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A259 CORRIDOR IMPROVEMENTS

TRANSPORT BUSINESS CASE

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TRANSPORT BUSINESS CASE

West Sussex County Council

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WSP | Parsons Brinckerhoff
Regus House
Southampton International Business Park
George Curl Way
Southampton
SO18 2RZ

Tel: +44 (0)23 8030 2596

www.wspgroup.com
www.pbworld.com

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PRODUCTION TEAM

CLIENT

Client Project Manager	Tony Bathmaker
------------------------	----------------

Modelling and Economics	Guy Parfect
-------------------------	-------------

WSP GLOBAL INC. (WSP)

Project Director	Craig Drennan
------------------	---------------

Project Manager	Alan Cowan
-----------------	------------

Senior Engineer	Michael Johns
-----------------	---------------

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1 EXECUTIVE SUMMARY

1.1 INTRODUCTION

1.1.1 This Transport Business Case presents the evidence base in favour of the proposed A259 Corridor Improvement in Arun District, West Sussex. The document has been prepared in accordance with the Department for Transport guidance on the five business case model. Guidance was published in April 2013, and requires the following five cases to be considered:

- Strategic Case
- Economic Case
- Financial Case
- Commercial Case
- Management Case

1.2 SCHEME DESCRIPTION

1.2.1 The scheme provides a continuous strategic corridor comprising approximately 5.1km of dual carriageway between the new A259/A284 roundabout in the west and the A259/A280 roundabout in the east. The scheme is an online improvement, mostly within the existing highway boundary, comprising the following elements:

- **Dualling between J5 (New A284) and J6 (Body Shop)** - approximately 550m in length. Existing right-turn gap into Olliver Acre Estate will be closed; a new shared pedestrian and cyclist path will be provided in the southern verge.
- **Dualling between J9 (Station Road) and J11 (A280)** - approximately 1400m in length. A new continuous shared pedestrian and cyclist path will be provided in the southern verge.
- **J6 (Body Shop Roundabout)** – It is proposed that localised entry widening (flare lane) is provided on the A259 eastbound entry arm. It is also suggested that developer proposals as a part of NL SDA (dwg. WYGLITTLEHSAMPTON.1/37 rev A) are also taken forward. These include revised spiral and destination markings and associated entry lane adjustments.
- **J9 (Station Road Roundabout)** - It is proposed that localised entry widening (flare lane) is provided on both the Station Road approaches (north and south arms), along with the dualling of the A259 western arm.
- **J10 (Roundstone Lane Roundabout)** – Modifications to the roundabout to accommodate dualling in both directions.
- **J11 (A259/A280 Roundabout)** – It is proposed that this roundabout is amended through localised widening of the A259 eastbound entry along with the dualling of the link leading up to it from the Roundstone Lane Roundabout. As part of this proposal the roundabout diameter is also increased slightly.

1.3 STRATEGIC CASE

- 1.3.1 The A259 through Arun District forms part of the West Sussex Strategic Road Network and it is important that the road can continue to adequately perform its role as a high level component of the County's road network hierarchy for the foreseeable future.
- 1.3.2 The route is characterised by several at-grade junctions, residential and retail frontages close to the highway boundary, and a discontinuous section of dual carriageway between the A259/B2187 Body Shop roundabout and the A259/Station Road roundabout. The remaining sections of single carriageway experience high traffic flows - up to 27,500 Average Annual Daily Traffic (AADT) in 2013 - with the resultant congestion causing severe delays and a detrimental impact to noise and air quality for residents.
- 1.3.3 Littlehampton's local economy performs poorly in comparison to other areas of West Sussex and the wider South East region. The congestion on the A259 across the local area is seen as a significant disincentive for businesses, especially higher value businesses, to locate in the Littlehampton area and makes it harder for existing business to attract and retain qualified and skilled staff.
- 1.3.4 The overall objective for this scheme is to improve the existing corridor to provide a high-quality strategic corridor between the new A259/A284 junction and Worthing. The scheme meets a series of objectives that align with the strategic aims of West Sussex County Council and Coast to Capital LEP. These are:
- Provide motorists with a less congested route with reduced journey times
 - Reduce queue lengths at key junctions within the scheme
 - Directly support delivery of the Angmering development allocation of 600 new homes and 8.95ha employment space
 - Indirectly contribute to creation of 4,695 jobs, 2,600 homes and 27,370sqm net employment space in East Arun
 - Fulfil the above criteria while providing good value for money for the taxpayer
- 1.3.5 The scheme has interdependencies with three other proposed major highways schemes. These are:
- The A259 Bognor Regis Relief Road is currently under construction and expected to open by spring 2016. This may lead to some re-routing of local traffic west of Littlehampton which could increase traffic through the A259/B2187 Bridge Road roundabout (J1), but is unlikely to significantly affect the bulk of the scheme.
 - The A284 Lyminster Bypass is scheduled for construction to open in December 2017. This will provide a new junction at A259 Worthing Road, Littlehampton (J5) with which the A259 scheme is designed to tie in. It will also change forecast traffic flows on the A259 north of Littlehampton by transferring A284 flows away from the existing roundabout at J4.
 - A27 improvements are planned in the Department for Transport's Roads Investment Strategy for implementation starting in late Road Period 1 (2015 to 2020) at Arundel Bypass and Worthing to Lancing improvement. Although both the A27 and A259 serve as east-west corridors, the A27 is a fast strategic route catering primarily for long-distance traffic, and the A259 is a slower route serving traffic with an origin or destination within the local area. As such, the two corridors are not considered as competing routes. The proposed improvement schemes on these corridors have significantly different timescales for implementation, and both are intended to relieve congestion for existing users. There is no expectation for significant transfer of traffic between the corridors, regardless of the status of the improvement schemes.

1.4 ECONOMIC CASE

- 1.4.1 The Economic case sets out the assessment of benefits that the scheme is forecast to deliver to society as a whole. The Value for Money (VfM) statement provides a summary of these benefits, and is presented in table 1.1.

Table 1.1: Value for Money statement

	ASSESSMENT	DETAIL
Initial Benefit Cost Ratio (BCR)	15.5	Calculated using WebTAG guidance
Adjusted BCR	16.0	Includes wider impacts
Qualitative assessment	Largely beneficial	Key improvements in journey quality and community severance
Key risks, sensitivities	Initial BCR range 7.98 to 17.42	Variation in cost and benefit uncertainty assessed according to WebTAG guidance
Value for money category	Very high	Initial and Adjusted BCRs are in Very High category, which is supported by qualitative assessment

- 1.4.2 The information presented in the economic case indicates that the proposed A259 Corridor Improvement has an Adjusted BCR of **16.0**, which is considered **Very High** value for money.

1.5 FINANCIAL CASE

- 1.5.1 The Financial case provides a detailed cost estimate and a breakdown of how the scheme will be funded. The total scheme cost is expected to be £15.29m, of which a total of £0.49m has been spent on scheme preparation and is not included in the costs used in scheme appraisal. The total scheme cost (net of scheme preparation costs) is £14.8m of which £2.61m is expected to come from banked and legally agreed S106 contributions. £7.51m is sought from Coast to Capital LEP, with the remaining £4.68m being funded by WSCC.
- 1.5.2 £0.056m of the S106 funding has been received and is available to be spent on the scheme. Legal agreements are in place to recover a further £2.56m from the developers, which will be due once the 'triggers' in the payment mechanism have been reached. A further £0.72m is expected to become available as development identified in the Emerging Arun Local plan comes forward and agreements put in place. However, in order to ensure timely delivery of the scheme, WSCC has decided to provide forward funding for the £3.28m of S106 contributions that have not yet been received and this is included in the Council's Capital Programme approved by the County Council on 30th October 2015. This is detailed in the programme profile and funding stream provided in the table below.
- 1.5.3 The transport analysis guidance (WebTAG) requires that the costs incurred on schemes by Central or Local Government are differentiated from costs incurred by developers and other contributors. Therefore, the economic appraisal for the business case is based on the assumption that the total S106 contributions amounting to £3.33m will be received and this is reflected in the programme and funding profile below.

Table 1.2: Annual budget cover (2015 Q2 prices incl. real inflation, risk and optimism bias)

FY	COST	S106	LEP	WSCC
2015-16	£321,230		£250,000	£71,230
2016-17	£1,648,103	£610,000	£90,000	£948,103
2017-18	£5,992,801	£1,790,000	£2,410,000	£1,792,801
2018-19	£6,837,770	£930,000	£4,760,000	£1,147,770
TOTAL	£14,799,904	£3,330,000	£7,510,000	£3,959,904

1.5.4 To help mitigate the risks surrounding Section 106 recovery, the Council is seeking to secure a legal agreement with all funding partners (primarily the District Council) to agree an approach to capital funding and the sharing of project related financial risks

1.5.5 Whilst the funding arrangements are under constant review and the values will change regularly as with any major civil engineering project 2 key reviews are planned:-

- The first will be undertaken ahead of D&B Award, once the scheme has secured full funding approval from the LEP and the tender prices are known.
- The second will on conclusion of Detailed Design, ahead of awarding the build stage of the contract.

1.6 COMMERCIAL CASE

1.6.1 The Commercial case has considered options relating to procurement of the scheme. A procurement workshop was held on the 29 April 2014 to address a range of questions in relationship to the A284 Lyminster Bypass and the outcomes of the workshop and subsequent discussion highlighted that a Design and Build (D&B) procurement strategy, through the restricted procedure, was considered the preferred option. The same arguments will apply to the A259 Improvements.

1.6.2 To facilitate the implementation of the Council's programme of major highways and transport schemes, the Council proposes to install a D&B Contractor Framework, which will provide a list of 3-4 Suppliers who can provide a D&B function for a programme of major highways schemes over a 6-year period.

1.6.3 The Council embarked on the procurement of the D&B framework contracts in January 2015 following a procedure that accords with the EU procurement regulations. Tenders were received from 9 contractors on 5th October 2015 and are currently being assessed.

1.6.4 Award of a D&B for the A259 Littlehampton Improvements is expected to be made by Early 2016.

1.7 MANAGEMENT CASE

1.7.1 The Management case sets out the proposed project management procedures to be adopted throughout the life cycle of the project. A Project Board has been set up to oversee the project. The responsibilities of the Project Board include:

- Ensuring the project is, and remains, aligned with its objectives and other strategic policies.
- Monitoring progress, timescales and costs at a strategic level

- Contributing to, and signing off of key project management documents and project level plans
- Reviewing each completed stage and approving progress to the next
- Approving Exception Reports including authorizing any major deviation from the agreed Project (or Stage) Plans
- Arbitrating on any conflicts within the project including negotiating a solution to any problems between the project and any third parties
- Ensuring the Project Benefits can be, and are, delivered by the project.
- Approving Project Closure

1.7.2 Owing to the constraints associated with the proposed southern bypass, a three stage approach is proposed for the delivery of the scheme as follows:

Stage One

- Complete preliminary designs and environmental impact assessment This has been completed.
- Complete Transport Business Case and obtain funding approval from the Coast to Capital LEP. This is intended to be submitted to the LEP in November 2015.

Stage Two

- Undertake land acquisition by negotiation or CPO. This process has started.
- Procure Design and Build contract for the detailed design and construction with a break clause which allows the contract to be ended at the completion of detailed design and target costing. The contract is due to be awarded by March 2016.
- Undertake detailed design and agree target cost of the scheme, starting in March 2016.

Stage Three

- Proceed to construction subject to funding and land acquisition. The timelines are detailed in the scheme programme in Appendix E.

1.7.3 The scheme will be subject to Gateway Reviews in accordance with the WSCC Gateway Review Process by the Project Board at key decision points. These reviews would, among others:

- Enable the Project Board to assess the viability of the scheme at regular intervals, rather than let it run on in an uncontrolled manner.
- Ensure that key decisions are made prior to the detailed work needed to implement them.
- Clarify the impact of any identified external influences on the scheme

1.7.4 A strategy has been developed to establish how the performance of the scheme against objectives for project success will be monitored and assessed, to demonstrate the value for money for the funding of the scheme. These objectives relate to changes in traffic flows, reductions in journey times and in variability of travel times, changes in noise and air quality levels at key locations, highway safety and wider economic indicators.

2 PROJECT BACKGROUND

2.1 OVERVIEW

2.1.1 Littlehampton is in Arun District, which is one of the coastal districts in West Sussex. The town has merged with the settlements of Rustington and East Preston to create an urban area with a combined population of 48,200. This makes Littlehampton the second largest built up area in Arun District and provides 46% of the jobs available in Arun. The draft Arun Local Plan has allocations for regeneration, development and sustainable urban extensions

2.1.2 The A259 through Arun District forms part of the West Sussex Strategic Road Network and it is important that the road can continue to adequately perform its role as a high level component of the County's road network hierarchy for the foreseeable future. The Joint East Arun Area Committee (JEAAC) has identified concerns about the ability of the A259 to support anticipated pressures in the short and longer term, including the implications of recent, significant permissions and the emerging Arun Local Plan.

2.2 PROPOSALS

2.2.1 The A259 Corridor Improvement scheme provides a continuous strategic corridor comprising approximately 5.1km of dual carriageway between the new A259/A284 roundabout in the west and the A259/A280 roundabout in the east, with associated junction improvements along the corridor. The scheme is an online improvement, mostly within the existing highway boundary.

2.2.2 The proposed scheme is shown in Figure 2.1.

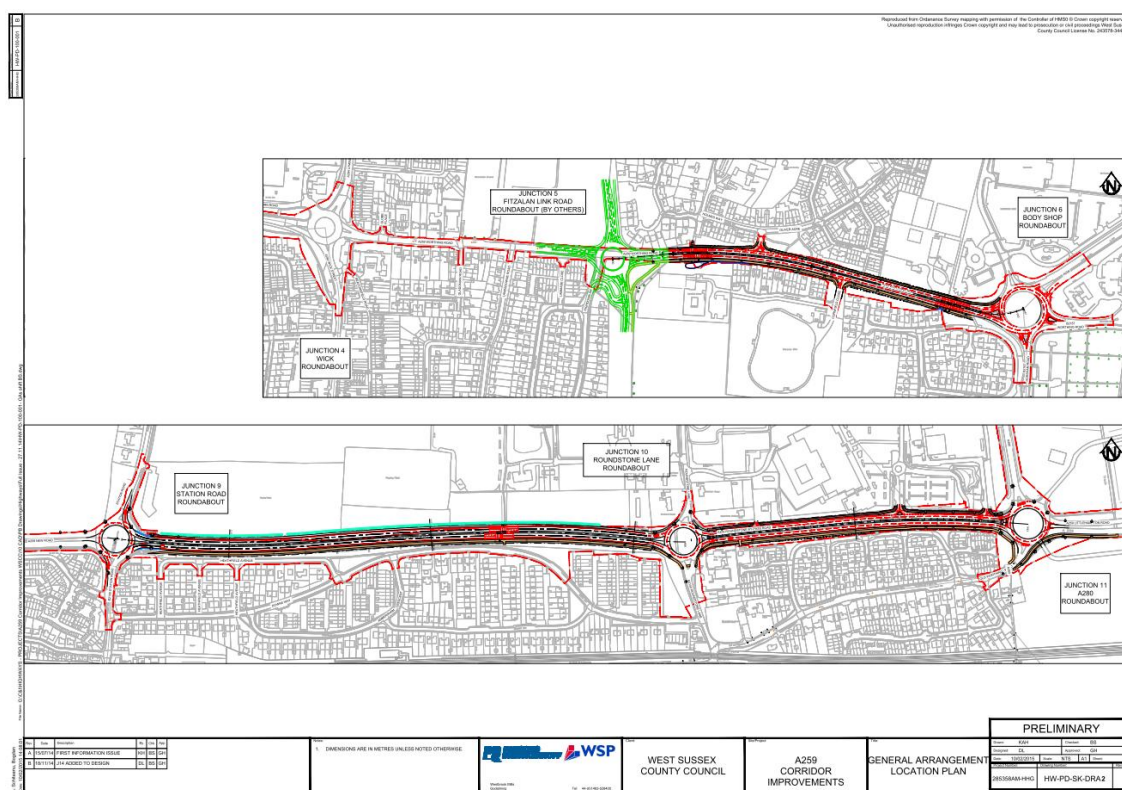


Figure 2.1 - Scheme overview

2.3 PURPOSE OF REPORT

- 2.3.1 The purpose of this report is to set out the Transport Business Case (TBC) for the scheme, thereby forming the primary evidence base for the A259 Corridor Improvement funding bid. The TBC has been completed in accordance with the Department for Transport's guidance document, "The Transport Business Cases" (January 2013). The TBC contains an assessment of the scheme options in sufficient detail to allow an investment decision to be made.

2.4 REPORT STRUCTURE

- 2.4.1 This Transport Business Case has been structured in accordance with the DfT's best practice five case model approach, with arguments set out in each of the following areas:

- **Strategic case** which sets out the case for change, demonstrating a need for future investment
- **Economic case** which identifies impacts of the options and demonstrates the resulting value for money, in accordance with the requirements of HM Treasury.
- **Financial case** which identifies the cost of the proposals, potential funding sources, financial risk and sustainability
- **Commercial case** which identifies the proposed strategy for procurement and management of the commercial risks
- **Management case** which demonstrates how the proposal will be delivered, setting out information relating to project planning, governance structure and stakeholder management

3 STRATEGIC CASE

3.1 INTRODUCTION

3.1.1 The information presented in the Strategic case sets out the need for the project and how the preferred option meets this need and aligns with the aims and objectives of West Sussex County Council and Coast to Capital Local Enterprise Partnership (LEP). Information has been obtained from liaison with key stakeholders. Information is presented on the following elements:

- Business strategy
- Problem identified
- Impact of not changing
- Objectives
- Measures for success
- Scope
- Constraints
- Interdependencies
- Stakeholders
- Options

3.2 BUSINESS STRATEGY

3.2.1 Coast to Capital is one of 39 Local Enterprise Partnerships set up in 2011 to deliver investments to drive economic growth and job creation. The Coast to Capital region covers Brighton and Hove, London Borough of Croydon, Gatwick Diamond, Lewes, and West Sussex, so works in close partnership with West Sussex County Council to deliver these objectives.

3.2.2 The A259 Corridor Improvement will support the growth of one of the underperforming areas of the West Sussex economy and is necessary for investment in Littlehampton so as not to constrain growth. The scheme, in combination with other schemes, would support the delivery of the Arun Local Plan which seeks to deliver 4,695 jobs, 2,600 homes and 27,370sqm net employment space in east Arun. Specifically, the scheme will support the delivery of at least 600 homes and 8.95Ha employment allocation at Angmering. The objectives align with the Coast to Capital vision around creating the right conditions for growth, jobs and investment.

3.2.3 Congestion along the A259 corridor is specifically identified in the West Sussex Transport Plan 2011-2026 as an issue to be addressed. The A259 Corridor Improvement addresses this problem and will support local objectives within the draft Arun Local Plan (Policy H SP1 and Policy T SP3) to reduce congestion along the A259 in Littlehampton and Angmering.

3.3 PROBLEM IDENTIFIED

3.3.1 The area of interest is shown in Figure 3.1.

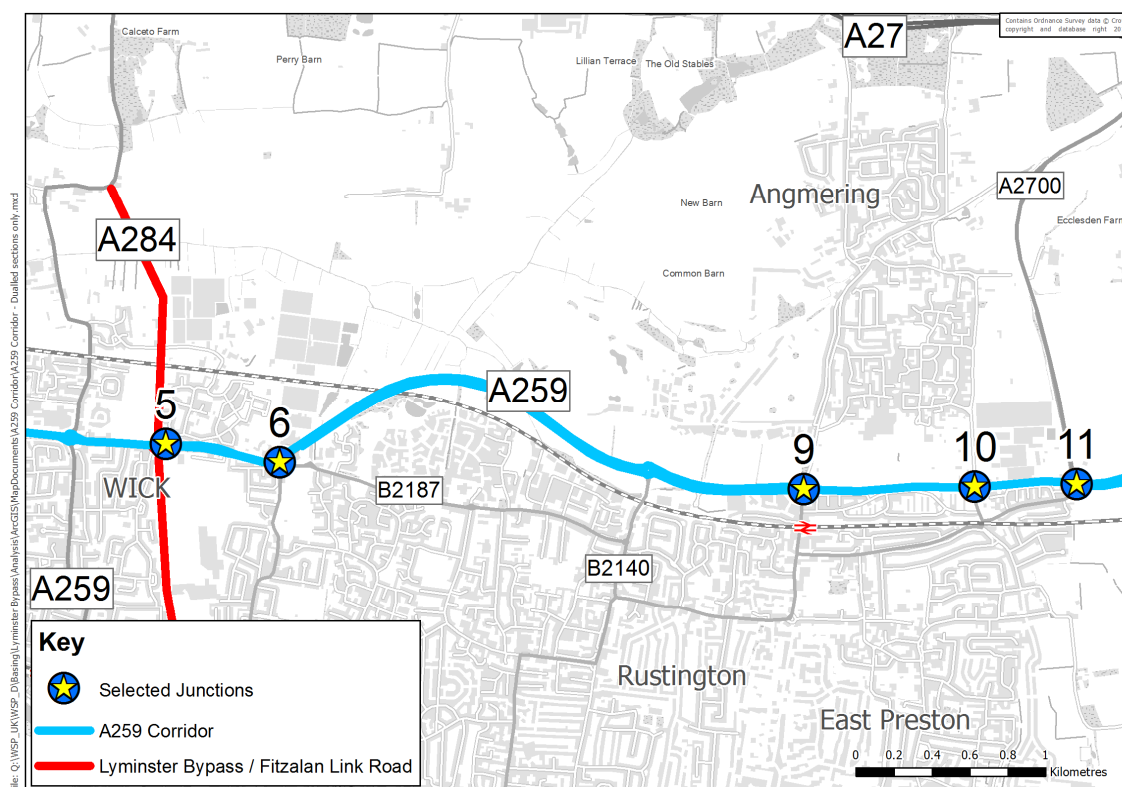


Figure 3.1 - Area of interest

- 3.3.2** The A259 through Arun District forms part of the West Sussex Strategic Road Network and it is important that the road can continue to adequately perform its role as a high level component of the County's road network hierarchy for the foreseeable future.
- 3.3.3** The proposed A284 Lyminster Bypass will join the A259 at a new junction between the existing A284/A259 Wick Roundabout and the A259/B2187 Body Shop roundabout. East of this point, the A259 provides the primary strategic east-west corridor through Arun District.
- 3.3.4** The route is characterised by several at-grade junctions, residential and retail frontages close to the highway boundary, and a discontinuous section of dual carriageway between the A259/B2187 Body Shop roundabout and the A259/Station Road roundabout. The remaining sections of single carriageway experience high traffic flows - up to 27,500 Average Annual Daily Traffic (AADT) in 2013 - with the resultant congestion causing severe delays and a detrimental impact to noise and air quality for residents.
- 3.3.5** Littlehampton's local economy performs poorly in comparison to other areas of West Sussex and the wider South East region. The congestion on the A259 across the local area is seen as a significant disincentive for businesses, especially higher value businesses, to locate in the Littlehampton area and makes it harder for existing business to attract and retain qualified and skilled staff.

3.3.6

Wards in Littlehampton have higher levels of unemployment and of deprivation in income and employment than the average for West Sussex, as shown below. The poor transport links and lack of attractiveness for business are likely to be contributory factors to this situation. River and Ham wards in Littlehampton feature in the 10% most deprived wards nationally from the indices of multiple deprivation.

