increases, and the dependency on private vehicles as the main mode of transport persists.

[6] ONS - Population projections for local authorities: Table 2 - Office for National Statistics

[7] F/YR20/0357/O Planning Application – Churchfields Farm Transport Assessment - Traffic modelling for the A605/B1040 Orchard Street/Broad Street roundabout (WSP/Kings Dyke Business Park Ltd 2020)

Figure 2.4: Whittlesey housing and employment commitments (2023)



Source: FDC Draft Local Plan

2.3.3 Scheme objectives

Taking into account the current issues and the future situation, a set of scheme objectives have been established. The objectives also reflect current policy and strategy at a national, regional and local level, and will guide the solution and option selection, so that the option short list is targeted towards meeting the needs of Whittlesey and the surrounding area.

The Scheme objectives that have been established to provide the overarching direction of the scheme are set out in Table 2.1.

Table 2.1: Scheme objectives

Objective Theme	Main Objective
1. Sustainable Growth:	Enable the transport network in Whittlesey to have sufficient capacity to support planned economic development and population growth in a sustainable manner.
2. Connectivity and access to opportunity:	Address the current transport network congestion and service constraints within Whittlesey to improve local and regional connectivity for all.
3. Health, wellbeing and sense of community:	Improve the health and wellbeing for all social groups along the A605 corridor through Whittlesey by reducing the impacts from poor air quality and poor road safety.
4. Environment:	Reduce the impact of traffic upon the historic environment of the town and contribute to wider reductions in carbon emissions.

For each scheme objective a series of measurable sub-objectives have been identified that inform the assessment criteria used to test the options and identify the best performing solution. These are set out in Table 2.2.

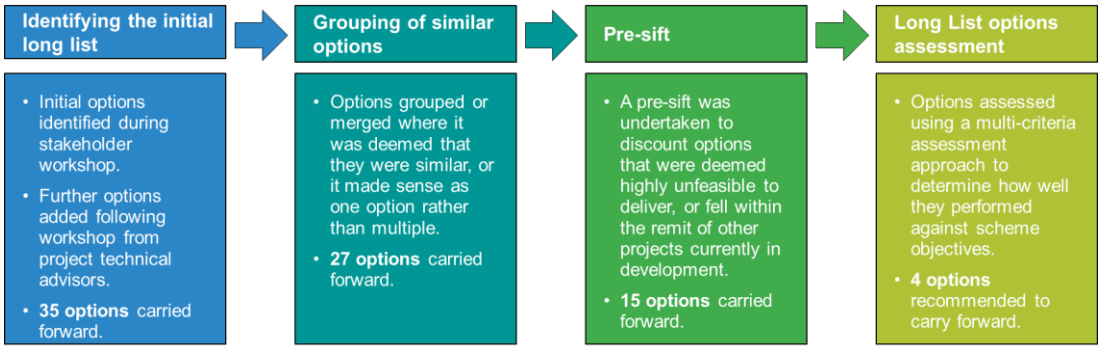
Table 2.2: Scheme measurable sub-objectives

Main objective theme	Sub-objective
1. Sustainable Growth:	1a. Provide additional transport capacity to accommodate 16% growth in future trips in Whittlesey.
	1b. Reduce the average car journey time in the peak periods by 10% for journeys along the A605 through Whittlesey.
2. Connectivity and access to opportunity:	2a. Increase the number of local and regional educational and employment opportunities accessible within 30 minutes for residents in Whittlesey.
	2b. Improve the integration of transport modes to provide viable sustainable travel options for all, leading to a 25% growth in public transport patronage.
	2c. Improve the resilience of the transport network within Whittlesey so that traffic speeds do not decrease by more than 25% during a road closure event along the A605.
3. Health, wellbeing and sense of community:	3a. Improve health and wellbeing for all social groups along the corridor and ensure annual NO2 concentrations remain at, or below, current levels, despite growth in trips.
	3b. Improve the safety for the travelling public, with a 50% reduction in collisions involving pedestrians and cyclists within Whittlesey by 2030.
	3c. Enhance the public realm within Whittlesey so that it puts people first and promotes active lifestyles, improving public perceptions of Whittlesey town centre by 10%.
4. Environment	4a. Reduce general through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.
	4b. Reduce HGV through traffic by 15% to ensure the natural, historic and built environment of Whittlesey is protected and enhanced.
	4c. Reduce the carbon impact from transport emissions and limit the embedded carbon impact from the delivery of any solution.

2.4 The options

The process for identifying and assessing the long listed options is set out in the Long List Options Assessment Report (Appendix B). In summary this captures how the Scheme identified a long list of potential options through stakeholder engagement, and with advisory input. These options were sifted before an assessment against the sub-objectives was carried out using a multi-criteria scoring approach. Figure 2.5 summarises the steps taken to arrive at a shortlist of four options.

Figure 2.5: Long list options identification and assessment process



Source: Mott MacDonald

The results of the long list options assessment outputs suggest that no single option is likely to deliver strongly against all Scheme objectives. Therefore, the conclusion of the long listing stage was that by packaging options together, where they complement each other across the themed objectives, the overall Scheme objectives could be met. The final four short listed options therefore reflect this packaging approach.

These options were progressed to concept design and will be subject of more detailed appraisal and public consultation. The options include:

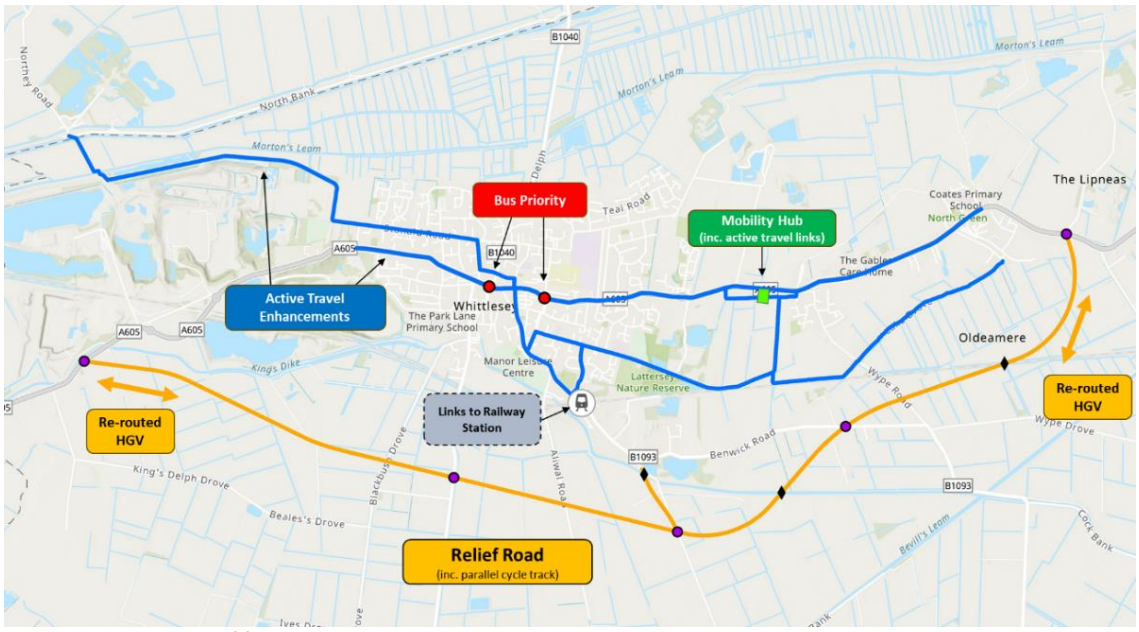
Option 1 - Relief road (black route alignment) including HGV re-routing.

Option 2 - Relief road (black route alignment) including HGV re-routing and bus improvements.

Option 3 - Relief road (black route alignment) including HGV re-routing and active travel improvements.

Option 4 - Bus based travel hub with active travel links.

Figure 2.6: Shortlisted options

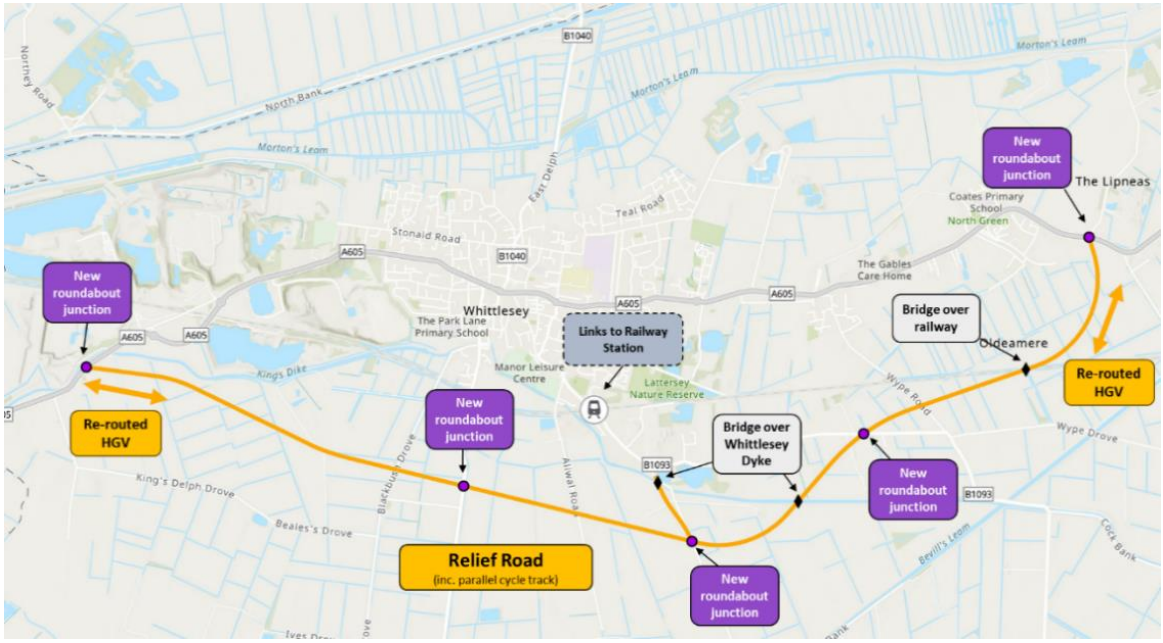


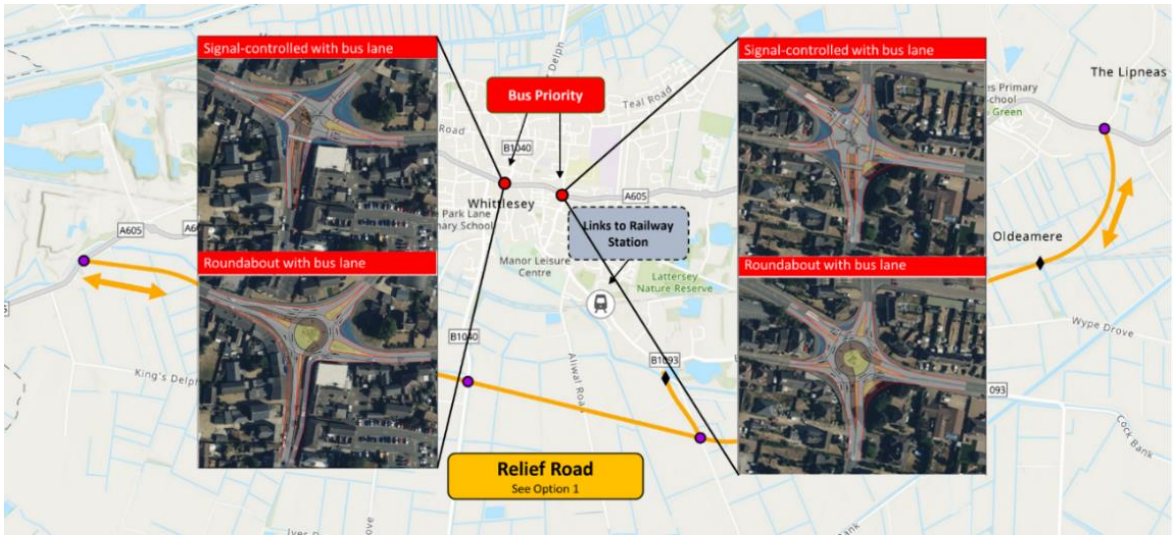
Source: Mott MacDonald

2.4.1 Option descriptions

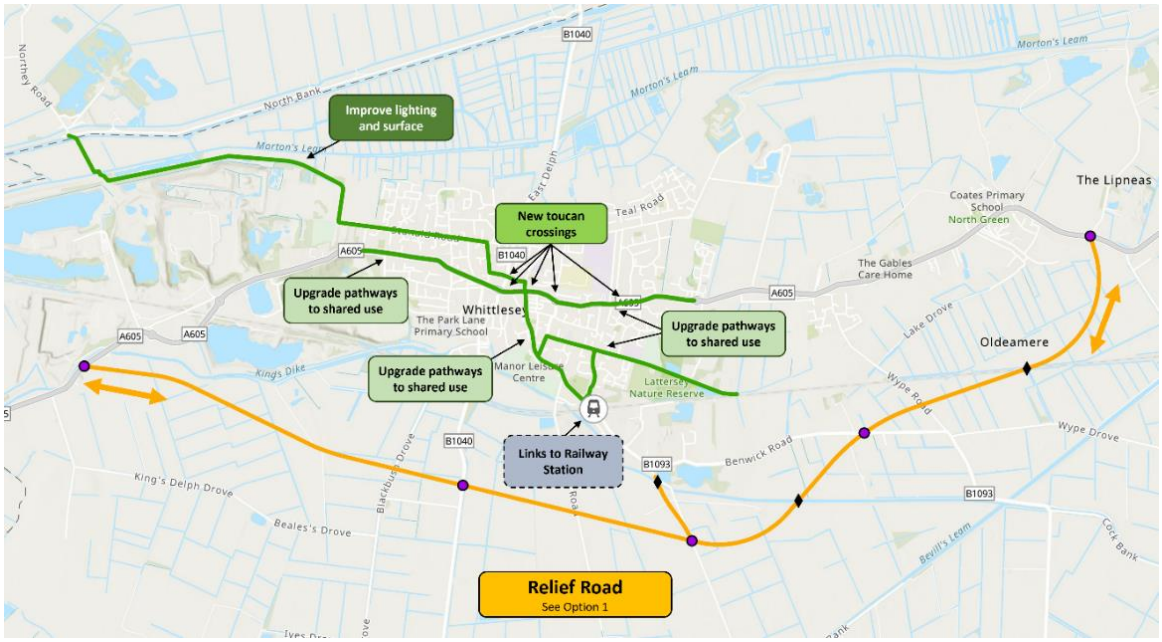
Each of the four options are described in more detail below in Table 2.3**.**

Table 2.3: Shortlist option descriptions

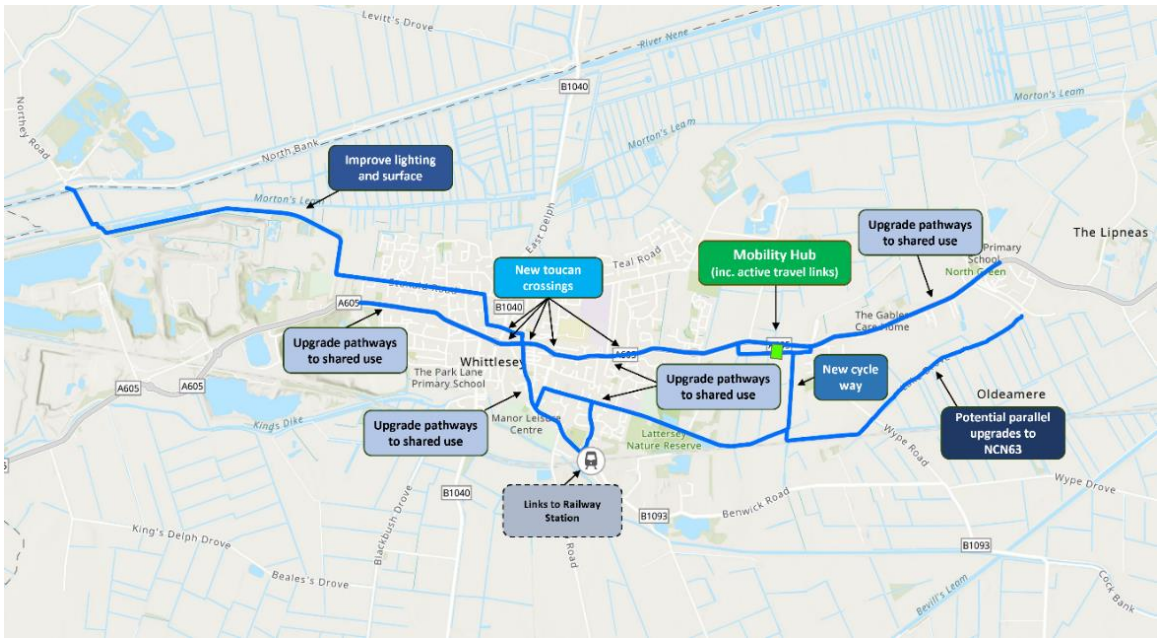
Option	Description
Option 1 – Relief Road with HGV re-routing	A new single carriageway road running to the south of Whittlesey town centre, that includes a parallel cycle track. Coming from the west of the town, the new road would divert from the A605 to the south of King's Dyke, running across fields to link into Turningtree Road, to the south of Station Road, enabling access to Whittlesea railway station. The road would then continue to the east, crossing over Whittlesey Dyke and the railway line, before connecting back into the A605 at Wisbech Road. The road would include junctions at key intersects with roads connecting into Whittlesey, including the B1093 Turningtree Road to allow access to the railway station and industrial sites to the south of the town, and Wype Road to allow access to Eastrea.
	
