



A51 Tarvin-Chester Improvements Scheme

Full Business Case

July 2019

Mott MacDonald
Ground floor
Royal Liver Building
Pier Head
Liverpool L3 1JH
United Kingdom

T +44 (0)151 482 9910
F +44 (0)151 236 2985
mottmac.com

Cheshire West and Chester
Council

A51 Tarvin-Chester Improvements Scheme

Full Business Case

July 2019

Issue and Revision Record

Rev	Date	Originator	Checker	Approver	Description
A	Oct 2017	Katie Daniels/ Emily Aldridge	Heather Kenyon/ Paul Walton	Chris Hardwick	Initial draft for internal review
B	Oct 2017	Katie Daniels/ Emily Aldridge	Heather Kenyon/ Paul Walton	Paul Walton	Draft for client comment
C	Dec 2017	Katie Daniels	Heather Kenyon	Chris Hardwick	Second draft
D	Jan 2018	Heather Kenyon/ Paul Walton	Heather Kenyon/ Paul Walton	Chris Hardwick	Final
E	Feb 2018	Heather Kenyon/ Katie Daniels	Chris Hardwick	Paul Walton	Revised final version, post peer review
F	March 2018	Heather Kenyon/ Katie Daniels	Paul Walton	Chris Hardwick	Updated final version, post peer review
G	March 2018	Heather Kenyon/ Katie Daniels	Paul Walton	Chris Hardwick	Updated final version following CWAC review
H	March 2018	Heather Kenyon/ Katie Daniels	Paul Walton	Chris Hardwick	Financial Case Updated
I	April 2018	Heather Kenyon/ Katie Daniels	Paul Walton	Chris Hardwick	Table 54 updated
J	Dec 2018	Katie Daniels	Heather Kenyon/ Paul Parkhouse	Paul Walton	OBC updated to draft FBC for client review
K	Dec 2018	Katie Daniels	Heather Kenyon/ Paul Parkhouse	Paul Walton	Final FBC draft for peer review
L	Dec 2018	Katie Daniels	Heather Kenyon/ Paul Parkhouse	Paul Walton	Economic Case and Funding Sources updated
M	Dec 2018	Katie Daniels	Heather Kenyon/ Paul Parkhouse	Paul Walton	Updated Post Peer review
N	Mar 2019	Katie Daniels	Heather Kenyon	Paul Walton	Updated following rescoping of scheme elements
O	Mar 2019	Katie Daniels	Heather Kenyon	Paul Walton	Final submission
P	Mar 2019	Katie Daniels	Heather Kenyon	Paul Walton	Appendix V added
Q	July 2019	Katie Daniels	Heather Kenyon	Paul Walton	Appendix W added

Document reference: 387187 | 001 | Q

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary	1
1 Introduction	10
1.1 Headline Description	10
1.2 Scheme Context	10
1.3 Purpose and Structure of Report	11
2 The Strategic Case	13
2.1 Scheme Background	14
2.2 Establishing the Problems and Opportunities	18
2.3 Strategic Socio-Economic Overview	18
2.4 Economy and Business	28
2.5 Existing Highway Network	30
2.6 Wider Transport Network Provision	40
2.7 How People Travel	45
2.8 Land Use and Development	50
2.9 Housing	55
2.10 Air Quality	58
2.11 Review of Problems and Opportunities	60
2.12 Scheme Objectives	55
2.13 Policy Review	56
2.14 Risks, Constraints and Dependencies	66
3 Options Appraisal and Preferred Option	75
3.1 Options Appraised	75
3.2 Preferred Option Selection	79
3.3 The Scheme	83
3.4 Stage 1 Road Safety Audit	89
3.5 Impacts of Scheme Not Being Delivered	89
4 The Economic Case	91
4.1 Transport Economic Benefits	92
4.2 Wider Economic Impacts	99
4.3 Social and Distributional Impacts	101
4.4 Environmental Constraints	103
4.5 Appraisal Summary Table	105
5 The Financial Case	106
5.1 Assumptions	106

5.2	Cost Breakdown	107
5.3	Maintenance Costs	108
5.4	Cost Allowance for Monitoring and Evaluation	109
5.5	Implications of Potential CPO Issues	109
5.6	Funding Arrangements	110
6	The Commercial Case	113
6.1	Output Based Specification	113
6.2	Approach to Demonstrate Commercial Viability	113
6.3	Contract Procedure Rules (CPR's)	114
6.4	Procurement Strategy	114
6.5	Payment Mechanism	117
6.6	Pricing and Charging Mechanism	117
6.7	Statutory and Other Consents	118
6.8	Risk Analysis and Transfer	119
7	The Management Case	120
7.1	Evidence of Similar Projects	120
7.2	Management Arrangements	122
7.3	Governance Structure within CWAC	125
7.4	Delivery Milestones	129
7.5	Communications and Stakeholder Management	130
7.6	Project Reporting	130
7.7	Monitoring and Evaluation	131
7.8	Risk Management and Mitigation	133
8	Summary and Conclusions	136
	Appendices	
	Appendix A Options Appraisal Report	
	Appendix B Scheme Drawings	
	Appendix C Model Base Year update	
	Appendix D Model Forecasting Report	
	Appendix E Economic Appraisal Report	
	Appendix F Land Use and Economic Development Report	
	Appendix G Environmental Constraints Report	
	Appendix H Social Impacts Appraisal	
	Appendix I Distributional Impacts Appraisal	
	Appendix J Benefits Realisation Plan and Monitoring and Evaluation Report	
	Appendix K Risk Register	

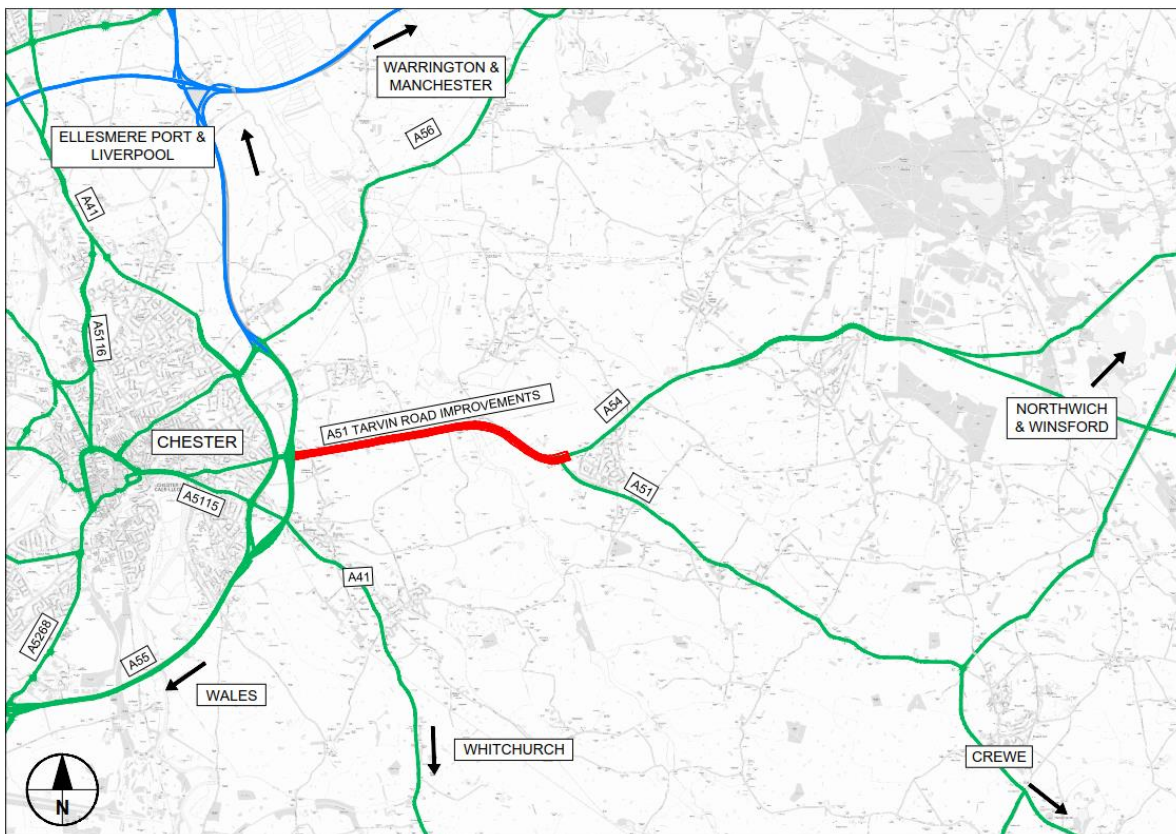
Appendix L Scheme Costs Report
Appendix M Evidence of Local Contribution
Appendix N Work Programme
Appendix O Appraisal Summary Table
Appendix P Flood Risk Assessment
Appendix Q Stage 1 Road Safety Audit Report & Designer's Response
Appendix R Ecological Assessment Report
Appendix S Stakeholders Communications Plan
Appendix T Stamford Bridge Approval in Principle (AIP) Report
Appendix U Procurement Approval
Appendix V Planning Letter
Appendix W Evidence Of Additional Funding Approval

Executive summary

This document presents the Full Business Case (FBC) for the A51 Tarvin-Chester Improvements Scheme. The scheme has been identified by the Cheshire and Warrington Local Enterprise Partnership (CWLEP) as one of a number of strategically important infrastructure projects which will support regional economic growth.

The scheme seeks to address transport problems between the A55/A51 junction and the Tarvin roundabout, which is prone to congestion and travel delay, through a series of highway capacity improvements at key points along the corridor. The location of the corridor is shown in Figure 1 below.

Figure 1: Strategic Location of the A51 Corridor



Source: Mott MacDonald

The FBC is divided into 5 'cases' presenting evidence and analysis to show why the scheme is needed, demonstrate its value for money and evidence that the scheme is commercially viable, financially affordable and achievable.

The Strategic Case

The purpose of the Strategic Case is to assess socio-economic trends in the study area and identify any current issues associated with transport and the economy, as well as highlighting how people travel across the borough, and how this has influenced the design and selection of the final preferred scheme.

Evidence presented in the Strategic Case demonstrates the importance of this scheme as the borough faces significant growth in housing, population and employment from developments such as Chester Northgate and the Chester Business Quarter. This presents a need for the highway network to remain resilient to support business growth in the area and offer reliable journey times for increasing freight movements as well as commuters, residents and visitors using the A51 corridor. The A51 Tarvin corridor is a particular cause for concern in light of increasing traffic volumes as it already experiences severe congestion. The DfT's own data has shown that the route between the Tarvin Roundabout and the A55 into Chester is the UK's 5th most congested in terms of average journey waiting time, outside London with a delay of 26.44 hours in 2014 (DfT traffic counts 2014).

The A51 is also a key route between major regional centres such as Crewe Hub, Chester Business Quarter, Ellesmere Port Enterprise Zone and the Atlantic Gateway. Therefore, ensuring congestion is reduced along this corridor will facilitate access to these developments and enhance their success as well as ensuring the area remains attractive to future investors.

As well as being a key route for the commuters and residents between key regional centres, the A51 serves as a key strategic corridor for freight traffic between Chester, North Wales, the West Midlands and beyond. Capacity improvements along the A51 will also ease congestion for road freight particularly on strategic connections from the M6 corridor through to the Atlantic Gateway.

Recent Air Quality monitoring data illustrates that there are no issues with Air Quality within the study area. However, Nitrogen Dioxide levels along parts of the A51 towards the city centre are shown to be higher than the annual desired averages. Collision data has shown issues of road safety with clusters of collisions at junctions along the corridor, such as the Hare Lane/Littleton Lane, and rear end shunting accidents resulting from stop start traffic.

The A51 Tarvin-Chester Improvements Scheme can therefore improve the quality of life for residents within the borough by improving air quality through reduced congestion and increasing opportunities for pedestrians and cyclists with safer roads and improved infrastructure.

This evidence demonstrates the need for capacity improvements and improved network resilience along the A51 corridor and have informed the development of scheme objectives which in turn guided scheme development. Scheme objectives have been grouped into 4 themes as follows:

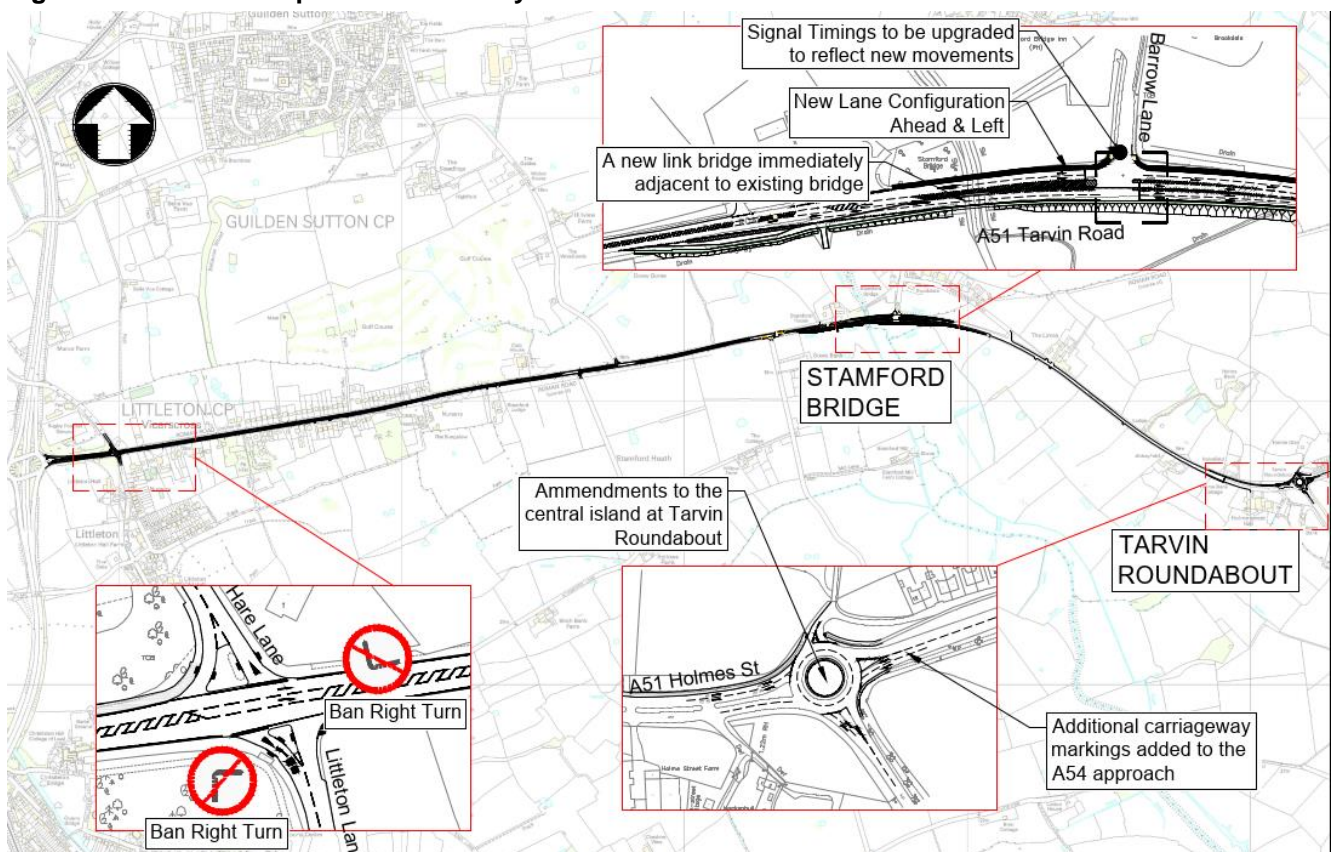
- **Economic growth-** To achieve improved accessibility to facilitate economic growth and job creation;
- **Strategic connectivity-** To deliver transport network improvements which deliver enhanced connectivity between Chester and Tarvin, and key regional centres such as Crewe, Northwich, Winsford and Manchester Airport;
- **Local connectivity-** To reduce levels of highway congestion and secure enhanced local connectivity between Chester and Tarvin and encourage and facilitate sustainable transport use along the route. In addition, ensure provision for efficient access to, and movement between, current and future local housing sites, employment and mixed-use developments; and
- **Wider social impacts-** To ensure local residents enjoy a good quality of life and that the area between Tarvin and Chester remains an attractive place to live, work and play.

In line with these objectives the scope of the A51 Tarvin-Chester Improvements Scheme was set so that selected components would enhance local and strategic connectivity in order to support economic growth and improve environmental and safety conditions for local residents. Increased capacity of the network and reduced congestion are key in addressing all 4 objectives and as such this scheme proposes to implement:

- Additional signage and carriageway markings on the A51 (S) approach to Tarvin Roundabout to encourage use of both lanes to turn left;
- Signal and lane marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an additional westbound lane at the Stamford Bridge junction through carriageway widening to the south, with a long merge for westbound traffic exiting the junction;
- A new bridge will be constructed immediately adjacent to the existing bridge such that the two bridges are linked giving the appearance of a single structure. A kerbed island will be in place between the two bridges; and
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction to reduce rear end shunts, additional delay and 'rat running'.

The key scheme components are summarised in the following figure.

Figure 2: Scheme Components Summary



Source: Mott MacDonald

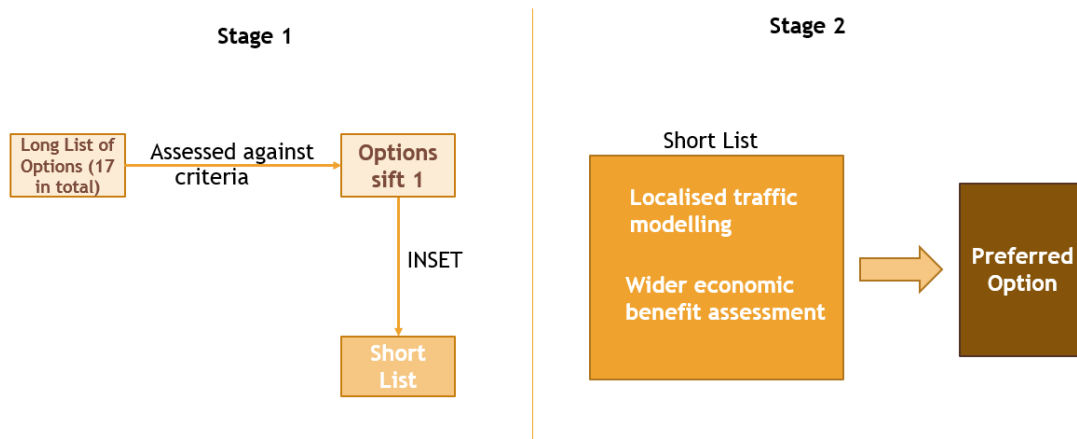
The strategic case also establishes how the scheme aligns with national, regional and local policy as it contributes towards a more resilient highway network. Enhanced transport infrastructure is vital in supporting economic growth and development by improving labour market access into and around Chester; a key priority for the CWLEP.

Potential risks to the delivery of the scheme are also outlined and include changes to legislation or local administration which may result in the scheme becoming lower priority and funding risks which may directly impact budgets.

The Economic Case

The Economic Case demonstrates that the preferred scheme delivers considerable economic benefits for Cheshire West and Chester Council (CWAC) and the wider CWLEP area. A robust appraisal process was undertaken to develop the components of the preferred option summarised in the Figure below.

Figure 3: Options Assessment Framework Two Stage Approach



A robust process has been carried out to develop the components of this scheme and ensure maximum benefits. A long list of 17 options was developed in response to the scheme objectives and sifted using Mott MacDonald's in-house Investment Sifting and Evaluation Tool (INSET) to produce a short list of 4 potential schemes.

Junction modelling and assessment of the wider economic benefits found that capacity improvements at Stamford Bridge, Tarvin roundabout, and the A55/A51 junction as well as banning right turn movements at Hare Lane and Littleton Lane provided the maximum benefits in terms of reduction in journey times and benefits to the economy and this was selected as the preferred option at OBC stage. Since the successful submission of the OBC the scheme was refined to allow for additional benefits associated with improvements at Stamford Bridge. However, due to funding constraints, the scheme has been further adjusted to reduce the scope of the works proposed at Tarvin Roundabout, Stamford Bridge and the A55/A51 junction. The benefits of these components are still relevant to the overall business case as there may be opportunities to add to the scheme at a later date, should funding become available.

Transport benefits and wider economic benefits have been assessed for the preferred option showing strong support for the scheme. Economic appraisal has shown the scheme presents High Value for Money with an initial Benefit Cost Ratio (BCR) value of 2.2. When adjusted for the inclusion of journey time reliability benefits, this BCR increases to 2.3.

Detailed assessment of the wider economic benefits demonstrates how the scheme enhances local economy with the potential to provide 10 to 20 jobs and £433,800 to £864,500 GVA in construction benefits. £171,840 to £343,680 worth of council tax can also be attributed to the proposed interventions within the scheme. There are no employment sites in proximity to the A51 corridor which will be directly influenced by this scheme. However, 200 houses are proposed in the Tarvin area with an additional 500 in Tarporley, Cuddington & Sandiway, as outlined within the Local Plan Part One, meaning improvements along the A51 may help to unlock jobs and development associated with housing growth. It should also be noted that this scheme is the first phase in a wider package of investments which could lead to further jobs and GVA uplift. Assessment of social and distributional impacts demonstrates that the scheme could be beneficial to journey quality as although there will be a temporary increase in route

uncertainty during construction, once operational the scheme is likely to produce a reduction in user frustration and fear of accidents. Severance is also likely to be reduced once operational, creating an improved connection to community facilities in Tarvin and Chester and there will be no severance during construction.

From an environmental perspective, several constraints have been identified that will impact the scheme, however these have been further assessed since the submission of the OBC and it is expected that these can be appropriately avoided or mitigated as the scheme develops.

The Economic Case therefore provides strong support for the scheme demonstrating High Value for Money and generating significant economic benefits for the local area in terms of GVA uplift and council tax generation. On a qualitative basis it is likely the scheme can be delivered without any adverse environmental impacts and when complete will improve journey quality for users of the route and improve local connectivity within local communities as severance is reduced.

The Financial Case

The total estimated scheme cost is £7,029,726 and includes construction costs, risks, statutory undertakers works and land acquisition costs. This also includes the application of inflation at £264,102. These costs have been prepared by Balfour Beatty.

£242,832 has also been included in the scheme costs to enable robust monitoring and evaluation of the scheme, in accordance with the CWLEP's Assurance Framework. This covers both pre-construction and post construction activities.

The total amount of funding required for the scheme is £7,029,726., Optimism Bias of 3% has been applied for Economic Appraisal purposes but does not form part of the funding ask and is therefore not included in the Financial Case which sets out the level of funding needed and where that funding will originate.

At OBC stage it was agreed that the CWLEP would fund £3,617,22 (67.5%) of the estimated scheme cost of £5,398,839 with CWAC Council providing a match contribution of £1,741,000 (32.2% of the overall construction and delivery cost of the scheme). The CWLEP'S conditional offer letter granted a maximum LGF allocation of £3,663,000 for the A51 Tarvin to Chester Scheme. There was also an amount of £40,617 to be sought from s106 agreements.

As the scheme estimate is now £7,029,726 at FBC, CWAC will fund the additional amount required (approximately £1.63m) from various other funding sources such as CIL ask Regulation 123 list, Littleton lane/Hare Lane Saughton Camp S106 and LTP Capital Programme, while drawing down the maximum LGF allocation of £3,663,000.

The Commercial Case

The Commercial Case demonstrates that the scheme is commercially viable and will be taken forward using a procurement strategy to engage the market to deliver the scheme. The A51 Tarvin-Chester Improvements Scheme meets a number of strategic objectives and outcomes within available funding and at low risk. As this is an OJEU level scheme key procurement options were either:

- Open Tender,
- Restricted Tender or
- An approved Framework that CWAC can utilise.

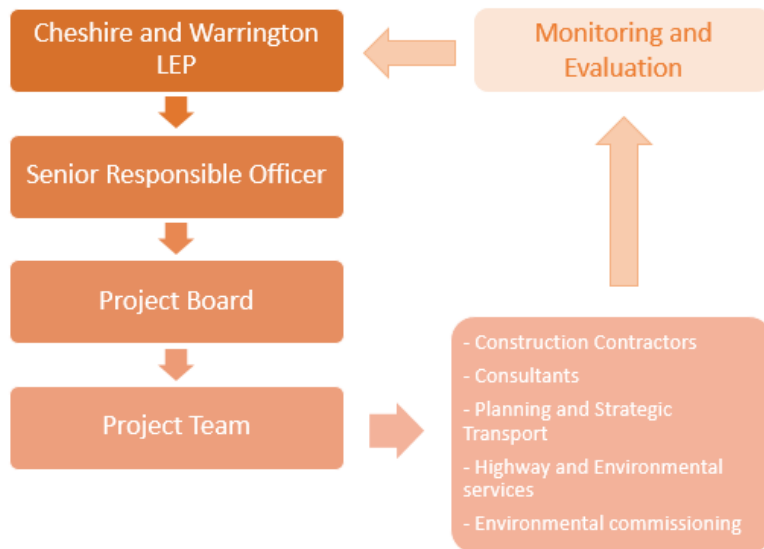
CWAC have chosen to deliver the scheme through the SCAPE Civil Engineering & Infrastructure Construction Framework for construction. SCAPE has been used on previous CWLEP funded schemes such as Centre Park Link and Warrington East Phase 2 and has a

number of benefits in terms of time saving and value for money. Balfour Beatty will therefore be the scheme contractors with continued consultancy support from Mott MacDonald who will assist with detailed designs.

The Management Case

CWAC are the scheme promoter and delivery agent for the A51 Tarvin-Chester Improvements Scheme. The strategic governance structure is shown in Figure 4.

Figure 4: Strategic Governance of the A51 Tavin Road Improvements Scheme



Source: Mott MacDonald

The CWLEP hold the devolved funding from Central Government, however responsibility then falls to CWAC to make the relevant payments to the associated project partners to ensure scheme delivery.

The Project Team will manage the day to day delivery of the scheme with the Project Manager reporting to the Project Board. The Project Team consists of officers from the Council’s Transport Planning and Highways Team who are responsible for providing advice on monthly spend/budget, funding and delivery agreements, land ownership issues and communication of the project with key stakeholders.

Delivery Milestones

Table 1 sets out the key milestones for delivery of the scheme and expected timescales which the Project Team will work to:

Table 1: Key Delivery Milestones

Key Milestone	Time Scales
Funding Approvals	27/03/19
Pre-Construction	20/12/18 – 23/06/20
• Advance Works	31/01/19 – 03/12/19
• Complete Detailed Design	20/12/18 – 12/11/19
• Environmental & Ecological Works	01/07/19 – 02/08/19
• Consents and Notices	20/12/18 – 24/03/20
• Statutory Undertakers Works	02/08/19 – 01/06/20

Key Milestone	Time Scales
• Contract Pricing	12/11/19 – 30/03/20
• Project Documentation	31/03/20 – 29/04/20
• Temporary Works Design	31/03/20 – 23/06/20
• Stakeholder and 3 rd Party Engagement	21/12/18 – 26/06/20
• Procurement	31/03/20 – 22/05/20
• Surveys	31/03/20 – 15/05/20
Construction	24/06/20 – 26/03/21
• Site Establishment	24/06/20 – 07/07/20
• Section 1 – A55 to Hare Lane Junction	08/07/20 – 24/08/20
• Section 2 – Stamford Bridge	08/07/20 – 12/03/21
• Section 3 – Tarvin Roundabout	25/08/20 – 19/10/20
• De-Mobilisation and Completion of Documentation	12/03/21 – 26/03/21
Project Completion Date	27/04/21

Source: Balfour Beatty Delivery Programme

Monitoring and Evaluation

The success of A51 Tarvin-Chester Improvements Scheme will be determined by a number of factors:

- Delivery to time, budget and specification;
- Reduction in congestion along the A51 corridor;
- Reduction in queue lengths at key junctions along the corridor;
- Improved journey times for east and westbound traffic travelling along the A51 corridor;
- Continued investment in developments within Chester and the wider region/ success of developments; and
- Improved local air quality.

Monitoring and evaluation activities need to be undertaken during scheme delivery to ensure the scheme is delivered on time, to budget and to specification (measuring inputs and outputs) and following scheme completion to evaluate to what extent outcomes and impacts have been realised. The cost of these monitoring and evaluation activities undertaken during the scheme delivery is covered within the funding ask. Additional activities completed after scheme completion will be covered by CWAC.

Risk Management and Mitigation

A number of key risks have been identified which may occur as a result of implementing the scheme. These risks include strategic, environmental, infrastructure and financial risks and are summarised in Table 2.

Table 2: Management and Mitigation of Key Identified Risks

Risk Owner	Risk Event	Consequences	Mitigation
Geotechnical			
Balfour Beatty	Embankment requires settlement period built into programme	Increased cost and programme duration	Carry out GI and GPR as early as landowner constraints allow, and progress design activity
Balfour Beatty/CWAC	Access for trial holes delayed	Delay to Design, additional cost if GI crew needs to be remobilised	Seek informal agreement with landowners who will not have agreements in place Feb 19
Environmental			
Balfour Beatty/CWAC	Presence of	Constraints on when otters can be	Further surveys. Construct new holt at

Risk Owner	Risk Event	Consequences	Mitigation
	protected species - Otters	disturbed may impact programme.	earliest opportunity, monitor and demonstrate otters have taken up residence
Balfour Beatty/ CWAC	Presence of protected species - Badgers	Badger sett identified on site adjacent to Stamford Bridge	Further surveys. Construct new sett at earliest opportunity, monitor and demonstrate badgers have taken up residence
Design			
Mott MacDonald	Absence of GI Report at Feasibility Stage	Increased uncertainty and contingency in Feasibility cost build up	Increased uncertainty and contingency in Feasibility cost build up
Mott MacDonald	Absence of GPR survey at Feasibility Stage	Increased uncertainty and contingency in Feasibility cost build up	Allowance in Risk Register for potential underground issues
Mott MacDonald	Condition of existing Stamford Bridge leads to unforeseen remedial work	Additional work, delay, additional cost	Design of new deck to be independent from existing structure.
Mott MacDonald	Increase in design resources to develop or change design solution	Additional cost, potential prolongation	GI and bridge design to be progressed early in Pre-Construction stage
Planning/Permitted Development Considerations			
CWAC	3rd party input during Preconstruction Stage leads to rework	Delayed start on site, additional cost	Public engagement sessions, contact with key stakeholders
CWAC	CWLEP require additional information in support of FBC	Delay to Pre-Construction Stage	Ongoing liaison with CWLEP
Statutory Authorities			
Mott MacDonald	No pricing assessment of utility diversions at Feasibility - C2 stage only	Stats diversion allowance at Feasibility is not underpinned by SA pricing	Establish underpinned SA cost at Pre Construction stage
Mott MacDonald	Presence of further stats providers not currently identified	SA allowance at Feasibility may be inadequate	Confirm at Preconstruction stage via C3/C4 process
Land Assembly			
CWAC	Negotiation to purchase land takes longer than anticipated	Delayed start, increased cost	Detailed programme at Feasibility
CWAC	Negotiation route fails and CPO powers initiated	Min 12-month delay to programme	CWAC to monitor progress on negotiation process
Balfour Beatty/CWAC	Delayed access to land for GI work	Issue of GI Report even later, impact on detail design and TC agreement	CWAC to liaise with landowner
Programme			
Balfour Beatty/ CWAC	Delayed start on site	Additional cost, late completion	Monitor with CWAC during Pre-Construction
Balfour Beatty	Phasing requirements imposed on construction programme	Imposition of phasing requirements prolong programme and increase cost	Review with CWAC at Pre-Construction Stage
Budget			
Balfour Beatty	Design Creep	Increased cost at Pre-Construction Stage	Monitor change and challenge design change
Balfour Beatty	Scope creep on work packages identified at Feasibility	Increased cost at Pre-Construction Stage	Construction Stage prior to developing Target Cost
Balfour Beatty	Quants Risk-undermeasure or omissions	Increased cost at Pre-Construction Stage	Construction Stage prior to developing Target Cost
Legal/Procurement			
Balfour Beatty/CWAC	Feasibility Report	Delay, additional cost or reduced	Feasibility Report will provide full detail

Risk Owner	Risk Event	Consequences	Mitigation
	budget exceeds CWAC current budget	scope	of costings and assumptions
Balfour Beatty/CWAC	CWAC / BB require prolonged period to agree terms of Delivery Agreement	Delay, additional cost or reduced scope	Draft DA provided to CWAC, meeting to review arranged for 5/11
CWAC	A competition is required to award the detail design package	Delay to commencement of detail design and subsequently construction stage	Discuss with CWAC and ascertain if Procurement are happy to proceed on this basis

Source: Balfour Beatty

1 Introduction

1.1 Headline Description

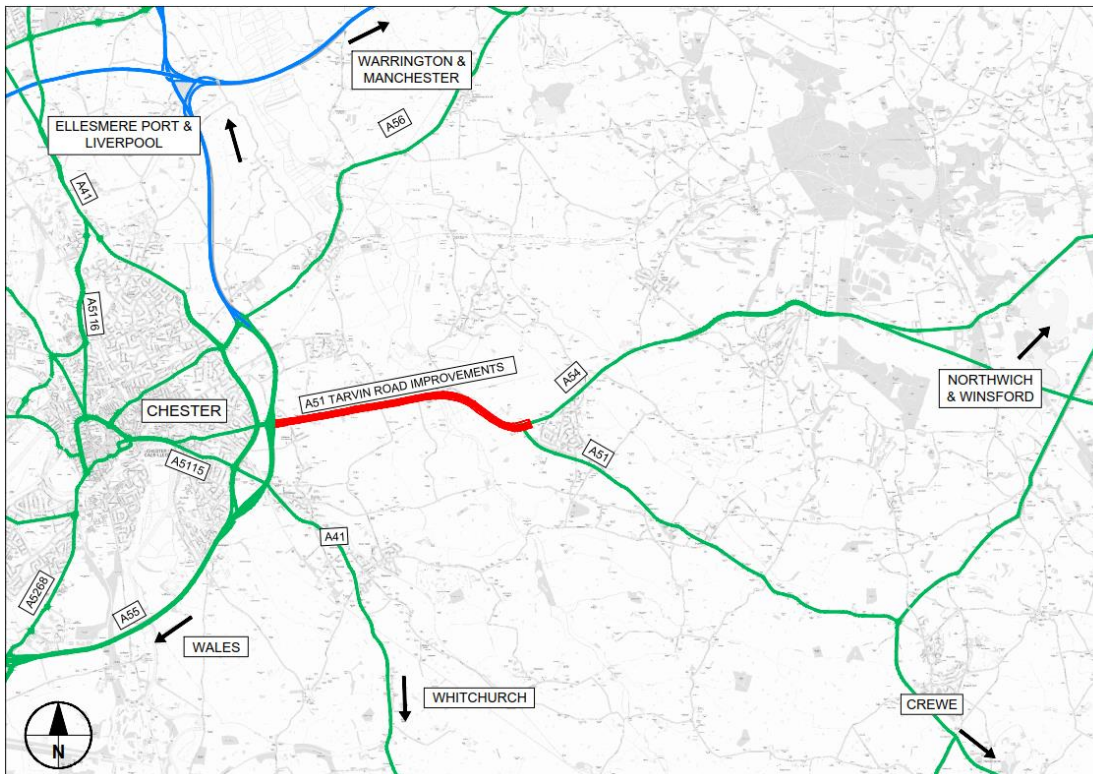
This Full Business Case prepared on behalf of Cheshire West and Chester Council (CWAC) for the A51 Tarvin-Chester Improvements Scheme follows on from the successful submission of the Outline Business Case in March 2018. The scheme has been identified by the Cheshire and Warrington Local Enterprise Partnership (CWLEP) as one of a number of strategically important infrastructure projects which will support regional economic growth.

The scheme seeks to address transport, accessibility and community cohesion issues between the A55/A51 junction and the Tarvin (A54/A51) roundabout; a corridor, illustrated in Figure 5, which is prone to congestion and travel delay. The proposed scheme aims to reduce network delay, improve journey time reliability and create a more resilient strategic highway network that will support economic growth in Chester and the wider Cheshire and Warrington area, emphasising the importance of this strategic corridor to the surrounding areas of Chester, Winsford, Northwich and Crewe.

1.2 Scheme Context

The A54 and A51 are key strategic roads running east and south-east respectively linking Chester to the M6. The A51 is a principle route for commuter and other traffic between Chester, Northwich and Winsford, Crewe, Staffordshire and the West Midlands as well as from local villages close to Chester such as Tarvin, Kelsall, Tarporley, Ashton and Barrow. The scheme section of the A51 is highlighted in red in Figure 5 and illustrates its importance as a strategic link to surrounding towns and the motorway network.

Figure 5: Strategic Location of the A51 Corridor

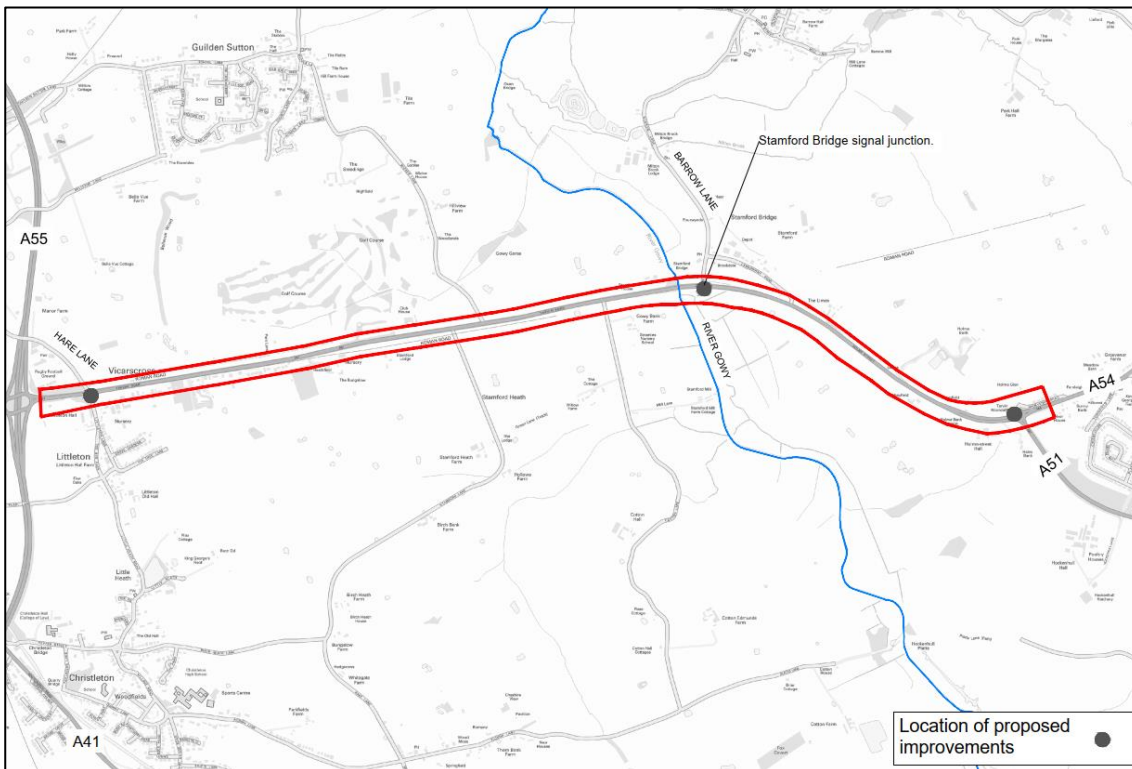


Source: Mott MacDonald

Within the identified corridor, Figure 6 illustrates the specific locations of the scheme interventions at a local level and these are:

- Amendments to the central island at Tarvin Roundabout and additional carriageway markings added to the A54 approach;
- Signal and lane marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an additional westbound lane at the Stamford Bridge junction through carriageway widening to the south, with a long merge for westbound traffic exiting the junction;
- A new bridge will be constructed immediately adjacent to the existing bridge such that the two bridges are linked giving the appearance of a single structure. A kerbed island will be in place between the two bridges; and
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction to reduce rear end shunts, additional delay and 'rat running'.

Figure 6: A51 Corridor – Study Area Boundary and Intervention Sites



Source: Mott MacDonald

1.3 Purpose and Structure of Report

This document is structured in accordance with the DfT's Guidance for Transport Business Cases, which was prepared in January 2013, capturing the 'Five Case' process approach.

Following the introduction, the remainder of the document is structured as follows:

- **Section 2:** The Strategic Case - this section identifies the key issues and opportunities that the scheme is aiming to address in line with the core objectives of the scheme and wider strategic objectives outlined within policy.

- **Section 3:** Options Appraisal - this section briefly describes the options appraisal process undertaken to arrive at the preferred option and how this has been refined since the submission of the OBC.
- **Section 4:** The Economic Case - this section demonstrates the value for money for the scheme including the impact on the economy, environment and society, based on an appraisal framework consistent with the DfT business case guidance.
- **Section 5:** The Financial Case - presenting an assessment of affordability, overall scheme costs and funding certainty. It outlines how the costs and the scheme are to be funded/financed, including the structuring of any borrowing and the position of the relevant parties.
- **Section 6:** The Commercial Case - a summary of the procurement strategy, pricing and payment mechanisms and risk allocations.
- **Section 7:** The Management Case - sets out clear proposals for governance, project planning, risk management, stakeholder management and evaluation.
- **Section 8:** Summary and conclusions of the key issues and benefits of the scheme.

2 The Strategic Case

Section Summary

The purpose of the Strategic Case is to assess socio-economic trends in the study area and identify any current issues associated with transport and the economy, as well as highlighting how people travel across the borough, and how this has influenced the design and selection of the final preferred scheme.

As well as identifying the key issues within the area this section highlights how the A51 Tarvin-Chester Improvements Scheme can provide opportunities to reduce congestion, support economic growth and improve socio-economic conditions. In order to assess these trends, this section reviews sources from the Office of National Statistics (ONS), Department for Transport (DfT), official labour market statistics, OS mapping, traffic counts, annual average daily flows and the English Indices of Deprivation. The identification of these problems and opportunities has been used to inform the development of the objectives for the A51 Tarvin-Chester Improvements Scheme to ensure that the scheme outputs have the capability to address local and regional issues.

Evidence presented in this section demonstrates the importance of this scheme as the borough faces significant growth in housing, population and employment from developments such as Northgate and the Chester Business Quarter. This presents a need for the highway network to remain resilient and offer reliable journey times for increasing numbers of residents, visitors, shoppers and commuters. The A51 Tarvin corridor is a particular cause for concern in light of increasing traffic volumes as it already experiences severe congestion. TrafficMaster journey times show that from the A55 Vicars Cross Roundabout to Tarvin Roundabout, which is the section of the A51 within which the interventions will take place, the journey in both directions in the off-peak takes around four minutes, whereas in the AM peak (08:00-09:00) the times increase to 7.5 minutes eastbound and 10 minutes westbound.

The A51 provides a key route between major regional centres such as the planned Crewe HS2Hub, Chester Business Quarter, Ellesmere Port Enterprise Zone and the Atlantic Gateway. Therefore, ensuring congestion is reduced along this corridor will facilitate access to these planned developments and enhance their success as well as ensuring the area remains attractive to future investors.

Nitrogen Dioxide levels along parts of the A51 towards the city centre are shown to be higher than the annual desired averages. Although, air quality is not a key issue within the study area it will be important to ensure this remains the case. Collision data has also shown issues of road safety with clusters of collisions at junctions along the corridor, such as the Hare Lane/Littleton Lane junction, and rear end shunting collisions resulting from stop start traffic. The A51 Tarvin-Chester Improvements Scheme can therefore also improve the quality of life for residents within the borough by further improving air quality through reduced congestion and increasing opportunities for pedestrians and cyclists with safer roads and improved infrastructure.

The key issues and evidence identified in this section demonstrate the need for capacity improvements along the A51 corridor to facilitate upcoming developments, mitigate current and future issues of congestion, support economic growth and ensure residents experience a good quality of life through improved air quality and road safety.

2.1 Scheme Background

2.1.1 Strategic Context

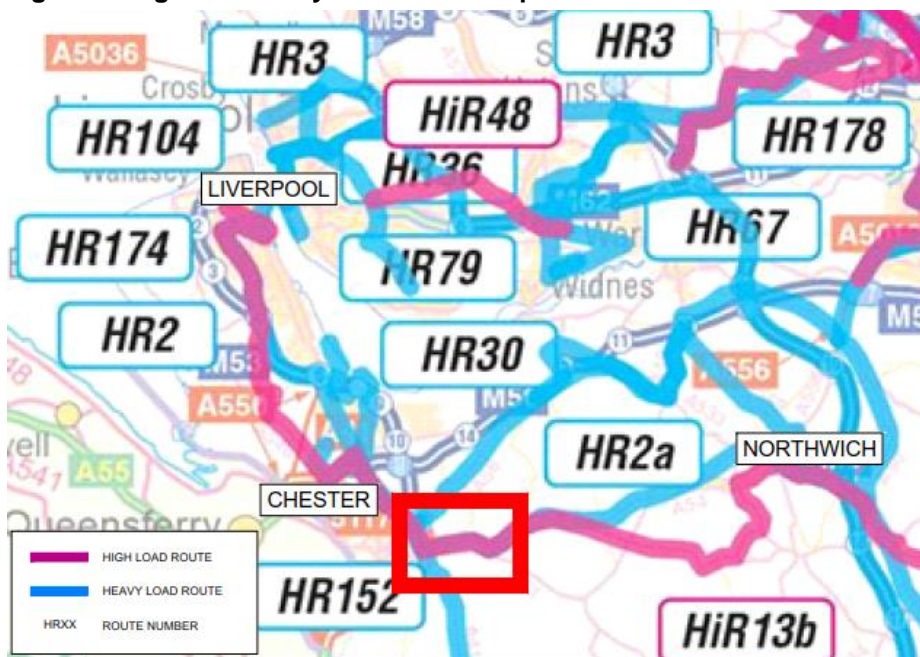
The A51 between Chester and Crewe is a key highway corridor in the north of England. The route has been identified by the Department for Transport as one of the five most congested highway corridors in England outside of London (DfT traffic counts 2014) and is recognised as a significant constraint on the long-term growth and development of Chester. Historically, Chester as the county town of Cheshire has relied on good highway connectivity to provide accessibility to the wider historic county which stretches as far as Stoke on Trent, east Manchester and the Peak District. As the first part of the journey to these areas, the A51 has performed a key role in enabling efficient west – east movement from Chester.

The A51 is also central to the Transport for North (TfN) West and Wales corridor where significant economic and population growth is forecast increasing demand and pressures on transport infrastructure. Capacity improvements along the A51 will enhance connectivity across the wider TfN strategic corridor to support the growth of Manchester Airport, Liverpool John Lennon Airport, the Cheshire Science Corridor Enterprise Zones, Atlantic Gateway, North Wales Arc, Port of Liverpool and Crewe HS2 Hub.

The A51 also provides a strategic link through mid-Cheshire between North Wales, Chester, Crewe and the Northwich/Winsford area. Whilst Chester as a whole is a relatively prosperous city, a number of locations in CWAC and parts of Cheshire East and Warrington are relatively deprived. The A51 forms a vital connection for residents in towns such as Winsford who wish to access employment or opportunities in Chester, Chester Business Park and Deeside. Growth in congestion and network delay therefore threatens the ability of the wider community of Cheshire to access these opportunities as the A51 offers unreliable and inefficient journey times.

As a key strategic link between North Wales, Chester, Crewe, Northwich and Winsford, the A51 also serves as an important network for freight services and is a critical route for both high and heavy loads as shown in the red box in Figure 7.

Figure 7: High and Heavy Loads Grid Map



Source: www.gov.uk

The High Load Route passing through the A51 is the HiR13b route from Stoke-On-Trent to Birkenhead. The Heavy Load Route is the HR2 from Rudheath to Birkenhead Docks. Figure 8 shows a typical wide load parked at the existing layby west of the Stamford Bridge junction.

Figure 8: Typical Wide Load using the A51 Corridor



Source: Google Maps

This network needs to remain resilient in order to ensure that freight traffic resulting from developments such as the Atlantic Gateway enables efficient transport of goods in and around the Local Authority. In addition to its role in connecting people to employment opportunities, the A51 Tarvin to Chester corridor is a vital link for traffic moving between the freight hubs of the Port of Holyhead, Liverpool2, Mersey Dee area and key distribution sites in the Midlands. Significant volumes of freight traffic are therefore using the route to travel between these locations and onwards to the channel ports. The A51's east - west routing also provides vital connectivity to Manchester and Liverpool John Lennon Airports through onward links to the M56 particularly from the surrounding areas of North Wales and Chester.

As a key strategic route between the east and west of the UK the A51 is subject to a high number of heavy loads per year. On average, CWAC receive over 3000 notifications per year of vehicles using the route with loads weighing over 44 tonnes. The importance of this route for heavy loads also highlights the need to consider the resilience of the bridge over the River Gowy which is expected to reach the end of its life expectancy in approximately 50-60 years-time. As there is no alternative route facilitating strategic east-west movements, any closure to the bridge without additional capacity would have significant detrimental impacts to the economy of the local area. A linked bridge will therefore not only provide additional capacity to the network, it will also allow the route to remain open during replacement of the old bridge with no detrimental impact to economic activity in the area.

2.1.2 Local Context

Whilst the route performs a key role as a strategic corridor providing access to employment sites, economic 'drivers' and centres of population it also forms a key part of the local transport network.

Local communities such as Tarvin, Tarpoley, Kelsall and Ashton all rely on the A51 to provide access to Chester which is the principal urban services centre for west Cheshire. As congestion

has increased and the performance of the network continues to deteriorate, these communities experience increasing severance from key amenities such as retail, leisure and employment.

