

---

*Coast to Capital Local Transport Body  
Funding Application Supporting Document*

# National Cycle Network 2: Section 5 (Littlehampton to Bognor Regis)

Prepared for  
**West Sussex County Council**

December 2014

**CH2MHILL®**

Elms House  
43 Brook Green  
London W6 7EF



---

<b>Version No</b>	<b>Version Name</b>	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Approved by</b>	<b>Date</b>
1	Draft	Roz Davies	Initial Review Jon Clyne		19/11/2014
2	Final	Roz Davies	Jon Clyne	Chris Weedon	26/11/2014
3	V2 Draft Final	Roz Davies	John Clyne		11/12/2014
4	V2 Final (incorporating WSCC text changes)	Roz Davies	n/a	Chris Weedon	12/12/2014



# Contents

---

Section	Page
<b>Acronyms and Abbreviations</b> .....	<b>2</b>
<b>1. Executive Summary of National Cycle Network Package of Schemes</b> .....	<b>1</b>
Summary of the package of schemes and strategic justification .....	1
Transport benefits .....	1
Economic benefits.....	3
Social benefits .....	3
Environmental impacts .....	4
<b>2. Introduction</b> .....	<b>6</b>
<b>3. Policy Background</b> .....	<b>7</b>
<b>4. Scheme Description</b> .....	<b>10</b>
<b>5. Method</b> .....	<b>14</b>
<b>6. Transport Benefits</b> .....	<b>20</b>
<b>7. Economic Benefits</b> .....	<b>26</b>
<b>8. Social Distributional Benefits</b> .....	<b>28</b>
<b>9. Environmental Assessment</b> .....	<b>30</b>
<b>Annex 1: References</b> .....	

## Acronyms and Abbreviations

---

BRES	Business Register Employment Survey
CBA	Cost Benefit Analysis
CBR	Cost Benefit Ratio
DfT	Department for Transport
EAST	Early Assessment and Sifting Tool
FUR	Functional Urban Regions
GVA	Gross Value Added
IMD	Index of Multiple Deprivation
LSOA	Lower Super Output Area
Pm10	Particulates
PT	Public Transport
SNCI	Site of Nature Conservation Importance
TAG	Transport Analysis Guidance
WebTAG	Web Transport Analysis Guidance
WSCC	West Sussex County Council

---

# 1. Executive Summary of National Cycle Network Package of Schemes

---

## Summary of the package of schemes and strategic justification

West Sussex County Council (WSSCC) is seeking a total of £900,000 in funds to design and construction of part of the National Cycle Network Route 2 (NCN2) in West Sussex between Littlehampton and Bognor Regis. The Section 5 Scheme and wider NCN2 will support the strategic transport and economic objectives of the Coast to Capital Local Enterprise Partnership (C2C LEP) that are outlined in their Coast to Capital Strategic Economic Plan (C2C SEP). It will create an enabling environment for sustainable transport. It will improve accessibility for cyclists and non-car users, connecting communities and workers to employment opportunities in West Sussex, and support the economy and employment in the area. This will support the C2C SEP overarching objectives to grow the economy and increase jobs. In addition, creating a supportive environment to encourage cycling and walking will see an increase in physical activity helping to improve the health and wellbeing of locals and visitors.

For various reasons there are gaps remaining in NCN2 in West Sussex that need to be completed. There is currently no suitable direct route along the A259 for cyclists travelling along the network between Littlehampton and Bognor Regis. The proposal is to construct a 3m wide shared use pedestrian-cycle path on the northern side of the A259 constructed on the existing grass verge, known as Section 5.

This document is a supporting technical report for the funding application to the Coast to Capital Local Transport Board (CCLTB) for Local Growth Funding (LGF) from the C2C LEP. It presents the methodology used to assess the transport, economic, social and environmental benefits and impacts of the scheme. It also presents the results of the assessment in detail supporting the high level summary in the CCLTB Funding Application Form.

## Transport benefits

The main transport benefits of the NCN2 Section 5 Scheme are a modal shift to sustainable transport (an increase in cycle journeys and reduced motor vehicle journeys) resulting from significantly improved journey quality (ambience) for cyclists, improved accessibility, and reduced accident rates. The modal shift will result in reduced vehicle user costs, improved decongestion on the A259 and reduced carbon emissions. In addition to transport benefits, the scheme will have wider economic and social benefits including health improvements. Due to a lack of comparator studies it has not been possible to estimate the growth in pedestrian trips, but there would be an expected increase in pedestrians using the facility.

In order to provide a broad indication of the transport benefits of the scheme a Benefit Cost Ratio (BCR) has been calculated drawing on the guidance in WebTAG's Active Mode Appraisal. The benefits included in the BCR are those that we have been able to monetise in the absence of a transport model. These are accident rate reduction, journey quality (ambience), decongestion, and carbon reduction. Health benefits have also been factored into the BCRs, although the approach to quantifying health benefits is a developing area of policy. It has been estimated that benefits are likely to comprise 50% of the overall benefits.<sup>1</sup> This has been reflected in the BCRs in this study by assuming that health benefits will represent 50% of all benefits.

Based on these indicators, and the capital and maintenance costs of the scheme, a range of high and low scenarios were prepared and the BCRs calculated. For our central case scenario, we assume a 60 year appraisal period and exclude health benefits. The central case BCR is 2:1 with the low scenario (assuming a 30 year appraisal period without health benefits) and high scenario (assuming a 60 year appraisal period including health benefits) at 4.1:1. We consider that the low scenario described above is in

---

<sup>1</sup> Department for Transport (2014) Claiming the Health Dividend

practice very conservative and would probably represent an underestimate of benefit realisation. In addition to the indicators included in the BCR there are many other non-monetised benefits to the NCN2 Section 5 Scheme, including transport, economic, social and environmental.

The BCR inputs for each scenario are presented in Table **Error! Reference source not found.** Quantified and qualitative transport benefits are summarised in Table 2.

Table 1 Benefit Cost Ratios for four impact scenarios

	Indicator	30 year BCR (excluding health)	30 year BCR (including health)	60 year BCR (excluding health)	60 year BCR (including health)
Benefits	Accident reduction	£750,000	£750,000	£1,500,000	£1,500,000
	Decongestion	£79,000	£79,000	£160,000	£160,000
	Carbon reduction	£70,000	£70,000	£142,000	£142,000
	Journey ambience	£1,227,000	£1,227,000	£2,464,000	£2,464,000
	Health		£2,126,000		£4,266,000
	Total benefits (2010 prices)	£2,126,000	£4,252,000	£4,266,000	£8,532,000
	Present Value Benefit	£1,093,000	£2,195,000	£1,515,000	£3,042,000
Costs	Capital costs (base 2014 prices)	£900,000	£900,000	£900,000	£900,000
	Maintenance costs (base 2014 prices)	£90,000	£90,000	£180,000	£180,000
	Total maintenance and capital cost 2014	£990,000	£990,000	£1,080,000	£1,080,000
	Total costs 2010 prices	£915,000	£915,000	£999,000	£999,000
	Present Value Cost	£720,000	£720,000	£736,000	£736,000
	<b>BCR</b>	<b>1.5</b>	<b>3.0</b>	<b>2.1</b>	<b>4.1</b>

Source: CH2M HILL (2014) Table 2 Transport benefits of NCN2 Section 5

Transport Indicator	WebTAG	Quantitative (over 60 years)	Qualitative
Reduced accident rate	WebTAG A5.1 Active Mode	£1,500,000.00	
Modal shift to sustainable transport:			
- Increase in cycle journeys	WebTAG A5.1 Active Mode	1.20 million additional cycling trips	
- Reduction in motor car journeys	WebTAG A5.1 Active Mode	1.281 million km in car journeys could be reduced	
Journey ambience	WebTAG A5.1 Active Mode; C2C Strategic Economic Plan Transport Objective	£2.464 million	
User cost savings in car maintenance and fuel	WebTAG A4.1 Social Appraisal	-	✓
Decongestion (time savings)	WebTAG A5.1 Active Mode	£160,000	
Reduced carbon emissions	WebTAG A5.1 Active Mode	£142,000	

Source: CH2M HILL (2014)



## Economic benefits

The economic benefits of the NCN2 Section 5 Scheme have been categorised into the design and construction stage and the operational lifetime of the cycle and foot path. The main economic benefits during the construction stage are temporary employment and GVA. During the operational lifetime of the Scheme, as a result of increased connectivity there is likely to be an increase in business turnover in local industries, tourism and cycling related industries due to the greater footfall from cycling. This will lead to an increase in employment and GVA in Arun District and government revenues associated with this. In addition there are likely to be some marginal economic benefits associated with an increase in physical activity through reduced NHS costs due to improved health and wellbeing. This is explored further in the social benefits section. The key economic benefits are presented in Table 3.

Table 3 Economic benefits of NCN2 Section 5

Economic Indicator	WebTAG Appraisal	Quantitative	Qualitative
Construction employment		6 temporary jobs	-
Construction related GVA		£441,000	-
Operational employment	WebTAG A2.1 Wider Impacts	-	✓
Business turnover and GVA <ul style="list-style-type: none"> <li>○ local industry</li> <li>○ tourism industry</li> <li>○ cycling industry</li> </ul>	WebTAG A2.1 Wider Impacts	-	✓
Government revenues	WebTAG A5.1 Active Mode/ WebTAG A2.1 Wider Impacts	-	✓

Source: CH2M HILL (2014)

## Social benefits

The social benefits of the scheme can be broadly categorised into three groups, benefits related to improving access and connectivity, benefits related to increased physical activity, and the social benefits related to economic growth such as regeneration. The key social and distributional benefits are presented in Table 4.

The NCN2 Section 5 Scheme will increase accessibility of the A259 to cyclists and pedestrians by creating a combined cycle and foot path separate from the main road. The improved accessibility for cyclists and walkers to the road will also increase connectivity for the road users to communities and employment along the whole route of the NCN2, particularly for non-car users who may have otherwise not been able to access the A259 leading to economic benefits mentioned above.

As a result of the scheme there will be an increase in physical activity and associated health benefits. There is a large body of evidence that shows the link between increased physical activity and improvements to health such as reduced rates of lifestyle related diseases. This will lead to a reduction in NHS costs due to reduced rates of illness. The health benefits are likely to be a significant proportion of all the benefits of the scheme and have been included in the BCRs presented above.

Arun has high levels of economic activity and employment. However the district has low income levels and pockets of deprivation. The NCN2 Section 5 and wider NCN2 network will support regeneration of these pockets of deprivation through improved access and connectivity to employment sites for low income families that may not have access to a motor vehicle.

