Bracknell Forest Council

A322 / A329 CORRIDOR IMPROVEMENTS - VIGAR WAY AND SPORTS CENTRE JUNCTIONS

Full Business Case

70063191-FBC-V02
NOVEMBER 2019

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CONTENTS

TABLES

FIGURES

APPENDICES

1

INTRODUCTION

1. INTRODUCTION

1.1. OVERVIEW

1.1.1. The Thames Valley Berkshire Local Enterprise Partnership (TVBLEP) brings together businesses, unitary authorities, education and the community sector to drive economic growth in the Thames Valley. The Thames Valley Berkshire Growth Deal will deliver growth by enhancing urban connectivity and addressing strategic infrastructure priorities across the LEP area. This will enable the delivery of essential housing at flagship sites in Newbury, Wokingham and Bracknell and improve access and reduce journey times across the LEP area.

1.1.2. This report sets out the Full Business Case (FBC) for the proposed improvement at Vigar Way and Sports Centre junctions. WSP has produced this business case on behalf of Bracknell Forest Council (BFC) for submission to the Thames Valley Berkshire Local Transport Body and their Independent Technical Evaluator (ITE), Hatch Regeneris.

1.1.3. The report has been prepared in accordance with the Department for Transport's (DfT) guidance on The Transport Business Cases and sets out the evidence base in favour of the two schemes and consists of:

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

1.2. PROPOSED SCHEMES

1.2.1. The schemes comprise improvements to two isolated junctions, Vigar Way roundabout and Sports Centre gyratory and BFC intends to submit one business case for both schemes totalling around £2.4m. Figure 1-1 depicts location of these schemes.