The current performance of the A51 also causes problems for local school children travelling to schools such as Guilden Sutton C of E Primary School and Christleton High School on a daily basis. A lack of suitable crossing points, high vehicle speeds and congestion at peak hours all contribute to a highway environment which restricts opportunities for children to walk to school further increasing congestion. Children travelling by bus are also often required to use a service which is routed via a variety of local side roads in an attempt to bypass congestion on the A51 and ensure more reliable journey times.

2.1.3 Development Pressures

A significant number of housing developments are located within a range of small villages and communities in CWAC and Cheshire East (see Section 2.9 for details on housing and upcoming developments). Due to its central location between these areas the A51 plays a key role in providing access to these housing sites and access between them and key urban employment centres. It is therefore vital that the strategic highway network, including the A51, provides sufficient capacity and network resilience to meet the needs of new residents in these areas both now and in the future.

The CWLEP has ambitious aspirations for growth and key housing sites play a role in enabling the achievement of those aspirations (outlined in Section 2.9.3). However, without adequate network capacity and scope to manage growth, the area's strategic objectives are unlikely to be realised.

2.1.4 Previous Scheme Options

Although the above problems on the A51 are well understood, local partners have been restricted in their ability to actively address these problems and the community's concerns until recently.

Prior to the development of this scheme changes have been made to individual junctions along the A51 to address network performance and capacity constraints. Previous work undertaken by Highways England saw the introduction of signal controls at the A55/A51 junction elevated roundabout in an attempt to address queuing issues on the A55 southbound off-slip. To the east of the route, CWAC introduced a left turn only lane at the Stamford Bridge junction for traffic approaching eastbound in an attempt to improve access to the A55 and enhance the performance of the junction. Carriageway marking changes were also made along the corridor to make the best available use of road space to manage traffic flow. However, despite CWAC's robust maintenance programme, constraints on available funding have reduced the ability of the local authority to create significant improvements to capacity and junctions.

The cumulative impact of these previous changes has led to short term improvements which have temporarily addressed local concerns but has not improved network resilience of traffic flow. The absence of a long-term strategic approach to the improvement of the corridor has meant that as traffic growth has continued and new areas of housing and employment have developed, pressure on the A51 has increased.

This now presents a need for a strategic, 'whole corridor' review of the A51 Chester to Crewe corridor to examine its role in supporting the future growth and strategic connectivity aspirations of the CWLEP, and the continuing needs of the local community and residents who are adversely affected by high traffic levels, growing congestion, and continuing concerns about road safety. The need for this review of the corridor becomes even more apparent in light of the planned HS2 depot at Wimboldsey which will stretch over 4km on land to the south of Winsford. The creation of jobs as a result, and likely increase in freight movements will place even greater

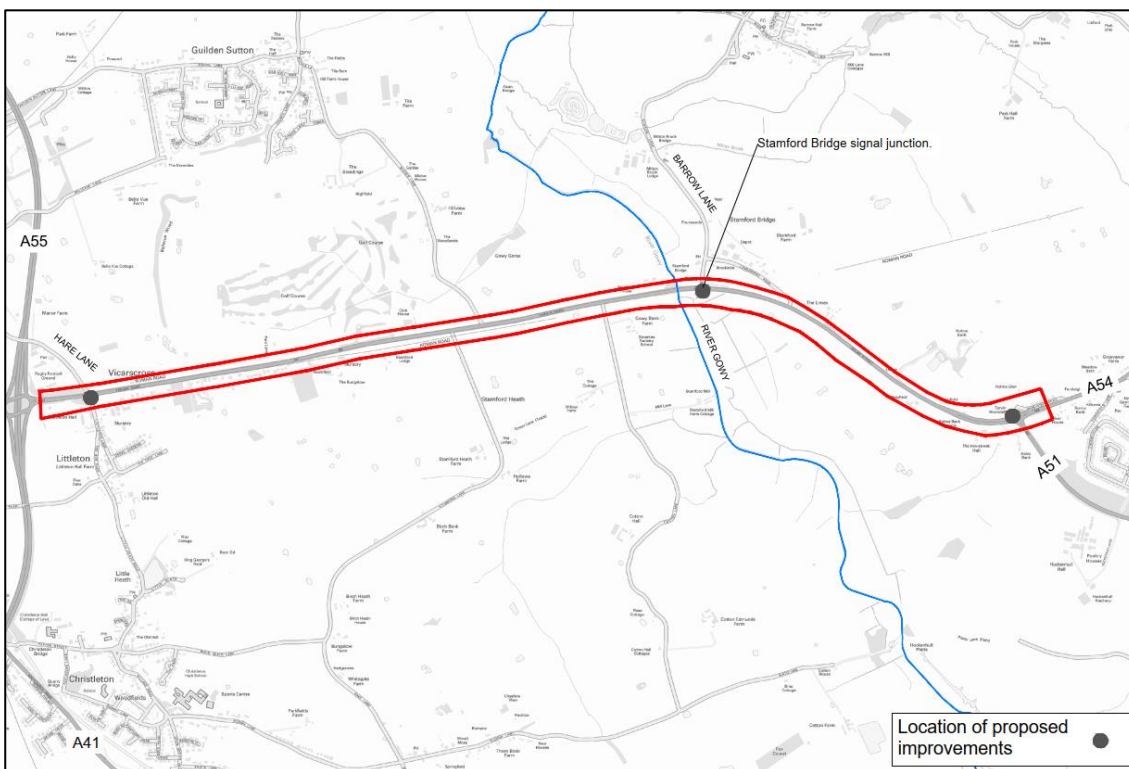
demand on the A51. As a first stage in this longer-term plan, CWAC are now examining the management and development of the A51 between Chester and Tarvin as part of a phased package of improvements.

2.1.5 A Phased Approach

CWAC secured programme entry for a proportionate package of local highway improvements to the A51 Tarvin to Chester Corridor through the submission of a Strategic Outline Case to the Local Enterprise Partnership. This has provisionally allocated £5.4m of investment in the A51 corridor, £3.6m from the Local Growth Fund and £1.8m local contribution from CWAC.

The initial Outline Business Case provided an opportunity to examine the wider performance and management of the A51 corridor. A package of investment options to extract maximum value from the above funding allocation are identified as the first phase in a potentially longer-term programme of investment for the A51. This scheme covers a series of capacity improvements along the A51 Tarvin to Chester Corridor between the A55/A51 Vicars Cross junction and Tarvin roundabout junction linking the A51 with the A54. The corridor for this investment is outlined in Figure 9 together with the location of the specific sites identified for Phase 1 improvements.

Figure 9: A51 Corridor – Phase 1 Study Area Boundary and Intervention Sites



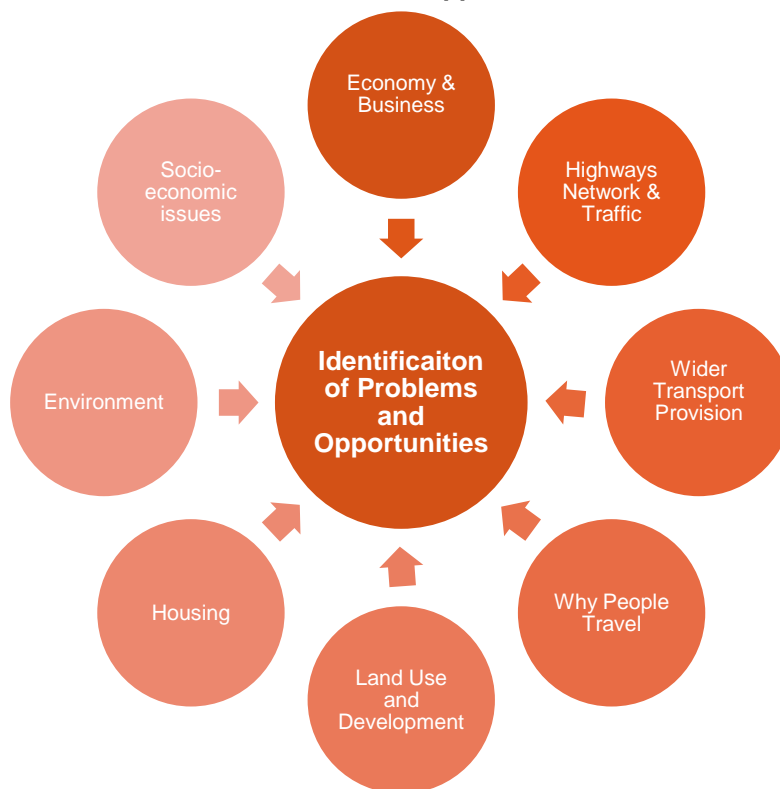
Source: Mott MacDonald

This opportunity to secure funding is therefore potentially just the start of a programme for investment in the wider corridor. To that end, this business case has evaluated a wider range of options in the context of this longer-term programme, selecting investment options which will interface and support further improvements to the highway network and A51 corridor over a longer period of time. This package of schemes should be seen as the first step in CWAC's long-term aspirations for highway network resilience and reliability.

2.2 Establishing the Problems and Opportunities

The background to the scheme set out above highlights the significance of the A51 in the local and wider area and the importance of reducing congestion along the corridor in order to maintain local and strategic connectivity and support growth. In contrast to previous work addressing short term issues of congestion at key junctions along the A51, this scheme aims to address issues for the whole corridor to provide a longer-term solution. To capture the key problems and opportunities evident along the A51 corridor eight themes have been identified for assessment; these are outlined in Figure 10.

Figure 10: Identification of Problems and Opportunities



Source: Mott MacDonald

In the following sub sections, each theme is investigated with key information sources and the themes relevance to the A51 Tarvin-Chester Improvements Scheme specified. Each section is set out according to the following structure:

1. Identification and explanation of the issue(s)
2. A summary of the key problems and opportunities
3. A 'So what does this mean for the A51 Tarvin-Chester Improvements Scheme?' section

These are summarised at the end of the overall Problems and Opportunities section to demonstrate how the scheme objectives were defined.

2.3 Strategic Socio-Economic Overview

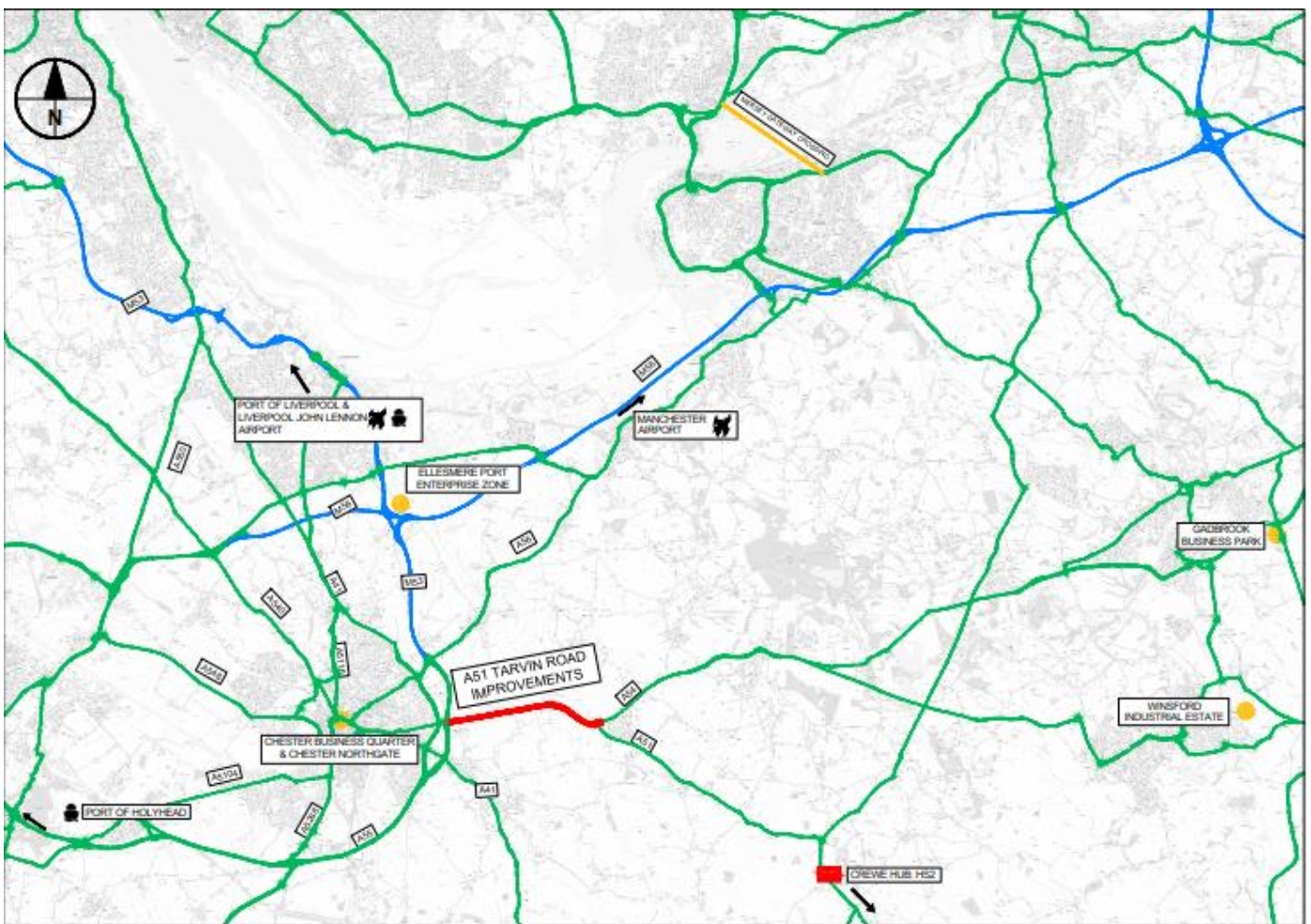
The assesment of socio-economic trends across CWAC helps identify any problems and opportunities concerning population, employment, unemployment and education in the region of the A51 and the wider area of the borough and how these trends may be impacted by issues of congestion along the A51 corridor.

2.3.1 Location

The A51 Tarvin to Chester Corridor lies within the borough of CWAC which covers a 900km² area in the North-West of England. It forms a key route into the city centre of Chester from towns to the east of the borough. It also offers connectivity to the south-east of Liverpool via the M53 and to Warrington, Manchester and the wider North-West region via the M56 (Figure 11).

This key link to the strategic highway network enables Chester and surrounding communities to prosper from good connections to surrounding northern conurbations and key employment centres such as Gadbrook Park, Winsford Industrial Estate and, in the future, to the HS2 depot in Crewe. Figure 11 highlights the location of the A51 Tarvin to Chester Corridor (shown in red) in relation to the motorway network as well as Chester and key towns in the wider region.

Figure 11: The Strategic Location of Chester



Source: Mott MacDonald

2.3.2 Population

The A51 Tarvin to Chester Corridor lies at the heart of CWAC, with the most recent population count for the Borough standing at 333,900 people, around 25% of which live in the city of Chester. The total population of CWAC is forecast to increase by 10% to around 366,700 in

2035¹. Table 3 illustrates the mid-year population estimates for Chester and the administrative area of CWAC.

Table 3: Mid-year Population Estimates

Area	Population Growth				
	2001	2011	2015	2025	2035
Chester	77,040	79,645	81,470	83,800	84,600
CWAC	321,971	329,608	333,900	355,300	366,700

Source: ONS

The age profile of CWAC in comparison to national and regional age profiles is set out in Table 4. CWAC's population has a slightly lower proportion of working age adults (61%) compared with the national average (63.1%). CWAC also has a slightly higher proportion of elderly residents (21%) compared with the national average (18.1%) (Table 4). The proportion of people over 65 is expected to grow to account for 28% of the forecasted 365,500 population by 2032, as illustrated in Figure 12.

Table 4: CWAC Age Profile, 2016

	No. of Children	Children (%)	No. of Working age	Working Age (%)	No. of Older People	Older People (%)
CWAC	59,200	18%	206,000	61%	70,300	21%
North West	1,367,200	18.9%	4,530,400	62.8%	1,322,000	18.3%
Great Britain	12,002,100	18.8%	40,267,500	63.1%	11,515,300	18.1%

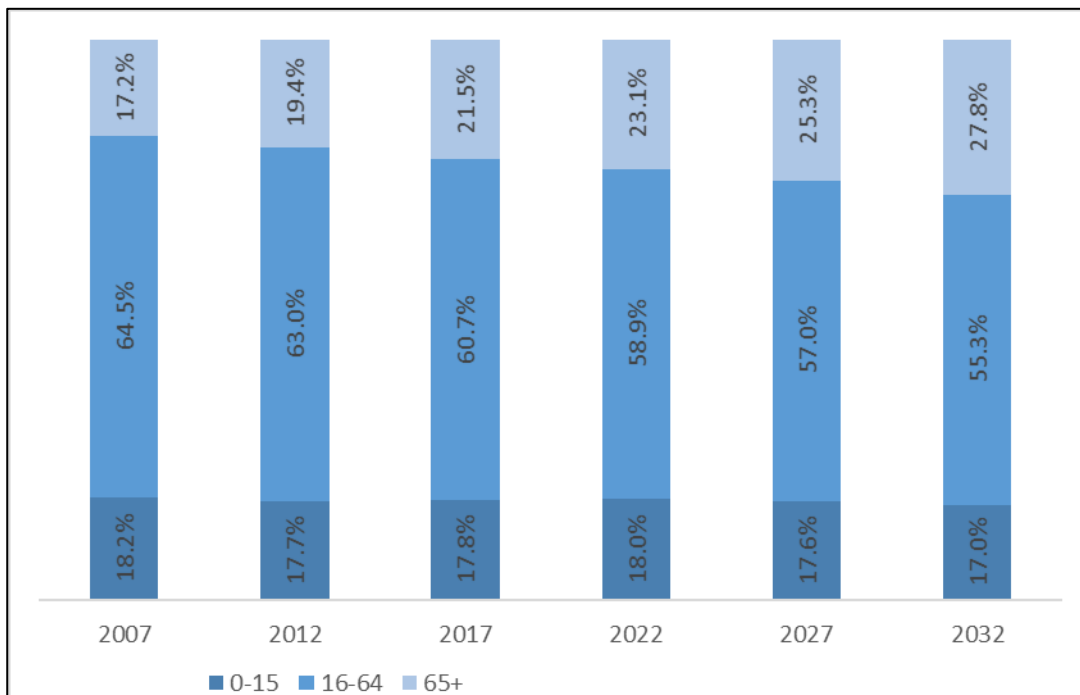
Source: ONS

The growth in the level of working age adults and elderly people projected in future years will increasingly contribute to the challenges the borough faces when addressing future transport issues.

Congestion and poor journey reliability on the A51 currently hinder the reliability and availability of bus services between Chester and the east of the borough, which are particularly depended upon by some older and mobility impaired residents to access facilities and services. An increase in the elderly population will therefore require reliable public transport services (and a highway network which supports bus services) across the borough to offer mobility to all ages.

¹ <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections>

Figure 12: CWAC Projected Age Structure (2007-2032)



Source: Health and Wellbeing Statistics Compendium, CWAC, 2015

2.3.2.1 Key Issues and Opportunities

Table 5 highlights the key issues and opportunities in relation to Chester’s population.

Table 5: Key Issues and Opportunities Presented by Population Growth

Issues	Opportunities
<ul style="list-style-type: none"> ● The population of CWAC has grown over the past 15 years and is projected to continue growing through to 2035 and beyond. A larger number of residents will generate an increased number of trips along the A51 Corridor as it forms a major route between key towns, cities and development areas within the borough such as Chester, Winsford and Northwich. It also provides connectivity to key employment sites such as, Gadbrook Park, Winsford Industrial Estate and the planned HS2 depot in Crewe. ● There will be greater demand to travel in and around Chester which could exacerbate problems at existing pinch points and congestion hotspots along the A51 corridor. ● Without intervention, this could generate further delays and increase vehicular based pollution. ● The population of the borough is ageing, with the over 65 age group forecast to account for 28% of the population by 2032. This will create an increased demand for public transport. 	<ul style="list-style-type: none"> ● A greater number of people living in Chester will create greater demand to access and utilise the wide-ranging local services in the area as well as employment opportunities which will require an efficient and reliable transport network. ● A greater number of people living and working within the borough will increase the job pool and create prosperity for all residents. ● Network resilience will be necessary to support the growth in demand for jobs, particularly at key employment sites of Crewe HS2, the Atlantic Gateway and Ellesmere Port Enterprise Zone as well as more local connections to Chester Northgate Retail. Such sites could flourish with improvements to the strategic network. ● Design improvements to the A51 corridor will be necessary to support enhanced public transport services.

So, what does this mean for the A51 Chester to Tarvin Corridor?

CWAC population is set to continue growing, adding to the risk that the highways network within the borough will become overloaded and congestion will be exacerbated as movement and the demand for travel place increasing strain on the A51 as it forms a major route through the borough.

The scheme presents an opportunity to support CWAC's growing population and travel demand by improving a key strategic route into the city centre. A reduction in journey time and travel delays would facilitate faster access to jobs and local services, ultimately creating more prosperity across the borough and facilitating an uplift in GVA.

The enhancements would facilitate improvements from which all parts of the community could benefit, including public transport that is currently hindered by delays along the A51 corridor. By improving the capacity of the A51, both local and strategic movements will become much easier.

2.3.3 Employment

Table 6 presents a summary of employment levels in CWAC, the North-West and Great Britain as a whole. CWAC has a greater number of economically active persons (76.4%) than the North-West (75.7%) as well as a greater proportion of people in employment (73.5%), compared with the North-West figure of 71.8%. These figures are slightly lower than that of Great Britain, with 78% economically active and 74.2% in employment.

CWAC has a significantly better rate of unemployment (4%) than the North-West and Great Britain as a whole (5.1% and 4.7% respectively). It is important to maintain these levels of employment by ensuring that an efficient transport network within the borough offers reliable access to jobs and opportunities.

Table 6: Employment and Unemployment (April 2016- Mar 2017) Chester and Great Britain

All people	CWAC (numbers)	CWAC (%)	North West (%)	Great Britain (%)
Economically active	162,000	76.4	75.7	78.0
In employment	156,300	73.5	71.8	74.2
Employees	138,400	65.4	62.3	63.2
Self-employed	17,500	7.9	9.2	10.6
Unemployed (model-based)	6,500	4.0	5.1	4.7

Source: ONS 2016

Ensuring an efficient, reliable, uncongested transport network is also a priority of the CWLEP as a means to access jobs and enable logistics movements, both now and to support future growth. The region contains the major growth areas of Ellesmere Port Enterprise Zone (earmarked for major housing and employment growth, with £8m LGF awarded in February 2016) and the Atlantic Gateway and is a net importer of labour with the A51 Chester to Tarvin corridor forming a key route to these sites from areas in east Cheshire. Improving connectivity within, and to the borough, will be central to unlocking employment opportunities.

Capacity improvements along the A51 will also ensure efficient access to education, training and employment. An increase in opportunities will encourage graduates to remain in the area after university leading to a general upskilling in the workforce around CWAC.

The A51 Chester to Tarvin corridor is also a major pinch point for local commuter traffic between the major growth areas of Chester, Crewe and Nantwich, and mid-Cheshire (Northwich and Winsford). It is also a pinch point for strategic travel and traffic between the M6 and the Atlantic Gateway and Ellesmere Port Enterprise Zone areas beyond Chester, and to north Wales. The A51 also provides vital access to jobs along the Cheshire Science Corridor, at Deeside Industrial Park, and to future employment opportunities at key development sites proposed by the Constellation Partnership, as well as the future HS2 depot in Crewe. The CWLEP area relies on growing its employment market to support and grow its strong, specialised and high-performing economy and therefore requires a highway network which offers reliable journey times and minimal congestion to ensure commuter journeys can be supported and the area remains an attractive place for a skilled workforce to live.

2.3.3.1 Key Issues and Opportunities

Table 7 highlights the key issues and opportunities in relation to employment in Chester.

Table 7: Key Issues and Opportunities Presented by Employment in Chester

Issues	Opportunities
<ul style="list-style-type: none"> • CWAC has ambitious growth plans with many future employment opportunities planned at the HS2 depot in Crewe, the Atlantic Gateway and Ellesmere Port Enterprise Zone, Cheshire Science Corridor, Deeside Industrial Park and key sites within the Constellation Partnership. There will be greater demand to reach these employment growth sites. • There will be greater commuter flows along the A51 corridor as a result of economic growth and a resultant need for increased network capacity. • Without intervention, there is risk that the highways network will become subject to critical 'network stress' and will cease to function effectively. 	<ul style="list-style-type: none"> • Economic development within the borough and on the periphery of Chester city centre will enable job opportunities for people in the region across a wide range of sectors. • New employment centres will in turn rely upon an effective and efficient strategic transport network.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Transportation can act as a catalyst for economic development and prosperity. The scheme presents an opportunity to better connect residents around Chester, Tarporley, Northwich and Winsford to employment sites and introduce journey time savings for people commuting to or from the east of the borough.

The A51 should ensure reliable and direct connections between residential areas and key employment industries such as administrative services, science and professional services, and transportation and storage. Consideration should also be given to better connecting the regions new and strategic employment sites such as: the Atlantic Gateway, Ellesmere Port Enterprise Zone and the HS2 Hub in Crewe.

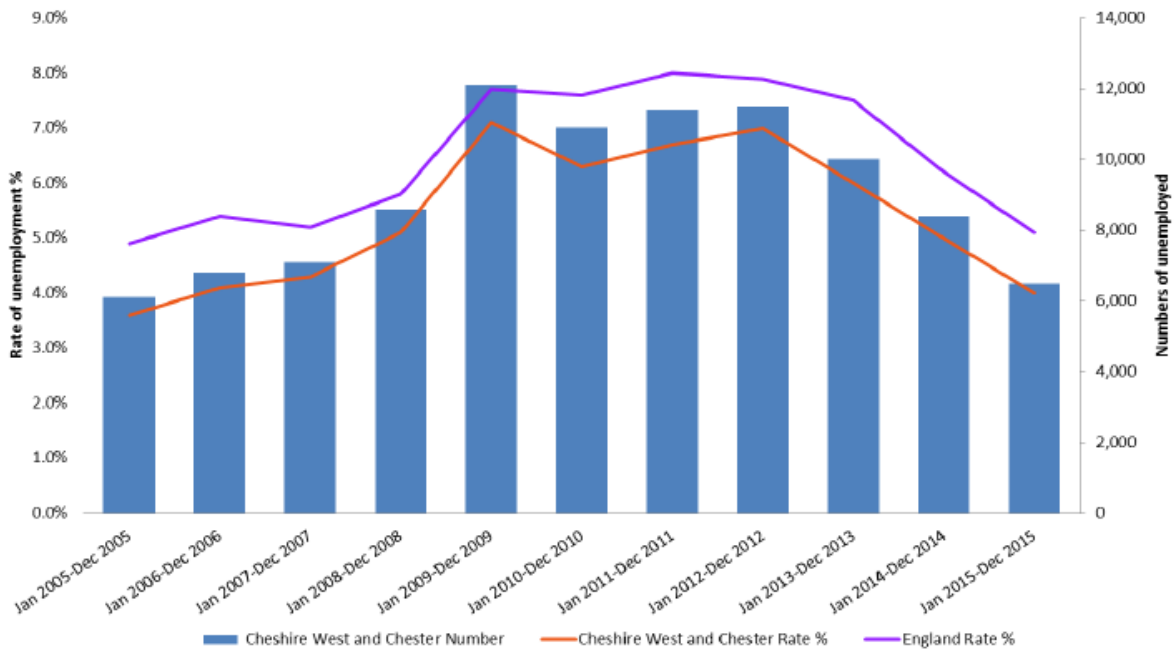
A faster and more reliable route to the east of Chester also has the potential to ease the congestion caused by freight traffic from the M6 corridor through to sites such as the Atlantic Gateway. In turn, this will create localised journey time benefits as well as the strategic improvements for freight movements.

2.3.4 Unemployment and Deprivation

The latest figure for unemployment in CWAC stood at 4% in 2016, below the rate for both the North-West (5.1%) and Great Britain as a whole (4.7%). Figure 13 illustrates the unemployment rate in CWAC from the period 2005 to 2015. Comparable with the rest of the UK, CWAC

experienced a spike in unemployment during the recession period, with a high of 7.75% taking place in 2009. A gradual decline was then observed from 2012 through to 2015.

Figure 13: Model-based Unemployment Rates Over Time



Source: NOMIS 2016

The A51 corridor provides connectivity to a number of significant employment areas such as the Chester Business Quarter, Chester Northgate Retail Development and Ellesmere Port Enterprise Zone. Therefore, the network needs to remain resilient in order to meet the requirement to enable economic growth through effective connectivity.

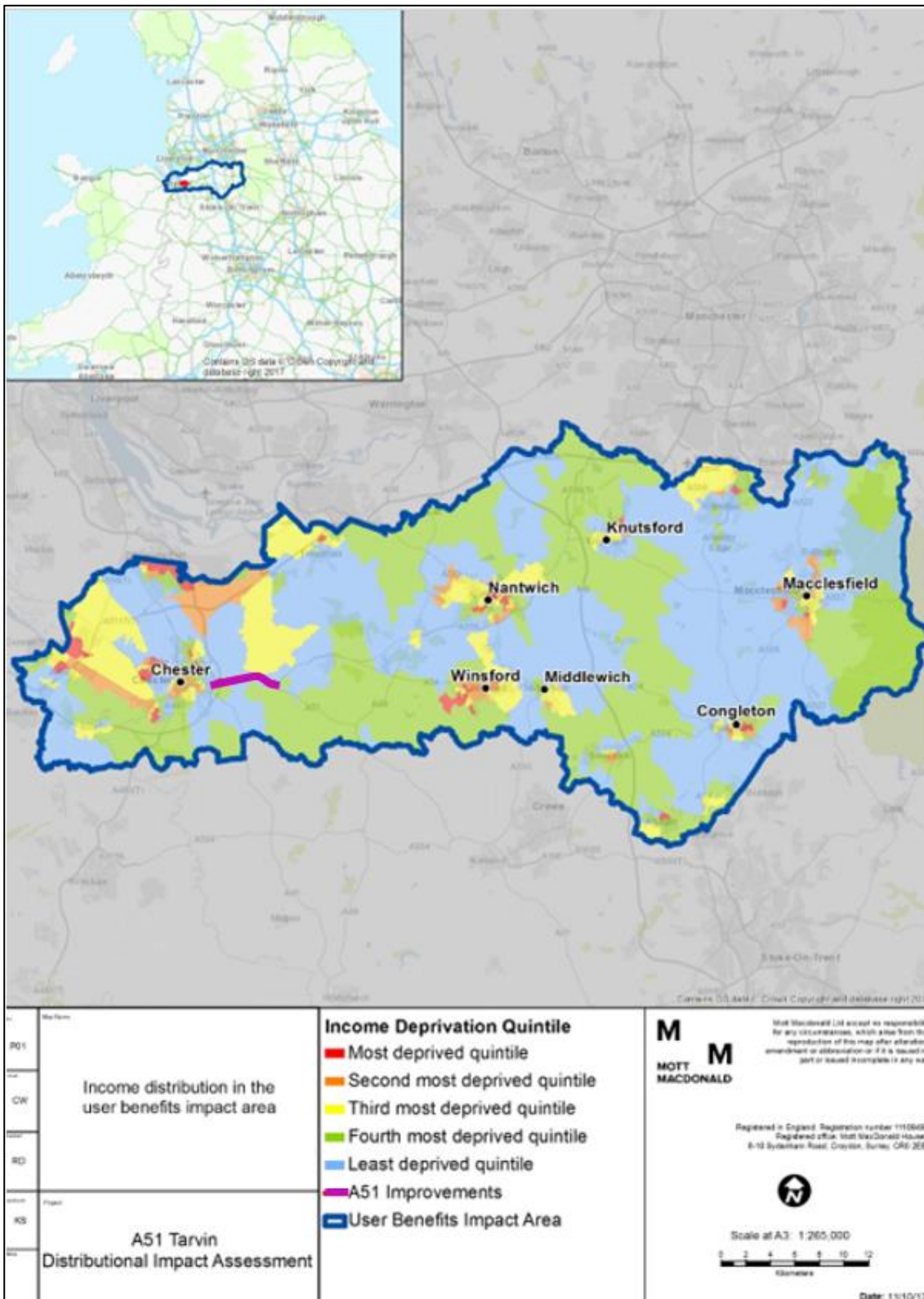
2.3.4.1 Deprivation

To aid understanding of deprivation and economic disadvantage, Indices of Multiple Deprivation (IMD) were mapped to acquire a spatial understanding of the socio-economic problems in the study area. The Index of Multiple Deprivation is the official measure of deprivation and combines information from the following domains:

- Employment Deprivation;
- Education, Skills and Training Deprivation;
- Health Deprivation and Disability;
- Crime;
- Barriers to Housing and Services; and
- Living Environment Deprivation.

As can be seen in Figure 14, Chester and areas directly surrounding the A51 Chester to Tarvin Corridor experience relatively low levels of deprivation.

Figure 14: Deprivation in Key Towns and Cities Surrounding the A51 and its Onward Links



Source: IMD, 2015

However, deprivation is a key issue for other key towns in the wider study area of interest. Winsford is situated around 12 miles to the east of the corridor and is connected to Chester via

the A51. Winsford features as the one Lower Layer Super Output Area (LSOA) in the top 3% most deprived in England. Two LSOAs in Winsford also fall into the top 10% most deprived areas in England. Northwich is another Mid-Cheshire town which is also served by the A51 Chester to Tarvin Corridor and which experiences moderate deprivation when compared to national averages, with some pockets of deprivation around the town centre.

Reliable journey times along the A51 Chester to Tarvin Corridor will enable residents in deprived towns such as Winsford to access employment opportunities within Chester, Chester Business Quarter and Deeside.

2.3.4.2 Key Issues and Opportunities

Table 8 highlights the key issues and opportunities in relation to unemployment and deprivation in Chester.

Table 8: Key Issues and Opportunities Presented by Unemployment and Deprivation

Issues	Opportunities
<ul style="list-style-type: none"> • The unemployment rate in the borough stands at 4%. • Several deprived areas are located in Chester city centre. • Winsford has one LSOA in the top 3% most deprived in England. 	<ul style="list-style-type: none"> • Over the past five years, the unemployment rate and percentage of people claiming job seekers allowance has slowly been declining in Chester. • The borough has an opportunity to continue increasing the number of people in employment by ensuring easy and affordable access to jobs, education and training.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Ensuring access to employment and opportunity is central to maintaining low levels of unemployment and deprivation which currently exist within the borough.

The A51 Chester to Tarvin Corridor is a key route between regional employment centres such as Chester Business Quarter, Crewe Hub, the Atlantic Gateway and key towns across the borough such as Winsford and Northwich and the city centre of Chester. Therefore, enabling efficient and reliable journeys along this route will be a key factor in supporting access to jobs for many people across the borough and ensuring that living and working in the area remains attractive.

2.3.5 Education

2.3.5.1 Educational Establishment Along the Corridor

There are a number of schools located in close proximity to the study area in Guilden Sutton and Christleton. A large number of school children, and parents assisting with school pick up and drop off, use the A51 for access to school by car, public transport, bicycle or on foot. Traffic modelling has shown that congestion along the A51 Tarvin to Chester Corridor is peaking in the AM peak and early PM peak increasing journey times for students and school children when travelling to and from their place of education.

The A51 also offers connectivity to towns to the east of the corridor such as Winsford and Northwich which have a dense network of educational establishments including Sir John Deane's College, a leading sixth form college with a large catchment area attracting many students from the Chester area. Winsford is also served by a large range of schools including the Mid-Cheshire college for tertiary education that offers a wide variety of courses. Enabling efficient reliable journeys along the A51 is therefore required to help those wishing to access these educational opportunities.

Although the Chester region out-performs the whole of the North-West in terms of NVQ 1-3 qualifications, rates of education deprivation in Northwich are of concern with 20% of the population living in LSOAs where educational deprivation is in the highest 20% in the country. Supporting access to education is therefore important to ensure a wide range of educational facilities are available to all residents within the borough and further afield.

2.3.5.2 Higher Education

The University of Chester has high ambitions set out in its Corporate Plan: Vision 2020, with aims to be a Top 50 University within the UK by 2020, and in the top 10% for student and staff satisfaction. Among its other priorities are to increase the undergraduate intake by 25% between 2013/14 and 2020, and to have over 650 postgraduate students.

However, Chester's One City Plan indicates that retention of graduates from the university within the city is low. The university has the scope to be a driver of innovation and economic growth in the city with its focus on sectors such as biosciences and food technology which can bring many opportunities for new employment in the city and surrounding area.

For the increase in students to be accommodated within the city, more student residential developments may be required. The ambitious plans of the University of Chester will require the transport network to be resilient and supportive to facilitate the increasing number of students living in or commuting to the area. The University seeks to support those wishing to learn and continue their education from a wide catchment area; the A51 corridor will play a key role in connecting prospective students in Cheshire to the opportunities provided at the University.

2.3.6 Key Issues and Opportunities

Table 9 highlights the key issues and opportunities in relation to education and skills in Chester.

Table 9: Key Issues and Opportunities Presented by Education and Skills

Issue	Opportunities
<ul style="list-style-type: none"> ● Chester has a successful university with high growth targets and increasing attendance figures. ● The University of Chester has a low graduate retention rate with a small of number of students choosing to stay in Chester for postgraduate study. This reduces opportunities for a highly skilled workforce in the borough. ● Rates of education deprivation in Northwich are moderate – 20% of the population live in LSOAs where educational deprivation is in the highest 20% in the country. 	<ul style="list-style-type: none"> ● Chester must seek to improve residents' access to education and training, whilst ensuring education services are accessible for those in deprived areas further afield. ● Improved access to employment opportunities in the area may lead to higher graduate retention levels. ● Residents in the borough have high qualification levels, with educational attainment higher than the regional and national average. Chester should look to support the retention of this skills base by improving access to the city centre and employment hubs such as Crewe and the Atlantic Gateway. ● Improvements to the A51 corridor could attract local residents to attend and continue education at the University of Chester through improved local journey times. ● Improvements could also encourage graduates to remain in the city on completion of their degree through a greater number of jobs being available due to developments being unlocked along the A51 corridor.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Poor access or a lack of transport choice can act as a key barrier to education. Effective investment in transport can support those with fewer qualifications to access educational services across the borough and support residents with access to adult education facilities. The scheme presents opportunities to enhance not only car user access to educational services, but also improve connectivity to education for public transport users through reducing congestion and improving the journey time reliability of bus services.

Many opportunities lie in extracting value from the services provided by the University of Chester, both in delivering higher education to the population of CWAC and also providing a highly skilled workforce. Developments taking place on the A51 corridor and in the wider CWAC area will support the provision of high quality jobs, resulting in higher rates of graduate retention and an uplift in GVA for the borough.

2.4 Economy and Business

CWAC aims to be ‘a desirable and attractive place to live, work, learn and visit with vibrant towns and rural villages². It has set a number of aspirations for growth in housing and jobs to be achieved across the borough, as summarised in Table 10.

Table 10: CWAC Growth Aspirations

Growth Aspiration	2010-2030
Housing Growth	22,000 houses
Jobs Growth	14, 000

Source: CWAC Adopted Local Plan (Part One) Strategic Policies, 2015

These growth aspirations for CWAC will boost the economy of the Cheshire and Warrington Local Enterprise Partnership area to £26.6bn by 2021, and £35bn by 2030, as set out in the CWLEP Strategic Economic Plan (2014). In addition, the CWLEP aims to increase its GVA to 110% of UK average by 2021 and to 115% by 2030³.

In order to achieve these objectives, CWAC’s Local Transport Plan 2011-2026 identifies the borough’s six key priorities for transport. These are:

- To provide and develop reliable and efficient transport networks which support sustainable economic growth in West Cheshire and the surrounding area;
- To reduce carbon emissions from transport and take steps to adapt our transport networks to the effects of climate change;
- To manage a well-maintained transport network;
- To contribute to safer and secure transport in West Cheshire and to promote types of transport which are beneficial to health;
- To improve accessibility to jobs and key services which help support greater equality of opportunity; and

² http://inside.cheshirewestandchester.gov.uk/policies_plans_and_strategies/planning_policy/local_plan/local_plan_part_one

³ <http://www.871candwep.co.uk/content/uploads/2018/07/SEP.pdf>

- To ensure that transport helps improve quality of life and enhances the local environment in West Cheshire.

Within these six objectives are a series of sub-objectives. Sub-objectives relevant to this proposed scheme include:

- Improve connectivity between West Cheshire and surrounding areas, particularly to Merseyside, Greater Manchester, North East Wales and to local airports and the Port of Liverpool;
- Improve and encourage the use of sustainable (low carbon) transport; and
- Ensure that new development takes place in accessible locations which minimise the need for travel.

Many housing and employment sites in the borough are constrained by a lack of infrastructure and road access causing local congestion on available routes inhibiting new investment at key locations. A transport network that is unable to cope with the increased amounts of traffic resulting from new developments is a threat to achieving these ambitions. This will in turn discourage private sector investment in the area. Therefore, it will be essential to ensure local highway networks remain resilient to increasing volumes of traffic.

In addition to increasing capacity to support growth in housing and enable access to employment, improvements along the A51 could also support the economy through enabling freight movements towards the Port of Holyhead, Mersey Dee area and key distribution sites in the Midlands from the east of Chester. This could help address key growth aspirations for CWAC which aim to improve connectivity between Cheshire and the surrounding area, particularly to Merseyside, Greater Manchester and North Wales.

2.4.1 Gross Weekly Pay

Gross weekly pay, as a measure of the average wages paid to employees in CWAC is higher than regional and national levels. Data on average gross weekly pay from 2015 shows:

- Gross weekly pay for full time workers in CWAC is £547.
- This is significantly higher than gross weekly pay across the North-West (£502.1).
- Gross weekly pay in CWAC is also higher than the average across Great Britain (£541.0).

This data indicates a higher proportion of higher paid, and likely high value, employees within the region relative to the comparator areas.

2.4.2 Gross Value Added (GVA) per Head

At £24,949, GVA per head in CWAC is significantly below that of neighbouring authorities Cheshire East (£29,984) and Warrington (£30,945), but higher than Merseyside (£18,621) (2015). GVA per head in CWAC is also well above the figure for the North-West as a whole (£21,011).

2.4.3 Gross Value Added (GVA) per Filled Job

GVA per filled job data sets out the total GVA of Chester and its comparator areas, divided by the number of jobs that are currently taken in the area. This data shows:

- CWAC has £49,695 of GVA per filled job. This is higher than the North-West average of £47,494, but lower than the England average of £54,783; and
- Within the CWLEP area, CWAC has the lowest GVA per filled job of all three unitary authorities and Cheshire East the highest:
 - CWAC; £49,695
 - Cheshire East: £60,748.

- Warrington: £50,733.

This suggests the need for CWAC to improve its GVA per filled job to remain competitive in the region. Encouraging the growth of higher value businesses through effective and efficient transportation services and highway networks in the borough will support this.

2.4.4 Key Issues and Opportunities

Table 11 highlights the key issues and opportunities in relation to the economy and businesses in CWAC.

Table 11: Key Issues and Opportunities Presented by Economy and Business

Issues	Opportunities
<ul style="list-style-type: none"> • GVA per head in the borough of CWAC is below that of the neighbouring authorities of Cheshire East and Warrington. • GVA per filled job in CWAC is lower than the national average and could potentially be improved by attracting higher value jobs to CWAC and building housing of a sufficient quality to attract higher paid, higher skilled workers to the town. 	<ul style="list-style-type: none"> • Attracting businesses to the borough, in part through effective transport networks, could help address the relatively low level of GVA per head in CWAC • CWAC has higher gross weekly pay than the regional and national averages, as well as a higher proportion of its businesses surviving beyond four years offering potential for a strong and competitive future economy. • This forms an excellent environment for businesses to set up and thrive.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This section has demonstrated that CWAC is performing well economically with key indicators suggesting that the borough is performing, in some cases, better than neighbouring authorities and in others better than the North-West and England as a whole.

This positive outlook suggests that improvements to the A51 would support continued economic growth by unlocking jobs and business opportunities both along the A51 corridor and locations further afield.

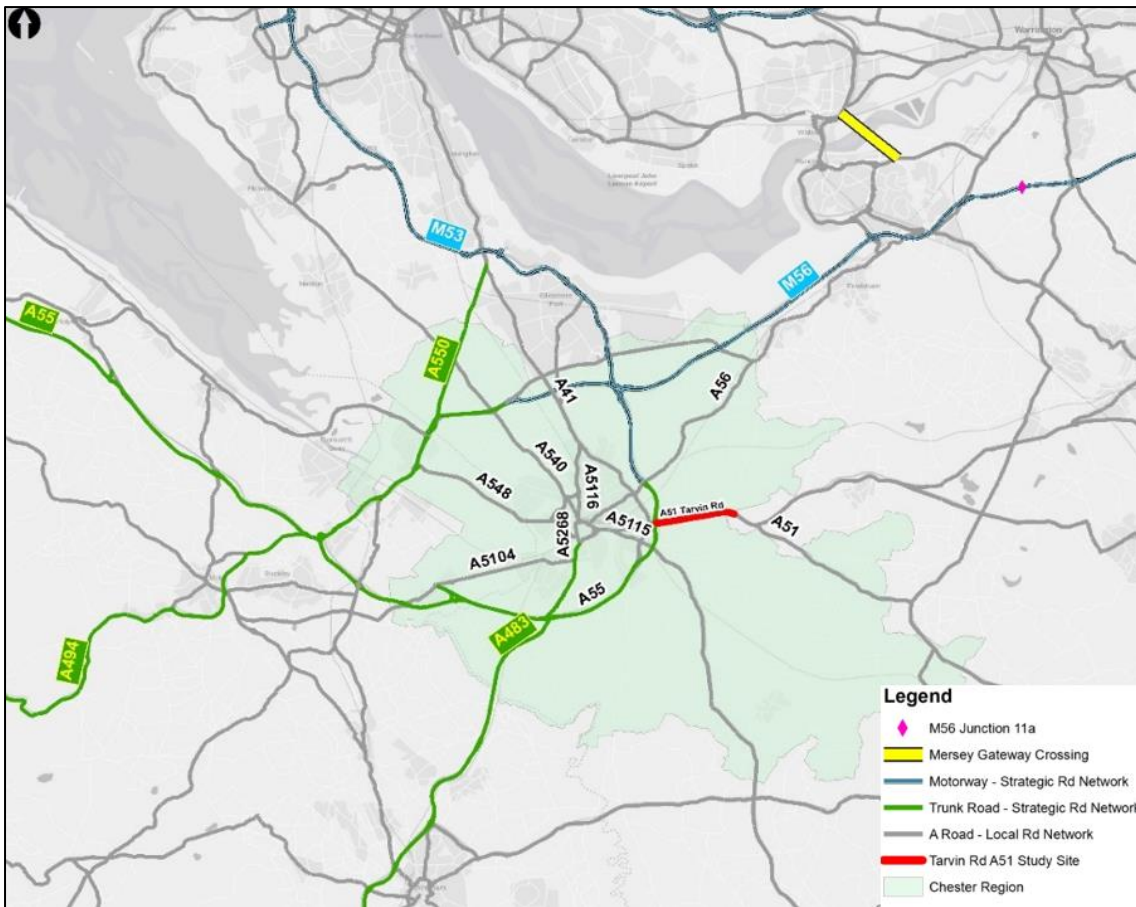
2.5 Existing Highway Network

This section discusses existing traffic conditions and characteristics of the local highway network. It considers the key travel problems found along the A51 corridor.

2.5.1 Strategic Road Network

Figure 15 shows the wider area around the A51 and surrounding strategic road network. The Chester region, highlighted light green is served by a dense network of key routes with the A51 at its centre. The strategic routes highlighted in this figure include both local and Highways England roads.

Figure 15: A51 Chester to Tarvin Corridor in Relation to the Wider Strategic Network



Source: Mott MacDonald

The A51 is a key route offering connectivity to Chester from areas to the east of the borough and further afield. The A51 Chester to Tarvin corridor provides a key strategic route for residents in the east of the borough to access employment opportunities, for sub-national movement of freight traffic as well as tourist movements between popular attractions in North Wales and Cheshire.

The position of the A51 provides an alternative route to the M56 for west/east freight movements, further increasing the need for a more resilient network to support economic activity. This also means the A51 is a critical route for both high and heavy loads. A faster and more reliable route to the east of Chester also has the potential to ease congestion caused by freight traffic from the M6 corridor through to sites such as the Atlantic Gateway. In turn, this will create localised journey time benefits as well as strategic improvements for freight.

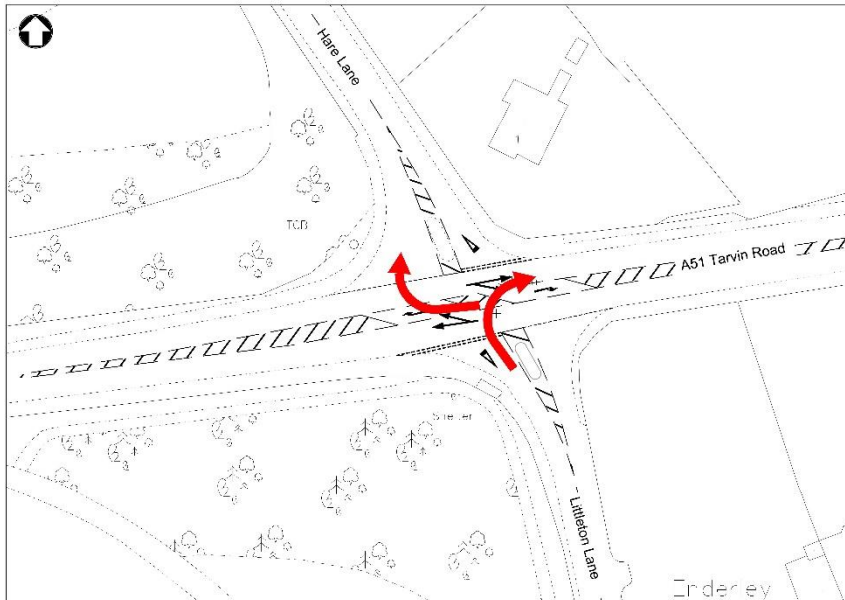
2.5.2 Local Road Network

The A51 is the primary route into Chester for residents of local towns and villages such as Tarvin, Tarporley, Kelsall and Ashton. Residents rely on the local road network for access to jobs, services and leisure and retail facilities. The current performance of the A51 is poor causing substantial delays to local journeys within the borough (DfT traffic counts, 2014). While congestion is evident along the whole corridor in both directions, the corridor between Tarvin roundabout and Stamford Bridge is severely congested during the PM peak period particularly for westbound traffic (Google traffic data, 2017). The A51 Tarvin-Chester Improvements

Scheme therefore aims to address capacity issues at key junctions along the corridor to improve the overall flow of traffic and reduce journey times.