Table 4 Social Benefits of NCN2 Section 5

Social distributional benefits	WebTAG Appraisal	Quantitative (over 60 years)	Qualitative
Accessibility	WebTAG A4.1 Social Appraisal; A4.2 Distributional Impacts	-	✓
Connectivity (linked to accessibility)	C2C Strategic Economic Plan Transport Objective	-	✓
Physical activity / Health improvements		£4.266 million	✓
Reduced NHS costs		-	✓
Reduced absenteeism	WebTAG A5.1 Active Mode	-	✓
Agglomeration	WebTAG A2.1 Wider Impacts	-	✓
Regeneration	WebTAG A2.2 Regeneration Impacts	-	✓

Source: CH2M HILL (2014)

## Environmental impacts

A high level desk study and appraisal of the proposed works was carried out to assess the environmental impacts. The appraisal found that there would be temporary impacts or nuisance during construction on air quality, dust, noise and water quality, but these will be relatively small scale, of short duration and can be managed through the adoption of best practice construction methods. With mitigation, no significant residual impacts are envisaged. It is also envisaged that any potential impact from disturbance of contaminated land can also be managed such that, with mitigation, no significant residual impact is envisaged.

No impact on designated or known features of cultural heritage interest is envisaged. However, the route of the NCN2 Section 5 lies along an area of high archaeological potential. Provided that the works are undertaken within the existing highway boundary, construction is not likely to result in any impact on buried archaeology. It is recommended that this is confirmed with Arun District Council's archaeological advisory service as the project progresses during detailed design.

No impact on designated ecological sites is envisaged, but reptiles are known to be present at Comet Corner and possibly along other sections of the route. Other protected species including Great Crested Newts, roosting bats and breeding birds are also likely to be present in local ponds, trees, hedges and grassland along the route. It is recommended that a site visit is undertaken during detailed design to determine the need for further specialist surveys and mitigation. With careful detailed design and mitigation, it is envisaged that significant long term adverse impacts can be avoided.

No significant impact on the landscape or views is envisaged, although consideration will need to be given during detailed design to the potential loss of trees and potential impacts on local residential receptors. With careful detailed design, no significant impact on views is envisaged.

Table 5 Environmental impacts of the NCN2 Section 5

Environmental Impacts	WebTAG Appraisal	Qualitative assessment
Archaeology and cultural heritage	WebTAG A3	No impact on designated sites. No impact on other sites envisaged, although the route passes through an area of high archaeological potential. Further consultation proposed
Air quality	WebTAG A5.1 Active Mode	Temporary construction impact. Some reduction in vehicle and carbon emissions, although unlikely to be "significant" levels.
Ecology	WebTAG A3	No impact on designated ecologic sites, but reptiles are known at Comet Corner and further surveys are

		recommended with mitigation (possibly compensatory habitat), no significant long term impact envisaged
Water	WebTAG A3	Temporary construction impact. No significant impact envisaged during operation
Landscape and townscape	WebTAG A3	No significant impact, but impacts of tree loss on views from small number of roadside residences will need further consideration
Geology and ground conditions		No significant impact
Noise and vibration	WebTAG A5.1 Active Mode	Temporary construction impact, unlikely, with mitigation, to be significant. No significant long term impact

Source: CH2M HILL (2014)

## SECTION 1

# 1. Introduction

---

This document is a technical report supporting the funding application to the Coast to Capital Local Transport Body (CCLTB) for Section 5 of the National Cycle Network 2. It should be read in conjunction with the completed CCLTB Funding Application.

The report presents the policy context for the funding application with particular focus on the Coast to Capital Local Enterprise Partnership (C2C LEP) Strategic Economic Plan (SEP). It sets out the methodology used to assess each of the benefits and costs of the scheme drawing on the Department for Transport's (DfT) Early Assessment and Sifting Tool (EAST), and WebTAG. It then presents the transport, economic, social and environmental benefits and costs of the scheme in line with the requirements of the CCLTB Funding Application Form. The report is structured into the following sections:

Section 3: Policy Background

Section 4: Scheme Description

Section 5: Method

Section 6: Transport Benefits

Section 7: Economic Benefits

Section 8: Social Distributional Benefits

Section 9: Environmental Assessment

## SECTION 2

# 2. Policy Background

---

This section presents an overview of the policy context for the NCN2 Section 5 Scheme. In line with the CCLTB Funding Application Form this section focuses on the C2C SEP and justifies how the package will support its key transport themes.

## The C2C LEP Coast to Capital Strategic Economic Plan

The vision of the C2C LEP is “that Coast to Capital will deliver exceptional growth and productivity gains to deliver economic performance to rival the best in Europe and the rest of the World”.<sup>2</sup> The priorities and objectives of the C2C LEP are set out in the C2C SEP.<sup>3</sup> Six strategic priorities are outlined in the Plan. These are:

- Successful Growth Locations, including transport investment;
- Successful Businesses;
- Building Competitive Advantage;
- Skills and Workforce;
- Growth is Digital; and
- Housing and infrastructure.

Overarching performance indicators to assess the success of the sub region are set by the C2C LEP in the C2C SEP. They are:

- To increase net private sector jobs;
- To increase GVA to reduce the gap with the South East; and
- To increase the percentage of companies that are regularly exporting.

The targets are summarised in *Table 6*.

*Table 6 Key Performance Indicators and Targets for the C2C LEP*

Top Line Priorities	2010 Baseline Coast to Capital	2010 Baseline South East Region	2020 Target
Net Private Jobs	652,200	Not applicable	140,000 net additional jobs
Private Jobs Share	81%	81%	Continue to match SE level
Public Jobs Share	19%	19%	Continue to match SE level
GVA Total £billion	£38.9bn	Not applicable	£55bn
GVA Per Head Working Age Population	£31,800	£35,100	Reduce gap with SE
Percentage of Companies Regularly Exporting	16%	Not available	1% increase year on year – double by 2035

Source: C2C LEP (2014) *Strategic Economic Plan*

---

<sup>2</sup> Coast to Capital Local Enterprise Partnership (2014) *Strategic Economic Plan*

<sup>3</sup> Ibid

## Transport Objectives

Transport is identified in the C2C SEP as a key priority underpinning the success of the sub region as an enabler and driver of growth. It is the largest element of the C2C LEP Growth Deal. There are five key overarching themes which have been identified that aim to tackle the areas transport issues. The themes have been informed by business needs across the area. The five themes are presented in Table 7.

Table 7 C2C LEP SEP Transport Objectives

C2C LEP SEP Transport Objectives	Approach to assessing SEP transport themes through WebTAG
Connectivity: "Can I get where I want to go?"	Connectivity is assessed in a transport appraisal through accessibility assessment and audit.
Reliability: "Will I arrive when I expect?"	In a larger scale appraisal, reliability can be measured by assessing expected variances in journey times. The NCN2 is a cycle/ pedestrian path - journey times are not appropriate. A qualitative assessment of reliability has been made based on accessibility.
Capacity: "Will I get a seat, a parking space, a clear road?"	Capacity is factored into a transport assessment through analysis of road/infrastructure utilisation. A qualitative assessment has been made here.
Quality: "Will my journey be healthy, safe, clean, sustainable and enjoyable?"	Journey quality has been assessed through a qualitative assessment.
Resilience: "Will transport be there when I need it – 24/7?"	In a larger scale appraisal this would be assessed through cancelations and delays and fed into time savings modelling. It has been assessed qualitatively in this study.

Source C2C LEP (March 2014) Strategic Economic Plan; CH2M HILL (2014) Analysis of C2C SEP Objectives

Sustainability is an important component of the SEP. The C2C LEP has proposed a number of sustainability packages that combined both transport and non-transport interventions that will help to restore confidence in local towns as areas which are ready and fit for growth. The packages include improvements to walking and cycling links, and junctions, behavioural changes, improving accessibility to rural areas and improving road safety.

## Coastal West Sussex Corridor Area

The C2C SEP has categorised their priorities into spatial areas, the West Sussex Coastal Corridor is one of the key spatial areas. The Coastal Corridor is regarded as one of the most sought after places to Live in the UK with a population of around 429,000 people.<sup>4</sup> It is located between the South Downs National Park and the sea, between Brighton in the east and Portsmouth to the west, with Worthing at its geographical centre. The area has a diverse economy with a strong horticulture industry and Advanced Engineering including medical device manufacturing, marine, tourism and the digital and creative industries.

The C2C SEP states that the Coastal Growth Deal is expected to create 5,100 new jobs, 5,100 homes and 79,237 m2 of employment space in the area. Several large scale development and regeneration opportunities exist in the area including Shoreham Harbour and Airport, and Enterprise Bognor Regis, as well as others around Littlehampton and Worthing that will help to achieve these targets.

The constrained geography has an influence on the area's infrastructure, which faces challenges particularly along the congested A27 and A259 road corridors. The C2C LEP recognises in their SEP the need to improve the local infrastructure to maintain the attractiveness of the Coastal Corridor and to support new developments that are taking place in the area.

<sup>4</sup> Coast to Capital Local Enterprise Partnership (2014) Coast to Capital Strategic Economic Plan

In order to improve the operation and reliability of the infrastructure in the Coastal Corridor one of the aspirations is the development of National Cycle Network Route 2 as a strategic cycle route package between Brighton and Chichester. Complementing this are other transport improvements in Arun District such as to the A259 to support housing in East Arun, A29 realignment to support housing north of Bognor Regis and the A284 Lyminster bypass.

## National Cycle Network 2

Sustrans' aim for NCN 2 is to provide a continuous route from Dover to Penzance. In West Sussex NCN2 runs along the coast between Southwick in the east and Emsworth in the west, it connects through coastal communities such as Shoreham, Worthing, Littlehampton and Bognor Regis. For various reasons NCN2 is not complete in West Sussex, with several outstanding sections to be considered. It is included in the C2C SEP Coastal Corridor spatial priorities.<sup>5</sup>

NCN2 will support the C2C SEP policy through increasing availability of sustainable transport and contributing to wider transport objectives, as well as supporting economic growth. It will create an enabling environment for cycling and walking. It will improve accessibility and connectivity for cyclists and non-car users, providing access to employment opportunities in Littlehampton, Bognor Regis and further afield, and support the economy and employment in the area. This will support the C2C SEP overarching objectives to grow the economy and increase jobs. It will also support the five key transport objectives. A summary of the linkages to the transport objectives is presented in Table 8.