Table 3.1: Economic indicators for Littlehampton wards

AREA	% UNEMPLOYED (2011 CENSUS)	% PEOPLE INCOME DEPRIVED (2010)	% WORKING AGE PEOPLE EMPLOYMENT DEPRIVED (2010)
West Sussex	3.2	9.5	6.9
Beach ward	3.6	10.5	9.3
Brookfield ward	4.1	11.1	6.8
Ham ward	4.7	24.0	13.8
River ward	5.6	21.1	18.1
Wick with Toddington ward	3.6	12.1	8.0

3.4 IMPACT OF NOT CHANGING

3.4.1

To inform the scheme design, a traffic model of the East Arun area has been created in accordance with the principles set out in WebTAG and the Design Manual for Roads and Bridges (DMRB). The East Arun Traffic Model (EATM) has been built to an observed base year of 2013, with forecasts built for the scheme opening year of 2017 and scheme design year of 2032. Development of the EATM is documented in the Local Model Validation Report and the Traffic Forecasting Report.

3.4.2

Each of the forecast year models has been run for three scenarios:

- Low Growth Scenario, which includes only committed developments and highway schemes which are deemed to be “near certain”;
- Core Scenario, which includes committed developments and highway schemes deemed as “near certain” and “more than likely”; and
- High Growth Scenario, which includes all committed developments and highway schemes

3.4.3

The Core Scenario is considered the most likely overall scenario, and therefore the Transport Business Case has been based on this. The impact of not changing is best evidenced by considering:

- Link flows
- Journey times
- Junction performance

3.4.4 The key points for each set of data are presented in the following paragraphs.

Link flows

3.4.5 Forecast weekday traffic flows for 2018 and 2033 are presented in table 3.2 for key links in comparison to observed 2013 flows.

Table 3.2: Average Annual Weekday Total (AAWT)

LINK	2013	2018	2033
J5 (A284) – J6 (Body Shop)	21,500	29,400	32,800
J8 (B2187/golf club) – J9 (Station Road)	33,500	39,600	43,900
J9 (Station Road) – J10 (Roundstone Lane)	26,700	29,400	32,700
J10 (Roundstone Lane) – J11 (A280)	27,500	29,600	31,000

3.4.6 Key links along the corridor experience a significant increase in traffic flow in forecast years, leading to increases in congestion and journey time, as further demonstrated below.

Journey times

3.4.7 Forecast journey times for each key section of the scheme have been extracted from the traffic model and are presented below.

Table 3.3: Forecast journey times (mm:ss)

LINK	DIRECTION	AM PEAK			PM PEAK		
		DM	DS	CHANGE	DM	DS	CHANGE
J5-6	EB	6:52	6:04	-0:48	9:03	6:43	-2:20
	WB	9:11	8:06	-1:05	7:07	6:25	-0:42
J9-11	EB	6:15	4:22	-1:53	4:19	2:52	-1:27
	WB	3:57	3:23	-0:34	5:04	3:07	-1:57

3.4.8 The scheme provides significant improvements in journey times along the corridor.

Junction performance

3.4.9 Junction models have been developed for each of the junctions along the route. The maximum queues in 2033 in the peak hours are provided below.

Table 3.4: Forecast queues

JUNCTION	APPROACH	AM PEAK			PM PEAK		
		DM	DS	CHANGE	DM	DS	CHANGE
J6 (Body Shop)	A259 E	2	2	0	3	4	+1
	A259 W	112	4	-108	49	2	-47
J9 (Station Road)	A259 E	5	4	-1	7	5	-2
	A259 W	3	3	0	3	3	0
J10 (Roundstone Lane)	A259 E	3	2	-1	5	3	-2
	A259 W	7	3	-4	8	3	-5
J11 (A280)	A259 E	1	1	0	3	3	0
	A259 W	35	2	-33	124	2	-122

3.4.10 The scheme provides significant congestion relief at key junctions along the corridor.

3.5 OBJECTIVES

3.5.1 The overall objective for this scheme is to improve the existing corridor to provide a high-quality strategic corridor between the new A259/A284 junction and Worthing. The scheme meets a series of objectives that align with the strategic aims of West Sussex County Council and Coast to Capital LEP. These are:

- Provide motorists with a less congested route with reduced journey times
- Reduce queue lengths at key junctions within the scheme
- Directly support delivery of the Angmering development allocation of 600 new homes and 8.95ha employment space
- Indirectly contribute to creation of 4,695 jobs, 2,600 homes and 27,370sqm net employment space in East Arun
- Fulfil the above criteria while providing good value for money for the taxpayer

3.6 MEASURES FOR SUCCESS

3.6.1 In order to measure whether the scheme objectives set out above have been met, a series of specific; measurable; achievable; realistic and time-bound targets have been derived.

Table 3.5: Measures for success

OBJECTIVE	TARGET
Provide less congested route with shorter journey times	Forecast journey times between the A259/A284 junction and A259/A280 lower in Do Something scenario compared to Do Minimum scenario
Reduce queue lengths	Forecast queue lengths between the A259/A284 junction and A259/A280 lower in Do Something scenario compared to Do Minimum scenario
Support Angmering development allocation	Full quantum of development in Angmering is completed by 2031
Indirectly support East Arun development allocation	Significant proportion of development quantum in East Arun is completed by 2031
Achieve good value for money	Benefit Cost Ratio greater than 2

3.7 SCOPE

3.7.1 The scheme provides a continuous strategic corridor comprising approximately 5.1km of dual carriageway between the new A259/A284 roundabout in the west and the A259/A280 roundabout in the east. The scheme is an online improvement, mostly within the existing highway boundary, comprising the following elements:

- **Dualling between J5 (New A284) and J6 (Body Shop)** - approximately 550m in length. Existing right-turn gap into Olliver Acre Estate will be closed; a new shared pedestrian and cyclist path will be provided in the southern verge.
- **Dualling between J9 (Station Road) and J11 (A280)** - approximately 1400m in length. A new continuous shared pedestrian and cyclist path will be provided in the southern verge.
- **J6 (Body Shop Roundabout)** – It is proposed that localised entry widening (flare lane) is provided on the A259 eastbound entry arm. It is also suggested that developer proposals as a part of NL SDA (dwg. WYGLITTLEHSAMPTON.1/37 rev A) are also taken forward. These include revised spiral and destination markings and associated entry lane adjustments.
- **J9 (Station Road Roundabout)** - It is proposed that localised entry widening (flare lane) is provided on both the Station Road approaches (north and south arms), along with the dualling of the A259 western arm.
- **J10 (Roundstone Lane Roundabout)** – Modifications to the roundabout to accommodate dualling in both directions.
- **J11 (A259/A280 Roundabout)** – It is proposed that this roundabout is amended through localised widening of the A259 eastbound entry along with the dualling of the link leading up to it from the Roundstone Lane Roundabout. As part of this proposal the roundabout diameter is also increased slightly.

3.8 CONSTRAINTS

3.8.1 The following is a summary of the high level constraints on the scheme:

- **Form of contract** – WSCC Standing Orders specify that the Lowest Price of Most Economically Advantageous Tender (MEAT) criteria shall be used when procurement is undertaken by the Council
- **Land** – The scheme is an online improvement, to be completed largely within the confines of the existing highway boundary, although some small areas of land take will be required

3.9 INTERDEPENDENCIES

- 3.9.1 There are three other schemes that potentially have interdependencies with the A259 Corridor Improvement. These are discussed below.

A284 Lyminster Bypass

- 3.9.2 The A284 Lyminster Bypass is being delivered in two sections. The southern section, from the North Littlehampton Strategic Development Location (SDL) to a new junction on the A259 (J5) is being delivered by the North Littlehampton developers along with the Fitzalan Link Road which continues south from A259 J5 to the Littlehampton Academy and hence to Littlehampton town centre. The northern section, from a tie-in north of Lyminster to the SDL is being delivered as a major project by WSCC. The current proposals are for the bypass to be open by December 2017 and there is a design interdependency in as much as both schemes tie-in at the same point, so designs must be harmonised.

- 3.9.3 There is also an operational interdependency, as the A284 Lyminster Bypass removes an existing pinch point between the A27 at Crossbush and the A259, reducing north-south journey times significantly by avoiding the existing Wick level crossing, and moving strategic traffic away from Wick roundabout (J4) further east to the new junction (J5). If the bypass were not constructed, the proposed A259 Corridor Improvement remains a valid scheme, but since J5 would no longer exist, additional works may be required between Junction 4 (Wick roundabout) and the proposed tie-in. The A284 Lyminster Bypass scheme will provide a proposed new junction on the A259 at Littlehampton (J5) and the scheme is designed to tie in at this junction. It will also change the location at which A284 traffic intersects with the A259 from J4 to J5. If the A284 bypass were not delivered, J5 would not exist and some additional works would be required to accommodate the proposed change in A259 link standard from S1 to D2 at this location together with the existing junction of Highdown Drive. However, the scope for works in this location is severely limited by the proximity of frontages to the existing highway boundary. If the bypass were not constructed this would also affect the traffic flow forecasts for the A259, notably between J4 and J6, as A284 traffic would join, leave and cross the A259 at J4 rather than J5.

A259 Bognor Regis Relief Road

- 3.9.4 This new road is also being delivered in two sections. The western section, which bypasses North Bersted, opened to traffic in December 2014, but has not had a measureable impact on A259 traffic flows at Littlehampton. The eastern section completes the route by bypassing Felpham and Upper Bognor Road, bridging the Barnham to Bognor Regis railway line and the Lidsey Rife watercourse. The road is under construction at the time of writing and is due to be completed in spring 2016. The new road may influence route choice for local journeys between Littlehampton and Chichester. This could increase traffic flow through the A259/B2187 Bridge Road (J1) at Littlehampton and on the Littlehampton Bypass to J4, but is not expected to noticeably influence traffic flow any further east than the A284 at J4/J5.

A27 Improvements

- 3.9.5 Details of the Government's commitment to improve the A27 at Arundel, Worthing and Lancing are not currently available and therefore cannot be taken into account in this TBC. In principle the A27 Arundel Bypass is described as a dual 2-lane carriageway bypass passing to the south of the town, but the preferred alignment has not yet been chosen. It is not yet known whether the bypass would have an intermediate junction at Ford Road and if so, whether this would serve all turning directions. The A27 Worthing to Lancing scheme is considering improvement options to junctions and links, principally based on the existing alignment. A27 improvements at Arundel, Worthing and Lancing will need to take account of this scheme as these proposals are developed.

3.9.6 The A27 at Arundel is a significant constraint on the operation of the trunk road network in this area, as it comprises a short section of single carriageway with three at-grade junctions on a route that is otherwise dual carriageway with some grade-separated junctions. This generates significant congestion, particularly at the signalised junction with the A284 at Crossbush, immediately to the north of the Lyminster Bypass.. The Department for Transport have published an A27 Corridor Feasibility Study, which includes consideration of Arundel Bypass. In its first Roads Investment Strategy published in December 2014, the Government committed to deliver a new dual carriageway bypass to link together the two existing dual carriageway sections of the road in late Road Period 1 (2015-20). An interim scheme for a minor improvement at Crossbush has been previously submitted for Pinch Point funding, but has so far not been granted funding. The interim scheme may not be taken forward if the main Arundel Bypass progresses according to the published timetable. Highway improvements at Crossbush or Arundel could be expected to significantly enhance the benefits for the A259 Corridor Improvement, with the degree of enhancement dependant on the final design for any A27 improvements.

3.9.7 Although both the A27 and A259 serve as east-west corridors, the A27 is a fast strategic route catering primarily for long-distance traffic, and the A259 is a slower route serving traffic with an origin or destination within the local area. As such, the two corridors are not considered as competing routes. The proposed improvement schemes on these corridors have significantly different timescales for implementation, and both are intended to relieve congestion for existing users. There is no expectation for significant transfer of traffic between the corridors, regardless of the status of the improvement schemes. Some traffic movements with local trip ends (origins or destinations) may adjust their routes to change the route of transfer between the A27 and A259, as a result of the combined effects of the A259, A27 and A284 improvement schemes, however at present this is expected to be broadly neutral for levels of overall flow on both roads.

3.10 STAKEHOLDERS

3.10.1 The following are key stakeholders in the scheme:

- **West Sussex County Council** – Scheme promoter, concerned with strategic movement of people across the highway network and economic regeneration of Littlehampton and surrounding area
- **Coast to Capital** – Local Enterprise Partnership (LEP) responsible for delivering economic growth and job creation in areas including West Sussex
- **Arun District Council** – Local Authority for scheme. Supporter of the scheme.
- **Joint Downland Area Committee** - covers The Six Villages, Clymping, Findon, Clapham, Patching and the Arundel Area and consists of 4 County Councillors, 6 District Councillors and 20 Town or Parish Council representatives. The committee is regularly provided with updates on the scheme.

3.10.2 The stakeholders are shown in figure 3.4.

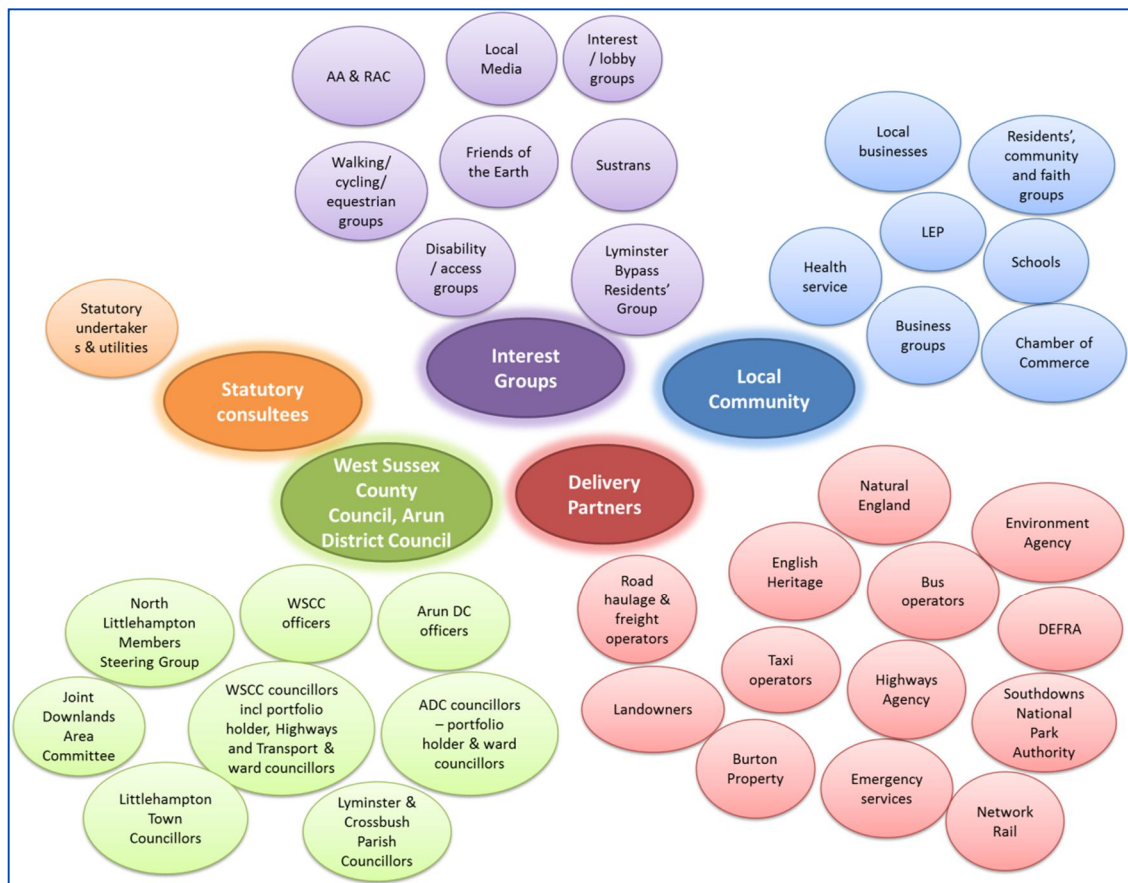


Figure 3.2: Stakeholder map

3.10.3 The approach for engaging these stakeholders is set out in section 7.7.

3.11 OPTIONS AND ALTERNATIVES

- 3.11.1 Transport consultants (Parsons Brinckerhoff) were commissioned by WSCC in October 2012, under the IESE Framework, to undertake an A259 Route Improvement Study. This study, steered by JEAAC Highways & Transport sub-group, focussed on the section of the A259 which runs from the River Arun in the West and extends to and includes the Goring Crossways in the east. This equates to approximately 6 miles of the A259 and 14 key junctions.
- 3.11.2 Utilising localised 'junction design models', the study concluded that further improvement will be required at specific links and junctions along the A259 within the study area. An initial first-tranche assessment was undertaken to create a shortlist of links and junctions that were likely to experience capacity issues during the period covered by the Arun District Council (ADC) Local Plan development proposals. This covers the period up to 2028.
- 3.11.3 A further, more detailed, assessment was then undertaken to firstly confirm the result of the first-tranche assessment and then test potential improvement options, before finally identifying a Preferred Options Package for the whole study route. The results of this commission were published by Parsons Brinckerhoff in the A259 Route Improvement Study in February 2013.
- 3.11.4 The Preferred Options Package comprises changes to two links and four junctions as well as adjustments and improvements to pedestrian and cycle crossings. The links are;
- **J5 - J6 (Worthing Road)** – Future Fitzalan Link Road/A284 Lyminster Bypass Roundabout to Body Shop Roundabout. Dualling of the currently single carriageway section between J5 – J6.
 - **J9 – J11 (Roundstone Bypass Road)** – station Road Roundabout to A280 Roundabout. Dualling of the current single carriageway.
- 3.11.5 The junctions are;
- **J6 – Body Shop Roundabout** – It is proposed that localised entry widening (flare lane) is provided on the A259 eastbound entry arm. It is also suggested that developer proposals as a part of NL SDA (dwg. WYGLITTLEHSAMPTON.1/37 rev A) are also taken forward. These include revised spiral and destination markings and associated entry lane adjustments.
 - **J9 – Station Road Roundabout** - It is proposed that localised entry widening (flare lane) is provided on both the Station Road approaches (north and south arms), along with the dualling of the A259 western arm.
 - **J10 – Roundstone Lane Roundabout** – It is proposed that the A259 is dualled in both directions.
 - **J11 - A259/A280 Roundabout** – It is proposed that this roundabout is amended through localised widening of the A259 eastbound entry along with the dualling of the link leading up to it from the Roundstone Lane Roundabout. As part of this proposal the roundabout diameter is also increased slightly.
- 3.11.6 The crossings pedestrian and cycle crossing are;
- Existing Puffin crossing mid-way between the future Fitzalan Link Road/A284 Lyminster Bypass Roundabout (J5) and Body shop Roundabout (J6) to be amended due to the proposed dualling.
 - Existing Toucan crossing immediately west of Body shop roundabout (J6) to be re-located further west due to proposed dualling and junction improvements.
 - Existing Pelican crossing mid-way between station Road Roundabout (J9) and Roundstone Lane Roundabout (J10) to be upgraded to Toucan crossing.

- 3.11.7 The Preferred Options Package has been reviewed and refined in more detail and assessed in terms of affordability, value for money, and fit with strategic objectives to arrive at the current project scope.

4 ECONOMIC CASE

4.1 INTRODUCTION

- 4.1.1 The economic assessment is undertaken to ensure that all the options are assessed and to fulfil HM Treasury's requirements for appraisal and demonstrating value for money.
- 4.1.2 To enable the scheme value for money to be calculated, and to inform the scheme design and environmental assessments of the scheme, a traffic model of the East Arun areas has been created in accordance with the principles set out in WebTAG and the Design Manual for Roads and Bridges (DMRB). The East Arun Traffic Model (EATM) has been built to an observed base year of 2013, with forecasts built for the scheme opening year of 2018 and scheme design year of 2033. Development of the EATM is documented in the Local Model Validation Report and the Traffic Forecasting Report.
- 4.1.3 A non-statutory Environmental Statement has also been prepared that assesses the environmental impacts of the scheme in accordance provided in DMRB Volume 11.
- 4.1.4 Information is presented below on the following:
- Options appraised
 - Assumptions
 - Sensitivity and risk profile
 - Appraisal Summary Table
 - Value for Money statement

4.2 OPTIONS APPRAISED

- 4.2.1 In developing the Economic Case, a single Do Something scenario, comprising the improvement specified in the project scope, has been developed for testing against a Do Minimum scenario. The results presented in the Economic Case are based on this Do Something scenario.

4.3 ASSUMPTIONS

- 4.3.1 The economic case has been compiled in accordance with the guidance set out in WebTAG. However, there are some assumptions that have been made in relation to some specific areas of the assessment, and these are discussed below. Full results are documented in the Economic Assessment Report (EAR).

User benefits

- 4.3.2 Scheme benefits have been assessed using the Department for Transport's TUBA (Transport Users Benefit Appraisal) software. This is an industry-standard tool for undertaking economic appraisal in accordance with guidelines published in WebTAG Unit A1 (November 2014). The full economic assessment methodology adopted including choice of parameters, definition of inputs, discounting and reporting is compliant with WebTAG Unit A1.
- 4.3.3 TUBA v1.9.5 was used which is the current version and is consistent with parameters published in WebTAG Unit A1 (November 2014).
- 4.3.4 The A259 Corridor, like most road projects, is considered to be an asset with an indefinite life, with maintenance and renewal taking place as required. Scheme appraisal has therefore been undertaken for a 60-year period in accordance with HM Treasury's Green Book, from the assumed scheme opening in 2018 to 2077.
- 4.3.5 Annualisation factors for the three modelled time periods have been derived based on values obtained from the traffic survey data, as set out in section 8.3 of the Data Collection Report. The derived annualisation factors are given in table 4.1.

Table 4.1: Annualisation factors

PERIOD	PEAK HOUR TO PEAK PERIOD FACTOR	NUMBER PER YEAR	ANNUALISATION FACTOR
AM (07:00-10:00)	2.329	253	589
IP (10:00-16:00)	6.075	253	1537
PM (16:00-19:00)	2.454	253	621
Off-peak (19:00-07:00 weekdays)	2.70	253	683
Weekend (Sat 07:00-Mon 07:00)	25.60	56	1444

- 4.3.6 Off-peak and weekend periods use the interpeak model as a proxy, with suitable factors applied based on observed traffic flows over these periods. Bank holidays are represented by weekend factors. There are 8 bank holidays per year, which can be amalgamated into four 2-day blocks equivalent to a weekend. Thus, there are 56 "weekend" periods in a year. The calculated benefits have therefore been derived for all 8,760 hours in the year.
- 4.3.7 User classes have been defined as shown in table 4.2 so that the definitions used in model development have been applied to the TUBA assessment.