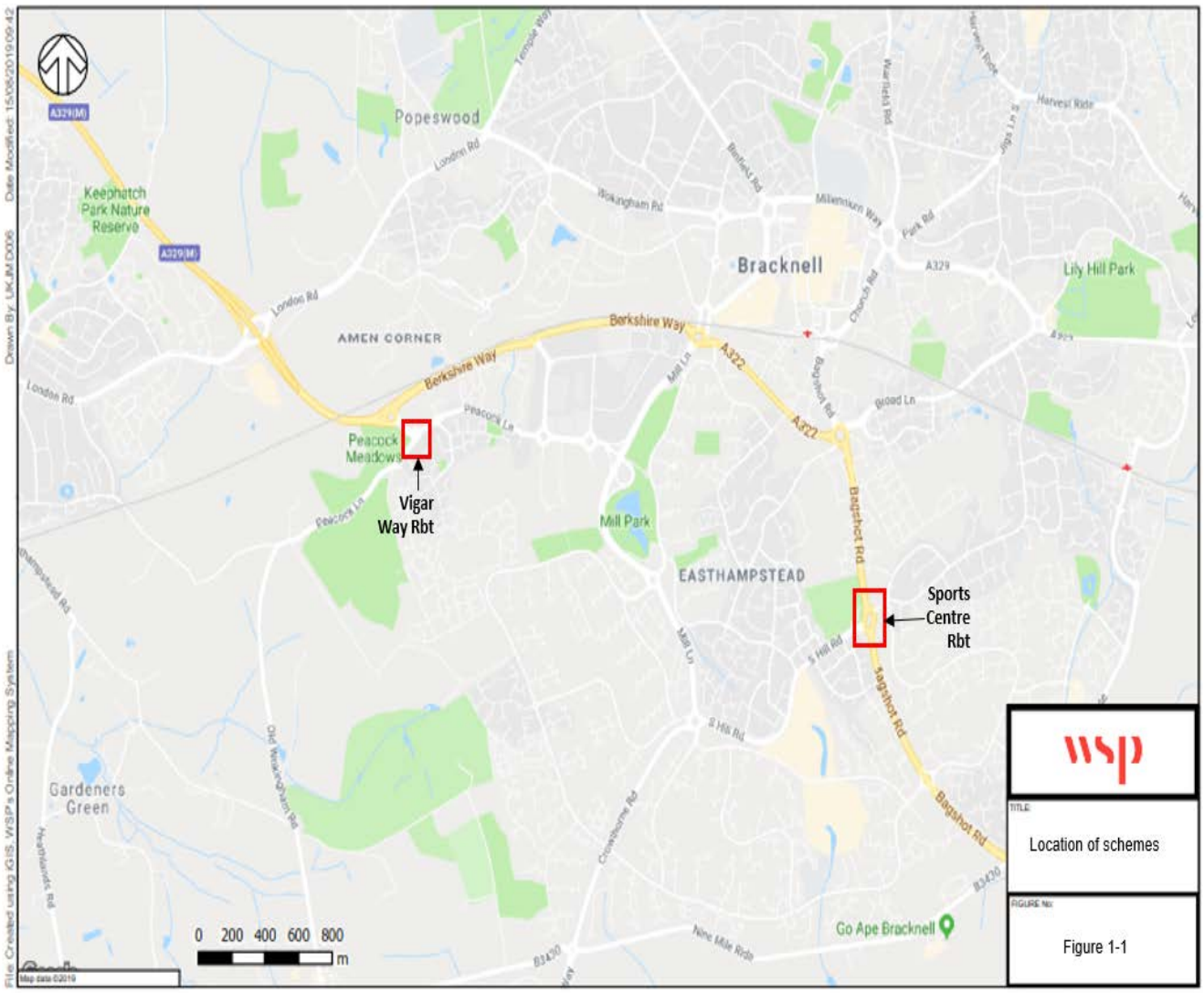


Figure 1-1 Location of Schemes

Vigar Way roundabout

1.2.2. This existing roundabout is proposed to be replaced with a fully signalised junction.

Sports Centre roundabout

1.2.3. Additional circulatory capacity will be added this signalised junction. The improvement also includes an additional exit lane on to Nightingale close

2

CONTENT AND STRUCTURE

2. CONTENT AND STRUCTURE

2.1. INTRODUCTION

2.1.1. WSP has prepared this business case on behalf of Bracknell Forest Council (BFC) to seek funding for the Vigar Way roundabout and Sports Centre gyratory from the Thames Valley Berkshire Local Enterprise Partnership (TVBLEP).

2.1.2. It has been prepared using the agreed standards and format for business cases, as set out in 'The Transport Business Cases' (Department for Transport).

2.2. CONTENT AND STRUCTURE

2.2.1. Business case development is based on the five-case model approach which shows whether a scheme:

- is supported by a robust case for change that fits with wider public policy objectives – the '**Strategic Case'**
- demonstrates value for money – the '**Economic Case'**
- is financially affordable – the '**Financial Case**'
- is commercially viable – the '**Commercial Case**'
- is achievable – the '**Management Case**'.

2.2.2. The next chapter details the assessment of different options and is followed by a chapter for each of the five cases in the five-case business case model.

- The **Strategic Case**: This gives a description of the scheme and sets out the problems and objectives of the scheme, any alternatives and why the scheme is the preferred option for meeting the stated objectives
- The **Economic Case**: This assesses the options to identify all their impacts to fulfil the treasury's requirements for appraisal and demonstrating value for money in the use of taxpayers' money
- The **Financial Case**: This sets out the outturn costs of the proposals outlining the scheme's affordability and funding arrangements over the lifespan of the project
- The **Commercial Case**: This sets out why the scheme is commercially viable, in terms of structure, content and nature of the proposed investment deal and provides details on the justification for funding, opportunities and additional or alternative forms of funding and the scheme procurement process and outcomes
- The **Management Case**: This confirms how the scheme promoter aims to deliver the proposals effectively and the quality of the authorities' project management at various stages of implementation ensuring that the proposals that can be delivered and offer the best value for money.

2.2.3. This document identifies the economic benefits of the Vigar Way roundabout and Sports Centre gyratory which include:

- Vigar Way:
  - Coordinated operation of the junction resulting in reduced delays and overall improvement to junction throughput
  - Reduction of queues
- Sports Centre Gyratory:
  - Reduce delays and queues on the approaches to junction
  - Improve circulatory flow.

2.2.4. These two schemes will contribute to the Local Objectives by:

- reducing delays associated with traffic congestion and improve reliability of journey times
- maintaining and improving where feasible, the local transport network.

2.2.5. This Business Case therefore documents that the proposed Vigar Way roundabout and Sports Centre gyratory is the most financial advantageous and offers the best value for money.

3

STRATEGIC CASE

3. STRATEGIC CASE

3.1. INTRODUCTION

3.1.1. This Section sets out the Strategic Case for the proposed improvements in relation to national, and regional polices and advocates the need for investment to deliver the schemes. It demonstrates that the two schemes are to be delivered with due regard to the relevant polices within the Council's Core Strategy and Local Transport Plan policies.