Table 8: Scheme support for C2C LEP Transport Objectives - summary table

C2C LEP SEP Transport Objectives	Section 5	NCN2 as a whole
Connectivity	✓	✓
Reliability	✓	✓
Capacity	✓	✓
Quality	✓	✓
Resilience	✓	✓

Source: CH2M HILL (2014)

The need for the NCN2 is explicitly stated in the West Sussex Transport Plan 2011-2026 (WSTP)<sup>6</sup>. It is also part of the strategic transport investment programme. Both of which have been consulted on with the public. WSTP identifies that in places NCN2 is indirect and disjointed, with inadequate signing, a lack of safe crossing points and is poorly surfaced. The WSTP aspires to improve NCN2 within the county, alongside development of coherent cycle networks in the major towns.

This funding application is raising funds for Section 5 of the NCN2 stretching across 4.35 km from Littlehampton to Bognor Regis. A detailed description of the scheme is presented in Section 4 of this report.

<sup>5</sup> Coast to Capital Local Enterprise Partnership (2014) Coast to Capital Local Economic Plan (page 70)

<sup>6</sup> West Sussex County Council (2011) West Sussex Transport Plan 2011-26

## SECTION 3

# 3. Scheme Description

---

The proposed scheme forms part of the National Cycle Network Route 2 (NCN2), NCN2 aims to provide a continuous cycle route from Dover to Penzance. For various reasons the route is not fully completed with several outstanding sections in West Sussex still to be constructed.

There is currently no suitable direct cycle facility along the A259 for cyclists travelling between the towns of Littlehampton and Bognor Regis. The A259 is considered to be a significant barrier to the greater take up of cycling and walking due to fast vehicle speeds and high volumes of traffic, particularly HGVs. The current signed route of NCN2 is indirect as it goes via Yapton, and is a significant diversion for those wishing to travel between the towns.

The NCN2 Section 5 Scheme will create a direct cycle facility between Littlehampton and Bognor Regis. This will involve the construction of a 3 metre wide combined cycle and foot path alongside the northern side of A259 between Church Lane Climping junction and the eastern end of the Bognor Regis Relief Road (BRRRd) at Felpham, along with signing upgrades. At the western end the facility will connect with a new cycle facility into Felpham and the new homes served by the BRRRd. The eastern end of the facility will connect with an existing combined cycle and foot path along A259 towards employment and new housing in Littlehampton. New crossing points will be provided at Church Lane Climping, B2132/A259 'Comet Corner' and Worms Lane. The total length of the works will be 4.35km.

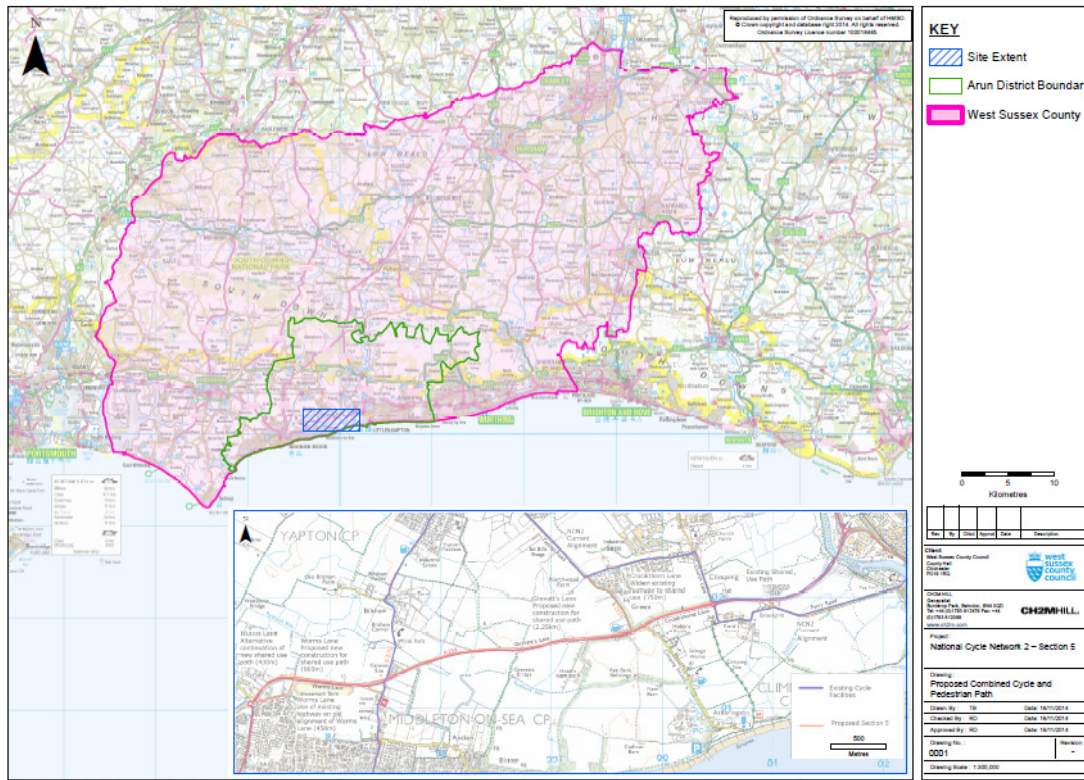
The path will be shared between cyclists and pedestrians, and will be segregated from traffic on A259. To achieve this it will require widening of the existing footway between Church Lane and B2233 Yapton Road. West of B2233 Yapton Road to the BRRRd it will be a new construction in the existing verge. All of the proposed works will take place within the highway boundary with no land outside the highway being required; however some lopping or tree removal may be required.

The majority of the route is rural but it provides a direct inter-urban alternative between Littlehampton and Bognor Regis and beyond. The existing cycle route will remain to Yapton to enable connections from the village to the cycle network.

The location and route of the propose Section 5 is presented in Figure 1.



Figure 1: Location map of the NCN2 Section 5



Source: CH2M HILL (2014) Location Map of NCN2 Section 5

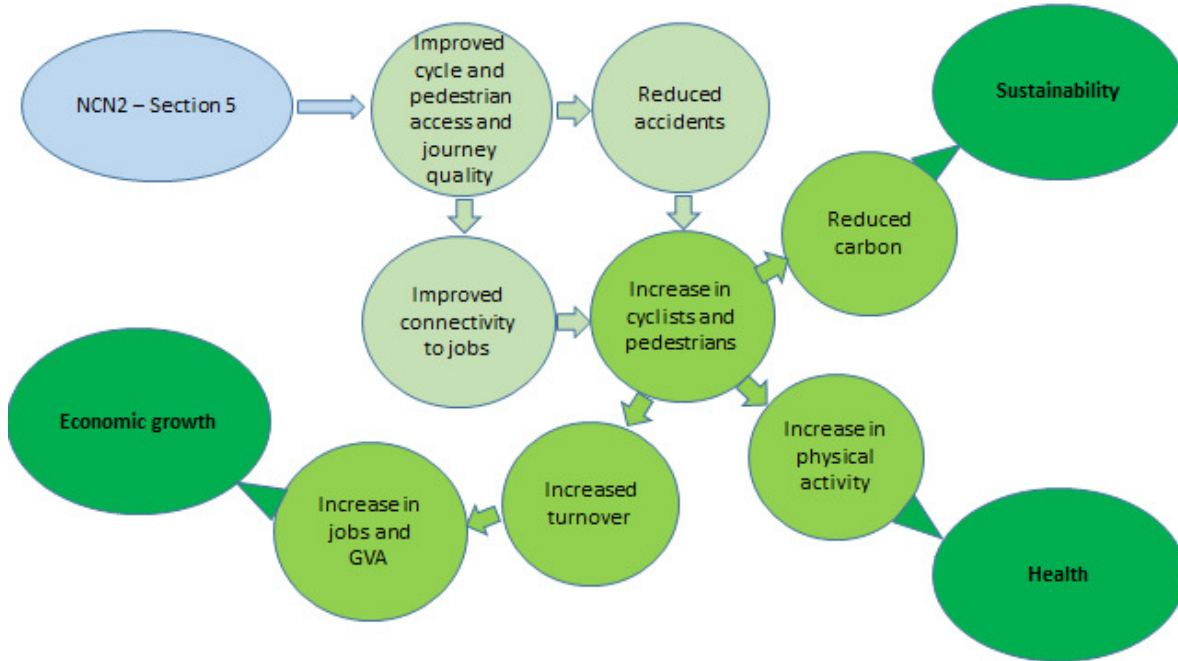
The benefits of constructing the combined cycle and foot path will include transport, economic, social and environmental aspects. By creating a path for cyclists and pedestrians separated from traffic, the NCN2 Section 5 scheme will create a direct cycle route significantly improve the access for cyclists and pedestrians to the A259. A safer environment will be created and accidents will be reduced. The journey ambiance for cyclists using the route will also be significantly improved. As a result more people will be encouraged to take up cycling and walking as a mode of sustainable transport. This will lead to a reduction in vehicle use and the associated benefits of decongestion and reduced carbon emissions. This will contribute to a future that is more sustainable.

The improved access for cyclists and pedestrians will also increase their connectivity to local facilities and employment, particularly for users that would not otherwise be able to afford access to a private motor vehicle. The increase in connectivity and increase in cycling and walking will help to enable people to access work in Littlehampton and Bognor Regis, and will increase the footfall for local business, attracting more visitors, leading to increased business turnover and associated new jobs and GVA. Ultimately leading to economic growth and supporting the SEP's aspirations for the Coastal West Sussex Corridor.

As a result of an increase in walking and cycling, users will also increase their physical activity. By doing this users will become fitter and healthier, more able to fight off illness and reduce risk of disease. Consequently there are health benefits to the scheme as well. These can be translated into economic benefits through reduced time off work sick, and reduced NHS costs.

Figure 2 shows the linkages between the NCN2 Section 5 and the scheme outcomes and impacts. Figure 3 provides further details on the scheme potential outcomes and impacts using the HM Treasury Logic Model approach.

Figure 2: Diagram to show linkage between the NCN2 Section 5 and the potential impacts of the scheme



Source: CH2M HILL (2014) NCN 2 Section 5 impacts

### Construction costs and funding

The estimated cost for the construction and design works for Section 5 of the NCN2 is £900,000. This includes a 10% risk factor on the construction costs and a 25% optimism bias. 100% of the funds required for the scheme are being sought from the C2C LEP via the C2CLTB.

### Maintenance costs

A high level estimate of the maintenance costs from WSCC indicates the costs will be an average of £3,000 a year excluding VAT. It is understood that that this factors in the resurfacing of the path every 15 years.

### Timeframe

The detailed design work and construction of Section 5 is anticipated to commence in the 2015/ 2016 financial year subject to availability of funding. The schedule of works has not yet been finalised.