The current right turn movements onto the A51 Tarvin Corridor from Hare Lane and Littleton Lane, shown in Figure 16, are also adding to issues of congestion.

Figure 16: Right Turn Movements from Hare Lane and Littleton Lane



Source: Mott MacDonald

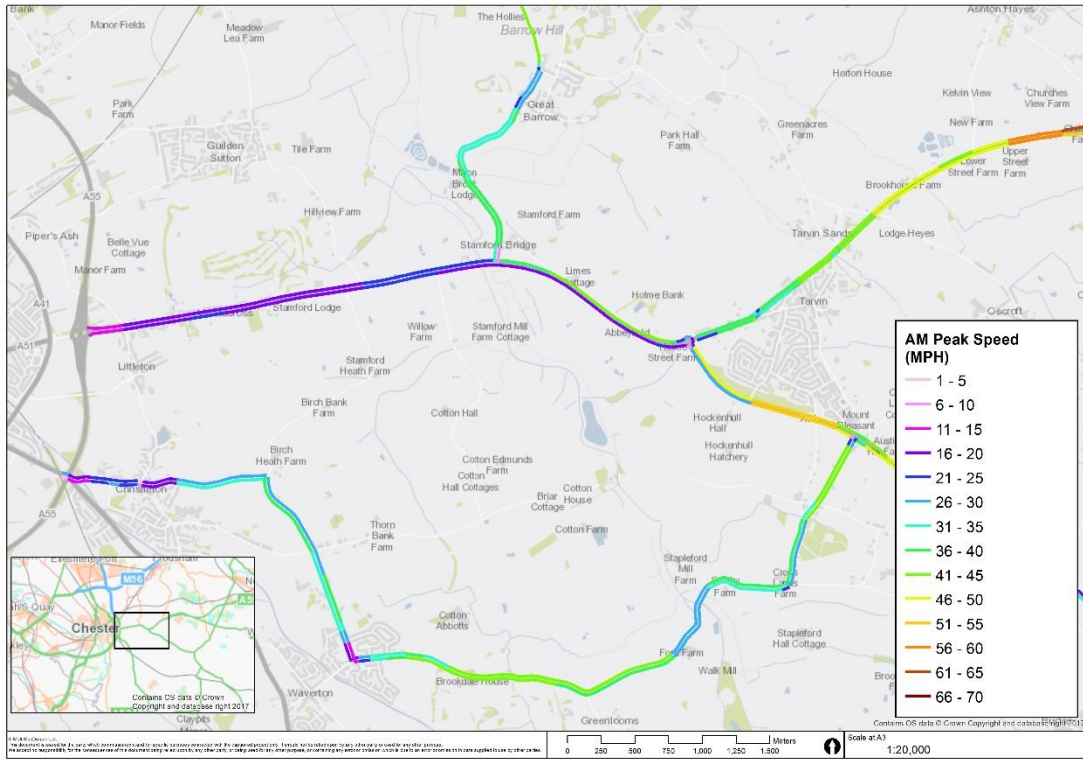
The existing layout at this junction provides minimal queuing space for vehicles to turn right into Littleton Lane and Hare Lane from the A51 causing traffic to build up on approach to the A55/A51 Vicars Cross junction. Delays also occur on Littleton Lane due to the narrow approach width to the junction with the A51. Right turn movements onto the A51 from this junction block vehicles wishing to turn left towards the Vicars Cross junction causing traffic to back up down Littleton Lane. Removal of selected right turning movements at these junctions would provide an opportunity to increase capacity and reduce network delay. Removing these right turn movements would also create safer environments for pedestrians and cyclists offering capacity for wider and safer crossings encouraging sustainable and active modes of travel.

2.5.2.1 Current A51 Congestion

Current levels of congestion along the A51 are a serious cause for concern with journey times between Tarvin and Chester taking up to 40 minutes in the AM peak period for a short 5-7 mile journey, considerably longer than the desired journey period. TrafficMaster journey times have also been calculated from A55 Vicars Cross Roundabout to Tarvin roundabout, which is the section of the A51 where the interventions will take place; in the off-peak it takes around four minutes to travel the route in each direction. In the AM peak (08:00-09:00) the times increase to 7.5 minutes eastbound and 10 minutes westbound.

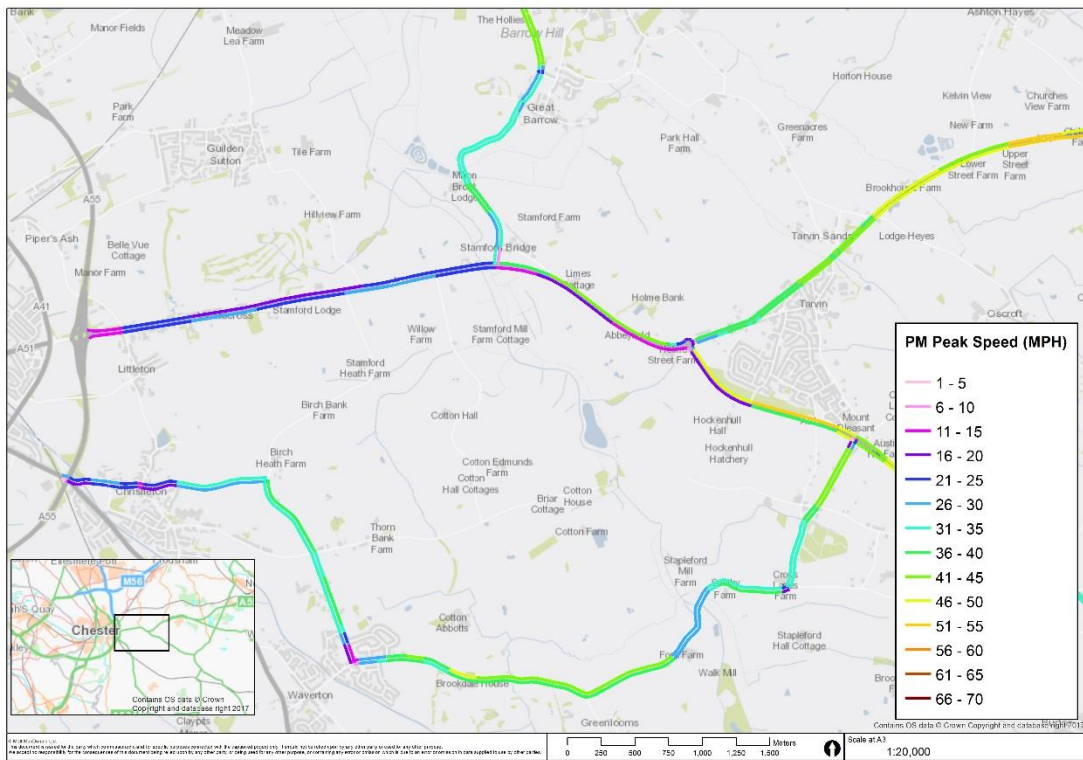
Figure 17 and Figure 18 show AM and PM peak hour average travel speeds, focused on the section of the A51 between Tarvin roundabout and the A55/A51 junction, where the scheme interventions are proposed.

Figure 17: AM Peak Average Speeds



Source: Mott MacDonald

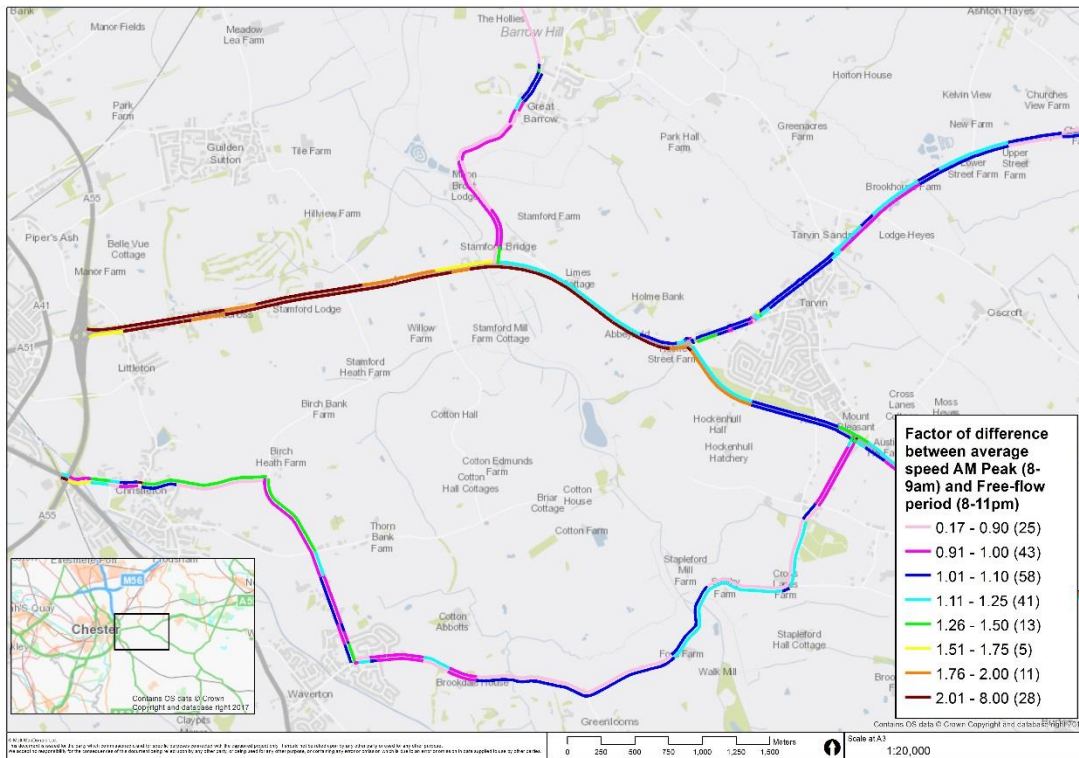
Figure 18: PM Peak Average Speeds



Source: Mott MacDonald

Using the AM peak as an example, Figure 19 shows the difference in speed between average AM peak speeds and average speeds when traffic is free flowing. It can be seen that most of the A51 corridor between the A55/A51 and Tarvin roundabout experience the greatest differential in speeds, (yellow, orange and burgundy colours), between the AM peak and hours of free flow traffic. Speeds in free flow traffic, depending on the section of the corridor are between 1.51 and 8 times faster in free flow than in the AM peak.

Figure 19: Factor of difference between average AM peak speed and free flow traffic



Source: Mott MacDonald

2.5.2.2 Future A51 Congestion

Key junctions along the network have been modelled to identify issues with future capacity in 2030 if no changes are made to the network. The results of this modelling show that:

- By 2030, the Tarvin roundabout will operate significantly over capacity. It will experience a maximum delay per Passenger Car Unit (PCU) of approximately 119.9 seconds during the AM peak and 116.6 seconds during the PM peak on the A51 southern approach to the roundabout. The results also demonstrated that the maximum queue on the roundabout would be significantly reduced by implementing the capacity improvements identified within this scheme.
- By 2030, each arm of the Tarvin Road / Barrow Lane junction at Stamford Bridge has a Degree of Saturation (DoS) approaching the recognised threshold level of 90% for a signal controlled junction with a maximum of 79.5% at the A51 westbound approach in the AM peak period.

This demonstrates how increasing traffic volumes will continue to slow journey times and increase delays at key junctions along the network and why there is a need to improve the current and future conditions along the corridor. This issue of congestion is also likely to be exacerbated as a result of future growth in and around Chester which may hinder the success of

economic development projects as congestion causes the area to become increasingly unattractive and inaccessible to prospective developers and investors.

Therefore, it is clear that intervention along this corridor is needed to reduce issues of congestion and ensure the network is able to operate effectively in anticipation of future growth and facilitate economic development.

2.5.3 Key Issues and Opportunities

Table 12 highlights the key issues and opportunities in relation to the highways network and traffic in Chester.

Table 12: Key Issues and Opportunities Presented by the Highways Network

Issues	Opportunities
<ul style="list-style-type: none"> ● High levels of congestion along the A51 Tarvin to Chester Corridor is affecting journey times in and out of Chester from the east of the borough. ● This congestion is likely to be exacerbated by predicted growth in the region. Congestion may hinder the success of future development. ● The Department for Transport's (DfT) data has shown that the route between the Tarvin roundabout and the A55 into Chester is the UK's 5th most congested in terms of average journey waiting time, outside London (with a delay of 26.44 hours in 2014). ● The A51 provides an alternative route for freight traffic which requires an efficient transport network to support the movements of goods and enable economic. 	<ul style="list-style-type: none"> ● There are strong road links from Chester to the strategic highway network which provide connectivity to local and regional hubs. This provides an opportunity to support economic growth. ● Capacity improvements along the A51 corridor could ease congestion for road freight particularly on strategic connections from the M6 Growth Corridor through to the Atlantic Gateway enhancing the transportation of goods and services around the borough and wider region. ● Reduction in congestion will also improve the efficiency and reliability of journey times for commuters and residents travelling between Chester and Cheshire towns to the east of the corridor such as Crewe, Winsford and Northwich. ● More efficient routes would also assist in a reduction in carbon emissions generated by vehicles, thus improving air quality conditions.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This section clearly demonstrates that the A51 is a key route within both the local and strategic highway network providing connectivity to regional centres and city centres of Chester and Liverpool for both commuter and freight movements.

However, data collected and modelling along this network provide evidence of heavy congestion which could produce significant delays in the future hindering developments and access to opportunities. Capacity improvements are therefore required to mitigate current issues of congestion and prevent severe delays for future traffic.

2.5.4 Road Safety

Road safety and security is an important issue for CWAC. This is reflected by the development of the 'Road Safety Plan' in 2016/2017. The plan proposes a range of measures to reduce the risk of road traffic collisions and casualties, including:

- Improving safety for all road users but especially vulnerable users;
- Directing traffic to use the most appropriate roads;
- Managing the speed of traffic;
- Behavioural change through Road Safety Education, Training and Publicity programmes; and

- Delivering targeted engineering measures to reduce collisions through the annual Local Safety Scheme Programme.

Overall, road safety trends in CWAC are broadly stable with a decrease in the number of people Killed or Seriously Injured (KSI) on roads within CWAC between 2012 and 2015. The number of casualties (slight, serious and fatal) has fluctuated over the 4-year study period as shown in Table 13. Of the 1026 casualties in 2014, 841 were slight casualties, 170 were serious, and 9 were fatal.

Table 13: Killed or Seriously Injured in Road Traffic Collisions (2012 to 2015)

Type	2012	2013	2014	2015
Adult	205	126	179	67*
Children	13	14	9	5*

Source: CWAC Road Safety Plan 2015 / 2016

*Data only up until June 2015

Table 14 shows how these casualties were distributed among different modes of transport. As can be seen in the table, the majority of casualties were car occupants. However, over 200 casualties in each year have been pedestrians and cyclists. Reducing congestion and enhancing the performance of junctions could therefore improve safety along the corridor creating better environments for cyclists and pedestrians.

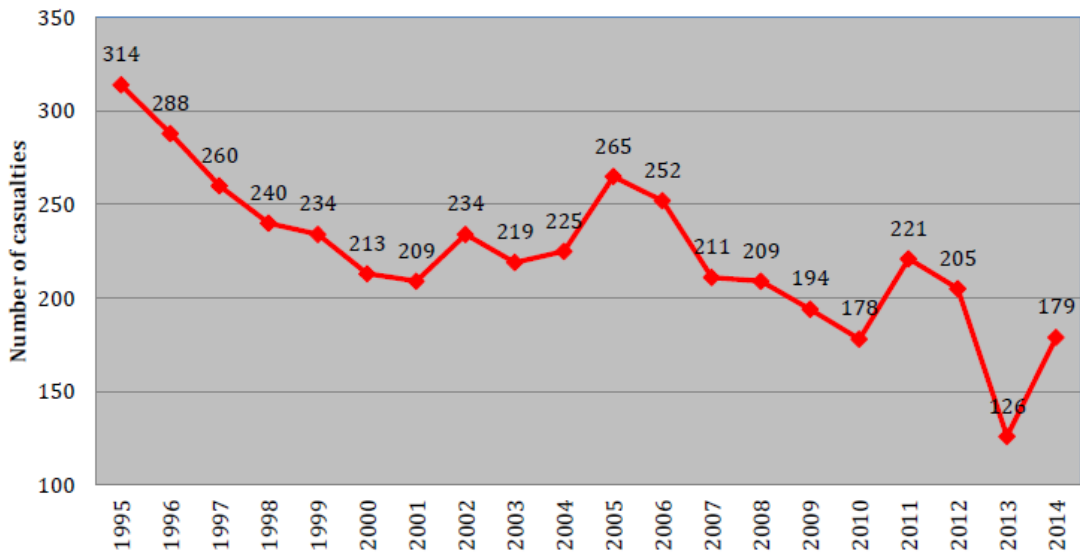
Table 14: Seriousness of Collision Sorted by Mode Type (2012 to 2014)

Casualty Group	2012					2013					2014				
	Fatal	Serious	Slight	Total	%	Fatal	Serious	Slight	Total	%	Fatal	Serious	Slight	Total	%
All casualties	11	194	917	1122	-	7	119	763	889	-	9	170	841	1026	-
Pedestrians	2	29	79	110	10	3	24	79	106	12	1	26	80	107	11
Pedal cyclists	0	24	76	100	9	1	22	82	105	12	0	27	97	124	12
Motor cyclists	4	58	67	129	11	2	21	90	113	13	1	59	75	135	13
Car occupants	3	75	646	724	65	1	46	477	524	59	7	54	551	612	60
PSV occupants	0	4	20	24	2	0	4	10	14	2	0	1	6	7	1
Other	2	4	29	35	3	0	2	25	27	3	0	3	32	35	3
KSI Total				205					126					179	

Source: CWAC Road Safety Plan 2015 / 2016

The graph displayed in Figure 20 shows the number of Killed or Seriously Injured (KSI) individuals on Cheshire's highway network since 1995. There has been a decrease in the number of recorded collisions between 1995 and 2014 with the exception of an increase between 2013 and 2014 of 53 accidents. Further data is required to know whether this is an anomaly or an emerging pattern.

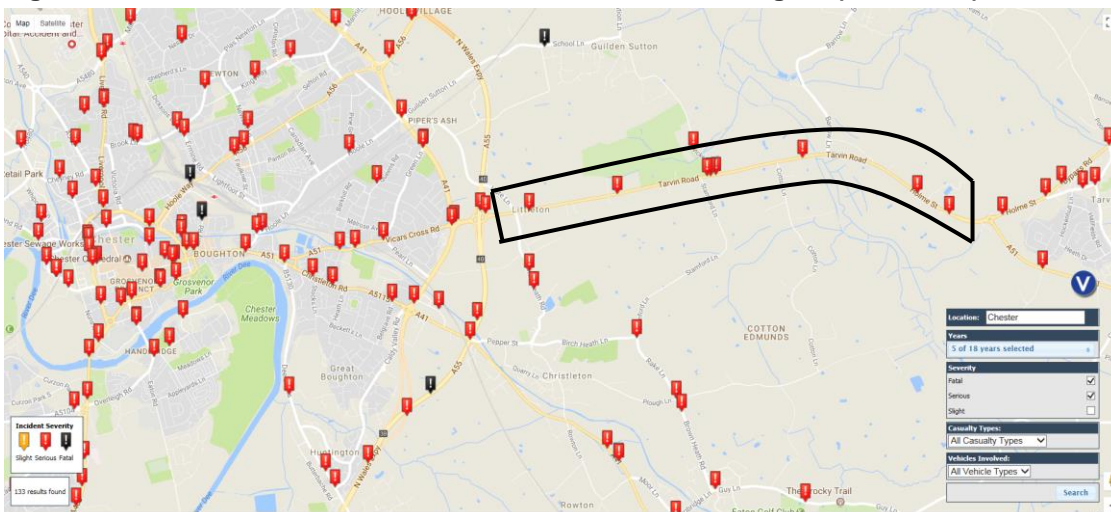
Figure 20: Killed or Seriously Injured in Road Traffic Collisions on CWAC local roads 1995-2014



Source: CWAC Road Safety Plan 2015 / 2016

The location of collisions that occurred between 2011 and 2015 can be seen in Figure 21 which displays the location of both serious and fatal accidents, black markers representing fatal and red markers representing serious collisions. As expected, there is clustering around the junctions along the A51 Chester to Tarvin Corridor. There have been no recorded fatalities during the study period along the A51; however, two have been recorded in Chester city centre and on the A56 / A55.

Figure 21: 5-Year Serious / Fatal Collisions in the Chester Region (2011-2015)



Source: www.Crashmap.co.uk 2017

The majority of collisions at junctions within the A51 study area are shunt related and can be associated with the stop-start nature caused by congestion. Therefore, improving the flow of traffic through junctions along the A51 Tarvin – Chester corridor will reduce the number of these type of collisions and improve overall road safety.

2.5.5 Key Issues and Opportunities

Table 15 highlights the key issues and opportunities in relation to road safety in Chester.

Table 15: Key Issues and Opportunities Presented by Road Safety

Issues	Opportunities
<ul style="list-style-type: none"> ● Latest figures from 2014 suggest that the number of KSIs has increased in CWAC. ● Continued analysis of accidents is required to help reduce accidents to a similar level observed between 1995 - 2013. ● Rear end shunting accidents are common at key junctions along the corridor such as the Hare Lane/Littleton Lane. 	<ul style="list-style-type: none"> ● The current level of road safety in the Chester region could be improved if the amount of stop start traffic is reduced. Junctions along the A51 Tarvin Corridor such as the A51/A55 Vicars Cross junction and the A51/Stamford Lane junction currently experience a higher than acceptable number of collisions of this type. The occurrence of rear end shunting accidents could be reduced if traffic is free flowing at junctions.

So, what does this mean for the A51 Chester to Tarvin Corridor?

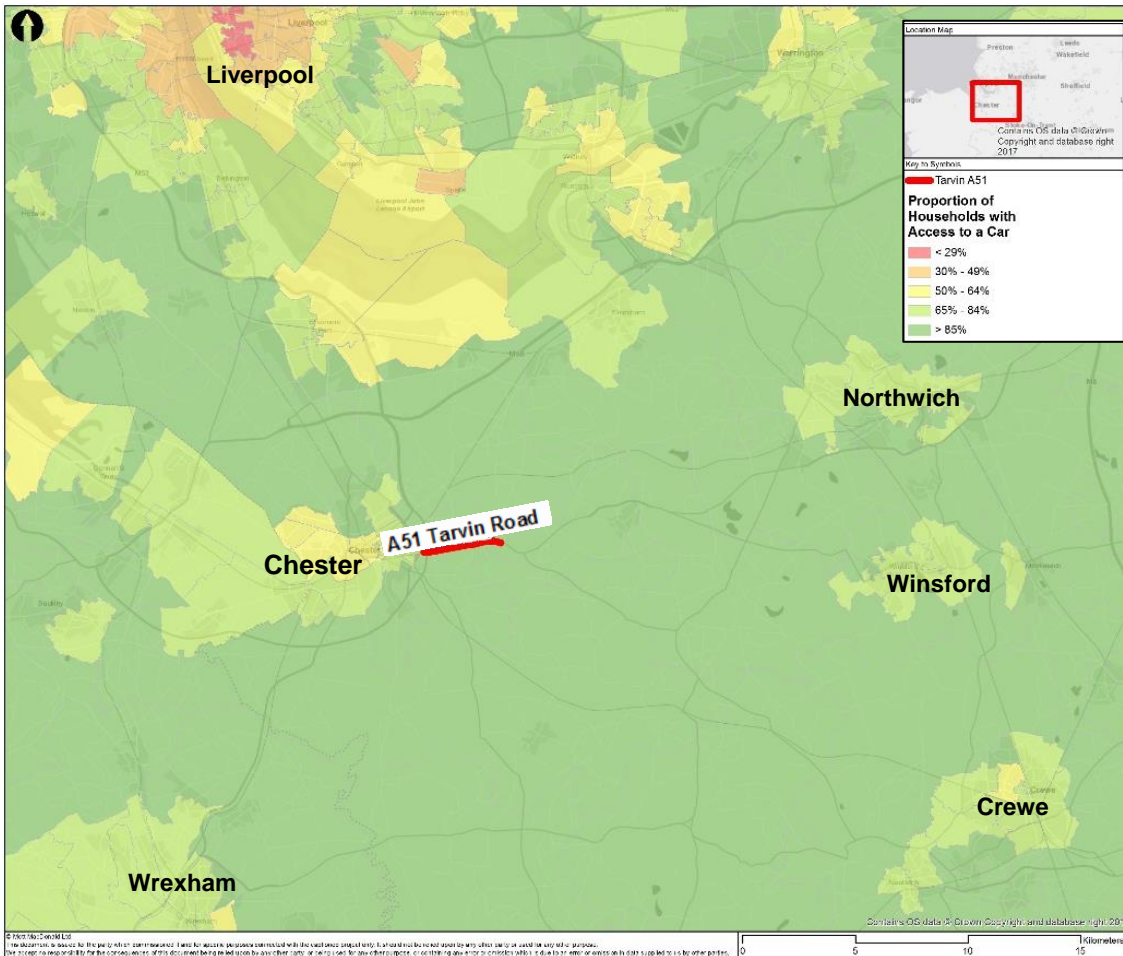
Accident data for the study area shows a number of serious and slight accidents occurring at key junctions along the corridor such as the Vicars Cross roundabout, Stamford Bridge Junction, Wicker Lane junction and the eastern and western approaches to the Tarvin roundabout.

Increasing capacity along the A51 and a series of improvements at key junctions such as Vicars Cross roundabout, Stamford Bridge and the Tarvin roundabout could enhance road safety for vehicles by improving the flow of traffic along the network and on approach to key junctions.

2.5.6 Car Ownership

Figure 22 presents a review of car ownership in the Chester region and analysis of 2011 ONS Census data forms the basis of this sub section.

Figure 22: Proportion of Households with Access to a Car



Source: ONS 2011

As can be seen there is a relatively high proportion of the population (85% of households) surrounding Chester that have access to a car. In Chester, parts of Ellesmere Port and Elton levels of access to a private car decreases to 50-64%. Further north, across the River Mersey the proportion of households with access to a car dramatically decreases, in some areas to less than 29%. It should also be noted that there is a direct correlation between areas of low car ownership and the most deprived parts of the wider study area (See Figure 14).

2.5.7 Key Issues and Opportunities

Table 16 highlights the key issues and opportunities in relation to car ownership in Chester.

Table 16: Car Ownership Issues and Opportunities in Chester

Issues	Opportunities
<ul style="list-style-type: none"> ● A high proportion of the population (85% of households) surrounding Chester have access to a car. ● Whilst this can be viewed as a positive indicator of wealth and prosperity in the study area, this also implies that car travel is embedded as a dominant mode of travel in Chester West and Chester. 	<ul style="list-style-type: none"> ● Within the urban centre fewer members of the population have access to a car. ● There is an opportunity to increase travel by sustainable modes and increase resident access to employment and services.

So, what does this mean for the A51 Chester to Tarvin Corridor?

High levels of car ownership are evident across the borough particularly in areas surrounding the A51 corridor which contributes to increasing levels of congestion along the A51. Therefore, the highway needs to remain resilient to high and increasing levels of car ownership and offer a network which supports sustainable modes of transport to reduce the number of trips made by car.

In order to create a resilient network and improve opportunities for sustainable travel, capacity of the network needs to be increased in order to reduce congestion and improve the reliability of bus services.

2.6 Wider Transport Network Provision

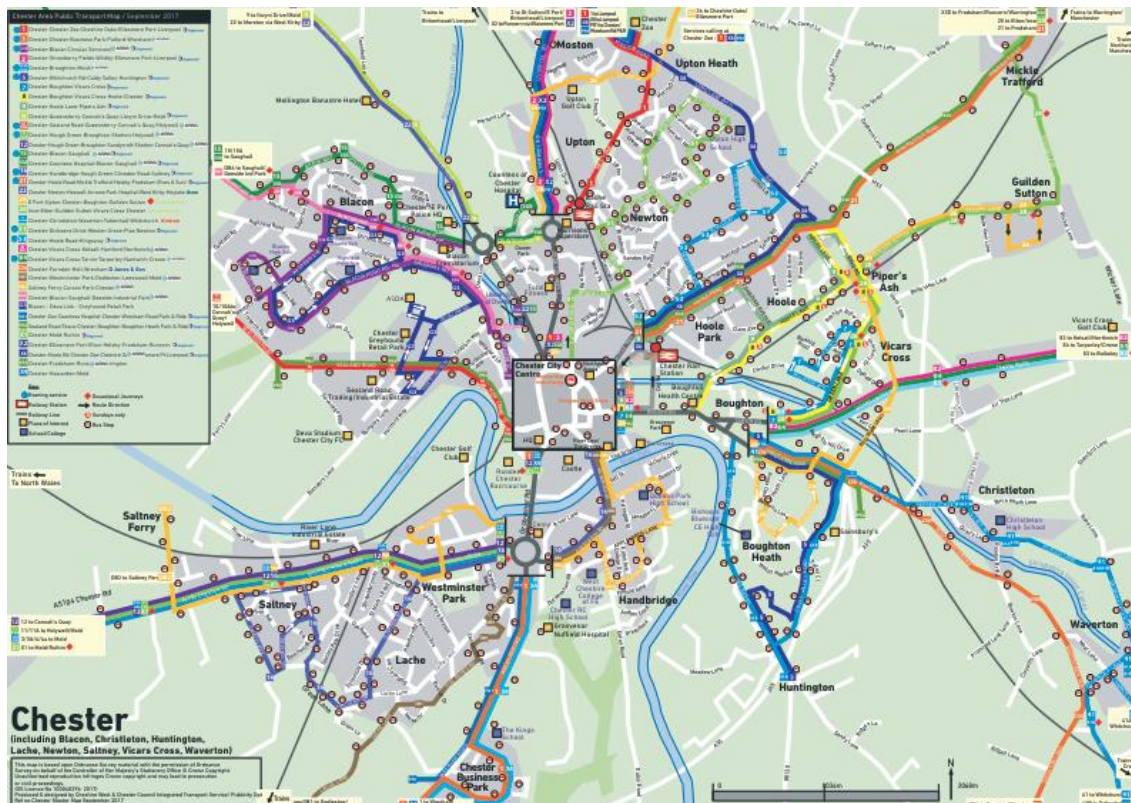
It is important to examine the use of the corridor by other forms of transport and ‘active mode’ users. This section examines wider transport provision in CWAC, examining accessibility on a mode by mode basis. Accessibility covers movement within the borough as well as to key centres to the east of Chester.

2.6.1 Public Transport

2.6.1.1 Bus

Buses are a sustainable and effective mode of transport that can efficiently utilise highways space. An overview of Chester’s bus network is displayed in Figure 23. There are currently three bus services that run along the A51 Tarvin to Chester Corridor. These are the 82 and 84 bus services which link Chester with Crewe, Northwich, Winsford and Tarpорley.

Figure 23: Chester Bus Network Map



Source: CWAC 2017

The importance of the A51 Chester to Tarvin corridor for buses travelling to and from Chester is demonstrated by the high number of services which stop along the route. On a weekly basis, 186 buses stop at the bus stop on the A51 Tarvin Road near Cotton Lane travelling towards Chester, and 176 stop at the bus stop on the opposite side of the A51, travelling from Chester⁴.

Effective public transport is a key factor in creating more sustainable communities. However, bus services which utilise the A51 Chester to Tarvin corridor often experience congestion and delay leading to poor journey time reliability with some services being discontinued as a result. Bus travel can become more attractive if journey times are fast and reliable which can be achieved through reducing congestion on the highway network.

High levels of car ownership in the study area (85%) could be indicative of a level of car dependency, reinforced by a perception that public transport offers a poor level of service. Improving conditions for travel along the A51 will increase opportunities for sustainable travel modes to connect Chester to wider surrounding areas, which in turn could further reduce congestion and lead to a positive change in carbon emissions.

Data from the DfT Public Service Vehicles (PSV) survey, which uses figures from bus operators within each local authority for years 2010-2016, has shown the number of passenger journeys on local bus services have fluctuated by around 11 million with a decrease occurring around 2011/12. Declining trends in bus passengers across the UK and no significant increase in patronage in CWAC since 2009/2010 demonstrate the need for change to enable services to become more efficient and attractive as a main mode of travel. As a percentage of the total bus passenger journeys undertaken in Chester, 30% are undertaken by passengers eligible for concessionary travel. Therefore, ensuring bus services are available and efficient is important to ensure all ages of the population have access to opportunities and facilities.

2.6.1.2 Rail

Rail plays a crucial role in the transport of people and goods in Cheshire and across north Wales and northern England. Chester railway station, currently operated by Arriva Trains Wales, is the main rail hub for the region with services on the North Wales Coast Line, the Wirral Line and the Mid-Cheshire Line. Figure 24 shows the location of the Chester rail network and how it is connected to Liverpool in the west, Manchester in the north and Crewe in the east.

Table 17 shows annual rail passenger levels at Chester railway station between 2011/12 to 2015/16. There has been an increase year on year by over 1.5 million passengers during the study period.

Table 17: Annual Rail Passengers at Chester Railway Station

Year	Annual rail passenger usage (Millions)
2011/2012	2.957
2012/2013	3.011
2013/2014	4.256
2014/2015	4.523
2015/2016	4.620

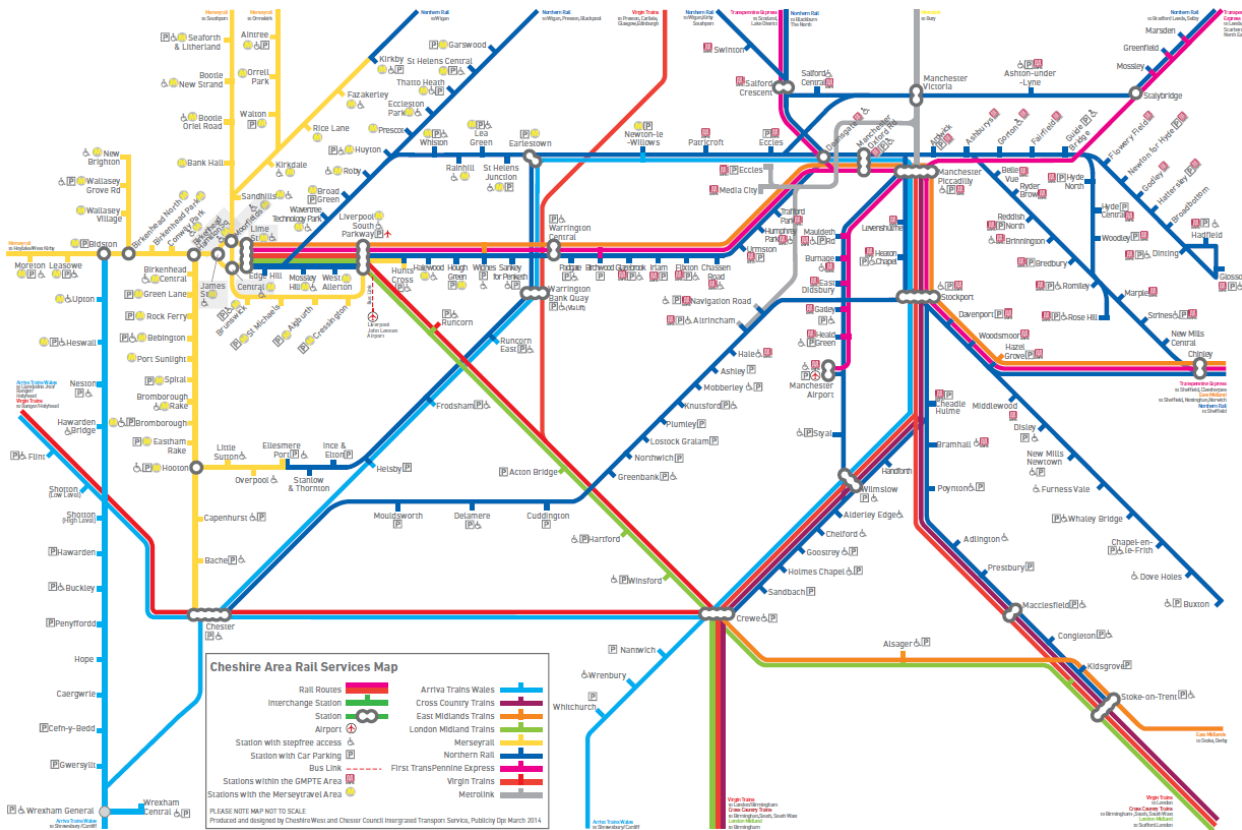
Source: ORR

Increasing passenger numbers are reflective of the attractiveness of rail as a mode of transport for commuters and visitors travelling between Chester, the wider region and further afield. Potentially this could reduce the number of vehicles on the local highway network as people use the train for regional journeys, however it could also see an increase in traffic as people drive or are driven to the station from the local environs to embark upon longer distance train journeys.

⁴ These figures relate to timetable information which was analysed during December 2017.

To support multi modal journeys and encourage use of public transport an efficient local highways network is needed to encourage people living in the vicinity of the A51 to either drive (or be driven) to the station to make onward longer distance journeys, or to take the bus to the station. Highway improvements along the A51 therefore have the potential to support an increase in public transport use.

Figure 24: Chester Rail Network Map



Source: Cheshire West & Chester Council 2017

2.6.2 Key Issues and Opportunities

Table 18 highlights the key issues and opportunities in relation to bus and rail use and services.

Table 18: Key Issues and Opportunities Presented by the Public Transport Network in Chester

Issues	Opportunities
<ul style="list-style-type: none"> • The Department for Transport forecast that Rail patronage may rise from 2010 to 2020 by 8-10%, 2026 by 16-20% and 2030 by 19-24%. • Congestion along the A51 corridor is causing significant delays to bus journey times, decreasing the reliability of services and attractiveness as a mode of transport. • The number of bus passengers on local bus services in Chester has shown no sign of significant increase between 2009/10 and 2015/16. 	<ul style="list-style-type: none"> • In the future, Chester has the ability to capitalise on HS2 and Northern Powerhouse Rail. Chester residents will be able to quickly access both growth sites and attract more residents who wish to connect to the high-speed rail service as long as they can access Chester station efficiently. At present this is a challenge for residents driving to the station using the A51. • Reduced congestion on the A51 Tarvin to Chester Corridor will help to improve bus journey times between Crewe and Chester. This can help promote a mode share increase towards public transport.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Chester rail station is well positioned to provide an opportunity to increase the use of sustainable modes of travel for long-distance trips for residents within CWAC. By investing in the local highway network, residents will be able to access Chester station more effectively to undertake onward travel by HS2, Northern Powerhouse Rail and the West Coast Main Line to London.

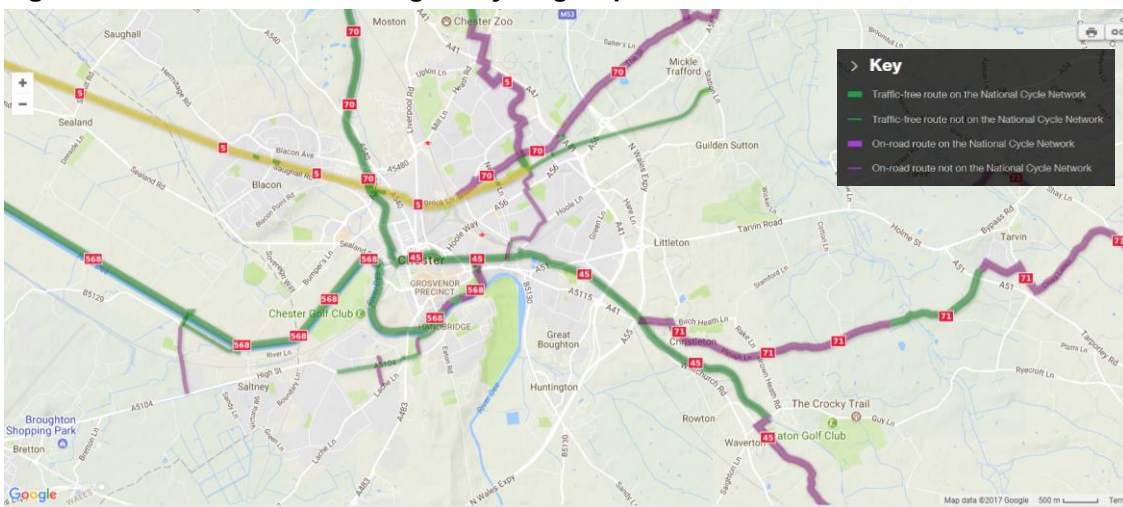
For local travel, investing in the A51 Corridor will facilitate improved journeys by bus through more efficient and reliable journeys. Furthermore, investment on the A51 corridor will complement the aims of the Chester City Gateway programme which aims to enhance access into Chester station via the A56 corridor.

2.6.3 Active Travel

2.6.3.1 Cycling

There are a number of cycle routes in and out of Chester city centre from the north, south, east and west with a traffic free cycle route. National Cycle Route 45, located along the A51 Tarvin to Chester corridor connects with the on-road National Cycle Route 71 which runs parallel to the A51 connecting Chester with Winsford as shown in Figure 25. However, this cycle facility is narrow, poorly maintained and therefore unattractive to many cyclists.

Figure 25: Sustran’s Chester Region Cycling Map



Source: Sustrans

Capacity and infrastructure improvements along the A51 highway corridor could improve conditions for cyclists between Chester and Tarvin. The proposed improvements to active travel routes form an integral part of this scheme and include;

- Widening of the A51 between Tarvin and Chester to a 3m shared facility, where feasible;
- New tactile paving; and
- New signage.

In addition, at Hare Lane, the scheme will see the installation of larger islands at the junction to block right turn movements and at the same time reduce crossing distances for pedestrians and cyclists.

At the Stamford Bridge junction, west of the garage, the scheme will also encompass the installation of a new pedestrian refuge island to serve an existing bus stop on the northern side of the A51. In addition, tactile paving and dropped kerbs will be installed to the existing central island west of Tarvin Roundabout and footways either side of the A51 to facilitate pedestrian crossing movements to existing bus stops. Footway surfacing will also be introduced to the southern bus stop up to the crossing point.

Improving the existing cycle network along the A51 Tarvin Road will assist in increasing the current utilisation of the facility and support a move away from private car use and assist in modal shift.

2.6.3.2 Walking

Walking is the simplest and easiest form of transport and it offers a quick and effective way to travel for shorter distances with benefits for both the user and the environment. For this reason, walking trips often form at least one leg of multi-modal journeys.

Walking as a main mode of transport along the A51 corridor offers limited connectivity to key towns and facilities which are not located within walking distance. However, walking to public transport stops, local shops, schools and leisure amenities could be supported for people living in close proximity to the A51 Tarvin to Chester corridor. There are a number of residential properties along the corridor and within Littleton which are within walking distance of six bus stops offering connectivity to Winsford, Northwich, Crewe and Tarporley. Residential areas around Littleton Lane are also located a 30-40 minute walk away from Chester railway station offering opportunities for walking as part of a longer distance journey reducing the need for vehicle use at the western end of the corridor.

The current congestion and lack of pedestrian crossings along the A51 present a road safety issue restricting walking opportunities for school children in the surrounding local areas such as Christleton. This adds to network pressures during school pick up and drop off times. Managing the flow of traffic and vehicle speeds and increasing safety at junctions along the A51 can create safer environments for pedestrians to help increase levels of walking amongst school age children.

2.6.3.3 Key Issues and Opportunities

Table 19 highlights the key issues and opportunities in relation to active travel in Chester.

Table 19: Key Issues and Opportunities Presented by Active Travel in Chester

Issues	Opportunities
<ul style="list-style-type: none"> • The existing cycle facility along the A51 Tarvin Corridor is narrow reducing the attractiveness of the route for cyclists. • The majority (> 85%) of the population have access to a car which is likely to decrease the levels of walking and reduce opportunities for sustainable travel. 	<ul style="list-style-type: none"> • During the last 3 years, a general increase has been noted in the level of walking trips in Chester. Enhanced pedestrian provision along the A51 corridor could encourage walking to public transport stops along Tarvin Road for people in the local area, offering sustainable modes of travel between Chester and Northwich. • Chester has several designated strategic cycle routes. These connect residential areas such as Christleton to the east. However, cycling along the A51 corridor is restricted with a narrow cycle facility and a heavily trafficked road network making the route unattractive. • Widening of footways can create more space for cyclists and pedestrians to travel between Chester and the east of the borough.

So, what does this mean for the A51 Chester to Tarvin?

Opportunities for active travel along the A51 corridor are predominantly associated with providing connectivity to public transport stops / stations with cycling offering sustainable connectivity for slightly longer journeys between the A51 and Chester. However, the currently congested network and narrow cycle facility alongside the A51 leads to an intimidating environment for pedestrian and cyclists.

Capacity improvements along the A51 aim to improve road safety and reduce congestion which will in turn create environments which better promote walking and cycling.

2.7 How People Travel

In addition to understanding the highway and wider transport network it is important to understand where people are travelling to and from, to gain an idea of movements along the A51 corridor and how capacity improvements can facilitate more efficient movement. This section examines how people travel within CWAC. It explores the travel behaviour of both those living and/or working within CWAC and the way in which they travel.

2.7.1 Travel to Work

Origin and destination data supplied by the ONS from the 2011 census provides an insight into the movement of people from their usual residence to their place of work. The data provides the usual place of residence for those working within Chester and the place of work for those who live in Chester disaggregated by modal share. This information shows the flow of commuters between Chester and the surrounding Local Authorities.

Table 20: Inbound and Outbound Commuter Flows for Chester City for all modes

Local Authority District	Chester Outbound Flows		Chester Inbound Flows	
	Total	Percent	Total	Percent
CWAC	31,527	59%	38,643	49%
Flintshire	9,019	17%	19,428	24%
Wirral	1,658	3%	5,607	7%
Wrexham	1,789	3%	4,780	6%
Liverpool	1,237	2%	967	1%
Manchester	748	1%	320	0.4%
Cheshire East	1,139	2%	1,467	2%
Halton	348	2%	793	1%
Denbighshire	429	1%	1,417	2%
Warrington	1,041	2%	853	1%
Other	4,681	8%	5,286	6.6%
Total	53,616	100%	79,581	100%

Source: ONS 2011

A summary of Chester's commuter flows, based on travel to work census data from 2011 is given below:

- In total, 131,197 commuter movements take place in and out of the Chester region each day; with 53,616 outward flows compared to 79,581 inward flows. Therefore, Chester can be considered as a net importer of commuters.
- 53,616 outward flows leave Chester. The largest proportion of outbound flows are to the wider CWAC area (59%), then Flintshire (17%) and Wirral (3%).

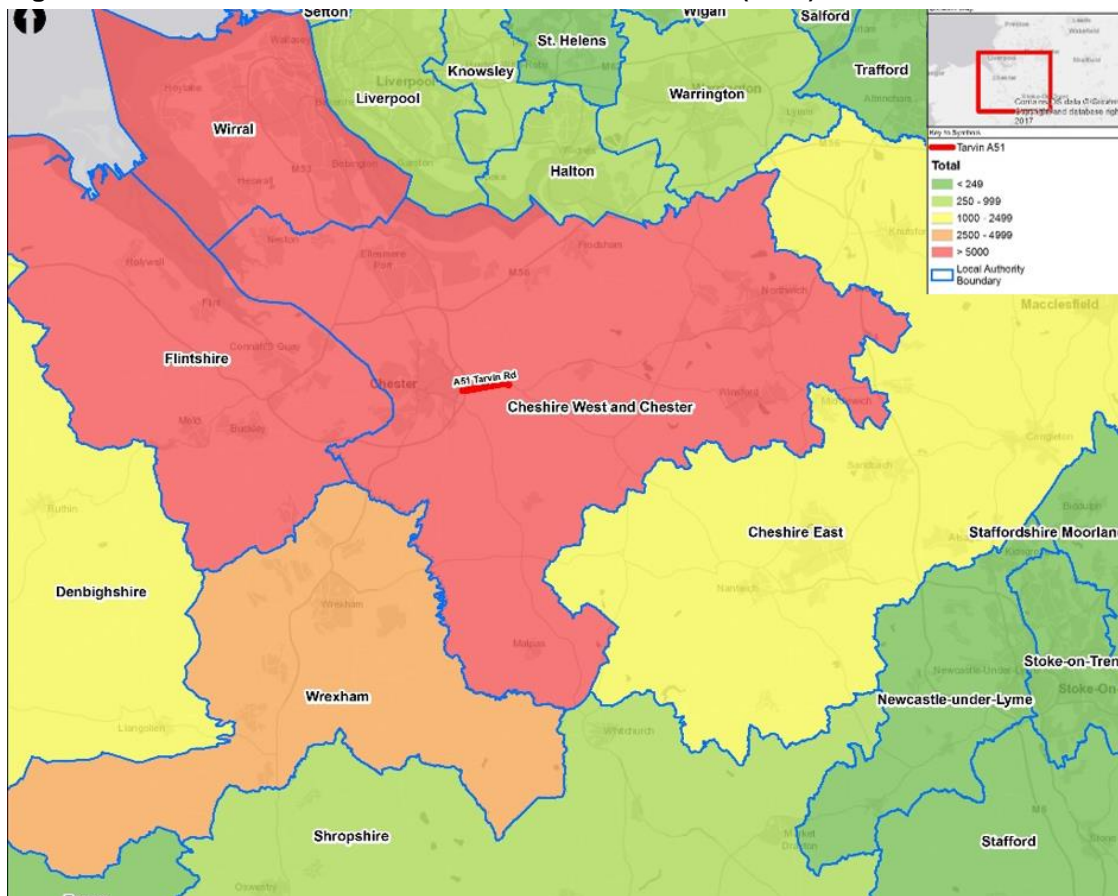
- There are typically 79,581 commuter movements into Chester each day. The three places of origin where inward flows are highest are from the wider CWAC area (49%), Flintshire (24%) and Wirral (7%). The largest volumes of inward commuter journeys originate from the east and north of Chester.
- Consequently, the A51 Chester to Tarvin corridor carries a greater level of commuter traffic compared to corridors to the south and west of Chester.