Table 4.2: User class definitions

UC	MODEL DEFINITION	TUBA PARAMETER		
		Vehicle Type	Purpose	Person Type
1	Car: Commuting	Car	Commuting	All
2	Car: Employer's Business	Car	Business	All
3	Car: Other	Car	Other	All
4	LGV	LGV Freight	Business	All
5	OGV1	OGV1	Business	Driver
6	OGV2	OGV2	Business	Driver

- 4.3.8 TUBA requires that the trip matrices be entered as total trips, but SATURN defines trips in Passenger Car Units (PCU), as set out in the Local Model Validation Report (February 2014). It is therefore necessary to apply adjustment factors to convert the PCU matrices into total trips. These are set out in table 4.3

Table 4.3: PCU to vehicle adjustment factors

UC	MODEL DEFINITION	PCU FACTOR	TUBA FACTOR
1	Car: Commuting	1.0	1.00000
2	Car: Employer's Business	1.0	1.00000
3	Car: Other	1.0	1.00000
4	LGV	1.0	1.00000
5	OGV1	1.9	0.52632
6	OGV2	2.9	0.34483

- 4.3.9 The derivation of the PCU factors is set out in section 2.7 of Deliverable D8 - Forecasting Report (October 2014).
- 4.3.10 Model skims were extracted for 2018 and 2033. The TUBA default assumption on growth has been applied, with no additional growth assumed beyond the final modelled year of 2033. The default assumptions on growth in the values of impacts have also been applied, meaning that the per unit benefits of the scheme decline over time.
- 4.3.11 The model forecasts have been completed in accordance with WebTAG principles, as set out in the A259 Corridor Improvement Forecasting Report. WebTAG requires that forecasts for fixed trip models should include increases to account for fuel and income growth, resulting in relatively large growth forecasts. While this is sufficient to generate a robust assessment, it is reasonable to assume that such growth forecasts will not continue indefinitely. There is no further evidence to indicate the likely direction of traffic growth beyond this point, so the default assumption of zero growth beyond the final modelled year has been adopted.

- 4.3.12 Although sensitivity testing around alternative growth profiles has not been carried out, the analysis undertaken on the high and low growth scenarios provides a sufficiently robust evidence base to assess the scheme benefits under alternative growth scenarios.

Wider impacts

- 4.3.13 The wider economic impacts of the proposed scheme have been assessed in accordance with guidance set out in WebTAG Unit A2-1. The guidance considers the following impacts:
- **WI1: Agglomeration:** changes in economic production as a result of changes in connectedness and accessibility
 - **WI2: Output change in imperfectly competitive markets:** a reduction in transport costs to businesses allows for an increase in output of goods and services that use transport
 - **WI3: Tax revenues arising from labour market impacts:** changes in labour supply or a move to more or less productive jobs due to a change in commuting cost
- 4.3.14 WebTAG indicates that the output change in imperfectly competitive markets and tax revenues from changes in the labour supply will be relevant to most schemes, but the other two elements may not be relevant. Critical to this determination is whether the scheme is in close proximity to an economic centre or large employment centre. WebTAG defines such locations as Functional Urban Regions (FUR), and the plan included in Appendix A of the guidance indicates that the A259 Corridor Improvement does not lie within a FUR.
- 4.3.15 It is considered that the impact on the labour supply due to changes in transport costs will be beneficial, as congestion will be reduced, but the impact will be small in relation to the typical length of commuting trips. The data collection and analysis required for a detailed quantitative study is considered disproportionate for a scheme of this size.
- 4.3.16 Consequently, only the output change in imperfectly competitive markets (WI2) has been assessed.

Accident assessment

- 4.3.17 Assessment of the costs and benefits associated with accidents has been undertaken using the DfT's CoBALT (**C**ost – **B**enefit-**A**nalysis **L**ight **T**ouch) software. Input parameters are the latest available, published November 2014.
- 4.3.18 CoBALT uses information derived from the SATURN model, so a network has been built that replicates the EATM network. Traffic flows have been obtained from the SATURN model, for the following years:
- Base Year (2013)
 - Opening year (2018)
 - Design year with Scheme (2033)
- 4.3.19 Accident data for a period of five years from 2009 to 2013 has been obtained from WSCC in order to provide accident rates for existing links in CoBALT. The accidents have been geocoded to correspond to the selected highway network. The observed accidents are shown by year in figure 4.1 and by severity in figure 4.2.

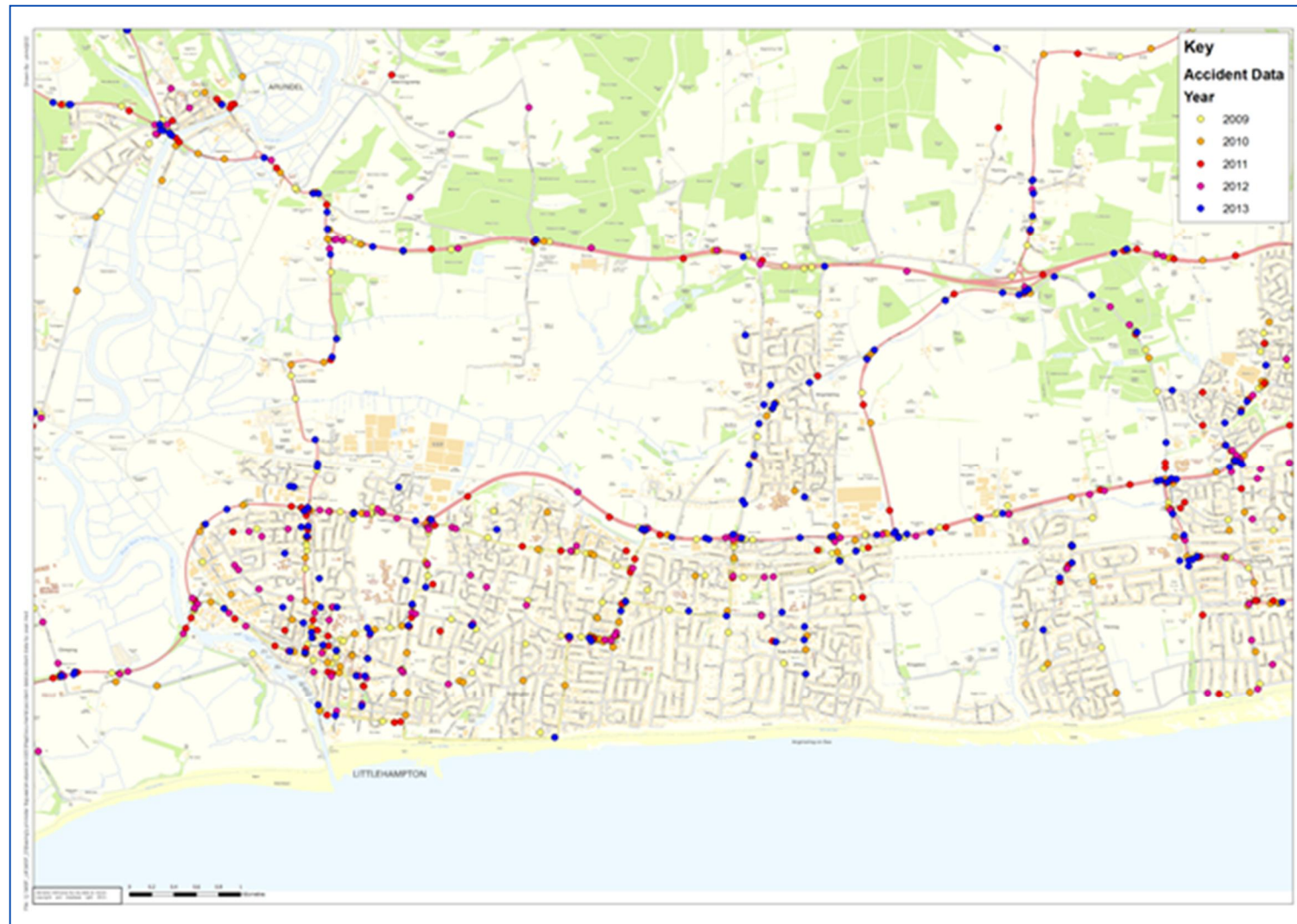


Figure 4.1: Observed accidents 2009-2013

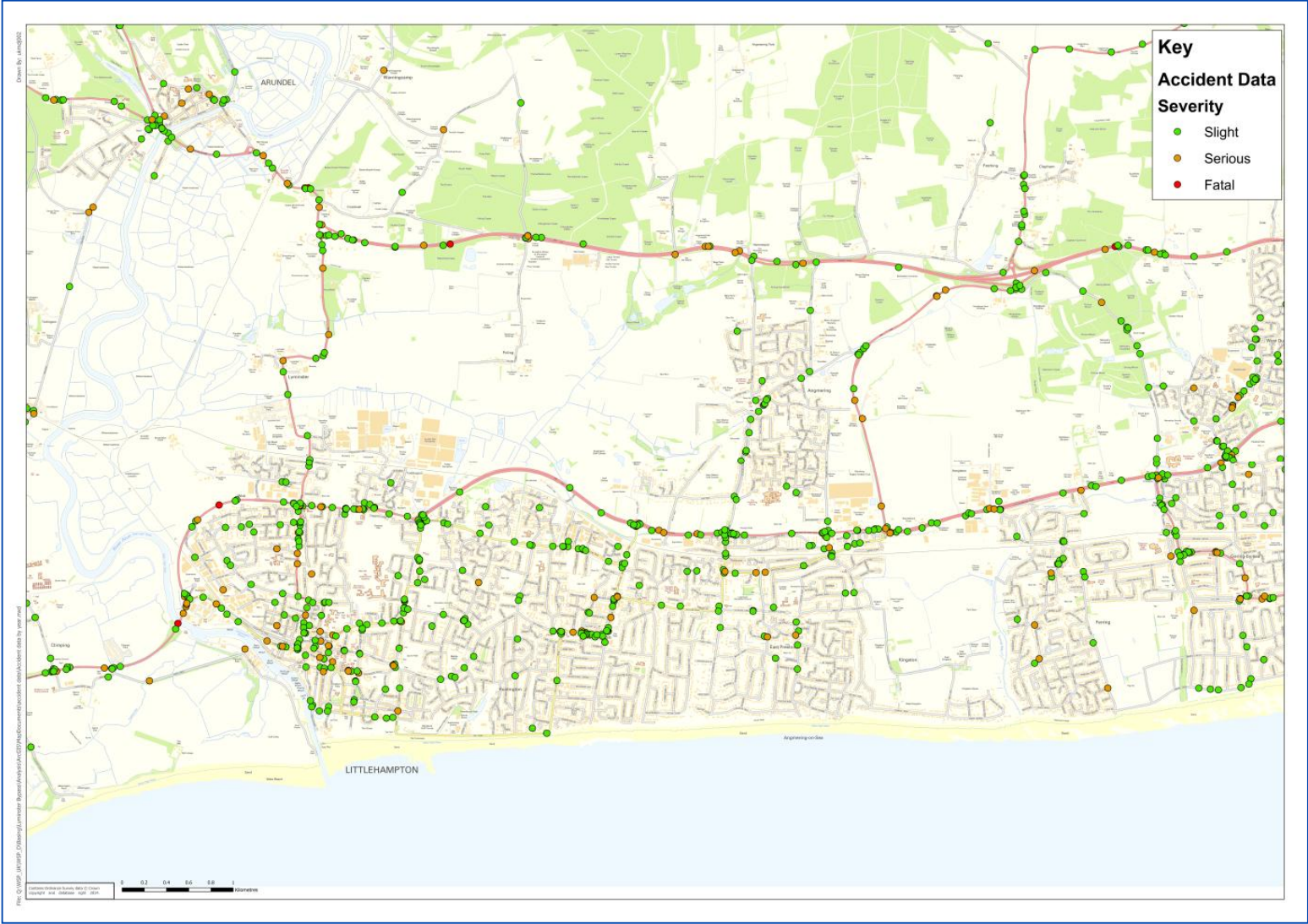


Figure 4.2: Observed accidents by severity

4.3.20 CoBALT provides three options for assessment:

- Link only
- Junction only
- Link and junction combined

4.3.21 The analysis for the A259 Corridor Improvement has been carried out using the 'combined' method. This requires considerably less analysis than separate link and junction analysis, so is the appropriate proportional assessment for this scheme. WebTAG Unit A4-1 2.3.9 indicates that this is acceptable when local data is hard to distinguish between links and junctions.

4.3.22 Full analysis of the accident assessment is provided in the Economic Assessment Report.

Delays during construction

4.3.23 Delays during construction have not been calculated at this stage, as the construction plan will be developed during the detailed design stage

Distributional Impact Appraisal

4.3.24 Distributional impact appraisal considers whether the benefits and disbenefits of a scheme have a disproportionate impact on a particular social group that is different to the impact on the population as a whole.

4.3.25 Following WebTAG guidance, a screening process has been undertaken to identify those elements that are likely to require assessment. Since the project is a highway-only scheme with a short length of new carriageway, the elements for which distributional impact appraisal have been undertaken are:

- Business users
- Commuting and other users

4.3.26 The results of the analysis are summarised in the AST in Appendix A, with supporting worksheets in Appendix B.

Air Quality Assessment

4.3.27 The results of the air quality assessment are provided in the Environmental Statement. They are not monetised and included in the economic analysis

Noise Assessment

4.3.28 The results of the noise assessment are provided in the Environmental Statement. They are not monetised and included in the economic analysis Results

RESULTS

4.3.29 Full results are provided in the Economic Assessment Report, and summarised below.

User benefits

4.3.30 The Transport Economic Efficiency (TEE) benefits are shown in table 4.4. All values are in 2010 prices, discounted to 2010.

Table 4.4: Transport Economic Efficiency benefits (2010 prices discounted to 2010)

BENEFIT		LOW GROWTH	CORE SCENARIO	HIGH GROWTH
Consumer - commuting user benefits	Travel time	£12,929,000	£15,160,000	£11,354,000
	Vehicle operating costs	£881,000	£989,000	£838,000
	Subtotal	£13,811,000	£16,150,000	£12,192,000
Consumer - other user benefits	Travel time	£46,697,000	£52,740,000	£40,686,000
	Vehicle operating costs	£875,000	£1,814,000	£2,036,000
	Subtotal	£47,572,000	£54,554,000	£42,721,000
Business benefits	Travel time	£35,498,000	£41,240,000	£30,640,000
	Vehicle operating costs	£2,533,000	£3,580,000	£3,231,000
	Subtotal	£38,032,000	£44,820,000	£33,871,000
Greenhouse gases		£756,000	£1,026,000	£888,000
Indirect tax revenues		-£1,916,000	-£2,618,000	-£2,356,000
Present Value of Benefits (PVB)		£98,255,000	£113,932,000	£87,316,000

Wider impacts

4.3.31 The results of the analysis described above are summarised in table 4.5. The appraisal period is 2018-2077. All monetary values in 2010 prices, discounted to 2010.

Table 4.5: Wider economic impacts results (2010 prices discounted to 2010)

IMPACT	2018	2033	FULL PERIOD	NET PRESENT VALUE
WI2 – Output in Imperfectly Competitive Markets	£72,393	£197,591	£16,435,985	£4,455,092

Accident assessment

4.3.32

Costs per casualty and per accident are given in tables 4.6 and 4.7, and are taken from the WebTAG data book November 2014). All monetary values are in pounds, in 2010 prices, discounted to 2010.

Table 4.6: Costs per casualty (2010 prices)

SEVERITY	COST
Fatal	£1,640,134
Serious	£184,305
Slight	£14,208

Table 4.7: Costs per accident (2010 prices)

SEVERITY	INSURANCE ADMIN	DAMAGE TO PROPERTY			POLICE COST		
		Urban	Rural	M'way	Urban	Rural	M'way
Fatal	£301	£7,842	£13,301	£16,919	£17,012	£17,469	£17,673
Serious	£187	£4,203	£6,064	£14,437	£1,878	£2,345	£2,477
Slight	£114	£2,479	£4,019	£7,304	£486	£666	£556
Damage only	£54	£1,773	£2,651	£2,547	£36	£20	£17

4.3.33

The results of the accident analysis are shown in table 4.8. The appraisal period is 2018-2077.

Table 4.8: Accident analysis results (2010 prices, discounted to 2010)

BENEFIT		VALUE
Total accidents saved by scheme		273
Casualties saved by scheme	Fatal	2
	Serious	34
	Slight	324
	TOTAL	360
Total value of accident savings		£14,311,500

- 4.3.34 The scheme generates £14.3m worth of safety benefits arising from a reduction in accidents and casualties. Therefore there are significant safety benefits associated with the scheme.

Distributional Impact Assessment

- 4.3.35 Detailed results of the distributional impact of user benefits are provided in Appendix B. The results are summarised in table 4.9.

Table 4.9: Distributional impact assessment

	DEPRIVATION	SHARE OF POPULATION	SHARE OF COMMUTING AND OTHER USER BENEFITS	SHARE OF BUSINESS USER BENEFITS
Most deprived	0 – 20%	2%	2%	2%
↑	20 – 40%	24%	18%	19%
	40 – 60%	38%	31%	34%
↓	60 – 80%	28%	45%	39%
Least deprived	80 – 100%	8%	3%	6%

- 4.3.36 User benefits are largely in line with the population split, with a slight bias towards benefits in the fourth deprivation band, at the expense of those in the second and third bands.

4.4 SENSITIVITY AND RISK PROFILE

- 4.4.1 The EATM Traffic Forecasting Report sets out the construction of Core Scenario forecasts that inform the core assessment of this business case, and are included on the Appraisal Summary Table. The Traffic Forecasting Report also sets out the derivation of low and high growth scenarios that correspond to optimistic and pessimistic rates of traffic growth, development and infrastructure improvement. These three scenarios allow the benefits of the scheme to be tested under different forecast conditions. The net Present Value of Benefits for the preferred scheme for each growth scenario is shown in table 4.10. All values are given in 2010 prices, discounted to 2010.

Table 4.10: Present Value of Benefits (PVB) for alternative growth scenarios

GROWTH SCENARIO	BENEFIT
Low	£98,255,000
Core	£113,932,000
High	£87,316,000

- 4.4.2 Benefits quoted here are as output from TUBA, so do not include adjustments to account for accidents. Values quoted in the Economic Efficiency of the Transport System (TEE) table and Analysis of Monetised Costs and Benefits (AMCB) table below for the Core Scenario include an allowance for accidents and delays during construction.
- 4.4.3 Scheme costs are presented in section 5.2, and include allowances for risk and optimism bias. Adjustments to these elements have been considered when undertaking sensitivity testing of scheme costs.
- 4.4.4 Risks that have the potential to affect the scheme cost are included in the project risk register, which also includes potential mitigation measures. The project risk register is included in Appendix C.
- 4.4.5 The risk report produces a core P80 risk assessment, as well as P90 (high) and P10 (low) bands. These are presented in table 4.11.

Table 4.11: Mitigated costs by risk band

RISK CATEGORY	2015 PRICES, UNDISCOUNTED	2010 PRICES, DISCOUNTED TO 2010
P10	£137,948	£75,349
P80	£826,226	£451,296
P90	£969,359	£529,477

- 4.4.6 A further source of cost uncertainty is the degree of optimism bias applied to the scheme. At present, a value of 15% has been assumed, as this stage of the project is approaching Conditional Approval. At Full Approval, an optimism bias value of 3% applies, so this has been assumed for the low cost scenario. For comparison purposes, a higher optimism bias of 44% has been assumed for the high cost scenario, equivalent to the Programme Entry stage.
- 4.4.7 Low, central and high cost estimates have been calculated taking into account variations in risk and optimism bias. These are shown in table 4.12, for both undiscounted whole scheme costs in the present year price base, and the Present Value of Costs, which are 2010 costs discounted to 2010, with S106 funding contributions taken into account.

Table 4.12: Cost sensitivity range

CATEGORY	RISK	OPTIMISM BIAS	2015 PRICES, UNDISCOUNTED	PRESENT VALUE OF COSTS
Low	P10	3%	£12,546,640	£6,539,034
Core	P80	15%	£14,799,904	£8,141,864
High	P90	44%	£18,738,165	£10,943,296

4.4.8 The core cost estimate includes all elements of risk, to ensure consistency with the detailed assessment presented in section 5.2.

4.4.9 Taking the alternative benefits and costs into account, it is possible to produce a matrix of Benefit to Cost Ratios (BCR), as shown in table 4.13.

Table 4.13: Sensitivity testing of BCR

		COST		
		Low	Core	High
Benefit	Low	15.03	17.42	13.35
	Core	12.07	13.99	10.72
	High	8.98	10.41	7.98

4.4.10 The BCR for the scheme ranges from 7.98 to 17.42. This means that the scheme generates substantial benefits in relation to its cost, even in a low growth scenario with high costs.

4.5 APPRAISAL SUMMARY TABLE

4.5.1 The Appraisal Summary Table (AST) is a single-page summary of the key aspects of the economic case, focusing on five key appraisal areas, in accordance with guidance presented in WebTAG:

- Economy
- Environmental
- Social
- Safety
- Public Accounts

4.5.2 The AST for the A259 Corridor Improvement scheme has been completed and is presented in Appendix A. Supporting worksheets are presented in Appendix B.

4.6 VALUE FOR MONEY STATEMENT

4.6.1 The value for money assessment has been prepared in accordance with the DfT's "Value for money assessment: advice note for local transport decision makers".

4.6.2 Guidance indicates a range of value for money categories that vary according to the Benefit to Cost Ratio (BCR) of the scheme. These value for money categories are as follows:

Table 4.14: DfT Value for Money Categories

BCR RANGE	VALUE FOR MONEY CATEGORY
< 1.0	Poor
1.0 – 1.5	Low
1.5 – 2.0	Medium
2.0 – 4.0	High
> 4.0	Very High

4.6.3

Initial monetised impacts of the scheme have been extracted from the AST and reported in the Economic Efficiency of the Transport System (TEE) table, Public Accounts (PA) table and Analysis of Monetised Costs and Benefits (AMCB) table, included in Appendix B and repeated in tables 4.15 to 4.17. In compiling the value for money statement, the impacts of accidents were included. All monetary values are in 2010 prices, discount to 2010.

Table 4.15: Economic Efficiency of the Transport System (TEE)

USER	ITEM	VALUE
Non-business: Commuting	Travel time	£15,160,000
	Vehicles operating costs	£989,000
	Net Commuting	£16,150,000
Non-business: Other	Travel time	£52,740,000
	Vehicles operating costs	£1,814,000
	Net Other	£54,554,000
Business	Travel time	£41,240,000
	Vehicles operating costs	£3,580,000
	Developer contributions	-£2,385,857
	Net Business	£42,423,143
TOTAL		£113,137,143

Table 4.16: Public Accounts (PA)

USER	ITEM	VALUE
Local government funding	Investment costs	£10,527,721
	Developer and other contributions	-£2,385,857
	Net impact	£8,141,864
Central government funding: non-transport	Indirect tax revenues	£2,618,000
Broad transport budget		£8,141,864
Wider public finances		£2,618,000

Table 4.17: Analysis of Monetised Costs and Benefits (AMCB)

ITEM	VALUE
Greenhouse gasses	£1,026,000
Accidents	£14,311,500
Economic Efficiency: Consumer Users (Commuting)	£16,149,000
Economic Efficiency: Consumer Users (Other)	£54,554,000
Economic Efficiency: Business Users and Providers	£42,434,143
Wider Public Finances (Indirect Tax Revenues)	-£2,618,000
Present Value of Benefits (PVB)	£125,856,643
Present Value of Costs (PVC)	£8,141,864
OVERALL IMPACTS	
Net Present Value (NPV)	£117,714,779
Initial Benefit to Cost Ratio (BCR)	15.5

4.6.4 This information shows that the Initial BCR of the scheme, based on standard monetised values, is **15.5**. This represents the benefits for the core elements of the scheme, and is considered **Very High** value for money according to DfT guidance.

4.6.5 The DfT guidance recommends that this Initial BCR be modified to include additional elements from the AST to create an Adjusted BCR. Following DfT guidance, the monetised values to be extracted from the AST are set out in table 4.18.

Table 4.18: Adjusted BCR Calculation

IMPACT		VALUE
Initial PVB		£125,856,643
Economy	Wider impacts	£4,455,092
Adjusted PVB		£130,311,735
Adjusted NPV		£122,169,871
Adjusted BCR		16.0

4.6.6 The Adjusted BCR is increased to **16.0**, representing the wider benefits of the scheme. This is considered to be **Very High** value for money according to DfT guidance.