Option 2 – Relief Road with HGV re-routing and bus priority improvements	As with Option 1, but to also include the introduction of new bus priority measures through the town and along the A605 to Peterborough. Measures will be introduced at the junctions between A605 and B1040, and the A605 and B1093, that will provide priority for buses accessing these roundabouts. This could be in the form of either enhancing the current roundabouts to provide a bus lane through them, or through the introduction of signal-controlled junctions that would allow for buses to be given priority. Enhanced pedestrian crossing facilities are also introduced in the form of either islands or traffic lights. This option could see a downgrade in road space for cars at these junctions to provide bus priority.



Option 3 – Relief Road with HGV re-routing and active travel improvements	As with Option 1, but to also include the introduction of new active travel improvements through the town and along the A605. This will include segregated active travel provision where possible along the A605 through the town, including enhanced junctions with greater priority for active travel to allow for safe and seamless connections across the town, and the A605. Improvements will be made to National Cycle Network route 63 through the town, from the northwest outskirts of the town to Lattersey Nature Reserve. This will also include an improved cycle link to the station along Station Road from the A605, New Road, and Hawthorne Drive.



Option 4 – Mobility Hub with active travel improvements	A new Mobility Hub located to the east of the town which can improve access to existing bus services and enable the introduction of shuttle bus type express services linking into the town centre, Whittlesea station, and Peterborough. To include improved active travel provision from across the town to both the Mobility Hub and Whittlesea station to encourage local trips to access bus and rail services without the use of a car.

	Mobility Hub Assumptions: Provision for circa 200 spaces, including for blue badge holders, and cycle storage facilities. Provision of seating and waiting facilities, with the potential also for bike pumps, toilets and showering facilities. Assumed that in order to attract users the site, it would be served by either dedicated services, or by existing services with higher frequency (circa 2 buses per hour), offering an express-type service to Peterborough with limited stops i.e. Whittlesey town centre and Peterborough city centre.
	

The following sections of this report set out how these options will be appraised alongside a Do Minimum.

3 Demand Forecasting Approach

This section sets out the proposed demand forecasting approach for the core elements of the Scheme options being appraised, including highway, bus and active travel.

3.1 Highway demand assessment

The proposed approach to the demand forecasting for the highways elements of the Scheme options at SOC stage has been informed by guidance set out in TAG, and The Transport Appraisal Process (May 2018) and Guidance for the Technical Project Manager (May 2018) in particular.

The latter document explains that initial appraisal is expected to be proportionate, to utilise readily available data and that, *"whilst the use of transport models to extract evidence at this stage would be desirable, it is not generally required for promoters to build a comprehensive transport model at this stage"*[8].

The Transport Appraisal Process guidance document also notes that, *"While the presumption is that more complex models will not be needed for Stage 1, existing transport models should be considered where sufficiently contemporary in nature and developed to acceptable standards. If an existing transport model does not exist or is not suitable for a particular study, consideration must be given to whether to commit resources to developing a model at this stage of the process, and to the required complexity of that model. Analysts should be clear that a transport model will add sufficient value to the more basic methods of analysis which could be undertaken at this stage of the process."*[9]

Therefore, whilst there is a need for proportionality at SOC, it is also clear that utilising tools that are not suitable (e.g., models that are not suitable for a particular study) to assess scheme options is not appropriate and could lead to incorrect conclusions being drawn.

Given the above guidance, a review has been taken to understand the availability and suitability of existing transport models of the area. This review is summarised in section 3.1.1. The conclusion of the model review is that the existing transport model for the area is unlikely to be suitable to inform scheme appraisal at this stage, although it could be used to inform and develop the Strategic Dimension of the scheme.

It is considered that the enhancements likely to be necessary to develop a suitable model to inform the demand assessment of the Scheme will not add sufficient value over other methods of analysis that are now proposed to be undertaken at this stage of the process instead.

The proposed approach to the demand assessment for highway elements of the Scheme options, and the appraisal of these options at this stage at SOC is therefore to develop a quantitative spreadsheet-based model. This will enable the potential highway impacts of the relief road options to be estimated, including the potential level of demand that would use a relief road, as well as travel time and vehicle operating cost impacts. More information on the proposed approach is set out in section 3.1.2.

[8] TAG Guidance for Technical Project Manager (May 2018)

[9] TAG Guidance for Technical Project Manager (May 2018)

3.1.1 Existing transport models

As noted above, a review of the availability and suitability of existing transport models of the area has been undertaken. This is summarised within this sub-section.

The following transport models have been identified as being available or are understood to be in the process of being developed:

- Peterborough Transportation Model 3 (PTM3);
- Peterborough Transportation Model 4 (PTM4); and
- Cambridgeshire and Peterborough Combined Authority Model (CAPCAM).

At the time of writing, it is understood that both PTM4 and CAPCAM are under development and completion dates are uncertain[10]. It is therefore assumed that these models will not be available for use at SOC, and no further consideration is given to them within this ASR.

3.1.1.1 PTM3 2023 'refresh'

As explained within the review of the existing PTM3 (see section 3.1.1.2), the existing model has a 2019 Base year, but it is understood that a 'refresh' of PTM3 to account for the impact of the COVID-19 pandemic is currently being finalised.

The PTM3 refresh is understood to involve a simple factoring of the 2019 demand matrices, the inclusion of recently completed transport schemes[11] and subsequent comparisons of updated modelled flows against 2023 observed traffic data. It is understood that no structural changes are being implemented to the model network or zoning system in the vicinity of Whittlesey, and no new or additional validation/calibration count sites or journey time routes are being included. The model refresh is primarily being undertaken in relation to the Peterborough Station Quarter scheme.

In summary, whilst the 2023 'refresh' should help to provide a model that is sufficiently contemporary in nature, other limitations of the model in terms of its suitability for use in the appraisal this Scheme are likely to remain. These limitations are identified in section 3.1.1.2. It is also noted that the model refresh is in the process of being finalised and/or approved and, at the time of writing, it is not certain when it would be available and whether this would align with the programme for developing and delivering the SOC.

However, if the model becomes available during the development of the SOC, it has the potential to be used in informing and developing the Strategic Dimension. This could include, for example, initial tests using the model to understand issues and high-level strategic impacts relating to the closure (due to flooding) of the B1040 to the north of Whittlesey. However, it is anticipated that the model will not be suitable for informing the demand assessment and economic appraisal of the Scheme options even at SOC.

3.1.1.2 Existing PTM3

Overview

As noted above, the existing PTM3 includes all main A and B roads (and some minor roads) in and around the Peterborough Unitary Authority area. It therefore includes a representation of Whittlesey, although its representation is relatively coarse and simplistic due to the town's location on the periphery of the model's simulation area.

[10] PTM4 was previously expected to be completed in early-2024 but this has not transpired.

[11] Including the A605 Ralph Butcher Causeway scheme, which replaced a level crossing on the A605 to the west of Whittlesey.

The PTM3 Local Model Validation Report (LMVR) has been obtained, as have the existing Base year and forecast future year models and the model zoning system. This information has informed the model review, which is summarised below.

Model type and structure

The PTM3 is a SATURN-based highway assignment model. It does not include public transport assignment or variable demand model (VDM) components. The absence of these components is not likely to be a material concern at SOC stage, though it will limit its ability to assess public transport options and the lack of a VDM needs to be recognised as a limitation. These potential limitations would need to be considered as the Scheme progresses beyond SOC.

Base year

The existing PTM3 has a base year of 2019. As noted previously, it is currently undergoing what is understood to be a relatively simplistic 'refresh' to update its base year to 2023 (i.e., post-COVID). The refresh will not involve updates to the underlying demand data used in the model (i.e., demand matrices will continue to be based on data from 2019) and will instead entail factoring of the demand using traffic count data.

Time periods

The model includes a representation of a weekday AM peak hour (08:00-09:00), inter peak hour (14:00-15:00) and a PM peak hour (17:00-18:00). These modelled time periods should be appropriate for modelling and appraisal of scheme options at this stage of scheme development. Further analysis and consideration would need to be given to confirm the appropriateness of these time periods as the Scheme progresses beyond SOC.

Demand segmentation

Demand within the model is segmented into the following user classes:

- Car Commute;
- Car Employers' Business;
- Car Other;
- Light Goods Vehicles (LGV); and
- Heavy Goods Vehicles (HGV).

This level of demand segmentation (vehicle types and journey purposes) should be appropriate for modelling and appraisal of the Scheme options at SOC.

Data

Various data sources have been used in the development of the existing (2019 Base) PTM3. These are summarised below:

- Matrix data
  - Demand matrices were developed primarily using Mobile Network Data (MND) collected on Mondays to Thursdays in March 2019, and supplemented with data from the UK Census, the National Trip End Model (NTEM v7.2), the National Travel Survey (NTS) and traffic count data.
  - Although detail is lacking within the LMVR, the 2019 demand matrices appear to have been developed appropriately using MND, with synthetic matrices used to infill short distance trips for example.

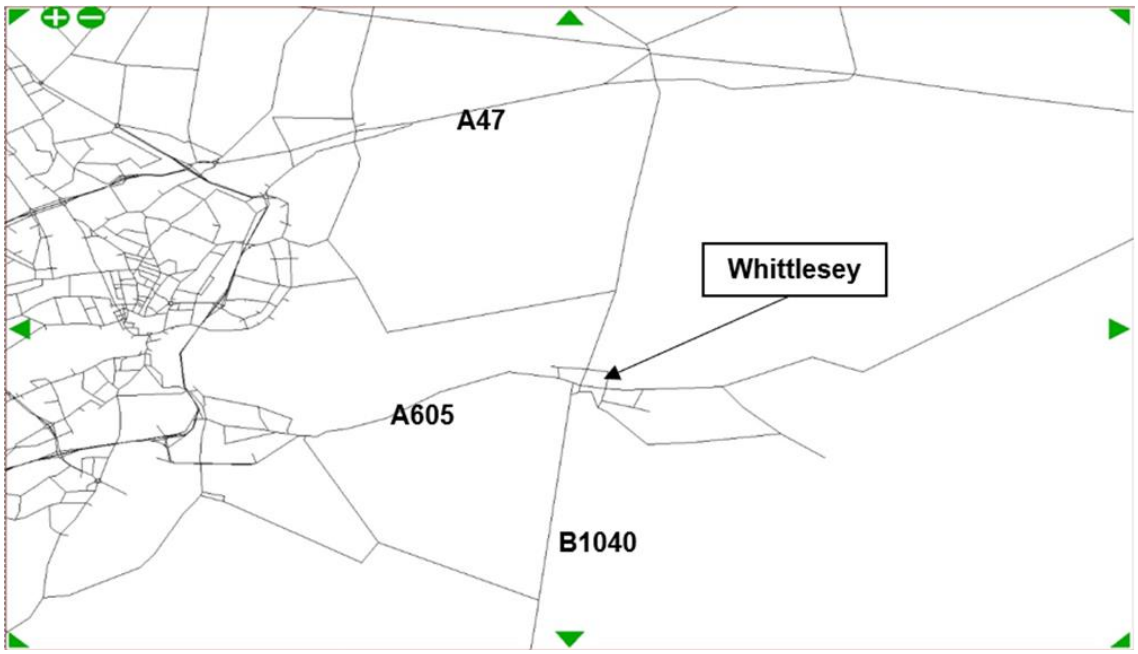
  - The reliance on pre-COVID matrix data and non-current NTEM data[12] is recognised as a potential limitation of PTM3, noting that the PTM3 'refresh' does not involve the use of post-COVID data to update the prior matrices.
- Traffic count data
  - The LMVR notes that Manual Classified Turning and Link Counts (MCCs) were undertaken in September 2019 and used for model calibration and validation purposes.
  - It is not clear whether longer term Automatic Traffic Counts (ATCs) have been used in model development.
  - The location of traffic data used in model calibration and validation is not clearly identified within the LMVR, but it appears that some calibration or validation counts are included in the model on all main routes into Whittlesey, plus some sites within the town itself.
- Journey time data
  - TrafficMaster journey time data collected in October 2017 has been used to validate journey times on a selection of routes within PTM3.
  - No journey time validation routes are included in or around Whittlesey.

In conclusion, there are limitations and uncertainties with the data used in the development of the existing PTM3. In particular, the lack of journey time validation through Whittlesey is a limitation that is recommended would need to be addressed at SOC if PTM3 were to be used. More detailed review of the data used in model development would need to be undertaken ahead of further business case stages.

Model network

The model highway network in the vicinity of Whittlesey is shown in Figure 3.1.

Figure 3.1: PTM3 SATURN network



Source: PTM3

The highway network within the existing (2019 Base) model includes most routes into Whittlesey, with the exception of the B1093 between the town and Benwick to the southeast.

[12] The latest version of NTEM is version 8.

The network is also relatively coarse within Whittlesey itself, but this is not likely to be a material limitation at SOC, noting that key junctions appear to be represented in the model.

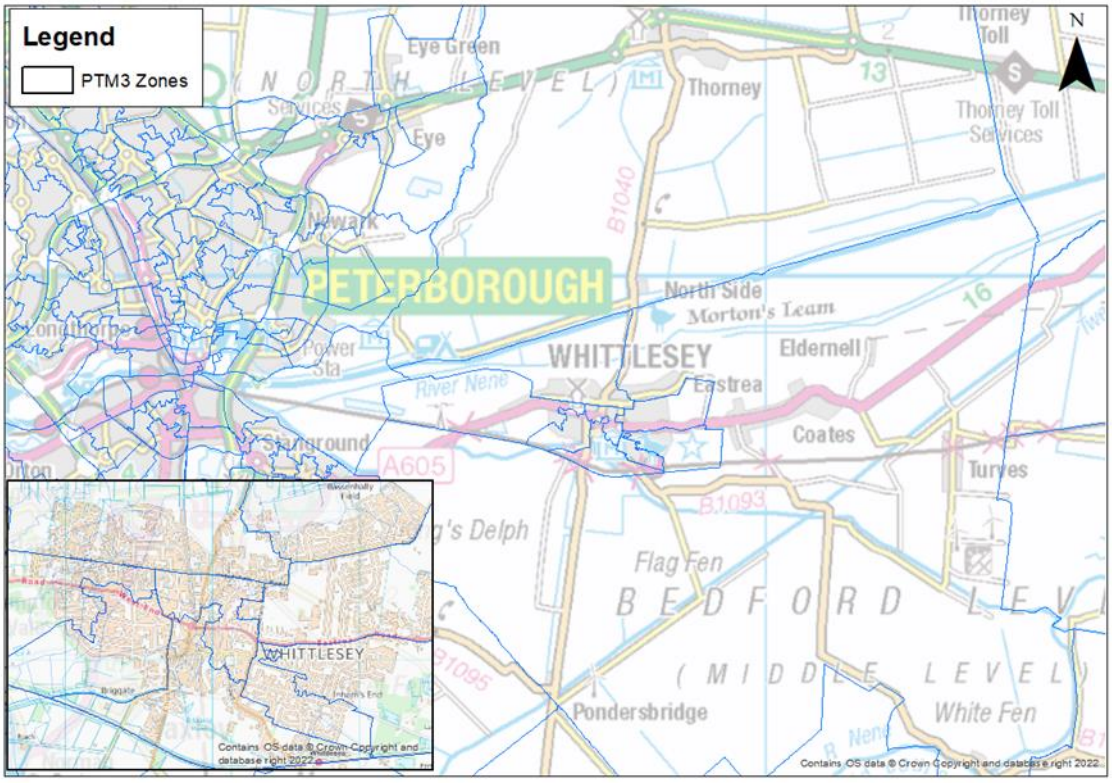
However, as noted above, the lack of journey time validation through Whittlesey means that confidence that the model (in terms of supply and demand) within the town is representative of observed conditions is low. In essence, though key junctions in the town are represented within the network there is only limited confidence that they operate as expected in the model.