2.7.1.1 Where Chester's Workforce Resides

The place of residence for people who work in Chester has been mapped in Figure 26.

The map shows that a high proportion of the workforce in Chester live within the wider CWAC area and neighbouring counties. Consequently, the area is potentially subject to a variety of cross county movements as resident's commute to work. Cheshire East and Denbighshire are within the third most popular category with 1000-2499 inbound Chester commuters living in these areas. Therefore, traffic flows approaching from the east (along the A51 corridor) and west in the AM and PM peaks have the potential to be high.

Figure 26: Chester's Workforce Usual Place of Residence (2011)



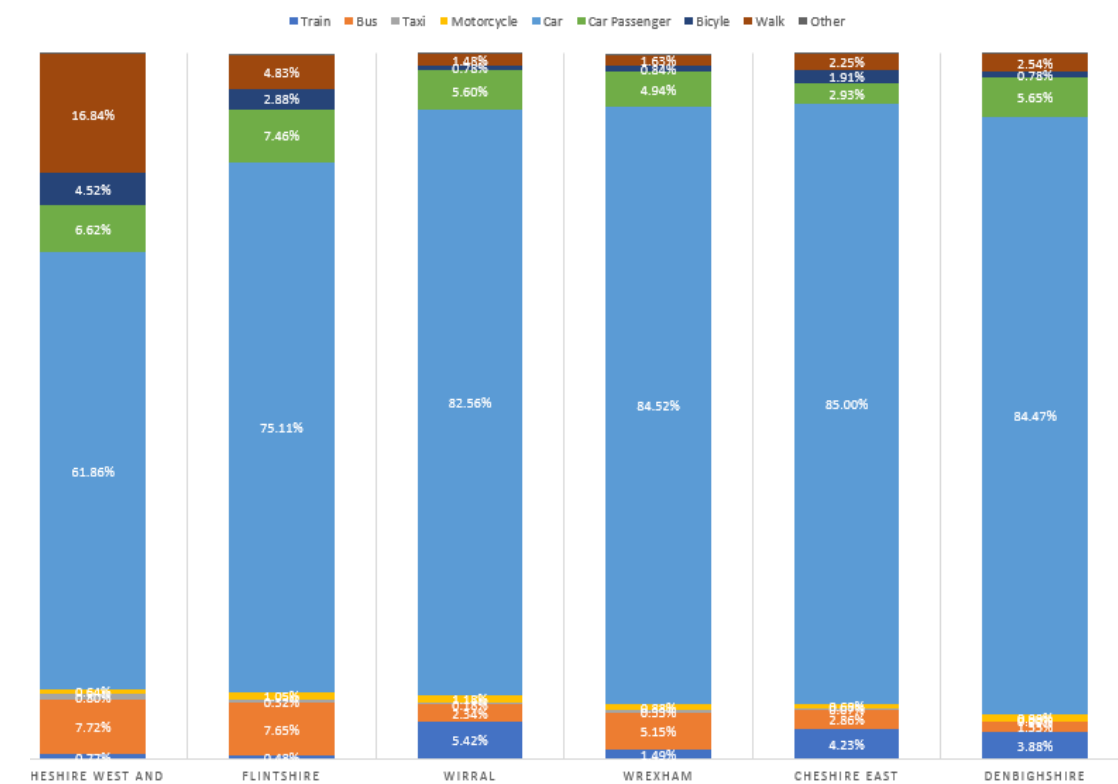
Source: ONS / MM

The modal share for inbound flows is set out in Figure 27. There is a high reliance on car transport. Car travel makes up at least 75% of all travel outside CWAC. Inside the wider borough, 62% use the car to get to Chester for work.

Rail use is relatively low (< 3% of total mode share in CWAC) with the exception of the Wirral, Cheshire East and Denbighshire where it accounts for 3-6%. Bus travel is highest from CWAC and Flintshire making up 8% of the total mode share for inbound commuter trips into Chester.

With a heavy reliance on the car as a main mode of transport for commuters to Chester and around 79,851 people travelling into the city each day it is clear why congestion on key routes into the area is an issue; this is likely to be exacerbated as a result of proposed developments within the Chester Northgate area and Chester Business Quarter increasing available employment opportunities. The A51 is a key route into the city centre from communities to the east of the city and commuters into Chester from other areas within CWAC make up the majority of inbound flows (59%) increasing the importance of the A51 as the key route between Chester and areas to the east of the borough.

Figure 27: Inbound Flows to Chester Modal Share (2011)

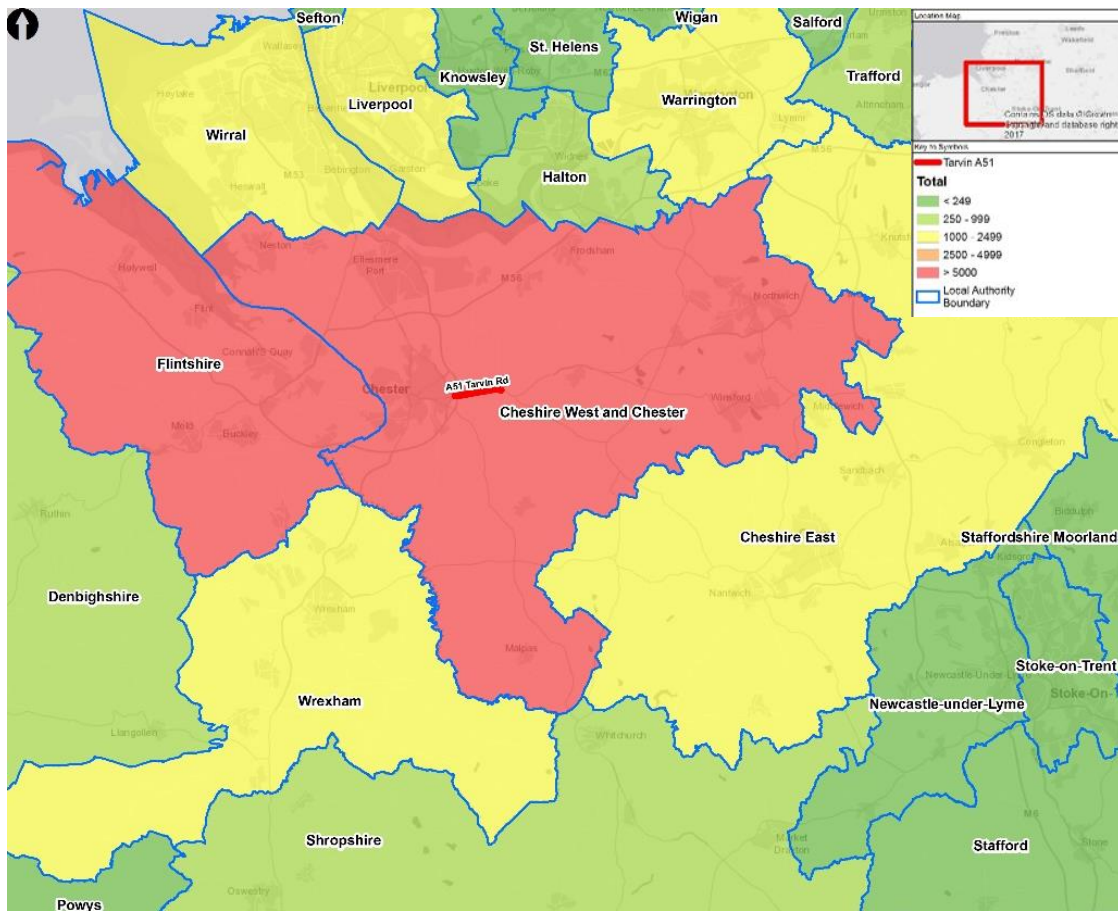


Source: ONS 2011

2.7.1.2 Where Chester's Residents Travel to Work

Chester residents usual place of work was mapped and is set out in Figure 28. The most popular place to work for Chester residents is within CWAC and Flintshire with over 5,000 movements per day.

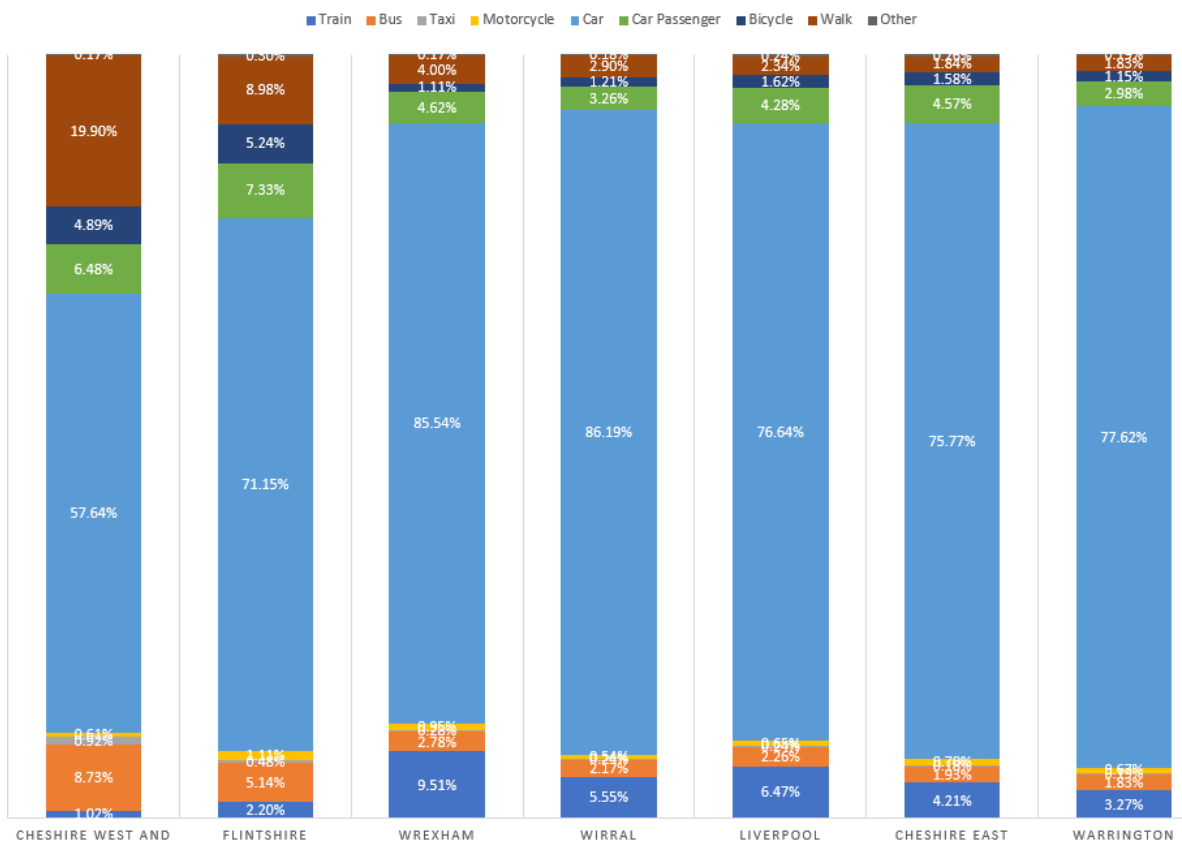
Figure 28: Chester Residents Place of Work (2011)



Source: MM / ONS

The modal share for these outbound flows is set out in Figure 29 which demonstrates that the majority of trips out of Chester for work are made by car. Within CWAC, car travel makes up 58% of commuter trips from Chester. Similar to the inbound flows, rail travel is greatest to Wrexham with 10% of trips made using this mode. For areas within Cheshire East and Warrington, rail accounts for less than 5% of commuter trips from Chester. There are over 1000 people who live in Chester and commute to areas within Cheshire East. Therefore, the significance of the A51 corridor is clear as it is a key link between Chester and Cheshire East for which car travel makes up around 75% of trips. Public transport use is also low (around 6%) for commuter trips from Chester to Cheshire East increasing the importance of highway connectivity between these areas.

Figure 29: Outbound Flows to Chester Modal Share (2011)



Source: ONS 2011

2.7.1.3 Key Issues and Opportunities

Table 21 highlights the key issues and opportunities in relation to how people travel to work to and from Chester.

Table 21: Key Issues and Opportunities Presented by How People Travel to Work to and from Chester

Issues	Opportunities
<ul style="list-style-type: none"> Chester is a net importer of commuters with 53,616 outward flows compared to 79,581 inward flows for all modes of transport each day. The majority of commuter trips in and out of Chester are made by car, making up between 65% to 90% of journeys with less than 3% of people using public transport. Commuters into Chester from other areas within CWAC make up the majority of inward flows (59%) increasing the importance of the A51 as the key route between Chester and areas to the east of the borough. Analysis of outbound commuter flows for people that live in Chester also shows a heavy reliance on the car. The A51 corridor forms a key route between Chester and Cheshire East, therefore highlighting the significance of the A51. 	<ul style="list-style-type: none"> The A51 is a key route for a significant number of commuters travelling between Chester on a regular basis. Therefore, it is important to ensure reliable journey times. The A51 corridor to the east and the highways network to the north of Chester are potentially exposed to greater levels of traffic than those to the south or west of the region highlighting opportunities for investment into capacity improvements in these areas. Buses only account for a small proportion of commuter trips CWAC (9%). Bus services that serve the A51 corridor such as the 82 between Chester and Northwich could be better utilised to increase the use of sustainable transport modes if congestion along the A51 was reduced. 25% of commuter trips within CWAC are made by cycling or walking. Where distances are

Issues

- Pressures on the A51 are further increased by commuters travelling from Chester to Cheshire East as public transport accounts for just 6% of these journeys.

Opportunities

- appropriate in length and suitable infrastructure is present, active travel should be encouraged to embed active travel as a regular commuter mode within Chester.
- Walking and cycling along the A51 corridor would become more attractive after improvements at key junctions such as the A55/A51 Vicars Cross junction and improve the safety of environments for cyclists and pedestrians.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This section shows how the A51 corridor provides a major route for a significant number of commuter trips between Chester and the east of the borough. It is therefore essential to ensure journey times are reliable and connections are efficient to ensure people can access jobs and contribute to the overall growth of the economy.

2.8 Land Use and Development

Following analysis of the current issues on the transport network and the A51 corridor, it is also useful to identify key upcoming developments in the study area to assess how traffic movements along the A51 corridor may change in the future. There are a number of significant developments planned and currently taking place around Chester, increasing the importance of strategic routes in and out of the city centre such as the A51 corridor. STRAT 3 of the CWAC Local Plan sets out the specific proposals for Chester which includes around 5,200 new dwellings.

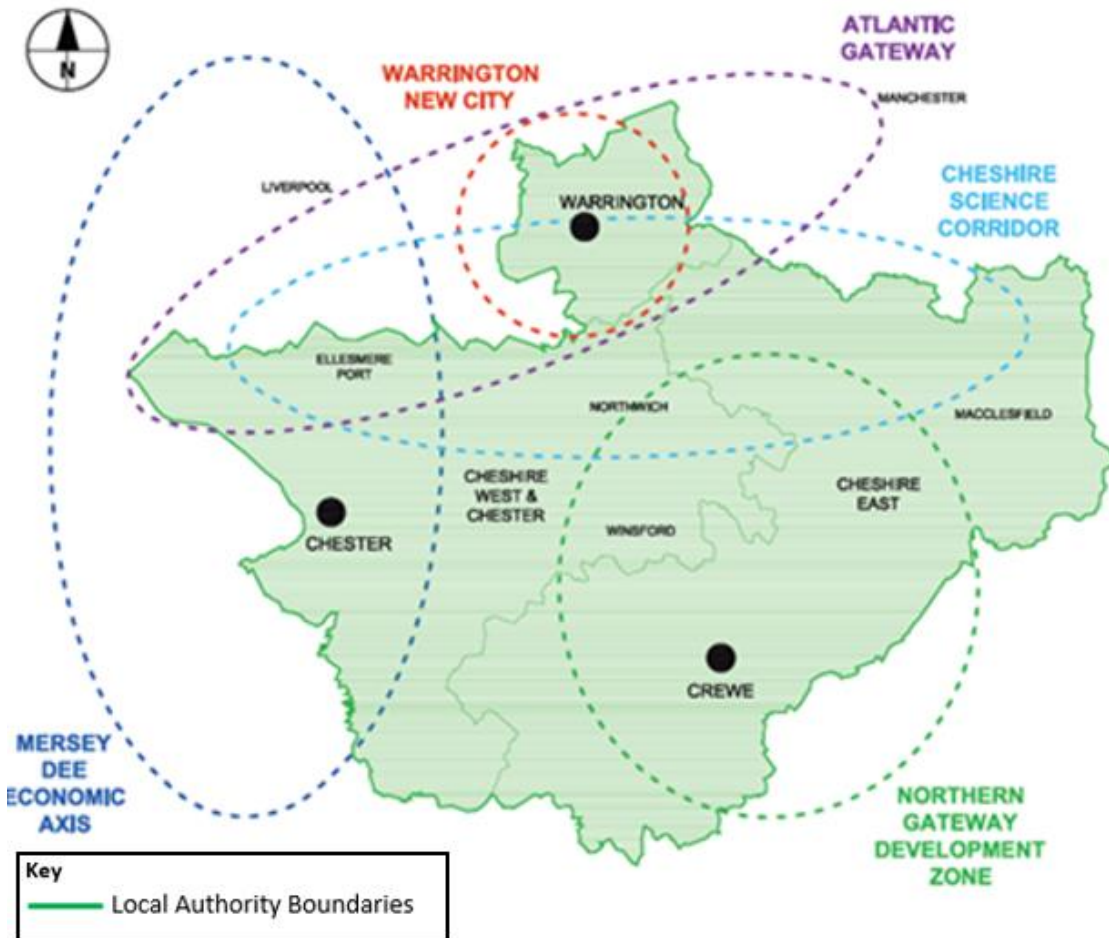
In addition, a key retail programme at Chester Northgate is in development including a new theatre and proposals for Business Quarter consisting of 44,000 m² of office floor space is creating many opportunities for the city. The A51 through Tarvin is an important strategic route which will be key to providing connectivity to these areas of development in Chester and so effective transport links will be essential.

2.8.1 The M6 Growth Corridor

The CWLEP proposals for a new HS2 hub at Crewe and a growth zone at Crewe / Stoke / North Staffordshire reinforces the importance of the M6 Growth Corridor. The aspirations for growth along the West Coast Main Line and HS2 corridor are set out in the sub-regional economic strategy 'Cheshire Matters', which formed the basis of a Growth Deal with Government in 2015. The ambition of 'Cheshire Matters' is to, by 2040:

- Grow the Cheshire and Warrington economy by £27bn to £50bn;
- Create 112,000 jobs;
- Build 115,000 new homes; and
- Increase GVA per head to 120% of the national average.

Figure 30: Key Development Growth Areas



Source: Mott MacDonald

Chester lies at the heart of the M6 Growth Corridor and forms one of the key cities within the Constellation Partnership, the Cheshire Science Corridor, the Atlantic Gateway and Mersey Dee Economic Axis. The A51 provides a key connection between these locations and the wider area. Reducing issues of congestion along this network will help facilitate these developments and ensure connections are efficient and reliable.

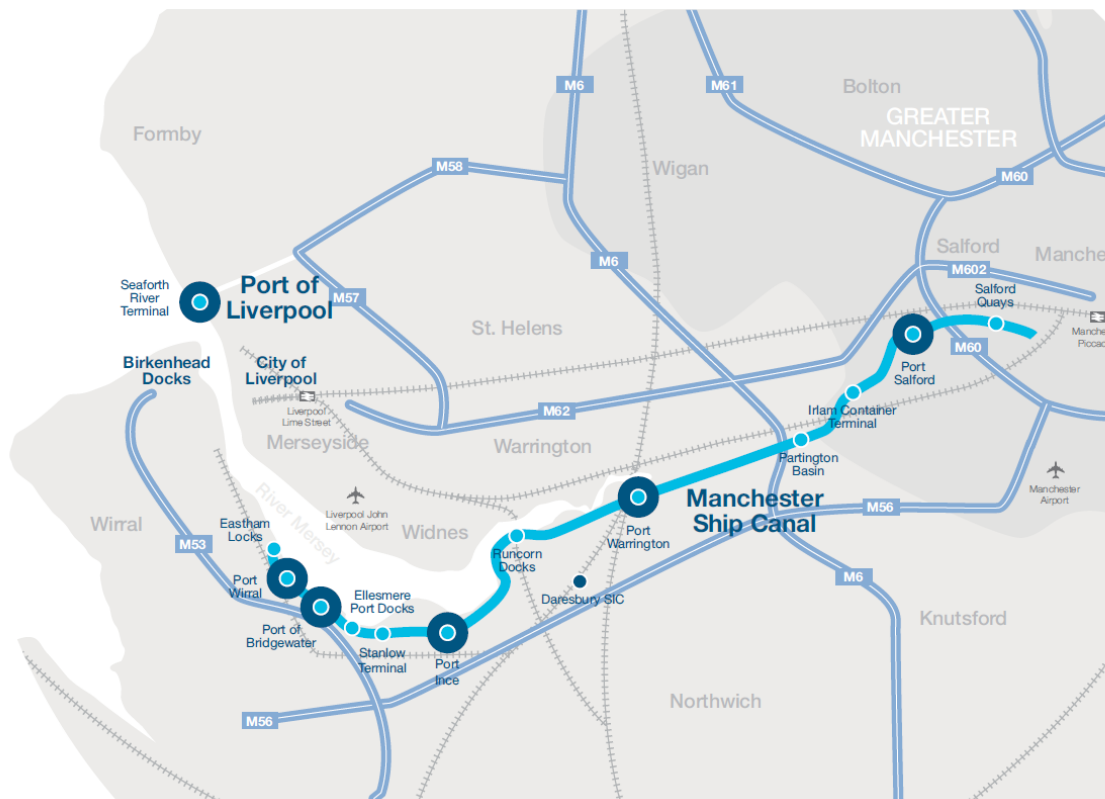
2.8.2 The Atlantic Gateway

The Atlantic Gateway is an emerging hub for world trade, logistics, business and innovation in the corridor stretching from Deeside and Merseyside through Cheshire and Warrington to Manchester and is shown in Figure 31. The Gateway region is a leader in innovation and advanced manufacturing and delivers a GVA of £17 billion per annum.

The area represents a key intervention priority for the CWLEP, Liverpool City Region LEP and Greater Manchester LEP, offering significant prospects for the long-term economic prosperity of the region.

By 2030, there is the potential for 250,000 new jobs to be created in the Atlantic Gateway area and around 140,000 of these jobs will be associated with Atlantic Gateway priority projects, involving £14 billion of new investment (Atlantic Gateway Business Plan, 2012).

Figure 31: Atlantic Gateway Initiative



Source: Atlantic Gateway Business Plan (2012)

The A51 provides a significant key connection to key strategic connectivity 'hubs' in the Gateway area. This scheme will support development of the Atlantic Gateway by enhancing connectivity from the east of Chester providing opportunities for efficient connections.

2.8.3 Chester Northgate Retail Development

A £300 million investment into a retail-led, mixed-use development in the Chester Northgate area of the city centre is set to deliver around 500,000 ft² of new retail, restaurant and leisure facilities over two phases of construction. The Chester Northgate project will transform the northwest quarter of Chester City Centre with a new shopping, leisure and residential development. Key features of the Chester Northgate development are:

- A multi-screen cinema – Picturehouse;
- Cafés, bars and restaurants;
- A new, reinvigorated market hall;
- New parking;
- New bus stops on St. Martin's Way; and
- New jobs.

Anticipated to create more than 1000 jobs, the open, single-level scheme has been designed with three main east-west shopping streets and two north-south streets to integrate seamlessly with the existing city centre. The creation of this strong shopping offer, anchored by the new department store, will extend and complete a city centre shopping circuit. Chester Northgate is set to generate a 'step change' for the city and propel Chester into again being one of the nation's Top 50 shopping destinations.

Figure 32: Artistic Impressions of Chester Northgate Development Area



Source: Cheshire Growth Partnership

The council has already taken major steps to facilitate this scheme by relocating the bus station and developing the cultural centre 'Storyhouse', however implications on the highway need to be considered to ensure any potential issues associated with increasing levels of traffic from visitors are mitigated. Chester is likely to experience a rise in the number of visitors creating additional pressures on the A51 as a major route into the centre of Chester.

2.8.4 Chester Business Quarter

In addition to the Chester Northgate development, increased commuter traffic generated as a result of Chester's Central Business Quarter (CBQ) will also create additional pressure on the A51

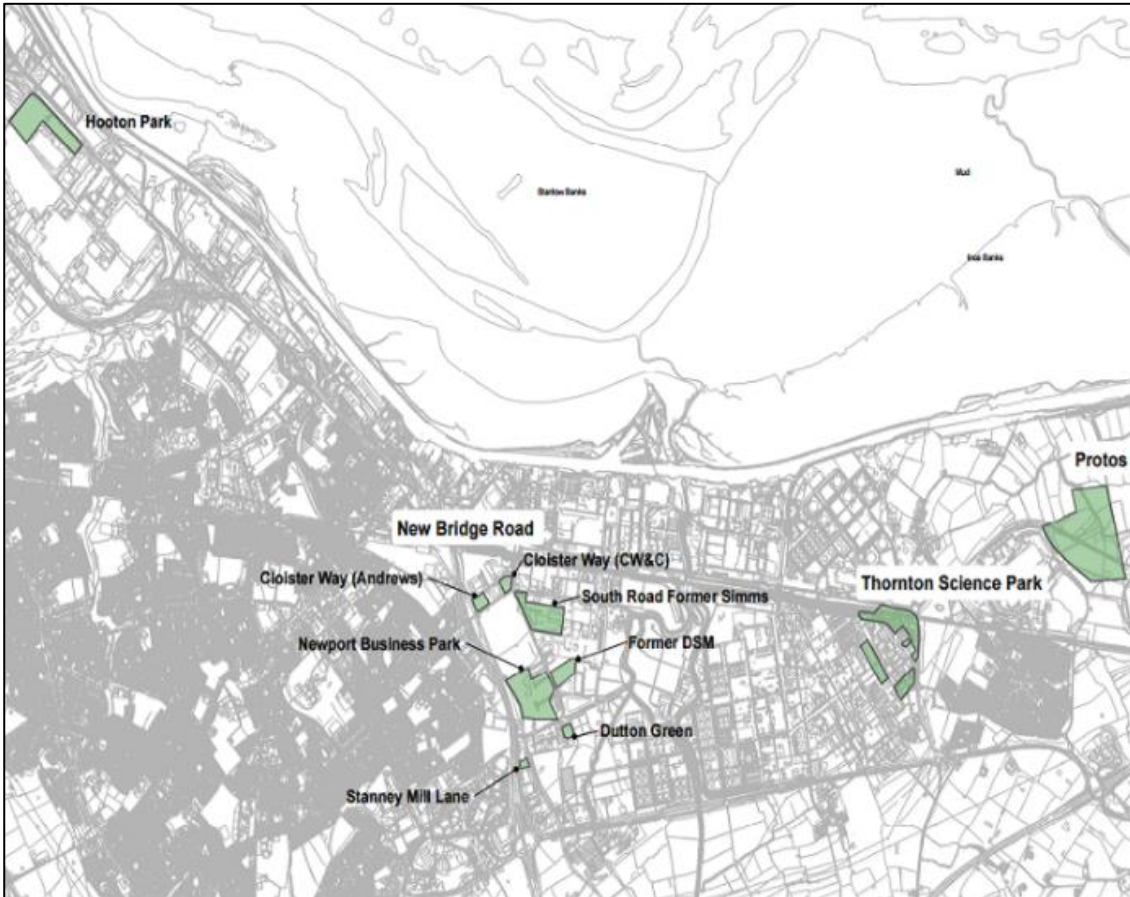
By 2028, it is planned that Chester's Central Business Quarter will offer up to 500,000 ft² of office space creating around 3,500 jobs. One City Place, a six-storey, 70,000 ft² office development, was completed in February 2016 and as a new sizeable employment destination is likely to have already attracted additional traffic on the A51.

2.8.5 Ellesmere Port Enterprise Zone

Ellesmere Port Enterprise Zone forms a substantial part of the Cheshire Science Corridor comprising nine sites across the area including Hooton Park, Dutton Green, Cloister Way and Newport Business Park. The Cheshire Science Corridor is a crescent that crosses the northern part of the Cheshire & Warrington sub-region linking together nationally and internationally significant research facilities and established science-based businesses.

Overall the science corridor would accelerate the significant growth potential of the sub region's cluster of science and innovation industries and create 15,200 new jobs by 2030 with 390 businesses attracted to Cheshire and Warrington. The substantial new enterprise zone initiative in the Ellesmere Port area has the potential to create around 4,000 jobs in and around the town.

Figure 33: Ellesmere Port Sites in the Cheshire Science Corridor



Source: cheshiresciencecorridor.co.uk

Enterprise Zone status is internationally recognised and therefore provides opportunities to boost the marketing of the sites in Ellesmere Port and across the science corridor as a whole attracting future investors and tenants.

The A51 forms a key route for traffic travelling to and from the Ellesmere Port Enterprise Zone from the surrounding areas to the east of Chester such as Northwich, Winsford and Crewe. Enhancing connectivity to Crewe from this site will also improve connectivity to longer distance destinations provided at Crewe Hub. Ensuring this network provides an efficient link to the sites at Ellesmere Port from the surrounding areas will therefore be essential in enabling the success and economic potential of the developments.

2.8.6 Key Issues and Opportunities

Table 22 highlights the key issues and opportunities in relation to economy, business and trade in an around Chester.

Table 22: Key Issues and Opportunities Presented by Economy, Business and Trade

Issues	Opportunities
--------	---------------

Issues

- Development sites towards Ellesmere Port and the Atlantic Gateway are currently relatively inaccessible from locations to the east of Chester due to high levels of congestion.
- Increasing journey times will decrease attractiveness of the sites to future investors and tenants slowing economic growth in CWAC and the wider region.
- Current issues of congestion along the corridor will further increase due to the significant number of people that will be commuting to these sites on a regular basis and the increasing number of visitors attracted by new retail and leisure facilities.

Opportunities

- The A51 Tarvin to Chester Corridor provides a key connection between the Constellation Partnership, the Cheshire Science Corridor, the Atlantic Gateway, Mersey Dee Economic Axis and the wider areas of the borough.
- A reduction in congestion would improve journey efficiency and reduce journey times along the A51 which acts as a key route from the M6 corridor through to the Atlantic Gateway.
- Reducing issues of congestion along this network will therefore help facilitate developments such as the Atlantic Gateway and ensure connections are efficient and reliable.

What this means for the A51 Chester to Tarvin Corridor?

The A51 has significant potential to support several key developments in the region. The sites identified in this section are widely recognised as crucial factors in future economic and employment growth across CWAC. Therefore, capacity improvements along the A51 corridor are required to reduce congestion and provide efficient and reliable journeys to key developments to the east, west and within Chester supporting and accelerating growth in the wider region.

2.9 Housing

This section expands on the above information, considering housing need across CWAC. Housing and employment land are inextricably linked and since the majority of Chester's workforce live within CWAC, there will be a requirement to provide a wide range of housing types to accommodate the current and future demands of residents and support the projected growth of employment across the borough. Improvements on the A51 corridor may also be required to facilitate and provide access directly to housing sites as around 1,200 new dwellings are proposed throughout green belt release.

2.9.1 Housing in Chester

Chester has the largest population in the borough with over 81,000 people (25 percent of the total population of the borough). Given the potential for Chester to drive economic growth and the need to meet the city's housing requirements, 5,200 dwellings are proposed for development during the period of the Local Plan (Part One) (up to 2030).

2.9.2 Local Housing Issues

The local housing market compares strongly against regional and national comparators. The key features of the CWAC housing market, based on the 2011 Census are:

- 147,746 households across CWAC;
- 34.7% of these homes are owned outright by the occupiers, this is higher than the figures for the North-West (31%) and England and Wales as a whole (30.8%);
- 36% of homes in CWAC are owned with a mortgage, around 3% higher than both comparator areas; and

- A lower proportion of CWAC’s residents live in social rented houses than across the North-West and England (14.7% in CWAC compared to 18.3% across the North-West and 17.6% in England⁵).

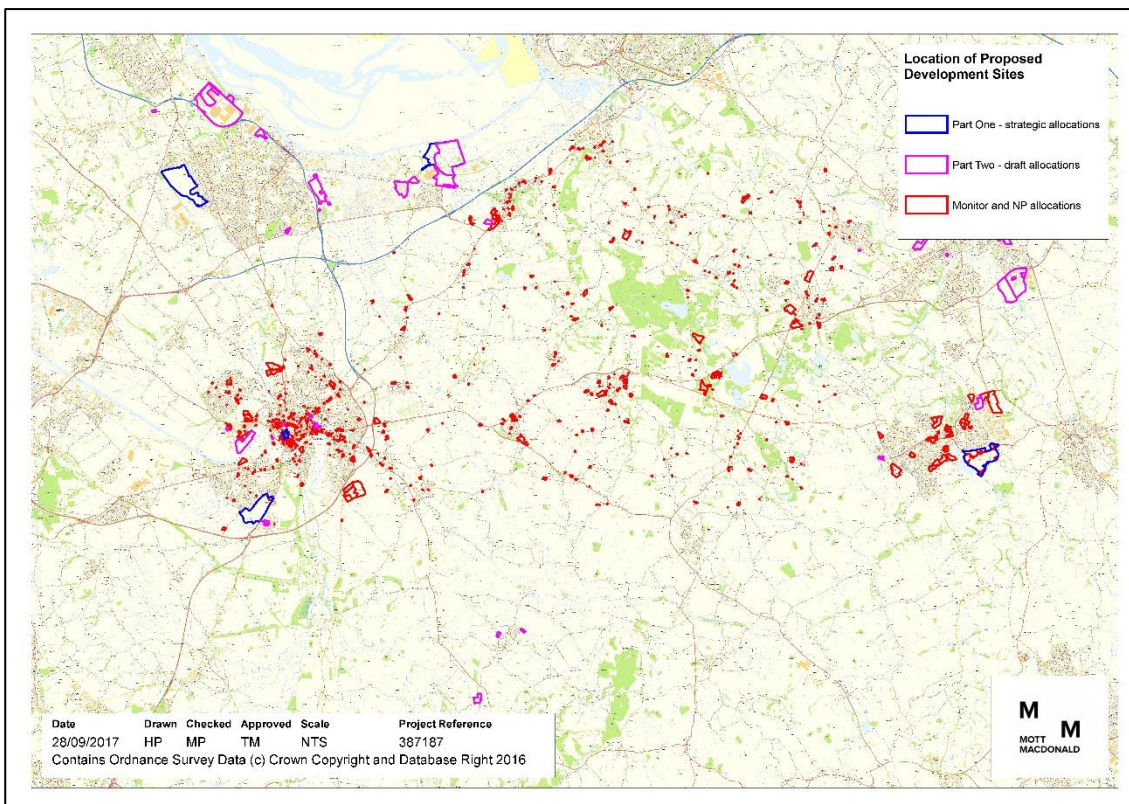
Affordable homes will be required within all new residential development, including those that form part of mixed use developments on sites that:

- In the urban areas, have a capacity for ten or more dwellings or comprise an area of 0.3 hectares or more; and
- In rural areas, have a capacity of three or more dwellings or comprise an area of 0.1 hectares or more.

2.9.3 Local Plan

Key elements of the Council's strategy are to deliver around 22,000 new homes across the district to support an additional 14,000 people in employment through to 2030. The Preferred Policy Directions (PPD) outline the Council's preferred option for growth which aims to deliver 1100 new homes per annum (22,000 over the Plan period). The city of Chester and towns of Ellesmere Port, Northwich and Winsford are the main focus for development to allow for the best integration of homes, jobs, services and facilities in the most accessible locations. Figure 34 shows the location of these developments across the wider area.

Figure 34: Location of proposed development sites



Source: Mott MacDonald, based on data from CWAC

⁵ <https://www.nomisweb.co.uk/query/construct/submit.asp?forward=yes&menuopt=201&subcomp=#>

However, in relation to the study area for the A51 Tarvin-Chester Improvements Scheme, a number of settlements are listed as key service centres that could provide a good range of facilities for development in rural areas. Within the rural area, provision will be made for at least 4,200 new dwellings and 10ha of additional land for employment development. The identified settlements relevant to this scheme are listed in STRAT 8 of the Local Plan (Part One) and are noted below:

- Tarvin - 200 dwellings
- Tarporley - 300 dwellings
- Cuddington and Sandiway - 200 dwellings

£14 million funding has also recently been granted to accelerate development of housing in the borough. This will speed up the construction of 700 new homes across Ellesmere Port, Winsford and Cheshire which all rely on the A51 for strategic and local connections.

Such increases in the number of dwellings in the rural areas of CWAC are likely to align and support the development of employment sites within and around the borough such as the Northgate Retail Development. Tarvin, Tarporley, Cuddington and Sandiway are all located to the east of the study area. Therefore, residents in these areas will rely on the A51 corridor for connectivity to Chester city centre and developments further afield such as the Ellesmere Port enterprise zone and the HS2 Crewe Hub increasing the need for capacity improvements along this corridor.

2.9.4 Key Housing Issues and Opportunities

Table 23 identifies the key issues and opportunities in relation to Chester’s housing offer.

Table 23: Key Issues and Opportunities Presented by Housing in Chester

Issues	Opportunities
<ul style="list-style-type: none"> ● Between 2010 and 2030 it is expected that at least 22,000 new dwellings and 365 hectares of land for employment development will be created in the borough. Traffic congestion along the A51 corridor will therefore increase as the borough attracts more residents and employers. ● Housing growth in communities along the A51 corridor has been significantly higher than in other key service centres seeing the completion of between 60 and 100 dwellings in each of these settlements during 2016. Heavy congestion on the local highway network could potentially slow housing growth if the area becomes an unattractive place to live and work. ● Development on green belt land to the south-east of Chester will add pressure to the A51 as a local route for residents and a strategic route for traffic. 	<ul style="list-style-type: none"> ● As CWAC delivers targets for housing each year, the demand to travel in the borough will increase. The A51 will continue to be a strategically vital route and must be improved in order to accommodate more movements. ● Increased numbers of new homes will also result in a greater demand for jobs in the area. To live and work in the borough workers must be attracted by efficient access to Chester City Centre as well as the developing employment centres of Crewe HS2 Hub and rolling stock depot, the Atlantic Gateway and the Northgate Retail Development. This would support the continued economic growth of Chester.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The demand for housing in CWAC is high and is likely to be increased by anticipated future economic growth. Therefore, future provision for housing must create enough homes to meet demand and provide a suitable mix of housing styles to accommodate a range of needs. The transport network must respond to this growth in housing numbers.

A number of rural areas around the A51 corridor have been identified as suitable areas for housing and employment sites. The A51 Tarvin-Chester Improvements Scheme can support these developments by unlocking significant amounts of land suitable to build homes required to meet demand driven by the employment growth across CWAC. Improvements will also ensure the highway network remains resilient in response to future growth in levels of traffic.

2.10 Air Quality

Recent Air Quality monitoring data illustrates that there are no issues with Air Quality within the study area. Since the submission of the OBC, Air Quality data for the year 2017 has become available, including NO₂ levels from a site within the study boundary along the A51 in Littleton (Figure 34, Site D).

Annual measurements of NO₂ have also been recorded at various locations along the A51 Tarvin Road towards Chester (Figure 34, Sites A, B and C) over the last four years which shows poorer levels of air quality. There is also an Air Quality Management Area (AQMA) just outside the study boundary which covers the Boughton gyratory west of Chester city centre and is situated where the A51 Tarvin Road and the A5115 Christleton Road meet. It is estimated that 280 residents live in this AQMA within 115 residential properties close to the road.

The air quality monitoring data for these diffusion tube sites are shown in Table 24 below. The location of these sites is illustrated in Figure 35. This table presents the unratified data which does not consider distance to receptors.

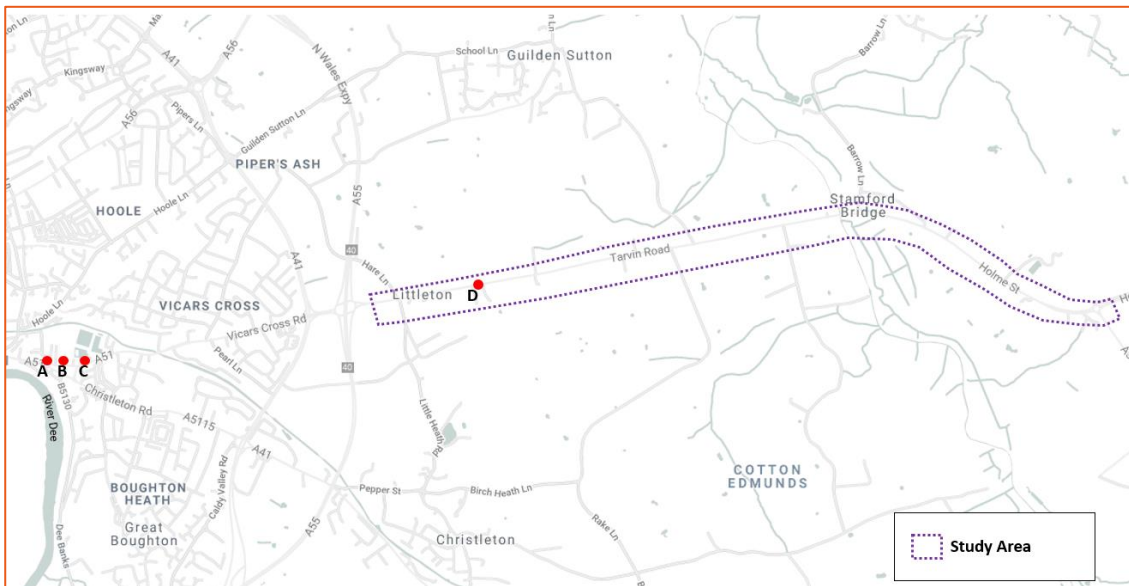
Table 24: Levels of NO₂ along Tarvin Road in /micrograms per cubic metre (µg/m³)

Location	Raw Data				
	2013	2014	2015	2016	2017
A	58.4	53.0	49.1	48.7	45.5
B	32.1	30.6	-	-	-
C	48.0	46.1	41.5	42.8	40.2
D	-	-	-	-	47.4

Source: www.cheshirewestandchester.gov.uk

Source: www.cheshirewestandchester.gov.uk

Figure 35: Locations of Diffusion Tube Sites in Proximity to Study Area



Source: www.cheshirewestandchester.gov.uk

Air quality data for the three sites towards the city centre (A, B and C) show that, across a 4-year period NO₂ levels along parts of the A51 Tarvin Road are higher than the national annual objective for Nitrogen Dioxide (NO₂) which is 40 micrograms per cubic metre (Defra). Properties are also closer to the road along this section of the route causing more severe impacts on quality of life.

The annual mean concentration of NO₂ recorded at this site, within the study boundary, for 2017 was 47.4 µg/m³. Although, this would appear to be above the national annual objective level this is unratified data and does not take account of the bias and adjustment factors. Once these adjustments have been made and the proximity of receptors accounted for the annual average is reduced to 34.2 µg/m³ which is well below the NO₂ annual average objective. When distance to the nearest exposure is considered, receptor sites along this section of the A51 are set much further back from the roadside.

Air quality remains a key objective within the study area and it is important to maintain and further reduce levels of air pollution to align with local policy objectives and ensure a high quality of life for residents. Reducing congestion will be central to achieving this as stationary, slow moving and stop-start traffic have considerably more adverse air pollution effects. Details of how CWAC plan to monitor Air Quality along the corridor going forward are detailed within the appended Monitoring and Evaluation Plan.

2.10.1 Key Issues and Opportunities

The key air quality issues and opportunities are summarised in Table 25.

Table 25: Air Quality Issues and Opportunities

Issues	Opportunities
<ul style="list-style-type: none"> Air Quality emissions are currently below threshold levels when distance factors are considered to properties. However, reducing congestion remains key to ensuring this remains the case to align with policy objectives and ensure a high quality of life for residents. 	<ul style="list-style-type: none"> The scheme presents an opportunity to reduce levels of Nitrogen Oxide in proximity to the carriageway by implementing a scheme which reduces congestion along the corridor.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Air Quality data within the study area shows current levels of NO₂ are below national targets when the distance from receptors is taken into consideration. However, enabling free flowing traffic along the A51 will ensure these levels can be further reduced.

Ensuring environmental impacts are mitigated also maintains the attractiveness of the area as a place to live, work and invest.

2.11 Review of Problems and Opportunities

The Strategic Case provides an in-depth analysis of the key issues and opportunities across CWAC, how these are linked to issues of congestion along the A51 corridor and how capacity improvements in the area provide significant opportunities for the borough and the wider region. A summary of the problems and opportunities are provided in Table 26, which also highlights the objectives emerging in response to the identified issues and opportunities to ensure the scheme outputs address key problems.

Table 26: Problems and Opportunities / Emerging Objectives Summary

Issues	Opportunities	Emerging Objectives
Strategic Socio-Economic Overview		
<ul style="list-style-type: none"> Population growth in CWAC is expected to continue generating more traffic on the highway network further increasing congestion and delay. CWAC has ambitious plans for economic growth. Without intervention, the network will become severely constrained hindering the efficient transport of goods and people in Chester. 	<ul style="list-style-type: none"> Network resilience will be key to supporting population growth and demand for jobs. New employment developments require a resilient transport network in the borough. Effective and affordable access to jobs, education and training could attract people to attend the University of Chester through improved local journey times. 	<ul style="list-style-type: none"> Provide a more resilient transport network able to deal with future increases in traffic growth.
Economy and Business		
<ul style="list-style-type: none"> Attracting larger businesses to Chester and CWAC would support an uplift in GVA and enable further job creation. GVA per filled job is lower than the national average. 	<ul style="list-style-type: none"> Unlocking access to development sites along the A51 corridor could attract larger businesses to the area. 	<ul style="list-style-type: none"> Support activity to 'unlock' the Chester Northgate - retail and leisure area through improved and more efficient and reliable highway access. Support job creation by reducing congestion to ensure that development sites along the A51 corridor remain attractive to investors. Ensure the A51 Tarvin to Chester Corridor has sufficient capacity to enable reliable and efficient journey times to the Chester Business Quarter supporting city centre business development.
Transport Network		
<ul style="list-style-type: none"> High levels of congestion along the A51 Tarvin Corridor is affecting journey times in and out of Chester. This will worsen as a result of predicted traffic growth in the region. Increase in the number of serious road accidents since 2014. 	<ul style="list-style-type: none"> Chester is well positioned in terms of the strategic road network. The A51 has the opportunity to provide strong links to local and regional hubs if congestion is relieved. Improvements at key junctions can address current concerns regarding traffic accidents and collisions. 	<ul style="list-style-type: none"> Secure congestion relief at key pinch point areas along A51 the corridor. Provide faster more reliable journey times for shoppers, visitors and those commuting to Chester city centre using the A51 corridor by private car or public transport. Reduce the number of rear-ending accidents occurring at junctions along the A51 corridor between Chester and Tarvin, by increasing capacity and improving junction operation.
How People Travel		
<ul style="list-style-type: none"> The majority of commuter trips into and out of Chester are made by car. A large number of inbound and outbound commuter trips to Chester occur to and from areas within CWAC. 	<ul style="list-style-type: none"> Reducing congestion will enable faster more reliable bus journey times increasing opportunities for sustainable travel and decreasing the number of commuter trips made by car. 	<ul style="list-style-type: none"> Enable efficient and reliable movement between north-Wales, Chester, Northwich and Winsford.

Issues

Opportunities

Emerging Objectives

Land Use Development

- Chester is central to many major development sites such as the Atlantic Gateway and Ellesmere Port Enterprise Zone which are relatively inaccessible at present, particularly from areas to the east of Chester due to levels of congestion of the A51.
- Increasing journey times will decrease attractiveness of these sites to future investors and tenants slowing economic growth.
- Without intervention, current issues of congestion along the corridor will further increase due to the significant number of people that will be commuting to these sites on a regular basis and the increasing number of visitors attracted by new retail and leisure facilities.

- Chester must address issues of congestion along the A51 Tarvin to Chester Corridor to facilitate economic development in the surrounding area and unlock upcoming significant development sites.
- A resilient highway network connecting developments to wider areas will help support and accelerate economic growth and provide a significant number of jobs.

- Enable access to the High Speed Two (HS2) hub at Crewe from Chester and Cheshire West through improvements which enable faster and more reliable journey times.
- Provide enhanced, reliable freight and private car connectivity to the Ellesmere Port Enterprise Zone and the Atlantic Gateway from Chester and Cheshire West.

Housing

- High demand and expected growth for housing in Chester to support economic growth and meet demand.
- Development on green belt land to the east of Chester will increase pressure on the A51 as a local route for residents and a strategic route for traffic.