3.1.2. The Strategic Case follows a defined structure as specified by government. Following this structure ensures all the necessary information is provided and enables efficient assessment of the proposal. Information is presented on the following elements:

- Business strategy
- Problem identified
- Impact of not changing
- Internal drivers for change - This is not assessed as part of the Outline Business Case
- External drivers for change - This is not assessed as part of the Outline Business Case
- Objectives
- Measures for success
- Scope
- Constraints
- Interdependencies
- Stakeholders
- Options.

3.2. SOCIO-ECONOMIC CHARACTERISTICS OF STUDY AREA

3.2.1. Bracknell Forest Council (BFC) is a unitary authority comprising 18 political wards and 6 separate parish and town councils. The major urban area of Bracknell Forest is situated in the centre of the Borough, with the settlements of Sandhurst and Crowthorne to the south, Binfield to the north and North Ascot to the west. A number of these settlement's cross boundaries with other authorities, in particular, Crowthorne and North Ascot. Sandhurst has strong connections to Camberley in the adjoining authority of Surrey Heath.

3.2.2. At the time of the 2011 Census, Bracknell Forest had:

- 113,205 people are permanent residents in the Borough in 45,878 households
- 86% of households own one or more cars or vans compared to the national average (England) of 74%
- The average number of cars owned per household across Bracknell Forest area is 1.49 which is higher than the national average (England) of 1.16
- The average household size is 2.41 people
- 78.3% of the population between 16 and 74 years old is considered to be economically active.

3.3. BUSINESS STRATEGY

3.3.1. The main aim of the LEP is to contribute to the sustainable economic growth of the Thames Valley Berkshire through the implementation of a Strategic Economic Plan, which has four programmes1:

- Enterprise and Innovation
- Employability and Skills
- International
- Infrastructure.

3.3.2. As part of the last programme the LEP prioritises infrastructure that supports growth through investment in transport improvements to enhance connectivity.

3.3.3. The Thames Valley Berkshire Economic Plan2 recognises the importance of connectivity to the continued growth of the region. Connections between residential areas to town centres and associated facilities, is important, and north-south routes linking to the major strategic corridors of the M3, M4 and M40 are particularly recognised.

3.4. BUSINESS STRATEGY: NATIONAL AND REGIONAL TRANSPORT PRIORITIES

3.4.1. The National Infrastructure Delivery Plan 2016-2021 has a commitment to invest over £100 billion by 2021 alongside significant private sector investment in our infrastructure. It brings together the government's plans for economic infrastructure over the next 5 years with those to support delivery of housing and social infrastructure. This investment will drive wider economic benefits, including:

- Supporting growth and creating jobs in the short term as projects are built
- Raising the productive capacity of the economy in the long term as benefits of the new infrastructure are realised
- Driving efficiency
- Boosting international competitiveness.

3.4.2. The National Planning Policy Framework (NPPF) states that plans should help to build a strong and competitive economy through the creation of jobs and prosperity. The NPPF Consultation document (March 2018) makes more explicit the importance of supporting business growth and improved productivity, in a way that links to key aspects of the Government's Industrial Strategy.

[1] http://thamesvalleyberkshire.co.uk/About/About-Us
[2] http://thamesvalleyberkshire.co.uk/Strategic_Economic_Plan

3.4.3. There are five National Goals set by the Government as the strategic backbone for the UK's future transport policy and infrastructure. The goals are:

- **Goal 1**: To support national economic competitiveness and growth, by delivering reliable and efficient transport networks
- **Goal 2**: To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change
- **Goal 3**: To contribute to better safety, security and health and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health
- **Goal 4**: To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society
- **Goal 5**: To improve quality of life for transport users and non-transport users, and to promote a healthy natural environment.

3.4.4. The Thames Valley Berkshire Local Enterprise Partnership submitted their Strategic Economic Plan (SEP) in March 2014, which outlines the case for necessary investment to infrastructure, enterprise and employment that is required for the Thames Valley regions economic growth.

3.4.5. It states that the Thames Valley Berkshire area is ranked second, behind London in terms of Business birth rate (12.4%) and economic output per head is valued at £32.8k. Hence continuous investment in infrastructure is essential to maintain prosperity of Thames Valley Berkshire area.

3.5. BUSINESS STRATEGY: CORE STRATEGY

3.5.1. The Council has an adopted Core Strategy Development Plan Document (Feb 08) which identifies the vision for growth to 2026 which includes around 11,000 new dwellings and which identifies three major areas for growth:

- Policy CS3 - Bracknell Town Centre
- Policy CS4 – Land at Amen Corner
- Policy CS5 – Land North of Whitegrove and Quelm Park (now known as Warfield).