While the 2019 Base model does not include the A605 Ralph Butcher Causeway scheme (a bridge replacing a level crossing on the A605 to the west of the town), it is understood that the model 'refresh' incorporates this scheme.

Model zoning system

As noted in the Whittlesey Relief Road Scheme Gap Analysis Report (November 2023), the model zoning system is coarse in the Whittlesey area. The zoning system is shown in Figure 3.2.

Figure 3.2: PTM3 zoning system



Source: PTM3 and Ordnance Survey © data

In terms of suitability of the model for assessing a relief road scheme the most pertinent issue appears to be the representation of Eastrea and Coates within the zoning system. These settlements, located on the A605 to the east of Whittlesey, are included within a large model zone that loads onto the network on the B1093 to the southeast of the town, rather than the A605.

Analysis of routing patterns in the local area, and analysis of Automatic Number Plate Recognition (ANPR) survey data obtained in November and December 2023, indicates that much of the traffic routing through Whittlesey on the A605 could be generated by Eastrea and Coates, rather than settlements further east. The coarse representation of Eastrea and Coates

within the model is therefore potentially a significant limitation, and it is understood that the PTM3 refresh will not incorporate changes to the zoning system in this area.

Unless the zoning system (and demand matrices) were revised to address the above limitations, it is considered that the existing PTM3 is not suitable for use in assessing and appraising a relief road scheme.

Model performance

An initial review of the existing (2019 Base) model's performance in terms of comparisons of modelled flows and journey times against observations was undertaken and summarised in the 2023 Gap Analysis Report.

In terms of traffic flows, a selection of links in and around Whittlesey are included in model calibration or validation and, in general, modelled flows were a reasonable match with observations in 2019. The modelled westbound flow on the A605 to the east of the town in the AM peak was, however, significantly lower than observed flows. The coarse zoning system in this area may have contributed to this instance of poor validation.

It was also noted that there are no journey time validation routes in or around Whittlesey within PTM3. This represents a significant limitation in terms being able to understand the suitability of the model for use in assessing a relief road scheme for the town.

Forecasts

Information on existing future forecasts developed using the PTM3 has not been made available at this stage. As such, it is not known whether any existing forecasts have been developed in a suitable manner for use in assessing the proposed Scheme options. For example, assumptions regarding forecast traffic demand are not known, including whether the proposed housing and employment developments within the town are incorporated in the forecasts.

If PTM3 and its existing forecasts were to be used at SOC, it would be necessary to review forecast assumptions and potentially update them with relevant assumptions.

Conclusions

The existing PTM3 includes a relatively crude representation of Whittlesey, reflecting the town's location on the periphery of the model area.

The model is therefore not considered suitable for this particular study, mainly due to the coarse zoning system being unsuitable for assessing the impacts of the relief road options. The lack of journey time validation through the town is also a notable limitation that reduces confidence in the model for use in assessing the Scheme options for this study.

Enhancements could be made to the existing model to improve its suitability for assessing and appraising options at SOC. As a minimum, this would need to include disaggregation of the model's zoning system, followed by a local model calibration and validation exercise, making use of updated traffic count and journey time data. It would also likely be necessary to revisit forecast models to incorporate relevant key future year assumptions relating to local developments.

In light of the above review, and in consideration of relevant guidance, it is considered that the level of resource and cost required to implement the necessary enhancements would be disproportionate for the Scheme at this stage, particularly as alternative more basis methods of analysis could be undertaken in place of a more complex transport model.

The recommended approach to highway modelling at SOC is set out in section 3.1.2 below.

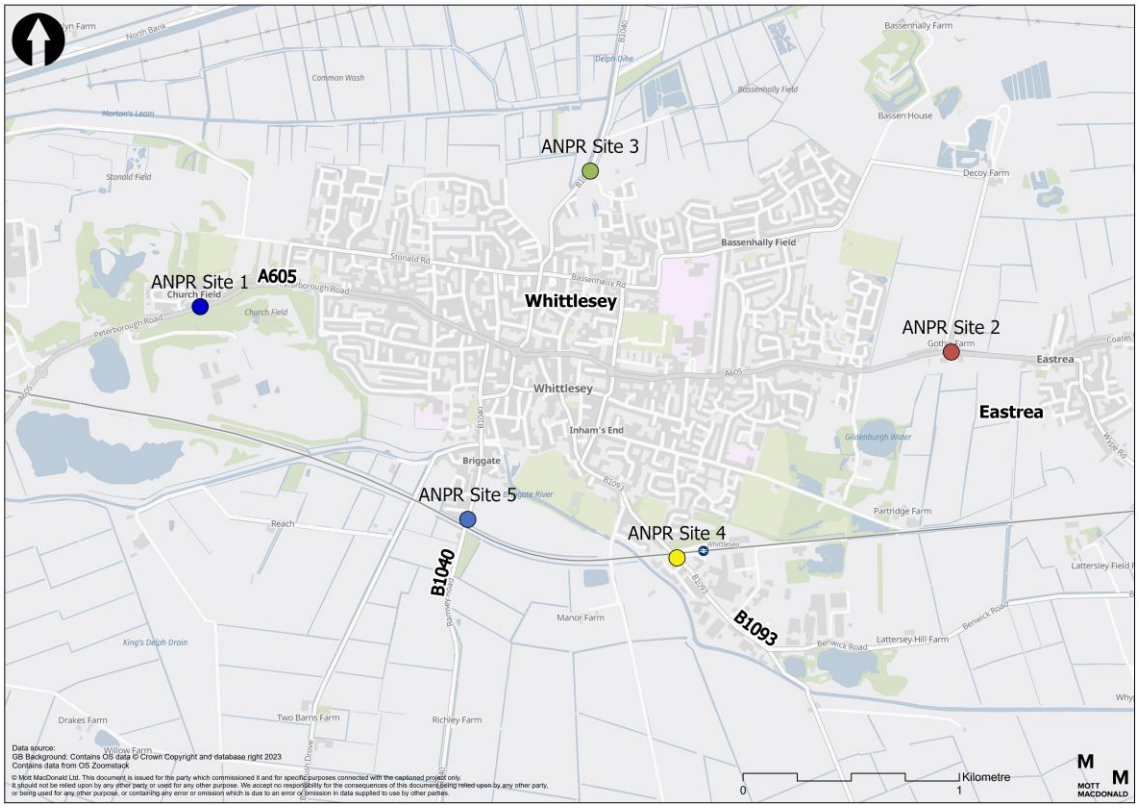
3.1.2 Proposed approach

As discussed in the previous sub-sections, given the limitations of the existing formal transport model, and the likely scale of effort required to develop a suitable model, the proposed approach to modelling at SOC involves the development of a spreadsheet-based model.

It is proposed that the extent of the spreadsheet model covers the routes into and out of Whittlesey, as recorded in the Automatic Number Plate Recognition (ABNR) survey undertaken in November and December 2023 (locations of counts shown in Figure 3.3). The ANPR survey captured movements between the following routes into/out of Whittlesey:

- ANPR site 1 – A605 west of Whittlesey
- ANPR site 2 – A605 east between Whittlesey and Eastrea
- ANPR site 3 – B1040 north of Whittlesey
- ANPR site 4 – B1093 southeast of Whittlesey
- ANPR site 5 – B1040 south of Whittlesey

Figure 3.3: ANPR site locations



Source: Mott MacDonald

The spreadsheet-based model would be used to estimate traffic volumes in forecast Do Minimum and Do Something scenarios (i.e., with and without scheme scenarios) between these points on the network. The spreadsheet would also provide an estimate of travel times associated with the relief road in the Do Minimum and Do Something scenarios. The estimates of demand and travel times would be used to inform an economic appraisal of highway user benefits, which is discussed in section 4.

It is proposed that the model includes an assessment of two future years – one will capture the assumed year of opening of the relief road scheme, with a single further horizon year. The horizon year assessment is subject to confirmation, but it would seek to capture any major step

changes in demand or supply that may affect the profile of scheme benefits. This would seek to include, for example, any significant local developments.

Subject to the temporal disaggregation available within the ANPR data, the spreadsheet model would be developed to represent key time periods of the week. It is proposed that this would include a weekday AM and PM peak period, a weekday inter-peak period and a weekend daytime period. At this stage it is not envisaged that assumptions regarding the proportion of traffic that would reassign onto the relief road would change by period, but the assumed travel times may vary by period based on assumed levels of highway congestion/delay.

Highway demand within the spreadsheet model would be segmented by the vehicle types for which the ANPR is provided (Car, LGV and HGV).

3.1.2.1 Demand estimates

The spreadsheet model would utilise observed traffic data, including the ANPR survey, to identify vehicle flows in the existing (Baseline) situation. Estimates of the volume of traffic that passes through Whittlesey (i.e., through-traffic) on the routes through the town (A605, B1040 and B1093), as well as traffic that has an origin or destination within the town, will be recorded within the spreadsheet model. Separating these types of demand will be important as it will inform estimates of the scale of traffic reassignment that may occur if a relief road scheme were implemented.

Forecast growth in traffic demand would be incorporated within the spreadsheet model for both forecast years, and for both the Do Minimum (without scheme) and Do Something (with scheme) scenarios. It is proposed that estimated growth would be informed by DfT TEMPro forecasts with specific allowance included for traffic associated with proposed local developments, if applicable.

Information on proposed local developments (e.g., development location, quantum, timescales etc) would be identified and trip generation and distribution exercises undertaken to provide an estimate of traffic demand associated with the developments. This will be necessary to enable an estimate of the volume of traffic associated with proposed developments that may reassign onto a new relief road. For example, traffic originating from developments in the east of Whittlesey and travelling into the centre of the town would be unlikely to use the relief road, whereas if it were travelling toward Peterborough, it may reassign onto the new route.

Development trip generation and distribution would be undertaken through review of Transport Assessments submitted as part of existing planning applications where these are available. If such documents are not available, a bespoke trip generation and distribution exercise would be undertaken, making use of trip rates derived from the TRICS database and distribution assumptions informed from a simple gravity model or the Census Travel to Work dataset.

The traffic impact of the Scheme would be captured within the spreadsheet model through estimates of the level of demand that could reassign onto the relief road. These estimates would primarily be informed by the ANPR data, which identifies the level of through-traffic on each route into Whittlesey. The proportion of through-traffic that would likely reassign onto the proposed relief road would be estimated through comparisons of assumed journey times for the existing route(s) through the town compared to the journey time if using the relief road (see below).

3.1.2.2 Journey time estimates

Estimates of highway journey times for each scenario (i.e., Baseline and forecast Do Minimum and Do Something scenarios) for each movement through the town would be made and incorporated into the spreadsheet model.

The travel time estimates would be based on TomTom Traffic Stats data (i.e., observed journey times) obtained for the project, and supplemented by other assumptions if required (e.g., use of online journey planners and assumed design speeds for the new road). Travel times in the forecast scenarios would be adjusted to account for estimated additional congestion in the future years, with the use of the DfT's National Road Traffic Projections 2022 (NRTP22) data or the application of basic 'speed-flow' relationships[13].

3.1.2.3 Additional scenario testing

The spreadsheet model would be used to include additional scenario testing, and specifically understanding the impacts associated with incidents/closures of the A47 route between Peterborough and Guyhirn. This would involve applying assumptions regarding the volume of traffic that would reassign onto the A605 when issues arise on the A47.

3.1.2.4 Limitations

A spreadsheet-based model is considered an appropriate and proportionate approach to assessing and appraising the relief road options at SOC. However, it should be recognised that the approach does have limitations as summarised below.

The model would provide only a simplistic representation of delays for traffic routing through the study area. While the model will seek to capture the relationship between demand and delays, it will do so in a relatively simplistic manner through the use of speed/flow relationships on a highway link basis. It will not, however, account for impacts of delays at specific junctions.

The model will capture demand and journey times for movements routing through the town, between the five points in the network identified in section 3.1.2. It will not be able to robustly account for impacts on trips with a start or an end point within Whittlesey itself. For example, any time savings for these trips (savings associated with reduced traffic demand within the town) will not be robustly captured. However, relative to the time impacts associated with the alternative route provided by the relief road, these impacts are not likely to be significant.

A further potential limitation is that it is unlikely to capture any wider strategic reassignment that may be associated with a proposed relief road option. However, analysis of local traffic routing within the area indicates that wider traffic reassignment is unlikely to be significant, so this limitation is unlikely to be material at this stage.

The spreadsheet model will not capture potential variable demand responses associated with the scheme options. Demand responses could cover changes in trip generation/trip frequency, trip distribution, as well as travel mode and time period choice. This is unlikely to be a significant issue at this stage, but further consideration of demand responses (and potential need for a variable demand model) will need to be given as the scheme progresses beyond SOC.

3.1.2.5 Spreadsheet model outputs

The proposed spreadsheet model would provide estimates of the volume of traffic that would reassign onto the proposed relief road, and the associated travel time savings. It would also provide inputs for an initial economic assessment of highway user impacts, as described in section 4.1.1.

[13] These capture the relationship between supply and demand with higher levels of traffic flow causing speeds to reduce, while lower flows contribute to speeds increasing.

3.1.2.6 Modelling at subsequent stages

The proposed approach to modelling has been developed following consideration of the availability and suitability of existing formal transport models of the area and is considered proportionate for SOC.

Should the Scheme progress beyond SOC, and based on the DfT's Transport Appraisal Process guidance document, it is likely that a formal model of the transport will be required to assess and appraise the scheme. This would likely involve the development of a model of the area, potentially through making enhancements to existing models such as PTM3, PTM4 or CAPCAM. The enhancements would need to be fully scoped but should seek to address the key limitations of the existing PTM3 that were noted within this section of the document.

3.2 Bus demand assessment

The demand forecasting for bus is relevant to Option 2 (Bus Priority) and Option 4 (bus-based travel hub).

3.2.1 Travel hub

The testing and quantification of Option 4 (bus-based travel hub with supporting package of interventions) will be conducted separately to the quantification of Options 1-3. Option 4 will instead focus on assessing the impacts of a new travel hub bus service on existing bus passengers, through the building of a simple and high-level spreadsheet-based uni-modal model.

This method is deemed appropriate at the options appraisal stage, given time and budget constraints to efficiently evaluate and compare a range of different options across different modes. However, following this study, should this option be taken forward as a preferred option, the model methodology would be developed into a more comprehensive mode choice model, incorporating bus impacts with highway impacts (e.g. using appropriate model skims as an input to understand shift from car trips to travel hub trips).

The modelling of Option 4 will be undertaken in four discrete steps, as follows:

1. **Data gathering**: confirming the data available and their sources;
2. **Model build**: developing the high-level travel hub forecasting demand model;
3. **Model testing**: sensitivity testing of key risks (limited to max 4), based on input data assessment; and
4. **Economic appraisal**: developing a high-level economic appraisal of standard DfT 'established impacts', in proportion with assessments developed for other options.

The model developed will be uni-modal (bus/travel hub mode only) using an elasticity-based approach akin to the Passenger Demand Forecasting Handbook (PDFH) used to forecast rail demand, as follows:

- Base demand will be collated for selected bus routes/ journeys using either bus count data (by cordon or service), or bus passenger surveys, depending on data availability, noting that without such data no baseline position can be ascertained, and demand forecasting would be difficult. This data will most likely be collated from the Cambridgeshire and Peterborough Transport Model (CaPCAM) model, which uses surveys at key locations.
- Bus routes/journeys will be selected by building a small node-link network in ArcGIS (Arc Pro) covering the impacted bus routes and key stops for the following services;
  - 31 bus (Ramsey – Whittlesey – Peterborough)
  - 33 bus (March – Coates – Eastrea – Whittlesey – Peterborough)

- The number of node (bus stop) pairs that can be modelled will be determined by the nature of the input demand data (e.g. location of cordons) but can be embellished by secondary sources where required (e.g. travel to work by mode data for local output areas).
- Baseline demand will be uplifted to the Scheme opening year and predetermined model years using exogenous factors (driven by TAG and TEMPro inputs for the local area, such as GVA, population, employment and competing modes/fuel costs).
- The model will forecast bus demand uplift for each selected node pair according to the change in generalised journey time (in-vehicle time + service interval penalty/ wait time + interchange penalty) and the PDFH Generalised Journey Time (GJT) elasticities used for rail (or bus equivalent, if available).
- GJT inputs will be sourced using online bus timetables, for impacted routes (and added to using the proposed bus service for the travel hub option).
- The change in GJT will be calculated between the Do Minimum scenario (current bus network) and Do Something scenario (Do Minimum plus travel hub service).
- The model response can be validated against comparator travel hub schemes (e.g. Cambridge) using observed counts, in proportion to car park capacity/ bus frequency.
- Key sensitivities (max 4x) of the model can be tested, such as DfT's Covid-19 recovery factors and alternative bus-based generalised journey time elasticities.
- Estimated demand uplift (constrained to the proposed car park capacity/ bus frequency) between the Do Minimum and Do Something will drive the outputs for this option, along with the Scheme costs, feeding a high-level economic assessment for comparability to other options (e.g. bus user benefits/ time savings, none-user benefits via mode shift from car, bus revenue).