- As CWAC delivers targets for housing each year, the demand to travel in the borough will increase. The A51 will continue to be a strategically vital route and must be improved in order to accommodate more movements.

- Provide a more resilient transport network able to deal with future increases in traffic growth.

Environment

- Good levels of Air Quality within the study area need to be maintained.
- There is a need to maintain and further reduce NO2 levels within the study area to ensure high quality of life and alignment with local policy.

- CWAC has the opportunity to reduce levels of Nitrogen Oxide in proximity to the carriageway by implementing a scheme which reduces congestion along the network.

- Improve air quality through a reduction in emissions from vehicles by optimising junction layouts and merging lanes to reduce idling and promote free flow speeds.

2.12 Scheme Objectives

The objectives emerging in response to the key issues identified have been categorised into 4 themes to create a comprehensive list of scheme objectives that aim to guide the development of scheme components. The four strategic objectives that this scheme aims to address are Economic Growth, Strategic Connectivity, Local Connectivity and Wider Social Impacts. The full list of scheme objectives is outlined in the diagram below.

Figure 36: Scheme Objectives



2.13 Policy Review

In addition to addressing the identified problems associated with connectivity, development, safety and environmental concerns it is important to ensure that the proposed scheme aligns with local, regional and national policy. This section summarises the local, regional and national policy documents relevant to the region of the A51 Chester to Tarvin Corridor and how the A51 Tarvin to Chester Improvements Scheme can contribute towards achieving the identified objectives.

2.13.1 National Policy and Strategy

2.13.1.1 National Planning Policy Framework (NPPF) – July 2018

The National Planning Policy Framework (NPPF) sets out the UK Governments planning policies for England. The document sets out requirements of the planning system and how policy should be adhered to and delivered in local plan development and planning decisions.

The NPPF promotes sustainable development and sets out three roles that planned development should fulfil: -

- **An economic role** - contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- **A social role** - supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and
- **An environmental role** - contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 Tarvin-Chester Improvements Scheme aligns with the NPPF by ensuring that the highway network supports current and future housing and development sites to make contribution towards a strong competitive economy.

This scheme is also designed to ensure that residents enjoy a good quality of life reducing carbon emissions and environmental impacts around the A51 supporting healthy communities and enhancing the natural and built environment.

2.13.1.2 National Policy Statement for National Networks

This document was prepared by Government in December 2014 to provide guidance for promoters of nationally significant infrastructure projects, such as national road and rail networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving the overall quality of life, as part of a wider transport system. This means developing:

- Networks with the capacity, connectivity and resilience to support national and local economic activity, facilitate growth and create jobs;

- Networks which support and improve journey quality, reliability and safety;
- Networks which support the delivery of environmental goals and the move to a low carbon economy; and
- Networks which join up our communities and link effectively to each other.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The improvements along the A51 corridor will deliver journey benefits to highway users in and around Tarvin. Increasing capacity of the highway network will result in a more resilient network that offers more reliable journey times particularly for shoppers and workers commuting to Chester during the AM and PM peak hours.

2.13.1.3 Major Road Network (MRN) Investment Planning Programme

The MRN will form a middle tier of the country's busiest and most economically important local authority 'A' roads, sitting between the national Strategic Road Network1 (SRN) and the rest of the local road network. The MRN has five central objectives;

- Reduce congestion
- Support economic growth and rebalancing
- Support housing delivery
- Support all road users
- Support the Strategic Road Network.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 Road Corridor has been identified as part of the MRN investment planning programme. The scheme will alleviate congestion, while taking into account impacts on air quality, biodiversity, noise, flood risk, water quality and landscaping. The scheme boosts Economic Growth by improving access to new and existing employment sites Atlantic Gateway and Ellesmere Port Enterprise Zone (as part of the Cheshire Science Corridor) through reducing congestion by improving end to end journey times/reliability across both local authority and SRN networks.

2.13.1.4 Single Department Plan (May 2018)

The Single Departmental Plan for the sets out the Department for Transport's strategic objectives to 2020. Overall the mission is to:

"Create a safe, secure, efficient and reliable transport system that works for the people who depend on it; supporting a strong, productive economy and the jobs and homes people need."

This vision has been broken down in to six key objectives:

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

- Promote a culture of efficiency and productivity in everything we do.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The objectives of this scheme directly align with the core vision of this policy as the aim of the highway capacity improvements is to ensure reliable and efficient journey times to facilitate economic growth and job creation in and around the city centre enabling it to remain an attractive area for investors and local residents.

2.13.1.5 DfT's Transport Investment Strategy (July 2017)

This document outlines a plan for the UK to build a stronger, fairer country, with an economy that works for everyone, in which wealth and opportunity are spread across the country and are set up to succeed in the long term. The four key objectives identified in the strategy to deliver this plan are:

- Create a more reliable, less congested, and better connected transport network that works for the users who rely on it;
- Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;
- Enhance our global competitiveness by making Britain a more attractive place to trade and invest; and
- Support the creation of new housing.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This scheme directly supports the objectives of the DfT's Transport Investment Strategy by implementing improvements to increase the capacity of the network and reduce congestion. This will create a more reliable network, supporting access to jobs to build a stronger economy and improving the efficiency of freight movements to ensure the area remains an attractive place to trade and invest. Reducing congestion and enhancing connectivity along the A51 Chester to Tarvin corridor will also ensure the area remains an attractive place to reside supporting future housing growth.

2.13.1.6 Major Road Network Consultation (DfT December 2017)

As part of the DfT's Transport Investment Strategy the Government committed to creating a Major Road Network (MRN) across England. This consultation outlined the Government's proposals for this network seeking views on its core principles, the definition of the network, investment planning, and eligibility and investment assessment. The creation of a Major Road Network (MRN) across England is a key step in the delivery of the strategy and will help to:

- Reduce congestion;
- Support economic growth and rebalancing;
- Support housing delivery;
- Support all road users; and
- Support the Strategic Road Network.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 is identified on the proposed major Road Network highlighting its importance as a strategic route on a national scale. Not only does this emphasize the significance of the scheme, it also provides opportunities for further investment along the corridor in the future. The A51 is also included in the MRN Investment Plan which provides a potential funding route for the higher cost interventions on the corridor that are not accounted for within this business case.

2.13.1.7 Highways England Road Investment Strategy (2015-2020)

The first 'Road Investment Strategy' (RIS 1) outlines a long-term programme for Highways England motorways and major roads with the stable funding needed to plan ahead. This is discussed further in Section 2.14.5 and includes a long-term vision for England's motorways and major roads and a multi-year investment plan that will be used to improve the network and create better roads for users.

Between 2015 and 2020 the RIS will:

- See £15.2 billion invested in over 100 major schemes to enhance, renew and improve the network;
- Help prevent over 2500 deaths or serious injuries on the network;
- Build over 1300 additional lane miles;
- Improve 200 sections of the network for cyclists; and
- Benefit up to 250,000 people by reducing the noise impact of England's motorways and major roads.

So, what does this mean for the A51 Chester to Tarvin Corridor?

It is important to ensure that proposals in this scheme align with the Highways England Road Investment Strategy, as the A55, managed by Highways England, is in close proximity to the proposed interventions. This scheme aims to increase capacity along the A51 Chester to Tarvin corridor to improve the network and create better roads for users which will support any improvements on the A55 as the junction to the west of the corridor carried out by Highways England.

2.13.2 Sub-Regional Policy Strategy

2.13.2.1 Strategic Transport Plan (TfN)

Transport for the North (TfN) was established in 2014 to bring together local representatives from across northern England with the aim of fostering better transport links in order to accelerate economic growth through influencing financial and transport decisions. The overarching objective is to develop a 'Northern Powerhouse' of economic growth which will redress some of the imbalance in the UK's economic geography. Transport is a key part of delivering the Northern Powerhouse because it creates better connections between economic centres. This can support business development and clusters, trade and business interaction. It also enables better commuting opportunities therefore providing businesses with access to a wider pool of skill. One of the key aims is to enhance the performance of the North's strategic road network.

TfN's Strategic Transport Plan for the North sets out the case for strategic transport infrastructure investment through to 2050. The West and Wales corridor is identified within the strategy to improve connectivity, for people and goods, to, from and through the important economic centres and assets of Cheshire, Liverpool City Region and Greater Manchester, with strategic connectivity in to North Wales and the Midlands.

Improvements in this corridor will also strengthen the North's cross border connections with North Wales and the Midlands. The A51 is located to the centre of this corridor which will see significant economic and population growth, increasing pressure on transport infrastructure. Connectivity improvements can support the growth of Manchester Airport, Liverpool John Lennon Airport, Cheshire Science Corridor Enterprise Zones, Atlantic Gateway, North Wales Arc, Port of Liverpool and Crewe HS2 Hub.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 corridor forms a key strategic route connecting Chester to Stoke-on-Trent. Therefore, the components identified in this scheme that aim to improve the performance of this network, directly align with one of the core aims of the Northern Transport Strategy. The A51 also lies within the West and Wales corridor which requires improved connectivity in order to support sub-regional economic growth.

2.13.2.2 Transport for The North (TfN), Strategic Development Corridors

Development of the "West and Wales Strategic Development Corridor" aims to improve connections for people and businesses and exploring the options for improving road, rail and waterborne capacity. This Strategic Development Corridor provides a long-term Investment Programme unlocking economic growth in the North between now and 2050.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Work along the A51 road corridor will unlock the following pan-northern objectives:

- Increase efficiency, reliability and resilience in the transport system;
- Transform economic performance;
- Improve opportunities across the North;
- Promote and support the built and natural environment.

2.13.2.3 Cheshire and Warrington Strategic Economic Plan and Growth Plan

The Strategic Economic Plan is part of the County's decade long strategy to support growth and economic development, it focuses on the three-year period between 2014-2017. The strategy sets out investment proposals for the local Growth fund and how this fund will be deployed.

An ambitious growth plan has been produced for Cheshire and Warrington. During the 3-year period, the plan pursues the delivery of 3,125 additional homes and 12,743 additional jobs for LGF investment of £124.8m. This feeds into the county's vision where:

- By 2021 Cheshire and Warrington will be an economy of £26.6bn with GVA per head 110% of the UK average;

- By 2030 Cheshire and Warrington will be an economy of £35bn with GVA per head 115% of the UK average, and home to an additional 100,000 residents, 75,000 new jobs and 70,000 new homes.

Connectivity through the CWLEP area will be improved which is a key enabling strategic policy in the Strategic Economic Plan (SEP). In addition, this scheme contributes to the following strategic imperatives in the CWLEP's SEP:

- 1. SI2: Attracting and retaining talent – In that our transport network needs to support a diverse and specialised range of employment sectors and ensure that transport problems do not prevent workers from accessing job opportunities.
- 2. SI4: Maximising our growth assets: property and place – In that improving through flow and efficiency on this important transport route helps create the conditions for economic growth.
- 3. SI6: Internationally connected and engaged – In that this road is a key desire line of traffic travelling between the Atlantic Gateway/Ellesmere Port Enterprise Zone – key strategic growth sites – and the M6 to the south.

The CWLEP has identified and developed three Intervention Priorities outlined in the Strategic Economic Plan these priorities are:

- **The Atlantic Gateway in Cheshire & Warrington** - reinforcing and grasping the opportunities of what Lord Heseltine and Sir Terry Leahy termed 'Britain's Second Engine of Growth' – the world trade, logistics, business and innovation corridor stretching from Deeside and Merseyside through the northern part of Cheshire and Warrington to Manchester. Warrington, one of the UK's most important locations for investment and business growth, coupled with Chester and Ellesmere Port form integral components of this growth corridor.
- **The Cheshire Science Corridor** - connecting into the Cities of Manchester and Liverpool, there are a string of interconnected centres of excellence located in Cheshire which are or have the potential of contributing significantly to national innovation in science – Capenhurst, Thornton Science Park, SciTech Daresbury, Birchwood Park, Jodrell Bank and Alderley Park.
- **Crewe High Growth City** - the major development hub centred on Crewe with accelerated growth potential for both business and new homes. HS2 now places Crewe at the heart of a 'Superhub', central to the countries' major infrastructure network – a national hub for transport connectivity. The access to HS2 services at Crewe is the key stimulus for development of the High Growth City.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Chester is identified within this document as a key location for growth with a strong financial and professional service sector which plays a major role in the sub-regional economy. Plans for a new business district in Chester will complement investment in transport and other investments, building on a strong leisure, tourism and higher education offer to support new investment in key service sectors. This scheme will also aim to support major growth areas in Crewe, the Atlantic Getaway and Cheshire Science Corridor by improving connectivity and making strategic journeys more reliable.

2.13.2.4 Cheshire and Warrington Local Transport Body (CWLTB)

The Cheshire and Warrington Local Transport Body (CWLTB) is a strategic partnership that has been established with a primary goal to ensure that the sub-region's transport investments support and enable economic growth and regeneration.

The LTB brings together the three local authorities (Cheshire East Council, CWAC and Warrington Borough Council) along with the Cheshire and Warrington Enterprise Partnership, and key stakeholders, such as the Highways Agency, DfT and Network Rail in an advisory role. Its single strategic objective is to improve transport infrastructure to secure significant connectivity gains in the support of economic growth and prosperity. As well as supporting economic growth, it is recognised that transport investment must also contribute towards wider social and environmental objectives.

The CWLTB proposes to fulfil a number of roles and functions over and above making decisions on devolved local authority major funds and support the Cheshire and Warrington growth agenda.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This transport investment will support economic growth and make contribution to wider social and environmental objectives through reducing congestion enabling Chester to remain attractive to new employers, businesses and potential development. An improvement to journey times also provides a better quality of life for people who live on or around the A51 corridor.

2.13.2.5 Chester and Warrington Transport Strategy (Draft)

This aims to support the Strategic Economic Plan (SEP) produced by the Cheshire and Warrington Local Enterprise Partnership (CWLEP). The strategy identifies the transport investment priorities needed to accommodate sub-regional growth and increasing demand from housing and employment. Transport and connectivity objectives outlined in the SEP include:

1. Improve connections to support development of priority employment sites including those within the Cheshire Science Corridor.
2. Improve connections to neighbouring sub regions, including international gateways to ensure that business has connectivity to global markets and to facilitate the economic benefits of both out and in commuting that takes place daily.
3. Resolve pinch points and congestion in the transport network, both road and rail, which act as barriers to growth if left unaddressed. Delays and unpredictable journey times affect business activity directly (e.g. the supply of components to the automotive sector) and indirectly, and influences commuting flows.
4. Address network resilience issues to deliver predictable and efficient journey times to support business productivity.
5. Make best use of the existing road (e.g. smart motorways) and rail network (e.g. electrification) to capitalise on existing infrastructure, offering efficient mechanisms for improvement and helping deliver best value for money from investment.
6. Ensure that the maximum benefit is gained in economic and connectivity terms from the development of the HS2 Hub Station at Crewe.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The objectives of this scheme are directly aligned with those identified in the SEP and Chester and Warrington Transport Strategy and the scheme has been developed to support growth and increase access to key areas such as Mersey Dee Economic Axis, Cheshire Science Corridor Enterprise Zone and the Constellation Partnership.

2.13.3 Local Policy and Strategy

2.13.3.1 Chester Transport Strategy (Phase 1 and 2 Reports)

The Chester Transport Strategy sets out how the borough can work towards the vision of ensuring that the city can cope with likely future trends and opportunities to support economic growth. Seven key goals were identified which the transport strategy intended to help to achieve:

- Supporting city centre development and the aspirations of the One City Plan;
- Enhancing transport connectivity to and from the rural hinterland, and across local, regional and national borders;
- Improving Chester's sustainable accessibility and alternative transport offer;
- Responding to changes in residential and other land use patterns;
- Increasing the reliability, safety and efficiency of core transport networks for the city;
- Safeguarding quality of life within Chester by securing the long-term future of its development; and
- Responding to strategic transport changes.

In order to achieve these goals, ten recommended work packages were developed as a result of the public consultation and other research which included congestion relief and access to employment. This package aims to tackle key congestion and queuing at pinch points on the local highway network, which in some cases may be triggered by future housing growth and development. The likely focus of this package includes:

- Liverpool Road/Moston Road (A41)/Liverpool Road (A5116);
- **Vicars Cross Road/Tarvin Road (A51); Hoole Road (A56);**
- **Vicars Cross/Tarvin Road (A51)/A55/Ring Road (A41) junctions;**
- Whitchurch Road (A41/A5115)/Ring Road (A55)/Caldy Valley Road;
- Boughton/Tarvin Road (A51)/Christleton Road (A5115) – Existing
- Air Quality Management Area (AQMA); and
- Sealand Road/New Crane Street (A548).

So, what does this mean for the A51 Chester to Tarvin Corridor?

This scheme therefore aims to make significant contribution to one of the core packages outlined within the Chester Transport Strategy to enhance transport connectivity and support city centre development through relieving congestion and increasing access to employment opportunities.

2.13.3.2 CWAC Local Plan

The CWAC Local Plan (Part One) Strategic Policies document was adopted on the 29th January 2015 and forms part of the statutory development plan for the borough. The Local Plan will be developed in two parts, Part One Strategic Policies and Part Two Land Allocations and Detailed Policies. The CWAC Local Plan (Part One) is the first local development document to be produced by CWAC. The purpose of this Plan is to provide the overall vision, strategic objectives, spatial strategy and strategic planning policies for the borough to 2030.

STRAT3 sets out the specific proposals for the Chester area which can be summarised as:

- Around 5,200 new dwellings of which in the region of 1,300 dwellings will be provided through Green Belt release;
- Key retail development at Northgate and proposals for a new theatre in the city centre will enhance the city's role as a sub-regional shopping and leisure destination and support its role as an international tourism destination and.
- Proposals at the Chester Business Quarter which include 44,000 m² of high quality office floor space adjacent to Chester Railway Station.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The CWAC Local Plan (Part One) identifies a considerable amount of development in and around the centre of Chester which could intensify the existing levels of congestion on the local highway network and have a detrimental impact on the growth of the economy. This scheme will ensure the highway network is able to remain resilient in light of housing and business growth increasing the number of people and vehicles accessing Chester via the A51 corridor.

The Local Plan (Part Two) Land Allocations and Detailed Policies document is currently being developed and a preferred approach was subject to public consultation between August and September 2016). This more detailed document will follow on from the strategic framework set out in the Part One Strategic Policies, and will include land allocations and detailed policies required to deliver the development requirements and the overall strategy set out in the Local Plan (Part One).

A range of documents and supporting evidence is being consulted on in the compilation of the Local Plan (Part Two) Land Allocations and Detailed Policies including the former district and county local plans, housing supply reports, Chester Transport Strategy Phase One and Phase Two.

2.13.3.3 CWAC Local Transport Plan (LTP 3)

Cheshire's third LTP sets out transport plans and priorities for the 15-year period of 2011/12 to 2025/26. The following core goals were identified in the Local Transport Plan:

- To provide and develop reliable and efficient transport networks, which support sustainable economic growth in West Cheshire and the surrounding area;
- To reduce carbon emissions from transport and take steps to adapt our transport networks to the effects of climate change;
- To manage a well-maintained transport network;
- To contribute to safer and secure transport in West Cheshire and to promote types of transport which are beneficial to health;

- To improve accessibility to jobs and key services which help support greater equality of opportunity; and
- To ensure that transport helps improve quality of life and enhances the local environment West Cheshire.

To help achieve these goals, CWAC has developed a number of objectives under each of the goals. These form the basis of the actions identified in the accompanying Implementation Plan, which sets out the strategy for the first four years of the plan. An update of this plan is currently being developed.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The development of this scheme will contribute towards a more efficient reliable transport network where lower levels of congestion result in reduced carbon emissions and improved accessibility to jobs and key services improving quality of life and enhancing the local environment of West Cheshire.

2.13.3.4 CWAC Highways Asset Management Strategy

This highway asset management strategy sets out how the Council will best manage highway assets, taking into consideration customer needs, local priorities, asset condition and best use of available resources. It addresses the highways asset as a whole, as well as articulating specific strategies for our major asset groups: carriageways, footways, bridges, structures, street lighting and traffic signals. These strategies are set out to inform the development of forward works programmes, in line with best practice lifecycle planning practice. This strategy identifies the following key objectives:

- **Creating a highways infrastructure asset that enables growth and development-** By identifying and focusing our investment where it receives the greatest return, our highways asset will be performing to the most effective level so as to encourage and enable further economic and community development.
- **Improve the condition of our unclassified network-** In order to optimize our investment funding for highways management, we are committed to improving, or minimising the deterioration, of the condition of our highways asset located within our unclassified network. This typically includes smaller, less-trafficked rural roads, and neighbourhood streets which provide crucial links and shorter length journeys for our residents.
- **Shifting the focus to more preventive maintenance vs reactive maintenance-** Continuing the work from previous years, CWAC will further expand our level of preventive maintenance works where appropriate, to ensure we extend the life of our critical assets. This will typically include undertaking preventive maintenance treatments on our carriageways and footways for surface dressing, micro asphalt works, and other similar treatments. This preventive approach will be delivered hand-in-hand with ongoing renewal and improvement works to our highways asset.

This scheme is directly aligned with the first objective of the Highways Asset Management Strategy. Highway improvements along the A51 corridor will support the growth of housing and facilitate the development of businesses by creating faster and more reliable journeys to Chester city centre and ensuring the wider residential areas remain attractive by improving connectivity and reducing congestion.

2.13.3.5 Chester Growth Partnership

Chester Growth Partnership along with key partners will deliver a programme of improvements in Chester as part of the One City Plan, the 15-year strategy which guides the future economic regeneration of Chester. The plan defines the overarching vision and direction of travel for the city, under which all projects should sit. Importantly, it is driven by prioritisation, implementation and delivery. The plan informed the Cheshire West & Chester Local Development Framework, the statutory planning document for the city.

The Chester One City Plan outlines many significant areas for growth such as the Business Quarter and major development projects such as the Northgate development scheme, the Cathedral and Castle Quarters.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This 15-year strategy will transform and accelerate economic growth in Chester increasing the importance of the city being easily accessible from the local and strategic areas. Ensuring the surrounding highway network is efficient and free from severe congestion will ensure proposed developments within the One City Plan will remain successful and the area will remain attractive to future investment further increasing opportunities for development.

2.13.4 Summary

This section has demonstrated a clear alignment of this scheme with national, regional and local policies and strategies through ensuring the highway network supports economic growth and remains resilient with regard to local development.

2.14 Risks, Constraints and Dependencies

To ensure the successful delivery of the A51 Tarvin-Chester Improvements Scheme it is important to consider the potential risks associated with the scheme in order to identify potential mitigation measures where appropriate. This section identifies the key risks and a number of environmental constraints arising from the development of the scheme. This sub-section also identifies how success of the scheme can be measured and the key stakeholders that will be involved throughout the development of the project.

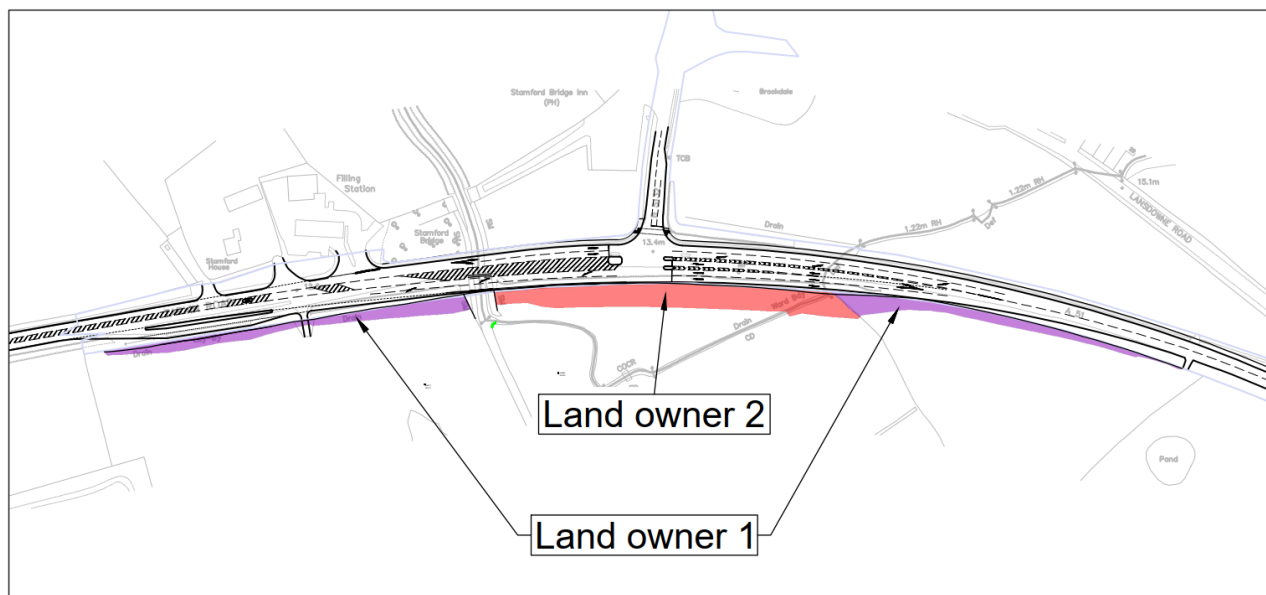
2.14.1 Risks

A detailed risk register for the delivery of the scheme has been completed by Balfour Beatty and is summarised in Section 7.8. The full Risk Register is set out in Appendix K. This identifies several geotechnical, environmental, planning and programme risks along with potential mitigation measures and the likely impact on the scheme which is given a numerical value between 1 and 20. The key risks are summarised in the subsequent subsections.

2.14.1.1 Land Acquisition Implications

Proposed improvements at Stamford Bridge will result in the requirement for third party land. This is unavoidable if sufficient capacity improvements are to be introduced. Figure 37 illustrates the areas of land which require negotiation with two landowners in relation to the proposed works at Stamford Bridge.

Figure 37: Stamford Bridge Land Acquisition



Source: Mott MacDonald

CWAC are in open discussions with both landowners and each has appointed a land agent to aid discussions with the council. Should agreement not be reached then there may be a requirement to engage in a CPO process, and this has a potential cost implication of between £50,000 - £112,000. To mitigate the impacts of this risk, the upper cost level has been included in the overall scheme cost analysis.

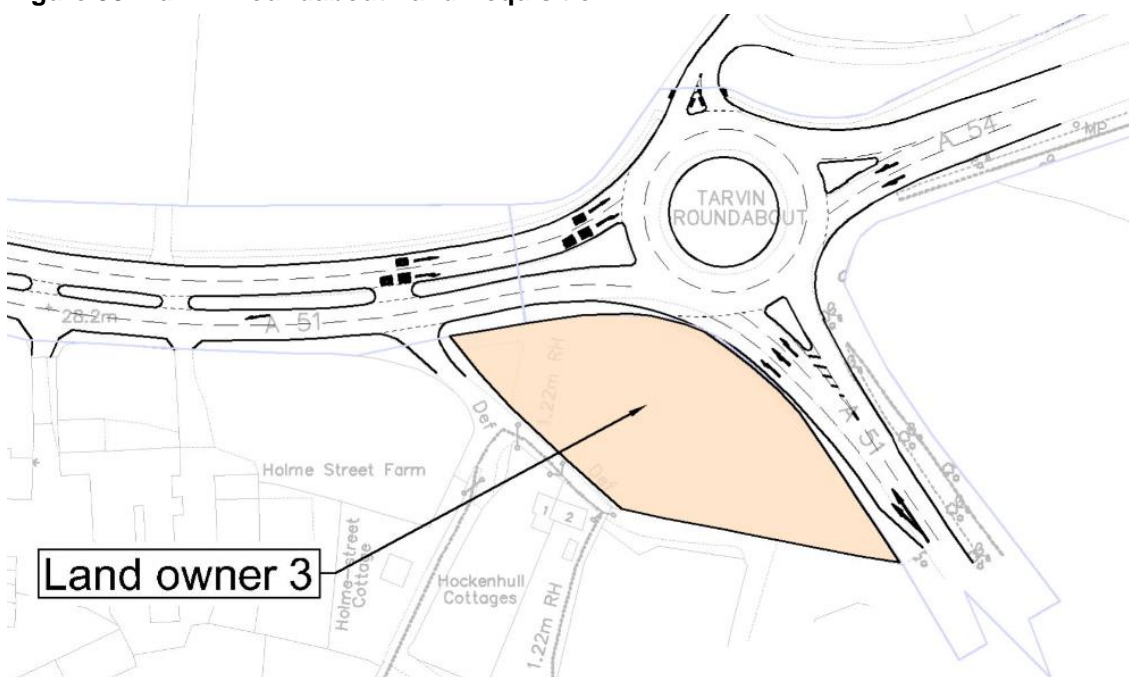
As the scheme is progressed CWAC will seek to avoid a CPO if possible. The engagement in a CPO process has been identified in the work programme (set out in Appendix N) and can be accommodated for within the delivery timescales. Therefore, acquiring third party land will not affect the overall delivery of the scheme. Further details discussions with landowners to address this are outlined in Appendix S.

In July 2019 the Cabinet and Council approved the revised FBC funding budget and work programme, while endorsing the use of CPO powers to enable land acquisition for scheme delivery, as outlined below. The list of all approved recommendations is shown in Appendix W:

- To authorise the use of compulsory purchase powers and to make such Compulsory Purchase Order(s) as necessary under sections 239, 240 and 250 of the Highways Act 1980 and the Acquisition of Land Act 1981 for the acquisition of land and rights over land required for the A51 Tarvin to Chester Improvement scheme.
- To authorise the Director of Places Strategy to approve minor or technical amendments to the CPO/s' boundaries as may be required as a consequence of further design work or negotiations with landowners and statutory undertakers or affected parties or for any connected reasons.
- To authorise the Director of Governance to take all necessary steps to secure the confirmation of the CPO/s and the vesting of the land in the Council, including the publication and service of all notices and the presentation of the Council's case at any Public Inquiry.
- To authorise the Director of Places Strategy in consultation with the Director of Governance to acquire the necessary interests in the land (including, where appropriate, new rights over land) within the CPO/s, either by agreement or compulsorily.

To authorise the expenditure arising from paragraphs above. This includes (but is not limited to) the costs of land acquisition and/or compensation payable to those with an interest in the land, and of instructing suitable external counsel and/or specialist CPO solicitors to advise and represent the Council in connection with the CPO. All such expenditure is to be subject to approval by the Director of Places Strategy in consultation with the Director of Governance. CWAC have also been involved in positive negotiations with another landowner (Landowner 3) in regard to a parcel of land at Tarvin Roundabout. This was required for the additional left turn lane at Tarvin Roundabout which has now been removed from the scheme that is being submitted as part of this FBC due to funding constraints. Land previously required from Landowner 3 is illustrated in Figure 38. This is required to support future phases of the strategic corridor improvements and will come forward, should additional funding be secured in the future, while the site may be used as a compound to deliver the existing scheme proposals.

Figure 38: Tarvin Roundabout Land Acquisition



Source: Mott MacDonald

Negotiations have been positive with Landowner 3 and CWAC have agreed a deal to purchase the land including the extents of the previous scheme component at this location. Therefore, the land is readily obtainable to accommodate the implementation of the left turn lane at Tarvin Roundabout should further funding become available or scheme efficiencies be achieved.

2.14.1.2 Statutory Undertakers

With regard to Statutory Undertakers apparatus, as part of the OBC development, C2 records were obtained and potential diversions highlighted to accommodate proposed diversion works. Estimates for such works were also made from previous similar sized schemes and included in the scheme cost estimate.

As part of the Full Business Case development, C3 enquiries have been made to confirm diversion requirements and obtain budgetary cost estimates from utility providers. Responses have been received from all companies providing more cost certainty for the scheme estimate.

When the scheme progresses to detailed design, C3 responses will be reviewed and dialogue commenced with utility companies whose apparatus is impacted by the scheme. Trial holes will enable apparatus to be clearly identified and the extents of works required. Subject to the scheme being finalised and agreed, utility companies will then be able to provide C4 estimates with agreed costs to divert their apparatus impacted by the scheme.

The scheme delivery programme makes allowance for such utility diversion work, taking account of seasonal influences, such as electric power cables diverted in the warmer spring/summer period.

2.14.2 Environmental Constraints

An assessment of environmental constraints undertaken at OBC stage identified a number of constraints within the boundary of the site and within 500m of this boundary.

A key constraint present within the site boundary is that the majority of the A51/B5132 junction lies within Flood Zone 3. This is sourced from the River Gowy that flows South to North underneath the A51. A Flood Risk Assessment has been carried out in this area which shows any flooding within the Flood Zone is likely to be low risk to the scheme due to the raised level of the A51. The impact of the scheme on the flood zone extents is also shown to be negligible.

Two Grade II listed buildings were identified within 500m of the site boundary. However, further review of this at FBC stage has shown this is not an issue in relation to the scheme due to the distance between the features and proposed works.

Noise Important Areas have also been identified within the study boundary at three locations (see Figure 3 in Appendix G Environmental Constraints report). Although the scheme will not directly improve noise levels in the area, the expected impact of the scheme is minimal as proposed improvements are located away from receptors. No monitoring has been undertaken at this stage as it is not usually required for a scheme of this nature and is not required in order to satisfy planning requirements. However, action will be taken by the local authority to monitor and mitigate noise should levels exceed the threshold level of 68db at any receptor sites. CWAC will follow guidance from Defra in relation to how noise can be controlled and managed. The usual approach to control the impact of noise from new or improved highways is compensation or insulation. More details of this can be found within Appendix J.

With regard to ecology, a number of surveys have been undertaken by CWAC since OBC stage with further surveys planned at certain times of the year to ensure all potential species are assessed. The ecology report provided in Appendix R summarises assessments undertaken.

To date, the surveys have identified the following:

- A badger set has been identified within the study area to the east of the River Gowy. An agreed site has been identified to the north of the A51 and costs for a new set included within scheme budgets. The new set will be constructed 6 months prior to closure of the existing set which would need to take place in the July – November period. A licence will be required for this which can take up to 30 days. The scheme programme reflects these timescales. A week long bait marking study is scheduled to take place between March and April 2019 to further assess and mitigate potential impacts on the species;
- Evidence of otters has been found near to the bridge although no holt has been located. Further surveys are required once vegetation has been cleared around the bridge. If a holt is located then a similar relocation process as for badgers will be required. During construction, access through the River Gowy will need to be maintained for otters. This will also maintain access for fish present within the river;

- Water vole surveys will be required in the spring. This is scheduled to take place in April 2019 and will cover an area 250m up and downstream from Stamford Bridge. If found to be present within 50m of the study area then the voles would be displaced to another area. A second option is to trap and relocate the voles;
- Great Crested Newts (GCN). Surveys have been undertaken at the A55/ Hare Lane (site 1) section of the scheme and the Stamford Bridge (site 2) section of the scheme. The surveys predicted that Site 1 will have a low negative impact on GCN and is not considered to breach legislation relating to the species. It concluded that GCN does not pose a constraint to development at this site, however, it was still recommended that the development should proceed under non-licensed mitigation in the form of reasonable avoidance measures. This was due to a failure to successfully sample one of the water bodies which is known for GCN. To further monitor the GCN, six surveys will take place between April and June 2019 using bottle traps which will be let overnight and collected the next day.
- At Site 2 the risk of encountering and injuring/killing GCN was found to be high and would likely result in a breach of legislation relating to the species. This poses a constraint to the proposed development at this site and the implementation of a Natural England licensed GCN mitigation strategy was therefore recommended. Further surveys are planned for 2019 and if further evidence of GCNs is found then necessary mitigation procedures will be followed prior to construction commencing on site. The delivery programme takes account of this and the presence of GCNs is not expected to result in any delays;
- Tree surveys have been undertaken at all junctions within the scheme extents. While none of the sites fell within a conservation area, 7 trees and 1 group at the Stamford Bridge junction were found likely to be protected by a 1986 Area Tree Preservation Order (TPO). This means statutory permission from the Local Planning Authority is required before any tree works can take place;
- No evidence has been found of any bats, however, further surveys are to be undertaken in 2019 as some trees may have bat roosting potential, however, this is deemed to be low at present;
- The usual construction rules will be taken into account with regard to breeding birds with tree works undertaken outside of nesting season (May-September); and
- Japanese knotweed has been found on the northern side of the A51 close to the east of the junction with the A55. Treatment for this has commenced which involves spraying initially and then removing through excavation.

Further dialogue is provided in Section 4.4 of the Economic Case with full details provided in Appendix R.

Further discussions with the Environment Agency (EA) will also be required in relation to works at Stamford Bridge to obtain their approvals. However, through design work undertaken so far and included within the FBC submission package, the following can be confirmed:

- The impact of the scheme on the existing flood plain south of Stamford Bridge has been found to be negligible (see Flood Risk Assessment in Appendix P);
- The new linked bridge over the River Gowy will be similar to the existing bridge (height above river, set back of bridge supports) and will not impact on the flow of the river; and
- The existing drainage outfall flow into the river will be maintained at the same rate for the proposed scheme. A petrol interceptor will also be included as part of the scheme.

Officers have been in close dialogue with EA on a number of issues and therefore this is not envisaged to be a problem, at this stage.

Whilst a number of constraints have been identified which may pose an increased risk to the scheme, these have been thoroughly considered throughout scheme development to ensure minimal impact on delivery costs and timescales.

2.14.3 Dependencies

The development of the A51 Tarvin Road Capacity Improvements scheme is not dependent on any other transport or regeneration schemes. Following consultation with key stakeholders such as Highways England and local Parish Councils, there are also no dependencies or influences identified and all were supportive of the improvements identified within this scheme.

2.14.4 Key Success Factors

The A51 Tarvin-Chester Improvements Scheme has identified a number of expected outcomes in terms of GVA uplift and employment opportunities, reducing congestion, increasing the capacity at junctions, improving air quality. Key success factors therefore include journey times and queue lengths at junctions along the A51 Tarvin to Chester corridor and reduced levels of Nitrogen Dioxide along the corridor. A 'Benefit Realisation Plan' and 'Monitoring and Evaluation Plan' has been set out to recognise and measure the attainment of these outcomes following construction of the proposed scheme interventions. Details of both the 'Benefit Realisation Plan' and 'Monitoring and Evaluation Plan' can be found in Appendix J attached as part of this submission.

2.14.5 Complimentary Schemes

In 2017/18 Highways England commissioned its Spatial Planning consultants WSP and Atkins to undertake six junction improvement studies for identified locations, with a view to generating improvement scheme options (supported by a Strategic Outline Business Case) for potential future funding and delivery.

One of the preferred options sets out improvements at the A55/A51 junction comprising the following elements, which includes proposals for the original A51 Tarvin Road Improvements prior to descopeing:

- Capacity improvements at the A51/ B5132 'Stamford Bridge' junction;
- Remodelling of the A51 Hare Lane / Littleton Lane side road junctions;
- Widening of the A51 eastbound carriageway on exit from the A55 junction, increasing the length of the 2-lane section;
- Widening of the A51 Tarvin Road westbound approach to the A55 junction to lengthen the 3-lane approach;
- Provision of two left-turn lanes for movements from the A51 west (Vicars Cross Road) towards the A55 north;
- Widening of the A55 southbound off-slip to flare to 3 lanes on approach to the junction;
- Widening of the southern circulatory to provide 3 lanes; and
- Provision of signalised pedestrian crossing facilities across the A55 slip roads (both north-facing and south-facing slip roads)

This demonstrates a combination of elements within this scheme and additional improvements at the A55/A51 junction. Further dialogue is required with Highways England with regard to descopeed elements of the A51 Chester to Tarvin Improvements Scheme, especially at the A55 end.

The full scheme will produce additional benefits in reducing congestion around the A55 junction to and from Chester as part of a wider package of investments along the entire A51 corridor. Highways England have now committed funding for the detailed design to ensure the scheme is ready for when RIS2 funding kicks-in on 1st April 2020.

2.14.6 Stakeholder Involvement

Engagement of key stakeholders, residents and members of the public is an obligation of the local authority during the planning and delivery of major highway projects. In relation to the A51 Chester-Tarvin Corridor Improvements Scheme, a managed approach to stakeholder engagement has been adopted to ensure the focus is the customer. The key objectives of stakeholder engagement have been defined as:

- To raise awareness and understanding of the scheme, promoting awareness, positive attitudes and behaviours; and
- To enable the public and stakeholders to discuss the scheme with a member of the project team through a variety of communication mediums.

Prior to the development of this scheme a number of key stakeholders were engaged as part of the Chester Transport Strategy consultation process which took place in 2014. This consultation highlighted a number of pinch points on the road network in Chester to be included within the strategy which was adopted by Cabinet in 2014. Further work was undertaken on the pinch points in February 2016⁶ which later led to the development of this scheme. Therefore, the need for this scheme has been agreed with stakeholders through the Chester Transport Strategy consultation process.

Table 27 outlines the key stakeholders that have been engaged with during the development of the OBC and their expected key roles within the scheme delivery at this stage. No potential conflicts between these Stakeholder were identified.

Table 27: Overview of Stakeholder Involvement

Key Stakeholder Group	Project Input/Roles Responsibilities
Highways England	Consultee, joint responsibility for network reliance along the A51, A55, A41 road corridors
Chistleton Parish Council	Consultee, representing local resident's views (represented by ward Cllr and Littleton as date with Parish Council could not be fixed)
Littleton Parish Council	Consultee, representing local resident's views
Guilden Sutton Parish Council	Consultee, representing local resident's views
Tarvin Parish Council	Consultee, representing local resident's views
Cheshire and Warrington LEP	Consultee, review and approval of preferred scheme and joint funding partner thorough grant agreement
Gowy Ward Member	Consultee, representing local resident's views
Tarvin Ward Member	Consultee, representing local resident's views
Chester Villages Ward Member	Consultee, representing local resident's views
Bus Operators – Stagecoach, Arriva North West, Arriva Cymru and Network Warrington Buses, Aintree Coachline	Consultee through the Council bus liaison group meeting
Landowners and tenants	Joint party to signed legal agreements for land acquisition required to deliver the scheme
Environment Agency and Natural England	Consultee, approvals required in relation to works at Stamford Bridge

⁶ <https://www.cheshirewestandchester.gov.uk/documents/parking-roads-and-travel/public-transport/transport-strategies/phase-two-reports/chester-transport-strategy-phase-two-congestion-relief-pinch-points-report-0216.pdf>.

Source: Mott MacDonald

At this stage of the process selected stakeholders were consulted to present details of the preferred option and provide an opportunity to give feedback. Key stakeholders identified and engaged with at this stage included:

- Highways England;
- Littleton Parish Council;
- Guilden Sutton Parish Council and
- Tarvin Parish council.

The following meetings have been held with the Parishes where scheme plans and progress so far have been shared. The key outcomes of these meetings are summarised in the following section.

Table 28: Details of Stakeholder Engagement Meetings

Date	Location	Representing
11 October 2017	CWAC HQ building	Gowy Ward Member also representing Barrow Parish Council
12 October 2017	CWAC HQ building	Littleton Parish Council and Chester Villages Ward Councillor
23 October 2017	Clotton and District War Memorial hall	Clotton Hoofield Parish Council Littleton Parish Council Tarvin Parish Council Christleton Parish Council Waverton Parish Council Tarporey Parish Council Duddon Parish Council Tilston and Fernall Parish Council Calveley Parish Council
6 December 2017	Guilden Sutton Village Hall	Guilden Sutton Parish Council
3 December 2018	Chester Rugby Club	Littleton Parish Council

Source: Mott MacDonald

2.14.6.1 Key Outcomes from Stakeholder Consultation

Highways England have stated that they are supportive of the scheme proposals and the anticipated benefit of reducing the queuing on the A55 southbound exit slip at the junction with the A51. Highways England are also developing a scheme to deliver improvements to the A55/A51 junction which would produce additional benefits to reducing congestion along the corridor. However, the Highways England scheme is currently scheduled to be delivered after the proposals set out in this business case.

A number of key points were raised during the other stakeholder consultation events which are noted below. None of these posed a barrier to the scheme and were deemed as helpful in fine tuning the designs. The table below summarises the key issues and how these have been addressed within the development of the scheme.

Table 29: Key Outcomes of Stakeholder Consultation

Issue	How the Scheme Addresses the Issue
Improved pedestrian crossing facilities at the Stamford Bridge junction.	Scheme updated to show additional dropped crossings with tactile paving.

Issue	How the Scheme Addresses the Issue
Westbound approach to the left turn lane at A55 junction to be extended.	This was addressed in the initial scheme by providing additional widening on the northern side and re-application of road markings to allow more efficient access to approach lanes to the roundabout. However, this element of the scheme has now been removed due to funding constraints.
Relocated layby opposite garage to the west of the Stamford Bridge junction to include existing field access.	Scheme to be updated to include relocated field access.
Additional pedestrian refuge and footway to the south of the A51 at the Cotton Lane junction required to serve existing bus stops.	Scheme to be updated to include a new refuge island and footway at the Cotton Lane junction.
Can right turning movements be banned from the garage onto the A51 west of the Stamford Bridge junction to improve road safety?	This would be difficult to achieve physically and also difficult to enforce.
Could additional movements be banned at the Hare Lane/ Littleton Lane junction such as the straight across movement from Hare Lane to Littleton Lane, a popular 'rat run'.	This movement could not be stopped without effectively making Hare Lane entry only or blocking entry to Littleton Lane. Banning right turn movements from Hare Lane is not worthwhile due to the relatively low numbers undertaking this movement and long detour involved should it be stopped.
Can the junction with the A55 be included in the scheme to address major delays?	This junction is within the trunk road network and under the control of Highways England and therefore outside the remit of this scheme. However, Highways England will be advised of the scheme proposals and the future benefits it will have on both the local and strategic network in the area.
Can yellow box markings be introduced at the A55 roundabout junction?	As stated above, this junction is under the control of Highways England and outside the remit of this scheme. However, should the scheme progress, measures to improve junction operation would be discussed with Highways England.
The A55 junction worked better before traffic signals were introduced.	As stated above, this junction is under the control of Highways England and outside the remit of this scheme. However, should the scheme progress, measures to improve junction operation would be discussed with Highways England.

Source: Mott MacDonald

2.14.6.2 Next Steps for Consultation

Consultation with key stakeholders such as Landowners and Highways England has been ongoing throughout the development of the FBC. No public consultation has been carried out in preparation of the Full Business Case due to timescales and changes to the scheme since the OBC stage. As the cost of the scheme increased, the scope of proposals and available funding sources were reconsidered within CWAC.

Final proposals and funding arrangements are required for public consultation to ensure the engagement process does not raise the public expectations by presenting a scheme which may be different from what is constructed. This will include a number of drop in sessions from May 2019 advertised by press releases, letters and information leaflets. Full details of consultation carried out to date and planned can be found in the appended Stakeholder and Communications Plan (Appendix S).

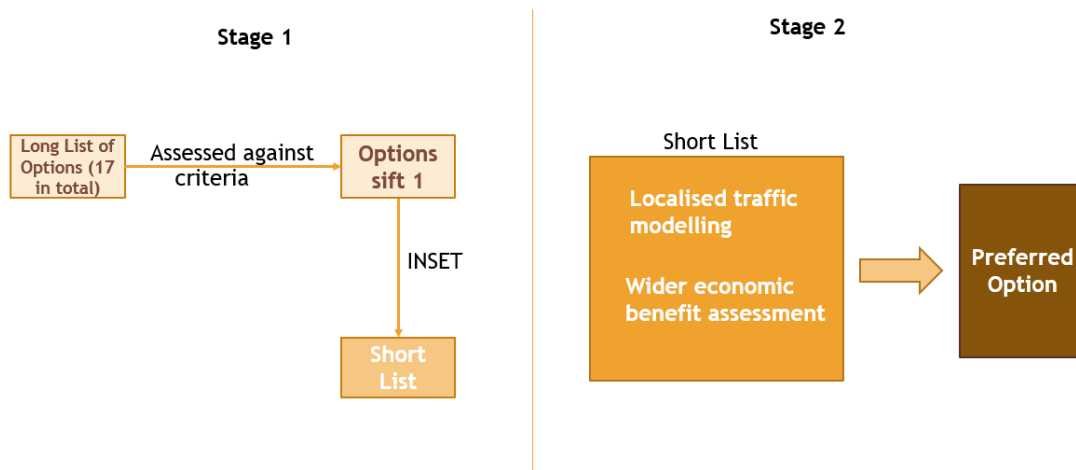
3 Options Appraisal and Preferred Option

Following identification of the key issues and scheme objectives a number of potential scheme options were developed to meet these objectives and mitigate current and future issues. This section sets out the options appraisal process carried out demonstrating how the preferred scheme was selected.

3.1 Options Appraised

The options appraisal process for the A51 Tarvin-Chester Improvements Scheme has been structured to align with DfT’s transport appraisal model. As part of the options assessment process, options pass through several stages of appraisal and refinement. The process of options appraisal used in this scheme is illustrated in Figure 39 and summarised below. Full details can be found in Appendix A - Options Appraisal Report which sets out the options appraisal process carried out at OBC stage and how options have been further refined since the submission of the OBC to develop the final scheme.