3.5.2. The Site Allocations Local Plan (SALP) allocates the above sites (respectively under policies SA11, SA8 and SA9). The SALP also allocates further sites to meet the Core Strategy growth needs. These further intended allocations are smaller sites identified in policies SA1, 2 and 3 and larger sites (SA4 – Land at Broadmoor, Crowthorne, SA5 Land at Transport Research laboratory, Crowthorne, SA6 - Land at Amen Corner North, Binfield and SA7, Land at Blue Mountain, Binfield). There are a number of improvements both implemented and proposed for this corridor and the sites allocated under the SALP would benefit from the improvements at Vigar Way and Sports Centre junctions.

3.5.3. This requirement was included in modelling evidence in support of the SALP. In recognising there is significant development due to come forward within BFC and to facilitate cumulative impact of the developments, incremental improvements such as these improvements to A322 / A329 corridor is a must and a cost-effective solution. Therefore, the proposed improvements along the A322 / A329 corridor is required to facilitate the Council's future growth plans for around 6,400 dwellings and improve journey times.

3.5.4. In addition to the 2026 Core Strategy, BFC has recently consulted on its Draft Bracknell Forest Local Plan which extends the plan period to 2034 with a residential growth requirement of about 5000 extra dwellings over and above the 11,000 dwellings up to the period 2026.

3.5.5. The following Core Strategy policies are particularly relevant for delivering the Council's transport goals in the context of spatial planning:

- **Policy CS1**: **Sustainable Development Principles** recognises transport as an integral component in delivering sustainable development. The intention is to ensure "development is located so that people are close to a range of services and facilities, thereby reducing the need to travel". This consequently reduces the impact of transport on air quality and climate change, whilst reaping the potential benefits to the health and wellbeing of local residents through providing "increased opportunities to walk or cycle"
- **Policy CS6**: **Limiting the Impact of Development**, states that development "will contribute to the delivery of infrastructure needed to support growth in the Borough and will mitigate adverse impacts on communities, transport and the environment". Through planning conditions or obligations, measures such as highway improvements and bus services and can be secured in the determination of planning applications
- **Policy CS7**: **Design**, states that development proposals will be required to be of a "high quality design" that "aids movement through accessibility, connectivity, permeability and legibility", providing the facilities to promote a modal shift from the private car to more sustainable modes
- **Policy CS23**: **Transport, and CS24**: Transport and New Development, ensure that development in the Borough is carried out with due consideration given to on-site transport provision and for connectivity to the wider area.

3.5.6. The South-East Plan (SEP) notes that "the strategic road network through the Thames Valley Berkshire area, and linking to neighbouring economies, is increasingly constrained; there is little scope for new roads, so the challenge is to maximise existing capacity and to tackle known 'pinch-points".

3.6. STRATEGIC IMPORTANCE OF THE A322/A329 CORRIDOR

3.6.1. The A322 / A329 corridor runs through the heart of Bracknell and connects the M3(J3) to the south and M4(J10) via A329M (Figure 3-2). It carries in excess of 50,000 vehicles a day. The proposed improvement at A329 Jennett's Park \ Vigar Way and Sports Centre gyratory is part of a wider programme to improve access between the M3(J3) and M4(J10).

3.6.2. As part of the transport plan for this corridor, BFC have invested in upgrading junctions along this route over the last five years to provide a better managed corridor resulting in reduced journey times and improved journey time reliability. Figure 3-3 shows, locations that have been identified for improvements on the A322 / A329 corridor. Several junctions including the followings have already been implemented:

- Twin Bridges Gyratory; full signalisation of the northern section of the roundabout and further capacity improvements
- Coppid Beech Roundabout; full signalisation and additional circulatory lanes
- Jannett's Park Roundabout; partial signalisation
- Horse and Groom Roundabout; extended dualling of the Downshire Way
- Hilton Roundabout; traffic signal optimisation with adjacent corridor improvements
- Coral Reef Roundabout; replacement of the existing roundabout with a fully signalised crossroads.

3.6.3. The improvements that have been identified and yet to be implemented are:

- Vigar Way Roundabout; replacement of the existing roundabout with a fully signalised junction;
- Sports Centre Roundabout; additional circulatory lanes;
- Downshire Way; introduction of westbound dualling for the full length of the link

3.6.4. This business case is for Vigar Way and Sports Centre Roundabout.

3.6.5. The incremental corridor wide improvement programme is vital to facilitate the growing economy and the housing projections. Figure 3-4, shows housing sites in the emerging Site Allocations Local Plan (SALP) and there are many sites along the A322 / A329 corridor.