Spend Profile	2015-16: (£ million)	2016-17: (£ million)
NCN2 Section 5	Construction works to commence in the 2015/ 2016 financial year. Spend profile not yet known.	Completion date not yet known.

### SECTION 3

Figure 3 Logic model for NCN2 Section 5

Objectives	Activities	Resources required	Outputs	Outcomes	Impacts
The NCN2 aims to provide a continuous cycle path from Dover to Penzance.	Construction of a combined cycle and foot path adjacent to the A259 road.	£900,000 is required for the construction of Section 5.	Completed NCN2 Section 5 along the A259 between Ferry Bridge Littlehampton to Elme	Reduced cycling and pedestrian accidents along the A259 between Ferry Littlehampton and Elme.	Modal shift to sustainable transport
The aim of the Section 5 is to fill in the remaining gap in the network between Ferry Bridge Littlehampton to Elmer.		Policy support		Section 5 of network will be more accessible to cyclists and pedestrians	Improved health
The objectives of the section 5 scheme are as follows:		Design and construction staff		Improved journey quality	Economic growth
To reduce accidents				Increase in the number of cyclists and pedestrians	
To support sustainable transport				Modal shift from private motor vehicle trips to sustainable transport	
To improve accessibility for cyclists and non car users				Associated decongestion and reduction in carbon emissions.	
To improve connectivity of communities and workers to employment opportunities in West Sussex.				Improve connectivity of communities and workers to employment opportunities in West Sussex.	
To support visitor and tourism industry				Increase in tourist numbers and spend	
Through improved access to cycling and jobs the quality of life in coastal West Sussex will be improved				Creation of jobs and GVA	
To increase physical activity				Increase in rate of physical activity	

Source: CH2M HILL (2014) Adapted from logic model framework in HM Treasury (2011) Magenta Book

## SECTION 4

# 4. Method

---

Section 5 of the NCN2 has been assessed using the four sections of the CCLTB Funding Application. The sections are Transport, Economic, Social distributional, and Environmental. Where possible, the benefits have been quantified. The DfT WebTAG Active Mode Appraisal (Unit A5-1) has been drawn on as guidance for the assessment. Due to the nature and scale of the scheme (focused on cycling rather than highways or rail transport modes) a time savings based transport assessment is not appropriate. Instead an assessment relevant to the benefits of cycling and walking has been carried out. The following paragraphs describe the method used for assessing each indicator.

The Active Mode Appraisal<sup>7</sup> covers the following key indicators:

- Accidents
- Journey Quality (ambience)
- Travel time (decongestion)
- Indirect tax revenue
- Physical activity/Health
- Absenteeism
- Environmental impact:
  - carbon reduction
  - air quality
  - noise

Where appropriate, guidance on additional indicators has drawn on from other WebTAG appraisal guidance documents including TAG Unit A2.1 Wider Impacts<sup>8</sup>; TAG Unit A2.2 Regeneration Impacts<sup>9</sup>; TAG Unit A4.1; Social Impact Appraisal<sup>10</sup>; TAG Unit A4.2 Distributional Impact Appraisal<sup>11</sup>; TAG Unit A3 Environmental Impact Appraisal<sup>12</sup>.

### **Asset life and appraisal period**

Typically, the appraisal period should be based upon the estimated lifespan of the asset. The asset life of a cycle path may vary depending upon the quality of construction and the level of maintenance it receives. In the absence of information on the forecast asset life of the NCN2 Section 5 the appraisal period has been based on guidance and existing comparator studies. The standard guidance on transport appraisal period from DfT in WebTAG is 60 years. The guidance acknowledges that there may be cases when schemes will require a shorter appraisal period, but it does not stipulate what the period should be. Consequently a 60 year appraisal period has been used for as the basis for this assessment.

Several recent studies of cycle schemes, have assumed a 30 year period, although no justification has been provided in the studies for this approach. In order to identify the potential impact that the scheme may have over this reduced appraisal period, in addition to the standard 60 year appraisal period, this study

---

<sup>7</sup> DfT (January 2014) WebTAG Unit A5.1 Active Mode Appraisal

<sup>8</sup> DfT (January 2014) WebTAG Unit A2.1 Wider Impacts

<sup>9</sup> DfT (January 2014) WebTAG Unit A2.2 Regeneration Impacts

<sup>10</sup> DfT (January 2014) WebTAG Unit A4.1 Social Impact Appraisal

<sup>11</sup> DfT (January 2014) WebTAG Unit A4.2 Distributional Impact Appraisal

<sup>12</sup> DfT (January 2014) WebTAG Unit A3 Environmental Impact Appraisal

tested a range of high and low scenarios using a BCR analysis based on an asset life of 30 and 60 years. This is explained in the BCR section of the methodology.

## Transport benefits

### Benefit Cost Ratio

The NCN2 Section 5 scheme is a combined cycle and pedestrian path along a stretch of the A259. As the scheme is not a highways or Rail based transport project a time savings based BCR is not appropriate. In order to provide a broad indication of the BCR of the scheme the benefits that can be quantified in a monetised form have been included into an active mode BCR drawing on the guidance in WebTAG's Active Mode Appraisal (A5-1). The benefits included in the BCR are:

- accident rate reduction
- journey quality (ambience)
- decongestion
- carbon reduction
- health (estimated as a proportion of all benefits in the scenario testing)

In addition to the benefits that have been monetised there will be other benefits that it has not been possible to quantify in this way, either due to a lack of information or limitations in the scope of work. A more detailed assessment would be required to further refine the benefits, costs and BCR. In order to indicate the impact of refining the BCR would have on the ratio we have carried out a series of high and low scenario testing.

The capital design, construction and maintenance costs of the scheme have been used in all scenarios. Four scenarios have been developed to factor in the uncertainties over the asset life of a cycle path and the unquantifiable benefits such as health. The four scenarios are:

1. 30 year appraisal period excluding health benefits
2. 30 year appraisal period including health benefits
3. 60 year appraisal period excluding health benefits
4. 60 year appraisal period including health benefits

The central case uses a 60 year appraisal period excluding health benefits. The low scenario uses a 30 year appraisal period, and two high scenarios that include health as a 50% proportion of total monetised benefits. The benefits and costs have been adjusted to 2010 prices and discounted to Present Value Benefits (PVB) and Present Value Costs (PVC).

It is important to note that the BCR is a broad indication of the monetised benefits and costs in the absence of transport modelling.

### Expected impact on road safety casualties

The impact of schemes on accident rates is normally estimated using COBOLT<sup>13</sup> which requires input link-based flows and speeds from a highway assignment model. WebTAG advises in the absence of modelling for smaller schemes standard accident investigation and prevention assessments should be used to produce the accident forecasts.

A review of the current accident rates along the stretch of the A259 where the scheme will be located has been carried out. In order to estimate the change in accidents that may result from the scheme a 45% reduction in cycle casualties and 11% reduction in pedestrian casualties over 3 years has been applied to

<sup>13</sup> COBOLT (Cost and Benefit to Accidents – Light Touch) computer program developed by DfT to analyse the impact of accidents as part of economic appraisal of road schemes.

the current accident rates that occur. These proportions have been based on case study evidence from the DfT<sup>14</sup>. Results were then scaled up over a 60 year period.

*WebTAG tables used:*

Table A 4.1.3: Average value of prevention of road accidents by severity and element of cost, £ (2010 prices & 2010 values)

### **Encouraging sustainable travel (modal shift)**

#### **a. Increase in number of cycle trips**

A key benefit of the NCN2 Section 5 Scheme is the potential increase in walking and cycling trips and associated modal shift from private motor vehicles to these sustainable modes of transport. In order to estimate the increase in cyclists the method has been based on WebTAG Active Mode Appraisal guidance. A review of comparator studies has been used to forecast growth in trips. WebTAG estimates the growth of cycling due to a larger cycling scheme was 51% over 2 years.<sup>15</sup> Sections of a relatively similar cycle scheme in Hull led to a smaller growth of approximately 20-30% over 3 years.<sup>16</sup> An appropriate estimate of 30% growth over 3 years from present day rates has been used for this project. The increase to 30% more cyclists in year three of operations assumes a gradual increase to this point, i.e. 10% increase from baseline in year 1; 20% increase from baseline in year 2; 30% increase from baseline in year 3.

Due to a lack of comparator studies it has not been possible to estimate the growth in pedestrian trips.

#### **b. Reduced distance travelled by car**

The potential reduction in travel by car as a result of the Scheme has been estimated in this study based on the distance travelled by the new cyclists that could have used a car for their journey. The average trip length of a cyclist is estimated to be 3.9km.<sup>17</sup> This is similar to the length of the NCN2 Section 5 which is 4.35 km. A study in WebTAG of a project that improved an existing cycle and footpath surveyed users to identify how many could have used a car for their journey but chose to use a bike. The study found that 27.3% of users surveyed stated that they could have used a car but chose to cycle.<sup>18</sup> Estimates in other sources have been found to be higher than this. For example Sustrans found that 42% of cyclists on the existing NCN could have used a car for their journey.<sup>19</sup> The conservative proportion of 27.3% has been used for this assessment for new cycle trips generated by the scheme. The total distance travelled by all the new cycle trips has been combined over 60 years and the 27.3% ratio has been applied to this figure to estimate the distance saved in car journeys.

### **Decongestion**

The modal shift to sustainable transport can be monetised through estimating the value for decongestion. The amount of decongestion created as a result of the scheme has been estimated based on the distance saved in reduced motor vehicle trips. A monetised value has been applied to this using WebTAG tables as recommended by WebTAG<sup>20</sup>.

*WebTAG tables:*

Table A5.4.4: 2010 Marginal External Congestion Costs - Cars (pence per km, £2010, 1 d.p.)

<sup>14</sup> Department of Transport (2004) Encouraging walking and cycling success stories, Case study 1: Hull City Council Cycling Paths

<sup>15</sup> DfT (2014) WebTAG Active Mode Appraisal

<sup>16</sup> DfT (2004) Encouraging walking and cycling success stories, Case study 1: Hull City Council

<sup>17</sup> DfT (2014) WebTAG Active Mode Appraisal

<sup>18</sup> DfT (2014) WebTAG Active Mode Appraisal

<sup>19</sup> Sustrans (2011) The Real Cycling Revolution, How the Face of Cycling is Changing

<sup>20</sup> DfT (2014) WebTAG Active Mode Appraisal

## Journey quality (ambience)

Journey quality or ambience is usually improved as a result of improved cycling facilities. The level of benefit can be assessed and monetised using WebTAG data tables. Journey quality can also be assessed qualitatively using the WebTAG Classifications and Examples of Journey Quality Table.<sup>21</sup> WebTAG estimates that for every minute spent cycling on an on-road segregated cycle lane the journey ambience is worth 2.99pence (2010 prices).<sup>22</sup> The time users are likely to spend cycling on the route has been estimated over a 60 year period and the WebTAG value of 2.99 pence has been applied to this. The time spent cycling has been estimated based on the assumption of an average speed of 15km per hour<sup>23</sup>, this has been multiplied by the distance travelled by cyclists on the path.