4.6.7 In considering overall value for money, attention must be paid to the Initial and Adjusted BCRs, as well as non-monetised impacts. The value for money statement provides a summary of these considerations, and is presented in table 4.19.

Table 4.19: Value for money statement

	ASSESSMENT	DETAIL
Initial BCR	15.5	Calculated using WebTAG guidance
Adjusted BCR	16.0	Includes wider impacts
Qualitative assessment	Largely beneficial	Key improvements in journey quality and community severance
Key risks, sensitivities	Initial BCR range 7.98 to 17.42	Variation in cost and benefit uncertainty assessed according to WebTAG guidance
Value for money category	Very high	Initial and Adjusted BCRs are in Very High category, which is supported by qualitative assessment

4.6.8 The information presented in the economic case indicates that the proposed A259 Corridor Improvement is considered **Very High** value for money.

5 FINANCIAL CASE

5.1 INTRODUCTION

5.1.1 To determine the affordability of the A259 Corridor Improvement, an initial feasibility study was commissioned, with the final report published in February 2013. This included a cost estimate for the scheme, allowing WSCC to review potential funding sources and commission work packages to complete the outline design and Transport Business Case. The information presented in this section demonstrates that the scheme is affordable.

5.1.2 Information is presented below on the following:

- Costs
- Budgets / funding cover

5.2 COSTS

5.2.1 Cost estimates have been prepared broadly in accordance with the guidance presented in WebTAG Unit A1-2. The cost pro-forma is included in Appendix D and summarised in table 5.1. Costs are provided in 2015 Quarter 2 prices.

Table 5.1: Summary scheme costs (2015 Q2 prices)

FINANCIAL YEAR	DESIGN	SUPERVISION	LAND	CONSTRUCTION	TOTAL
2015-16	£250,000				£250,000
2016-17	£57,860	£33,430	£296,909	£871,018	£1,259,217
2017-18	£274,834	£158,791		£4,137,335	£4,570,960
2018-19	£313,890	£181,356		£4,725,272	£5,220,518
TOTAL	£896,584	£373,577	£296,909	£9,733,624	£11,300,694

5.2.2 These scheme costs are further adjusted to account for inflation, risk and optimism bias. Inflation relates to real inflation, over and above general price inflation in the economy as a whole. RPI forecasts have been taken from Bank of England forecasts July 2015, and CTPI figures from forecasts published by Theobald and Gardiner, 2015 Q2. Dividing CTPI figures by RPI figures generates real inflation figures, to be included as part of the scheme costs. These values are shown in table 5.2.

Table 5.2: Forecast inflation

FINANCIAL YEAR	CTPI	RPI	REAL INFLATION	COMPOUND INFLATION
2015-16	5.5%	0.9%	4.6%	4.6%
2016-17	4.0%	2.1%	1.9%	6.5%
2017-18	3.0%	2.8%	0.2%	6.7%
2018-19	3.0%	3.1%	-0.1%	6.6%

- 5.2.3 Risk values are taken from the project risk register, discussed in section 4.4. At this stage, risk values have been split across time periods on a pro rata basis.
- 5.2.4 An optimism bias of 15% has been assumed in accordance with WebTAG guidance for a scheme at this stage of development.
- 5.2.5 Finally, the total cost is converted to a 2010 price base and then discounted to 2010 to ensure a valid comparison with the calculated benefits. The price base is adjusted using the HM Treasury GDP price deflator index, published as part of the WebTAG databook.

$$\frac{GDP_{2010}}{GDP_{2015}} = \frac{100.00}{109.37} = 91.4\%$$

- 5.2.6 Discounting is applied at 3.5% pa in accordance with HM Treasury Green Book. Taking account both the price deflator and the total discount rate, the final adjustments to the cost inputs are shown in table 5.3.

Table 5.3: Price base deflation and discounting

FINANCIAL YEAR	DISCOUNT FACTOR (3.5% PA)	TOTAL FACTOR INCL. DEFLATOR
2015-16	84.2%	77.0%
2016-17	81.4%	74.4%
2017-18	78.6%	71.9%
2018-19	75.9%	69.4%

- 5.2.7 The final adjusted scheme costs are provided in table 5.4.

Table 5.4: Adjusted cost profile by financial year

FINANCIAL YEAR	INVESTMENT COST (2015 PRICES)	INCLUDING REAL COST INFLATION	RISK ADJUSTED COST	RISK ADJUSTED COST INCL. OPTIMISM BIAS	RISK ADJUSTED COST INCL. OB DEFLATED AND DISCOUNTED TO 2010
2015-16	£250,000	£261,397	£279,331	£321,230	£247,296
2016-17	£1,259,217	£1,341,125	£1,433,133	£1,648,103	£1,225,869
2017-18	£4,570,960	£4,876,574	£5,211,131	£5,992,801	£4,306,745
2018-19	£5,220,518	£5,564,159	£5,945,887	£6,837,770	£4,747,812
TOTAL	£11,300,694	£12,043,256	£12,869,482	£14,799,904	£10,527,721

- 5.2.8 Costs associated with scheme maintenance and monitoring have not been included at this stage. These are not anticipated to be significant, and will be funded through WSCC's maintenance budget.

5.3 BUDGET / FUNDING COVER

- 5.3.1 The total scheme cost is expected to be £15.29m, of which a total of £0.49m has been spent on scheme preparation and is not included in the costs used in scheme appraisal. The total scheme cost (net of scheme preparation costs) is £14.8m of which £2.61m is expected to come from banked and legally agreed S106 contributions. £7.51m is sought from Coast to Capital LEP, with the remaining £4.68m being funded by WSCC.

- 5.3.2 £0.056m of the S106 funding has been received and is available to be spent on the scheme. Legal agreements are in place to recover a further £2.56m from the developers, which will be due once the 'triggers' in the payment mechanism have been reached. A further £0.72m is expected to become available as development identified in the Emerging Arun Local plan comes forward and agreements put in place. However, in order to ensure timely delivery of the scheme, WSCC has decided to provide forward funding for the £3.28m of S106 contributions that have not yet been received and this is included in the Council's Capital Programme approved by the County Council on 30th October 2015. This is detailed in the programme profile and funding stream provided in table 5.6.

Table 5.5: Funding sources

SOURCE	TOTAL	STATUS
S106 Contributions	£3.33m	Total expected S106 contributions, partially forward funded by WSCC.
Coast to Capital LEP	£7.51m	The subject of this Transport Business Case
WSCC	£3.96m	Funding shortfall met by WSCC
TOTAL	£14.80m	

- 5.3.3 The transport analysis guidance (WebTAG) requires that the costs incurred on schemes by Central or Local Government are differentiated from costs incurred by developers and other contributors. Therefore, the economic appraisal for the business case is based on the assumption that the total S106 contributions amounting to £3.33m will be received and this is reflected in the programme and funding profile below.

Table 5.6: Annual budget cover (2015 Q2 prices incl. real inflation, risk and optimism bias)

FY	COST	S106	LEP	WSCC
2015-16	£321,230		£250,000	£71,230
2016-17	£1,648,103	£610,000	£90,000	£948,103
2017-18	£5,992,801	£1,790,000	£2,410,000	£1,792,801
2018-19	£6,837,770	£930,000	£4,760,000	£1,147,770
TOTAL	£14,799,904	£3,330,000	£7,510,000	£3,959,904

5.3.4 Finally, the contributions have been converted into 2010 prices, discounted to 2010, for input into the Economic Case.

Table 5.7: Annual budget cover (2010 prices, discounted to 2010)

FY	COST	S106	LEP	WSCC
2015-16	£247,296		£192,460	£54,836
2016-17	£1,225,869	£453,722	£66,943	£705,205
2017-18	£4,306,745	£1,286,389	£1,731,954	£1,288,402
2018-19	£4,747,812	£645,746	£3,305,110	£796,955
TOTAL	£10,527,721	£2,385,857	£5,296,467	£2,845,398

5.3.5 To help mitigate the risks surrounding Section 106 recovery, the Council is seeking to secure a legal agreement with all funding partners (primarily the District Council) to agree an approach to capital funding and the sharing of project related financial risks

5.3.6 Whilst the funding arrangements are under constant review and the values will change regularly as with any major civil engineering project 2 key reviews are planned:-

- The first will be undertaken ahead of D&B Award, once the scheme has secured full funding approval from the LEP and the tender prices are known.
- The second will on conclusion of Detailed Design, ahead of awarding the build stage of the contract.

6 COMMERCIAL CASE

6.1 INTRODUCTION

6.1.1 The commercial case provides evidence of the commercial viability of the project and the procurement strategy adopted.

6.1.2 Information is presented below on the following:

- Output based specification
- Procurement strategy
- Sourcing options
- Payment mechanisms
- Pricing framework and charging mechanisms
- Risk allocation and transfer
- Contract length
- Contract management

6.2 OUTPUT BASED SPECIFICATION

6.2.1 West Sussex County Council is promoting the delivery of the A259 Corridor Improvements, between the future Fitzalan Link Road/A284 Lyminster Bypass Roundabout and the A280/A259 Roundabout. A feasibility study undertaken by Parsons Brinckerhoff/WSP in February 2013 identified a package of improvements to the A259 in Eastern Arun to address existing and anticipated transport needs for the corridor to the horizon year of the emerging Arun district Local Plan. Submission of the recommended scheme package as a bid for funding to the Coast to Capital Local Transport Body (C2C LTB) was approved by the WSCC Cabinet Member for Highways & Transport in July 2013. Funding of £7.5m has subsequently been allotted by the LTB (also in July 2013) in the period 2015/19 with a currently assumed start of construction of Q3 2017. The aim of the scheme is to provide transport improvements that cater adequately for predicted transport demand in terms of capacity and, notably, to improve journey times, journey time reliability and reduce congestion and delay on this section of the A259.

6.2.2 The proposed improvement works are:

- Dualling between Junction 5 (New Lyminster Bypass roundabout) and Junction 6 (Body Shop Roundabout) - approximately 550m in length. Existing right-turn gap into Olliver Acre Estate will be closed; a new shared pedestrian and cyclist path will be provided in the southern verge. There will be 2 lanes in each direction – 3.30m wide, no hardstrips and a paved central reserve with a double sided barrier in the middle. A signal controlled pedestrian crossing is provided near Cornfield School. The existing pond near the pedestrian crossing will become larger to cater for the new wider carriageway. The tie-in with the future Junction 5 is subject of construction timing of the Lyminster Bypass and the A259 Corridor Improvement works.
- Dualling between Junction 9 (Station Road roundabout) and Junction 11 (A280 Roundabout) - approximately 1400m in length. A new continuous shared pedestrian and cyclist path will be provided in the southern verge. There will be 2 lanes in each direction – 3.65m wide, no hardstrips at the paved central reserve but 1m wide hardstrips at the nearside verges. A double sided barrier will be provided in the central reserve. Two new signal controlled pedestrian crossings are provided to suit current crossing desired lines. A drainage swale is provided in the northern verge between Junctions 9 and 10. A new footway is provided in the

northern verge between Junctions 10 and 11. The existing right turn gap into the Garden Centre will be closed.

- 6.2.3 A Preliminary Drainage Strategy for the proposed improvement works has been prepared to ensure that any new drainage features will cater for the new wider carriageway and road surfaces and to ensure that there is no increased risk of flooding in the local areas. It includes a series of sustainable drainage systems (SuDS) features and interconnecting drainage features will be utilised and will include: gullies or open ditches (swales) to collect water and provide the first line of defence against pollution as well as shallow detention basins. The finalised Drainage Strategy will be confirmed during the detailed design stage of the scheme.

6.3 PROCUREMENT STRATEGY

- 6.3.1 The aim of a procurement strategy is to achieve the optimum balance of risk, control and cost certainty for a particular project. In developing the procurement strategy, the following issues have been considered:
- What are the contracting and procurement options available for the scheme?
 - How will the contracting/procurement options secure the economic, social and environmental factors outlined in the economic case for the scheme?
 - Is the contracting and procurement strategy being proposed robust?
 - Is the risk transfer supported by incentives (positive or negative) that prompt the intended outcomes, e.g. will the contractor lose money if there are any cost overruns?
 - Is there a developed market for the proposed procurement approach and financing arrangements?
 - How confident are we that appropriate contractual/commercial arrangement can be defined to make the structure and risk transfer work in practice?
 - Is the proposed risk allocation consistent with the cost estimate?
 - How does the mechanism incentivise performance, efficiency and innovation?
 - Does the contracting authority have or have access to appropriate resources to manage the preferred procurement and subsequent contract management?

Procurement Rules

- 6.3.2** The European public contracts directive (2004/18/EC) applies to public authorities including, local authorities. The directives set out detailed procedures for the award of contracts whose value equals or exceeds specific thresholds. The current construction cost for the scheme exceeds the threshold for works (applying from January 2014) of £4,322,012. Therefore, the EU Regulations apply to the scheme.
- 6.3.3** The WSCC Standing Orders on Procurement and Contracts (May 2013) require that contracts for services, supplies or works, over the financial thresholds specified in the EU Regulations must be conducted as set out in the EU Regulations. They also require that procurements must be conducted in accordance with Local Government Acts 1988 and 1999 (relating to the application of non-commercial considerations) and all relevant subordinate legislation relating to them. Where EU Regulations apply, they apply in addition to the WSCC Standing Orders and override Standing Orders in cases of conflict.

Consideration of Procurement Options

- 6.3.4** In order to make an informed choice of the procurement strategy to be used for the A259 Corridor Improvement scheme, consideration has been given to current best practice (e.g. Cabinet office "Government Construction Strategy") and WSCC's resource capacity and capability. Other considerations driving the choice of procurement option are the importance WSCC places on cost certainty and the principles of shared risk, costs and rewards.
- 6.3.5** The following procurement options were evaluated at the procurement workshop against the project outcomes, budget and risks to determine which will be the most suitable:
- Traditional
 - Early Contractor Involvement (ECI)
 - Design and Build (D&B)
- 6.3.6** A brief background to each of the options discussed is summarised as follows:

Traditional

- 6.3.7** A traditional contract, sometimes referred to as design- bid- build, is a contract between a client and a contractor for the construction of a fully designed project. The design process is separate from the construction process and full documentation (i.e. drawings, work schedules, bills of quantities) must be supplied by the client before contractors can be invited to tender for the works.
- 6.3.8** The contractor has no responsibility for any design, other than temporary works (although some 'traditional' contracts do provide for the contractor to design specific parts of the works). Also, the client typically retains the design consultants during the construction phase to prepare any additional design information that may be required, to review any designs that might be prepared by the contractor, and to inspect the works. Normally, one consultant will be appointed to administer the contract.

- 6.3.9 However, the preparatory work for large infrastructure projects often consumes an extraordinary amount of time, money and human resources. Under the traditional option, clients and consultants make design decisions with insufficient information and knowhow as to available technology, equipment and potential innovative solutions and the contractors are not able to help improve the buildability and packaging of proposals as they develop. The contractors may also be challenged because of insufficient knowledge of the physical conditions at the project site. In addition, it can be slower than other forms of contracting and if design information is incomplete at tender, or if significant variations are required after the contractor has been appointed, the cost to the client can be significant.
- 6.3.10 Consequently, the separation of design and construction under traditional procurement can be inefficient, not particularly cost-effective and often results in adversarial contractual relations.

Early Contractor Involvement (ECI)

- 6.3.11 ECI contracts involve the appointment of a contractor during the pre-construction phase of a project with selection based on a combination of qualitative and price criteria, the latter including profit, overhead and pre-construction phase fees. This early appointment ensures that the contractor understands its terms of reference during the pre-construction-phase and is paid for its contributions, without the client committing to a construction-phase appointment until a series of agreed pre-conditions had been satisfied.
- 6.3.12 ECI provides an efficient means of designing and planning infrastructure projects in a cost-effective, more efficient and less adversarial structure.
- 6.3.13 The approach encourages the contractor to offer design contributions, collaborative risk management and efficient pre-construction-phase programming to achieve a more robust design and price and significant time savings.
- 6.3.14 ECI contracts are normally used for major highways schemes where there is significant scope for input from the supply chain. Suppliers' engagement is on a partnering basis with their knowledge and abilities to influence project decisions having maximum impact in terms of project timing, quality and cost.
- 6.3.15 Using ECI with a properly executed contract that reflects a relationship able to deal with project risks should increase transparency and therefore reduce risks, increase shared responsibilities and limit the reasons for disputes.
- 6.3.16 However, the use of the ECI involves open book cost management and the Client needs to either have in-house skills to manage this or procure external resources at additional cost.

Design & Build

- 6.3.17 Design and build (D&B) is a procurement route in which the main contractor is appointed to design and construct the works. It is typically used for schemes where most design decisions are fixed in advance of works procurement.
- 6.3.18 D&B like ECI involves the appointment of a contractor during the pre-construction-phase of a project with selection based on a combination of qualitative and price criteria, the latter including profit, overhead and pre-construction phase fees. This early appointment ensures that the contractor understands its terms of reference during the pre-construction-phase and is paid for its contributions, without the client committing to a construction-phase appointment until a series of agreed pre-conditions had been satisfied.

- 6.3.19 The contractor can either be appointed to carry out all of the design work, or if the client wishes to have greater influence over the design, a concept design and outline (or performance) specification can be prepared by a design team employed by the client, and then the contractor is appointed to complete the design and carry out the construction. The contractor is expected to complete the required level of design, which must include introducing any potential savings in time, cost and/or quality gained through their previous know-how.
- 6.3.20 The contractor may use their own in-house designers to design the scheme, or appoint external designers, or the client's designers can be employed by the contractor to complete the design (either by novation or consultant switch).
- 6.3.21 D&B projects can follow either a single-stage or two-stage tender processes (e.g. The Cabinet Office's two stage open book process)
- 6.3.22 While D&B is a relatively low risk procurement option for the client in terms of cost and time there can be a risk related to design and quality, particularly if the employer's requirements were not properly specified and if the contractor's proposal is not properly examined.

Options Discussion (Merits and Demerits)

- 6.3.23 The traditional approach was considered to have some merit given that the A259 Corridor Improvement scheme is not deemed overly complicated. However, the disadvantage is that the project might not benefit from any added value or efficiency that could be gained from the early appointment of a contractor.
- 6.3.24 The ECI approach was then considered by the workshop and the view was that it lends itself better to more complex projects. In addition WSCC does not have the in-house resources required to fully support for ECI contracts and would need to buy in the required resources at additional cost. This added cost could however be offset by savings arising from the adoption of the ECI process.
- 6.3.25 Given that the A259 Corridor Improvement scheme is not complex and that preliminary designs and EIA for the scheme will be completed prior to procurement, WSCC concluded that the scheme would not benefit fully from the key advantages offered by the ECI process.
- 6.3.26 The next approach explored was D&B. WSCC considered that the imminent completion of preliminary designs (including ground investigations) and EIA would enable most of the design decisions to be fixed in advance of procurement, a key requisite for the adoption of the D&B approach. The A259 Corridor Improvement scheme would potentially benefit from the following advantages that come with the early appointment of a main contractor ahead of the completion of design under the D&B process:
- A quicker start on site.
 - A single point of responsibility for delivering the project following procurement
 - Securing the involvement of a contractor for pre-contract services on a competitive basis, to obtain input on buildability, sequencing and subcontractor selection.
 - Retaining greater client involvement in the pre-selection and appointment of subcontractors.
 - Motivating the design and construction team to drive down cost and to drive in value.
 - Transferring a greater degree of design and other construction risk to the contractor.
 - Option to include a break clause following completion of the design

- 6.3.27 It was further noted that the D&B option has been successfully used by WSCC in the delivery of the Adur Ferry Bridge scheme and the Littlehampton Academy scheme in recent times.
- 6.3.28 WSCC therefore concluded that the D&B approach is best suited to the A259 Corridor Improvement and agreed that the procurement strategy for the scheme should be based on this approach. WSCC will use a combination of internal and external resources to clearly specify its requirements and expected outcomes and to carefully examine the D&B contractors' proposals to ensure that the successful tenderer is best placed to meet WSCC's requirements for the scheme.
- 6.3.29 The type / form of contract best suited to support the preferred option will be recommended as part of the procurement strategy

6.4 SOURCING OPTIONS

Procurement Route

- 6.4.1 Having determined the procurement option, WSCC looked at the procurement mechanisms (routes) that could be potentially used for the scheme. The routes discussed included existing Frameworks or an EU compliant procurement.
- 6.4.2 Consideration has also been given to procuring the A259 Corridor Improvement scheme as a phase or work packages of related highways schemes.

Frameworks

- 6.4.3 West Sussex County Council is a member of the South East 7 (SE7) Regional Highways Framework. The framework has a limit of £5m per Work Package as detailed in the OJEU notice. The SE7 Regional Highways Framework was considered and discounted immediately because the value of the scheme exceeds the threshold of £5m.
- 6.4.4 WSCC has identified a significant number of strategic transport schemes which have already attracted, or are likely to attract external funding through the Local Enterprise Partnership (LEP) for implementation in 2015-21. The total capital cost of the schemes, which includes the A259 Corridor Improvement scheme, is likely to exceed £100m and includes major highway realignment schemes (up to £30m) as well as transport packages (up to £40m). To facilitate the implementation of these schemes, as well as other separately funded highway programmes, WSCC intends to procure a Design and Build Contractor Framework to be in place by December 2015. The framework will be awarded in several lots (to be agreed) so that the value of the works is best matched to the size of the contractor.

EU Compliant Procurement Process

- 6.4.5 The following procedures have been considered for the procurement of the Design and Build Contractor Framework:
- Open
 - Restricted Tenders
 - Competitive Dialogue.

a. Open

6.4.6 The open procedure is suitable for simple procurements where the requirement is straightforward. It is most commonly used in practice for the purchase of goods where the requirement can be clearly defined and the buyer is seeking the least expensive supplier. As there is no "pre-qualification" of bidders, anyone can submit a tender and it is possible that a large number of suppliers will bid

6.4.7 The main points are:

- Invitation to Tender (ITT) documents must be issued to all suppliers requesting one
- Negotiation on fundamental aspects of contracts, (especially price), which are likely to distort competition, is prohibited. Dialogue with bidders should generally be limited to requests for clarification. Any discussions with candidates should be properly recorded and meetings which discuss proposals/requirements in any detail should be avoided where these discussions might have the potential to distort competition

b. Restricted

6.4.8 The restricted procedure is used where you want to "pre-qualify" suppliers based on their financial standing and technical or professional capability so as to narrow the number permitted to submit bids. Where the restricted procedure is appropriate, you should be able to specify your entire requirement such that, based on your invitation to tender, bidders will be able to deliver a fully priced bid without the need for any negotiations following receipt of the bid.