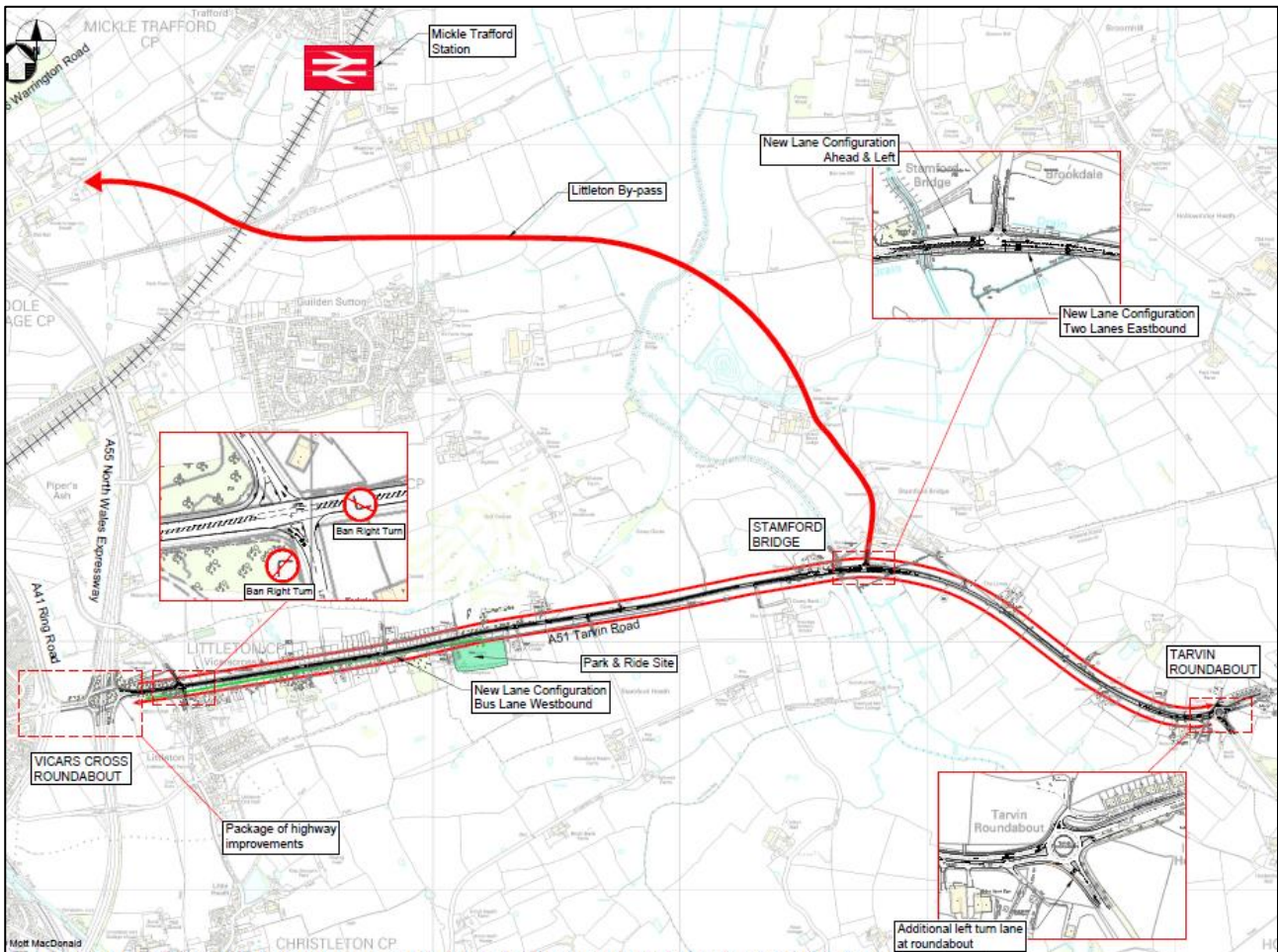
Figure 39: Options Assessment Framework Two Stage Approach



Source: Mott MacDonald

The long list of options was developed in response to the key issues identified along the corridor. Do Minimum Options were included for comparison, to provide evidence of the need for intervention and to demonstrate the benefits that could be achieved through delivery of the preferred option. A number of high-cost options were also included within the long list to consider potential longer-term benefits. Although these are not currently deliverable due to funding constraints, from a strategic viewpoint it was important to recognise that any current interventions should be considered as part of a longer term strategic approach in support of economic growth through area wide improvements to capacity and connectivity along the A51 corridor. As a result, the final long list consisted of 17 options. Details of the long list of options appraised can be found within Section 5.2 of the OAR, but they are illustrated here in Figure 40.

Figure 40: Overview of Long list of Options



Source: Mott MacDonald

This approach of identifying and assessing options along the whole A51 corridor, clearly demonstrates CWAC’s holistic approach to addressing the issues and opportunities for the entire area. Although at this point in time it is recognised that available funding can only support selected interventions at key pinch points within the corridor, if further funding becomes available, delivery of this scheme can be presented as evidence of the initial phase of a much broader highway improvement strategy to support economic growth.

3.1.1 Appraisal Criteria

Following the development of the long list of options an initial sift was then undertaken using a set of themed criteria based on:

- Theme 1: Alignment with both strategic and enabling objectives and
- Theme 2: Deliverability.

The assessment of the 17 options at Stage 1 was undertaken using Mott MacDonald’s in-house Investment Sifting and Evaluation Tool (INSET), which applies weighted scoring to each option based on how well an option meets identified criteria, and where relevant sub criteria under each theme.

The process and rationale for the selection of criteria and assignment of weightings is covered in detail in the OAR but the following two tables provide an overview of the criteria and associated weightings under each of the two themes.

Table 30: Assessment Criteria and Weighting under Theme 1, Alignment with Objectives

Assessment Criteria	Sub-criteria	Weight
Economic Growth	Unlock Chester Northgate retail and leisure area	3
	Supports development sites along the length of the A51 corridor	3
	Supports reliable and efficient journeys to Chester Business Quarter	3
	Job Creation	3
	GVA Uplift	3
Strategic Connectivity	Enables reliable, faster access to HS2 hub, Crewe	3
	Reliable, faster connectivity for cars and freight traffic to Ellesmere Port Enterprise Zone	3
	Enhanced connectivity to Atlantic Gateway	3
	Enable reliable faster journeys between north Wales, Chester, Northwich & Winsford	3
Local Connectivity	Congestion relief at key pinch points	2
	Enable reliable faster journeys along the A51 corridor from Tarvin to Chester by private car or public transport	2
	Improved network resilience	2
Social Impacts	Enhanced pedestrian and cycle safety	1
	Reduce rear-ending /shunting accidents at junctions along the A51	1
	Improved local air quality by optimising junction layouts and merger lanes to reduce idling.	1

Source: Mott MacDonald

No Deliverability sub-criteria that could meaningfully be measured at the time of the long list appraisal was identified, so a brief description of the criteria is provided instead.

Table 31: Assessment Criteria and Weighting under Theme 2, Deliverability

Assessment Criteria	Weight	Description
Land ownership acquisition issues	1	The extent to which land is available to construct the highways intervention.
Physical barriers	1	The extent to which physical barriers may affect scheme delivery
Relative cost	5	The extent to which the scheme can be delivered within the funding constraints of the scheme.
Public Support	1	The extent to which there is support from the public for the delivery of the option.
Stakeholder Support	1	The extent to which there is support from stakeholders for the delivery of the option.
Total	9	

Source: Mott MacDonald

This assessment, using a weighted scoring system narrowed the list of options down to a shortlist of four (as per the scope of our proposal); these were the three highest scoring options plus a Do Minimum option for comparison. Table 32 shows that based on INSET scores alone the Do Something 3 is the preferred option, however INSET was applied sift out poorly performing options that either did not meet scheme objectives or would prove to be complex to

deliver; it did not consider actual performance at the junctions. For this reason a second round of assessment was undertaken for the four shortlisted options.

Table 32: INSET Scores

No.	Option Name	Theme 1: Alignment with Objectives	Theme2: Deliverability score	Total Quantitative Score	Rank based on total score only
1	Do Nothing	-2.06	1.67	-0.40	16
2	Do Minimum 1	-1.14	2.11	0.97	8
3	Do Minimum 2	-1.07	1.00	-0.07	15
4	Do Something 1	0.28	0.89	1.17	6
5	Do Something 2	0.61	0.78	1.38	2
6	Do Something 3	0.73	0.78	1.50	1
7	Do Something 4	0.67	0.11	0.78	11
8	Do Something 5	1.10	0.11	1.21	4
9	Do Something 6	0.69	0.33	1.03	7
10	Do Something 7	0.96	0.33	1.29	3
11	Do Something 8	1.79	-0.89	0.90	9
12	Do Something 9	0.86	0.00	0.86	10
13	Non-Highway 1	0.19	0.22	0.41	14
14	Non-Highway 2	-0.06	-1.67	-1.73	17
15	High Cost 1	2.08	-1.33	0.75	12
16	High Cost 2	1.66	-1.11	0.55	13
17	High Cost 3	2.64	-1.44	1.20	5

Source: Mott MacDonald

Table 33 summarises the specific interventions within each of the shortlisted options.

Table 33: Shortlist of Schemes

Capacity Improvement							
Option	Stamford Bridge Road Markings	Tarvin roundabout- Left turn lane	Stamford Bridge Long Merge (Westbound)	Stamford Bridge Short Merge (Westbound)	Right turn bans at the Hare Lane/ Littleton Lane	Extension of eastbound merge from the A55/ A51 junction	2 Lanes westbound from Tarvin roundabout to the Stamford Bridge junction
Do Minimum 1	✓						
Do Something 2	✓	✓	✓				
Do Something 3	✓	✓		✓	✓	✓	
Do Something 7	✓	✓	✓				✓

Source: Mott MacDonald

Junction modelling in LinSIG and ARCADY was undertaken to test the effects of junction designs on traffic flows and journey times for the four shortlisted options whilst a SATURN model was used to assess impacts on the wider network. A high level strategic assessment of economic impacts was also carried out using the Mott MacDonald proprietary Transparent

Economic Assessment Model (TEAM) to assess impacts on GVA and determine indirect and induced effects of jobs created directly by the scheme. A benefit cost ratio (BCR) was then calculated for the preferred option to illustrate the value for money. Full details of the options assessed and the appraisal process can be found in the supporting Options Appraisal Report.

3.2 Preferred Option Selection

3.2.1 Outline Business Case (OBC) Stage

As outlined within the methodology the preferred option was to be selected based on the options which produced the greatest Wider Economic Benefits (WEBS) and results of the junction modelling. As there was no difference in the results of the WEBS assessment for each of the shortlisted options it was assumed that the option with the greatest transport benefits would produce the greatest wider economic benefits.

Therefore, the selection of the preferred option was based on assessments of traffic modelling. Results of these assessments can be found in detail within the Options Appraisal Report submitted as part of this FBC as Appendix A, however an overview of the results is provided here.

The four shortlisted options are very similar in essence with some options containing a number of the same interventions as shown in Table 33. Therefore, for Stage 2 of the assessment process, the interventions at each key junction along the corridor were compared under each of the scenarios, rather than the overall package.

For Tarvin Roundabout, as indicated in Table 33, the Do Something Option is the same for Options 2, 3 and 7. The benefits of proposed measures when compared to the Do Minimum scenario are summarised in Table 34 for the future assessment year of 2030. This shows the reduction in delay and resultant queues on the worst performing arm, the A51 south.

Table 34: Tarvin Roundabout Modelling Results Summary (ARCADY, 2030)

AM peak	A51 (south)		
	Delay (seconds)	Queue (PCUs)	Flow (PCUs)
Do Nothing	119.9	22	522
Do Something	12.1	2	522
PM peak	A51 (south)		
	Delay (seconds)	Queue (PCUs)	Flow (PCUs)
Do Nothing	111.6	22	568
Do Something	11.2	2	568

Source: Mott MacDonald

Passenger Car Unit (PCU) is a single unit taking account of all vehicle types on the network.

Delay in seconds is for each PCU passing through a particular arm of a junction.

Queue is the predicted length of queue in PCUs for a particular arm of a junction.

For the Stamford Bridge junction, the shortlisted options varied from changes to carriageway markings (Do Minimum) to an additional westbound lane through the junction with a long merge (Do Something 2 and 7) and short merge (Do Something 3).

The benefits of a longer merge over a shorter merge cannot be assessed in the modelling package used (Linsig), however, it is expected that the extra carriageway space will result in more efficient junction operation. There will also be added benefits with regard to road safety as the longer merge would be to highway standards (in combination with a reduction in speed limit).

Table 35 compares the modelling output results for the Do Nothing, Do Minimum and Do Something scenarios (for the future assessment year of 2030) and indicates the improved resultant capacity and reduced delay.

Table 35: Stamford Bridge Modelling Results Summary (LINSIG, 2030)

AM peak	Stamford Bridge	
	PRC (%)	Total Delay (PcuHr)
Do Nothing	5.4	12.1
Do Minimum	12.2	9.8
Do Something	19.4	7.7

PM peak	Stamford Bridge	
	PRC (%)	Total Delay (PcuHr)
Do Nothing	14.8	10.5
Do Minimum	28.2	8.8
Do Something	29.8	7.7

Source: Mott MacDonald

Practical Reserve Capacity (PRC) is the predicted % available capacity remaining at a signal controlled junction for a particular scenario.

Total Delay is a measure of the total delay for all PCUs at a signal controlled junction for a particular time period (PCU Hr)

With regard to introducing right turn bans at the **Hare Lane/ Littleton Lane junction**, although numbers of turning vehicles are relatively low, there is still expected to be some benefit in restricting these movements. The cost of this scheme would also be low and easy to install as it would be limited to minor kerb works and amendments to road markings.

Modelling of this junction is not likely to show any major improvements in traffic flow through the junction. However, removing the right turn movements will enable an extended right turn lane into Littleton Lane, improving safety and reducing delays on the A51. By removing the right turn movements from Littleton Lane this will make it easier to turn left onto the A51 as traffic waiting to turn right or travel straight ahead to Hare Lane currently blocks this movement.

Measures proposed for this junction were included as part of the Do Something 3 Option.

At the **A55/A51 junction**, extending the eastbound merge would provide benefits to traffic leaving this junction. It has not been possible to model this using a stand-alone junction modelling package such as Linsig. However, economic assessment of the benefits using SATURN has been undertaken and is set out within the Economic Case.

In addition, to aid traffic travelling west towards this junction on the A51, it is proposed to widen the southern kerbline to assist left turning traffic heading towards Wales. At present, the middle (straight ahead lane) can block back, restricting access to the left turning lane.

From the modelling assessment, components of the Do Something 3 Option were identified as providing the greatest benefits in terms of reducing delays along the A51 corridor. The one change identified was the amendment of the short merge for westbound traffic leaving the Stamford Bridge junction to a long merge over the bridge to comply with highway design standards and mitigate issues of road safety.

3.2.2 Full Business Case (FBC) Stage

3.2.2.1 Updated FBC

Following submission of the Outline Business Case, components of the preferred Option were further investigated as the scheme progressed to more detailed design. This led to some changes to the scheme around Stamford Bridge to ensure the scheme is able to mitigate congestion both now and beyond the scheme completion.

Changes to this part of the scheme included construction of a new bridge immediately adjacent to the existing bridge such that the two bridges are linked giving the appearance of a single structure. A kerbed island will be in place between the two bridges. The previous scheme included for widening of the existing bridge. By constructing a new bridge, this would maintain traffic movements on this key route when the existing bridge needs replacing and would reduce congestion impacts during scheme construction.

Limiting works to the existing bridge would also minimise construction risks and enable a large part of the works at this junction to be completed off-line, thus minimising disruption to traffic flows. Works to the old bridge will involve carriageway resurfacing only and since a large depth of surfacing is currently present on the bridge (c100-200mm) replacement of the top layer only will not result in exposure of the bridge deck and the need to re-waterproof.

3.2.2.2 Descoped FBC

Due to funding constraints, a descoping exercise was required in February/ March 2019 to reduce the overall scheme costs to approx. £7m. To achieve this a number of workshops were held between the project team comprising representatives from CWAC, Balfour Beatty and Mott MacDonald where value engineering of the full scheme was assessed.

In addition, to assist in the decision making process, Mott MacDonald undertook some high level Benefit-Cost Ratio (BCR) assessments when elements of the scheme are removed. This was undertaken using estimates of the travel time savings for each element of the model to provide indicative economic benefits. Results when removing the A55/Hare Lane and Stamford Bridge elements of the scheme are presented in Table 36.

The results indicate that upon removal of the Hare Lane/ A55 elements of the scheme, the BCR increases from 2.14 to 2.44. This is due to the costs for this part of the scheme outweighing the benefits, although it unlocked the complimentary Highways England scheme. It was therefore agreed that since proposals to widen the A51 from the A55 junction should form part of the wider Highways England complimentary scheme at the A55/ A51 junction, it would be more beneficial if all these works were undertaken together (for economies of scale) at a later stage. It was agreed that the Hare Lane/ Littleton Lane improvements would remain within the current scheme.

Table 36: High Level BCR Assessment Results

	Full Scheme Adjusted BCR	Hare Lane/A55 Removed	Stamford Bridge Removed
Scheme Costs including risk in 2018 prices	8,503	7,633	2,485
Scheme Costs including risk and optimism bias at 3% in 2018 prices	8,758	7,862	2,560
(All entries below are present values discounted to 2010, in 2010 prices)			
Present Value of Costs (PVC)	6,663	5,807	1,890
Present Value of Benefits (PVB)	14,285	14,150	-135
Benefit to Cost Ratio (BCR)	2.14	2.44	-0.07

Source: Mott MacDonald

For Stamford Bridge, the BCR reduces substantially to -0.07 confirming this element of the scheme provides large benefits. It was therefore agreed that this element of the scheme should remain. However, from a value engineering point of view, there was still scope to make cost savings at this junction, and through workshop discussions, the following was agreed:

- The verge width to the south of the junction could be reduced from 3m to 2m;
- Lane widths to straight-ahead lanes in each direction could be reduced from 3.65m to 3.25m; and
- The extents of proposed carriageway and footway surfacing was reduced to a minimum without compromising on road safety.

In terms of junction assessment based on amendments to lane widths, this would have negligible impact, so the results presented in Table 35 would be unchanged.

With regard to Tarvin Roundabout, an assessment has been made using the junction modelling software package ARCADY. Although SATURN has been used to assess the wider benefits of the scheme (used to calculate results in Table 36), it can be limited when used for stand-alone roundabout junctions.

The main cost saving element at Tarvin Roundabout is through the removal of the proposed new left turn lane. As well as works costs there would also be a need to divert 33kv power cables as well as existing gas apparatus.

Tables 37 compares results (for the A51 (S) arm), for the future assessment year of 2030, for the existing roundabout, the full scheme and a descoped scheme with the left turn lane removed.

The results indicate that although the main benefits are still attributed to the full scheme, the descoped scheme is still predicted to provide improvements to traffic flow on the A51 (S) approach to the roundabout.

Table 37: Tarvin Roundabout Updated Modelling Results (ARCADY 2030)

AM peak	A51 (south)	
	Delay (seconds)	Queue (PCUs)
Do Nothing	119.9	22
Do Something (full scheme)	12.1	2
Do Something (Descoped Scheme)*	33.9	5.5

PM peak	A51 (south)	
	Delay (seconds)	Queue (PCUs)
Do Nothing	111.6	22
Do Something (full scheme)	11.2	2
Do Something (Descoped Scheme)*	30.3	5.3

Source: Mott MacDonald

*Assumes 20% of approach traffic will utilise the outside lane to turn left onto the A51 (W)

Passenger Car Unit (PCU) is a single unit taking account of all vehicle types on the network.

Delay in seconds is for each PCU passing through a particular arm of a junction.

Queue is the predicted length of queue in PCUs for a particular arm of a junction.

It should be noted that an assumption has been made with regard to how traffic approaches Tarvin Roundabout from the A51(S). One of the issues at present is that motorists hog the nearside lane with the outer lane not generally utilised for left turning movements. Subsequently, the outer merge lane on the A51(W) as traffic heads towards Chester is also underutilised. The new left turn lane proposed as part of the full scheme would have alleviated this issue through the provision of greater capacity and clearer approach lanes to the roundabout. For the descoped scheme, it has therefore been assumed that improved carriageway markings and a new approach sign will improve utilisation of the outer approach lane to the roundabout by traffic wishing to turn left. Since the majority of traffic is still likely to use the nearside lane due to the relatively short length of the outer lane, a figure of 20% has been used in junction modelling assessments.

Therefore, the scheme components removed or reduced following the descoping exercise is as follows:

- The removal of the left turn lane at Tarvin Roundabout from the A51 South to the A51 West;
- Removal of the proposed modifications to the westbound approach to the A55 and eastbound merge on the A51 at the A51/ A55 junction;
- Reduction of proposed lane widths and southern verge width for works to be undertaken at Stamford Bridge; and
- Reduction in the extents of carriageway and footway surfacing at all three junctions.

3.3 The Scheme

The robust options appraisal process detailed above aims to ensure that selected components of the scheme will enhance local and strategic connectivity in order to support economic growth and improve environmental and safety conditions for local residents.

The scheme has also been developed in close collaboration with CWAC and the CWLEP to ensure the final proposals are deliverable within time and funding constraints. However, the scheme components identified below also aim to support wider aspirations for the A51 corridor and a potential longer-term programme of investment should further funding become available in the future.

Considering the benefits and problems identified, the impacts of doing nothing and the scheme objectives, the selected preferred option is as follows:

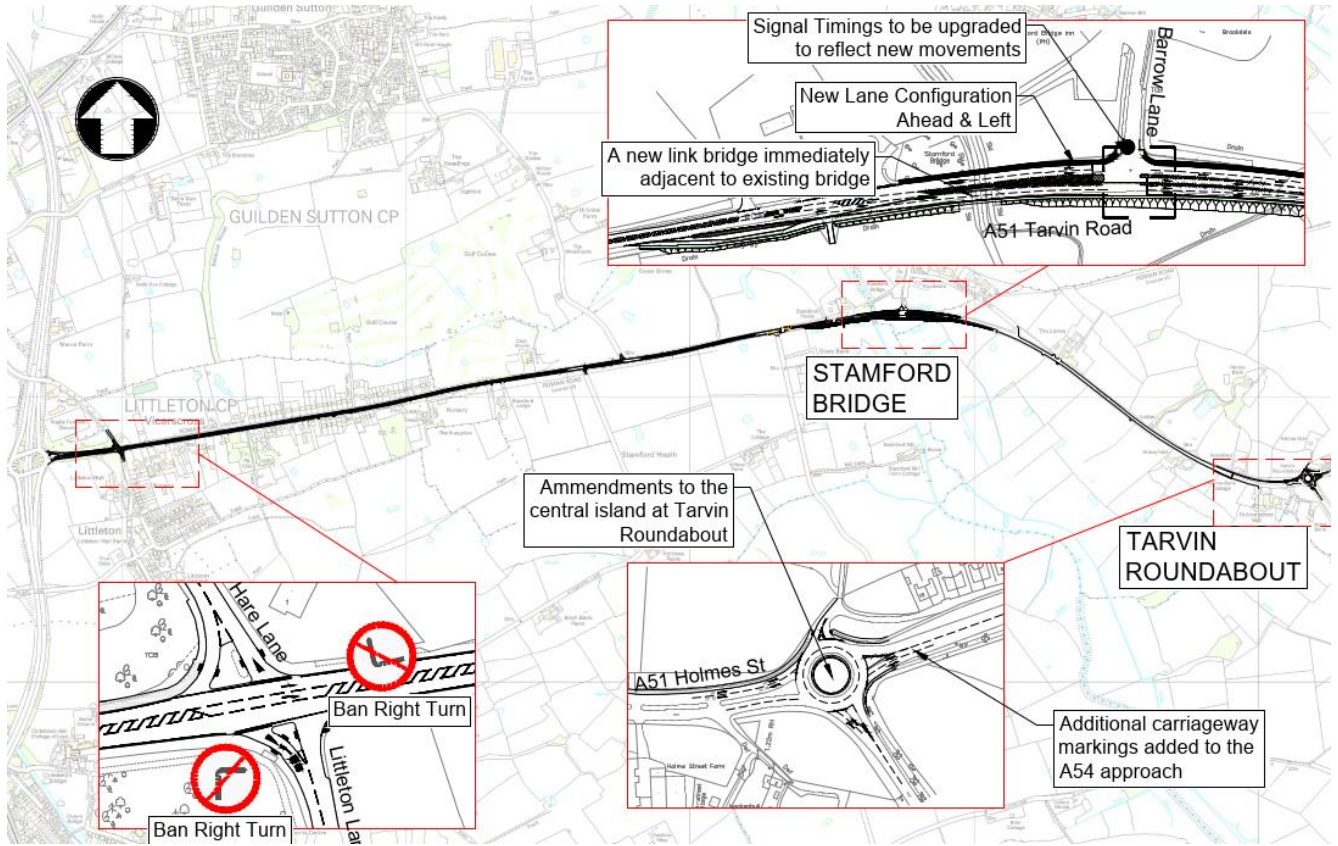
- Amendments to the central island at Tarvin Roundabout and additional carriageway markings added to the A54 approach;
- Signal and lane marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an additional westbound lane at the Stamford Bridge junction through carriageway widening to the south, with a long merge for westbound traffic exiting the junction;
- A new bridge will be constructed immediately adjacent to the existing bridge such that the two bridges are linked giving the appearance of a single structure. A kerbed island will be in place between the two bridges; and
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction to reduce rear end shunts, additional delay and 'rat running'.

The implementation of the scheme components set out above aim to deliver the following key outcomes:

- Reduction in journey times, particularly in the AM and PM peak periods for people travelling along the A51 corridor.
- Reduced levels of Nitrogen Dioxide (NO₂) measured at roadside locations along the A51 corridor.
- Junctions along the A51 corridor that are able to function within capacity up to 2030 and beyond.
- Retain and increase the amount of investment in and around Chester by ensuring highway network remains efficient and reliable in order to support and accelerate economic growth.
- Increased levels of walking and cycling as a result of improved infrastructure.
- Reduction in number of rear-ending shunt and turning relating accidents occurring at junctions along the A51.
- Reduced community severance through improved pedestrian and cyclist facilities within the study area.

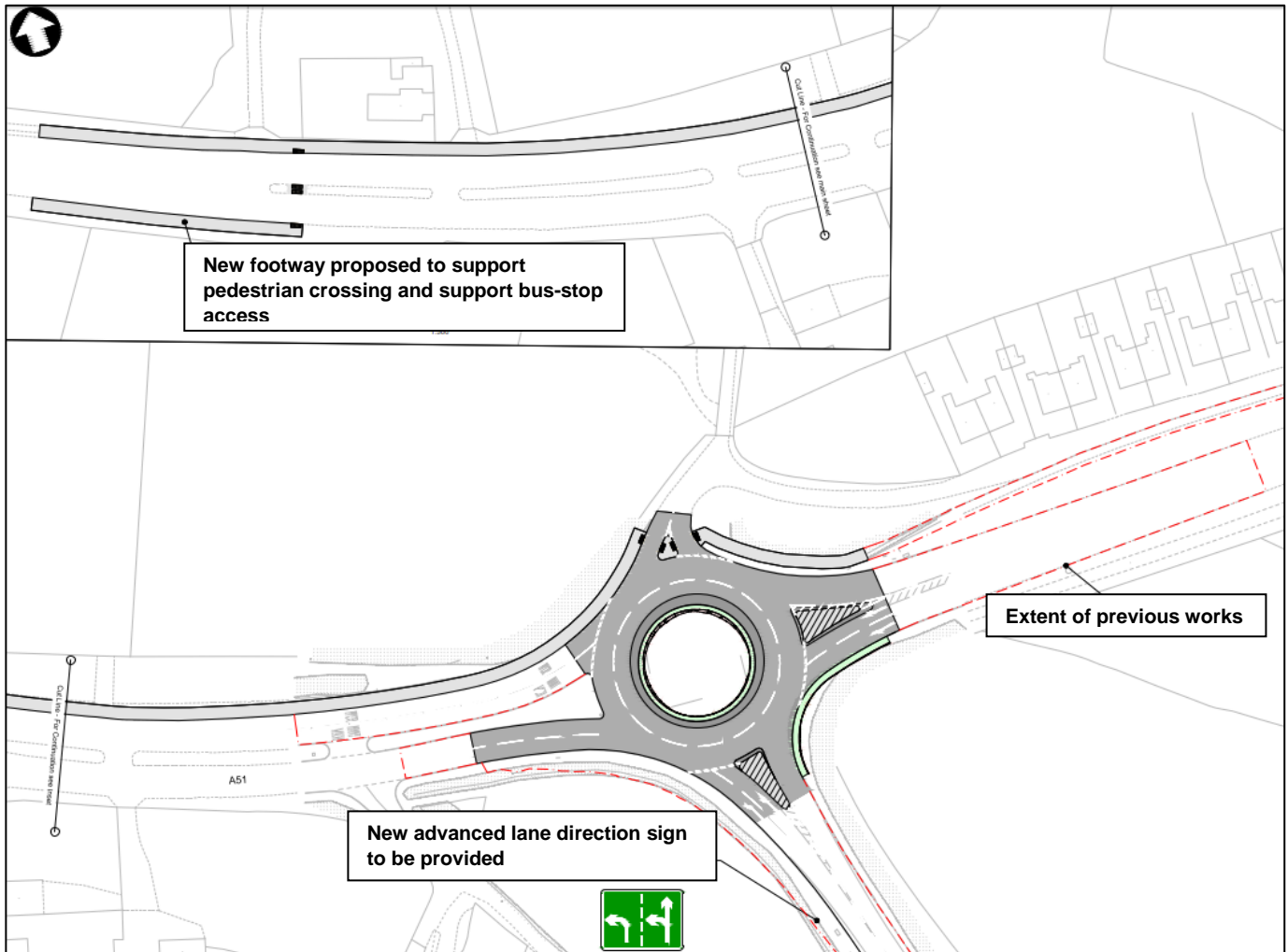
The overall scheme is shown in Figure 41: Scheme Components Summary with detailed scheme designs of each of the key components shown in Figure 42 to Figure 45. Full drawing details are provided in Appendix B.

Figure 41: Scheme Components Summary



Source: Mott MacDonald

Figure 42: Tarvin Roundabout Improvement Works

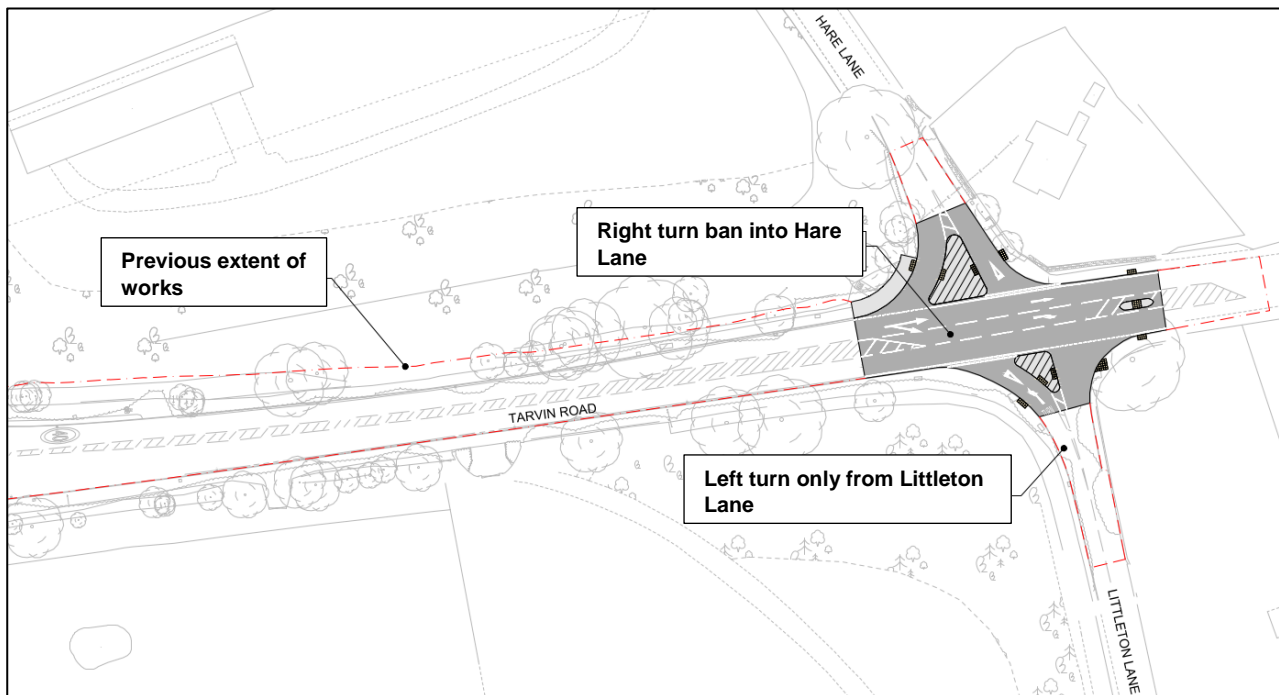


Source: Mott MacDonald

For the A51 (S) approach and traffic turning left towards Chester, observations indicate the outer traffic lane is under-utilised prior to the merge to a single lane. This adds to the already large traffic queues encountered on the A51 through Tarvin roundabout. To address this, slight modifications to kerblines would be provided on the A54 approach and central island to the roundabout. This would enable two approach lanes to be marked out on the A54 and two lanes also marked out on the circulatory carriageway. A new advanced lane direction sign would also be provided on the A51 (S) approach to encourage use of both lanes.

The addition of carriageway markings should further assist in guiding motorists through the roundabout and improving utilisation of the two lanes heading towards Chester on the A51 prior to the merge to a single lane.

Figure 43: Right Turn Bans at Hare Lane/Littleton Lane Junction



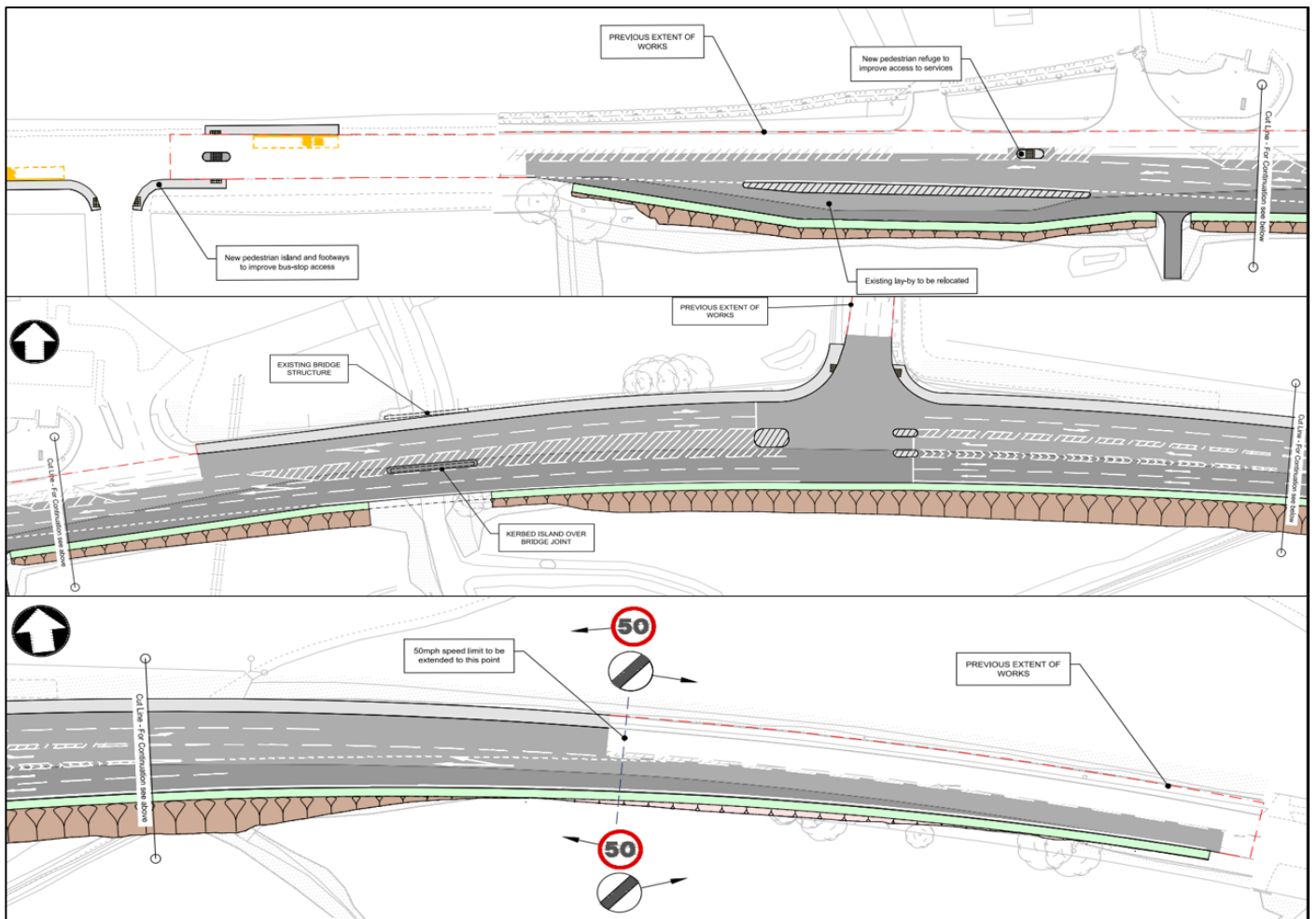
Source: Mott MacDonald

Banning right turn movements at Hare Lane and Littleton Lane would help to resolve issues created by these junctions through 'rat running' as traffic seeks to avoid the busy A55 junction. During busy periods, since traffic is often queuing through this junction on the A51, motorists tend to let waiting vehicles out from both the Hare Lane and Littleton Lane entry points which can add to delays. The number of turning movements at this junction has also led to a number of turning related/ shunt collision.

This option seeks to restrict the number of turning movements by banning the following movements through the provision of increased splitter islands and amendments to road markings.

- Right turn from the A51 into Hare Lane;
- Right turn from Littleton Lane to the A51; and
- Ahead movement from Littleton Lane to Hare Lane.

Figure 44: Stamford Bridge Lane Configuration and Long Merge Over Bridge



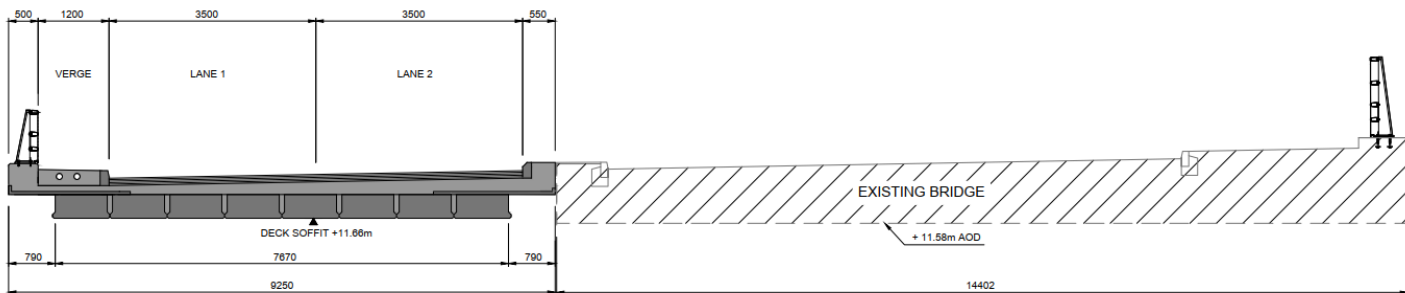
Source: Mott MacDonald

At the A51/Barrow Lane junction carriageway markings would be amended on the eastbound approach to the signals as shown in Figure 44. At present, the left turn only lane into Barrow Lane is under-utilised with traffic queues resulting in the single straight-ahead lane.

By modifying the nearside lane to straight-ahead and left (along with required changes to the signals) this will increase capacity on this approach. The amendment to road markings on the eastbound approach would result in an improvement in the Practical Reserve Capacity (PRC) and resultant delay in both the AM and PM peak periods.

To improve capacity in the westbound direction towards Chester this option would provide an additional straight-ahead lane through the signals at the Stamford Bridge Junction. A linked bridge will be constructed adjacent to the existing bridge to accommodate the additional lane and a long merge back to single carriageway. The long merge would extend for a distance of approximately 150m and is shown in Figure 44. Figure 45 shows proposals for the new linked bridge. In addition, an Approval in Principle (AIP) assessment has been undertaken for the bridge and is provided in Appendix T. This sets out the design criteria for the bridge.

Figure 45: Proposed Linked Bridge over the River Gowy



Source: Mott MacDonald

Additional third-party land would be required to accommodate this additional lane due to the existing level difference to the south. Relocating the southern kerbline would require an existing embankment to extend into fields beyond the current highway boundary fence.

The long merge option has been designed for a 50mph speed limit and can be accommodated prior to the garage on the northern side of the A51. At present, the A51 is subject to the National Speed Limit through the junction, dropping to 50mph approximately 30m west of the junction. As part of scheme proposals this speed limit change is to be relocated to the east of the junction. These changes would enable the merge to be to required design standards.

The existing parking layby to the south of the A51 opposite the garage would need to be relocated as part of this proposal.

Also included in this option is additional widening to the north-east of the junction to allow for the longer merge from 2 lanes to 1 on the eastbound exit to the signals.

3.4 Stage 1 Road Safety Audit

A Stage 1 Road Safety Audit was undertaken by CWAC in October 2018. A total of four issues were raised all centred around the Hare Lane/ Littleton Lane junction. The scheme was updated to reflect recommendations made in the audit. The audit can be found in Appendix Q along with a copy of the Designers Response to the queries raised.

Following the descope exercise for the scheme, the Road Safety Audit team were presented with the updated drawings for review. No additional comments were made on the scheme proposals.

3.5 Impacts of Scheme Not Being Delivered

Potential impacts of the scheme not coming forward are outlined in this section to reiterate the importance of the scheme and its benefits.

The following impacts need to be considered if improvements along the A51 Chester-Tarvin corridor are not delivered:

- An increase in congestion along this section of the corridor with junctions such as the Tarvin roundabout and Tarvin Road / Barrow Lane junction at Stamford Bridge operating significantly over capacity by 2030.

- Major disruption to the A51 corridor once the existing bridge over the River Gowy is replaced in the future (in approximately 50-60 years) as there is no diversion route for traffic. This will have major implications on the A51 as a strategic link and also a designated route for large loads.
- Increasing levels of Nitrogen Dioxide along the A51 Chester-Tarvin corridor producing poorer quality of life for residents and potential health effects.
- Continued low levels of road safety reducing opportunities for pedestrians and cyclists and increasing the number of rear-end shunt accidents at junctions.
- Reduced attractiveness of the area for future investment hindering economic growth.
- Increasing levels of noise pollution reducing the attractiveness of the area to future residents and developers.
- Reduced access to opportunities for people living either side of the corridor as it forms a key route between key centres such as Crewe Hub, Ellesmere Port Enterprise Zone and the Atlantic Gateway.
- Increasing journey times to key centres for both commuters and freight traffic reducing opportunities for continued economic growth.
- Continued community severance due to no improvements to pedestrian and cyclist facilities along the Corridor.

4 The Economic Case

Section Summary

The purpose of the Economic Case is to assess options to identify all their impacts, and the resulting value for money, to fulfil Treasury's requirements for appraisal and demonstrating value for money in the use of taxpayers' money. This section summarises what economic, environmental, social and distribution impacts the scheme is expected to deliver.

A long list of 17 options was developed in response to the scheme objectives and sifted using Mott MacDonald's in-house Investment Sifting and Evaluation Tool (INSET) to produce a short list of 4 potential schemes. As agreed with the CWLEP, the level of appraisal carried out for this application is proportional to the scale and cost of the scheme. Therefore, this section assesses the economic impacts of the preferred option only.

Junction modelling and assessment of the wider economic benefits found that capacity improvements at Stamford Bridge and Tarvin Roundabout as well as banning right turn movements at Hare Lane and Littleton Lane provided the maximum benefits in terms of reduction in journey times and benefits to the economy. Improvements at Stamford Bridge, Tarvin Roundabout and Hare Lane/Littleton Lane have been further developed and economically appraised as part of the FBC.

Transport benefits and wider economic benefits have been assessed for the preferred option showing strong support for the scheme. Economic appraisal has shown the scheme presents High Value for Money with an initial Benefit Cost Ratio (BCR) value of 2.2. When adjusted for the inclusion of journey time reliability benefits, the BCR increases to 2.3.

The surrounding land use and development sites have been reviewed to assess whether the scheme could assist in unlocking development. There are no employment sites in proximity to the A51 which will be directly influenced by improvements along the corridor, but 200 houses are proposed in Tarvin with an additional 500 in Tarporley, Cuddington and Sandiway. This scheme could help to unlock this development however it is not possible to quantify how many of these houses rely on A51 improvements at this stage.

Although this scheme forms part of a wider package of investments this particular intervention has the potential to provide 10 to 20 jobs (including construction, indirect and induced jobs) and £433,800 to £864,500 GVA in construction benefits during the construction period only. £171,840 to £343,680 worth of council tax can also be attributed to the proposed interventions within the scheme, once new homes supported by the scheme are occupied.

Assessment of social and distributional impacts demonstrates that the scheme could be beneficial to journey quality as although there will be a temporary increase in route uncertainty during construction, once operational the scheme is likely to produce a reduction in user frustration and fear of accidents. Severance is also likely to be reduced once operational, creating an improved connection to community facilities in Tarvin and Chester and there will be no severance during construction. From an environmental perspective, several constraints have been identified that will impact the scheme such as potential flood risk. Assessment into these constraints at FBC stage have been carried out which demonstrate a low impact to the scheme development.

The Economic Case therefore provides strong support for the scheme demonstrating High Value for Money and generating positive economic benefits for the local area in terms of GVA uplift during the construction period, and council tax generation. On a qualitative basis it is likely the scheme can be delivered without any adverse environmental impacts and when complete will enhance journey quality for users of the route and improve local connectivity within local communities as severance is reduced.

4.1 Transport Economic Benefits

This section sets out the calculation of transport economic benefits consisting of:

- Journey time benefits to transport users;
- Journey time reliability benefits; and
- Accident benefits.

The Economic Appraisal Report (EAR) is included as Appendix E.

This assessment has considered the preferred option only. The short-listed options were assessed using individual junction models and from this analysis the preferred option was determined. The Options Appraisal Report in Appendix A provides full details.

4.1.1 Assumptions

In order to arrive at the economic benefits, a number of modelling and appraisal assumptions have been adopted. The standard TAG appraisal forms the basis of the approach with specific assumptions and simplifications made to allow best use of available local modelling data, the perceived nature of the schemes and the longevity of their impacts. The assumptions adopted for economic assessment of this scheme are summarised in the points below:

- Measures have been taken to ensure that the benefits included in this assessment are relevant to the scheme by only including benefit to, from and within the area influenced by the scheme.
- The economic assessment has been based on 2020 and 2030 traffic modelling where data is available from the A51 Chester Traffic Model.
- Traffic modelling has been undertaken for the following weekday periods:
 - AM (08:00-09:00)
 - Interpeak (Average hour 10:00-4:00)
 - PM (17:00-18:00)

The TAG recommended assessment period of 60 years has been adopted.

4.1.1.1 A51 Chester SATURN Model

The primary transport modelling platform is the A51 Chester Traffic Model (A51 CTM) which is a junction based model developed in the SATURN software.

The A51 CTM⁷ model has a base year of 2017 and includes up to date transport forecasts for CWAC. The model was developed based on a proportionate update the 2010 CTM to specifically assess this scheme, including the collection of new traffic count and journey time data in the vicinity of the scheme. All junctions in the scheme are part of the model simulation area and additional buffer network has been added to allow the impacts of re-assignment to be examined. Within the study area, full junction coding is included (SATURN simulation), outside of this link based speed flow curves are applied.

Therefore, this is suitable for calculating a BCR for the proposed transport improvements.

Full details of the base and future year models are presented in Appendices C and D respectively.

⁷ A51TarvinRoadCapacityImprovementsScheme_ModelBaseYearUpdate_RevA

4.1.2 Scheme Costs Adjustment for Risk

The base cost of the scheme has been adjusted to allow for risk and optimism bias for the purposes of economic modelling. The total estimated cost of the scheme covering only design, construction, and preliminaries costs is £5,808,086. A Quantified Risk Assessment (QRA) figure has been applied based on all identified risks, including strategic and funding risks, inclusive of inflation which is set out in detail in Appendix K.

Quantified risk assessment (QRA) enables an expected value of the cost of the scheme to be calculated. The key assumptions of where risk has been calculated is stated in the QRA along with the likely impact and appropriate mitigation measures. The base cost of the scheme (with no risk) is estimated at £5,808,086. Based on this cost the QRA has been calculated at £1,167,640. The assumption is therefore that the base cost amounts to £7,029,726. Optimism bias has also been applied on top of this QRA figure for the purposes of economic appraisal which brings the total cost of the scheme to £7,240,618. The adjusted scheme costs in relation to the application of risk allowance are summarised in the table below.

Table 38: Scheme Costs used for Economic Appraisal

Component	Cost (£)
Base Cost in 2018 prices	£5,808,086
QRA	£1,167,640
Monitoring and Evaluation (post construction, pre-construction costs are included within the base cost above)	£54,000
Sub Total	£7,029,726
Optimism Bias (3%)	£210,892
TOTAL	£7,240,618

Source: Mott MacDonald

4.1.2.1 Indirect Taxation Factor

Prices measured in the factor cost unit of account can be converted to (or from) the market price unit of account by multiplying (or dividing) by the indirect tax correction factor, $(1+t)$, where t is the average rate of indirect tax on goods and services in the open market, in this case 1.19. TAG A1.3 states that indirect tax revenues should be converted to market price. This conversion is undertaken with TUBA which has been used for this assessment.

4.1.2.2 Inflation

The economic appraisal is based on 2018 prices with an allowance made for inflation also included. Balfour Beatty have also included an allowance for inflation in their costs in the sum of £264,102. This is based on standard inflation rate data forecast from BCIS general civil engineering indices.

4.1.3 Benefit Cost Ratio

The BCR for the preferred option of this scheme has been calculated by modelling two scenarios; one without implementation of the scheme and one with the scheme to produce trip and cost matrices. The calculation of the initial BCR and an estimate of the adjusted BCR value are given in Table 39.

In line with the appraisal guidance, a modified BCR has been calculated by including journey reliability benefits that arise from the transport interventions.