*WebTAG tables:*

Table 4.1.6: Value of journey ambience benefit of cycle facilities relative to no facilities (2010 prices and 2010 values)

## Carbon

A broad estimate of the potential carbon savings has been made using WebTAG tables. In order to estimate the carbon savings, the amount of fuel saved from reduced vehicle trips was firstly estimated by using the average fuel (litre) saved per km. The carbon emissions per litre of fuel saved (Kg CO<sub>2</sub>e/l) was identified using WebTAG Table A3.3. The savings were estimated over a 60 year period and a financial value applied based on £/tonne of CO<sub>2</sub>e/l in WebTAG Table A3.4.

*WebTAG tables:*

- Table A1.3.8: Fuel & Energy consumption parameter values
- Table A3.3: Carbon dioxide emissions per litre of fuel burnt / kWh used
- Table A3.4: Non Traded Values, £ per Tonne of CO<sub>2</sub>e (2010 prices)

## Non quantified benefits

Several important benefits of the NCN2 Section 5 scheme have not been quantified or included in the BCR for the scheme due to a lack of data required to provide an accurate estimate. In particular non quantified yet important benefits of the scheme include accessibility and connectivity benefits, wellbeing, employment, GVA and regeneration benefits. These have been assessed qualitatively in the economic benefits and social benefits sections of this report. With more data and a more detailed scope of work it would be possible to quantify some of these benefits and include them in the BCR. For an explanation of the approach used to estimate the health benefits please refer to the social benefits in this Chapter.

# Economic Benefits

## Temporary job creation from the design and construction stage

Temporary employment will be generated during the design and construction of the scheme. This has been derived from the design and construction cost estimates. A ratio of construction jobs per pound of investment has been estimated based on a review of existing civil works schemes, and then applied to the total estimated cost of the scheme. A ratio of one new job for every £143,750 in construction costs has been applied.

The resulting number of jobs created has then been split between construction and professional and technical sector using a 2:1 ratio previously derived by CH2M HILL for similar studies, in order to provide an indication of the types of temporary employment that will be created.

<sup>21</sup> WebTAG (2014) TAG Unit A4.1 Social Impact Appraisal

<sup>22</sup> DfT (2014) WebTAG Data Tables Autumn 2014 Issue v1.3

<sup>23</sup> DfT (2011) National Travel Survey

In addition to temporary direct construction jobs, it is expected that the scheme will also help generate some indirect jobs in the supply chain and induced jobs due to additional spending of employee wages. Given the scale of the schemes the indirect and induced impacts are likely to be limited and have not been quantified in this study.

### Temporary GVA from construction stage

Gross Value Added (GVA) will be generated during the design and construction phase. This has been calculated for each scheme using the construction employment and industry-specific GVA/employment ratios derived from the Office for National Statistics (ONS) Regional GVA figures and the ONS Business Register Employment Survey (BRES) dataset.

- A ratio for construction GVA/employment has been used. For every construction employee there is £81,760 generated in construction GVA in the South East.
- A second ratio was used for estimating the professional & technical GVA/employment for construction. For every professional and technical employee there is £49,925 generated in sector GVA regionally.

Applying these ratios to the total expected number of construction and professional jobs generated during construction provides an approximation of the potential GVA impact at the construction stage.

### Operational Employment and GVA

In addition to temporary construction-related employment, longer term growth in employment can be expected as a result of the scheme.

A combination of qualitative assessment and case study examples have been used to report on potential employment impacts.

### Increase in business turnover and GVA and government revenues

There may be a small increase in the number of visitors to the area due to the cycle path leading to higher footfall. The increase in footfall is likely to have a beneficial impact on local business turnover and GVA across industries. This will lead to an associated growth in government revenues. A review of literature on existing studies has been carried out to also gather evidence for this impact.

## Social benefits

### Improved accessibility

The recommended method for assessing the accessibility impacts of a transport scheme are presented in WebTAG Unit A4.2 on Distributional Impacts. It identifies two assessments, the strategic accessibility assessment and the accessibility audit. The strategic assessment assesses the impact in changes to the transport network and is based on the production of contour maps in GIS showing accessibility to sites. The accessibility audit is a more qualitative process where the analyst assesses the various ways in which the scheme affects accessibility of different users. Considering the scale of the scheme, the accessibility analysis has been scaled down to be proportionate and relevant to the schemes. A qualitative desk top analysis of the accessibility of the scheme has been carried out drawing on the Accessibility Audit Worksheet - Table 18 in WebTAG Unit A4.2<sup>24</sup>.

### Increase in physical activity and improved health

Cycling and walking schemes lead to an increase in physical activity which has significant health and wellbeing impacts on people. The health benefits could be assessed using DfT WebTAG guidance or the World Health Organisation Health Economic Assessment Tool (HEAT). However data on the number of cyclists using the scheme would be required for this.

In the absence of the data required to accurately assess these benefits a scenario has been prepared to broadly estimate the impact that health is likely to achieve. DfT (2014) Claiming the Health Dividend report

<sup>24</sup> DfT (January 2014) TAG Unit A4.2 Distributional Impact Appraisal



states that the physical activity benefits may make up 50-60% of all the benefits of a cycle project and state that this is a conservative estimate. Based on this assumption, the health benefits may equate to the same amount of all the existing monetised benefits. This assumption has been applied in the assessment of NCN2 Section 5: all the monetised benefits have been assessed and summed together, and the health benefits have been assumed to equal this total. In addition a brief qualitative assessment of the impacts has been made based on a review of existing studies on the topic.

### **Agglomeration**

Agglomeration provides a measure of the mass of economic activity across the impact area. It measures accessibility of firms and workers to each other and, therefore, is a function of generalised cost for business and commuting travel. A scheme that reduces cost of journeys could, therefore, have an agglomeration benefit provided that it helps businesses to access a larger pool of labour and workers to access wider range of jobs. Although linked to regeneration, this is assessed separately in WebTAG.

There are specific areas in England where agglomeration impact of a transport scheme is expected to be significant. These areas are called Functional Urban Regions (FURs) and are listed in the WebTAG FUR Database. As part of this assessment, agglomeration impacts of the scheme have been assessed qualitatively. The impact area has been compared against the FUR Database to identify whether the expected agglomeration impact is likely to be significant.

### **Regeneration of the area**

Improvements to infrastructure including transport schemes are likely to contribute to the regeneration of the local area. This can be assessed in terms of property values; agglomeration; level of deprivation; reduced unemployment; and improved wellbeing. A qualitative assessment of regeneration has been carried out for this study.

## **Environmental benefits**

A high level appraisal of potential environmental effects associated with the scheme works has been undertaken. The appraisal has been based on a desk study comprising a review of readily available data to identify and consider the environmental risks. The following data sources were used to inform the environmental appraisal:

- <http://www.natureonthemap.naturalengland.org.uk>
  - <http://www.britishlistedbuildings.co.uk>
  - <http://www.heritagegateway.org.uk>
  - <http://maps.environment-agency.gov.uk/wiyby>
  - <http://www.westsussex.gov.uk>
  - <http://www.arun.gov.uk>
- <http://www.google.co.uk/maps>

Environmental issues considered as part of the appraisal comprise archaeology and cultural heritage, air quality, ecology, water, landscape and townscape, geology and ground conditions, and noise and vibration.

SECTION 5

# 5. Transport Benefits

## Benefit Cost Ratio

BCRs of the transport benefits that can be monetised compared to the costs of the scheme have been prepared based on a range of high and low scenarios. The benefits that have been monetised are accident savings, journey quality (ambience), decongestion and carbon savings, (and health). The benefits and costs have been based on 2010 prices and discounted to “Present Value Benefits” (PVB) and “Present Value Costs” (PVC).

Several important benefits of the NCN2 Section 5 scheme have not been quantified in this assessment due to a lack of data required to provide an accurate estimate. In particular non quantified yet important benefits of the scheme include health and wellbeing benefits, accessibility and connectivity benefits, employment, GVA and regeneration benefits. With more data and a more detailed scope of work it would be possible to quantify some of these benefits. For example health could be assessed using DfT WebTAG guidance or the World Health Organisation Health Economic Assessment Tool (HEAT). However data on the number of cyclists using the scheme would be required for this.

In the absence of the data required to accurately assess these benefits a scenario has been prepared to broadly estimate the impact that one of the larger benefits (health) is likely to achieve. DfT (2014) Claiming the Health Dividend report states that the physical activity benefits may make up 50-60% of all the benefits of a cycle project and state that this is a conservative estimate. Based on this assumption, the health benefits may equate to the same amount of all the existing monetised benefits.

In addition, there is uncertainty over the asset life of the cycle path and consequently the appraisal period has been based on guidance and existing comparator studies. The standard guidance on transport appraisal period from DfT in WebTAG is 60 years. The guidance acknowledges that there may be cases when schemes will require a shorter appraisal period, but it does not stipulate what the period should be. Several recent studies on cycle schemes, have assumed a 30 year period, although not justification has been provided in the studies for this approach. Consequently this study has created scenarios for two possible lengths of asset life, 30 years and 60 years.

In total four scenarios have been explored: 30 year and 60 year appraisal periods, and each have been assessed with and without health benefits. This provides a range of high and low scenarios for the BCR for the scheme. The central case has assumed a 60 year appraisal period without health benefits, the low scenario assumes a 30 year appraisal period without health benefits and the high scenarios include both 30 and 60 year appraisal periods with health benefits. The BCRs range from 1:5 to 4.1:1 with the central case standing at 2:1. Table 9 presents the results of the four scenarios.