6.4.9 It is a 2 stage process:

- Selection of suppliers with the capacity, capability and experience to perform the contract
- Invitation to tender for those suppliers selected to submit proposals

Stage 1

- Supplier selection is on the basis of looking at the supplier's capacity and capability, not how the organisation will deliver your requirement. Therefore, this is a backward looking process focussing on the bidder, i.e. you cannot consider matters specific to performance of the contract at this stage
- There must be a minimum of five companies invited to tender, (where there are at least five suitably qualified, experienced companies)

Stage 2

- Issue ITT documents to the selected suppliers
- Negotiation on fundamental aspects of contracts, (especially price), which are likely to distort competition, is prohibited. Dialogue with bidders should generally be limited to requests for clarification
- Any discussions with candidates should be properly recorded and bilateral meetings which discuss proposals/requirements in any detail should be avoided wherever the discussions might have the potential to distort competition

c. Competitive Dialogue

- 6.4.10 This can only be used in exceptional circumstances for 'particularly complex' supplies, services and works contracts where it would not be possible to award a contract using the open or restricted procedures and where the circumstances do not permit use of negotiated procedures.
- 6.4.11 That is, a contract where the buyer is not objectively able to:
- define the technical means capable of satisfying its needs or objectives
 - specify either the legal or financial make-up of a project, or both
- 6.4.12 In other words, it is used where the buyer needs the expertise of the market to design a feasible fit-for-purpose solution.
- 6.4.13 Under this procedure:
- any supplier may make a request to participate
 - the buyer will conduct a dialogue with the suppliers admitted to the procedure with the aim of developing one or more suitable alternative solutions capable of meeting the requirements
 - on the basis of this dialogue the buyer will select suppliers to invite to tender
 - the process always involves competitive tendering and can only use the most economically advantageous award criterion
- 6.4.14 A record of clear reasons for selecting this approach is required and commercial confidentiality is of key importance in employing this procedure.

Preferred Procurement Route

- 6.4.15 A significant number of highways and transport schemes have been identified through the West Sussex County Council Strategic Transport Investment Programme (STIP), which have already attracted or are likely to attract external funding through the LEP for implementation in 2015-21. The total capital cost of the schemes could exceed £100m and includes major highway realignment schemes (up to £30m) as well as transport packages (up to £40m). This includes the A259 Corridor Improvement scheme.
- 6.4.16 To facilitate the implementation of these schemes, as well as other highways and transport programmes funded from developer contributions or Capital allocation, WSCC proposes to install a Design and Build (D&B) Contractor Framework and three other framework contracts.
- 6.4.17 The framework will provide a list of Suppliers who can provide a Design and Build function for WSCC's programme of major highways schemes, increasing the certainty of resource for these projects when other Local Authorities around the country will be competing for similar resources in the same timescales and creating a quicker route to final contract.
- 6.4.18 The projected values of the various framework contracts are above the financial thresholds specified in the EU regulations. Therefore, in accordance with the Public Contract Regulations 2015 and WSCC Standing Orders on Procurement and Contracts (May 2013), WSCC has since January 2015 embarked on the procurement of the framework contract in accordance with the EU procurement regulations.

Market Engagement

- 6.4.19 A soft market engagement exercise was held in January 2015 which provided the opportunity to assess the market's likely response to the contract models proposed for tender. A total of 10 highways consultants and contractors attended the event and provided valuable input into the procurement process.

Procurement Process

- 6.4.20 An OJEU Notice for the D&B framework was published on 27th May 2015 and this resulted in 56 expressions of interest. From that WSCC received completed pre-qualification questionnaires (PQQs) from a total of 13 contractors. Following assessment of the PQQs, an Invitation to Tender (ITT) was issued to 9 prequalified contractors on 22nd June 2015. All 9 contractors submitted their tenders on 5th October 2015 and the tenders are currently being assessed by WSCC. Award of a design and build contract for the A259 Corridor Improvement is expected to be made by March 2016. The tendered target prices indicate that the estimates used for the financial analysis included in this business case are robust.

6.5 PAYMENT MECHANISMS

- 6.5.1 Payment mechanisms to the service provider have not yet been determined, and will be developed in more detail prior to procurement.

6.6 PRICING FRAMEWORK AND CHARGING MECHANISMS

- 6.6.1 The WSCC Standing Orders specify that the Lowest Price or Most Economically Advantageous Tender (MEAT) criteria shall be used when the Council is buying. Owing to the fact that quality is a very important consideration for the A259 Corridor Improvement scheme, it is proposed to use the MEAT criteria in the evaluation of tenders for the Framework. Factors to be evaluated will include the tenderer's capacity, capability, stability, experience and strength of their supply chain plus their profit, fees, overheads and their other costed proposals (e.g. the cost of detailed design) as appropriate. The precise criteria and the methodology for applying them will be decided and made available to contractors with tender documents.
- 6.6.2 The contractor will be selected on a combination of qualitative (60%) and price (40%) criteria, the latter including profit, overhead and pre-construction phase fees.

6.7 RISK ALLOCATION AND TRANSFER

- 6.7.1 The risks associated with the project have been considered and included in the project risk register (included in Appendix C), which has been updated regularly through the project life cycle. The risk register will be considered as part of the preparation of the detailed procurement strategy, and those risks that are best managed by the contractor will be allocated to be priced by the contractor accordingly. Risks best managed by WSCC will be retained, so will be excluded from the contract.

6.8 CONTRACT LENGTH

- 6.8.1 The Framework will be available for six years as determined by EU regulations. The contract strategy for each call off (scheme) will be dependent on the level of integration of design, construction and cost certainty for a given project, and should support the main project objectives in terms of risk allocation, delivery, incentivisation etc.

6.8.2 For the A259 Corridor Improvement scheme, it is proposed to adopt a two stage contract strategy. In stage 1, the successful D&B Contractor team will be appointed to undertake the detailed design of the scheme on the basis of an NEC Professional Services Contract (PSC) Option A (Fixed Price with Activity Schedule) or Option C (Target Cost contract with Activity Schedule). On completion of detailed design and subject to the Contractor meeting WSCC's stated outcomes and cost benchmarks, the Contractor proceeds to the second stage involving the construction of the scheme on an NEC Engineering and Construction Contract (ECC) Option C (Target Cost contract with Activity Schedule).

6.8.3 The contract is expected to run from March 2016 to March 2020.

6.9 CONTRACT MANAGEMENT

6.9.1 Procurement of the WSCC design and build framework contract is currently in its closing stages with a view to having the framework in place by December 2015. The A259 Corridor Improvement scheme will be included in the basket of schemes to be priced by tenderers for the framework contract and the successful framework contractor offering the most economically advantageous tender for the scheme will be offered the contract for the detailed design and construction of the A259 Corridor Improvement scheme. This will enable the detailed design of the A259 Corridor Improvement scheme to start by March 2016, following approval of this TBC.

6.9.2 Contract management will be in line with current best practice and will include but not be limited to:

- Performance management and reporting that will facilitate continuous improvement from project to project
- Open book cost management and financial controls
- Risk and business continuity
- Dispute resolution
- Social value impact assessment
- Benefits realisation

7 MANAGEMENT CASE

7.1 INTRODUCTION

7.1.1 The Management case sets out how the scheme will be delivered and managed, with measures to manage and apportion risk clearly defined.

7.1.2 Information is presented below on the following:

- Evidence of similar projects
- Programme / project dependencies
- Governance, organisational structure and roles
- Programme / project plan
- Assurance and approvals plan
- Communications and stakeholder management
- Programme / project reporting
- Risk management strategy
- Benefits realisation plan
- Monitoring and evaluation
- Options

7.2 EVIDENCE OF SIMILAR PROJECTS

7.2.1 The Design and Build procurement option has been successfully used by WSCC in the delivery of the Adur Ferry Bridge scheme and the Littlehampton Academy scheme in recent times.

7.3 PROGRAMME / PROJECT DEPENDENCIES

7.3.1 The principal project dependency is the completion of the new junction on the A259 at the southern end of the A284 Lyminster Bypass. This is being delivered by the developers of the North Littlehampton Strategic Development Location (SDL). The developers' current proposals are for the southern bypass to be open in summer 2017, with the northern section delivered by WSCC to be open by December 2017. The two projects are dependent only in as much as it is necessary to tie the two designs together.

7.3.2 If the A284 Lyminster Bypass were to be delayed, there would be no significant impact on the A259 Corridor Improvement scheme, and it would be down to the SDL developers to ensure that the schemes tied together correctly. If the bypass were to be cancelled altogether, the proposed A259 Corridor Improvement remains a valid scheme, but since J5 would no longer exist, additional works may be required between Junction 4 (Wick roundabout) and the proposed tie-in. However, the scope for works in this location is severely limited by the proximity of frontages to the existing highway boundary.

7.4 GOVERNANCE, ORGANISATIONAL STRUCTURE AND ROLES

7.4.1 Owing to the scale of the scheme, a Project Board has been set up to oversee its delivery. The project management structure for the scheme is as shown in figure 7.1.

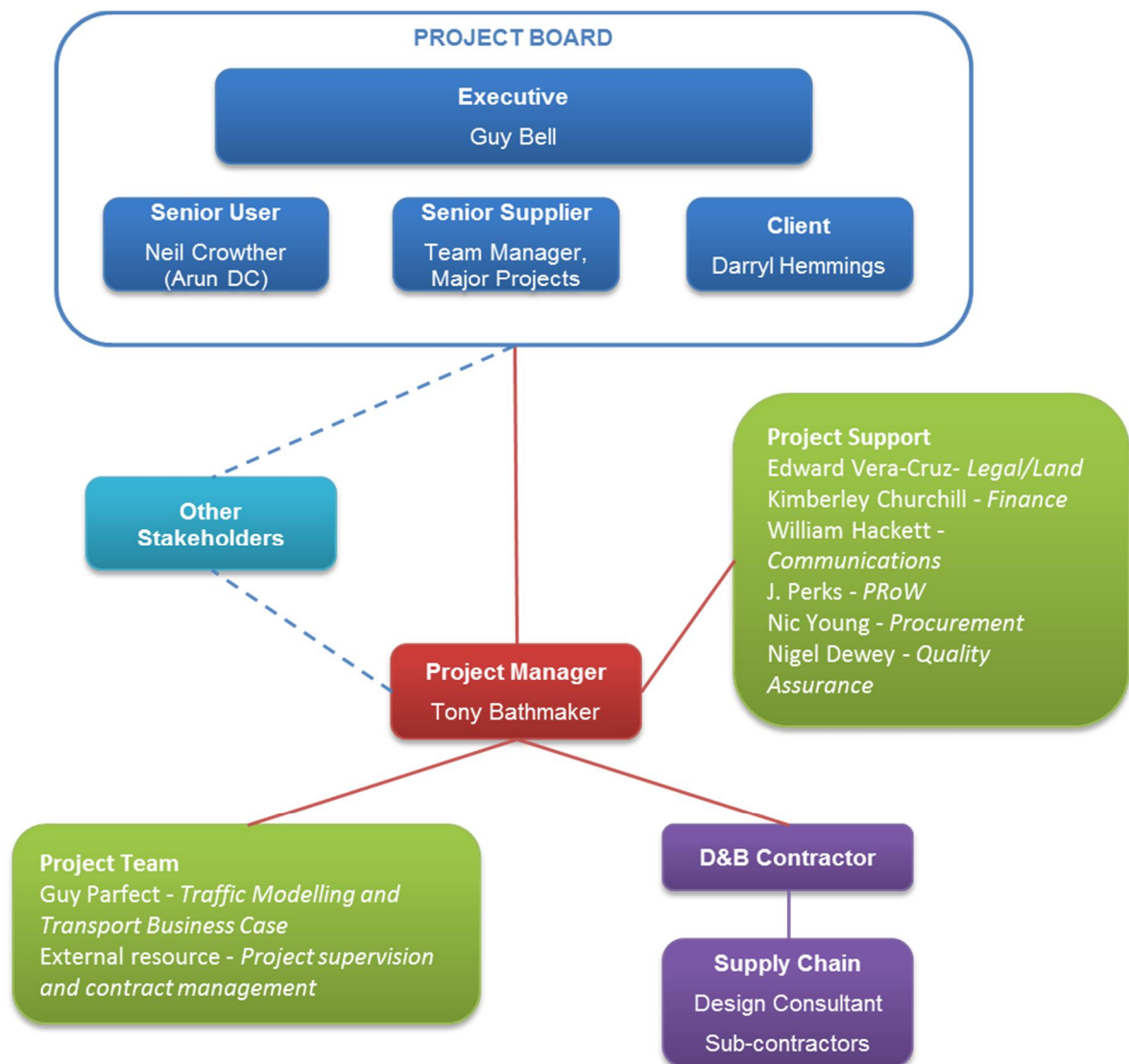


Figure 7.1: Project management structure

7.4.2

The responsibilities of the Project Board include:

- Ensuring the project is, and remains, aligned with its objectives and other strategic policies.
- Monitoring progress, timescales and costs at a strategic level
- Contributing to, and signing off of key project management documents and project level plans
- Reviewing each completed stage and approving progress to the next
- Approving Exception Reports including authorizing any major deviation from the agreed Project (or Stage) Plans
- Arbitrating on any conflicts within the project including negotiating a solution to any problems between the project and any third parties
- Ensuring the Project Benefits can be, and are, delivered by the project.
- Approving Project Closure

7.4.3 The Project Board represents three areas of interest as follows:

- **Executive:** Ultimately accountable for the delivery of the scheme, supported by the Senior Suppliers and Senior User.
- **Senior User:** Represents the interests of the end-users of the scheme. This role is currently occupied by a representative of Arun District Council. However it is expected to revert to WSCC Asset Management as the scheme progresses towards implementation
- **Senior Suppliers:** Responsible for the design, facilitating, funding, procuring and building of the scheme.

Project Manager

7.4.4 The Project Manager is the individual who is directly charged with delivering the scheme. The Project Manager leads and manages the project teams and runs the project on a day-to-day basis. The specific responsibilities of the project manager include:

- Preparing and maintaining the project initiation document, stage and exception plans as required.
- Ensuring that risks are identified, recorded, managed and regularly reviewed.
- Authorising work packages following stage approval by the Project Board.
- Ensuring that the scheme is delivered to specification, on time and to cost within tolerances agreed by the Project Board.
- Escalating project issues where any corrective actions will result in the stage or scheme going beyond agreed tolerance margins.
- Reporting through agreed reporting lines on project progress through highlight reports and stage assessments including budget and expenditure.
- Conducting end project evaluation to assess how well the project was managed and preparing an end-project report.
- Preparing a Lessons Learned Report.
- Preparing any follow-on action recommendations as required.

7.5 PROGRAMME / PROJECT PLAN

7.5.1 Owing to the constraints associated with the proposed southern bypass, a 3 stage approach is proposed for the delivery of the scheme as follows:

Stage One

- Complete preliminary designs and environmental impact assessment
- Complete Transport Business Case and obtain funding approval from the Coast to Capital LEP

Stage Two

- Undertake land acquisition by negotiation or CPO
- Procure Design and Build contract for the detailed design and construction with a break clause which allows the contract to be ended at the completion of detailed design and target costing
- Undertake detailed design and agree target cost of the scheme

Stage Three

- Proceed to construction subject to funding and land acquisition.

7.5.2 A programme is provided in Appendix E.

7.6 ASSURANCE AND APPROVALS PLAN

7.6.1 Controls are being implemented during the scheme to ensure that it stays in line with the expectations defined in the Project Initiation Document, the current Stage Plan and this Transport Business Case.

7.6.2 The scheme will be subject to Gateway Reviews in accordance with the WSCC Gateway Review Process by the Project Board at key decision points. These reviews would, among others:

- Enable the Project Board to assess the viability of the scheme at regular intervals, rather than let it run on in an uncontrolled manner.
- Ensure that key decisions are made prior to the detailed work needed to implement them.
- Clarify the impact of any identified external influences on the scheme

7.6.3 The Project Manager will endeavour to contain the cost of any commission or contract works within the approved estimate, subject to a 10% or £20,000 tolerance (whichever is the lesser). The Project Manager will notify the Project Board as soon as it becomes evident that the approved estimate may or will be varied by more than the tolerance and advise the value of the variation, together with options and recommendations to bring the commission back within estimate where appropriate.

7.6.4 Cabinet Member approval will also be sought in order to undertake Statutory Procedures, including the making of a Planning Application and Land Acquisition.

7.7 COMMUNICATIONS AND STAKEHOLDER MANAGEMENT

7.7.1 A consultation and communication strategy has been developed for the scheme, which seeks to achieve the following overarching aims with regard to the pre-planning application consultation:

- Meeting the requirements of the Localism Act and WSCC's Statement of Community Involvement (SCI) which obligate developers/scheme promoters to consult with communities prior to submitting planning applications;
- Ensuring that all stakeholders are aware of, interested in, and able to contribute to the consultation;
- Enabling the local community to give timely feedback on the proposals so that the plans can be refined accordingly to take into account local opinion;
- Informing the final proposed design for the route and ensure that the design is supported by stakeholders and the wider community.

- 7.7.2 The consultation will address various elements of the proposed scheme, such as the rationale for the bypass, junction design and carriageway width options, environmental and ecology issues.
- 7.7.3 William Hackett is the Communications Lead for the scheme.
- 7.7.4 A pre-consultation event is planned for the Joint Eastern Arun Area Committee (JEAAC) members in early December 2015, providing members a preview of the information that will be presented to local residents. A 6-week public consultation event will then be held from the beginning of January to the middle of February, with a series of drop-in events planned for the last week of January 2016.

7.8 PROGRAMME / PROJECT REPORTING

Project Acceptance Criteria

- 7.8.1 The Project acceptance criteria will generally be in accordance with the requirements of the Design Manual for Roads and Bridges (DMRB) as well other guidance from the DfT.

Quality Checking Process

- 7.8.2 A quality management system will be agreed and implemented for each stage of the scheme. Generally, the quality plan for each stage will describe techniques and standards to be applied during the project, and the various responsibilities for achieving the required quality levels.

Project Management Processes

- 7.8.3 WSCC is taking the lead role in the development, construction, operation and maintenance of the proposed scheme. To this end WSCC will be responsible for all the project management processes involved in delivering the scheme (See 7.4 for further details of the project management processes).

Configuration Management

- 7.8.4 The Project Manager will be responsible for configuration management ensuring that the project's baseline outputs are clearly defined and agreed and no changes are made without authorisation from the Project Board.

Change Management

- 7.8.5 The Project Board is responsible for approving or rejecting any requests for change falling outside agreed tolerance levels. The Board may either set new tolerance levels as long as they are within the constraints of the overall project budget or refer the matter back to corporate management for a decision.

7.9 RISK MANAGEMENT STRATEGY

- 7.9.1 Risk workshops have been undertaken over the course of the project, with results compiled into the Risk Register included in Appendix C. Risks are assessed on their likelihood and their severity, both with and without mitigation.
- 7.9.2 The risk register is reviewed at every monthly progress meeting, with historic risks being removed. Mitigation measures identified through this process have been put in place as required, allowing potential risks to pass without incident. This strategy has therefore proven successful, and will continue for the lifetime of the project. It is not considered necessary for a third party risk specialist to be involved.

7.10 BENEFITS REALISATION PLAN

- 7.10.1 Since the scheme is not expected to generate revenue, the benefits associated with the scheme will be social benefits, to be tracked as part of WSCC's ongoing monitoring programme. This is discussed below.

7.11 MONITORING AND EVALUATION

- 7.11.1 This section sets out how the performance of the scheme against objectives for project success will be monitored and assessed, to demonstrate the value for money for the funding of the scheme. These objectives relate to core economic objectives, changes in traffic flows, reductions in journey times and in variability of travel times, changes in noise and air quality levels at key locations, and highway safety.

Core Economic Objectives

- 7.11.2 A set of core economic objectives have been selected as metrics for assessing the impact of an intervention. These relate to delivery of development at "impact sites", and are set as follows:

- Jobs connected to the intervention (Full-Time Equivalents)
- Commercial floorspace created (sqm, by class)
- Housing units starts
- Housing units completed

- 7.11.3 Impact sites are defined as those which have contributed to the intervention, even if planning consent has been granted without being conditional on the completion of the intervention. In this case, scheme funding will be drawn from numerous applications within Angmering parish.

- 7.11.4 Annual monitoring reports are produced by Arun District Council setting out planning consents and completions within the District. These reports will be examined to check on the rate of delivery of the planned housing, commercial space and employment development at these core impact sites.

Traffic

- 7.11.5 An extensive programme of data collection was undertaken in September and October 2013 to establish the baseline traffic conditions. This included roadside interview surveys, automatic traffic counts, manual turning counts and journey time surveys. In addition WSCC has permanent automatic traffic counters at key locations on main A class roads, including on the A259 corridor.

- 7.11.6 For establishment of post opening traffic flows and journey times, the survey of a selection of the key traffic data can be repeated in 2019. This would take place at least 12 months after the completion of the scheme to allow for establishment of more permanent traffic trends, once drivers have become used to the new layouts.

- 7.11.7 It will not be necessary to repeat all the survey locations which were required to build the East Arun model, but data will be collected on roads, where the model forecasting indicates that there may be significant changes to traffic flows, as well as on roads close to the new A259 road, to pick up any unforeseen changes. This is likely to include:

- Junctions along the A259 Worthing Road
- The existing A284 corridor from the A27 to Littlehampton town centre.
- The new Lyminster Bypass

- Data from A27 TRADS sites east and west of Crossbush
- Data from permanent WSCC sites on A259 between Climping and Angmering, on A280 Water Lane near Angmering and on Ford Road

7.11.8 The surveys will pick up the combined effects of this scheme, along with the build out of the strategic development sites, as the construction periods will run in parallel. It will not be possible to isolate the impact of the A259 Corridor Improvement alone. This also applies to all other indicators to be monitored.

Journey Times

7.11.9 Journey time surveys will be undertaken along the A259 corridor and compared to the 2013 journey time route data.

Road Traffic Collisions

7.11.10 WSCC has access to Road Traffic Collisions data supplied by Sussex Police. Data from this will be extracted annually to compare accident rates on major roads within a study area similar to that used for traffic flows, using three years pre-construction data from 2014 to 2016 as a base, then initially collecting a rate for 2019 post scheme completion. This comparison will be revisited once sufficient time has passed to obtain a three year post-bypass rate from 2019 to 2021. Statistics will be examined for:

- numbers of road collisions and KSI (Killed and seriously injured) rates per billion vehicle kilometres
- road collisions by vehicle type
- number and severity of casualties
- breakdown of casualties for vulnerable road users and others

7.12 OPTIONS

7.12.1 Full details of the management of the project have not been established at this stage. However, WSCC have a project board in place with sufficient processes to monitor and approve project development at key stages. This will continue following procurement of a contractor to design and build the project.

8

SUMMARY

8.1 BACKGROUND

8.1.1 This Outline Transport Business Case presents the evidence base in favour of the proposed A259 Corridor Improvement in Arun District in West Sussex. The document has been prepared in accordance with the Department for Transport guidance on the five business case model. Guidance was published in April 2013, and requires the following five cases to be considered:

- Strategic Case
- Economic Case
- Financial Case
- Commercial Case
- Management Case

8.2 TRANSPORT BUSINESS CASES

8.2.1 The Strategic case outlines the need for the scheme. The scheme meets the overall objective of improving the existing corridor to provide a high-quality strategic corridor between the new A259/A284 junction and Worthing, reducing journey times along the corridor and reducing queues at key junctions. This would make the Littlehampton area more attractive to developers, leading to local economic growth. The key stakeholders are set out, and the interactions with other schemes are discussed.

8.2.2 The Economic case sets out the assessment of benefits that the scheme is forecast to deliver to society as a whole. Over 60 years, the scheme is expected to generate benefits worth £126m, including £14m of safety benefits. The scheme generates a Benefit-Cost ratio of 16.0, so is considered a very high value for money scheme.

8.2.3 The Financial case provides a detailed cost estimate and a breakdown of how the scheme will be funded. The total scheme cost is expected to be £14.8m, of which £3.3m is secured through S106 funding and £3.9m will be funded by WSCC. The remaining £7.5m is sought from Coast to Capital LEP to complete the scheme.