Table 39: Assessment summary (in £000s, 2010 prices if not stated)

	Initial BCR	Adjusted BCR
Scheme Costs in 2018 prices	7,030	7,030
Scheme Costs including risk and optimism bias of 3% in 2018 prices	7,241	7,241
<hr/> (All entries below are present values discounted to 2010, in 2010 prices)		
Cost to Public Accounts (including risk and optimism bias of 3%)	5,797	5,797
Economic Benefits	11,658	11,658
Journey Time Reliability Benefits	-	601
Accidents	341	341
<hr/>		
Present Value of Costs (PVC)	5,384	5,384
Present Value of Benefits (PVB)	11,999	12,600
Benefit to Cost Ratio (BCR)	2.2	2.3

Economic Benefits is the sum of Economic Efficiency, Greenhouse Gases and Wider Public Finances from the AMCB table

4.1.3.1 Transport Economic Benefits

The transport economic benefits of the scheme have been calculated using the Transport Users Benefit Appraisal (TUBA) program (Version 1.9.9), which carries out an economic assessment in accordance with published DfT guidance. The analysis uses transport modelling results from the A51 Chester Traffic Model that reflect delay and traffic reassignment impacts of the A51 Tarvin-Chester Improvements scheme.

The economic benefits calculated for the scheme include:

- Transport economic benefits (TAG A1 and TAG A2.3). The transport economic appraisal and calculation of greenhouse gases has been undertaken using the TUBA program, which carries out an economic appraisal in accordance with published DfT guidance. This is based on trip and cost matrices from the A51 CTM and travel cost changes implied by the proposed schemes.
- Accident benefits. Estimation of accident benefits has been carried out using COBALT, the DfT's tool for accident appraisal.
- Journey reliability benefits (TAG A1). The estimate of journey time reliability benefits is made to satisfy the 'Reliable journeys' sub-objectives within the 'Economy' section of scheme appraisal. The calculations assume that the model area is dominated by urban regions and therefore uses the urban journey time reliability calculations that are set out in the TAG unit.

The transport modelling has shown that the A51 Tarvin-Chester Improvements Scheme produces reductions in delay and journey time for traffic. The Transport Economic Efficiency (TEE) table reflects this and shows that the transport interventions when assessed in isolation result in some benefits for all road users. Table 39 shows that the A51 Tarvin-Chester Improvements Scheme is forecast to deliver a present value of main transport economic benefits (PVB) of £12.0m over a standard appraisal period of 60 years. When the PVB is taken together with the present value of scheme costs (PVC) of £5.38m the initial BCR is calculated as 2.2. According to Department for Transport guidance, the BCR of 2.2 represents High Value for Money.

4.1.3.2 Economic Appraisal Results Tables

The completed TEE table is shown in Table 40. The transport modelling has shown that the A51 Tarvin Road Capacity Improvements scheme produces reductions in delay and journey time for traffic. The TEE table reflects this and shows that the transport interventions when assessed in isolation result in benefits for all road users.

The overall Present Value of Transport Economic Efficiency Benefits is £11.9m (2010 prices, discounted to 2010). This is shown in Table 40.

Table 40: Economic Efficiency of the Transport System (TEE) Table

Economy: Economic Efficiency of the Transport System (TEE) - £000's

Consumer – Commuting User Benefits	All Modes			Road
Travel Time	5,089			5,089
Vehicle Operating Costs	407			407
User Charges	0			0
During Construction & Maintenance	0			0
NET CONSUMER – COMMUTING BENEFITS	5,496			5,496
<hr/>				
Consumer – Other User Benefits	All Modes			Road
Travel Time	1,962			1,962
Vehicle Operating Costs	141			141
User Charges	0			0
During Construction & Maintenance	0			0
NET CONSUMER – OTHER BENEFITS	2,103			2,103
<hr/>				
Business	All Modes	Goods Vehicles	Business Cars & LGV	
Travel Time	3,471	1,967	1,503	
Vehicle Operating Costs	815	597	218	
User Charges	0	0	0	
During Construction & Maintenance	0	0	0	
Subtotal	4,286	2,564	1,721	
<hr/>				
Private Sector Provider Impacts	All Modes			
Revenue	0			
Operating Costs	0			
Investment Costs	0			
Grant/Subsidy	0			
Subtotal	0			
<hr/>				
Other Business Impacts	All Modes			
Developer Contributions	0			
NET BUSINESS IMPACT	4,286			
<hr/>				
TOTAL	All Modes			
Present Value of Transport Economic Efficiency Benefits (TEE)	11,885			

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

The impact on public accounts for the A51 Tarvin Road Capacity Improvements scheme is set out in Table 41 and is a cost to the public accounts of **£5.38m**. There is a cost of **£0.4m** in Indirect Tax Costs for central government.

Table 41: Public Accounts (PA) Table

Public Accounts - £000's

Local Government Funding	All Modes	Road
Revenue	0	0
Operating Costs	0	0
Investment Costs	0	0
Developer Contributions	0	0
Grant/Subsidy Payments	0	0
NET IMPACT	0	0
Central Government Funding: Transport		
	All Modes	Road
Revenue	0	0
Operating Costs	0	0
Investment Costs	5,384	5,384
Developer Contributions	0	0
Grant/Subsidy Payments	0	0
NET IMPACT	5,384	5,384
Central Government Funding: Non - Transport		
	All Modes	Road
Indirect Tax Revenues	413	413
TOTALS		
	All Modes	
Broad Transport Budget	5,384	
Wider Public Finances	413	

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

The Analysis of Monetised Costs and Benefits (AMCB) details are set out in Table 42 and show an overall PVC of the scheme as £5.38m against an overall PVB of £12.00m having allowed for impacts of indirect taxation on the economy and greenhouse gases.

Table 42: Analysis of Monetised Costs and Benefits (AMCB) Table

Analysis of Monetised Cost and Benefits - £000's

Local Air Quality	0
Greenhouses Gases	186
Accidents	341
Economic Efficiency: Consumer Users (Commuting)	5,496
Economic Efficiency: Consumer Users (Others)	2,103
Economic Efficiency: Business Users and Providers	4,286
Wider Public Finances (Indirect Taxation Revenues)	-413
Present Value of Benefits (PVB)	11,999

Analysis of Monetised Cost and Benefits - £000's

Broad Transport Budget	5,384
Present Value of Costs (PVC)	5,384

Overall Impact

Net Present Value (NPV)	6,615
Benefit to Cost Ratio (BCR)	2.2

This table includes costs and benefits which are regularly or occasionally present in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

4.1.3.3 Accidents Benefits

Accident benefits have been calculated using the DfT's Cost and Benefit to Accidents – Light Touch (COBALT) software. COBALT assesses the safety aspects of road schemes using details of the roads and junctions that would be impacted by the scheme. The assessment is based on a comparison of accidents by severity and associated costs across the network (in this case the section of the A51 from Vicars Cross, Chester to Tarvin roundabout, Tarvin). The assessment uses link and junction characteristics, relevant accident rates and costs, and forecast traffic volumes for each link and junction. Default accident rates have been used, and accidents have been calculated for the A51 study area only.

Accident benefits provide a benefit of **£0.34m**. The details are shown in Table 43. The accident benefits largely arise from the removal of the right and straight ahead movements from Littleton Lane to A51 Tarvin Road, and the removal of the right turn from A51 Tarvin Road to Hare Lane. Due to the descoping of the scheme and small reassessment impacts the benefits see a reduction.

Table 43: Accident Benefits

Accident Benefits	£000s
Total Accident Benefits saved by Scheme	341

All entries are in thousands of pounds discounted to 2010 in 2010 prices

4.1.3.4 Journey Time Reliability Benefits

The term reliability refers to variation in journey times that individuals are unable to predict (journey time variability, or JTV). Such variation could come from recurring congestion at the same period each day (day-to-day variability, or DTDV) or from non-recurring events, such as incidents. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects which travellers are assumed to be aware.

The measure of travel time variability is the standard deviation of travel time, and reliability benefits are calculated based on the change in standard deviation of travel time with a transport scheme in place as per the guidance in TAG A1.3. The urban roads calculation has been used.

The journey time reliability benefits have been calculated using the equation:

$$Reliability = -\frac{1}{2} \sum_{ij} \Delta\sigma_{ij} * (T_{ij}^0 + T_{ij}^1) * VOR$$

where:

- $\Delta\sigma_{ij}$ = change in standard deviation of journey time from i to j (in seconds)
- $T_{ij}^0 + T_{ij}^1$ = journey time, without and with scheme, from i to j (in seconds)
- VOR = value of time multiplied by the reliability ratio, where the reliability ratio is set to 0.4 as per TAG Unit A1.3.

The journey time reliability details are set out in Table 44 and show a benefit of £0.6m. The journey time reliability benefits are included in the adjusted BCR calculation.

Table 44: Journey Time Reliability Benefits

Reliability Benefits	£000s
Journey Time Variability Benefits 2020	15
Journey Time Variability Benefits 2030	11
Journey Time Variability Benefits (60 year period)	601

4.1.4 Value for Money Statement

The Value for Money (VfM) assessment of a transport intervention has been designed as a staged process to ensure that a complete and robust analysis is undertaken by the practitioner.

Table 45 summarises the comparative BCR results. The full assessment summary showing the calculation of both BCR's is provided in Table 46.

Table 45: BCR Results

	Results
Initial BCR	2.2
Adjusted BCR	2.3

A VfM statement was produced using the BCR assessment to appraise whether the benefits outweigh the costs. The A51 Tarvin-Chester Improvements Scheme VfM was judged based on the categories below:

- Poor VfM if BCR is below 1.0
- Low VfM if the BCR is between 1.0 and 1.5
- Medium VfM if the BCR is between 1.5 and 2.0
- High VfM if the BCR is between 2.0 and 4.0.

The full value for money statement is included in Appendix E of the FBC.

According to DfT guidance and criteria, the modified BCR of 2.3 for the A51 Tarvin to Chester Improvements Scheme represents High Value for Money. The initial BCR of 2.2 calculated based on transport benefits alone also yields High Value for Money. It should be noted that this assessment has been based on a pessimistic development schedule and has incorporated the Quantified Risk Assessment (**QRA**) at **£1,167,640** and optimism bias at 3%.

In addition to the monetised benefits noted above there are also additional qualitative benefits that cannot be monetised, namely:

- Journey quality will be improved as a result of the scheme, with reduced frustration and fear of potential accidents, and reduced route uncertainty; and
- Severance will be reduced by improving motorised vehicle access to community facilities in Chester from Tarvin.

Table 46: Value for Money Summary for the Preferred Option

	Initial BCR	Adjusted BCR
Present Value of Benefits	11,999	12,600
Present Value Costs	5,384	5,384
BCR	2.2	2.3
Value for Money Category	High	High

4.1.5 Sensitivity Test

Two sensitivity tests have been undertaken:

- Test 1: Increase of scheme costs by 25%;
- Test 2: Reduction of scheme benefits by 25%; and
- Test 3: Increase of scheme costs by 25% and reduction of scheme benefits by 25%.

Table 47 presents the output of the sensitivity tests. It can be seen that for Tests 1 and 2 the BCR is above 1.8 and classified as Medium Value for Money. Test 3 has a BCR of 1.4 which is classified as Low Value for Money, but this is a worst case sensitivity test. These are worse than OBC as there is now a requirement to replace the bridge which has increased the cost of the scheme substantially. However, this will future proof the scheme. Therefore, it can be concluded that the BCR is robust and can account for reasonable changes in costs or benefits.

Table 47: Sensitivity Tests

Item	PVB	PVC	BCR
Adjusted BCR	12,600	5,384	2.3
Test 1	12,600	6,730	1.9
Test 2	9,450	5,384	1.8
Test 3	9,450	6,730	1.4

4.2 Wider Economic Impacts

The Wider Economic Benefits Appraisal carried out for this scheme establishes the key employment and housing development sites that are located near the study area and how these sites could be supported by the highway improvements through alleviating congestion and improving journey times, thus improving labour market access into the city and supporting planned growth in CWAC.

4.2.1 Residential Sites

The Cheshire West & Chester Council Local Plan Strategic Policies (Part One) document demonstrates that there is significant demand for development land around the area. 20 residential sites have been identified in proximity to the scheme which account for 84.6 ha of land available for development. The 2013 Strategic Housing Land Availability Assessment (the most recent publicly available document at the time of writing) and local data for CWAC indicates that this would support 2,790 dwellings, housing 6,417 residents. The Local Plan Part One also proposes 200 new dwellings in Tarvin with an additional 500 in Tarporley, Cuddington and Sandiway, however although this scheme offers potential to unlock housing development along the corridor it is not possible at this stage to state how many of these houses will be dependent upon improvements to the A51.

Considering the travel to work patterns of commuters living around the A51, it is clear that the eastern side of Chester forms part of the 'commuter belt' to the city. While the area in which the

scheme falls does not currently have high levels of this east-west commute, it is immediately located next to an area with a much higher level of commuting. Therefore, there is a possibility that as Chester's economy grows and access to the city centre improves, these residential development sites will become more attractive to developers. However, the extent to which the scheme influences the decision to develop the sites is likely to be fairly low, as there are currently other housing sites closer to the city being brought forward. As such, a low level has been attributed to the economic benefits of the sites to the A51 improvements (in the range 5-10%), so benefits are not overstated. These benefits are as follows:

- 10 to 20 jobs and £433,800 to £864,500 GVA in construction benefits could be attributed to the road improvement scheme as a direct result of the schemes construction and therefore **relate to the construction period only.**
- As an indirect impact of the scheme, £171,840 to £343,680 in council tax could be attributed to the road improvement works, however these will only be generated once new homes are occupied.

Additional information and evidence to support these calculations is detailed in Appendix F, Land Use and Economic Development Report.

4.2.2 Employment Sites

There are two development sites designated for employment in proximity to the A51 Tarvin Corridor. The details of these development sites are shown in the table below. These two employment sites account for 19.8 ha of land available for development.

Table 48: Employment development sites

Map Number	Reference	Site Name	Local Plan Area	Site size (ha)	Planned use
1	TAR/0068	Land south of Heath Green, Tarporley	Tarporley	19.2	Mixed (non resi)
2	TAK/0162	Town House Farm, High Street, Clotton, Chester	Rural	0.6	Employment

Source: CWAC Council

Given that the predominant travel to work pattern on the A51 is in an east-west direction, it is highly unlikely that many commuters will travel in the other direction (i.e. from Chester - with its larger economy - to an area with lower economic activity). Site 1 (the larger of the two identified sites) is accessible via a number of different routes and as such, potential employees at the site are not dependent on the A51 around Tarvin. Given the location of these sites and current access routes, it is not anticipated that the development of these sites can be attributed to the A51 junction improvement scheme and benefits have not been calculated. Nevertheless, there is potential for these sites to be supported by the scheme, as future businesses located there will have good access into Chester potentially enabling them to expand.

4.2.3 Tourism and Retail

The improvements to the A51 will support key sectors, developments, employment and transport opportunities across the region.

The improvements included in this scheme will be taking place on a key eastern corridor into Chester, which will support the visitor economy by improving the reliability and time of trips. Visitors will be able to access Chester's tourism and retail offer more easily, which should subsequently help to increase visitor trips and visitor expenditure and associated multiplier benefits into the local economy.

These proposed improvements to the A51 at Tarvin will also help to improve access to rail services at Chester railway station in the centre of the city. Chester railway station is a regional hub, with links across the North West to Liverpool, Manchester, North Wales and Crewe (which will become a HS2 Hub). Improving access into Chester on the A51 will help people living on the eastern side of the city access opportunities further afield. Finally, as the scheme will improve access into Chester, it will thereby indirectly support key development sites within the city centre (many of which are likely to be connected to the Atlantic Gateway Corridor and the Cheshire Science Corridor Enterprise Zone).

4.3 Social and Distributional Impacts

4.3.1 Social Impact Appraisal

To support the development of the Outline Business Case a Social Impact Appraisal (SIA) has been carried out for the preferred option. This SIA has been carried out drawing on WebTAG Guidance Unit A4.1. It assesses the human experience of the scheme and its impact on social factors. The eight social impacts covered in the WebTAG guidance (Unit A4.1) are:

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

A screening stage was carried out to identify which impacts were relevant to the scheme and which could be assessed at this stage for the OBC. The number of impacts that were relevant to the Scheme were narrowed down at this stage. Option and non-use values and accessibility were scoped out of the SIA due to the scheme being a highways improvement, and these two impacts relate to public transport improvements. Personal affordability assessment was also scoped out due to potential changes in affordability being insignificant due to the scale of the scheme. The following table provides a summary of the SIA analysis.

Table 49: SIA Summary

Impacts	Summary of key impacts	Quantitative	Qualitative	Monetary £(NPV)
Reliability impact on commuting and other users	N/A		-	
Physical activity	Some footpath restrictions during construction. Once operational the footpaths will have been widened which may encourage an increase in pedestrian trips.		Neutral	
Journey quality	Temporary increase in route uncertainty during construction. Once operational there is likely to be a reduction in user frustration and fear of accidents.		Beneficial	
Accidents	Reduction the occurrence of rear-ending accidents at Tarvin	-	Beneficial	-

Impacts	Summary of key impacts	Quantitative	Qualitative	Monetary £(NPV)
	roundabout. Potential increase in accidents associated with an increase in new trips.			
Security	There are not likely to be any impacts on security. Street lighting and landscaping will be replaced.		Neutral	
Access to services	N/A		-	
Affordability	N/A		-	
Severance	No severance during construction. Reduced severance once operational, creating an improved connection to community facilities in Tarvin and Chester. The scheme will improve footways and introduce a dropped crossing to assist mobility impaired residents.		Beneficial	

Source: Mott MacDonald

This assessment demonstrates that the scheme could be beneficial to journey quality as although there will be a temporary increase in route uncertainty during construction, once operational the scheme is likely to produce a reduction in user frustration and fear of accidents. Severance is also likely to be reduced once operational, creating an improved connection to community facilities in Tarvin and Chester and there will be no severance during construction. A detailed analysis of the SIA is included as Appendix H.

4.3.2 Distributional Impact Appraisal

A Distributional Impact Appraisal (DIA) has also been carried out in line with WebTAG guidance Unit A4.2, proportionate to the size of the scheme and the availability of data. It assesses the variance of the scheme's impact across different social groups, including low income, children, and older people. The impacts are presented in maps and DIA tables to show whether the net benefits or disbenefits of a scheme are disproportionately impacting the relevant groups. Full details are provided in Appendix I.

An initial screening process was carried out which examined the eight impact areas identified in WebTAG A4.2 and determined whether they needed to be appraised further. The eight impact areas are:

- User Benefits (Non-Business);
- Noise;
- Air Quality;
- Accidents;
- Security;
- Severance;
- Accessibility; and
- Personal Affordability.

The Distributional Impact Assessment conducted for the OBC submission has been progressed to stage 2C of the DIA guidance document. The exception to this is the user benefits chapter which has been quantitatively assessed using the guidance in TAG unit A4.2.

The impact area for the user benefits DIA is the same as the core modelling area in the Chester Transport Model. The analysis shows that user benefits are largely experienced by the

population that are located within the least deprived quintiles. The proportion of the population in these quintiles is also higher, but the proportion of the benefits is disproportionately higher in comparison.

Table 50: DIA Summary

Impacts	Sub Impacts	Summary of key impacts	Distributional 7-pt scale/ vulnerable grp
Environment	Noise	Not possible to assess the DIA of noise at this stage	Scoring not available at this stage
	Air quality	Not possible to assess the DIA of air quality at this stage	Scoring not available at this stage
Social	Commuting and other users	The user benefits are largely experienced by the population that are located within the least deprived income quintiles	Uneven distribution
	Accidents	The number of casualties is below the minimum threshold required for an assessment	Not appraised
	Security	N/A	Not appraised
	Access to services	N/A	Not appraised
	Affordability	N/A	Not appraised
	Severance	Partial footpath severed during construction. Improved access to facilities once operational. Disabled people most likely to be affected during the construction stage	Scoring not available at this stage

Source: Mott MacDonald

Security, Accessibility, and affordability have been scoped out of the DIA. Security impacts have been scoped out due to this relating to changes in public transport stop infrastructure and how this relates to a traveller’s perception of security, whilst accessibility impacts relate to changes in public transport routes and service frequencies. None of these are anticipated at this stage. As per the SIA, affordability issues have been scoped out due to potential changes in affordability being insignificant due to the scale of the scheme.

4.4 Environmental Constraints

A high-level assessment has been undertaken in order to identify the potential environmental risks and constraints along the A51 between Tarvin and Chester and in the vicinity of the route within 500m of the site boundary. The A51 between Tarvin and Chester and the 500m buffer zone are outlined in Figure 46. Full details of this assessment can be found in Appendix G.

Figure 46: Environmental Constraints Assessments Study Extents



Source: Mott MacDonald

Whilst the assessment identified a number of constraints such as Grade II listed buildings and historic landfill within 500m of the site boundary, these were minor issues and it is expected that these can be appropriately avoided or mitigated as the scheme develops.

The key constraints identified within the study boundary were potential flood risk and a Noise Important Area which have therefore been further considered at FBC stage.

A high-level Flood Risk Assessment has been carried out due to part of the study area being identified within a Flood Zone 3. The source of the flood risk is the River Gowy which flows south to north under Stamford Bridge where works will be carried out to increase capacity along the route. However, the Flood Risk Assessment shows that the potential risk of flooding in this area would have a low impact to the scheme due to the raised level of the A51. Further details of this assessment can be found in Appendix P.

Three Noise Important Areas were identified within the study boundary along the A51 and either side of the A41/A51 junction. Due to the nature of the scheme and distance to residential properties, the impact on noise levels is expected to be minimal. No monitoring is required at this stage but will be carried out in the unlikely event that noise levels exceed 68db for local residents. Noise will be assessed at a reception point located 1m in front of the most exposed property as recommended by Defra. Further details of noise monitoring can be found in the appended Monitoring and Evaluation Plan (Appendix J).

The Environmental Constraints Report submitted at OBC stage also recommended further surveys to identify specific constraints or risks proposed by ecological features and protected species. Based on this recommendation the following surveys have been undertaken:

- An Ecological Scoping Report identifying protected habitats and species and further survey requirements

- A specific Great Crested Newt Survey including recommendations for action
- A specific Tree Report including recommendations for action
- A specific Badger Report without recommendations for action

A summary of results of these surveys is set out in Appendix R.

4.5 Appraisal Summary Table

The Appraisal Summary Table (AST) provides details of the impacts of the scheme. These include both qualitative and quantitative benefits as required by DfT guidance. The quantitative benefits are given in the AST in Appendix O. The qualitative benefits are given in Table 51 and show that the scheme provides the following qualitative impacts:

Table 51: Estimated Impacts of the Scheme in the AST

Impacts	Sub-impacts	Estimated Impact	Positive/Negative (7pt scale)
Economy	Business users & transport providers	N/A	Moderate Benefits
	Reliability impact on Business users	N/A	Slight Benefits
	Regeneration	N/A	Moderate Benefits
	Wider Impacts	Low	Slight Benefits
Environmental	Noise	Low	Neutral
	Air Quality	Low	Slight Benefits
	Greenhouse gases	Low	Slight Benefits
	Landscape	Low	Neutral
	Townscape	Low	Neutral
	Heritage of Historic resources	Low	Neutral
	Biodiversity	Low	Neutral
	Water Environment	Low	Neutral
Social	Commuting and Other users	High	Moderate Benefits
	Reliability impact on Commuting and Other users	Medium	Moderate Benefits
	Physical activity	Low	Slight Benefits
	Journey quality	Low	Slight Benefits
	Accidents	Low	Slight Benefits
	Security	Low	Neutral
	Access to services	Medium	Moderate Benefits
	Affordability	N/A	N/A
	Severance	Medium	Moderate Benefits
Option values	N/A	N/A	
Public Accounts	Cost to Broad Transport Budget	Low	N/A
	Indirect Tax Revenues	Low	N/A

5 The Financial Case

Section Summary

The Financial Case comments on the affordability of A51 Tarvin-Chester Improvements Scheme, its funding arrangements and technical accounting issues. The case presents the financial profile in terms of how and when the funding will be spent on the different elements of the scheme up to the year 2024/25.

The total estimated scheme cost is £7,029,726 and includes construction costs, risks, statutory undertakers works and land acquisition costs. This also includes the application of inflation at £264,102. These costs have been prepared by Balfour Beatty.

£242,832 has also been included in the scheme costs to enable robust monitoring and evaluation of the scheme, in accordance with the CWLEP's Assurance Framework. This covers both pre-construction and post construction activities.

The total amount of funding required for the scheme is £7,029,726. Optimism Bias of 3% has been applied for Economic Appraisal purposes but does not form part of the funding ask and is therefore not included in the Financial Case which sets out the level of funding needed and where that funding will originate.

At OBC stage it was agreed that the CWLEP would fund £3,617,22 (67%) of the estimated scheme cost of £5,398,839 with CWAC Council providing a match contribution of £1,741,000 (32.2% of the overall construction and delivery cost of the scheme). The CWLEP'S conditional offer letter granted a maximum LGF allocation of £3,663,000 for the A51 Tarvin to Chester Scheme. There was also an amount of £40,617 to be sought from s106 agreements.

As the scheme estimate is now £7,029,726, CWAC will fund the additional amount required (approximately £1.63m) from various other funding sources.

This section of the FBC summarises the cost of the scheme and how costs are broken down with and without the application of risk allowance. These costs have been prepared by Balfour Beatty. The financial case also identifies how the scheme will be funded and how the cost of the scheme is expected to be spread out from the approval of funding to completion of the scheme.

5.1 Assumptions

Key assumptions made with regards to deriving scheme costs include:

- Construction will begin in 2019/20 and be completed in 2021/22.
- An opening year of 2021.
- Monitoring and Evaluation activities within the first quarter of the scheme programme (2020/21) will form part of the funding ask. Activities undertaken post scheme completion through to 2024/25 will be covered by CWAC.
- In accordance with WebTAG guidance, optimism bias is not included in the Financial Case cost breakdown; it is only included in the Economic Case for the purposes of economic appraisal and does not form part of the funding request.

5.2 Cost Breakdown

Detailed costs of the A51 Tarvin-Chester Improvements Scheme have been prepared by Balfour Beatty and are presented in this section. The cost is considered proportionate and affordable to the scale of the issues identified in the Strategic Case and the predicted benefits of the scheme assessed in the Economic Case.

At this stage of the project, the cost has been developed as a target cost under the SCAPE framework (see the Commercial Case section for further details on this procurement route). This is an all-inclusive cost, however, it is anticipated that some of the risks identified can be reduced through further surveys and pre-construction assessments. This will enable a refined cost to be established prior to construction commencing.

5.2.1 Base Construction Costs

The estimated base construction cost for the scheme is £5,808,086 excluding risk and post construction monitoring and evaluation. The cost includes for construction costs, Statutory Undertakers diversions, land acquisition, detailed design fees and pre-construction monitoring and evaluation costs. Construction costs include for all construction items as well as preliminaries, overheads and construction risks. Inflation is also included in this total.

The base year for the cost estimates is Q4, 2018 and the table below provides details of how the total base cost for construction has been derived.

Table 52: Cost Breakdown

	A55/ Hare Lane	Stamford Bridge	Tarvin Roundabout	Total
Pre-Construction Costs				
Pre-Construction Works	£12,713	£295,551	£35,834	£344,098
Detailed Design	£14,988	£348,445	£42,247	£405,680
Statutory Undertakers Diversions		£250,000		£250,000
Site Clearance (Trees/ Vegetation)		£10,000		£10,000
Land Acquisition		£92,150	£20,000	£112,150
Monitoring & Evaluation (pre-construction)	£6,977	£162,191	£19,665	£188,832
Sub-Total A	£34,678	£1,158,337	£117,745	£1,310,760
Construction Costs				
Works Cost	£120,464	£2,800,517	£339,543	£3,260,524
Preliminaries	£35,937	£835,468	£101,295	£972,700
Inflation	£9,758	£226,841	£27,503	£264,102
Sub-Total B	£166,159	£3,862,826	£468,341	£4,497,326
Base Construction Costs Total (A+B)	£200,837	£5,021,164	£586,085	£5,808,086
Project Risk	£43,140	£1,002,905	£121,595	£1,167,640
Monitoring & Evaluation (post-construction)	£1,995	£46,381	£5,623	£54,000
Total	£245,972	£6,070,450	£713,304	£7,029,726

Source: Mott MacDonald

Since the submission of the OBC, the scheme costs have increased by approximately £1.63m. The main reasons for the increase are as follows:

- Proposals at the Stamford Bridge junction now incorporate a new bridge which will be linked to the existing bridge effectively forming a single structure over the River Gowy. The previous proposals allowed for widening of the existing bridge only. As highlighted previously in this report, this was a decision made by CWAC to ensure that the future operation of the A51 is not impacted when the existing bridge is replaced in approx. 50-60 years-time;
- It was agreed with CWAC that the extents of surfacing to the existing cycle/ footway should be extended at all 3 junctions to ensure a more continuous facility is provided. An additional crossing point with dropped crossings has also been included at the eastern end of the scheme;
- It was agreed with CWAC that the extents of carriageway surfacing (including kerb replacement) should be extended at all 3 junctions to accommodate the above works although the extents have since been modified as part of a descoping exercise;
- Costs have been included for ecology works to cover surveys and planned mitigation measures;
- An allowance for full replacement of street lighting including cabling works has been included within the footprint area of each junction improvement;
- Additional drainage works have been included at the Stamford Bridge junction to allow for a new carrier drain and outfall including an oil interceptor;
- Risk allowance has increased due to the different calculation method undertaken by Balfour Beatty at detailed design stage to determine project risks; and
- Procurement costs are higher due to the use of the Scape framework.

A Risk Register has been produced by Balfour Beatty setting out all project risks and is provided in Appendix K. The total value of risks amounts to £1,167,640.

Balfour Beatty have also included an allowance for inflation in their costs in the sum of £264,102. This is based on standard inflation rate data forecast from BCIS general civil engineering indices.

Table 53 sets out revised costs inclusive of project risks and post monitoring and evaluation costs (pre-construction monitoring and evaluation is included in the base cost).

Table 53: Full Cost Summary

Base Cost	£5,808,086
Risk	£1,167,640
Monitoring & Evaluation (post construction)	£54,000
TOTAL	£7,029,726

Source: Mott MacDonald

The total funding required for construction and delivery of the scheme is **£7,029,726**, however, including VAT (£1,405,945 @ 20%), the total scheme cost is £8,435,671. All VAT is recoverable to CWAC.

5.3 Maintenance Costs

WebTAG Unit A1.2 (Scheme Costs) states that traffic-related maintenance and renewal costs should also be considered in addition to capital investment costs. The potential financial costs of ongoing maintenance include:

- Resurface roads
- Footways slurry seal

- Gritting
- Road sweeping
- Outfall and Gully Cleaning
- Structure Inspections, Repainting and bearing replacement,
- Fencing repairs and replacement
- Road restraint systems replacement
- Road Sign Cleaning
- Grass cutting and planting thinning

Maintenance costs are estimated to be an additional £35,000 over 20 years and will be covered by the Council's own maintenance budget; as such they do not form part of the total scheme cost.

5.4 Cost Allowance for Monitoring and Evaluation

An amount of £242,832 has been allocated to ensure that the scheme can be monitored and evaluated both during delivery and post completion in line with the requirements of the CWLEP's Assurance Framework. This amount includes ecology surveys along with noise and air quality assessments to be undertaken

Monitoring and Evaluation, as detailed in Appendix J will cover monitoring during scheme delivery to ensure the project is being delivered on time, to specification and to budget, and one and four years post completion to evaluate the extent to which scheme outcomes, impacts and benefits have been realised.

The funding allowance sought, as outlined within this section, will cover the costs of monitoring and evaluation throughout the construction of the scheme. Any additional monitoring and evaluation carried out after the scheme delivery will be delivered through CWACs own budget.

5.5 Implications of Potential CPO Issues

At the time of writing no formal requirements for CPO's have been identified and CWACs Property Team is progressing with land acquisition through private negotiations, in principal all landowners are willing to sell the land required to mobilise the scheme. All land owners have appointed land agents, with land acquisition negotiations being positive. Dialogue to acquire the land at Tarvin has been agreed subject to contract exchange, with positive dialogue underway between parties to agree the extent and value of the land required, temporary land requirements during construction and costs. Again, negotiations are positive, although no deal has yet been agreed between all parties. The land owner has been notified that the use of CPO is at the Council's disposal to acquire the remaining land around Stamford Bridge.

CWAC are prepared to engage in a CPO process should negotiations stall, and this has a potential cost implication of between £50,000 and £112,000. Land around Stamford Bridge requires negotiations to be finalised, however both the land owners are engaged and land agents appointed. The upper cost level has been included in the overall scheme cost analysis. As the engagement in a CPO process has been identified in the work programme (set out in Appendix N) this can also be accommodated within the delivery timescales. Therefore, acquiring third party land will not affect the overall delivery of the scheme.

5.6 Funding Arrangements

This section sets out how much funding is being sought through funding from the CWLEP and how much is being contributed by CWAC Council. The total scheme cost for construction and delivery is £7,029,726. The proposed funding mix, is set out in Table 54.

Table 54: Scheme Funding

Revised scheme cost	CWLEP LGF as per conditional offer	Council LGF match agreed 2016	Third Party (£106)	CWAC LTP ITB	Littleton Lane/Hare Lane Saighton Camp S106
£7,029,726	£3,663,000	£1,741,000	£40,617	£1,225,726	£359,383

Source: CWAC

A full breakdown of costs and spending on an annual basis is provided in Appendix L. This is summarised in Table 55. Funding amounts at OBC stage have been retained with the additional amount required (approx. £1.63m) added as an additional line in the table. CWAC will fund this through various resource streams.

Table 55: Funding Breakdown

	Financial Year	2016/17	2017/18	2018/19	2019/20	2020/21	2021/25	Total
		£ '000 Actuals	£ '000 Actuals	£ '000 Actuals	£ '000 Forecast	£ '000 Forecast	£ '000 Forecast	£ '000 Forecast
Original Funding	LGF (CWLEP)	0.005	0.094	0.147	0.624	2.793	0.000	3.663
Approved Full Council 2016 (OBC Stage)	LTP	0.003	0.046	0.073	0.780	0.759	0.040	1.701
	Section 106	0.000	0.000	0.000	0.040	0.000	0.000	0.040
Additional Funding	Additional LTP required	0.000	0.000	0.000	0.643	0.622	0.000	1.265
Approved Full Council 2019 (FBC Stage)	Section 106	0.000	0.000	0.000	0.000	0.360	0.000	0.360
	TOTAL	0.008	0.140	0.220	2.087	4.534	0.040	7.029

Source: CWAC

At OBC stage, the estimated scheme cost was identified as £5,398,839 with the CWLEP funding £3,617,22 of this (67%). The CWLEP's conditional offer letter granted a maximum LGF allocation of £3,663,000 for the A51 Tarvin to Chester Scheme. The remaining cost (£1,741,000) was to be funded by CWAC as match contribution, equating to 32.2% of the OBC scheme cost. This was to be funded through the Council's own capital resources including; Integrated Transport Block, Maintenance Block allocation, the Council's own capital reserves while seeking third party funding contributions towards the scheme from Community Infrastructure Levy (CIL) for the A51/A54 Tarvin roundabout, Barrow Lane. Section 106

contributions amounting to £40,617 (0.8%) was also to be sought to fund sustainable transport improvements at the Hare Lane/Littleton Lane junctions.

Funding levels to be contributed by the CWLEP as set out in Table 55 are allocated at 67% of total costs for the years 2016/17, 2017/18 and 2019/20. For the years 2019/20 and 2020/21 funding is reduced slightly to a rate of 51.4% of total scheme costs.

As the OBC has been developed, the updated cost estimate is now £7,029,726 at the FBC stage with the additional cost of £1,630,887 to be funded by CWAC from various approved funding sources, as outlined in Appendix W.

Appendix M and W provide details of Executive Board papers highlighting that the Cabinet and Council acknowledge the requirement for local contribution match funding as part of the submission to the Local Growth Fund for their schemes. The Section 151 Officer signed the submission to the CWLEP. The paper to Full Council in July 2016 and July 2019 (provided in Appendix M and Appendix W) would not have been able to proceed had the Section 151 Officer not been supportive of the bid.

5.6.1 Impact of Funding Not Coming Forward

CWAC and CWLEP have both identified the A51 strategic road corridor as a key priority for enhancing connectivity, improving capacity while reducing congestion to key economic centres, through dedicated adopted policies. In the event that the FBC for the A51 Tarvin - Chester Improvements does not receive conditional approval from the CWLEP, the Council would seek alternative future funding streams to deliver the scheme, including (but not an exhaustive list); future Department for Transport congestion pinch point Funding, other government grants, third party contributions through S106 Agreements and Community Infrastructure Levy (CIL) funding and future growth deals. As outlined below in section 5.6.2, the Council's own local contribution to deliver this scheme has already been approved and secured.

5.6.1.1 Cost Overruns

Understanding that funding from the CWLEP which covers construction, delivery, monitoring and evaluation cannot exceed £ 3,663,000 as per the conditional offer letter. CWAC will cover any additional costs the scheme may encounter to ensure its completion.

5.6.2 Council Approvals

The client team for this project, have already secured and received Cabinet and Full Council approvals (in June and July 2016) to progress this scheme at risk, using Council resources to secure third party funding, with commitment to match and accept grant funding to deliver the A51 Tarvin-Chester Improvement Scheme, subject to a successful bid submission. The decisions, approved by the Council include (refer to Appendix M):

- To approve submission of the Local Growth Fund 3 (LGF) funding bid via the Cheshire and Warrington Local Enterprise Partnership (CWLEP).
- To approve the use of Council funding as match to draw down the Local Growth Fund 3 monies and ring fence the identified funding for delivery of the proposed schemes.
- To approve the acceptance of the Local Growth Fund 3 funding for all or such bids as are successful, subject to compliance with the Finance and Contract Procedure Rules (External Arrangements) and approve incurring the total project expenditure as outlined in Appendix 1.
- To authorise the Director of Governance to conclude all necessary legal documentation arising from funding approvals.

This scheme has gained programme entry, and conditional approval from the CWLEP upon receipt of the Outline Business Case. A conditional offer letter has been issued by the CWLEP and signed by the Council, outlining the grant parameters. The Full Council Paper in July 2016 facilitates this process (refer to Appendix M).

The Council's Directors' Management Team have also approved the revised budget position for the scheme, on the basis that the scheme will continue to be reviewed and value engineered to help reduce costs accordingly. i.e. reduce number of number kerbs, area of resurfacing. This was approved at the Directors' Management Team Capital Project Board meeting on Friday 7 December 2018.

The above process adheres to the Council's Code of Financial Practice. This establishes the fundamental principles on which the conduct of the organisation's financial affairs are based. A revised set of finance procedure rules were approved and adopted by the Council in October 2010.

The code of practice affects any plans to seek external funding sources for projects or any funding bids being prepared. All external funding bids must be in accordance with CWAC Council policy and have secured all resources necessary for a successful project to take place. Schemes over £1m require Full Council Approval. The A51 Tarvin – Chester Improvement Scheme received Full Council Approval in July 2016 (see Appendix M) to submit the LGF bid, secure and approve the match and accept the allocation, subject to a successful business case.

Through the development of the FBC, funding requirements have increased beyond the levels agreed at OBC stage in 2016. CWAC has since secured and received Cabinet and Full Council approval (Cabinet on 10th July and Council on 18th July 2019) to progress the approved revised FBC scheme budget of £7.029m, noting the additional £1.63m match funding required since Council approval on 21 July 2016, and has ring fenced the additional £1.63m required from Local Transport Plan funding allocations in the years 2019/2020 and 2020/2021 necessary for the delivery of the revised A51 Tarvin to Chester Improvement scheme, as set out in Tables 54 and 55. (see Appendix W)

The same reports also approved the authorisation and expenditure of using compulsory purchase powers and to make such Compulsory Purchase Order(s) as necessary under sections 239, 240 and 250 of the Highways Act 1980 and the Acquisition of Land Act 1981 for the acquisition of land and rights over land required for the A51 Tarvin to Chester Improvement scheme (see Appendix W).

6 The Commercial Case

Section Summary

This section outlines the Commercial Case for the A51 Tarvin to Chester Improvements Scheme and provides evidence on the commercial viability of the proposal and the procurement strategy that will be used to engage the market. Here, risk allocation and transfer, contract timescales and implementation timescales, capability and skills of the team delivering the project and personal implications from the proposal are all documented.

The Commercial Case requires the A51 Tarvin-Chester Improvements Scheme to meet a number of strategic objectives and outcomes in order to deliver a scheme that ensures best value for highway improvements along the corridor within available funding and at low risk.

A number of procurement options were considered for the A51 Tarvin to Chester Improvements Scheme to assess the various advantages and disadvantages to select the most appropriate method to deliver the scheme. Following consideration of various procurement options, the scheme will be delivered through the SCAPE National Civil Engineering and Infrastructure Framework 2015.

A risk analysis has been undertaken for the preferred option to assess any potential strategic, financial, environmental and infrastructure risks and a full risk register is appended within Appendix K. The Commercial Case identifies the key risks from the risk register to demonstrate how the responsibility of these risks are shared between the public and private sector.

6.1 Output Based Specification

The A51 Tarvin-Chester Improvements Scheme will deliver the following infrastructure outputs:

- Amendments to the central island at Tarvin Roundabout and additional carriageway markings added to the A54 approach;
- Signal and lane marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an additional westbound lane at the Stamford Bridge junction through carriageway widening to the south, with a long merge for westbound traffic exiting the junction;
- A new bridge will be constructed immediately adjacent to the existing bridge such that the two bridges are linked giving the appearance of a single structure. A kerbed island will be in place between the two bridges; and
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction to reduce rear end shunts, additional delay and 'rat running'.

6.2 Approach to Demonstrate Commercial Viability

In terms of commercial viability, the A51 Tarvin-Chester Improvements Scheme needs to deliver the scheme within available funding. There is a fixed amount of funding available from the CWLEP and developer, with the remainder being contributed by CWAC. All risks on cost overrun remain with CWAC. As such CWAC need to:

- Deliver the scheme in accordance with the budget, timescales and specifications noted in Section 7.3 of the Management Case.
- Ensure continued engagement with contractors and stakeholders throughout planning and development of the full major scheme business case through to scheme delivery to ensure the scheme remains valid, current and viable.
- Deliver highway capacity improvements within construction design standards that will be defined within the future contract with construction providers.
- Reduce risk to a level that is as low as reasonably practicable by obtaining contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve outturn certainty thereby reducing risks.

6.3 Contract Procedure Rules (CPR's)

Procurement is an integral part of the project management process. The Council's procurement activities are governed by Contract Procedure Rules (CPR's), which are mandatory and comply with European legislation requirements. The requirements are determined by the value of the purchase/contract in total, not by each transaction. The CPR has set threshold levels for which there is guidance for each:

Thresholds for goods and services:

- CPR's £0 - £24,999
- CPR's £0 - £99,000
- CPR's £25,000 - £100,000
- CPR's £100,000 - Below OJEU
- CPR's £164,176
- £589k+

Consultants fees to date in business case development and preliminary design are currently at a level where the Councils Procedure Rules for contract over £164,176 are applicable meaning this is an OJEU level scheme.

6.4 Procurement Strategy

As this is an OJEU level scheme, procurement options for consideration fall into the following categories:

- Open Tender,
- Restricted Tender or
- An approved Framework that can be utilised.

6.4.1 Procurement Options

Several procurement options were considered within the above categories for the A51 Tarvin - Chester Improvements Scheme, these are set out in Table 56: Alternative procurement options, alongside the advantages and why they were discounted.

Table 56: Alternative procurement options

Option	Advantages	Why discounted
Open tender (OJEU procurement)	<ul style="list-style-type: none"> ● A large amount of flexibility is present with this option as CWAC can determine the contractor requirements and award criteria. ● High level of competition leading to competitive rates and added value proposals 	<ul style="list-style-type: none"> ● A full OJEU procurement procedure would take a significant amount of additional time post-business case approval.
Design and Construct	<ul style="list-style-type: none"> ● Established forms of contract are available. ● Risks can be transferred to the contractor ● Less scope for variations in design 	<ul style="list-style-type: none"> ● Resource heavy due to the detailed approvals required. ● Contractor risks are higher and may raise the price of the contract.
Earlier Contract Involvement	<ul style="list-style-type: none"> ● Improved risk management and buildability through early contractor involvement ● Risks can be transferred to the contractor ● Early interception of the contractor involvement 	<ul style="list-style-type: none"> ● A higher level of certainty is required over the schemes funding before a contractor can be involved ● Involves open book cost management and in-house skills to manage ● Target cost for the main construction works is generally negotiated rather than competitively tendered, which may impact on the value for money of the construction contract.
Restricted Tender using a Supplier Questionnaire	<ul style="list-style-type: none"> ● Limits the request for tenders to a select number of suppliers 	<ul style="list-style-type: none"> ● Resource heavy ● Can often lengthen procurement timescales
SCAPE national civil engineering and infrastructure framework 2015	<ul style="list-style-type: none"> ● Nationally competitively tendered framework on fixed overheads, profit and preliminaries basis; ● SCAPE procures a significant volume of projects and services enabling the framework to command highly competitive and fixed rates. ● Strong balance of risk, control and cost certainty enabling good value for money. ● Low-risk and established route to market. ● Removes the need for CWAC to conduct its own procurement processes as the SCAPE framework is already in place, with Balfour Beatty as the designated supplier ● Would allow Balfour Beatty to be engaged at each stage but does not preclude CWAC from not progressing through each stage of the SCAPE Framework. ● Flexibility to place scheme on hold within SCAPE and progress with the project via other procurement frameworks should this be required. 	<ul style="list-style-type: none"> ● This procurement option has been taken forward
Warrington Borough Council, Transportation and Public Realm Consultancy Services Framework	<ul style="list-style-type: none"> ● A group of shortlisted suppliers can offer fewer procurement risks than open tender. ● All providers have pre-qualified and meet minimum standards ● Possibility to appoint delivery team used for stages 0-2 and maintain project knowledge 	<ul style="list-style-type: none"> ● Requires CWAC to conduct own procurement process when other frameworks already have contractors in place
Mini competition among suppliers on the North-West Construction Hub Framework	<ul style="list-style-type: none"> ● A group of shortlisted suppliers can offer fewer procurement risks than open tender. ● All providers have pre-qualified and meet minimum standards ● Standardised procurement documents could offer time and cost savings on procurement exercise 	<ul style="list-style-type: none"> ● Any cost savings from a mini competition are deemed unlikely to be high enough to warrant the lengthier procurement period compared to the use of the SCAPE framework.
Other open framework agreements	<ul style="list-style-type: none"> ● Various consultants can be used to provide multi-disciplinary technical advice ● This framework is widely used by CWAC for the initial stages of project development. 	<ul style="list-style-type: none"> ● There is absence of a single framework to provide a full range of service

Source: Mott MacDonald

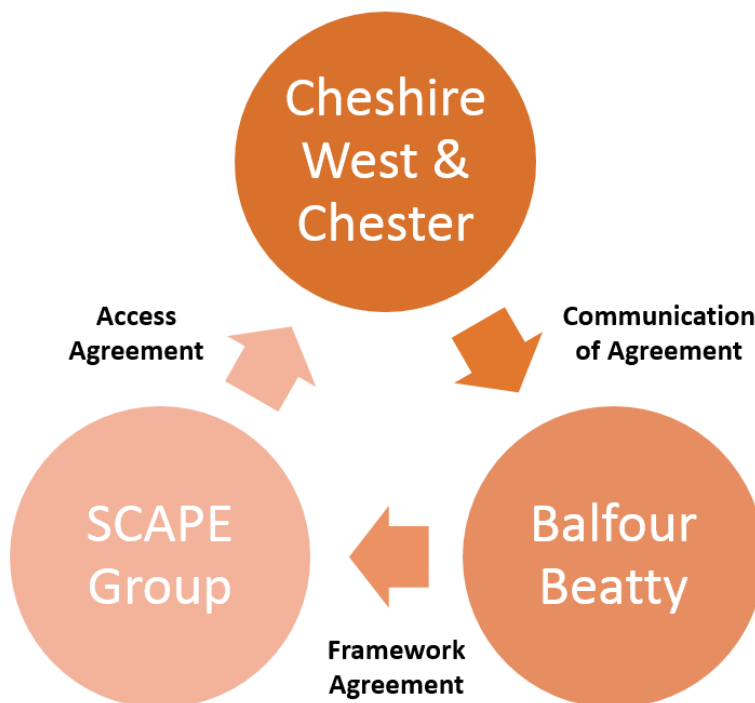
There are also other options such as negotiated and competitive dialogue options, however these can be lengthy procurement routes and the timeframe for delivery of the scheme is restricted. For these reasons they have not been considered further.

6.4.2 Preferred Procurement and Payment Method

The national SCAPE National Civil Engineering and Infrastructure framework has been selected as the procurement method for the delivery of the A51 Tarvin to Chester Improvements scheme. Confirmation of procurement approval is attached as Appendix U. Balfour Beatty is the current appointee to the civil engineering framework lot.

The schematic below demonstrates the overall mechanisms to facilitate the use of SCAPE:

Figure 47: SCAPE Mechanisms



Source: Mott MacDonald

The framework allows project inputs to be staggered across three main gateways including:

1. Feasibility stage - provision of support relating to the development of feasibility design, costs, QRA and other up-front design works. Balfour Beatty provides this through the framework contract at zero cost.
2. Pre-construction stage - Balfour Beatty needs to be formally engaged at this stage, appointed to take forward all the work necessary to produce a target (contract) price.
3. Construction stage – a further formal appointment through the SCAPE framework where the construction contract is signed and the project taken on site and through to construction completion.

The SCAPE Framework has been selected as the preferred option as it possesses advantages that other alternative procurement options fail to display. The framework provides a strong balance of risk, control and cost certainty. Thus, overall providing good value for money. The following points illustrate how SCAPE provides Value for Money.