Table 9 Summary of Benefit Cost Ratio Scenarios based on appraisal period and health benefit variations

Appraisal period	Excluding health benefits	Including health benefits
60 yr BCR	2.1	4.1
30 yr BCR	1.5	3

Source: CH2M HILL (2014)

Table 10 Benefit Cost Ratios based on a 60 year appraisal period

	Indicator	60 year BCR (excluding health)	60 year BCR (including health)
Benefits	Accident reduction	£1,500,000	£1,500,000
	Decongestion	£160,000	£160,000
	Carbon reduction	£142,000	£142,000

	Journey ambience	£2,464,000	£2,464,000
	Health		£4,266,000
	Total benefits (2010 prices)	£4,266,000	£8,532,000
	Present Value Benefit	£1,515,000	£3,042,000
Costs	Capital costs (base 2014 prices)	£900,000	£900,000
	Maintenance costs (base 2014 prices)	£180,000	£180,000
	Total maintenance and capital cost 2014	£1,080,000	£1,080,000
	Total costs 2010 prices	£999,000	£999,000
	Present Value Cost	£736,000	£736,000
	<b>BCR</b>	<b>2.1</b>	<b>4.1</b>

Source: CH2M HILL (2014)

Table 11 Benefit Cost Ratios based on a 30 year appraisal period

	Indicator	30 year BCR (excluding health)	30 year BCR (including health)
Benefits	Accident reduction	£750,000	£750,000
	Decongestion	£79,000	£79,000
	Carbon reduction	£70,000	£70,000
	Journey ambience	£1,227,000	£1,227,000
	Health		£2,126,000
	Total benefits (2010 prices)	£2,126,000	£4,252,000
	Present Value Benefit	£1,093,000	£2,195,000
Costs	Capital costs (base 2014 prices)	£900,000	£900,000
	Maintenance costs (base 2014 prices)	£90,000	£90,000
	Total maintenance and capital cost 2014	£990,000	£990,000
	Total costs 2010 prices	£915,000	£915,000
	Present Value Cost	£720,000	£720,000
	<b>BCR</b>	<b>1.5</b>	<b>3.0</b>

Source: CH2M HILL (2014)

### Expected impact on road safety casualties

The implementation of a cycle and pedestrian path segregated from the motorised traffic is likely to lead to a reduction of accidents. The DfT estimate that the implementation of a cycle / pedestrian path can lead to 45% reduction in cycle casualties and 11% reduction in pedestrian casualties (over 3 years). This has been factored over a 60 year period to work out the accident reductions over 60 years. The total value of reduced pedestrian accidents is forecast to be approximately £29,000 and peddle cyclists is likely to be approximately £1.471 million (rounded to the nearest £1,000). This is a total saving of £1.500 million over 60 years. These results are summarised in Table 12.

Table 12 Forecast accident reduction and monetised savings

Pedestrian	Number of accidents over 5 years	Forecast number of accidents over 60 years	Forecast reduction in accidents	Value of one accident reduced	Total value of accidents reduced over 60 years (rounded to nearest 1000)
Slight	1	12	-1.29	£22,153.94	£29,000
Serious	-	-	-	-	-
Fatal	-	-	-	-	-
<b>Total</b>	<b>1</b>	<b>12</b>	<b>-1.29</b>	<b>£22,153.94</b>	<b>£29,000</b>
Cyclist accidents	Number of accidents over 5 years	Forecast number of accidents over 60 years	Forecast reduction in accidents	Value of one accident reduced	Total value of accidents reduced over 60 years
Slight	3	36	-15.93	£22,153.94	£353,000
Serious	1	12	-5.31	£210,655.45	£1,119,000
Fatal					
<b>Total</b>	<b>4</b>	<b>48</b>	<b>-21.24</b>	<b>£232,809.39</b>	<b>£1,471,000</b>
<b>Sum Total</b>	<b>5</b>	<b>60</b>	<b>-22.53</b>	<b>£254,963.33</b>	<b>£1,500,000</b>

Source: CH2M HILL (2014) Analysis of West Sussex County Council (13-November-2014) Full Details Report Summary - A259 Yapton 5yr PIA to 30 Sept 14

### Encouraging sustainable travel (modal shift)

The scheme will encourage sustainable travel. Through improved access (see Section 8), journey quality, connectivity and reduced accidents, cycling and walking will become a more viable and attractive option locally. In addition to increase cycle trips there will be reduced car trips. The modal shift to more sustainable modes of transport can be measured quantitatively through an increase in the number of cycling trips and reduced distance travelled by car. It has been possible to broadly estimate the increase in cycling that may occur. However due to a lack of local data and comparator studies it has not been possible to estimate the growth in walking. Despite this, it is expected that there will be some increase in walking.

#### a. Increase in number of cycle trips

Comparator studies have been used to estimate the potential growth in cycling that may occur as a result of the scheme. An example provided by WebTAG in the Active Mode Appraisal guidance estimates the growth of a cycle trips resulting from a cycling scheme to be 51%.<sup>25</sup> A relatively similar scheme that was carried out in Hull found the impact to approximately 20-30% over 3 years. A conservative estimate of 30% over three years has been used for this project. The current cycling trips along the stretch of A259 has been identified using the 2011 Census Mode Share data (for Bognor Regis, Littlehampton, Yapton and Arun District) provided to CH2M HILL by West Sussex County Council. The current number of daily cycle journeys along the stretch of road was 206 in 2011, annually this is equivalent to approximately 68,000 cycle trips<sup>26</sup>. Based on the assumption that there will be a 30% increase in cycle trips over the first three years as a result of the scheme, there are likely to be 88,000 trips per annum along the route within three years of operation. This equates to approximately 41,000 additional trips over the first three years (assuming that there will be a gradual ramp up to the 30% increase).<sup>27</sup> Assuming that this rate then

<sup>25</sup> DfT (2014) WebTAG Active Mode Appraisal

<sup>26</sup> The annual estimate is based on 206 trips occurring for 330 days – from DfT Traffic Counts 2014

<sup>27</sup> The increase to 30% more cyclists in year three of operations assumes a gradual increase to this point, i.e. 10% increase from baseline in year 1; 20% increase from baseline in year 2; 30% increase from baseline in year 3.

reaches its peak at the three year mark, over a 60 year period the increase in trips could amount to 1.20 million additional cycling trips. Table 13 presents the estimated increase in cycle trips along the route of Section 5.

Table 13: Estimated increase in cycle trips along the A259 NCN Section 5 Route (base case and development case)

	3 years	60 years
Baseline cycle trips	204,000	4,079,000
30% increase in cycle trips resulting from scheme <sup>28</sup>	41,000	1,203,000
<b>Total forecast cycle trips</b>	<b>245,000</b>	<b>5,282,000</b>

Source: CH2M HILL (2014) Estimated forecast in cycle trips based on 2011 Census Trips by Mode

#### b. Reduced distance travelled by car

The resulting reduction in travel by car has been estimated based on the conservative assumption that 27.3% of new cycle trips could have been made by car.<sup>29</sup> (see Section 5 of this report for the detailed method). This has been applied to the increase in cycle trips annually. It indicates that in the first three years approximately 11,000 car trips may be replaced by cycle trips (assuming there is a ramp up in cycle trips over the first three years).<sup>30</sup> Over a 60 year period this could equate to approximately 328,000 reduced car trips. The distance in car journeys saved has been estimated by applying the average distance travelled by bicycle (3.9 km). This indicates that in the first three years a reduction of almost 43,000 km in car journeys could be achieved, and over 60 years over 1.281 million km in car journeys could be saved.

#### Journey quality (ambience)

Journey quality (ambience) for the cyclists using the NCN2 Section 5 will be significantly improved compared to cycling with the motorised traffic. The creation of a separate path will enable cyclists to cycle more efficiently, safely and more easily. This will improve the overall journey quality and experience, reducing stress of the cyclists and encouraging more people onto their bikes. It is estimated in WebTAG that for every minute spent cycling on an on-road segregated cycle lane the journey ambience is worth 2.99pence (2010 prices).<sup>31</sup> In a monetised value the estimate of journey ambience resulting from the NCN2 Section 5 scheme is estimated to be worth £2.464 million in 2010 prices over a 60 year period.

A summary of the qualitative journey ambience / quality benefits is presented in Table 14.

<sup>28</sup> See footnote 27

<sup>29</sup> Based on DfT (2014) WebTAG Active Mode Appraisal estimate

<sup>30</sup> See footnote 27

<sup>31</sup> DfT (2014) WebTAG Data Tables Autumn 2014 Issue v1.3

Table 14 Qualitative Assessment of Journey ambience / quality Impacts of the NCN2 Section 5

Factor	Sub Factor	Description
Traveller Care	Cleanliness	NA
	Facilities	Provision of a new dedicated combined cycle lane and pedestrian footpath.
	Information	Clearer demarcation of where vehicles, cyclists and pedestrians should be on the road and path.
	Environment	Improved environment for all road users. Reduced crowding on the road.
Travellers' Views		NA
Traveller Stress	Frustration	Reduced frustration of all road and path users due to improved road layout - segregation of vehicles from cyclists and pedestrians. Reduced conflict on the road between users.
	Fear of potential accidents	Reduced fear of accidents - cyclists can feel safer on the roads encouraging bike usage. Vehicles can drive more safely with reduced risk of hitting a cyclist or pedestrian. There will be a space between the path and the road reducing risk of pedestrians stepping out on the road or of vehicles entering the path.
	Route Uncertainty	Reduced route uncertainty. Cyclists and pedestrians can be more confident that they will be dedicated access for them on the route.

Source: CH2M HILL (2014) Adapted from DfT (2014) WebTAG Journey Quality Table

### Reduced Travel Costs

The modal shift to sustainable transport modes of cycling and walking will result in travel cost savings for users. The costs of traveling by bicycle or walking are far lower than travelling by motor vehicle. In a 2011 study on the original NCN, it was found that one in five cyclists said that the money saved has encouraged them to get on their bike. This is nearly double the proportion in 2010.<sup>32</sup> The reduction in costs will include savings in decongestion, fuel, parking and car maintenance.

### Time savings

By taking the cyclists and pedestrians off the road and providing them with a separate (combined) cycle and pedestrian path, cyclists will benefit from time savings on their trips. The time savings created by cycle paths are represented through decongestion.

### Decongestion

The reduction in car journeys will have an impact on decongestion, reducing the number of motor vehicles on the road. Based on WebTAG Table A 5.4.4 which estimates 2010 Marginal External Congestion Costs for Cars at 12.5 pence per km, the potential decongestion savings over a 60 year period could amount to approximately £160,000.

### Carbon reduction

WebTAG tables have been used to estimate the potential carbon savings that could be made from the reduced motor vehicles on the road. Firstly fuel savings were calculated by estimating the proportion of the reduced motor vehicles that are run on petrol diesel and electric, and the fuel saved per km using WebTAG Table A1.3.8. The carbon emissions per litre of fuel (Kg CO<sub>2</sub>e/l) were identified using WebTAG Table A3.3. The savings were estimated over a 60 year period and a financial value applied based on £/tonne of CO<sub>2</sub>e/l in WebTAG Table A3.4.

The monetised value of the potential carbon savings over 60 years in 2010 prices as a result of the modal shift to cycling caused by the scheme is estimated to be £142,000.