The following data inputs (where available) are required to undertake this task:

- Bus passenger surveys or bus counts (by impacted service, or cordon) – CaPCAM surveys at key locations;
- Travel hub passenger counts and/or ticket sales (users) for comparator travel hub sites (e.g. Cambridge) - time of day and/or counts in/out;
- Existing bus service timetables (31 and 33), routes and fares – publicly available;
- Confirmation of supply-side information (routes, timetables, fare prices, car park costs, car park capacities, bus vehicles used);
- 2021 Census journey to work data for local output areas;
- TEMPro v8 population and employment trends;
- PDFH and TAG guidance; and
- DfT's Covid-19 recovery factors.

3.2.2 Bus priority

Existing demand figures for bus ridership across the two junctions where the bus priority measures are planned can be derived from the methodology set out above for mapping the existing bus network for the Travel Hub scenario. Given that this intervention has a significantly smaller scope, selected zones from the network assessment can be selected to give an estimate of existing users that are likely to gain some journey time saving.

Traditional Green Book demand elasticity forecasting methods are not appropriate for this project, as elasticity modelling for a single mode requires that there is no significant change in Generalised Cost (GC) for any other mode of transport. In this instance, the Do Minimum, based on today, includes car congestion which is a driver for bus demand. However, with the inclusion of the relief road as part of the scheme, the congestion for car users is reduced, thus leading to

a material improvement of the car GC. This material impact for car users means that it is inaccurate to assume that there will be a mode shift to bus from Car, without developing a more complex multi model transport model to account for the competing GCs of each mode.

Therefore, given the fairly modest impact on bus users, and the much greater impact on car users, it is proposed that it is not proportional to forecast a mode shift car to bus as a result of the scheme, and that the estimated number of existing trips should be used as the number of forecasted trips with the scheme.

3.3 Active travel demand assessment

DfT's Active Mode Appraisal Toolkit (AMAT) will be used to quantify the uplift in demand for the walking and cycling enhancement option (Option 3), with standard diversion factors applied to estimate diversion and mode shift from other modes such as cars. These will come from standard TAG Databook diversion factors, and the concurrent Marginal External Costs of Car (MECC) values.

Baseline counts for walking and cycling will, where available, come from observed local count data provided by Fenland District Council and the Cambridgeshire and Peterborough Combined Authority. Observed count data we are currently aware of include DfT traffic counts and 2017-2021 cordon count sites around Whittlesey.

If pedestrian numbers are required and not captured by observed count data, we will use values from DataShine Commute. Similar to PCT, this only accounts for commuting trips so the 'all trips' demand, in line with 2021/2022 Active Travel Fund guidance will be calculated by multiplying the values by 32 (x2 for outbound/homebound trips and x16 to convert commuting trips to all trips).

One of the limitations of DataShine is that the data is area based so looks at MSOA-to-MSOA movements. Therefore, professional judgement will be used to determine whether the MSOA flows are likely to use the route where improvements are proposed.

To growth the baseline demand data to the Scheme opening year we will use the background growth rate in AMAT (0.75% per annum).

To forecast the increase in walking and cycling demand as a result of the Scheme, comparable schemes in which pre- and post-scheme implementation demand data is available, will be used to understand the growth factors to apply based on the level of infrastructure to be provided. The latest version of Active Travel England's 'uplifts' tool (September 2023) will be used to produce a forecast of the walking and cycling demand uplifts to enhance the robustness of the demand forecasts.

4 Appraisal Approach

The technical scope of the Transport Appraisal of the Scheme will conform to that specified in TAG and focus on the 4 strands of impacts - Economy, Environment, Social and Public Accounts, and the 24 sub-objectives as set out in the Appraisal Summary Table (AST). The following sections build on what was reported in the SOC ASR.

4.1 Appraisal approach summary

The appraisal of the Scheme will focus on illustrating how the scheme benefits are meeting the individual Scheme objectives. As the Scheme options include highway, bus and active travel elements, it is intended that the appraisal of impacts focuses on those related to these measures.

The methodology for appraising the impacts of each option is set out in the sections of this report below, with a summary of approach set out in Table 4.1, whilst the Appraisal Specification Summary Table (ASST) in Appendix A sets out the likely impact of the options against each impact. The ASST identifies where the Scheme is likely to have only a neutral, slight positive, or slight adverse impacts. Where these impacts are likely to have little influence on the Scheme's overall Value for Money, they will be categorised in the ASST as 'assumed neutral', and therefore no further assessment will be carried out (this is in line with TAG – The Transport Appraisal Process (May 2018), under Section 3.1 on scope for proportionality).

Table 4.1: Summary of appraisal approach

Impact	Appraisal approach
Highway traffic user impacts	Quantitative / Monetised
Bus user impacts	Quantitative / Monetised
Active travel impacts	Quantitative / Monetised
Accident impacts	Quantitative / Monetised
Environmental impacts	Qualitative
Reliability impacts	Qualitative
Social impacts	Qualitative
Distributional impacts	Qualitative
Wider economic impacts	Qualitative

4.1.1 Highway user impacts

The appraisal of highway user impacts would seek capture and monetise changes in travel time and vehicle operating costs associated with the scheme options.

It is proposed to use the DfT's TUBA software (current version v1.9.23) to estimate and monetise the highway user impacts, making use of forecast estimates of traffic demand, travel times and travel distances in the Do Minimum and Do Something scenarios for two forecast years. These estimates would be provided from the spreadsheet-based model outlined in section 3.1.2.

The TUBA software will use the forecast demand and travel costs (travel times and distances) for the two forecast years and, through a process of interpolation, will estimate user benefits across the full proposed 60-year appraisal period. The software will also apply relevant adjustments (e.g., discounting to 2010 and conversion to market prices) to convert the monetised benefits into a Present Value of Benefit (PVB) for the Scheme options.

Consideration will be given to the use of annualisation factors that would be used by TUBA to estimate benefits across the whole year based on inputs for the modelled periods. Annualisation factors will be derived from local long-term traffic data, which will be analysed to understand the relationship between demand in the modelled periods and non-modelled periods. At this stage, the modelled periods are subject to confirmation but, as noted in section 3.1.2, are expected to include weekday AM and PM periods, a weekday inter-peak period and a weekend daytime period.

4.1.2 Bus user impacts

The appraisal of bus user benefits is relevant to Option 2 (Bus Priority) and Option 4 (bus-based travel hub).

Option 2 – Bus Priority

Demand figures, based on an estimate of existing trips across the two junctions where the bus priority measures will be located, will be used to calculate the annual number of hours saved in journey time. The journey time calculation will be based on the assessment of link flow speeds through Whittlesey, assuming that the bus priority measures allow the bus to flow without congestion. This value of journey time saving per trip will allow for a rule-of-a-half calculation for the overall user benefits in hours. Note that because there are no 'new' users, this calculation is simply users x journey time saving.

Using the latest values from the TAG databook (May 2024), the journey time savings will be monetised and appraised over a 60-year period. The PVB, discounted and in 2010 prices will show the impact of the intervention.

Option 4 – Travel Hub

The appraisal of the Travel hub impacts will be similar to that of the bus priority in that a rule-of-a-half calculation will be undertaken to calculate total impact to users. For this option, there will be 'new' users and therefore an assumed mode shift from car to bus. A TAG compliant MEC (Marginal External Cost) of car appraisal will be undertaken to capture congestion and environmental effect of the resulting mode shift.

As with the bus priority, an appraisal spreadsheet will be developed capturing the latest values from the TAG databook, resulting in a PVB value, discounted in 2010 prices.

4.1.3 Active travel impacts

The standard approach for calculating benefits associated with walking and cycling is the use of the latest version of the DfT's Active Mode Appraisal Toolkit (AMAT)[14], following guidance set out in TAG Unit 5.1.

AMAT enables for the following benefits to be quantified:

- User benefits - journey ambience uplift.
- Business benefits - reduction in absenteeism.
- Health benefits - economic benefits of preventing early mortality through cycle and walking exercise; and
- Marginal external cost savings – reduction in the number of car trips to mode switch to cycling and walking.

In line with the value for money guidance issued as part of Active Travel Fund 4 (ATF4), the economic benefits of the options with walking and cycling improvements will be appraised over

[14] May 2024 at the time of producing this ASR.

a 40-year due to the high-quality infrastructure that the Scheme will provide and alignment to the principles of LTN 1/20 which contribute to a longer asset life.

4.1.4 Accident impacts

Accident impacts appraisal will be undertaken in accordance with TAG Unit A4-1. At this stage, it is anticipated that the options under consideration would result in the reassignment of traffic away from the centre of Whittlesey and onto a modern relief road. This reassignment would be expected to contribute to a reduction in personal injury collisions over the 60-year appraisal period.

It is proposed that a simple assessment is undertaken at this stage using the Cost and Benefit to Accidents – Light Touch (COBA-LT) software to forecast the change in the number and severity of accidents associated with the proposed scheme options. The COBALT software will also apply standard economic values in order to monetise the forecast change in the number and severity of accidents.

The assessment would make use of existing traffic flows and accidents in Whittlesey, which COBALT would use to calculate observed accident rates on the existing routes through the town. Accident rates on the proposed new relief road would set to default rates contained in COBALT, reflecting the proposed link types and speed of the proposed route.

Forecast future year changes in traffic flows associated with the scheme will be sourced from the spreadsheet-based model discussed in section 3.1.2. Through the application of the observed accident rates (and default rates on the relief road links), COBALT will estimate the number and severity of accidents in the Do Minimum and Do Something scenarios. By comparing the results from both scenarios, the overall benefit (or disbenefit) associated with the Scheme is identified.

In addition, accident benefits as a result of mode shift will be estimated using the MEC approach values for safety, which will calculate benefits associated with the removal of traffic arising from any mode shift from car trips to bus and active travel.

4.1.5 Environmental impacts

The appraisal of environmental impacts will be undertaken in accordance with TAG Unit A3 following a qualitative approach. The environmental topics covered include:

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

The level of impact for each topic will be summarised using the standard TAG seven-point scale and reported in the AST of the SOC. The assessment will be informed using evidence already collated and reviewed as part of the development of the SOC, as set out in the Baseline Evidence Report[15].

[15] Baseline Evidence Report - Mott MacDonald, February 2024.

4.1.6 Social impacts

The social impact appraisal will be carried out in accordance with TAG Unit A4.1. Social impact appraisal covers the human experience of the transport project and its impact on social factors. The impacts considered include:

- Accidents
- Physical activity
- Security
- Severance
- Journey quality
- Option and non-use values
- Accessibility
- Personal affordability

Each social impact will be assessed using qualitative analysis and will be informed by the result of the environmental appraisal and transport model outputs where available. For example, the outputs from COBA-LT will be used for accident analysis, whilst AMAT will be used for the physical activity impact analysis. The appraisal will produce summary assessment scores for each social impact on a seven-point scale of beneficial, neutral or adverse impacts. As with the environmental appraisal, the social assessment will be informed using evidence already collated and reviewed as part of the development of the SOC, as set out in the Baseline Evidence Report.

4.1.7 Distributional impacts

A distributional impact appraisal will be carried out in accordance with TAG Unit A4.2. Due to the stage of work, this will be limited to Step 1 in the process for undertaking a Distributional Impacts Assessment, which is a screening process.

The impacts considered include:

- User benefits
- Noise
- Air quality
- Accidents
- Security
- Severance
- Accessibility
- Personal affordability

4.1.8 Wider economic impacts

The wider economic impacts for the Scheme are those that are considered additional to the transport user benefits. As the level of benefits coming from wider economic impacts, including both from changes in land use and fixed land use are predicted to be small in relation to the overall Scheme benefits, it is proposed that a qualitative approach is taken to appraising these as part of the options appraisal that is reported in the final SOC.

This qualitative assessment of benefits relating to changes in land use as defined within TAG Unit A2.1, will examine how the Scheme contributes to the economic growth of Whittlesey and the wider region by providing new transport infrastructure that will improve links to development sites, supporting housing and employment growth.

4.2 Reporting and appraisal outputs

The results of this analysis will be summarised in the following tables and statements:

- A TEE (Transport Economic Efficiency) table, reflecting transport efficiency benefits
- Public Accounts (PA) table
- The Analysis of Monetised Costs and Benefits (AMCB) table
- An Appraisal Summary Table (AST)
- A Value for Money (VfM) statement

In addition to the reports and tables listed above, the methodologies and results discussed in this ASR will be summarised and presented in the Economic Dimension of the SOC for the Scheme.

5 Appendices

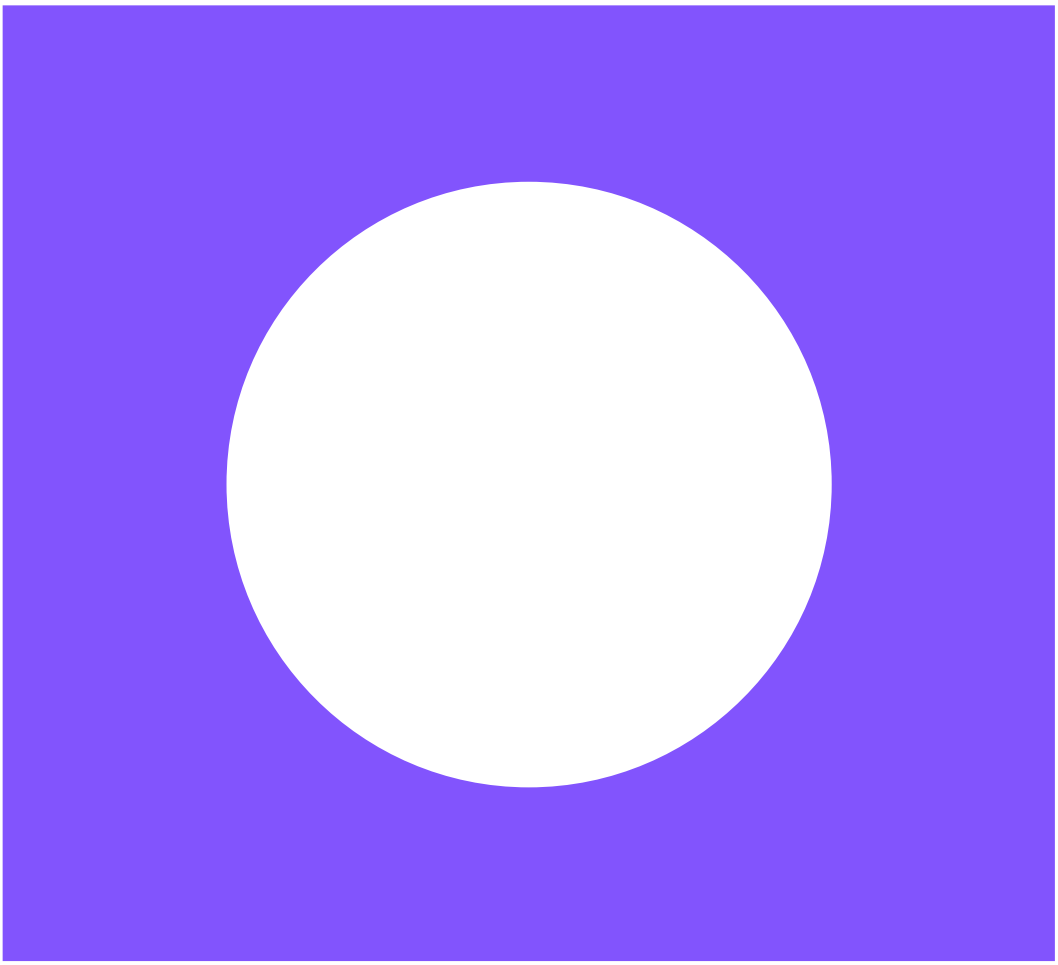
A. Appraisal Specification Summary Table