- The level of all SCAPE Framework Partners profit, overheads, people costs are tightly regulated within the specific Scape Framework and cannot be breached. These costs are visible within the overarching Framework Agreement.
- As SCAPE offers single provider Frameworks, all expensive and time consuming tender processes (OJEU, Mini Comp. Multi Provider Frameworks) are negated.
- As SCAPE offers single provider frameworks, early engagement with the contractor is enabled, thus enabling and establishing a collaborative and consultative partnership with the client that allows the project to be budgeted, programmed, time lined, costed and agreed together.
- Any Project Feasibility Study required is free to the client under SCAPE. All SCAPE contractors are happy to take this risk.
- All SCAPE processes are open book and always visible to the client. Software is available which can be accessed 24/7 by the contractor to keep track of the scheme.
- All Frameworks are underpinned by the NEC Form of Contract (NEC training is available at no cost).

To evidence this, 99% of projects procured through SCAPE are completed on time and to budget.

6.5 Payment Mechanism

The SCAPE Framework's contract value for the delivery of the scheme will be contained in the contract between CWAC and Balfour Beatty. This would be completed once full funding from CWAC and the CWLEP has been agreed.

Payments will be made via the NEC3 contract. No costs shall be payable by CWAC to Balfour Beatty in respect of any work carried out or services provided by the Contractor during the Feasibility Stage, other than the cost of any surveys requested by the Employer. Balfour Beatty are paid monthly and in return detailed invoices in accordance with the terms and conditions of the contract are submitted each month. Payment would be processed between CWAC and Balfour Beatty for the agreed services.

Funding provided by CWLEP will be filtered through to CWAC who would then pay Balfour Beatty. Sufficient evidence of the expenditure on valid scheme delivery will be provided to CWLEP by Balfour Beatty.

6.6 Pricing and Charging Mechanism

The SCAPE framework includes two main payment areas:

- Contractor and their agent payments
- SCAPE Procure Management Team payments

The fee for using the SCAPE framework is set at 0.5% of the total contract value (0.25% at Project Order; 0.25% at Delivery Agreement). The payments direct to the contractors or contractor's agents are determined based on fee quotations or the target contract cost. These costs have been accounted for within the FBC and are included within the total scheme costs values.

The Council have agreed a gain share/pain share incentive mechanism as part of the contract. This process can help ensure costs are kept to a minimum and benefits are shared equally among parties. The actual costs will be compared with the target cost and savings, or over expenditure, will be shared between CWAC and the contractor.

6.6.1 Contract Management

The Project Board including the Commissioning Lead and Strategy Lead will primarily manage the contracts with Balfour Beatty under the SCAPE framework, whereby the Project Delivery Manager will directly manage the day to day activities of the Construction Team. The Senior Responsible Officer for the scheme is Charlie Seward, Strategic Director. The Project Delivery Manager will provide continuity from scheme development, through to detailed design, construction and final account settlement. CWAC as the planning authority will monitor the construction works to ensure any specified conditions are adhered to by the contractor. The project teams' structure and responsibilities are outlined in the Management Case.

6.6.2 Procurement Timescales

In accordance with the Contract Delivery Programme set out in Appendix N, Balfour Beatty were procured in October 2018 under the SCAPE framework to support the design and construction elements of the scheme. Mott MacDonald will be responsible for producing the scheme designs under the management of Balfour Beatty.

6.7 Statutory and Other Consents

6.7.1 Traffic Regulation Orders (TROs)

The following TROs will be required for the implementation of this scheme:

- Right turn ban from Littleton Lane onto the A51 Tarvin Road;
- Right turn ban from the A51 Tarvin Road into Hare Lane; and
- Relocation of existing 50mph speed limit to the eastern approach of the Barrow Lane signal controlled junction.

6.7.2 Land Acquisition

Land acquisition will also be required in order to carry out improvements at the A51/Barrow Lane Junction. The following land acquisition will be required:

- Existing farmland to the south of the A51 Tarvin Road at the Barrow Lane signal controlled junction to accommodate carriageway widening. CWAC are currently in discussions with two landowners regarding the purchase of land required.

There is a potential risk that a CPO process will be required to acquire third party land as CWAC are still in discussion with landowners. However, this risk has been accounted for within the scheme costs and timescales for delivery. CWAC have already undertaken a number of discussions with both landowners which have been positive with land agents appointed for both. It is expected that the need for a CPO process is unlikely.

6.7.3 Environment Agency (EA) Consents

Further discussions with the EA will also be required in relation to works at Stamford Bridge to obtain their approvals. However, through design work undertaken so far and included within the FBC submission package, the following can be confirmed:

- The impact of the scheme on the existing flood plain south of Stamford Bridge has been found to be negligible (see Flood Risk Assessment in Appendix P);
- The new linked bridge over the River Gowy will be similar to the existing bridge (height above river, set back of bridge supports) and will not impact on the flow of the river; and
- The existing drainage outfall flow into the river will be maintained at the same rate for the proposed scheme. A petrol interceptor will also be included as part of the scheme.

Officers have been in close dialogue with EA on a number of issues and therefore this is not envisaged to be a problem at this stage.

Ecological surveys have also been carried out to assess any specific environmental constraints associated with this element of the scheme and identify areas where further assessment is required.

6.7.4 Planning Approval

Proposals for the new bridge over the River Gowy will result in a new linked bridge effectively forming a single structure. Planning approval will therefore not be required. The full scheme can therefore be deemed as permitted planning development. Evidence of this provided in Appendix V through a letter from CWAC Planning which confirms the scheme is 'not considered to be EIA development'.

6.8 Risk Analysis and Transfer

A detailed risk register analysis has been undertaken for the preferred option to assess any potential geotechnical, environmental, planning and programme risks. The risk register in Appendix K details the full quantified risk assessment for the entire cost plan of the A51 Tarvin-Chester Improvements Scheme and provides full details of all identified risks, including mitigation measures, and how it impacts on cost and delivery timescale of the scheme. However key risks are summarised as part of the Management Case.

The risks have been identified, recorded and updated regularly throughout the scheme development phase of the investment lifecycle. Management of these risks will be an ongoing task through to practical completion.

As part of this process, an owner has been allocated to each of the key risks identified in Table 61. Where appropriate, the aim is to eliminate the identified risk, or prepare relevant mitigation measures to manage and reduce the impact of the risk.

The Council will attribute all project risks to a nominated party that can best demonstrate value for money in managing the risk. Early contractor involvements from Balfour Beatty through the SCAPE framework has enabled a greater degree of design and other construction risk to be mitigated by the contractor and consultant, while under management/supervision of the Highways Delivery Team.

It is envisaged that the Council would bear the risks associated with land, planning and environmental permissions. This includes the risks associated with having to prepare a Compulsory Purchase Order or attend a Public Inquiry. This is considered an appropriate strategy as the Council's Property and Legal Teams are currently managing the ongoing negotiations with impacted land owners and if required would prepare the Compulsory Purchase Orders. It is also noted, that the main construction contract between the Council and Principal Constructor would be conditional on the resolution of these risks paving the way for the delivery phase.

7 The Management Case

Section Summary

The purpose of the Management Case is to assess whether the A51 Tarvin-Chester Improvements Scheme is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and project assurance.

CWAC Council are the scheme promoter and delivery agent for the A51 Tarvin-Chester Improvements Scheme whilst Cheshire and Warrington Local Enterprise Partnership (CWLEP) have an integral part in the A51 Tarvin-Chester Improvements Scheme as a key funding source.

The A51 Tarvin-Chester Improvements Scheme will be delivered in line with the CWLEP Growth Programme Assurance and Accountability Framework and governed by the CWLEP executive board which set the corporate and strategic direction of the organisation.

The CWLEP hold the devolved funding from Central Government, however responsibility then falls to CWAC to make the relevant payments to the associated project partners to ensure scheme delivery. CWAC are also required to apply to the Performance and Investment Committee for funding release as well as documenting all expenditure associated with CWLEP funding.

The Project Team manage the day to day delivery of the scheme and the Project Manager reports to the Project Board. The Project Team consists of officers from the Council's Transport Planning and Highways Team who are responsible for providing advice on monthly spend/budget, funding and delivery agreements, land ownership issues and communication of the project with key stakeholders.

Key milestones within the scheme delivery indicate that from funding approval to the proposed activity end date, the project, which includes four-year post completion monitoring and evaluation will be "live" between 2018 and 2025.

7.1 Evidence of Similar Projects

7.1.1 Northwich Town Centre Gyrotory and Leicester Street Roundabout Improvements

Funding was secured from Local Pinch Point Fund in 2014/15 for Leicester Street roundabout capacity improvement scheme and the permanent implementation of the town centre gyrotory scheme. Similar to the proposals identified in this scheme these highway improvements at key junctions aimed to increase capacity of the network to reduce congestion and support large scale local development.

The scheme included: remodelling of the roundabout and new car park, alterations to five signalised junctions, incorporated two swing bridges over the Weaver Navigation while linking them to an Urban Traffic Management Control system. The increased capacity from the scheme was designed to support future levels of traffic as part of the overall town's regeneration programme, enabling access to the new £80m retail and leisure development at Barons Quay.

Extensive public consultation was carried out prior to construction to discuss alternative design options. Construction of the scheme then began in February 2016 and was completed in September 2016.

Figure 48: New Barons Quay Development (Left) and New Leicester Street Roundabout (Right)



Source: Mott MacDonald

7.1.2 A556 Gadbrook Park Junction Upgrade

This scheme was developed in close collaboration with businesses at Gadbrook Park, whose employees, suppliers and customers currently face severe congestion problems when accessing the Park. CWAC worked together with the Gadbrook Park Business Improvement District (BID) and the CWLEP to create the right conditions for job growth at the Park.

This scheme aimed to ease congestion around the site entrance junction to Gadbrook Business Park to unlock economic growth and job creation opportunities. Options were tested in LinSig, based on current job numbers and traffic levels, plus forecast traffic growth up to the year 2020.

Figure 49: Southbound Approach to Gadbrook Park during typical AM Peak Period



Source: Mott MacDonald

7.1.3 Chester Bus Interchange and Frodsham Street Public Realm

This scheme saw the implementation of a £13.5m fully accessible contemporary Bus Interchange, providing; 13 new bus stands, Coffee shop, Newsagents, Information Desk with improved public realm and pedestrian linkages near the site and throughout Frodsham Street. Frodsham Street works (£3.5m) forms part of the wider bus interchange project requiring that all surfaces being at one level creating a shared space for pedestrians and traffic using high quality materials, while creating social spaces.

The new £10m bus station opened in June 2017 creating a key gateway into the historic city of Chester, whilst enabling the commencement of the proposed Chester Northgate Redevelopment.

The total £13.5m of funding was secured from the Local Growth Fund (LGF) through the Cheshire and Warrington 'Growth Deal'. The bus interchange is now fully operational and provides state of the art facilities for passengers as well as an important visual element to the historic City Gateway site. The Interchange was delivered with a 6-month delay to the original programme, but this delay was largely unavoidable due to unforeseen issues inherent with a brownfield site in a historic Roman city.

Figure 50: New Chester Bus Interchange and Frodsham Street Shared Space



Source: Mott MacDonald

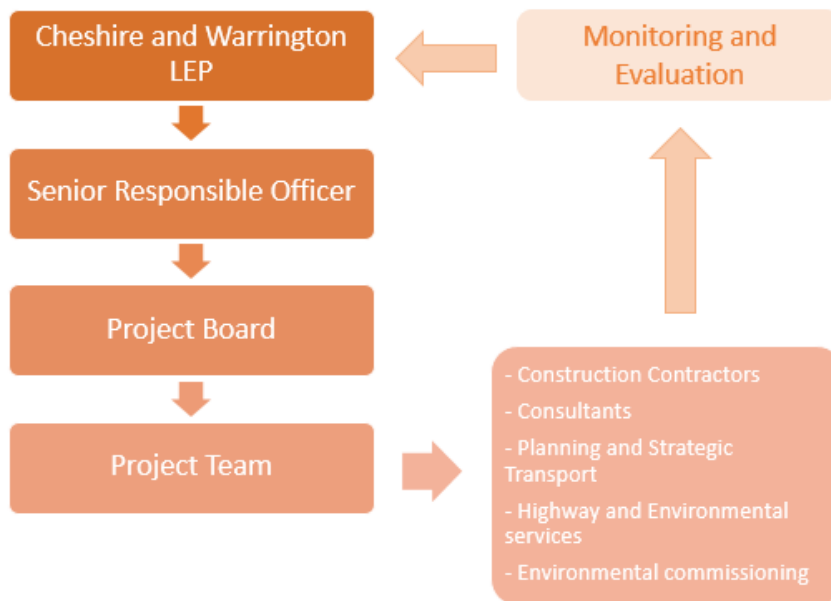
7.2 Management Arrangements

This section outlines the governance structure and the roles and responsibilities of those within that structure that will deliver, monitor, approve and ultimately be responsible for the A51 Tarvin-Chester Improvements Scheme.

7.2.1 Strategic Project Governance

CWAC are the scheme promoter and delivery agent for A51 Tarvin-Chester Improvements Scheme but remain accountable to the CWLEP who are the major funding contributors. A summary of the key tiers in the strategic governance structure is provided in Figure 51 and in the text below.

Figure 51: Key Tiers in the Governance Structure



Source: Mott MacDonald

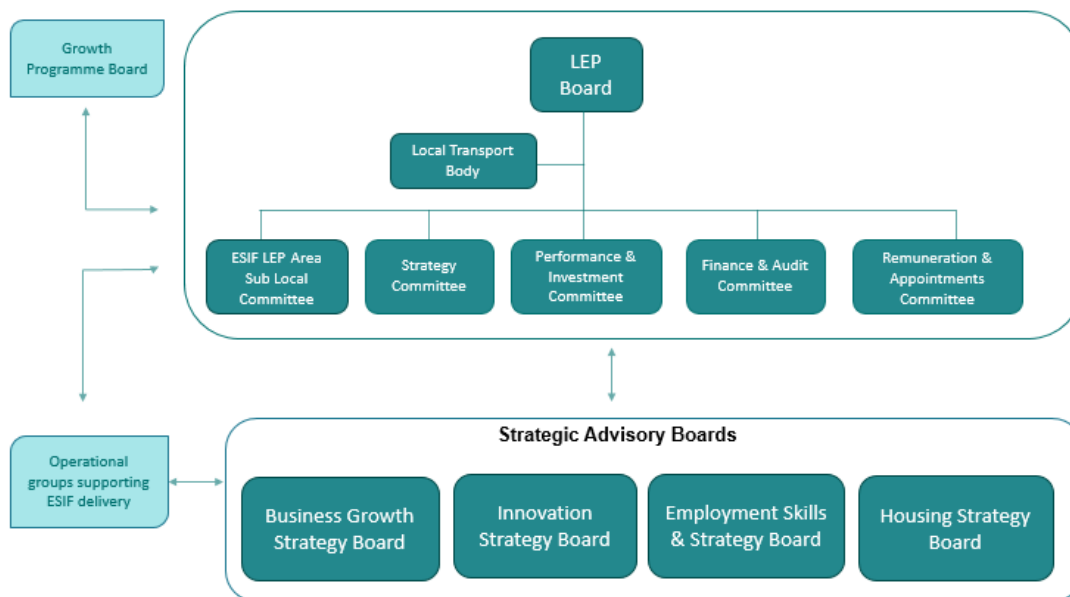
7.2.1.1 Cheshire and Warrington LEP

The CWLEP are one of 38 public-private partnership bodies across England. They have an integral part in the A51 Tarvin-Chester Improvements Scheme and are the key funding source for the scheme. The CWLEP’s Performance and Investment Committee have delegated authority to grant funding for the A51 Tarvin-Chester Improvements Scheme.

CWLEP have a key role across Cheshire and Warrington; the organisation sets local economic priorities to help focus and boost economic growth and job creation. CWLEP decide how funding devolved from central Government is spent within the area.

The following diagram sets out the governance structure of CWLEP in relation to the A51 Tarvin-Chester Improvements Scheme.

Figure 52: Governance Structure of CWLEP



Source: Mott MacDonald

Governance

The CWLEP Executive Board sets the corporate and strategic direction of the organisation and oversees five committees. Of specific note is the Performance and Investment Committee, which has the delegated authority to approve funding for projects put forward for Local Growth Funding, provided their value is within certain financial limits, which the A51 Tarvin-Chester Improvements Scheme is. They will also:

- Provide scrutiny and oversight to funded schemes
- Monitor programme performance
- Ensure that the processes set out in the LRP's Assurance and Accountability Framework are adhered to

Delivery

The A51 Tarvin-Chester Improvements Scheme will be delivered in line with the CWLEP Growth Programme Assurance and Accountability Framework. CWLEP have devised the framework to establish a clear decision-making process within its Growth Programme (Local Growth Fund Programme, Growing places Fund and European Structural Investment Fund). This framework provides a mechanism for the Council, the CWLEP and key stakeholders to be clear about their responsibilities and to ensure good project governance.

Funding

CWLEP hold the devolved funding from Central Government, however responsibility lies to CWAC to make the relevant payments to the associated project partners to ensure scheme delivery. In accordance with the CWLEP Assurance Framework, CWAC are then required to apply to the Performance and Investment Committee for funding release in arrears, providing evidence of paid invoices as well as documenting all expenditure associated with CWLEP funding.

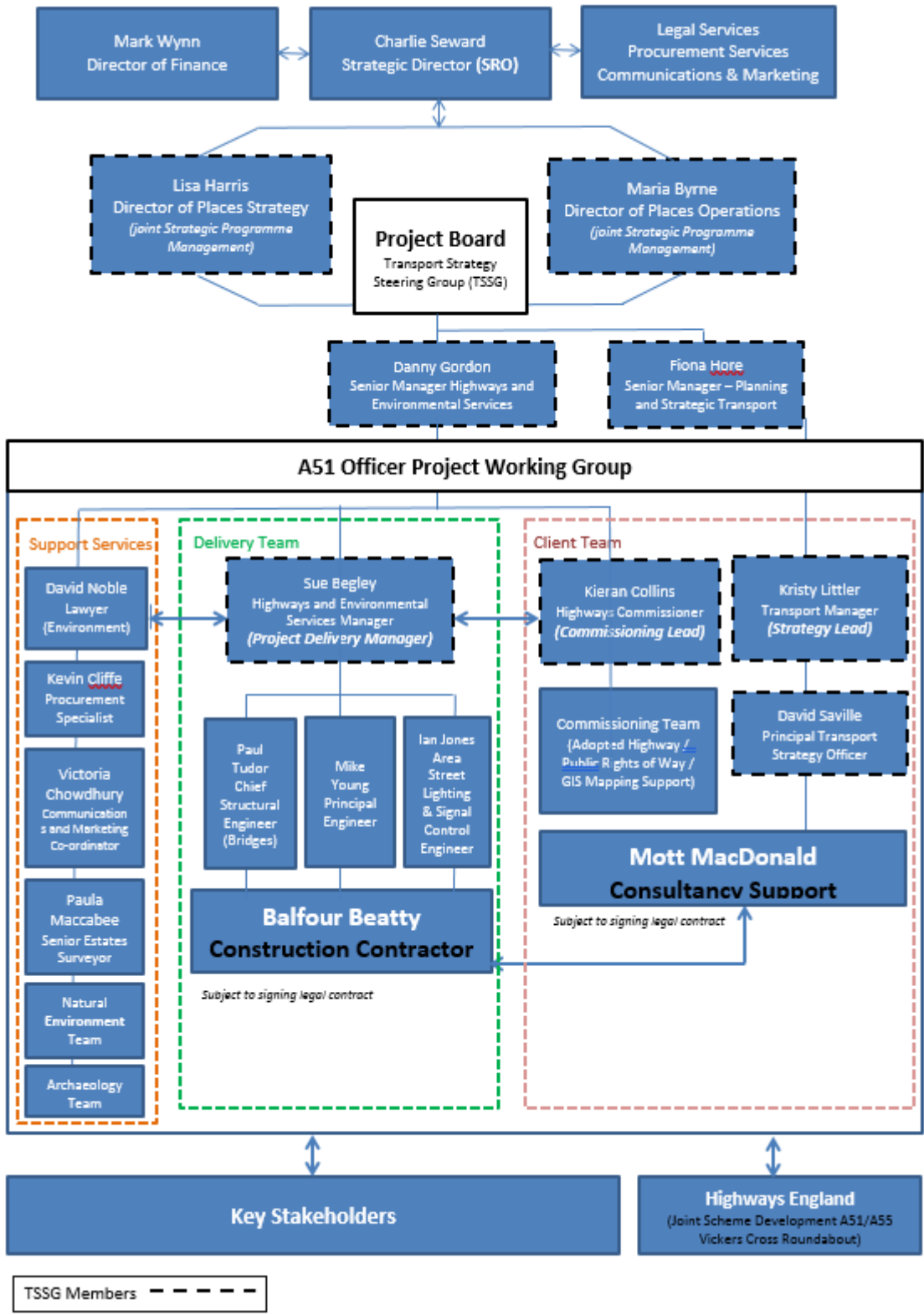
CWLEP Growth Programme Assurance and Accountability Framework

CWLEP's partial funding of the A51 Tarvin-Chester Improvements Scheme warrants the use of the CWLEP Growth Programme Assurance and Accountability Framework. The framework includes the appointment of an independent technical advisor to review the Business Case and Value for Money appraisal on behalf of the CWLEP. For the A51 Tarvin-Chester Improvements Scheme, the CWLEP have appointed a reviewee from AECOM. In meeting the framework requirements, the CWLEP Performance and Investment Committee will, as noted in the paragraph above also be responsible for approving funding for the scheme.

7.3 Governance Structure within CWAC

Figure 53 illustrates the governance structure for both the delivery and project management of the A51 Tarvin-Chester Improvements Scheme with CWAC.

Figure 53: CWAC Project Governance



Source: CWAC / Mott MacDonald

7.3.1 Roles and Responsibilities

At a strategic level the Senior Responsible Officer (SRO) will be a key point of contact between financial and legal services and the project board. The SRO for the A51 Tarvin-Chester Improvements Scheme. will be Charlie Seward, Strategic Director. Mark Wynn, Director of Finance and Legal Services will provide guidance directly to the SRO at a strategic level.

Table 57: CWAC Key Roles and Responsibilities

Role	Who	Key Responsibilities
Senior Responsible Officer (SRO)	Charlie Seward	<ul style="list-style-type: none"> Organise chair project board Monitor and control project plan Provide progress reports enabling the board to be in a position to provide guidance on project decisions
Joint Strategic Programme Management	Lisa Harris and Maria Byrne	<ul style="list-style-type: none"> Provide joint Strategic Programme Management Overseeing and being responsible for reporting to members and key stakeholders
Director of Finance	Mark Wynn	<ul style="list-style-type: none"> Providing advice on monthly spend/budget, monthly financial reporting to the Strategic Management Team and reporting requirements associated with CWLEP funding
Legal Services	Legal Team	<ul style="list-style-type: none"> Provide advice relating to land ownership issues.

Source: Mott MacDonald

Whilst the key people outlined in Table 57 above will take a more strategic role in the scheme, the Project Board will be responsible for governing the operational deliverability of the scheme. The structure of the Project Board for this scheme is highlighted in Figure 53 above. The Board will be accountable to CWAC members and in turn the report to the CWLEP. The key roles and responsibilities of the Project Board are summarised in the table below.

Table 58: Project Board Roles and Responsibilities

Role	Who	Key Responsibilities
Project Delivery Managers	Danny Gordon, Steve Bakewell and Fiona Hore	<ul style="list-style-type: none"> Manage delivery of the project. Prepare and monitor Project Plans Manage project delivery through project delivery team and co-ordination of meeting Manage allocated funding Report to the CWLEP Planning and development of work programme Completion of work packages to meet project timescales Directing and co-ordination of Project Team resources
Commissioning Lead	Kieran Collins	<ul style="list-style-type: none"> Management of internal and external procurement contractors and reporting.
Construction / Project Delivery Lead and overall Project Manager	Sue Begley	<ul style="list-style-type: none"> Manage engineering, building, communications and operation advisory services as Project Delivery Manager Manage overall project progress and day to day delivery as the overall Project Manager
Strategy Lead	Kristy Littler	<ul style="list-style-type: none"> Communicate the project with key stakeholders Manage consultancy support
Construction Contractors	Balfour Beatty	<ul style="list-style-type: none"> Agree objectives for supplier activities Ensure resources available Contribute supplier opinions Brief non-technical management on supplier aspects Manage the procurement of the scheme
Consultancy Support	Mott MacDonald	<ul style="list-style-type: none"> Design and engineering support Business case development

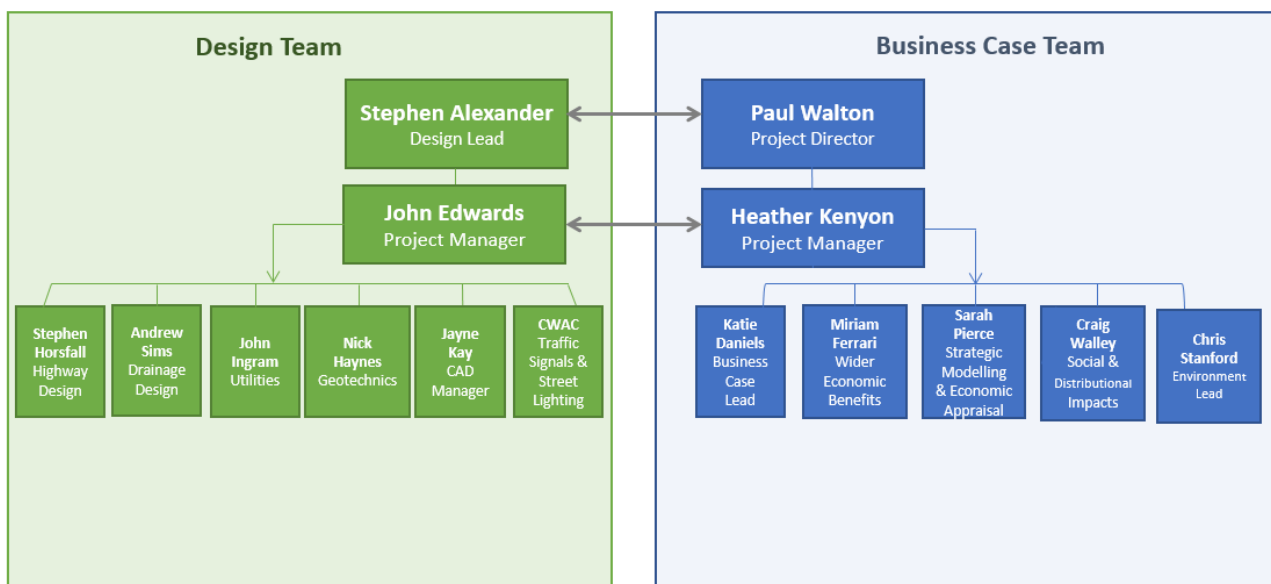
Role	Who	Key Responsibilities
Key Stakeholders	See Table 27	<ul style="list-style-type: none"> Provide input and feedback on scheme as it develops

Source: Mott MacDonald

As summarised in Table 58, key roles within the Project Board include the Construction Lead and Strategy Lead who will essentially lead members if the project team in carrying out day to day tasks such as overseeing the delivery of the works, the management of risks and issues on a daily basis, project reviews, cost loaded schedules and monthly update reports in accordance with CWAC’s project and programme management processes.

As detailed in the table above, Balfour Beatty and Mott MacDonald have been procured to support CWAC with the business case, design elements and construction of the scheme. Figure 54 illustrates how the scheme will be governed within these project teams.

Figure 54: Mott MacDonald Project Governance



Source: Mott MacDonald

7.3.2 CWAC Approval Process / Accountability

At this late stage of the business case process, the majority of the approvals processes have already been completed. For example, the submission and peer review of the OBC and procurement of consultancy support for the FBC.

The contract delivery programme provided in Appendix N sets out the remaining approvals process along with dates, if known. Key tasks are set out as follows:

Table 59: Approvals Programme

CWAC Approvals	Dates
Completion of FBC	24/07/2019
Undertake Peer Review of FBC	25/07/2019
Deadline for papers to Performance Investment Panel (PIP)	25/07/2019

CWAC Approvals	Dates
Performance Investment Panel Meeting to review Full Business Case and CWAC request Full Funding Approval	14/08/2019
Source: Mott MacDonald	

The Places Finance team within CWAC have confirmed that no additional approvals are required to increase funding subject to SAB.

7.4 Delivery Milestones

Those identified in the governance arrangements outlined above will have key responsibility for ensuring The A51 Tarvin-Chester Improvements Scheme is delivered on time, within budget and to the required specification.

The following table sets out the key milestones for the scheme and expected delivery timescales. A detailed programme delivery schedule is included in Appendix N (BB).

Table 60: Key Project Milestones

Key Milestone	Time Scales
Funding Approvals	27/03/19
Pre-Construction	20/12/18 – 23/06/20
• Advance Works	31/01/19 – 03/12/19
• Complete Detailed Design	20/12/18 – 12/11/19
• Environmental & Ecological Works	01/07/19 – 02/08/19
• Consents and Notices	20/12/18 – 24/03/20
• Statutory Undertakers Works	02/08/19 – 01/06/20
• Contract Pricing	12/11/19 – 30/03/20
• Project Documentation	31/03/20 – 29/04/20
• Temporary Works Design	31/03/20 – 23/06/20
• Stakeholder and 3 rd Party Engagement	21/12/18 – 26/06/20
• Procurement	31/03/20 – 22/05/20
• Surveys	31/03/20 – 15/05/20
Construction	24/06/20 – 26/03/21
• Site Establishment	24/06/20 – 07/07/20
• Section 1 – A55 to Hare Lane Junction	08/07/20 – 24/08/20
• Section 2 – Stamford Bridge	08/07/20 – 12/03/21
• Section 3 – Tarvin Roundabout	25/08/20 – 19/10/20
• De-Mobilisation and Completion of Documentation	12/03/21 – 26/03/21
Project Completion Date	27/04/21

Source: Balfour Beatty Delivery Programme

Within the above key tasks, the following can also be set out within the detailed programme provided in Appendix N:

- Ground Investigation Surveys – 02/19 – 04/19
- Environment Agency approvals – 01/19 – 05/19
- Statutory Undertakers – trial holes/ negotiation/ C4 returns – 04/19 – 08/19
- Further Ecology Surveys – 04/19 – 06/19

- Relocation of identified badger sett – 08/19
- Temporary TROs (prior to construction) – 10/12/19-03/03/20
- Archaeological Assessments – ongoing during any construction activities

With regard to Environment Agency (EA) approvals, this will cover works associated with the new linked bridge over the River Gowy, drainage outfalls at Stamford Bridge and impacts on the existing flood plain at Stamford Bridge. However, as highlighted previously, no detrimental impact has been identified in these areas, so the approval process is expected to be agreeable with EA.

A key part of delivery for CWAC as the scheme promotor is the management of designs and costs as they are updated. As highlighted previously, to assist in the management and delivery of the scheme, CWAC have employed Balfour Beatty through the Scape framework. This early contractor engagement, along with the employment of Mott MacDonald as a consultant to deliver the Business Case element, has enabled advice to be sought on an ongoing basis and ensure all delivery risks are addressed at an early stage. In preparation of the FBC, regular progress meetings involving all parties to continually review the scheme designs, cost risks and programme have taken place resulting in some changes to the proposals that were submitted at OBC stage.

7.5 Communications and Stakeholder Management

Consultation has been carried out during the early stages of scheme development with the following stakeholders:

- Highways England;
- Littleton Parish Council;
- Guilden Sutton Parish Council; and
- Tarvin Parish Council.

Consultation with the above stakeholders focused on the development of SOBC and OBC and background of the scheme. This included the options appraisal process and arrival at the preferred scheme and details. Consultation materials included scheme costs, benefits and design drawings. The key findings of stakeholder consultation are summarised within Section 2.13.5 of this document.

In preparation for the FBC, consultation with key stakeholders such as landowners and Highways England has been ongoing. Final proposals and funding arrangements are required for public consultation to ensure the engagement process does not raise the public expectations by presenting a scheme which may be different from what is constructed.

Therefore, consultation is scheduled to take place after the submission of the FBC in May 2019 including a number of public drop in sessions. Full details of consultation undertaken to date and the plan going forward can be found within the appended Stakeholder Communications Plan (Appendix S).

7.6 Project Reporting

Project reporting will be used to ensure the scheme is delivered effectively and within budget. Reporting will be thoroughly carried out in two stages to address issues associated within any changes to the delivery or costs of the scheme at the earliest possible stage. The two ways in which the project will be reported are outlined in the sections below.

7.6.1 Delivery Reporting

The Project Delivery Managers will be responsible for the dissemination of information within the Project Team, ensuring that members are up to date with accurate information. Moreover, they also have the responsibility as Project Board leads to report any notable project developments or issues to the SRO, through update reports and if necessary, exception reports if scheme delivery should deviate outside defined tolerances in terms of budget, timescales and delivery specifications.

The Senior Responsible Officer will maintain a close working relationship with the Project Board and provide progress reports enabling the board to be in a position to provide guidance on project decisions.

7.6.2 Cheshire and Warrington LEP Reporting

CWLEP are the major funding source for the A51 Tarvin-Chester Improvements Scheme. To ensure correct project spend and funding is being utilised to its greatest potential, monthly control meetings will be undertaken detailing current budget, expenditure, risks and project progress.

7.7 Monitoring and Evaluation

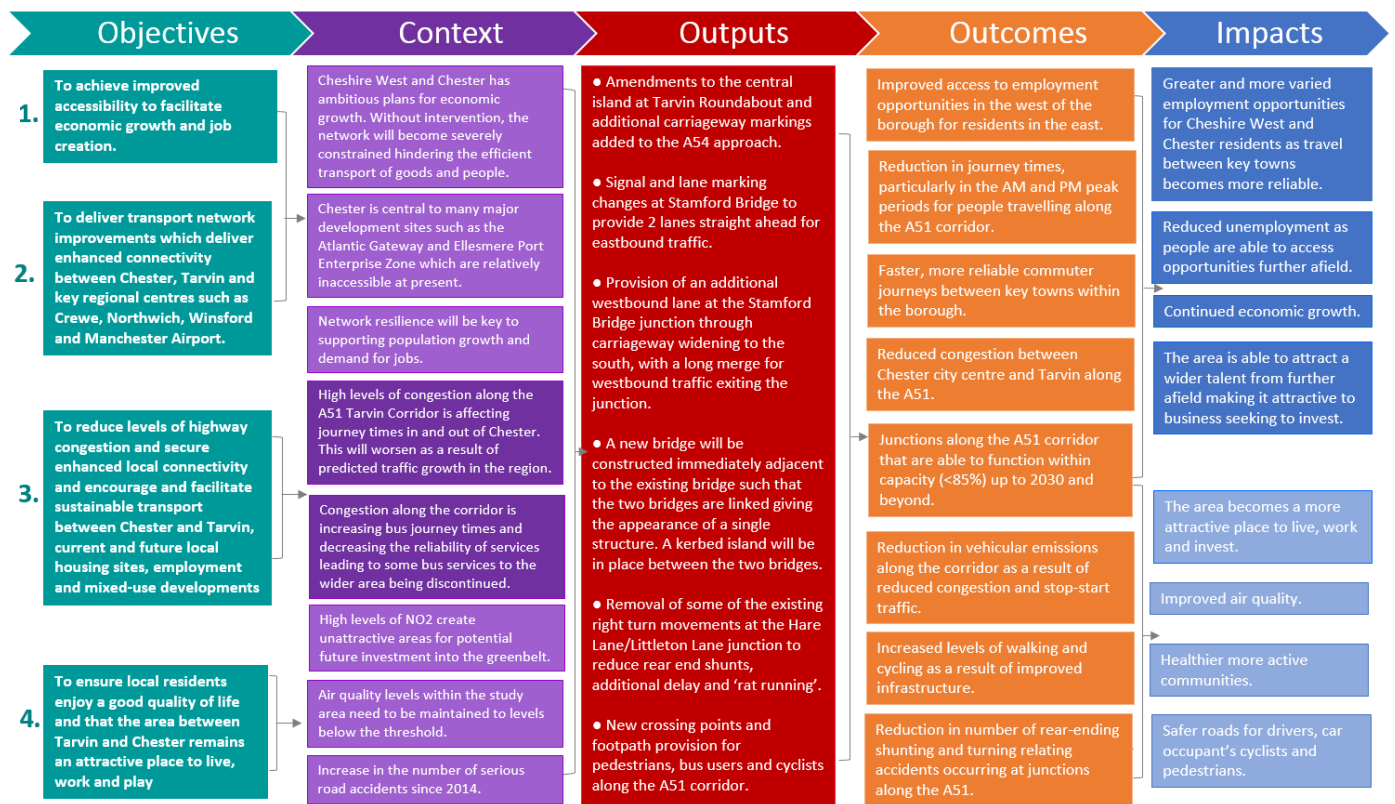
Monitoring and evaluation are essential parts of any infrastructure project. It provides an opportunity to improve performance by reviewing past and current activities, with the aim of replicating good practice in the future and eliminating mistakes in future work. This section outlines the monitoring and evaluation plan for the A51 Tarvin-Chester Improvements Scheme.

Success of A51 Tarvin-Chester Improvements Scheme will be determined by a number of factors:

- Delivery to time, budget and specification;
- Reduction in congestion along the A51 corridor;
- Reduction in queue lengths at key junctions along the corridor;
- Improved journey times for east and westbound traffic travelling along the A51 corridor;
- Continued investment in developments within Chester and the wider region/ success of developments; and
- Helps improve local air quality.

The delivery and likely benefits of the A51 Tarvin-Chester Improvements Scheme are demonstrated in detail within the Benefits Realisation Plan and Monitoring and Evaluation Report attached as Appendix J, however Figure 55 shows the causal pathway linking scheme objectives to the deliverables and outcomes and impacts that will be measured to determine the success of the scheme.

Figure 55: A51 Tarvin Improvements Scheme: Logic Map



Source: Mott MacDonald

DfT guidance 'Monitoring and Evaluation Framework for Local Authority Major Schemes' has been used as the basis of our monitoring approach. Within this guidance, monitoring is defined as the collection of data to check progress against planned targets and benefits whilst evaluation is defined as the assessment of the scheme's effectiveness and efficiency during and after implementation; this includes measuring the causal effect of the scheme on planned outcomes and impacts and assessing whether the anticipated benefits and value for money have been realised.

Monitoring and evaluation activities also need to be undertaken during scheme delivery to ensure the scheme is delivered on time, on budget and to specification. To this extent monitoring and evaluation has been split into two categories:

1. Monitoring of project delivery; and
2. Monitoring the achievement of scheme outcomes and impacts

7.7.1 Monitoring and Evaluation Reporting

Monitoring of project delivery will be undertaken by the Area Manager, who in accordance with delivery timescales will report on progress on a quarterly basis to the Project Board, and on a monthly basis to the joint Project Delivery Managers. This will focus on construction milestones, budgets and delivery of outputs to specification

Monitoring and evaluation of scheme impacts will be reported on in two stages:

- One year after scheme delivery – with the primary aim of understanding the impact of A51 Tarvin-Chester Improvements scheme on journey times and travel patterns.
- Four years after scheme delivery to understand the longer-term benefits associated with the improvements and how they address the strategic objectives of the scheme.

The Benefits Realisation Plan and Monitoring and Evaluation Report attached as Appendix J details the methodology for monitoring realisation of scheme outcomes and subsequent benefits

7.8 Risk Management and Mitigation

The management of risk and uncertainty is key to the successful delivery of the scheme, and an appropriate strategy will identify threats to project delivery and enable effective risk management actions to be assigned.

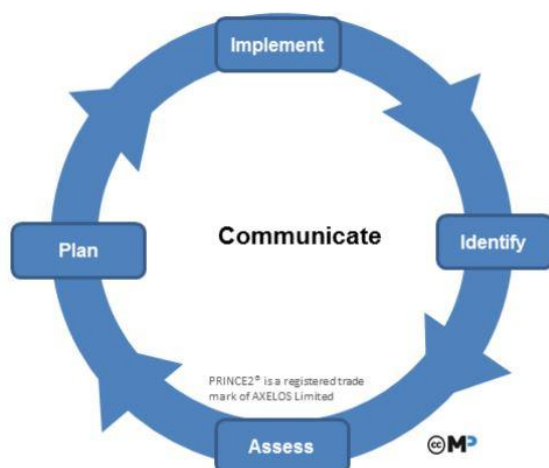
7.8.1 Risk Management Strategy

An effective risk management strategy for the project will be based on the principles for risk management contained within the OGC PRINCE2 guidance. The procedure for identifying key risks should follow as below:

- Identify: complete the risk register (as appropriate to the area of the project and/or the producing organisation) and identify risks, opportunities, and threats;
- Assess: assess the risks in terms of their probability and impact on the project objectives
- Plan: prepare the specific response to the threats (e.g., to help reduce or avoid the threat), or this could also be to plan to maximize the opportunity if the risk happens
- Implement: carry out the above in response to an identified threat or if one occurs
- Communicate: report and communicate the above to relevant project team members and stakeholders

The risk management strategy is owned by the SRO and it is recognised that risk management needs to be an ongoing process, shown in Figure 56 below.

Figure 56: Risk Management Process



Source: PRINCE2

7.8.2 Key Risks and Ownership

Several key risks have been identified which may occur as result of implementing this scheme. Risks include strategic, environmental, infrastructure and financial risks. Full details of all identified risks can be found in the full risk register attached as Appendix K. The risk register has been prepared by Balfour Beatty and takes account of all potential risks both pre-construction and during the construction period. Balfour Beatty will remain the owners of the risk register and will be responsible for updating the risks and impacts on a regular basis throughout scheme delivery. An overview of the key risks and how they will be managed within the delivery of this scheme are outlined in the table below.

Table 61: Management and Mitigation of Key Identified Risks

Risk Owner	Risk Event	Consequences	Mitigation
Geotechnical			
Balfour Beatty	Embankment requires settlement period built into programme	Increased cost and programme duration	Carry out GI and GPR as early as landowner constraints allow, and progress design activity
Balfour Beatty/CWAC	Access for trial holes delayed	Delay to Design, additional cost if GI crew needs to be remobilised	Seek informal agreement with landowners who will not have agreements in place Feb 19
Environmental			
Balfour Beatty/CWAC	Presence of protected species - Otters	Constraints on when otters can be disturbed may impact programme.	Further surveys. Construct new holt at earliest opportunity, monitor and demonstrate otters have taken up residence
Balfour Beatty/ CWAC	Presence of protected species - Badgers	Badger sett identified on site adjacent to Stamford Bridge	Further surveys. Construct new sett at earliest opportunity, monitor and demonstrate badgers have taken up residence
Design			
Mott MacDonald	Absence of GI Report at Feasibility Stage	Increased uncertainty and contingency in Feasibility cost build up	Increased uncertainty and contingency in Feasibility cost build up
Mott MacDonald	Absence of GPR survey at Feasibility Stage	Increased uncertainty and contingency in Feasibility cost build up	Allowance in Risk Register for potential underground issues
Mott MacDonald	Condition of existing Stamford Bridge leads to unforeseen remedial work	Additional work, delay, additional cost	Design of new deck to be independent from existing structure.
Mott MacDonald	Increase in design resources to develop or change design solution	Additional cost, potential prolongation	GI and bridge design to be progressed early in Pre-Construction stage
Planning/Permitted Development Considerations			
CWAC	3rd party input during Preconstruction Stage leads to rework	Delayed start on site, additional cost	Public engagement sessions, contact with key stakeholders
CWAC	CWLEP require additional information in support of FBC	Delay to Pre-Construction Stage	Ongoing liaison with CWLEP
Statutory Authorities			
Mott MacDonald	No pricing assessment of utility diversions at Feasibility - C2 stage only	Stats diversion allowance at Feasibility is not underpinned by SA pricing	Establish underpinned SA cost at Pre Construction stage
Mott MacDonald	Presence of further stats providers not currently identified	SA allowance at Feasibility may be inadequate	Confirm at Preconstruction stage via C3/C4 process
Land Assembly			
CWAC	Negotiation to purchase land takes longer than anticipated	Delayed start, increased cost	Detailed programme at Feasibility
CWAC	Negotiation route fails and CPO powers	Min 12-month delay to programme	CWAC to monitor progress on negotiation process

Risk Owner	Risk Event	Consequences	Mitigation
	initiated		
Balfour Beatty/CWAC	Delayed access to land for GI work	Issue of GI Report even later, impact on detail design and TC agreement	CWAC to liaise with landowner
Programme			
Balfour Beatty/ CWAC	Delayed start on site	Additional cost, late completion	Monitor with CWAC during Pre-Construction
Balfour Beatty	Phasing requirements imposed on construction programme	Imposition of phasing requirements prolong programme and increase cost	Review with CWAC at Pre-Construction Stage
Budget			
Balfour Beatty	Design Creep	Increased cost at Pre-Construction Stage	Monitor change and challenge design change
Balfour Beatty	Scope creep on work packages identified at Feasibility	Increased cost at Pre-Construction Stage	Construction Stage prior to developing Target Cost
Balfour Beatty	Quants Risk-undermeasure or omissions	Increased cost at Pre-Construction Stage	Construction Stage prior to developing Target Cost
Legal/Procurement			
Balfour Beatty/CWAC	Feasibility Report budget exceeds CWAC current budget	Delay, additional cost or reduced scope	Feasibility Report will provide full detail of costings and assumptions
Balfour Beatty/CWAC	CWAC / BB require prolonged period to agree terms of Delivery Agreement	Delay, additional cost or reduced scope	Draft DA provided to CWAC, meeting to review arranged for 5/11
CWAC	A competition is required to award the detail design package	Delay to commencement of detail design and subsequently construction stage	Discuss with CWAC and ascertain if Procurement are happy to proceed on this basis

Source: Balfour Beatty

The potential requirement of third party land through a CPO process has also been recognised as a key risk to scheme development. To account for this risk, the cost of a CPO process has been included in scheme costs set out in the economic and financial cases and delivery timescales set out in Appendix N. Therefore, should a CPO process be required the scheme can still be delivered without exceeding scheme costs or timescales.

8 Summary and Conclusions

This FBC has demonstrated a clear need for the scheme to facilitate upcoming developments, mitigate current and future congestion, support economic growth and ensure residents experience a good quality of life through improved air quality and road safety. The A51 is a major route between east and west Cheshire providing connectivity between key developments such as the Atlantic Gateway, proposed Crewe Hub and Northgate retail development for many visitors, shoppers residents and commuters. A resilient highway network that offers reliable journey times is therefore essential to support these developments and ensure the borough remains an attractive place to live work and invest.

Several options have been assessed to develop a scheme which is best positioned to meet the scheme objectives and objectives outlined in local and national policy. Economic appraisal has shown the scheme presents High Value for Money with an initial Benefit Cost Ratio (BCR) value of 2.2. When adjusted for the inclusion of journey time reliability benefits, this BCR increases to 2.3. Additional economic benefits include up to £864,500 GVA in construction benefits with an additional £343,680 in council tax which can be attributed to the road improvement scheme.

The total estimated scheme cost is £7,029,726 and includes construction costs, risks, statutory undertakers works and land acquisition costs. This also includes the application of inflation at £264,102.

£242,832 has also been included in the scheme costs to enable robust monitoring and evaluation of the scheme, in accordance with the CWLEP's Assurance Framework. This covers both pre-construction and post construction activities.

Optimism Bias of 3% has been applied for Economic Appraisal purposes but does not form part of the funding ask and is therefore not included in the Financial Case which sets out the level of funding needed and where that funding will originate.

At OBC stage it was agreed that the CWLEP would fund £3,617,22 (67%) of the estimated scheme cost of £5,398,839 with CWAC Council providing a match contribution of £1,741,000 (32.2% of the overall construction and delivery cost of the scheme). The CWLEP'S conditional offer letter granted a maximum LGF allocation of £3,663,000 for the A51 Tarvin to Chester Scheme. There was also an amount of £40,617 to be sought from s106 agreements.

As the scheme estimate is now £7,029,726 at FBC stage, CWAC will fund the additional amount required (approximately £1.63m) from various other funding sources, while drawing down the full LGF maximum allocation of £3,663,000 (52%) towards the revised costs.

The delivery of the scheme has been thoroughly considered and will be procured through SCAPE Civil Engineering & Infrastructure Construction Framework. A Project Board has been put in place setting out roles and responsibilities for key members of the project team to ensure successful and efficient management of scheme delivery. Monitoring and evaluation are essential parts of any infrastructure project which will be carried out following the implementation of this scheme the success of the scheme will be monitored, evaluated and reported measuring any reductions in queue lengths and congestion.

A number of risks have been identified in association with the delivery of the scheme associated with infrastructure, funding and managing of the scheme. However, these have been quantified and costs adjusted to allow for risk and measures have been identified for each of the individual risks in order to mitigate the impacts of potential risks.

Consultation has been carried out with key stakeholders presenting the preferred option and three alternative options identified in the short list in Stage 1 of the options appraisal process. Key stakeholders consulted with at this stage included; Christleton, Littleton, Guilden Sutton and Tarvin Parish Councils. Findings from these workshops have shown a general support for the scheme with key concerns around pedestrian crossings and the location of laybys which have been addressed by altering scheme design. All key issues raised during stakeholder consultation have been used to inform the design of the scheme to address any concerns.

Consultation with key stakeholders such as Landowners and Highways England has been ongoing throughout the development of the FBC. Public consultation is planned to be undertaken in late Summer 2019 in the form of drop in sessions which will be well publicised through press releases and leaflets.

Overall, this report and its supporting annexes present a robust evidence base highlighting the need for the A51 Tarvin-Chester Improvements Scheme and has proved the scheme is deliverable, affordable and achievable producing significant benefits for people in CWAC and the wider area.