<sup>32</sup> Sustrans (2011) The Real Cycling Revolution, How the Face of Cycling is Changing

**Health benefits**

See section 8 (social benefits).

## 6. Economic Benefits

---

### Impact Area

In addition to the transport benefits along the A259, the economic benefits are expected to affect the wider district and county. As a broad estimate the wider impact area has been defined as the Arun District. A location map which identifies the extent of the project site and the boundaries of Arun District is presented in Section 4 in Figure 1.

### Baseline

Arun District covers an area of 85 square miles and has a population of 140,800.<sup>33</sup> West Sussex as a whole is an economically successful county. The economic activity rate in West Sussex is higher than the regional rate (79.3) and the national rate (GB 76.7). Employment rates are also higher than the South East and Great Britain.<sup>34</sup> Arun District is also more economically active than the national rate, despite this it is slightly lower than the average in West Sussex and the median earnings are lower than national average. The economic activity rate in Arun was 81% in 2012, which is higher than the national average of 77% but lower than the average across West Sussex of 82%. The employment rate in Arun was 79% in 2012 which is higher than the national average of 70% and also slightly higher than the West Sussex average of 78%. However the median weekly earnings of full time employees in Arun at £478 in 2013 are low compared to West Sussex (£522) and England and Wales (£509).<sup>35</sup>

### Design and construction stage

#### Temporary job creation from design and construction stage

During the design and construction stage there will be the need for employees to carry out the design and construction works. This may be carried out by existing or temporary contract employees. It is anticipated that there will be a need for 6 temporary jobs. Of which, 2 are likely to be professional/technical staff and 4 are likely to be construction workers.

#### Temporary GVA from design and construction stage

A small amount of GVA is also likely to be generated at the construction stage. The method for calculating this is presented in Section 5 of this report. It is expected that approximately £131,000 of GVA will be generated by the professional and technical sectors, and £338,000 of GVA will be generated in the construction sector during the design and construction of the Section 5 Scheme. This is a total of £441,000 in GVA during the design and construction stage.

### Operational stage

#### Operational Employment

As a result of increased access and connectivity to places of work in Arun created by the scheme, and the associated growth in cycling and walking, it is anticipated that this will lead to some growth in employment during the operational lifetime of the scheme. The NCN2 connects a number of allocated and proposed employment lands in Brighton, Adur, Worthing, Arun and Chichester. Completing the Section 5 of the route along the A259 in Arun will help to provide sustainable access to these sites for employment and business purposes. It has not been possible to quantify the growth in employment that this will result in. However the growth will contribute to the C2C SEP objectives of increasing employment in West Sussex.

---

<sup>33</sup> Arun District Council (no date) Open for Business – Economic Overview of the Arun District

<sup>34</sup> West Sussex County Council (2013) West Sussex Economic Fact Sheet

<sup>35</sup> NOMIS (accessed 2014) Annual Survey of Hours and Earnings 2012-13



### **Business turnover and operational GVA**

It can also be expected that there will be a growth in business turnover and GVA during the operation phase. Although it has not been possible to quantify the extent of the growth it can be expected that the Scheme will contribute to a growth in these economic indicators. For example:

- The improved connectivity to local employment lands, will lead to a growth in footfall. This is likely to lead to an increase in business turnover and profits, and as a result an increase in GVA locally.
- The Scheme will also support the leisure and tourism industry. It is estimated that 45% of trips on the existing NCN 1 are for leisure purposes.<sup>36</sup> The Scheme, by contributing to connecting up the wider NCN2 is likely to encourage a growth in tourism and leisure trips. As a result there will be an increase in spending in the tourism and leisure industry and a growth in GVA. For example, it has been estimated that across Europe there are 2.295 billion cycle tourism trips per annum with an economic value in excess of £35.5 billion.<sup>37</sup>
- Cycling itself is a generator of GVA through purchasing bikes, gear, and bike maintenance. Annually there are 250,000 new cyclists (1 million over 4 years). Together they are worth £141 million over four years.<sup>38</sup> This means that for every new cyclist on the road, £141 is generated in GVA into the UK economy.

### **Other economic benefits**

Other economic benefits can be expected as a result of the Scheme. These include cost savings to the NHS due to reduced incidents of ill-health associated with increased physical activity. This is discussed in more detail in Section 8 of this report on socio distributional impacts.

<sup>36</sup> Sustrans (2012) cited in West Sussex County Council (No date) NCN2 Strategic Cycle Route Package Intervention Programme

<sup>37</sup> (Weston et al., 2012) cited in Zovko, I (June 2013) The Value of Cycle Tourism - opportunities for the Scottish Economy (Transform Scotland)

<sup>38</sup> Sky/ British Cycling (No date) The British Cycling Economy - Gross Cycling Product Report

## 7. Social Distributional Benefits

---

### Improved accessibility and connectivity

The Scheme will increase accessibility of the A259 to cyclists and pedestrians. The accessibility benefits include:

- Improved access to amenities and employment in the area which non car users may have otherwise not been able to access
- A clearly defined cycle path will enable cyclists to navigate a safe route to their destination
- By having a separate cycle path cyclists will have a more secure and comfortable journey with reduced obstacles.

The improved accessibility will also increase connectivity for the road users to communities and employment along the route of the NCN2. In particular people that do not have access to a motor vehicle but that do have the means to acquire a bike would be able to travel across the area more efficiently and safely, increasing connectivity to potential new work and social opportunities.

### Increase in physical activity and associated health benefits

The increase in cycling and walking equates to an increase in physical activity which will help to improve the health and wellbeing of the users of the path. In order to quantify the impacts on health certain data is required on the number of cyclists, their frequency of use of the cycle route, and their health status. If this data is available health benefits can be assessed using DfT WebTAG guidance or the World Health Organisation Health Economic Assessment Tool (HEAT). The data required to assess the health benefits is not available for this study consequently two approaches have been taken.

1. A high level estimate of the health benefits has been prepared based on the ratio of potential health benefits to all other monetised benefits in the scheme BCR.
2. A qualitative assessment has been carried out based on a review of existing literature.

#### Quantitative assessment

DfT (2014) Claiming the Health Dividend report states that the physical activity benefits may make up 50-60% of all the benefits of a cycle project and state that this is a conservative estimate. Based on this assumption, the health benefits may equate to the same amount of all the existing monetised benefits.

Using this approach during a sixty year appraisal period it is possible that £4.266 million in health benefits could be achieved (in 2010 prices) making the total monetised benefits £8.532 million.

In a thirty year appraisal period the health benefits could amount to approximately £2.130 million (2010 prices) making the total monetised benefits over a 30 year period £4.261 million.

#### Qualitative assessment

There is a large amount of literature proving the link between increased physical activity through cycling and walking, and improvements to peoples' health. Vouri (1994) cited in Sustrans's review of evidence found through a randomised control study of inactive middle aged men and women who travelled to work by active travel for one hour a day for 10 weeks "increased their VO2 maximum by 4.5%, increased their maximal treadmill time by 10.3% and lowered cholesterol by 5%; all signs of increased physical fitness".<sup>39</sup>

---

<sup>39</sup> Cited in Sustrans (2011) Active Travel, Related Academic Evidence

In addition to physical health benefits, mental health and wellbeing is improved through physical activity. Boyd et al (1998) found that regular cycling led to an improvement in perceptions of enhanced wellbeing and self confidence.<sup>40</sup>

Studies have also be carried out to assess the benefits of walking. A review of evidence on walking interventions found that six of the studies reviewed found a significant net increase in walking also reported effects on self reported health, wellbeing, or quality of life.<sup>41</sup>

The health benefits of physical exercise, particularly cycling have been proven to have knock on benefits for business and the economy. It has been found that regular cyclists take one sick-day less per year.<sup>42</sup> This saves the economy an estimated £128 million per year in absenteeism; factored over 10 year period, this could amount to £1.6 billion in net present value of cost savings.<sup>43</sup> In addition a 20% rise in cyclists could result in savings of £52 million in costs to the NHS.<sup>44</sup> Wang et al prepared a cost benefit analysis of physical activity using bike/ pedestrian trails in Lincoln, Nebraska. The CBR assessed the financial benefits to improved health that resulted from using the paths compared to the costs of constructing them. The assessment resulted in a CBR of 2.94, which means that every 1 U.S. dollar investment in trails for physical activity led to 2.94 U.S. dollars in direct medical benefit.<sup>45</sup>

### **Agglomeration**

The Scheme is likely to support the agglomeration locally to a marginal extent. Agglomeration provides a measure of the mass of economic activity across the impact area. There are specific areas in England where agglomeration impact of a transport scheme is expected to be significant. These areas are called Functional Urban Regions (FURs) and are listed in the WebTAG FUR Database. None of the statistical wards that comprise Arun District are included in the FURs database, this indicates that transport improvements here are not necessarily expected to have a significant impact on agglomeration. However the Scheme is likely to have some marginal positive impact on agglomeration.

### **Regeneration**

Improvements to infrastructure including transport schemes are likely to contribute to the regeneration of the local area. The impact area of Arun District has a relatively high levels of employment (see baseline). However income levels are relatively low in the area compared to the national average. Also 30% of the Lower Super Output Areas (LSOAs) in Arun District are within the top 30% most deprived in the country. This indicates that although in a wealthy county there are significant pockets of deprivation in Arun. Through improved accessibility and connectivity, it is possible the NCN2 Section 5 and wider NCN2 will enable the unemployment and low earners to access higher income employment across the route of the NCN2. In addition, through creating a safer and improved environment for cycling and walking it supports lower income families to use cycling and walking as a potential alternative to the more expensive motor vehicle option for daily transport needs.

---

<sup>40</sup> Ibid

<sup>41</sup> BMJ (2007) Interventions to promote walking: systematic review

<sup>42</sup> Sky/ British Cycling (No date) The British Cycling Economy - Gross Cycling Product Report

<sup>43</sup> Ibid

<sup>44</sup> Ibid

<sup>45</sup> Wang G, Macera CA, Scudder-Soucie B, Schmid T, Pratt M, Buchner D, A cost-benefit analysis of physical activity using bike/pedestrian trails, Health promotion practice, April 2005, vol./is. 6/2(174-9), 1524-8399

## 8. Environmental Assessment

---

This is based on a desktop assessment of available information and data.

### Archaeology and Cultural Heritage

There are no Scheduled Monuments along or in close vicinity to the proposed route. The closest Scheduled Monuments are located at Climping, at 450m and 650m to the north of the A259 respectively. Neither of these will be directly or indirectly affected by the project.