Table A.1: Appraisal Specification Summary Table

Impacts	Sub-impacts	Estimated Impact	Level of uncertainty	Proposed proportionate appraisal methodology	Reference to evidence and rationale in support of proposed methodology	Type of Assessment Output (Quantitative/ Qualitative/ Monetary/ Distributional)
Economy	Business users & transport providers	Positive	High	Assessment through TUBA based on outputs from bespoke spreadsheet model	TAG Unit A1-3	Monetary
	Reliability impact on Business users	Positive	High	Qualitative	TAG Unit A1.3	Qualitative
	Regeneration	Non expected	Low	N/A	N/A	N/A
	Wider Impacts	Limited	Low	Qualitative assessment following TAG Unit A2.1	TAG Unit A2.1	Qualitative
Environmental	Noise	Slight Benefit	Low	Environmental impacts worksheets	TAG Unit A3 Section 2	Qualitative
	Air Quality	Slight Benefit	Low	Environmental impacts worksheets	TAG Unit A3 Section 3	Qualitative
	Greenhouse gases	Neutral	Low	Environmental impacts worksheets	TAG Unit A3 Section 4	Qualitative
	Landscape	Slight Adverse	Low	Environmental impacts worksheets	TAG Unit A3 Section 7	Qualitative
	Townscape	Slight Benefit	Low	Environmental impacts worksheets	TAG Unit A3 Section 7	Qualitative
	Heritage of Historic resources	Slight Benefit	Low	Environmental impacts worksheets	TAG Unit A3 Section 8	Qualitative
	Biodiversity	Slight Adverse	Low	Environmental impacts worksheets	TAG Unit A3 Section 9	Qualitative
	Water Environment	Slight Adverse	Low	Environmental impacts worksheets	TAG Unit A3 Section 10	Qualitative
Social	Commuting and Other users	Large Benefit	Low	Qualitative	TAG Unit A1-3	Qualitative
	Reliability impact on Commuting and Other users	Large Benefit	High	Qualitative		Qualitative

Impacts	Sub-impacts	Estimated Impact	Level of uncertainty	Proposed proportionate appraisal methodology	Reference to evidence and rationale in support of proposed methodology	Type of Assessment Output (Quantitative/ Qualitative/ Monetary/ Distributional)
	Physical activity	Slight Benefit	Low	Qualitative	TAG Unit A4.1, Section 3	Qualitative
	Journey quality	Slight Benefit	Low	Qualitative	TAG Unit A4.1, Section 6	Qualitative
	Accidents	Slight Benefit	Low	COBALT	TAG Unit A4.1, Section 3	Quantitative/ Monetary
	Security	Neutral	Low	Qualitative	TAG Unit A4.1, Section 4	Qualitative
	Access to services	Slight Benefit	Low	Qualitative	TAG Unit A4.1, Section 8	Qualitative
	Affordability	Slight Benefit	Low	Qualitative	TAG Unit A4.1, Section 9	Qualitative
	Severance	Large Benefit	Low	Qualitative	TAG Unit A4.1, Section 5	Qualitative
	Option values	Slight-Large Benefit	Low	Qualitative	TAG Unit A4.1, Section 7	Qualitative
Public Accounts	Cost to Broad Transport Budget		Low	Scheme costings	TAG Unit A1-2	Monetary
	Indirect Tax Revenues		Low	Outputs from TUBA and AMAT		Monetary

B. Long List Options Assessment Report



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Whittlesey Relief Road

Modelling and Economic Assessment Report

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Whittlesey Relief Road

Modelling and Economic Assessment Report

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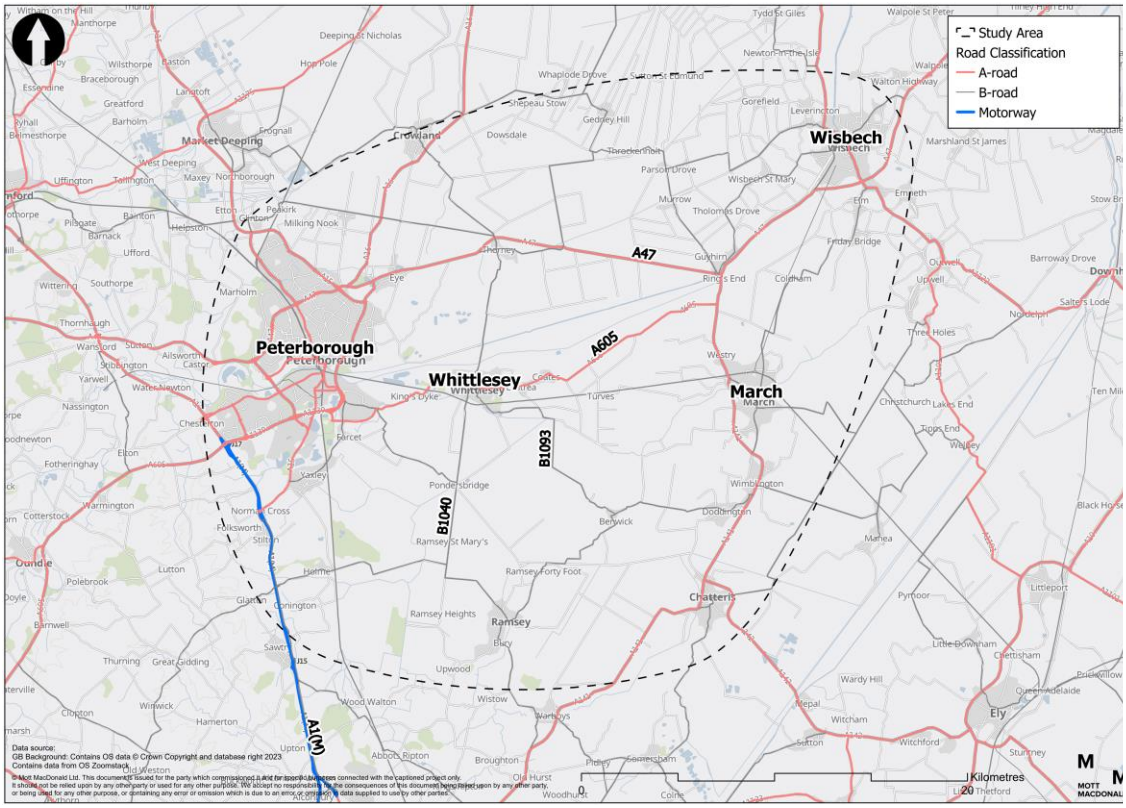
1 Introduction

As part of the development of the Whittlesey Relief Road Strategic Outline Case (SOC), Mott MacDonald have undertaken a comprehensive review to establish the issues and opportunities for the scheme for the town of Whittlesey situated in the Cambridgeshire district. The purpose of this document is to outline the traffic modelling and economic assessments carried out as part of the Whittlesey Relief Road SOC.

1.1 Study area

The study area considered for the review is shown in Figure 1.1. Whittlesey is situated along the A605 between Peterborough and Wisbech.

Figure 1.1: Study area



Source: Mott MacDonald

1.2 Summary

The development of the Whittlesey Relief Road Strategic Outline Case (SOC) included a long listing optioneering exercise with four options shortlisted for detailed appraisal. Of these options a Relief Road forms part of 3 of these. The appraisal set out in this note describes the impacts of the Relief Road element of these 3 options.

In order to provide an initial quantified estimate of highway user benefits that may arise from a proposed Relief Road south of Whittlesey, a localised spreadsheet-based traffic model was set up to forecast traffic volumes and journey times in both 'with' and 'without' scheme scenarios.

All ‘through-trips’ passing through the town, other than those travelling to and from the north of Whittlesey, are expected to benefit from the proposed scheme generating travel time and distance savings.

The outputs of the spreadsheet traffic model have been used to inform a TUBA economic assessment to quantify the highway user benefits and a COBALT assessment to quantify the impact of changes in collisions forecast with and without the scheme in place.

Over the assessment period of 60 years there are £18.3m highway user benefits forecast and £3.3m based on accident savings.

Other economic impacts associated with the provision of bus priority and non-motorised user upgrades proposed as part of some of the scheme options are not summarised within this report.

1.3 Report Structure

The report has been structured into the following chapters:

- Chapter 2: Traffic Modelling – including details about the data used, the model preparation for base and forecast and the forecast results.
- Chapter 3: Economic assessments – including the description of the user benefit and collision impact assessments, detailing of the scheme costs and the appraisal results.
- Chapter 4: Sensitivity Testing – detailing the impacts of diverting traffic during incidents along the A47 north of Whittlesey on the A605.

2 Traffic Modelling

This section describes the traffic modelling carried out and used to inform the economic assessment of the proposed scheme. This includes an overview of traffic data used in the modelling, base model preparation and forecasting.

2.1 Introduction

The approach to modelling at SOC was developed and set out in detail within the 'Whittlesey Relief Road Appraisal Specification Report' (ASR) (August 2024). In summary, modelling for the scheme has been undertaken using a spreadsheet-based model that provides estimates of traffic volumes and travel times in a 'Do Minimum' (i.e., without scheme) and the 'Do Something' (i.e., with scheme) scenarios.

The remainder of this section summarises the development of the spreadsheet-based model.

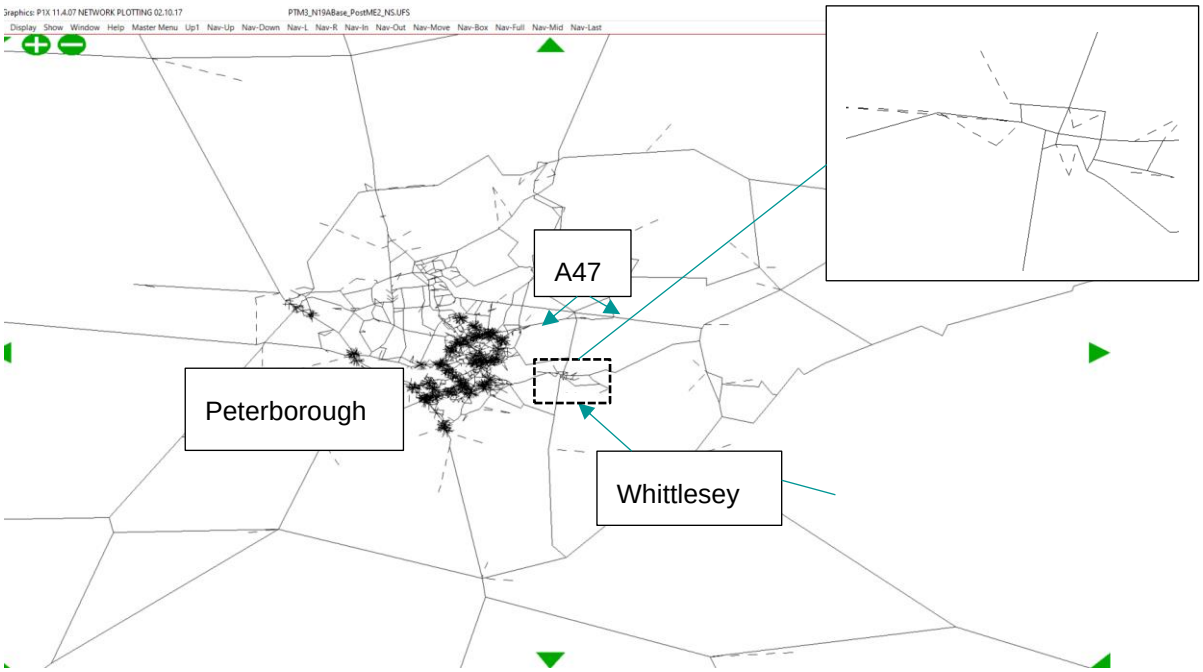
2.2 Data

Various datasets were collated to inform the development of the spreadsheet-based traffic model. These are described below.

2.2.1 Existing Traffic Model

The network coverage of the existing Peterborough Transportation Model v3 (PTM3) is shown in Figure 2.1. The model's network includes the study area of Whittlesey in a skeletal format within its simulation area.

Figure 2.1: Peterborough Transportation Model network coverage (PTM3)



Source: Mott MacDonald

The existing base traffic model represents a 2019 base year (i.e., pre-COVID). Although it is understood that PTM3 is in the process of being updated it is not available in time for this assessment.

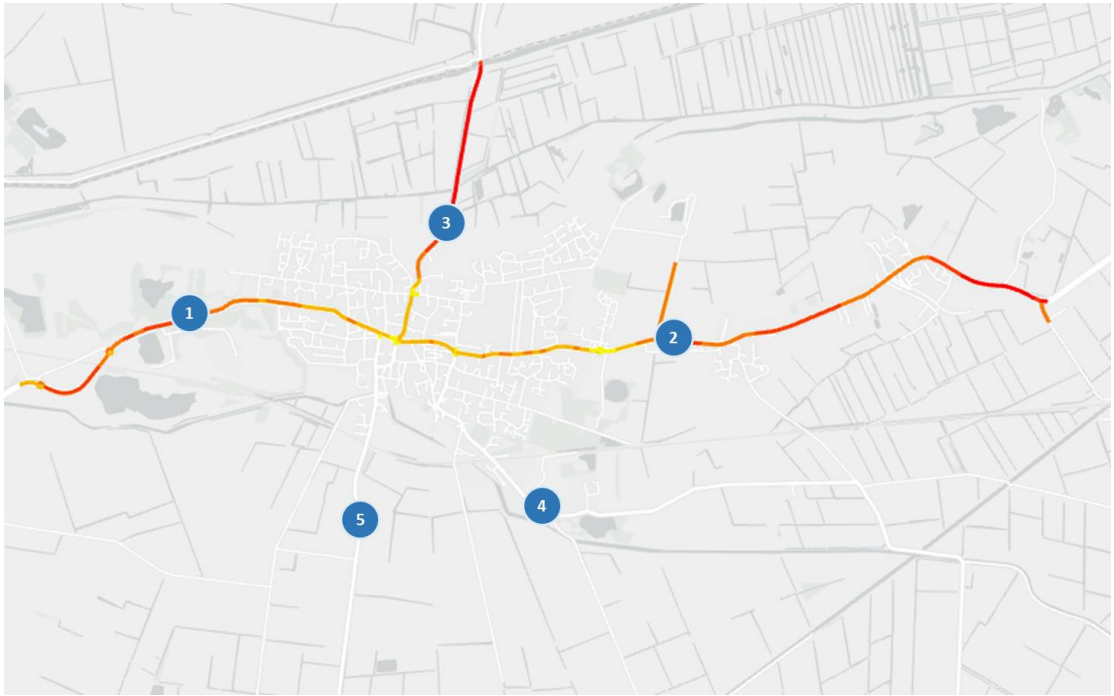
In addition, as set out in the ASR document, there are various other limitations of the existing PTM3 that mean it is not considered suitable for assessing a Relief Road scheme for Whittlesey. Limitations include the relatively crude representation of Whittlesey in the model, including the zoning system in the area, and a lack of journey time validation through the town. These limitations could be addressed through relevant model enhancements, but such updates would have impacted the project timeline and, moreover, were not considered proportionate at this stage of scheme development.

Based on these considerations, and as set out in detail within the 'Whittlesey Relief Road Appraisal Specification Report', PTM3 was not considered suitable for the assessment of the Relief Road scheme options. However, it was noted that the existing PTM3 may be useful in informing high-level insights into other issues, such as potential traffic reassignment impacts on the occasions that incidents occur on the A47.

2.2.2 ANPR Data

Automatic Number Plate Recognition (ANPR) surveys were undertaken in November 2023. These surveys captured vehicles entering and existing Whittlesey at the five points shown in Figure 2.2.

Figure 2.2: ANPR counter locations



Source: Mott MacDonald

The data is provided in 15-minute periods and broken down for cars, LGVs, OGV1, OGV2 and Bus/Coach.

The data is also categorised into journey times between ANPR sites with less or more than 10 minutes. It has been assumed that all travel times between the sites for genuine 'through-trips' should be within less than 10 minutes while journeys above this threshold are likely to represent

a ‘chain’ of trips (e.g., a trip entering the town, parking for a period before continuing on the journey). For the purpose of this assessment, trips longer than 10 minutes are excluded.

Journeys observed as entering and exiting Whittlesey at the same location are also excluded on the same basis.

2.2.3 Journey Time Data

TomTom data covering all model links representing all Tuesday to Thursday data between 02/10/2023 and 22/10/2023 was used to calculate average model travel speeds for peak (based on 0700-0800) and non-peak (1100-1200). The short TomTom link data was aggregated into the model links for each of these periods. The speeds for the AM peak period are comparable with the PM speeds and peak speeds are used for AM and PM models, while non-peak speeds are applied for interpeak (IP) and off-peak (OP).

2.2.4 Other Data

From the National Road Traffic Projections 2022 (NRTP22) traffic speed and traffic volumes by road and vehicle type were used for the calculation of forecast factors for LGV and HGV demand growth and speed adjustment.

The TAG Databook v1.23 from May 2024 was used for the calculation of generalised cost parameters.

2.3 Spreadsheet Traffic Model

This section describes the spreadsheet model set up and modelling assumptions for the base year and forecast years.