3.6.6. Housing projection discussed above (about 5000 extra dwellings over and above the 11,000 dwellings up to the period 2026) is to meet both demographic and economic led housing need. When this is considered in the context of travel to work areas (TTWAs), the significance of the A329 / A322 corridor becomes more prominent. Figure 3-5 shows the limit of the various TTWAs covering Bracknell Forest and illustrates that Bracknell Forest Borough falls entirely within Reading TTWA, with a very small area to the south falling within the Guildford and Aldershot TTWA.

3.6.7. Based on 2011 Census data, travel to work flow containment shows that 52% of Bracknell Forest's workforce live in Bracknell Forest. By threshold definition, Bracknell Forest is not self-contained in terms of travel to work flows. This means, the rest of the work force will be travelling to three other authorities within the West Berkshire as depicted in the TTWAs plan (Figure 3-5), Table 3-1 shows highest level of flows are between Bracknell Forest and Wokingham and Reading taking second place. Figure 3-6 shows the A329 / A322 corridor and urban centres within the TTWAs. To appreciate the vital role of this corridor in the context of housing and economy, we only need to look at the configuration of the A322 / A329 in the context of the main employment centres and the other corridors.

Usual Residence	Place of Work					
	Bracknell Forest	Reading	West Berkshire	Wokingham	Other	TOTAL
Bracknell Forest	31,025	1,936	833	4,620	23,770	62,184
Reading	2,247	47,239	6,255	7,778	16,680	80,199
West Berkshire	1,027	9,199	53,917	2,498	15,508	82,149
Wokingham	6,371	12,616	2,659	38,708	21,432	81,786
Other	18,915	18,558	23,867	15,959	-	77,299
TOTAL	59,585	89,548	87,531	69,563	77,390	-

Source: ONS, Census 2011

Figure 3-1: Journey to Place of Work

3.6.8. These sites are dependent on junction improvements along the A322 / A329 corridor. The Vigar Way / Jennett's Park and Sports Centre junctions' improvement are part of the corridor-wide improvement programme.