No listed buildings are located immediately adjacent to the route, but one is located on Climping Street, to the south of the A259, four at Blisham, approximately 700m or more to the north of the A259 and four at Flansham, approximately 300m or more to the north west of Flansham Roundabout. None of these will be directly or indirectly affected by the project.

The Historic Monuments Record has not been checked during this appraisal for the entire length of the route, but due to the known archaeological interest in the vicinity of Comet Corner junction and on advice given by Mark Taylor of Arun District Council's archaeological advisory service (provided by West Sussex County Council for works proposed at Comet Corner), an archaeological assessment has been undertaken at Comet Corner. The results revealed proven evidence of buried archaeology, including prehistoric, possible Iron Age, Middle Saxon, Roman and mediaeval activity at or close to the site, and excavations associated with previous construction works for the A259 indicated the presence of remains dating to the late prehistoric period (Iron Age) and Romano-British periods (of a potentially high status). On the basis of this assessment, it was concluded that in those parts of the site which have previously been unaffected by development and on the verge of the north side of the A259, there is a high archaeological potential.

The assessment concluded that where the scheme lies within existing or former road corridors, construction is unlikely to have any impact on buried archaeology, given the historic disturbance created by road construction. However, where the road will be widened, or where earthworks or landscaping are required, there is a high potential for the removal of archaeological features or deposits, which, at the north side of the A259, could result in an impact of high significance. Further site investigations, including trial trenches, were recommended, and a watching brief was proposed during Ground Investigations.

The implications of this are that for the proposed cycle path works, which will be undertaken within the existing highway boundary, construction is not likely to result in any impact on buried archaeology. However, it is recommended that this is confirmed with Arun District Council's archaeological advisory service as the project progresses during detailed design.

### Air quality

Air quality within the study area is generally good. The Environment Agency Compliance Rating (based on the number of breaches recorded over the year) for the A259, approximately 500m east of the Crookthorn Roundabout, is Very Good.

During construction, there is likely to be some adverse impact on air quality as a result of dust and emissions from construction plant and equipment, but the effects are likely to be temporary and localised, and can be mitigated by the application of suitable controls during construction. No significant impacts are envisaged.

During operation, the project is likely to encourage in a greater use of cycling (see 'Effects on Vehicle Traveller, Pedestrians, Cyclists and the Local Community'), which is sustainable and non-polluting form of transport. Although this is a beneficial outcome of the project, which contributes towards sustainability goals, and will lead to some carbon emission reductions the scale is unlikely to result in "significant" impact on air quality or carbon emissions.

### Ecology

There are no nationally important designated sites of conservation interest at or in close vicinity of the proposed works. The closest comprise Climping Beach Site of Special Scientific Interest (SSSI) located

1.3km to the south east of Crookthorn Roundabout at Littlehampton and Felpham SSSI located approximately 2.2km to the south west of Flansham Roundabout at Middleton-on-sea, both comprising coastal sites. Part of Climping Beach SSSI is also designated as a Site of Nature Conservation Interest and a Local Nature Reserve. No impact on designated sites is envisaged.

No site visit or search for protected species has been undertaken along the length of the A259, but aerial photography shows that the grass verges along this section of the A259 contain rough grassland and there are frequent hedges, mature trees and open drains along the verges and the highway boundary. From previous studies undertaken at Comet Corner, it is known that there is a low or small population of reptiles (slow worm and lizards) at the verges at Comet Corner (their numbers being affected by roadside mowing), and there are ponds in the vicinity that could support Great Crested Newts. The roadside trees were also considered suitable for roosting bats and breeding birds. However, the hedges were not considered suitable for dormice. It is therefore possible these protected wildlife species and possibly others may be present (dormice, badgers, water voles and invertebrates) along the A259 verges, ditches and hedgerows.

It is therefore recommended that a site survey is undertaken once the full extent of the works are known. Further surveys to establish the presence of protected species and a detailed mitigation strategy may then be required. Potential mitigation may include minimising the loss of trees and hedges (which are currently likely to be cut on an annual basis), appropriate programming (specifically with reference to tree and hedge removal and grass cutting), site supervision during construction and other forms of mitigation specific to protected species. Some compensatory habitat or habitat enhancement, either within the Highways Boundary or within adjacent habitats, may be required to mitigate the loss of reptile habitat (depending on how widespread and numerous reptiles are along the A259) and grassland. Any trees that require lopping or removal would need to be checked for breeding birds and bats. With careful detailed design and mitigation, it is envisaged that significant long term adverse impacts can be avoided.

At present, it is not envisaged that there will be any works affecting the drainage ditch within the highway boundary, but any works would need to ensure that their ecological interest is retained (see also 'Water'). This issue will need further consideration during detailed design. However, with mitigation, no significant long term impact is envisaged.

### **Water**

The main watercourse within the study area is Ryebank Rife, which connects into numerous smaller drains around fields. In addition to this, there is an open drainage ditch that passes along the north side of the A259, inside the highway boundary.

The majority of the A259 between the B2233 and Middleton-on-sea is not classified as being at risk of flooding. However, there are stretches of the road at Wormshovels in the vicinity of Flansham, stretches to the east of Comet Corner and a further area to the west of the B2233, that are associated with Ryebank Rife. These are classified as being at high risk of flooding due to surface water and Flood Zone 3.

During construction, it will be important to ensure that mitigation is put in place to avoid any risk of pollution to the ditch. With mitigation, no significant impact is envisaged.

During operation, no impact on water quality or local flood risk is envisaged, but any works affecting the ditch will need consent and suitable drainage will need to be maintained.

### **Landscape**

The A259, between the B2233 and Middleton-on-sea, passes through a rural landscape dominated by agricultural land use, with roadside grassland along the edge of the road and trees and hedgerows (in some places quite dense and mature) along the highways boundary, particularly along the north side of the road. The vegetated ditch is apparent at some locations.

The proposed cycle path will result in the loss of some roadside grass, and lopping and removal of some trees and scrub. The grass will be replaced by a 3m wide hard surface. This will comprise a minor change to the local land use and landscape, but unless there is a large scale loss of trees, it will not affect the wider landscape outside the highway boundary or affect views from or towards the road, and there will be no significant change to the rural character of the A259 itself. However, it is recommended that a more

detailed evaluation of the effects of tree loss is undertaken during detailed design so that the effect on any local residences (Rookery Farm, approximately 700m from Flansham Roundabout; The Brambles, approximately 700m from Comet Corner; and Apple Barn Cottage, Ways Meet Cottage, The Cottage and a public house with a garden, close to the B2233). With careful design, no significant impact on views from these properties is envisaged.

### **Geology and Ground Conditions**

There are no sites designated for their interest to geology located at or in the vicinity of the site. No impact on features of geological importance are envisaged.

No specialist search for potentially contaminated land has been undertaken as part of this assessment. However, there are no current or historic landfill sites identified on the Environmental Agency website, and, given the rural location, no contaminated land is envisaged within the footprint of the works. If contamination were discovered or suspected during construction, good practice construction practices would be adopted to ensure no adverse impacts on humans or the environment.

No long term impact from contamination is envisaged.

### **Noise and Vibration**

There are some residential and commercial receptors located along the A259. These include Rookery Farm (approximately 700m from Flansham Roundabout) a caravan park and The Brambles (adjacent to and approximately 700m from Comet Corner respectively), Apple Barn Cottage, Ways Meet Cottage, The Cottage and a public house with a garden (close to the B2233) and St Mary's Church of England Primary School (approximately 130 m the south of Crookthorn Roundabout, on Crookthorn Lane).

During construction, noise from the works may be audible at these receptor locations, but elevated noise levels will be temporary and will last for a short duration at any single location. With mitigation in the form of adherence to industry best practice for construction times and noise levels, and given the existing noise levels associated with traffic on the A259, no significant nuisance is likely.

No significant impact during operation is envisaged.

# Annex 1: References

---

- Arun District Council (no date) Open for Business – Economic Overview of the Arun District
- BMJ (2007) Interventions to promote walking: systematic review
- Coast to Capital Local Enterprise Partnership (2014) Coast to Capital Local Economic Plan
- Department for Transport (November 2014) WebTAG Data Book Autumn 2014 v1.3
- Department for Transport (November 2014) Claiming the Health Dividend A summary and discussion of value for money estimates from studies of investment in walking and cycling
- Department for Transport (January 2014) WebTAG Unit A2.1 Wider Impacts
- Department for Transport (January 2014) WebTAG Unit A2.2 Regeneration Impacts
- Department for Transport (January 2014) WebTAG Unit A3 Environmental Impact Appraisal
- Department for Transport (January 2014) WebTAG Unit A4.1 Social Impact Appraisal
- Department for Transport (January 2014) WebTAG Unit A4.2 Distributional Impact Appraisal
- Department for Transport (January 2014) WebTAG Unit A5.1 Active Mode Appraisal
- Department for Transport (August 2014) Value for Money Assessment of Cycling Grants
- Department for Transport (2004) Encouraging walking and cycling success stories
- HM Treasury (2011) The Magenta Book
- NOMIS (accessed 2014) Annual Survey of Hours and Earnings 2012-13
- Office of National Statistics (2011) Census Trips by Mode
- Sky/ British Cycling (No date) The British Cycling Economy - Gross Cycling Product Report
- Sustrans (2011) Active Travel, Related Academic Evidence
- Sustrans (2011) The Real Cycling Revolution, How the Face of Cycling is Changing
- Wang G, Macera CA, Scudder-Soucie B, Schmid T, Pratt M, Buchner D, A cost-benefit analysis of physical activity using bike/pedestrian trails., Health promotion practice, April 2005, vol./is. 6/2(174-9), 1524-8399
- West Sussex County Council (13-November-2014) Full Details Report Summary - A259 Yapton 5yr PIA to 30 Sept 14 (Accidents Found Date Range: 09/01/2010 - 02/09/2014 Grid Coordinate Range: 496289, 101046 - 500474, 101955 Accident Date BETWEEN '01-Oct-2009' AND '30-Sep-2014')
- West Sussex County Council (2013) West Sussex Economic Fact Sheet
- West Sussex County Council (2011) West Sussex Transport Plan 2011-26
- West Sussex County Council (No date) NCN2 Strategic Cycle Route Package Intervention Programme
- Zovko, I (June 2013) The Value of Cycle Tourism - opportunities for the Scottish Economy, Transform Scotland

## **Websites accessed November 2014:**

- <http://www.natureonthemap.naturalengland.org.uk>
- <http://www.britishlistedbuildings.co.uk>
- <http://www.heritagegateway.org.uk>
- <http://maps.environment-agency.gov.uk/wiyby>

<http://www.westsussex.gov.uk>

<http://www.arun.gov.uk>

<http://www.google.co.uk/maps>