2.3.1 Base Year Model

The spreadsheet model was set up for the 2023 base year and represents a neutral month weekday model with average peak period hours for the following time periods.

- AM: 0700-1000
- IP: 1000-1600
- PM: 1600-1900
- OP: 1900-0700

The coverage of the model is shown in Figure 2.3.

Figure 2.3: Spreadsheet-based model extents

Source: Mott MacDonald

The model zones are located at the edge of the models aligning closely with the ANPR sites. At this stage no zone is allocated to Whittlesey itself, but only 'through-trips' (i.e., trips between the ANPR sites) are within scope of the model, with trips with a start or end within Whittlesey not considered. Although these trips across the day represent about 30% of total trips, they are not considered likely to use the Relief Road.

Distances between the zones were extracted from GIS mapping using the shortest routes between each zone based on the model shown above.

The by link aggregated TomTom average speed data for each model link as shown above was grouped into routes between origin and destination zones. The peak period data was used for the AM and PM models while the off-peak data was used for the interpeak and off-peak periods.

Matrices were built for car, LGV, OGV1 and OGV2 from the observed ANPR data. Due to the very small volume of bus/coach traffic these were not included as a separate vehicle class. The final period matrices are shown for AM, interpeak and PM peak below.

Table 2.1: Base model demand AM

	1	2	3	4	5	Total
1		76	13	35	6	131
2	151		66	5	23	245
3	19	29		22	26	96
4	30	3	16		2	51
5	3	13	20	1		37
Total	203	122	115	63	56	559

As the model is built to assess the impact of a Relief Road on the existing traffic volumes, the trips with destinations within Whittlesey are not taken into account at this stage but through trips only.

Table 2.2: Base model demand IP

	1	2	3	4	5	Total
1	0	64	12	23	4	104
2	71	0	38	5	11	125
3	12	36	0	13	15	76
4	26	3	15	0	2	46
5	5	11	20	2	0	38
Total	115	114	85	42	32	388

Table 2.3: Base model demand PM

	1	2	3	4	5	Total
1		133	17	18	7	175
2	102		31	4	10	147
3	13	59		11	16	98
4	35	4	21		1	62
5	6	17	26	3		52
Total	156	213	95	35	35	533

2.3.2 DM Forecast Models

Forecast models were prepared for 2030 to represent an estimated opening year and 2045 as second forecast year 15 years after opening.

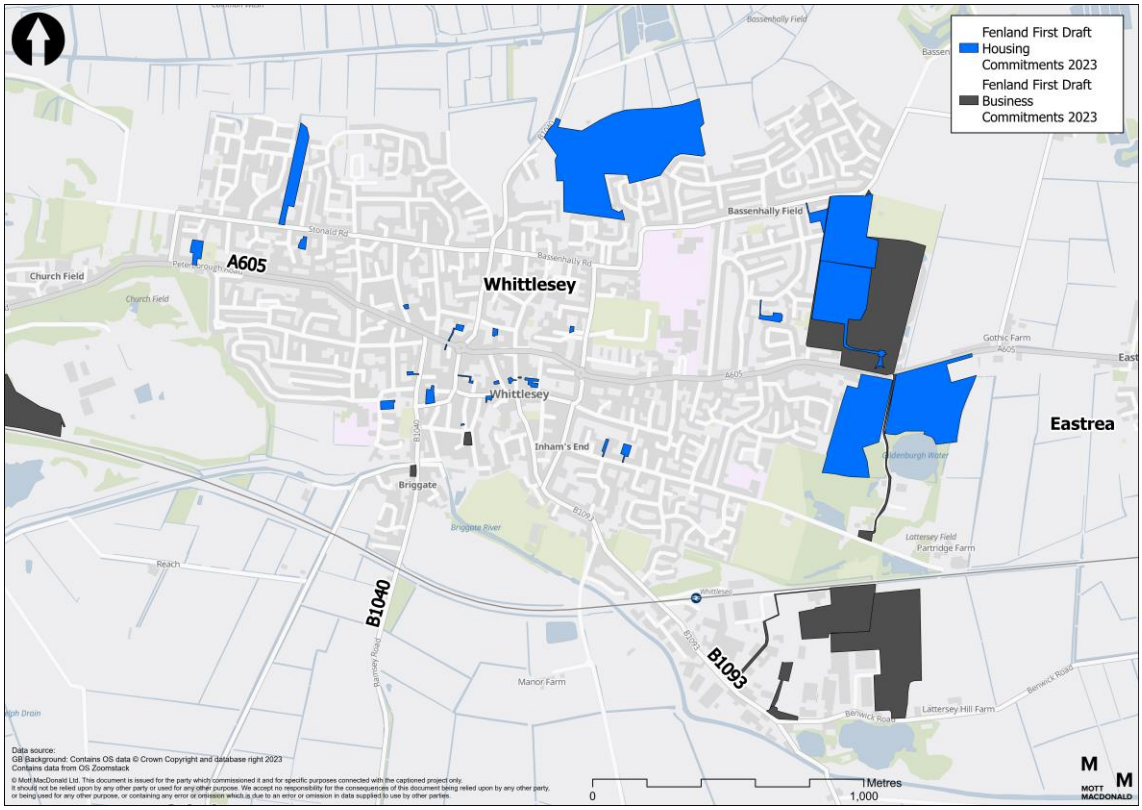
2.3.2.1 Land Use Assumptions

The current adopted Fenland Local Plan (2014) aimed to deliver 11,000 new homes between 2014 and 2031 and for 85ha of new employment sites and 7,200 additional jobs.

Of the allocations in the Local Plan, 1,000 homes and five hectares of employment land were allocated for Whittlesey, with a majority of Whittlesey's housing allocation (500 dwellings) being supported by an extension to the urban area at land north and south of Eastrea Road to the east of the village. As of January 2024, this development has been partially completed and has contributed to the town seeing growth that exceeds the allocations set out in the Local Plan. Most of the additional traffic generated would be captured by the ANPR data.

Currently a new draft Fenland Local Plan (2022) is being developed for the district, that along with the adopted Peterborough Local Plan (2019), sets out the future development strategies for the region. The overarching land allocations for future housing and employment contained within the Local Plans for the Whittlesey area are shown in Figure 2.4. This includes a total of 875 dwellings and 31ha of employment space.

Figure 2.4: Whittlesey housing and employment commitments (2023)



Source: FDC

If these developments come forward, they will generate a significant level of additional traffic flow to, from and within Whittlesey. However, as the model currently accounts only for traffic through Whittlesey these additional trips are not taken into account directly at this assessment stage.

2.3.2.2 Forecast Assumptions

As described above the proposed housing and employment developments would result in a significant increase in trips for Whittlesey. At this stage they are not quantified into the model directly while the spreadsheet model is built to focus on through traffic. Instead, the car growth factors from NTEM8 were extracted for the Fenland 006 area origin and destination growth. These are shown in Table 2.4 below. The average factors were applied to the base year demand.

Table 2.4: NTEM 8 growth factors for car growth

Year	Origin	Destination	Average
2030	1.0402	1.0397	1.0400
2045	**1.0994**	**1.0983**	**1.0989**

LGV and OGV growth is based on NRTP22 using Eastern England A-road values for each vehicle type respectively. The resulting factors are set out in Table 2.5.

Table 2.5: NRTP22 growth factors for goods vehicle growth

Year	LGV	HGV
2030	1.055	1.010
2045	**1.268**	**1.047**

Generalised costs were applied using the TAG Data Book v1.23 May 2024.

Forecast speed reductions were calculated based on NRTP22 core values for Eastern England. A weighted average was applied for A-roads and minor roads across all vehicle types. The speeds and factors are shown below and were applied to the base year speeds to create forecast speeds for each forecast year along the existing route.

Table 2.6: NRTP22 speeds and adjustment factors

Year	Average speed (mph)	Factor
2023	31.6	1.000
2030	31.4	0.992
2045	30.9	0.980

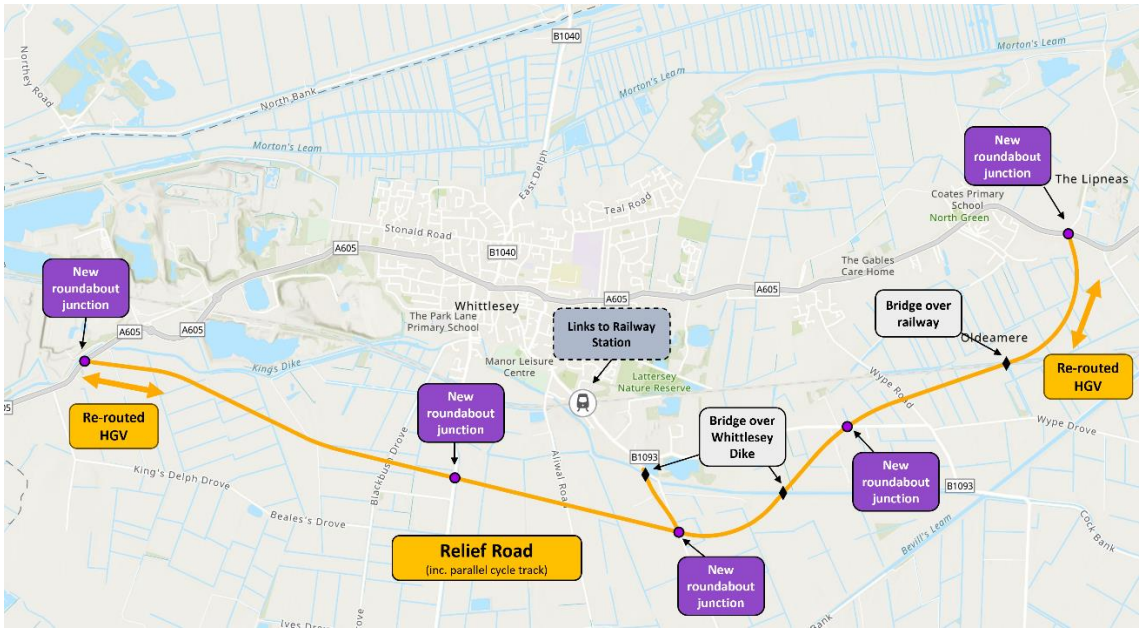
2.3.3 DS Forecast Models

As part of the development of the SOC, a set of shortlisted options has been defined following a sifting process. This included packaging the better performing options together, where they complement each other across the themed objectives. The final packaging resulted in four options to be progressed to concept design and more detailed appraisal and consultation at SOC.

Three of the options include the same Relief Road alignment (black route) as shown in Figure 2.5, with the other option only entailing only a bus-based travel hub with active travel links. The assessments described below only include the Relief Road element that is common across three of the options but exclude further bus or active travel improvements proposed.

The proposed Relief Road is currently assumed as operating with a 40mph speed limit.

Figure 2.5: Proposed Relief Road location



Source: Mott MacDonald

The initial design results in a travel distance of 8.9km between the zones at the western and eastern edges of the model. This is 500m further than travelling via the existing A605 route. However, the road's 40mph speed limit is assumed to result in an overall time saving for east/west through trips along the A605, and through-trips are therefore assumed to reassign onto the Relief Road.

Other locations within the model (e.g., to the south via B1040 or B1093) benefit from more direct connections to the east and west and avoiding the need to route via Whittlesey town centre.

2.3.3.1 DS Demand

Based on a review of estimated travel times and distances, all through-trips forecast for Whittlesey (other than those to and from the north, which will not directly benefit from the Relief Road) are assumed to benefit from the proposed Relief Road and are assumed to switch in their entirety to the scheme in the DS models.

2.4 Forecast Modelling Results

The spreadsheet model forecasts combine the elements above and calculates the DM and DS demand, distance and travel time. The demand, distance and speed changes across the forecast years and for DM and DS are summarised in the tables below.

Based on the generalised costs, distance and time savings are achieved for all zones impacted by the Relief Road, which only excludes zone 3 to the north of the town. Savings increase during the second forecast year 2045 based on increased demand and reducing vehicle operating costs.

Table 2.7: Forecast total demand changes (in vehicles/hour)

Time Period	Base 2023	2030	Diff to base	2045	Diff to base
AM	559	581	4%	614	10%
IP	388	404	4%	427	10%
PM	533	554	4%	586	10%
OP	82	85	4%	90	10%

Demand across all vehicle types increases by 4% in 2030 and 10% by 2045 for all time periods.

Table 2.8: Distance via town centre (existing route) in km

Origin/Destination	1	2	3	4	5
1		8.4	5.5	5.7	4.8
2	8.4		7.6	6.8	6.9
3	5.5	7.6		4.8	3.9
4	5.7	6.8	4.8		4.1
5	4.8	6.9	3.9	4.1	

Table 2.9: Distance with Relief Road (scheme) in km

Origin/Destination	1	2	3	4	5
1		8.9	5.5	4.6	2.9
2	8.9		7.6	4.3	5.9
3	5.5	7.6		4.8	3.9
4	4.6	4.3	4.8		1.7
5	2.9	5.9	3.9	1.7	

Table 2.10: Difference in distance in km

Origin/Destination	1	2	3	4	5
1		0.4	0	-1.1	-1.9
2	0.4		0	-2.6	-0.9
3	0	0		0	0
4	-1.1	-2.6	0		-2.5
5	-1.9	-0.9	0	-2.5	

Although the travel distance along the Relief Road travelling east to west or west to east increases by just under half a kilometre, the majority of origin destination pairs achieve significant distance savings from the new Relief Road with a maximum reduction of 2.6km for trips between zone 2 (east) to zone 4 (south-east).

Table 2.11: Travel time via town centre (existing route) for AM and PM peak period in min

Origin/Destination	1	2	3	4	5
1		11.4	7.1	8.0	6.7
2	11.4		9.6	8.9	9.2
3	7.1	9.6		6.2	5.0
4	8.0	8.9	6.2		5.9
5	6.7	9.2	5.0	5.9	

Table 2.12: Travel times with Relief Road (scheme) for AM and PM peak period in min

Origin/Destination	1	2	3	4	5
1		8.3	7.1	4.3	2.7
2	8.3		9.6	4.0	5.6
3	7.1	9.6		6.2	5.0
4	4.3	4.0	6.2		1.6
5	2.7	5.6	5.0	1.6	

Table 2.13: Difference in travel time for AM and PM peak in min

Origin/Destination	1	2	3	4	5
1		-3.1	0.0	-3.7	-4.0
2	-3.1		0.0	-4.9	-3.6
3	0.0	0.0		0.0	0.0
4	-3.7	-4.9	0.0		-4.3
5	-4.0	-3.6	0.0	-4.3	

The travel time reduces for all through trips other than those to and from zone 3 (north) with the largest saving of almost 5 minutes for trips between zone 2 (east) and zone 4 (south-east).

3 Economic Assessments

As part of the Whittlesey Relief Road assessments based on the above traffic modelling a quantification of the user and accident benefits has been carried out and described below. The TUBA software and Cobalt

3.1 Transport User Benefits

In order to calculate the user benefits TUBAv1.9.23 was set up.

3.1.1 TUBA set-up

The TUBA assessment is based on the traffic forecasting results described in section 2.3. The set-up assumptions were as follows:

3.1.1.1 User Classes

Using the modelled vehicle classes car, LGV and OGV the following factors were applied based on TAG Databook v1.23 May 2024 table A1.3.4 to disaggregate the demand volumes into the required TUABA user classes.

Table 3.1: TUBA User Classes

ID	Name	Modelled vehicle class	Factor
1	Car Business	Car	0.062
2	Car Commute	Car	0.252
3	Car Other	Car	0.686
4	LGV Business	LGV	0.12
5	LGV Personal	LGV	0.88
6	OGV1	OGV1	1
7	OGV2	OGV2	1

3.1.1.2 Annualisation Factors

The annualisation factors are based on all weekday hours for each modelled time period and are shown in Table 3.2.

Table 3.2: Annualisation Factors

Time Period	Annualisation Factor
AM: 0700-1000	759
IP: 1000-1600	1,518
PM: 1600-1900	759
Off-peak: 1900-0700	3036

Source: Mott MacDonald

3.2 Collision Impacts

Currently the A605 carries significant volumes of traffic through the urban centre of Whittlesey with destinations beyond. This includes heavy goods vehicles accessing the business park to the south via the small market town roads posing risks of collisions. With the Relief Road in place this 'through' traffic would divert to a non-urban, safer route resulting in accident benefits. These are quantified with the Cobalt assessment described below.