8.2.4 The Commercial case considers procurement of the scheme. A Design and Build procurement strategy through the restricted procedure is considered the preferred option, with the preferred supplier determined through a 60% quality / 40% price split.

8.2.5 The Management case sets out the proposed project management procedures to be adopted throughout the life cycle of the project. The project management team is provided, with an explanation of roles and responsibilities. Measures have also been set out to ensure high quality and timely delivery. Stakeholder management and post-implementation assessment strategies are also discussed.

8.3 CONCLUSION

8.3.1 The proposed A259 Corridor Improvement will generate substantial net benefits to the local economy, helping fulfil Coast to Capital's remit.

Appendix A

APPRAISAL SUMMARY TABLE

Appraisal Summary Table			Date produced:	05-Nov-15		Contact:			
Name of scheme:		A259 Corridor Improvements				Name	Tony Bathmaker		
Description of scheme:		Online junction improvements and localised dualling between new A259 / A284 junction and A259 / A280 Roundstone Bypass				Organisation	WSCC		
						Role	Promoter/Official		
Impacts		Summary of key impacts		Assessment					
				Quantitative		Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp	
Economy	Business users & transport providers	Scheme primarily reduces journey times by less than 2 minutes within EATM study area, but this affects a large number of users. Benefits are felt by all income groups. Benefits favour those in the fourth income group (quintile 4 - 60-80%) based on indices of multiple deprivation considerably more than expected given their relative proportion of the population. Low to mid income groups (quintile 4 - 60-80%) experience a smaller than expected proportion of benefits.		Value of journey time changes(£)		£41.2m	N/A	£42.4m	Moderately beneficial
				Net journey time changes (£)					
				0 to 2min	2 to 5min	> 5min			
				£43.3m	-£2.1m	£0m			
	Reliability impact on Business users	CRF Stress-based approach most appropriate assessment method, so impacts apply to all users. Benefits arise partly from junction improvements, not just carriageway improvements		DM: 113.7%, DS: 38.7%		Moderate beneficial	N/A		
	Regeneration	The scheme does not affect a regeneration area, so this is not assessed.		N/A		Neutral	N/A		
	Wider Impacts	Scheme is not within a Functional Urban Region (FUR) and unlikely to have significant impact on labour supply, so only benefits from imperfectly competitive markets have been assessed.		N/A		N/A	£4.5m		
Environmental	Noise	The Scheme has the potential to affect the noise and vibration levels experienced by nearby people and dwellings due to changes in road layout, as well as potential changes in the speed and volume of vehicular traffic. Mitigation measures are not considered required during the operational phase of the scheme.		N/A		Slight adverse	N/A	N/A	
	Air Quality	An Air Quality Management Area was declared in Worthing in 2010 as a result of EU limit values for annual mean Nitrogen Dioxide being exceeded. The AQMA includes an action plan which includes a consideration of traffic management schemes. Increased emissions of nitrogen dioxide and particulate matter from changes in traffic flow may occur as a consequence of the improvements. At this stage it is not anticipated that this will result in any further exceedences of air quality limits along the route of the proposed scheme as a result of the scheme alone.		N/A		Slight adverse	N/A	N/A	
	Greenhouse gases	Reduced consumption leads to reduced fuel consumption and reduced emissions of CO2		Change in non-traded carbon over 60y (CO2e) Change in traded carbon over 60y (CO2e)		-21,772 -1	N/A	£1.0m	
	Landscape	The scheme is located along an existing route and the nature of the works will not result in any change to the key characteristics of the local Landscape Character Area. The scheme will affect the view from various residential and publicly accessible areas, due to loss of mature vegetation and their proximity to the Scheme. Limited verge space on the north and parts of the south will limit landscape mitigation opportunities to reduce visual impacts to residential properties and footpath and cycleway users. In the North, additional land take may allow avenue tree planting between Junctions 9 and 10 and selected areas of hedge, individual trees and native planting where opportunities allow to screen and filter views from properties and publicly accessible areas to the north. In the South, wider verge spaces allow for hedge, tree and shrub planting that in time would reduce visual impacts to properties off Heathfield Avenue, Downs Way, Arlington Crescent and Loxwood.		N/A		Neutral	N/A		
	Townscape	Between Junctions 5 and 6, two strips of land will be required. The westward strip is covered by dense trees and vegetation. The eastern strip comprises dense trees and vegetation and the access to Windroos Nursery. Between Junctions 9 and 10, the two strips of land are within an area designated as open space in the Local Plan. Both strips comprise hedgerow, grass verge and stand alone trees between the highway and the playing fields to the north. The western strip of land take will also require a small amount of the playing fields.		N/A		Slight adverse	N/A		
	Heritage of Historic resources	No heritage assets were identified within the Scheme area, however areas of high archaeological potential, designated as Archaeological Notification Areas (ANA) do extend into the western part of the Scheme area. There are various listed buildings or scheduled ancient monuments which are located within a 250m study area. It is anticipated that there will be a small impact upon the setting of two Grade II listed buildings (HA01 and HA02)) and one Grade II* Listed Park and Garden (HA08). However, these impacts are not considered to be significant, and no mitigation beyond the landscaping that will take place as part of the proposed Scheme is proposed.		N/A		Neutral	N/A		
	Biodiversity	No long term operational effects are expected for protected wildlife sites in respect of designated sites, notable habitats or protected species. To compensate for the loss of hedgerow habitat, new hedgerows would be planted at the edge of the Scheme boundary. New hedges should comprise native woody species which have been sourced locally. All trees in the Scheme boundary which are earmarked for felling are considered to have low bat roost potential.All Category 2 (low potential) trees would be felled under a method statement prepared by a qualified bat ecologist. Felling will be undertaken by a suitably qualified arborist, and consideration will be given to installation of a sensitive lighting scheme, which reduces disturbance to bats.		N/A		Neutral	N/A		
	Water Environment	Various sensitive drainage and hydrological features have been identified and assessed, including watercourses and ditches, and flood zones. A Flood Risk Assessment including an outline surface water drainage strategy will be prepared, and will include measures to mitigate any potential adverse effects on flooding. Surface water runoff has the potential to contain pollutants that are washed off the road surface. This will be mitigated by incorporation of appropriate pollution mitigation measures in the new drainage systems.		N/A		Neutral	N/A		
	Journey Ambiance	Various improvements for cyclists and pedestrians are proposed. The scheme will result in an increase in amenity along the A259, due to better conditions for pedestrians and cyclists adjacent to the road in terms of access and crossing safety and easement of congestion. The scheme will result in improved capacity, safety and journey times for Motorised Travellers. It will also reduce queuing, delays and pollution.		N/A		Moderate beneficial	N/A		
	Social	Commuting and Other users	Scheme primarily reduces journey times by less than 2 minutes within EATM study area, but this affects a large number of users. Benefits are felt by all income groups. Benefits favour those in the fourth income group (quintile 4 - 60-80%) based on indices of multiple deprivation considerably more than expected given their relative proportion of the population. Low to mid income groups (quintile 4 - 60-80%) experience a smaller than expected proportion of benefits.		Value of journey time changes(£)		£67.9m	N/A	£70.7m
Net journey time changes (£)									
0 to 2min					2 to 5min	> 5min			
£71.5m					-£3.4m	-£0.1m			
		Reliability impact on Commuting and Other users	CRF Stress-based approach most appropriate assessment method, so impacts apply to all users. Benefits arise partly from junction improvements, not just carriageway improvements		DM: 113.7%, DS: 38.7%		Moderate beneficial	N/A	
		Physical activity	There is scope for improved walking and cycling due to enhanced shared use facilities and improved crossings		N/A		Slight beneficial	N/A	
		Journey quality	Benefit to drivers from reduced frustration and perceived accident risk.		N/A		Moderate beneficial	N/A	
		Access to services	No significant effect		N/A		Neutral	N/A	N/A
		Affordability	No significant effect		N/A		Neutral	N/A	N/A
		Severance	Corridor passes through settlement. Increased severance on dualled sections, as greater separation between settlements.		N/A		Moderate adverse	N/A	N/A
Safety	Option values	Provision of transport services in the area is not substantially changed.		N/A		Neutral	N/A		
	Accidents	Upgrade existing single carriageway to modern dual carriageway, with gap closures and upgraded central barrier		Casualties saved: Fatal = 1.8, Serious = 33.9, Slight = 324.4		N/A	£14.3m	N/A	
	Security	No significant effect		N/A		Neutral	N/A	N/A	
Public Accounts	Cost to Broad Transport Budget	Construction cost = £11.30m. Real inflation = £0.74m. Risk = £0.83m. Optimism Bias (15%) = £1.93m. Total scheme cost = £14.80m (2015 Q2 prices). £3.33m funding secured through S106 contributions		N/A		N/A	£10.5m		
	Indirect Tax Revenues	Reduced fuel consumption, so reduced government revenue through fuel duty and VAT.		N/A		N/A	-£2.6m		

Appendix B

AST SUPPORTING WORKSHEETS

TAG Stress-based reliability impact worksheet

	Old Route (i)	New Route (ii)
Without scheme stress (a)	113.7	
With scheme stress (b)	39.7	
Difference in stress (c=a-b, restricting a and b to the range 75% - 125%)	38.7	
With scheme AADT flow (d)	33394	
Overall impacts (e=c*d)	1291088	
Overall assessment (e(i) + e(ii))	1291088	

Reference Source

East Arun Traffic Model

Summary Assessment Score

Moderate beneficial

Qualitative Comments

Moderate beneficial

APPRAISAL- Greenhouse Gases

Proposal Name: A259 Corridor Improvement

Present Value Base Year 2010

Current Year 2015

Proposal Opening year: 2018

Project (Road/Rail or Road and Rail): Road

Overall Assessment Score:

Net Present Value of Carbon dioxide Emissions of Proposal (£):

£1,026,000

(60 Year Period)

*positive value reflects a net benefit (i.e. CO2E emissions reduction)

Quantitative Assessment:

Change in Carbon dioxide Emissions over 60 year appraisal period (tonnes):
(between 'with scheme' and 'without scheme' scenarios)

-21,771

Of which Traded

1

Change in Carbon dioxide Emissions in Opening year (tonnes):
(between 'with scheme' and 'without scheme' scenarios)

-216

Qualitative Comments:

Sensitivity Analysis:

Description:

Upper Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£):

£1,572,000

Lower Estimate Net Present Value of Carbon dioxide Emissions of Proposal (£):

£480,000

Data Sources: Scheme TUBA Analysis

TAG Journey Quality Impacts Worksheet

Factor	Sub-factor	Better	Neutral	Worse
Traveller Care	Cleanliness		✓	
	Facilities		✓	
	Information		✓	
	Environment		✓	
Travellers' Views	-		✓	
Traveller Stress	Frustration	✓		
	Fear of potential accidents	✓		
	Route uncertainty		✓	

Reference Source

Qualitative review

Summary Assessment Score

Moderate beneficial

Qualitative Comments

Benefit to drivers from reduced frustration and perceived accident risk.

Distributional Impacts: User Benefits (Commuting & Other)

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Arun 002A			167.9			167.9
Arun 004A	28.6					28.6
Arun 004B	28.0					28.0
Arun 004C		127.0				127.0
Arun 004D						0.0
Arun 004E			83.3			83.3
Arun 005A				926.4		926.4
Arun 005B					63.4	63.4
Arun 005C			135.6			135.6
Arun 005D		137.5				137.5
Arun 005E		196.7				196.7
Arun 007A				172.9		172.9
Arun 007B				212.8		212.8
Arun 007C			117.3			117.3
Arun 007D			160.1			160.1
Arun 007E				169.8		169.8
Arun 007F			77.7			77.7
Arun 008A					31.4	31.4
Arun 008C						0.0
Arun 009A				57.8		57.8
Arun 009C		126.2				126.2
Arun 009D		45.9				45.9
Arun 009F			151.4			151.4
Arun 010A				23.9		23.9
Arun 010B				18.9		18.9
Arun 010C			155.5			155.5
Arun 010D					24.0	24.0
Arun 011B			42.6			42.6
Arun 011C						0.0
Total benefits (ΣLSOAs)	56.5	633.4	1091.4	1582.4	118.9	3482.6
Total disbenefits (ΣLSOAs)	-	-	-	-	-	0
Share of user benefits	2%	18%	31%	45%	3%	100%
Share of user disbenefits	-	-	-	-	-	0
Share of population in the impact area	2%	24%	38%	28%	8%	100%
Assessment	✓✓	✓	✓	✓✓✓	✓✓	

Distributional Impacts: User Benefits (Employers Business)

	IMD Income Domains £m					Total
	Most deprived areas ← → Least deprived areas					
	0%<20%	20%<40%	40%<60%	60%<80%	80%<100%	
Arun 002A			148.3			148.3
Arun 004A	36.4					36.4
Arun 004B	35.6					35.6
Arun 004C		161.7				161.7
Arun 004D						0.0
Arun 004E			208.8			208.8
Arun 005A				759.5		759.5
Arun 005B					159.1	159.1
Arun 005C			142.6			142.6
Arun 005D		144.6				144.6
Arun 005E		240.7				240.7
Arun 007A				211.5		211.5
Arun 007B				260.4		260.4
Arun 007C			143.6			143.6
Arun 007D			195.9			195.9
Arun 007E				207.8		207.8
Arun 007F			95.1			95.1
Arun 008A					33.0	33.0
Arun 008C						0.0
Arun 009A				70.8		70.8
Arun 009C		160.7				160.7
Arun 009D		58.5				58.5
Arun 009F			192.8			192.8
Arun 010A				25.1		25.1
Arun 010B				19.8		19.8
Arun 010C			190.3			190.3
Arun 010D					29.4	29.4
Arun 011B			54.3			54.3
Arun 011C						0.0
Total benefits (ΣLSOAs)	72.0	766.2	1371.5	1554.9	221.5	3986.1
Total disbenefits (ΣLSOAs)	-	-	-	-	-	0
Share of user benefits	2%	19%	34%	39%	6%	100%
Share of user disbenefits	-	-	-	-	-	0
Share of population in the impact area	2%	24%	38%	28%	8%	100%
Assessment	✓✓	✓✓	✓✓	✓✓✓	✓✓	

Non-business: Commuting		ALL MODES	ROAD	BUS and COACH	RAIL	OTHER	
<u>User benefits</u>	TOTAL		Private Cars and LGVs	Passengers	Passengers		
Travel time	15160000		15160000				
Vehicle operating costs	989000		989000				
User charges							
During Construction & Maintenance	0						
COMMUTING	16149000	(1a)	16149000				
Non-business: Other		ALL MODES	ROAD	BUS and COACH	RAIL	OTHER	
<u>User benefits</u>	TOTAL		Private Cars and LGVs	Passengers	Passengers		
Travel time	52740000		52740000				
Vehicle operating costs	1814000		1814000				
User charges							
During Construction & Maintenance	0						
NET NON-BUSINESS BENEFITS: OTHER	54554000	(1b)	54554000				
Business			Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers
<u>User benefits</u>							
Travel time	41240000		20203000	21037000			
Vehicle operating costs	3580000		2434000	1146000			
User charges	0						
During Construction & Maintenance	0						
Subtotal	44820000	(2)	22637000	22183000			
Private sector provider impacts							
Revenue							
Operating costs							
Investment costs							
Grant/subsidy							
Subtotal		(3)					
Other business impacts							
Developer contributions	-2385857	(4)					
NET BUSINESS IMPACT	42434143	(5) = (2) + (3) + (4)					
TOTAL							
Present Value of Transport Economic Efficiency Benefits (TEE)	113137143	(6) = (1a) + (1b) + (5)					

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

Public Accounts (PA) Table

	ALL MODES	ROAD	BUS and COACH	RAIL	OTHER
<u>Local Government Funding</u>	TOTAL	INFRASTRUCTURE			
Revenue	0				
Operating Costs	0				
Investment Costs	10527721	10527721			
Developer and Other Contributions	-2385857	-2385857			
Grant/Subsidy Payments	0				
NET IMPACT	8141864 (7)				
<u>Central Government Funding: Transport</u>					
Revenue	0				
Operating costs	0				
Investment Costs	0				
Developer and Other Contributions	0				
Grant/Subsidy Payments	0				
NET IMPACT	0 (8)				
<u>Central Government Funding: Non-Transport</u>					
Indirect Tax Revenues	2618000 (9)	2618000			
<u>TOTALS</u>					
<u>Broad Transport Budget</u>	8141864 (10) = (7) + (8)				
<u>Wider Public Finances</u>	2618000 (11) = (9)				
Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers. All entries are discounted present values in 2010 prices and values.					

Analysis of Monetised Costs and Benefits

Noise	N/A	(12)
Local Air Quality	N/A	(13)
Greenhouse Gases	1026000	(14)
Journey Quality	0	(15)
Physical Activity	0	(16)
Accidents	14311500	(17)
Economic Efficiency: Consumer Users (Commuting)	16149000	(1a)
Economic Efficiency: Consumer Users (Other)	54554000	(1b)
Economic Efficiency: Business Users and Providers	42434143	(5)
Wider Public Finances (Indirect Taxation Revenues)	-2618000	- (11) - sign changed from PA table, as PA table represents costs, not benefits
Present Value of Benefits (see notes) (PVB)	125856643	(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1a) + (1b) + (5) - (11)
Broad Transport Budget	8141864	(10)
Present Value of Costs (see notes) (PVC)	8141864	(PVC) = (10)
OVERALL IMPACTS		
Net Present Value (NPV)	117714779	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	15.46	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented 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.

Appendix C

RISK REGISTER

A259 CORRIDOR IMPROVEMENTS

PROJECT RISKS WORKSHOP

REPORT

West Sussex County Council

Job Number: 285358AM-HGG

Prepared for
West Sussex County Council
County Hall
Chichester
PO19 1RQ

Prepared by
WSP | PB
Westbrook Mills
Godalming
Surrey GU7 2A
www.pbworld.com

AUTHORISATION SHEET

Client: West Sussex County Council
Project: A259 Corridor Improvements
Address: County Hall, Chichester, PO19 1RQ

PREPARED BY

Name: Stephen Grimwood
Position: Senior Risk Consultant
Date: 21 May 2015

AGREED BY

Name: Xxxx
Position: Director
Date: 21 May 2015

AUTHORISED FOR ISSUE

Name: Bogdan Schiteanu
Position: Project Manager
Date: 21 May 2015

DISTRIBUTION

ACCEPTED BY

Name: Tony Bathmaker
Position: WSCC Project Manager
Date:

ACCEPTED BY

Name:
Position:
Date:

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2	RISK MANAGEMENT OBJECTIVES	4
3	RISK IDENTIFICATION	6
4	RISK ANALYSIS	6
5	RECOMMENDATION	8

1 RISK WORKSHOP OVERVIEW

Stephen Grimwood, Risk Consultant from Parson Brinckerhoff MPS Division, facilitated a Risk Workshop at the County Hall on the 5th May 2015. The objective of the Workshop was to:

1. Establish the Risk Management 'context and objectives' that are applicable for the project
2. Produce the risk register with clear risk descriptions, ownerships, mitigations, probability of occurrence and 3 point estimates of the associated impacts
3. Discuss and describe potential mitigations and understand what mitigations can be carried out to ensure the project objectives can be fully achieved.
4. Produce a risk model to understand the contingency level required, key risk drivers, and comparison pre and post mitigation results.
5. Establish the risk process methodology to ensure the project continues Risk Management moving forward.

The Workshop was attended by the project Team:

- Tony Bathmaker
- Bogdan Schiteanu
- Alan Cowan
- Alan Feist
- Darryl Hemmings
- Paul Eagle
- Dan Baker
- Clare Harris
- Sue A Furlong
- Kevin Macknay
- Daniel Dei
- Gail Rowley
- Dominic Smith

2 RISK MANAGEMENT OBJECTIVES

The Risk Management objectives were discussed at the start of the workshop.

It was concluded that the two Risk Impacts which should be assessed were:

1. Cost
2. Schedule

The Risk Register matrix was calibrated by the team based on the current scope of works. This ensured that the team was in agreement about what a 'high' Risk means, and also enabled a 'Quantitative Risk Model' to be produced based on the qualitative assessment.

The following Risk Matrix was agreed during the workshop:

RISK ASSESSMENT MATRIX										
		Budget	Schedule	Probability						
		GBP		VL	L	M	H	VH		
Impact	Very High	>£1M	> 12 months	VH	18	19	22	24	25	2
	High	500K - 1M	9 - 12 months	H	11	14	17	21	23	3
	Medium	200K- 500K	6 - 9 months	M	5	10	13	16	20	4
	Low	£50k - 200K	3- 6 month	L	4	8	9	12	15	5
	Very Low	<£50k	< 3 Months	VL	1	2	3	6	7	6
				VL	L	M	H	VH		
				Very Low	Low	Medium	High	Very High		
				< 5%	5% to 20%	20% to 50%	50% to 70%	> 70%		

Figure 1 – Risk Scoring Matrix

The Risks were scored based on this scale for the qualitative assessment. To produce the quantitative model each risk had their 3 point estimate fine-tuned further.

It was decided that risks would be identified up to the end of construction as shown in the diagram below

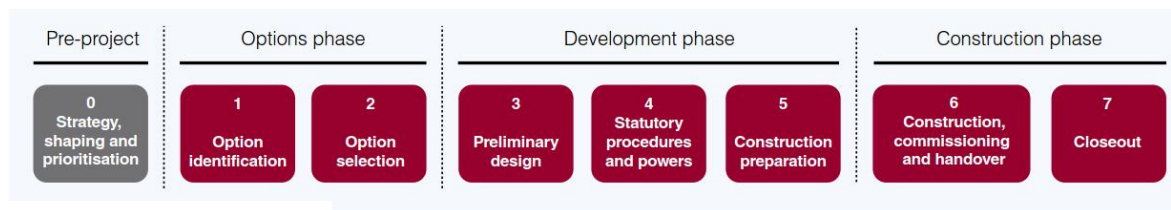


Figure 2 – Example Project Lifecycle

3 RISK IDENTIFICATION

Categories were produced as a team to help with risk identification and ensure it was carried out in a structured way. This was used as a checklist during the workshop.

The following categories were discussed:

- Scheme Preparation
- Statutory process
- Scheme Cost
- Procurement
- Environment / Ecology
- Construction

Risks were captured on the register and the scoring was evaluated jointly by the team during the workshop. Each attendee had time to raise and discuss their key risks and the checklist was used to ensure that the majority of risks were captured during the workshop.

As well as risks being identified to quantify the level of contingency required, the 'show stopper' risks were also identified and captured on a separate register. The Risk Register and the show stopper Register is shown in Appendix A.

4 RISK ANALYSIS

From the qualitative assessment and the calibrated matrix a quantitative Monte Carlo Model was produced to provide useful insights of the Project Risk Exposure.