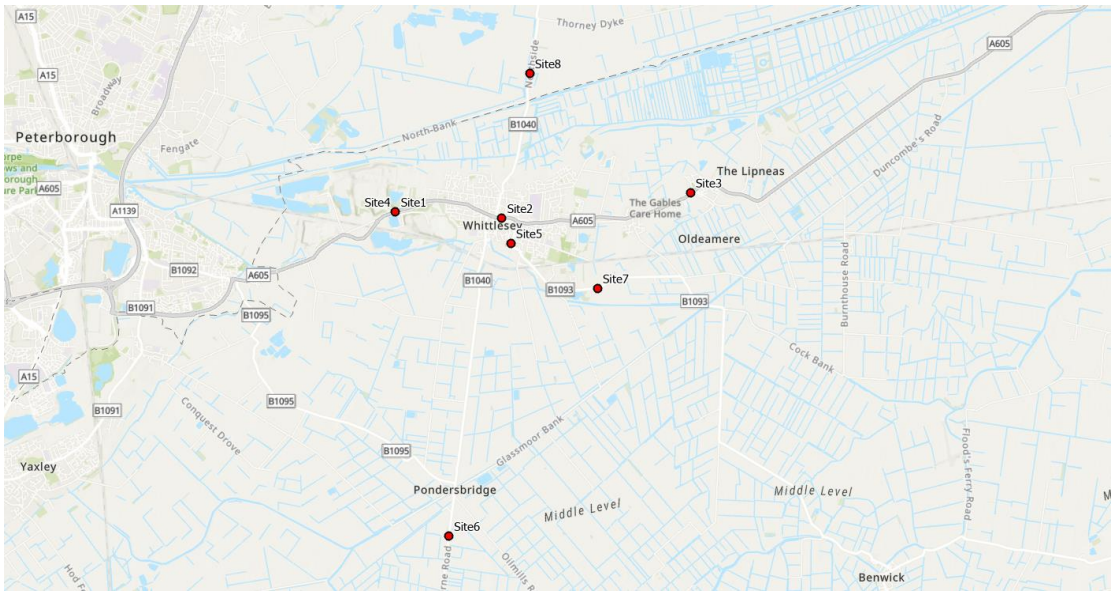
3.2.1 COBALT set up

The COBALT assessment is based on the traffic model links shown in Figure 2.3. The links and junctions combined approach was chosen as no junction data is available.

DfT traffic flow data was available for several model links as shown in Figure 3.1 and the latest count and count method are shown in

Table 3.3.

Figure 3.1: DfT count locations



Source: Mott MacDonald

Table 3.3: DfT Count Data

Site	DfT ID	Road Name	Latest Year	Count Method
Site1	7329	A605	2022	Manual count
Site2	57350	A605	2023	Estimated using previous year's AADF on this link
Site3	57362	A605	2023	Estimated using previous year's AADF on this link
Site4	95042	A605	2023	Estimated using previous year's AADF on this link
Site5	808568	B1093	2023	Manual count
Site6	940944	B1040	2019	Manual count
Site7	940959	B1093	2019	Estimated using previous year's AADF on this link
Site8	941982	B1040	2019	Manual count

Although the availability of the latest data varied by year no adjustment factors were applied to the data at this stage, as the annual traffic growth varied significantly by site and year.

The AADT value for model links without DfT count data available was estimated by calculating averages of adjacent links.

A summary of the base year and Do Minimum (DM) counts used as well as link type, speed and distance definition extracted from GIS are shown in Table 3.4.

Table 3.4: COBALT inputs Base and DM

ID	LinkType	Speed Limit	Section Length	DfT Count Site
1	Older S2 A Roads	40	0.99	Site 3
2	Older S2 A Roads	30	2.233	Site 3
3	Other S2 Roads	60	1.558	Site 8
4	Other S2 Roads	30	0.764	Site 8
5	Older S2 A Roads	30	0.468	Site 2
6	Older S2 A Roads	30	1.568	Average Site 2 and 3
7	Other S2 Roads	30	2.054	Site 5
8	Other S2 Roads	20	0.319	Site 6

ID	LinkType	Speed Limit	Section Length	DfT Count Site
9	Other S2 Roads	60	1.299	Site 6
10	Older S2 A Roads	30	1.133	Average Site 1 and 2
11	Older S2 A Roads	40	2.056	Site 1

Forecast demand growth was aligned with the forecast modelling and for 2023 to 2030 based on NTEM8 growth using the origin and destination combined factor of 1.04. The growth from 2030 to 2045 was then based on the total matrix growth calculated from the forecast modelling and cumulated to 1.089.

The Do Something (DS) demand was calculated based on the ANPR data proportions of 'through' traffic versus traffic to and from Whittlesey. This was calculated for all sites other than ANPR site 3 to the north at which traffic is not impacted by the Relief Road. The final proportions of traffic switching are summarised in Table 3.5 below. The table also indicates the impact on the DM link demand associated to each ANPR site.

Table 3.5: COBALT DS Demand Definition

Site	Shifting Factor	Links applied	Equivalent demand reduction applied to
Site 1	26%	Applied to link 11 to determine DS link 13	Links 10 and 11
Site 2	37%	Applied to link 2 to determine DS link 12	Links 1, 2, 5 and 6
Site 4	19%	Applied to link 7	Link 7
Site 5	20%	Applied to link 9	Link 8 and 8

3.2.2 Accident Data

Local accident data was available from the DfT's Road Safety Open Data (SATS19). Data was extracted from 2017 to 2023, but data from years 2020 and 2021 excluded for the assessment due to the impact of Covid19. The collisions were allocated to the base/DM model links for the five years separately.

From the local accident data, it is noticeable that the majority of accidents within the urban area are located at junctions with few collisions located along the road sections between junctions.

3.2.3 COBALT limitations

Based on the nature of the spreadsheet model it is at this stage not possible to represent scheme impacts on links and junctions separately within the COBALT assessment. Therefore, all accidents at junctions are allocated to the adjacent link. As there are few accidents located along the links the local accident rates are much lower than the default values for the identified link types. It is therefore concluded that the accident rates for the new Relief Road would be significantly overestimated if purely based on the default rate and a rate from a similar adjacent link was used to calculate the overall results based on local accident rates. However, these results underrepresent the impact at the junctions with currently higher incidents identified.

Subsequently, impacts have also been assessed using all default accident rates as well to provide a scale of impact results. These results are likely to overstate the impacts, as the local accident rates are generally lower.

3.3 Economic Appraisal Results

3.3.1 TUBA Results

The TUBA economic assessment was carried out using TUBA v1.9.23.

The results by time period and purpose are shown below.

Table 3.6: TUBA user benefits by purpose (in £,000)

Purpose	Year	User Time	User charges PT_fares	VOC Fuel	VOC Non_fuel	Operator revenue PT_fares	Indirect taxes	Total
Business	2030	189	0	32	32	0	-17	236
Business	2045	166	0	16	20	0	-8	194
Commuting	2030	69	0	4	0	0	-2	71
Commuting	2045	57	0	2	0	0	-1	58
Other	2030	140	0	12	1	0	-6	147
Other	2045	116	0	4	1	0	-2	119
Business	Total	7,990	0	718	888	0	-350	9,246
Commuting	Total	2,769	0	72	7	0	-34	2,814
Other	Total	5,631	0	211	26	0	-99	5,769

The majority of benefits by purpose are forecast for the business purpose combining goods vehicles and cars. Benefits for other purposes are also high with fewer benefits assessed for commuting. For each purpose the benefits reduce slightly in the second forecast year due to discounting impacts.

Table 3.7: TUBA user benefits by period (in £,000)

Purpose	Year	User Time	User charges PT_fares	VOC Fuel	VOC Non_fuel	Operator revenue PT_fares	Indirect taxes	Total
AM peak	2030	101	0	12	8	0	-6	115
AM peak	2045	86	0	5	5	0	-3	93
PM peak	2030	88	0	8	4	0	-4	96
PM peak	2045	75	0	3	2	0	-2	78
Inter-peak	2030	130	0	18	14	0	-9	153

Purpose	Year	User Time	User charges PT_fares	VOC Fuel	VOC Non_fuel	Operator revenue PT_fares	Indirect taxes	Total
Inter-peak	2045	111	0	9	9	0	-4	125
Off-peak	2030	79	0	10	7	0	-5	91
Off-peak	2045	67	0	5	4	0	-2	74
AM peak	Total	4,169	0	249	230	0	-122	4,526
PM peak	Total	3,626	0	148	105	0	-72	3,807
Inter-peak	Total	5,348	0	390	393	0	-186	5,945
Off-peak	Total	3,247	0	213	192	0	-103	3,549

Comparing results across the periods most benefits are assessed for the interpeak period, which represents a longer period than the peaks. AM and PM peak results are similar and fewest benefit are achieved during the weekday off-peak periods. The benefits in the second forecast year are slightly lower than for the opening year due to discounting.

There were 1574 warning messages which are all related to the higher-than-expected benefits between zones 4 and 5. Currently these trips route via the town centre but will gain a much more direct connection with the Relief Road in place. No warnings were identified representing a concern regarding the assessment outputs.

The TEE table is presented in Table 3.5.

Table 3.8: Transport Economic Efficiency (TEE) Table

Non-business: Commuting	ALL MODES		ROAD		BUS and COACH	RAIL		OTHER
User benefits	TOTAL		Private Cars and LGVs		Passengers	Passengers		
Travel time	2,769		2769					
Vehicle operating costs	78		78					
User charges	-		0					
During Construction & Maintenance	-		0					
NET NON-BUSINESS BENEFITS: COMMUTING	2,848	*(1a)*	2848					
Non-business: Other	ALL MODES		ROAD		BUS and COACH	RAIL		OTHER
User benefits	TOTAL		Private Cars and LGVs		Passengers	Passengers		
Travel time	5,631		5631					
Vehicle operating costs	237		237					
User charges	-		0					
During Construction & Maintenance	-		0					
NET NON-BUSINESS BENEFITS: OTHER	5,867	*(1b)*	5867					
Business								
User benefits			Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers	
Travel time	7,990		7393	598				
Vehicle operating costs	1,606		1530	76				
User charges	-		0	0				
During Construction & Maintenance	-		0	0				
Subtotal	9,596	*(2)*	8922	674				
Private sector provider impacts						Freight	Passengers	
Revenue	-							
Operating costs	-							
Investment costs	-							
Grant/subsidy	-							
Subtotal	-	*(3)*						
Other business impacts								
Developer contributions	-	*(4)*						
NET BUSINESS IMPACT	9,596	*(5) = (2) + (3) + (4)*						
TOTAL								
Present Value of Transport Economic Efficiency Benefits (TEE)	18,311	*(6) = (1a) + (1b) + (5)*						

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2010 prices and values

Overall, £18.3m benefits are assessed for the 60 year appraisal period assuming an opening year of 2030. The benefits are based on the time savings model traffic achieves from using the Relief Road with a faster speed limit and fewer junctions than the current A605 leading through Whittlesey town centre.

3.3.2 COBALT Results

The COBALT results are presented for the assessment with local and default accident rates. This is because although the local rates are significantly lower than the default rates, when assessing links and junctions combined, the vast majority of local accidents are located at junctions. The combined assessment is therefore likely to underestimate the impacts of the Relief Road. However, based on the spreadsheet model it is not currently possible to assess junction impacts separately.

Therefore, the impacts of a default combined assessment are also shown. These are likely overestimating the impacts.

The benefits table below shows that based on local accident data combining links and junctions impacts of £0.8m are assessed compared to £3.3m using default rates.

Table 3.9: COBALT Benefits

Accident Data	Accident Costs Without-Scheme (£000)	Accident Costs With-Scheme (£000)	Benefits of Scheme (£000)
Local	9,862.1	9,092.8	769.3
Default	31,919.7	28,668.8	3,250.9

Table 3.10: COBALT Accident Summary (PIA's)

Accident Data	Accident Numbers Without Scheme	Accident Numbers With Scheme	Benefit of Scheme
Local	280.0	258.0	22.1
Default	907.2	814.9	92.3

The accident numbers based on local data are less than a quarter of the default values. However, this is likely to be underestimated as the local rate does not consider the accidents at junctions explicitly at this stage.

Table 3.11: COBALT Casualty Numbers

	Without Scheme			With Scheme			Scheme benefits		
Accident Data	Fatal	Serious	Slight	Fatal	Serious	Slight	Fatal	Serious	Slight
Local	2.0	36.2	328.3	1.8	33.5	302.2	0.1	2.8	26.1
Default	6.4	115.4	1075.9	5.7	103.7	966.5	0.6	11.8	109.4

The casualty results align with the accident results showing significantly fewer casualties based on local rates. However, there assessment shows for both accident assumptions the scheme will reduce fatal serious and slight accidents resulting in benefits overall.

3.3.3 Summary

Based on ANPR data from 2023 across a weekday there are about 7,400 trips along the A605 approaching Whittlesey from the west and about 5,100 trips approaching Whittlesey from the east. Of these 1,900 are 'through-trips' that currently travel through Whittlesey's urban centre

but would shift to using the Relief Road. This represents a 30% traffic reduction for the urban centre.

The through traffic volumes vary between about 550 vehicle trips in AM and PM peak hours and 380 vehicle trips during the interpeak of which 10% and 15% are heavy goods vehicles (HGV's), respectively.

In addition to reducing the traffic volumes through the urban centre the 'through-trips' travel faster on the Relief Road and for trips to and from the southern direction the Relief Road also represents a reduction in travel distance.

The user benefit assessment shows benefits of £18.3m with the Relief Road in place and further accident benefits of £3.3m.

4 Sensitivity Testing

The A605 through Whittlesey features as National Highways' (NH) default diversion route for the A47 to the north. The A47 east of Peterborough near Eye carries about 14,000 vehicles per direction including one thousand during the afternoon peak hour (based on WebTRIS data 2023). This is between three and four times the volume of traffic compared to the A605 east of Whittlesey. Therefore, the impact of any incidents along the A47 can have a tremendous impact on the volumes of through traffic through Whittlesey.

The routing impacts are not possible to be modelled with the localised spreadsheet model. Instead, a high level select link analysis was carried out using the PTM3 updated 2023 base model. This shows that the vast majority of trips (between 80 and 90%) along the A47 have their origin or destination at Peterborough to the west and Wisbech or Norwich to the east. This means they are very likely to divert via the A605. The remaining trips are to or from Chatteris or Ely to the south-east and could divert via the A141 and A1(M) instead.

There are several minor roads, such as B1143 and B1167, parallel to the A47 that could represent alternatives for some car or LGV trips with more local destinations or in scenarios when delays via the A605 increase. However these are unlikely to be used by HGVs, which will follow the NH diversions. The impact of the volume of HGV's along could represent almost double the traffic volumes through the urban centre of Whittlesey.

With the Relief Road in place traffic would still be required to use the A605 as diversion. However, traffic would avoid the urban centre and bypass it instead resulting in significantly reduced delays and disruption to Whittlesey.

MOTT MACDONALD

Whittlesey Relief Road

Social Impact Appraisal

September 2024

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Whittlesey Relief Road

Social Impact Appraisal

September 2024

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1 Introduction

Mott MacDonald has been commissioned by Fenland District Council to support the development of the short listed options for the proposed Whittlesey Relief Road. A Social Impact Appraisal covers the human experience of a transport system and its impact on social factors not considered as part of economic and environmental appraisals. Methods prescribed in TAG Unit A4.1[1] have been used to determine any impacts of the scheme.

The eight social impacts, as defined by TAG Unit A4.1 guidance, assessed as part of the appraisal are:

- Accidents
- Physical activity
- Security
- Severance
- Journey quality
- Option and non-use values
- Accessibility
- Personal affordability

The overall summary of the expected social impacts is outlined in Table 1. Each social impact is assessed per option in more detail below.

Table 1: Summary of expected social impacts

Social Impact	Overall Appraisal Result			
	Option 1	Option 2	Option 3	Option 4
Accidents	Moderate beneficial	Moderate beneficial	Moderate beneficial	Slight beneficial
Physical Activity	Slight beneficial	Moderate beneficial	Large beneficial	Moderate beneficial
Security	Neutral	Neutral	Slight beneficial	Slight beneficial
Severance	Moderate beneficial	Moderate beneficial	Large beneficial	Slight beneficial
Journey Quality	Moderate beneficial	Large beneficial	Large beneficial	Slight beneficial
Option and non-use values	Neutral	Neutral	Neutral	Slight beneficial
Accessibility	Slight beneficial	Moderate beneficial	Large beneficial	Moderate beneficial

[1] Department for Transport, TAG UNIT A4.1 Social Impact Appraisal Guidance, Available at - TAG UNIT A4.1 Social Impact Appraisal (publishing.service.gov.uk), accessed March 2022.

Personal affordability	Neutral	Neutral	Neutral	Neutral

2 Accidents

1.1 Overview

Transport interventions may reduce the likelihood of people being hurt in accidents. Accidents can occur in all modes of transportation, affecting both users and non-users. The key quantitative indicator for evaluating transportation initiatives is the difference in the number of casualties and accidents with and without the scheme.