The Current Risk Exposure is shown in the graph below

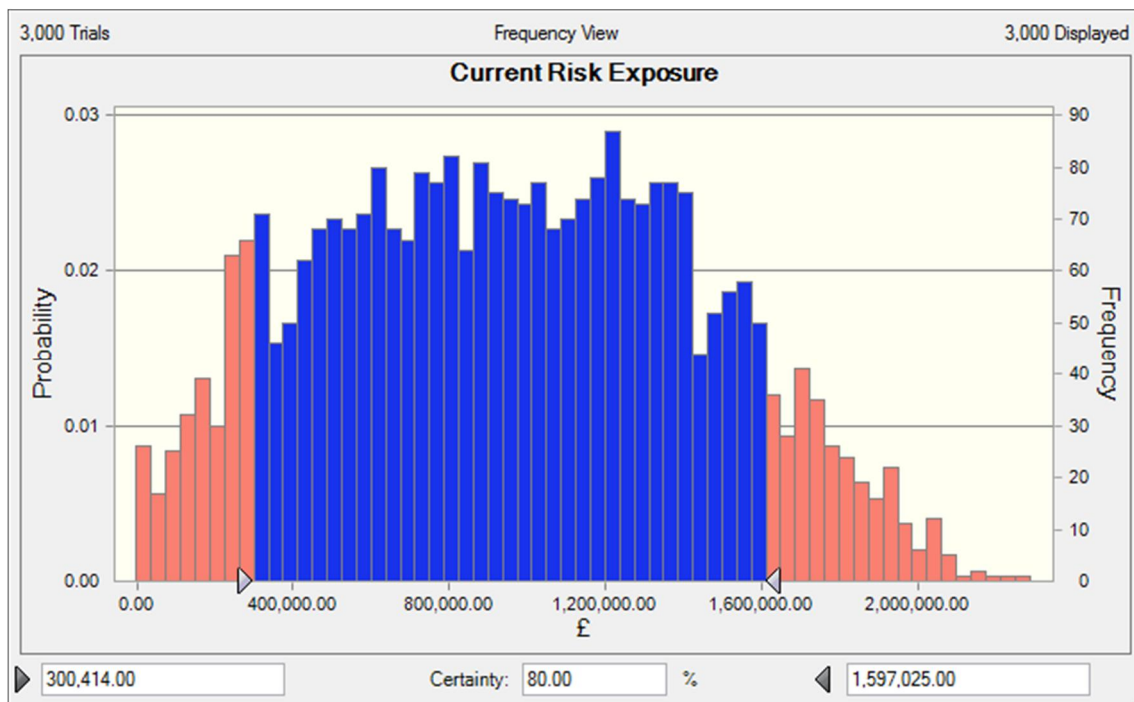


Figure 3 – Monte Carlo Frequency Distribution (Current)

This graph shows that based on the data provided there is a wide spread of likely outcomes, with the P10 to P90 range shown in blue, which is £300,414 to £1,597,025. The P80 is £1,395,213, which is the 80% confidence of not exceeding value.

The Key Risk Drivers are shown by the chart below:

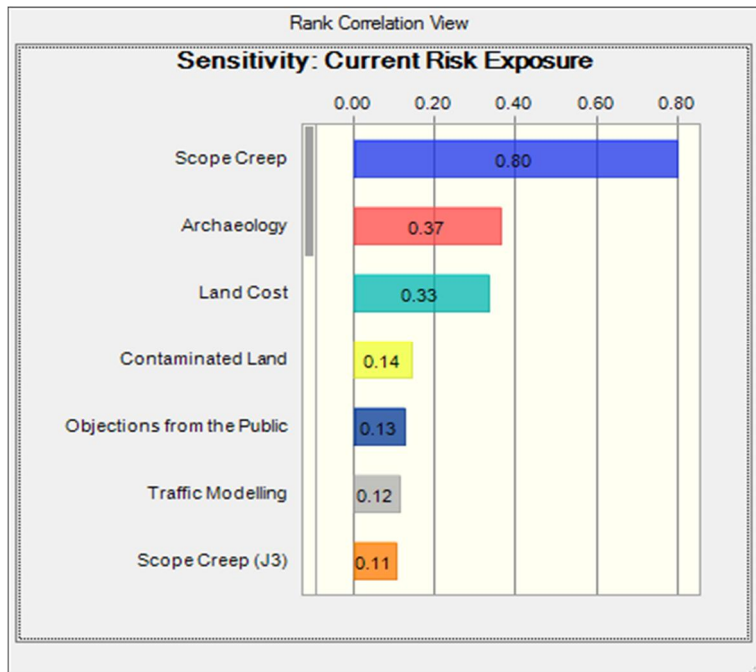


Figure 4 – Key Risk Drivers (Current)

Mitigations were identified and the post mitigation scoring was evaluated on the Risk Register. This produced the following results.

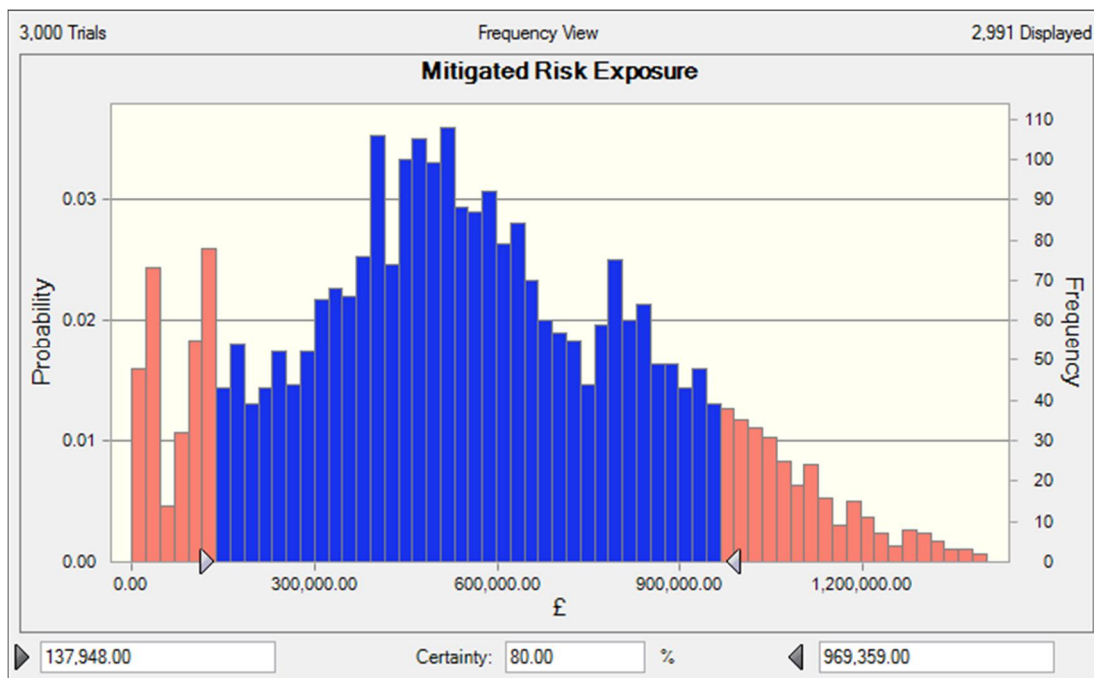


Figure 5 – Monte Carlo Frequency Distribution (Mitigated)

This graph shows that the Risk Exposure is significantly reduced once Mitigation has been successfully carried out. The P10 to P90 range is shown in blue, and the P80 difference between Current and Mitigated is ~£570K. The P80 for the mitigated position is **£826,226**, which is the 80% confidence of not exceeding value for the contingency.

The Key Risk Drivers for the mitigated exposure is shown by the chart below:

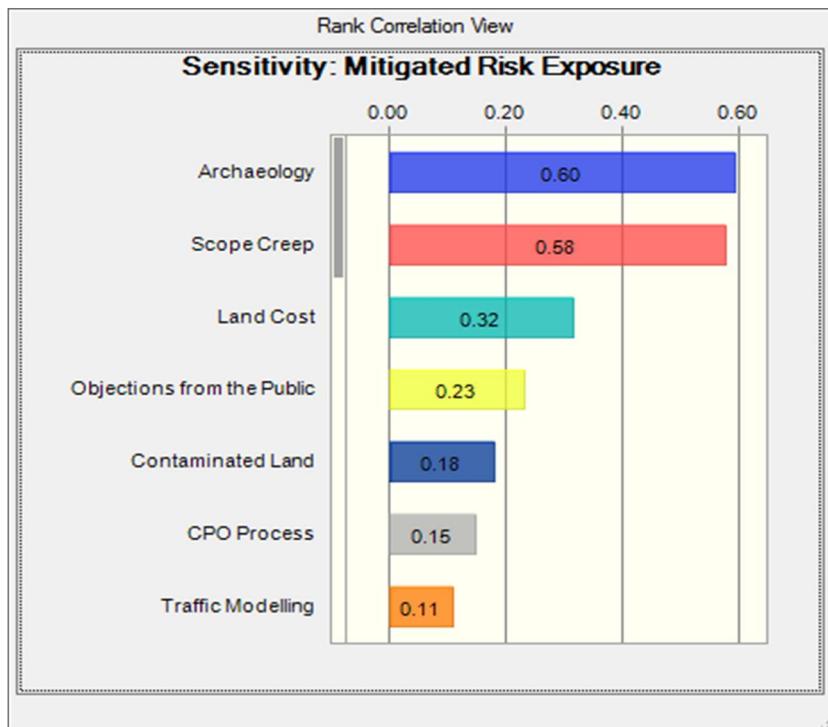


Figure 6 – Key Risk Drivers (Mitigated)

5 RECOMMENDATION

It is recommended that the Risk Register produced from this workshop is maintained moving forward. The analysis has demonstrated that some key mitigation's will significantly reduce the project risk exposure and these should be carried out in a timely manner. Regular risk reviews would help to build the 'Risk Management' culture and therefore the chance of delivering the Project successfully. The figures from the risk model can be used to provide the contingency estimate.

APPENDIX A

Title	Category / Phase	Risk Description	Owner	Strategy	Probability	Budget	Schedule	Pre Mitigation Risk Rank	Mitigations	Probability	Budget	Schedule	Post Mitigation Risk Rank	Risk Retirement Date
Scope Creep	Scheme Preparation	The Client instructs a change of scope due to foreexample results from Traffic Modelling, or change in junction design.	West Sussex Project Manager	Accept	H	H	L	21	Accommodate the change required	H	M	L	16	Q3 2017
Local Developments	Scheme Preparation	Developers submit planning application, resulting in delay to gaining approval of the intended design and scope of work	West Sussex Project Manager	Treat	H	VL	L	12	Ensure the West Sussex implementation team is aware of this scheme and the impact the development will have	H	VL	VL	6	Q3 2017
Traffic Modelling	Scheme Preparation	Traffic Modelling is not approved by the LEP, leading to delay and cost (linked to Scope Change)	West Sussex Project Manager	Treat	M	L	L	9	Submit the Business Case to the LEP in advance for an informal review	L	L	L	8	Q4 2015
Key Staff	Scheme Preparation	Unavailability of key staff on the project	West Sussex Project Manager	Treat	M	VL	L	9	Continue to employ a Professional services organisation and liase with Business Manager to ensure availability of resources	L	VL	L	8	Q3 2017
Objections from the Public	Scheme Preparation	Objectives from the Public eg School playing fields, results in delays and scope change	West Sussex Project Manager	Treat	H	L	L	12	Hold exhibitions to find out the likely objectives earlier	M	L	L	9	Q4 2015
Land Referencing	Statutory process	Failure to identify correct ownership of Land, results in significant delay	West Sussex Project Manager	Treat	VL	VL	L	4	Issuing letters to Land owners (requisition of information)	VL	VL	L	4	Q1 2016
CPO Process	Statutory process	Objections submitted by Land owners after CPO published, resulting in delay to the process	West Sussex Project Manager	Treat	H	L	L	12	Sending out Letters to Owners in advance of CPO Publication to acquire by agreement	M	L	L	9	Q4 2016
Land Cost	Scheme Cost	Land cost is more than estimated during the design phase	West Sussex Project Manager	Treat	M	M	VL	13	Land needs to be valued by the district valuer	L	M	M	10	Q4 2016
Ecology	Environment / Ecology	Unexpected protected species found	West Sussex Project Manager	Treat	L	VL	VH	19	Additional surveys. Re-schedule the construction	VL	VL	H	11	Q4 2016
Landscaping	Environment / Ecology	New areas for habitats (mitigation) not found leading to delays	West Sussex Project Manager	Treat	M	L	L	9	Identify Land adjacent to the highway during scheme preparation	L	L	L	8	Q3 2015
Archaeology	Environment / Ecology	Discover something of archaeological note, delaying the scheme while recording is taking place	West Sussex Project Manager	Accept	H	M	M	16	* Employ Archaeologist firm	H	M	M	16	Q1 2019
Contaminated Land	Environment / Ecology	Contaminated land results in delay and remediation & disposal cost	West Sussex Project Manager	Accept	M	L	VL	9		M	L	VL	9	Q1 2019
Ground Conditions - Void	Environment / Ecology	1 Void found around Jnc 11. Investigation is approx 25K. Cost increase on scheme if further voids found.	West Sussex Project Manager	Treat	L	L	L	8	Ground Surveys to be carried out along the route. Ground investigation report to be included in site information	VL	L	L	4	Q1 2019
Public Enquiry	Statutory process	CPO not confirmed by secretary of state, therefore cannot aquire land and results in a significant delay	West Sussex Project Manager	Accept	VL	VH	VH	18	* Follow CPO processes correctly	VL	VH	VH	18	Q1 2017

Title	Category / Phase	Risk Description	Owner	Strategy	Probability	Budget	Schedule	Pre Mitigation Risk Rank	Mitigations	Probability	Budget	Schedule	Post Mitigation Risk Rank	Risk Retirement Date
JR Decision Risk	Statutory process	JR challenge that the decision is not a sound democratic process. This could lead to significant delay while court proceedings go ahead.	West Sussex Project Manager	Accept	VL	VH	VH	18	* Follow processes correctly	VL	VH	VH	18	Q1 2017
Protestor action	Construction	Protesters present on site delaying the construction programme	West Sussex Project Manager	Treat	VL	VL	L	4	County Council Emergency Management Team Liaison for local intelligence. Community engagement	VL	VL	L	4	Q1 2019
EA Approval of design	Scheme Preparation	EA do not approve the hydraulic and drainage strategy, FRA etc.	Consultant	Treat	L	L	VL	8	Change of design to meet approvals	VL	L	VL	4	Q4 2015
Construction Suppliers	Construction	Construction supplier(s) goes into administration leading to delays	West Sussex Project Manager	Treat	L	H	H	14	Due Dilligence (Framework)	L	M	M	10	Q1 2019
Changes in design standards	Scheme Preparation	Changes in design standards results in non compliance and therefore rejection of departures from standard resulting in re-design	West Sussex Project Manager	Treat	VL	M	M	5	Keeping up to date with design standards	VL	L	L	4	Q4 2015
Extreme Weather (NEC contract)	Construction	Extreme weather	West Sussex Project Manager	Accept	VL	VL	VL	1	* can re-programme depending on weather forecast	VL	VL	VL	1	Q1 2019
Unforeseen ground conditions	Construction	Unforeseen ground conditions outside the highway boundary has not been surveyed.	West Sussex Project Manager	Treat	VL	M	M	5	Survey the land outside the boundary	VL	M	M	5	Q4 2015
Statutory Undertaker costs	Construction	C4 Estimates are much higher than C3 estimates	West Sussex Project Manager	Treat	H	VH	L	24	Negotiate with utilities for the contractor to carry out some of the works	M	VH	L	22	Q1 2019
Damage to SU equipment	Construction	Contractor damages SU equipment. They incur the cost impact but the project may be delayed	West Sussex Project Manager	Accept	L	VL	VL	2	* Contractor Methodology agreed prior to works commencing. Liaison with SU's	L	VL	VL	2	Q1 2019
Design and Build Framework	Procurement	Framework procurement is delayed leading to delays on the programme	West Sussex Improvements Manager	Treat	H	VL	VL	6	PM to liase with the IM	L	VL	VL	2	Q4 2015
Skills shortage	Scheme Preparation	Skills shortage in the industry, particular the design works. Results in a delay while recruitment takes place	West Sussex Project Manager	Accept	M	VL	VL	3		M	VL	VL	3	Q4 2015
Challenge to Tender	Procurement	Unsuccessful Tenderer challenges the framework process, leading to potential delay	West Sussex Project Manager	Accept	VL	M	M	5	* Follow processes correctly	VL	M	M	5	Q4 2015

Title	Category / Phase	Risk Description	Owner	Strategy	Probability	Mitigations
Non confirmation of Statutory orders	Statutory processes	Secretary of state does not confirm orders therefore land cannot be acquired	West Sussex Project Manager	Treat	L	Re-start the statutory orders process
Securing Funding	Commercial	Lack of secured Funding from local authority or other finance sources	West Sussex Project Manager	Treat	H	Local authority to decide if they have the risk appetite to invest in the scheme
Change of Government policy	Political	New Government dissolves LEP's or removes funding	West Sussex Project Manager	Accept	M	N/A
Change of West Sussex county council priorities	Political	Change of priorities at the local level, due to change of leader at this level in government	West Sussex Project Manager	Accept	M	N/A
Developer investment	Developers	Assumed local development does not come forward resulting in lack of S106 contribution	West Sussex Project Manager	Treat	M	Lobby local developers

Appendix D

SCHEME COST PROFORMA

SUMMARY COST ESTIMATE - JCT 5 & 6

SERIES	DESCRIPTION			AMOUNT
200	SITE CLEARANCE			30,891.12
300	FENCING			63,000.00
400	ROAD RESTRAINT SYSTEMS			40,448.82
500	DRAINAGE			336,704.64
600	EARTHWORKS			380,687.16
700	PAVEMENTS			333,293.94
1100	KERBS FOOTWAYS AND PAVED AREAS			143,675.54
1200	TRAFFIC SIGNS AND ROAD MARKINGS			141,063.58
1300	ROAD LIGHTING			38,815.92
1400	ELECTRICAL WORK FOR ROAD LIGHTING COLUMNS AND SIGNS			46,561.08
3000	LANDSCAPE AND ECOLOGY			10,708.94
	STRUCTURES - RETAINING WALL			36,468.00
	SUB TOTAL			£ 1,602,318.74
	ADD FOR CONTRACTOR'S OH&P (not included in above rates)	6.00%		£ 96,139.12
	(HO Overheads 4-8%, Profit 2-5%)			
	SUB TOTAL			£ 1,698,457.86
	PRELIMINARIES INCLUDING TRAFFIC MANAGEMENT	40.00%		£ 679,383.14
	LAND TAKE			£ 93,546.75
	ESTIMATED CONSTRUCTION COSTS			£ 2,471,387.76
	PREPARATION COSTS (DMRB Volume 13, part 2, Chapter 7, 7.3)	12.00%		£ 296,566.53
	SUPERVISION COSTS (DMRB Volume 13, part 2, Chapter 7, 7.4)	5.00%		£ 123,569.39
	SUB TOTAL			£ 2,891,523.67
	Optimism Bias (HM Treasury Green Book - Supplementary Guidance)	15.00%		£ 433,728.55
	ESTIMATED TOTAL COST (CONSTRUCTION AND DESIGN FEES)			£ 3,325,252.22

BOQ BREAKDOWN COST ESTIMATE

SERIES	ITEM	QUANTITY	UNIT	RATE	AMOUNT	SERIES SUMMARY	COMMENTS/NOTES
200	SITE CLEARANCE						RATES FROM SPON'S CIVIL ENGINEERING AND HIGHWAY WORKS 2014, UNLESS SPECIFIED
	General Site Clearance - live dual carriageway	3.008	ha	5212.21	15,678.33		
	Take up or down and remove to tip off site Kerbs, Channels and Edgings	2914	m	4.12	12,005.68		
	Take up or down and remove to tip off site Lighting Column including bracket arm and lantern; 10m high	21	No.	141.63	2,974.23		
	Take up or down and remove to tip off site gully grating and frame	39	no	5.68	221.52		
	Take up or down and remove to tip off site chamber cover and frame	2	no	5.68	11.36	30,891.12	
300	FENCING						
	Single-sided timber reflective barrier at 2.4metres high with concrete posts	350	m	180.00	63,000.00		Rate and item provided by Godlaming
						63,000.00	
400	ROAD RESTRAINT SYSTEMS						
	Tensioned double sided corrugated beam	460	m	56.06	25,787.60		
	Short post for setting in concrete for double sided corrugated beam	187	no	24.89	4,654.43		
	Standard concrete foundation for tensioned double sided corrugated beam	187	no	32.17	6,015.79		524/2.5
	Terminal section for tensioned double sided corrugated beam	5	no	745.94	3,729.70		6 connections
	Connection to existing safety barrier	1	no	261.30	261.30	40,448.82	
500	DRAINAGE						
	150mm dia. Drain or sewer in trench, depth to invert average 1.50m deep	480	m	63.06	30,268.80		
	Extra for Type S concrete surround 650 wide x 100mm	480	m	31.83	15,278.40		
	225mm dia. Drain or sewer in trench, depth to invert average 1.50m deep	703	m	97.99	68,886.97		
	Extra for Type S granular surround 750 wide x 150mm	703	m	47.88	33,659.64		
	Proposed Soakaway 2400mm diameter n.e. 3.00	20	no	6430.35	128,607.00		based on 3m depth chamber
	Connection of pipe to existing drain, sewer or piped culvert 225mm	1	No.	238.34	238.34		
	Connection of 150mm pipe to existing soakaway	4	No.	206.07	824.28		
	Connection of 225mm pipe to existing soakaway	5	No.	309.11	1,545.53		
	Connection of 150mm pipe to existing pond	2	No.	206.07	412.14		
	Connection of 225mm pipe to existing pond	1	No.	309.11	309.11		
	Connection of 150mm pipe to proposed chamber	30	No.	104.90	3,147.00		150mm connection
	Connection of 225mm pipe to proposed chamber	12	No.	157.35	1,888.20		PRO RATA 104.90/0.15*0.225
	Connection of 150mm pipe to proposed pipe	20	No.	234.34	4,686.80		
	Road Gully 450mm x 900mm deep	59	no	527.49	31,121.81		
	Extra over excavation for excavation in hard material in drainage	188	m3	24.97	4,694.36		
	Sealing redundant road gullies with C15 concrete	25	m3	14.70	363.33		
	Filling redundant Chambers with C15 concrete	2	no	66.20	132.40		
	Grouting up of existing drains and service ducts 150mm	369	m	7.60	2,804.40		
	Grouting up of existing drains and service ducts 225mm	159	m	24.67	3,922.13		
	Grouting up of existing drains and service ducts 300mm	119	m	32.89	3,913.91	336,704.64	
600	EARTHWORKS						
	Excavate unacceptable material class U1A in cutting and other excavation	5017	m3	4.11	20,619.87		Tactiles, Footway, Carriageway, Central reserve and verges
	Excavate acceptable material excluding 5A in cutting and other excavation	1672	m3	4.11	6,871.92		
	Excavation of acceptable material class 5A	418	m3	3.08	1,287.44		
	Extra over excavation in cutting and other excavation in hard material pavements	1254	m3	67.40	84,519.60		
	Disposal of unacceptable materials Class U1A distance to tip 1km	5017	m3	4.65	23,329.05		
	Disposal of acceptable materials distance to tip 1km	1283	m3	4.65	5,965.95		
	Allowance for 10km tip £2.32/m3/km	6300	m3	20.88	131,544.00		
	Deposition of acceptable material	389	m3	1.19	462.91		Non-hazardous materials
	Imported topsoil class 5B	985	m3	22.35	22,014.75		
	Compaction	389	m3	0.63	245.07		
	Completion on formation	6806	m2	1.02	6,942.12		
	Topsoiling 150mm to surfaces at 10 deg or less to the horizontal	9356	m2	6.08	56,884.48		
	Allowance for extension of Pond capacity		item		20,000.00	380,687.16	pond extended from 25m2 to 250m2
700	PAVEMENTS						
	Type 1 unbound mixture sub-base in carriageway, hardshoulder and hardstrip.	1021	m3	43.99	44,911.24		
	Dense Base Asphalt Concrete (AC 32 HDM base 40/60) 180mm thick in carriageway hardshoulder and hardstrip	3140	m2	28.61	89,835.40		Pro Rata Base rate =
	Dense asphalt concrete binder, 60mm thick in carriageway, hardshoulder and hardstrip.	8011	m2	10.62	85,076.82		
	Dense Bitumen Macadam (DBM) surface course 50mm thick in carriageway hardshoulder and hardstrip	4871	m2	13.06	63,615.26		
	Thin surface course, 40mm thick in carriageway, hardshoulder and hardstrip in overlay.	3140	m2	10.45	32,806.72		
	Cold Milling; 110mm deep	4871	m2	3.50	17,048.50	333,293.94	
1100	KERBS FOOTWAYS AND PAVED AREAS						
	Bullnosed, splayed or half battered Kerbs laid straight or exceeding 12m radius 125x255mm	1264	m	16.32	20,628.48		
	Foundation 300 x 150mm	1264	m	5.12	6,471.68		
	Bullnosed, splayed or half battered kerbs laid Curved not exceeding 12m radius 125x255mm	38	m	15.64	594.32		
	Foundation 300 x 150mm	38	m	5.12	194.56		
	Edging Kerbs 150 x 50mm	1886	m	5.46	10,297.56		
	Foundation 200 x 100mm	1886	m	2.49	4,696.14		
	Drop kerbs and transitions 125mm x 255mm	24	m	27.91	669.84		
	Foundation 300 x 150mm	24	m	5.12	122.88		
	Sub base 150mm	2620	m2	5.17	13,545.40		
	Paved area comprising binder course 40mm thick and surface course 20mm thick	2620	m2	21.09	55,046.20		
	Sub base 150mm	984	m2	5.17	5,087.28		Central Reserve
	Paved area comprising binder course 60mm thick and surface course 40mm thick (central Reserve)	984	m2	22.51	22,149.84		Central Reserve
	Tactile paving 400x400 on 25mm sand bedding and 150mm sub base	62	m2	67.28	4,171.36	143,675.54	Historic Rate
1200	TRAFFIC SIGNS AND ROAD MARKINGS						
	Intermittent line in reflectorized white 100mm wide with 4m line and 2m gap	1764	m	0.89	1,569.96		
	Intermittent line in reflectorized white 200mm with with 1m line and 1m gap	152	m	1.55	235.60		
	Elephants feet 0.1 x 0.2 x 0.8	96	m	2.81	269.76		
	Ancillary line in reflectorized white 200mm wide in hatched areas	129	m	1.55	199.95		
	Arrows in reflectorized white 4.0m long straight or turning	11	No.	26.21	288.31		
	Allowance for amendments to existing Signage 10@ £500 10 @ £1000		item		15,000.00		
	Removal of Existing reflectorized thermoplastic road markings 150mm wide line		Item		1,500.00		Daily Rate allowance for Hydrodem Removal.
	TOUCAN CROSSING	2	No.	61000.00	122,000.00	141,063.58	Approximate Estimating Rates - Pelican Crossing on Major Road - Highest Rate Used
1300	ROAD LIGHTING						
	Proposed road lighing column of 10m nominal height with 1.5m single arm projection	24	No.	1141.57	27,397.68		Price from SPONS (Column and 1.5m Bracket Arm)
	Lantern unit with photo-electric control set to switch on at 100 lux; Lamps, 250W SON (P426); to suit 8m, 10m, and 12m columns	24	No.	475.76	11,418.24	38,815.92	(690.20+451.37=1141.57)
1400	ELECTRICAL WORK FOR ROAD LIGHTING AND SIGNS						
	300mm to 450m wide; depth not exceeding 1.5m	1305	m	15.61	20,371.05		
	1 No. 100mm internal diameter UPVC duct in trench depth not exceeding 1.0 metres	1305	m	3.48	4,541.40		Historic Rate
	2 No. 100mm internal diameter UPVC duct in trench depth not exceeding 1.0 metres	32	m	8.12	259.84		
	16mm2 3 core XLPE/PVC/SWA/PVC cable with copper conductors in duct	1305	m	8.22	10,727.10		Historic Rate
	Trench for duct exceeding 450mm but not exceeding 600mm wide depth not exceeding 1.0 metres in carriageways, footways, bridge decks and paved areas.	32	m	162.40	5,196.80		Concrete Surrounding, Historic Rate
	Galvanised steel feeder pillars 111 x 1203mm	3	No.	1552.20	4,656.60		
	Termination of 4 core PVC/SWA/PVX cable in road lighting columns, 16mm2	21	No.	38.49	808.29	46,561.08	Using 4 core prices
3000	LANDSCAPE AND ECOLOGY						
	Grass seeding by conventional sowing at 10 degrees or less to the horizontal	9356	m2	0.77	7,204.12		
	Break up subsoil to a depth of 200mm in treepit	20	No.	1.38	27.60		
	Supply and plant tree in prepared pit; backfill with excavated topsoil minimum 600mm deep standard tree	20	No.	77.56	1,551.20		
	Excavate trench by machine for hedge and deposit soil alongside trench 300 wide x 300mm deep	158	m	1.07	169.06		
	Supply and plant hedging plants; backfill with excavated topsoil single row plants at 200mm centres	158	m	11.12	1,756.96	10,708.94	Assumption on hedge plants
	STRUCTURES						
	Retaining Wall, based on reinforced in situ concrete including excavation, reinforcement, formwork, expansion joints granular backfilland 100mm land drain, profiled formwork finish to one side typical retaining wall, allowing for profiling finishes, based on 2m high:						
	9m	9	m2	620.00	5,580.00		
	72m long x 0.65m high	72	m2	429.00	30,888.00	36,468.00	

SUMMARY COST ESTIMATE - JCT 9-11

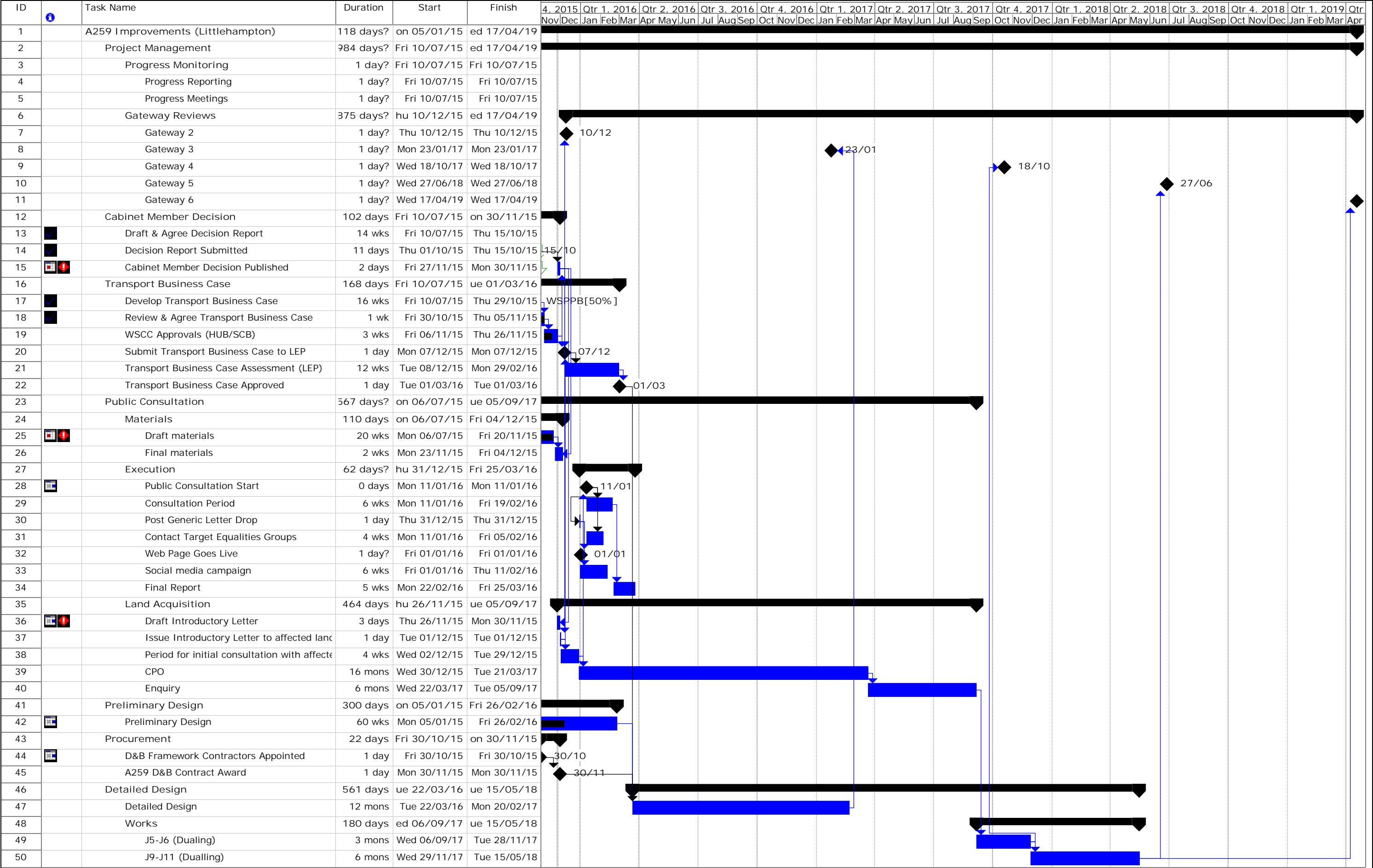
SERIES	DESCRIPTION				AMOUNT
200	SITE CLEARANCE				64,709.04
300	FENCING				189,000.00
400	ROAD RESTRAINT SYSTEMS				93,884.61
500	DRAINAGE				449,666.87
600	EARTHWORKS				733,628.24
700	PAVEMENTS				1,118,402.99
1100	KERBS FOOTWAYS AND PAVED AREAS				347,635.93
1200	TRAFFIC SIGNS AND ROAD MARKINGS				50,430.11
1300	ROAD LIGHTING				87,335.82
1400	ELECTRICAL WORK FOR ROAD LIGHTING COLUMNS AND SIGNS				86,113.95
3000	LANDSCAPE AND ECOLOGY				11,526.31
	SUB TOTAL				£ 3,232,333.86
	ADD FOR CONTRACTOR'S OH&P (not included in above rates)	6.00%			£ 193,940.03
	(HO Overheads 4-8%, Profit 2-5%)				
	SUB TOTAL				£ 3,426,273.90
	PRELIMINARIES INCLUDING TRAFFIC MANAGEMENT	40.00%			£ 1,370,509.56
	LAND TAKE				£ 203,362.50
	ESTIMATED CONSTRUCTION COSTS				£ 5,000,145.95
	PREPARATION COSTS (DMRB Volume 13, part 2, Chapter 7, 7.3)	12.00%			£ 600,017.51
	SUPERVISION COSTS (DMRB Volume 13, part 2, Chapter 7, 7.4)	5.00%			£ 250,007.30
	SUB TOTAL				£ 5,850,170.77
	Optimism Bias (HM Treasury Green Book - Supplementary Guidance)	15.00%			£ 877,525.61
	ESTIMATED TOTAL COST (CONSTRUCTION AND DESIGN FEES)				£ 6,727,696.38

BOQ BREAKDOWN COST ESTIMATE

SERIES	ITEM	QUANTITY	UNIT	RATE	AMOUNT	SERIES SUMMARY	COMMENTS/NOTES
200	SITE CLEARANCE						RATES FROM SPON'S CIVIL ENGINEERING AND HIGHWAY WORKS 2014, UNLESS SPECIFIED
	General Site Clearance - live dual carriageway	7.485	ha	5212.21	39,013.39		
	Take up or down and remove to tip off site Kerbs, Channels and Edgings	4302	m	4.12	17,724.24		
	Take up or down and remove to tip off site Lighting Column including bracket arm and lantern; 10m high	55	No.	141.63	7,789.65		
	Take up or down and remove to tip off site gully grating and frame	32	no	5.68	181.76	64,709.04	
300	FENCING						
	Single-sided timber reflective barrier at 2.4metres high with concrete posts	1050	m	180.00	189,000.00		Rate and item provided by Godlaming
						189,000.00	
400	ROAD RESTRAINT SYSTEMS						
	Tensioned single sided corrugated beam (Bridge)	62	m	31.74	1,987.88		
	Short post for setting in concrete or socket for single sided corrugated beam	27	no	32.17	868.59		
	Standard concrete foundation for corrugated beam	27	no	24.38	658.26		
	Terminal section for tensioned single sided corrugated beam	4	no	461.43	1,845.72		1 connection, 3 ends
	Tensioned double sided corrugated beam	1065	m	56.06	59,703.90		
	Short post for setting in concrete for double sided corrugated beam	427	no	24.89	10,628.03		
	Standard concrete foundation for tensioned double sided corrugated beam	427	no	32.17	13,736.59		3377/2.5
	Terminal section for tensioned double sided corrugated beam	6	no	745.94	4,475.64	93,884.61	4 connection, 2 ends
500	DRAINAGE						
	150mm dia. Drain or sewer in trench, depth to invert average 1.50m deep	84	m	63.06	5,297.04		
	Extra for Type S concrete surround 650 wide x 100mm	84	m	31.83	2,673.72		
	225mm dia. Drain or sewer in trench, depth to invert average 1.50m deep	2507	m	97.99	245,660.93		
	Extra for Type S granular surround 750 wide x 150mm	2507	m	47.88	120,035.16		
	Connection of pipe to existing drain, sewer or piped culvert 225mm	2	No.	238.34	476.68		
	Connection of 225mm pipe to existing manhole	4	No.	305.11	1,236.42		
	Connection of 150mm pipe to proposed chamber	2	No.	104.90	209.80		150mm connection
	Connection of 225mm pipe to proposed chamber	18	No.	157.35	2,832.30		PRO RATA 104-90/0.15*0.225
	Connection of 150mm pipe to proposed pipe	37	No.	234.34	8,670.58		
	Connection of 225mm pipe to proposed pipe	2	No.	351.51	703.02		225mm connection
	Chamber assumed 1200 dia x 2000m deep	22	no	1502.06	33,045.32		type not shown, assumed
	Road Gully 450mm x 900mm deep	34	no	527.49	17,934.66		
	Extra over excavation for excavation in hard material in drainage	426	m3	24.97	10,637.22		
	Sealing redundant road gullies with C15 concrete	17	m3	14.70	254.02	449,666.87	
600	EARTHWORKS						
	Excavate unacceptable material class U1A in cutting and other excavation	9142	m3	4.11	37,573.62		Tactiles, Footway, Carriageway, and verges
	Excavate acceptable material excluding 5A in cutting and other excavation	3047	m3	4.11	12,523.17		
	Excavation of acceptable material class 5A	762	m3	3.08	2,346.96		
	Excavate unacceptable material class U1A in intercepting ditches (ditch)	4063	m3	6.78	27,547.14		
	Extra over excavation in cutting and other excavation in hard material pavements	2286	m3	67.40	154,076.40		
	Disposal of unacceptable materials Class U1A distance to tip 1km	13205	m3	4.65	61,403.25		
	Disposal of acceptable materials distance to tip 1km	3047	m3	4.65	14,168.55		
	Allowance for 10km tip £2 32/m3/km	16252	m3	20.88	339,341.76		
	Imported topsoil class 5B	435	m3	22.35	9,722.25		
	Completion on formation	25883	m2	1.02	26,400.66		
	Topsoiling 150mm to surfaces at 10 deg or less to the horizontal	7981	m2	6.08	48,524.48	733,628.24	
700	PAVEMENTS						
	Type 1 unbound mixture sub-base in carriageway, hardshoulder and hardstrip.	4313	m3	43.99	189,718.09		
	Dense asphalt concrete binder, 60mm thick in carriageway, hardshoulder and hardstrip.	23183	m2	10.62	246,203.46		
	Thin surface course, 40mm thick in carriageway, hardshoulder and hardstrip in overlay.	13271	m2	10.45	138,655.41		
	Dense Base Asphalt Concrete (AC 32 HDM base 40/60) 180mm thick in carriageway hardshoulder and hardstrip	13271	m2	28.61	379,683.31		Pro Rata Base rate =
	Dense Bitumen Macadam (DBM) surface course 50mm thick in carriageway hardshoulder and hardstrip	9912	m2	13.06	129,450.72		
	Cold Milling; 110mm deep	9912	m2	3.50	34,692.00	1,118,402.99	
1100	KERBS FOOTWAYS AND PAVED AREAS						
	Bulldozed, splayed or half battered Kerbs laid straight or exceeding 12m radius 125x255mm	2911	m	16.32	47,507.52		
	Foundation 300 x 150mm	2911	m	5.12	14,904.32		
	Bulldozed, splayed or half battered kerbs laid Curved not exceeding 12m radius 125x255mm	44	m	15.64	688.16		
	Foundation 300 x 150mm	44	m	5.12	225.28		
	Edging Kerbs 150 x 50mm	4537	m	5.46	24,772.02		
	Foundation 200 x 100mm	4537	m	2.49	11,297.13		
	Drop kerbs and transitions 125mm x 255mm	40	m	27.91	1,116.40		
	Foundation 300 x 150mm	40	m	5.12	204.80		
	Sub base 150mm	5699	m2	5.17	29,463.83		
	Paved area comprising binder course 40mm thick and surface course 20mm thick	5699	m2	21.01	119,735.99		
	Sub base 150mm	3438	m2	5.17	17,774.46		
	Paved area comprising binder course 60mm thick and surface course 40mm thick (central Reserve)	3438	m2	22.51	77,389.38		Assumed depth 125mm upstand, therefore 125-60 = 65mm regulating
	Tactile paving 400x400 on 25mm sand bedding and 150mm sub base	38	m2	67.28	2,556.64	347,635.93	Historic Rate
1200	TRAFFIC SIGNS AND ROAD MARKINGS						
	Intermittent line in reflectorized white 100mm wide with 4m line and 2m gap	1141	m	0.89	1,015.49		
	Intermittent line in reflectorized white 200mm with with 1m line and 1m gap	140	m	1.55	217.00		
	Elephants feet 0.1 x 0.2 x 0.8	22	m	2.81	61.82		
	Ancillary line in reflectorized white 200mm wide in hatched areas	72	m	1.55	111.60		
	Arrows in reflectorized white 4.0m long straight or turning	20	No.	26.21	524.20		
	Allowance for amendments to existing Signage 10@ £500, 10 @ £1000		item		15,000.00		
	Removal/amendments to existing road markings		Item		3,000.00		Daily Rate allowance for Hydrodemolition Removal, allow 2 days
	TOUCAN CROSSING - allow 50 % for upgrade to Toucan	1	No.	30500.00	30,500.00	50,430.11	Approximate Estimating Rates - Allow for Pelican Crossing on Major Road - Highest Rate Used
1300	ROAD LIGHTING						
	Proposed road lighting column of 10m nominal height with 1.5m single arm projection	54	No.	1141.57	61,644.78		Price from SPONS (Column and 1.5m Bracket Arm) (690.20+451.37=1141.57)
	Lantern unit with photo-electric control set to switch on at 100 lux; Lamps, 250W SON (P426); to suit 8m, 10m, and 12m columns	54	No.	475.76	25,691.04	87,335.82	
1400	ELECTRICAL WORK FOR ROAD LIGHTING AND SIGNS						
	300mm to 450mm wide; depth not exceeding 1.5m	1524	m	15.61	23,789.64		
	1 No. 100mm internal diameter UPVC duct in trench depth not exceeding 1.0 metres	1524	m	3.48	5,303.52		Historic Rate
	2 No. 100mm internal diameter UPVC duct in trench depth not exceeding 1.0 metres	203	m	8.12	1,648.36		
	16mm2 3 core XLPE/PVC/SWA/UPVC cable with copper conductors in duct	1524	m	8.22	12,527.28		Historic Rate
	Trench for duct exceeding 450mm but not exceeding 600mm wide depth not exceeding 1.0 metres in carriageways, footways, bridge decks and paved areas	203	m	162.40	32,967.20		Concrete Surrounding, Historic Rate
	Galvanised steel feeder pillars 111 x 1203mm	5	No.	1552.20	7,761.00		
	Termination of 4 core PVC/SWA/PVX cable in road lighting columns, 16mm2	55	No.	38.49	2,116.95	86,113.95	Using 4 core prices
3000	LANDSCAPE AND ECOLOGY						
	Grass seeding by conventional sowing at 10 degrees or less to the horizontal	7981	m2	0.77	6,145.37		
	Break up subsoil to a depth of 200mm in treepit	32	No.	1.38	44.16		
	Supply and plant tree in prepared pit; backfill with excavated topsoil minimum 600mm deep standard tree	32	No.	77.56	2,481.92		
	Excavate trench by machine for hedge and deposit soil alongside trench 300 wide x 300mm deep	202	m	1.07	216.14		
	Supply and plant hedging plants; backfill with excavated topsoil single row plants at 200mm centres	202	m	11.12	2,246.24		Assumption on hedge plants
	Form planting hole in previously cultivated area, supply and plant specified shrub and backfill with excavated material shrub 300mm high	44	each	8.92	392.48		Assume length/2
						11,526.31	

Appendix E

PROGRAMME



Appendix F

RECORD OF MODEL FILES USED

SCENARIO	YEAR	TIME PERIOD	ITEM	FILENAME
Do Minimum (Core)	2018	AM	Network	EATM_DM_2018_AM_CS_DevUpdate.dat
			Matrix	EATM_2018_BG_CommDevUpdate_AM_CS.ufm
		IP	Network	EATM_DM_2018_IP_CS_DevUpdate.dat
			Matrix	EATM_2018_BG_CommDevUpdate_IP_CS.ufm
		PM	Network	EATM_DM_2018_PM_CS_DevUpdate.dat
			Matrix	EATM_2018_BG_CommDevUpdate_PM_CS.ufm
Do Minimum (Core)	2033	AM	Network	EATM_DM_2033_AM_CS_DevUpdate.dat
			Matrix	EATM_2033_BG_CommDevUpdate_AM_CS.ufm
		IP	Network	EATM_DM_2033_IP_CS_DevUpdate.dat
			Matrix	EATM_2033_BG_CommDevUpdate_IP_CS.ufm
		PM	Network	EATM_DM_2033_PM_CS_DevUpdate.dat
			Matrix	EATM_2033_BG_CommDevUpdate_PM_CS.ufm
Do Something (Core)	2018	AM	Network	EATM_DS_2018_AM_CS_DevUpdate_J5_J6_J9_J11.dat
			Matrix	EATM_2018_BG_CommDevUpdate_AM_CS.ufm
		IP	Network	EATM_DS_2018_IP_CS_DevUpdate_J5_J6_J9_J11.dat
			Matrix	EATM_2018_BG_CommDevUpdate_IP_CS.ufm
		PM	Network	EATM_DS_2018_PM_CS_DevUpdate_J5_J6_J9_J11.dat
			Matrix	EATM_2018_BG_CommDevUpdate_PM_CS.ufm
Do Something (Core)	2033	AM	Network	EATM_DS_2033_AM_CS_DevUpdate_J5_J6_J9_J11.dat
			Matrix	EATM_2033_BG_CommDevUpdate_AM_CS.ufm
		IP	Network	EATM_DS_2033_IP_CS_DevUpdate_J5_J6_J9_J11.dat
			Matrix	EATM_2033_BG_CommDevUpdate_IP_CS.ufm
		PM	Network	EATM_DS_2033_PM_CS_DevUpdate_J5_J6_J9_J11.dat
			Matrix	EATM_2033_BG_CommDevUpdate_PM_CS.ufm