Accidents can result in no casualties (resulting in damage only) or one or more casualties (such as Personal Injury Accidents) of varying severity. As stated in Section 2.1.4 in the TAG guidance[2], three groups are used to differentiate between casualty severity: fatal (death occurs within 30 days); serious (casualties require hospital treatment and have lasting injuries); and slight (casualties have injuries that do not require hospital treatment or if they do, effects subside quickly).

1.2 Appraisal of impacts

The A605 is a key route for east-west traffic between Peterborough and the Fenland market towns. The A605 through Whittlesey sees circa 7,500 vehicles per day from Peterborough and 5,000 vehicles per day from Fenland Market Towns, 75% of which is dominated by private vehicles. A significant proportion of all traffic along this route through Whittlesey is through traffic (40%) and 68% of HGV movements are through traffic. The high volume of traffic on the A605 through a town centre segregates the town and means accidents are likely, causing congestion and resulting in longer journey times for commuting traffic.

The objectives of the scheme include reducing congestion, improving safety and reducing severance on the local road network through Whittlesey, which requires a smoother flow of traffic in the area.

Option 1, 2 and 3 propose a new single carriageway relief road running to the south of Whittlesey town centre, that includes a parallel cycle track. This is likely to reduce the number of vehicles, of up to 3,000 vehicles per day, including up to 370 HGVs per day travelling through Whittlesey town centre, reducing the likelihood of collisions which will potentially improve safety in Whittlesey and reduce the number of accidents.

Option 2 includes enhanced pedestrian crossing facilities in the form of either islands or traffic lights, which is likely to improve safety and access for pedestrians in Whittlesey, reducing the likelihood of accidents involving pedestrians.

Option 3 includes include the introduction of new active travel improvements through the town and along the A605 which is likely to enable a greater level of local journeys around Whittlesey to be undertaken by walking or cycling, reducing car use for shorter journeys and subsequently congestion and likelihood of accidents. However, there may be an increase in accidents as a result of an increased number of pedestrians and cyclists.

Option 4 proposes a new Mobility Hub located to the east of the town which could improve access to existing bus services and enable the introduction of shuttle bus type express services linking into the town centre, Whittlesea station, and Peterborough. Option 4 will also include improved active travel provision across the town to both the Mobility Hub and Whittlesea station

[2] Department for Transport, TAG UNIT A4.1 Social Impact Appraisal Guidance, Available at - TAG UNIT A4.1 Social Impact Appraisal (publishing.service.gov.uk), accessed March 2022.

to encourage local trips to access bus and rail services without the use of a car. This is likely to encourage more bus services to serve Whittlesey, and a modal shift away from private car use and on to public transport and active travel, thus slightly reducing the number of vehicles and congestion on the local road network, and improve safety in the area for pedestrians. However Option 4 will not reduce the level of HGV movements in Whittlesey, and the Mobility Hub's location may mean that residents in the west of Whittlesey may not utilise its facilities. Additionally, Option 4 is reliant on bus operators capitalising on these new improvements by running services.

All of these measures will ultimately contribute to reduced casualties, lower accident severity and a lower accident rate, benefiting non-motorised users (pedestrians and cyclists), as well as motorised users (drivers). Options 1, 2 and 3 will therefore yield a moderate beneficial impact and Option 4 a slight beneficial impact, for users of the A605 through Whittlesey.

1.3 Summary appraisal scores

Option 1: Moderate beneficial

Option 2: Moderate beneficial

Option 3: Moderate beneficial

Option 4: Slight beneficial

3 Physical Activity

3.1 Overview

The interdependence between transportation, the environment, and health has long been recognised[3]. Physical activity levels can be influenced by transportation. Physical inactivity is a major risk factor for a wide variety of noncommunicable diseases, including coronary heart disease, stroke, diabetes, as well as many cancers[4]. Physical activity is also effective in reducing weight gain and obesity, as well as enhancing mental health. This section examines the health benefits of travel (i.e. walking and cycling).

Physical activity benefits are often a major component of the scheme's benefits for interventions aimed at promoting cycling and walking. Physical activity impacts will be relevant for schemes such as this that involve other modes, if it can be proved that there is a considerable mode shift owing to the intervention to or from active modes.

3.2 Appraisal of impacts

The implementation of the proposed scheme may affect pedestrians, cyclists and existing public transport services.

Option 1, 2 and 3 propose a new single carriageway relief road running to the south of Whittlesey town centre, that includes a parallel cycle track. This is likely to reduce the number of vehicles travelling through Whittlesey town centre, improving safety and reducing severance for pedestrians and cyclists in Whittlesey.

Option 2 includes enhanced pedestrian crossing facilities which is likely to improve safety and access for pedestrians in Whittlesey.

Option 3 includes the introduction of new active travel improvements through the town and along the A605 which is likely to enable a greater level of local journeys around Whittlesey to be undertaken by walking or cycling and reducing car use for shorter journeys.

Option 4 proposes improved active travel provision across the town to a new Mobility Hub and Whittlesea station to encourage local trips to access bus and rail services without the use of a car. This is likely to encourage more bus services to serve Whittlesey, and a modal shift away from private car use and on to public transport and active travel.

Overall, Options 1 is assessed to have a slight beneficial effect, Option 2 a moderate beneficial effect, Option 3 a large beneficial effect and Option 4 a moderate beneficial effect.

3.3 Summary appraisal scores

Option 1: Slight beneficial

Option 2: Moderate beneficial

Option 3: Large beneficial

Option 4: Moderate beneficial

[3] Road Transport and Health (1997), British Medical Association

[4] Department of Health (2004): At Least Five a Week. A report from the Chief Medical Officer.

4 Security

4.1 Overview

Transport interventions may have an impact on the level of security for transport users. The assessment of these impacts should take into account both changes in security and the predicted number of affected users. Site perimeters, entrances, and exits; formal and informal monitoring; landscaping; lighting and visibility; and emergency call points are all examples of security indicators.

While the TAG guidance focuses on the security impacts of railway stations and public transportation, our assessment will focus on the security of non-motorised users of the road, particularly pedestrians and cyclists. Certain user groups, such as women and older people, may be more prone to safety concerns and, as a result, are more likely to avoid travelling by bicycle or foot.[5]

4.2 Appraisal of impacts

While the development of the scheme aims to improve safety and security for all, the scheme is unlikely to affect vulnerability to crime and other aspects of personal safety, which are the primary factors assessed in the TAG guidance.

During construction of the scheme, there is potential for adverse landscape and visual effects, which may contribute to potential security concerns but are expected to be temporary in nature.

While Options 1, 2 and 3 provide an improved cycle track along the potential relief road, these improvements are unlikely to impact on perceived safety of non-motorised users from the perspective of reduced crime. Options 3 and 4 provide improved active travel infrastructure, including segregation where possible, improved lighting and improved surfaces. This has the potential to increase feelings of security amongst vulnerable road users (VRU's) such as the elderly. Therefore, the overall impact on security, during construction and operation is anticipated to be neutral for Options 1 and 2 and slightly beneficial for Options 3 and 4.

4.3 Summary appraisal scores

Option 1: Neutral

Option 2: Neutral

Option 3: Slight beneficial

Option 4: Slight beneficial

[5] TAG Unit A4.1 Social Impact Appraisal

5 Severance

5.1 Overview

The introduction or removal of a physical barrier between residents and community facilities/services, as well as whether traffic flows arising from the scheme cause or remove barriers between residents and community facilities/services, are all considered in community severance. Significant changes in transportation infrastructure that obstruct pedestrian mobility or create a physical barrier to movement might cause severance.[6]

Severance predominantly impacts non-motorized modes of transportation, notably walkers, however this assessment will also consider motorised travel due to the higher impact on journey delays. Cyclists will be impacted differently by severance due to two factors: they travel faster and may not have access to crossing facilities. Severance impacts are grouped into four broad categories, according to TAG guidance: none, slight, moderate, and large.

5.2 Appraisal of impacts

The objective of the scheme is to reduce congestion, improve safety and reduce severance on the A605 through Whittlesey and the surrounding road, walking and cycling network.

The high volume of traffic on the A605 through Whittlesey segregates the town centre creating severance. Options 1, 2 and 3 are likely to reduce the severance caused by the high volume of traffic through Whittlesey by providing a relief road to the south of Whittlesey for though traffic. Additionally, the new cycle track parallel to the relief road will provide a new safe active travel route that bypasses Whittlesey Town Centre. Option 2 is also likely to discourage private vehicles travelling through Whittlesey town centre due to bus priority measures, further reducing severance along the A605. Option 3 has the potential to further reduce severance in Whittlesey through the introduction of active travel improvements including shared use paths and toucan crossings. Therefore the impact is assessed to be moderate beneficiation for Option 1 and 2 and large beneficial for Option 3.

Option 4 has the potential to indirectly reduce severance by encouraging more public transport and active travel use though the provision of shared use spaces, toucan crossings, and a mobility hub. However this option will not reduce the number of HGVs travelling through Whittlesey, therefore the overall impact is assessed to be slight beneficial.

5.3 Summary appraisal scores

Option 1: Moderate beneficial

Option 2: Moderate beneficial

Option 3: Large beneficial

Option 4: Slight beneficial

[6] TAG Unit A4.1 Social Impact Appraisal

6 Journey Quality

6.1 Overview

Journey quality is a measure of the real and perceived physical and social environment experienced while travelling and can be affected both by travellers and by network providers and operators. The journey quality assessment evaluates the actual and perceived social and physical environment experienced when travelling, which can have an important influence on travel choices. Traveller care, traveller perspectives, and traveller stress are three subcategories of journey quality. Poor journey experience may deter people from taking certain modes of transportation, whereas good journey quality can often go undetected and become assumed.

6.2 Appraisal of impacts

TAG Unit A4.1 guidance includes aspects such as cleanliness, level of facilities and information provision in traveller care, which have limited relevance in highways schemes.

As a result, this section primarily assesses traveller stress from the perspectives of both motorised and non-motorized users. Traveller stress, according to TAG guidelines, may be subdivided into frustration, fear of accidents, and route uncertainty, the latter of which is less relevant for highway schemes. Frustration is caused by road layout and geometry, road network quality, and overall ability to make effective progress along a route. The presence of other cars, inadequate sight distances, the risk of pedestrians stepping onto the road, the presence of central reservations or safety barriers, and the presence of roadworks all contribute to the concerns about potential accidents.

Options 1, 2 and 3 are likely to increase the journey quality of journeys for road users due to the provision of a relief road, directing through traffic out of Whittlesey town centre. Thus improving the road layout which is likely to reduce fear of accidents and frustration for users of the scheme, reducing travel stress levels. Options 1, 2 and 3 are expected to reduce traveller frustration and stress and as such improve journey quality for road users as a result of reduced congestion and improved, more predictable, journey times. The provision of safer and more reliable transport routes should contribute to positive impacts on journey quality for all road users.

Journey quality for those using public transport is particularly likely to improve as a result of Option 2 which includes bus priority measures within Whittlesey and Option 4 which includes a Mobility Hub, which is anticipated to improve the journey reliability and reduce stress of users travelling through and accessing Whittlesey.

Across all options, journey quality may be temporarily impacted during construction due to construction activities and potential road diversions or closures increasing route uncertainty. These disruptions to routes will no longer exist once the project is operational, and positive effects are envisaged. The provision of safer and more reliable transport networks should improve the overall quality of journey for all road users. The overall rating is assessed as moderate beneficial for Option 1, large beneficial for Options 2 and 3 and slight beneficial for Option 4.

6.3 Summary appraisal scores

Option 1: Moderate beneficial

Option 2: Large beneficial

Option 3: Large beneficial

Option 4: Slight beneficial

7 Option Values and Non-Use Values

7.1 Overview

Option and non-use values should be assessed if the scheme being appraised includes measures that will substantially change the availability of public transport services within the study area. Option values consider the willingness to pay to preserve the option of using a transport service for trips not yet anticipated or currently undertaken while non-use values are the values that are placed on the continued existence of a service.

7.2 Appraisal of impacts

Where a step-change in transport service is expected (e.g. the removal or introduction of a new mode), an appraisal is required include an assessment regarding the nature of the change in service and whether the change is beneficial or adverse in terms of option and non-use values. Options 1, 2 and 3 do not include measures that will change the availability of public transport options for those living in the study area. Therefore, the overall impact is considered for Options 1, 2 and 3 is neutral.

Option 4 proposes a new Mobility Hub which could improve access to existing bus services and enable the introduction of shuttle bus type express services linking into the town centre, Whittlesea station, and Peterborough. This is likely to encourage more bus services to serve Whittlesey, and a modal shift away from private car use and on to public transport. However, the Mobility Hubs location may mean that residents in the west of Whittlesey may not utilise its facilities and this option is reliant on bus operators capitalising on these new improvements by running services. Overall the impact is considered slight beneficial for Option 4.

7.3 Summary appraisal scores

Option 1: Neutral

Option 2: Neutral

Option 3: Neutral

Option 4: Slight beneficial

8 Accessibility

8.1 Overview

This section is focussed on local accessibility impacts that more vulnerable residents, such as people who are disabled and older people, could experience. Residents without access to a private car and those from vulnerable social groups can be more reliant on public transport, non-motorised travel, or lifts from friends and family. Key barriers to accessibility according to TAG guidance are availability and physical accessibility of transport, cost of transport, services and activities located in inaccessible places, safety and security, and travel horizons.

8.2 Appraisal of impacts

Option 1, 2 and 3 increase accessibility to local roads in Whittlesey by locating through traffic onto a relief road, providing a parallel cycle track and improving links to the railway station, increasing interconnectivity and accessibility within and around Whittlesey. However, Option 1 predominantly focuses on accessibility for motorised users, with minimal focus on active travel and public transport therefore Option 1 is assessed to have a slight beneficial effect.

Option 2 also includes bus priority measures which will reduce bus journey times and improve reliability, thus enhancing the bus offer for those travelling between Whittlesey, March and Peterborough. However, this is reliant on bus operators capitalising on these new improvements by running services. Option 2 also enhances pedestrian crossing facilities to improve safety and access for pedestrians. Therefore Option 2 is assessed to have a moderate beneficial effect.

Option 3 includes the relief road mentioned above in addition to the introduction of new active travel improvements through the town and along the A605. This will include:

- Segregated active travel provision where possible along the A605 through the town, including enhanced junctions with greater priority for active travel to allow for safe and seamless connections across the town, and the A605.
- Improvements will be made to National Cycle Network route 63 through the town, from the northwest outskirts of the town to Lattersey Nature Reserve.
- An improved cycle link to the station along Station Road from the A605, New Road, and Hawthorne Drive.

Option 3 is likely to enable greater level of local journeys around Whittlesey to be undertaken by walking or cycling, reducing car use for shorter journeys. Improvements to National Cycle Network route 63 will improve the quality of longer distance journeys and improvements to active travel access to Whittlesea station, allowing for easier access to onwards journeys by rail. As well as more people orientated infrastructure in the town and the potential reduction in local car journeys which will enhance the public realm and experience for visitors. Therefore Option 3 is assessed to have a large beneficial effect.

Option 4 proposes a new Mobility Hub which could improve access to existing bus services and enable the introduction of shuttle bus type express services linking into the town centre, Whittlesea station, and Peterborough. Option 4 will also include improved active travel provision across the town to both the Mobility Hub and Whittlesea station to encourage local trips to access bus and rail services without the use of a car. This is likely to encourage more bus services to serve Whittlesey, and a modal shift away from private car use and on to public transport and active travel. However, Option 4 is unlikely to significantly reduce the levels of through traffic in Whittlesey and the Mobility Hubs location may mean that residents in the west of Whittlesey may not utilise its facilities. The option is also reliant on bus operators capitalising

on these new improvements by running services. Overall, Option 4 is assessed to have a moderate beneficial effect.

Additionally, the scheme will have no impact on the availability and physical accessibility and cost of transport across all options.

8.3 Summary appraisal scores

Option 1: Slight beneficial

Option 2: Moderate beneficial

Option 3: Large beneficial

Option 4: Moderate beneficial

9 Personal Affordability

9.1 Overview

The monetary cost of travel can act as a major barrier to mobility for certain groups of people, for example those on lower incomes or from more deprived areas. Changes to the transport network that involve changes in user charging can impact upon those from low-income groups and deprived areas.

9.2 Appraisal of impacts

As the scheme proposes developments relating to changes to the road layout, and minor changes to public transport priority, there are no significant impact relating to personal affordability of transport. The proposed scheme also does not include measures that will change the affordability of public transport options for those living in the study area. Therefore, the overall impact appraisal is neutral across all options.

9.3 Summary appraisal scores

Option 1: Neutral

Option 2: Neutral

Option 3: Neutral

Option 4: Neutral