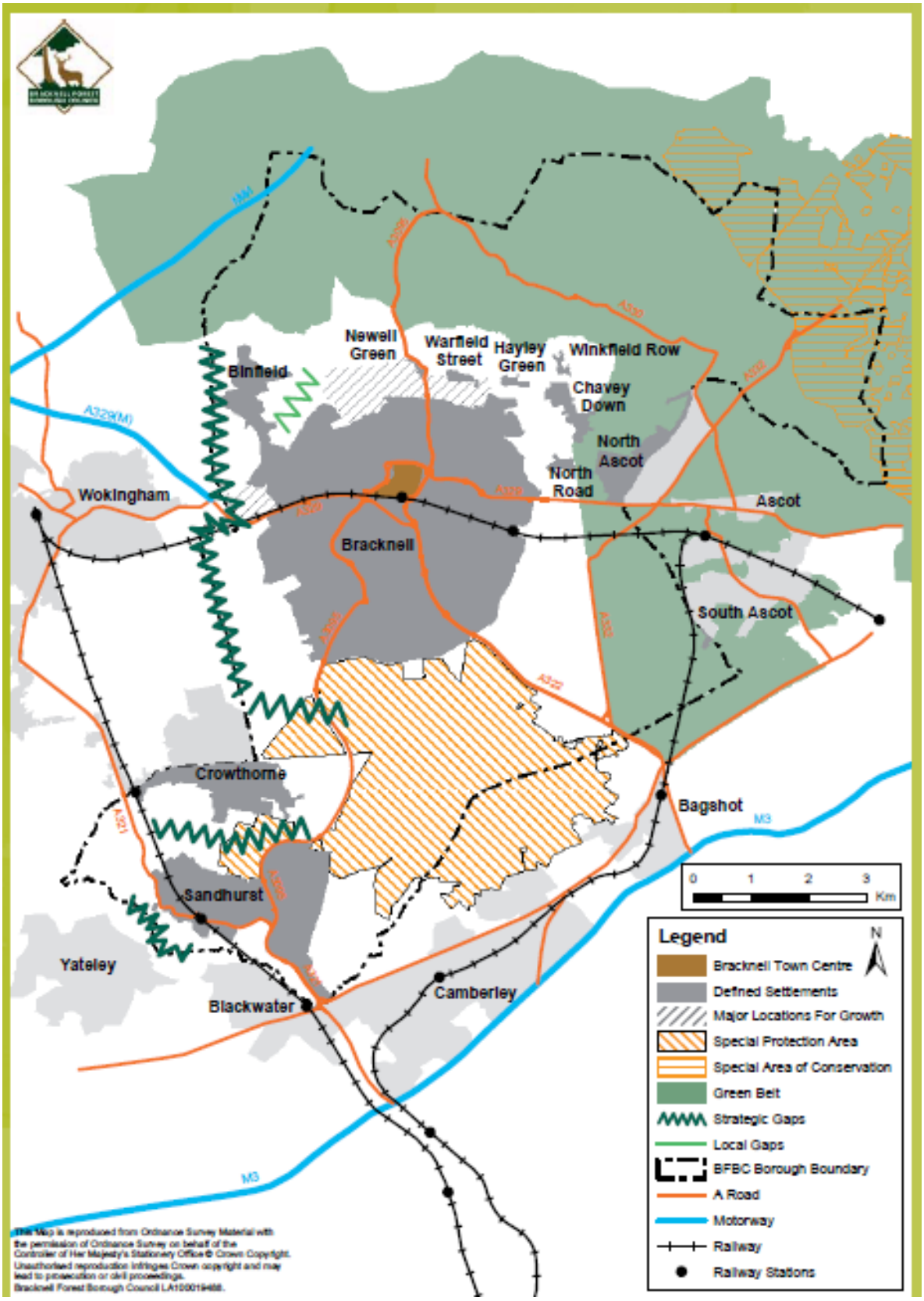


Figure 3-2: A322 / A329 Corridor-wide Improvement Strategy

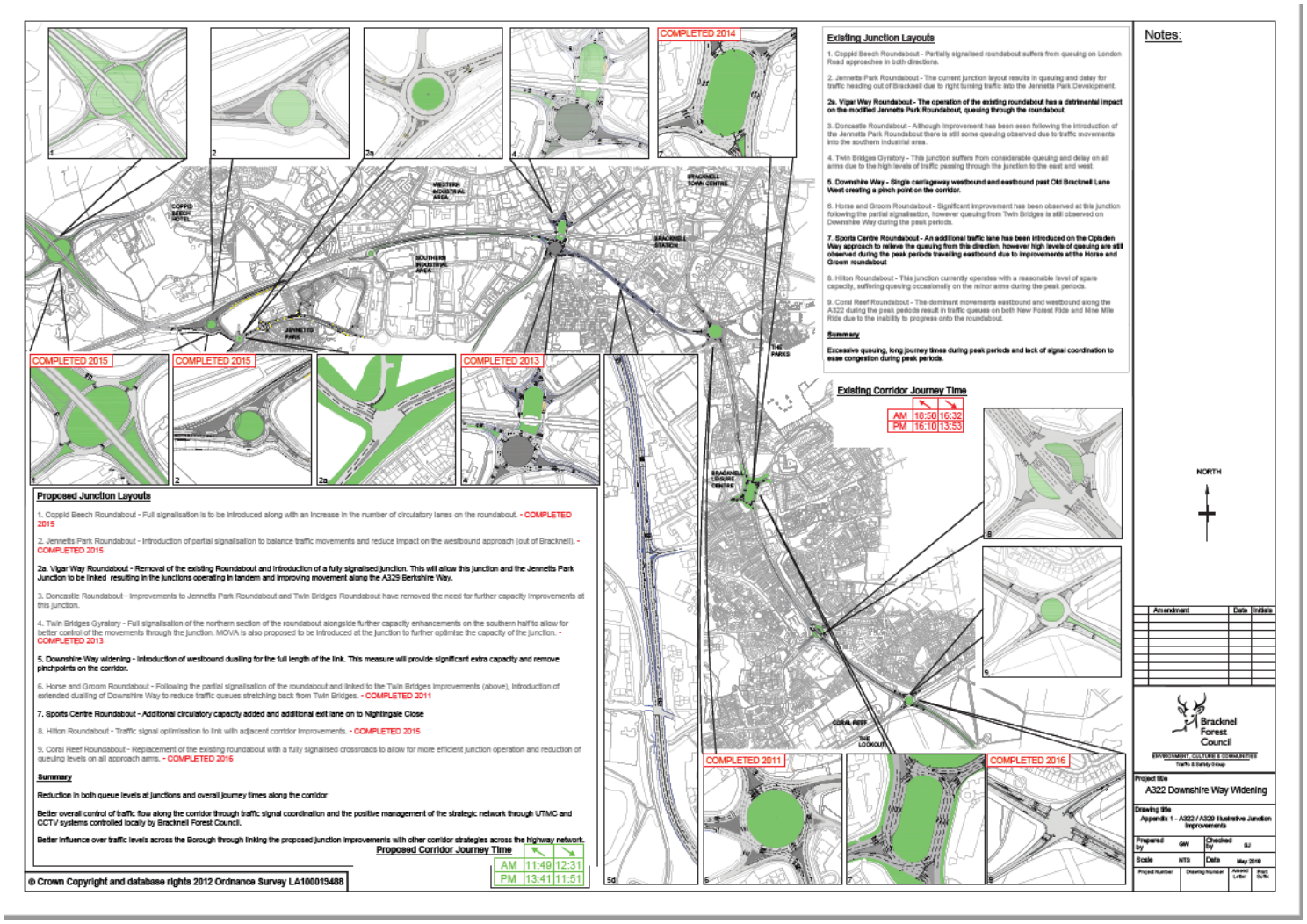


Figure 3-3: A322 / A329 Corridor-wide Improvement Strategy

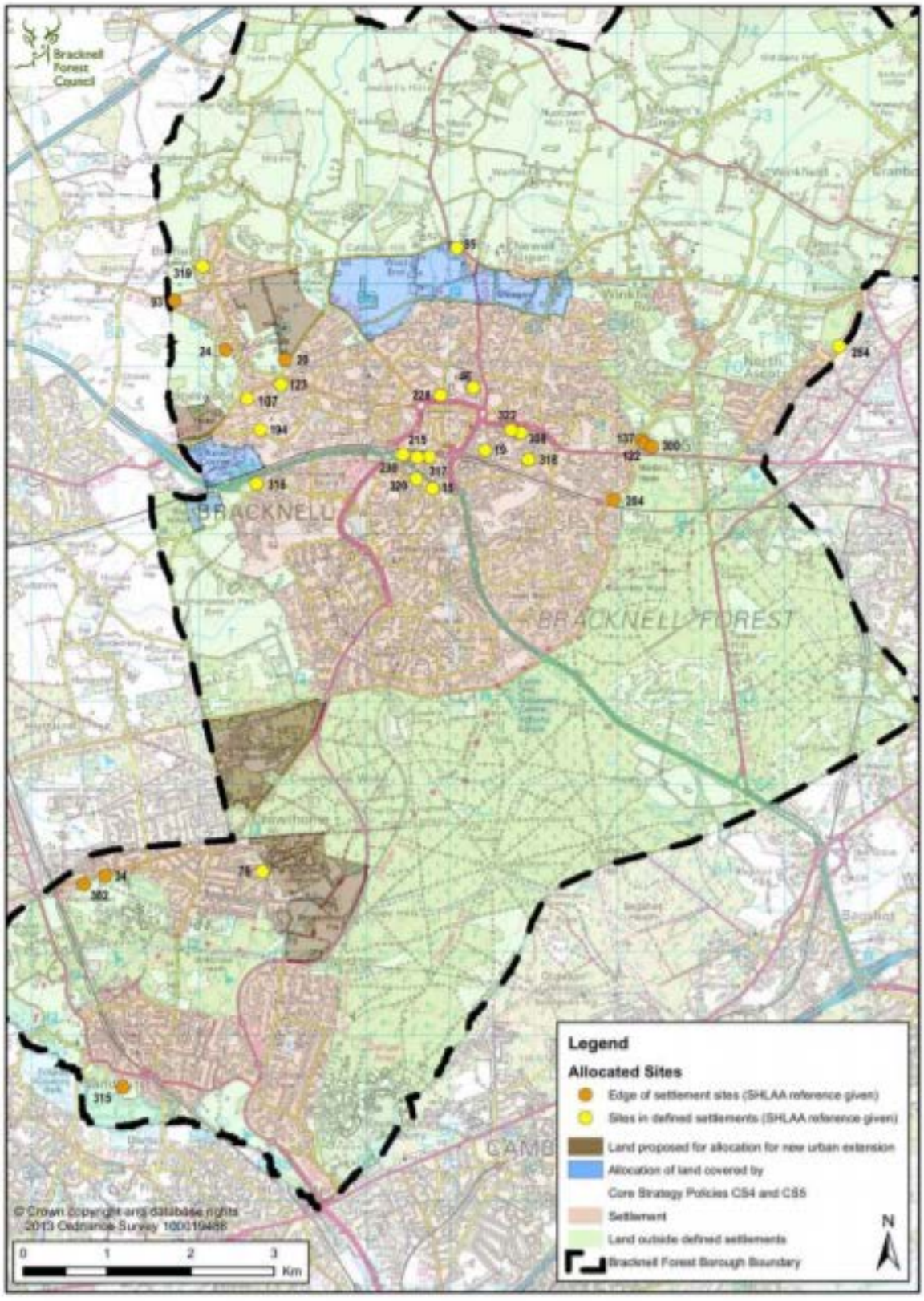


Figure 3-4: Location of Allocated Housing Sites with the SALP

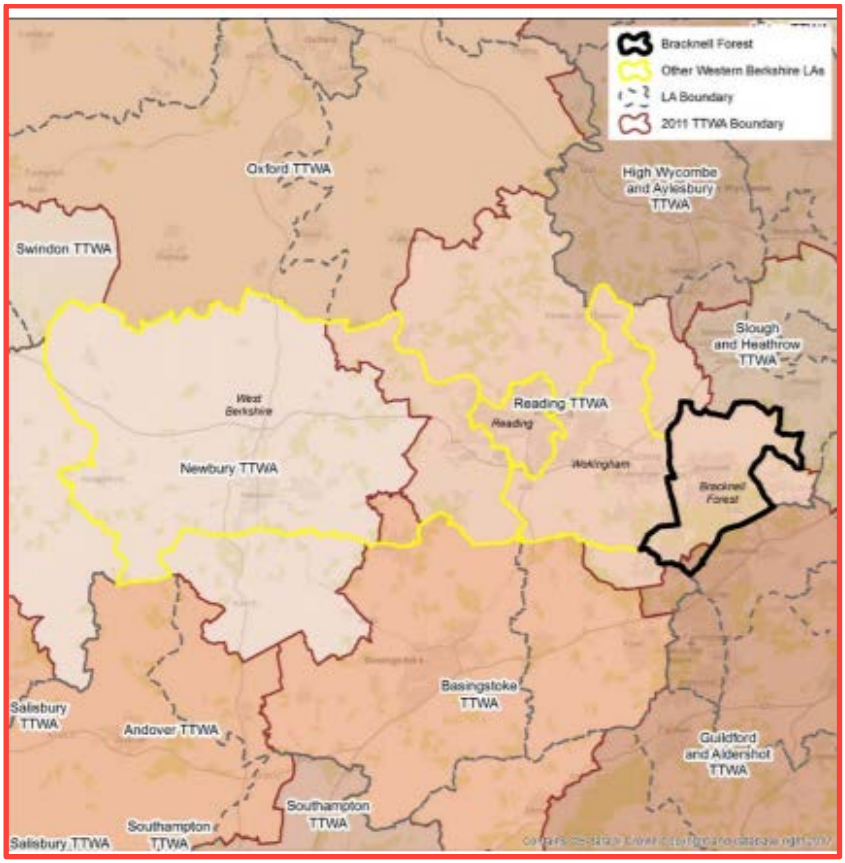


Figure 3-5: Bracknell Forest and Travel to Work Areas

Figure 3-6: A329/A322 corridor and main travel to work areas- West Berkshire

3.6.9. The proposed schemes are part of an overall A322/A329 corridor improvements. This runs roughly north south and links the M4 to the north and the M3 to the south. Improvements along this corridor would enable improved journey time movements between Reading, Wokingham and Bracknell. Thames Valley Berkshire Strategic Economic Plan (Implementation Plan13), Package 6 includes improvement to North-South links between the M3 and M4 motorways.

3.6.10. This corridor was recognised to be complementary to M25 in terms of the Heathrow expansion in Highways England M25 SW Quadrant Study4. The study recommended that given the scale of traffic on the M25, it may also be necessary to introduce more strategic highway capacity Improvements on the A322 /A329 corridor. Improvements on this corridor will provide improved journey time to both strategic and local traffic.

3.7. BUSINESS STRATEGY: LOCAL TRANSPORT PRIORITIES

3.7.1. Bracknell is identified in the South-East Plan as a second-tier regional hub and as such will be a focus for transport investment in the regional context. The Bracknell Forest Local Transport Plan 3 (LTP), Core Strategy and Implementation Plan 2011-2026 sets the context for the development of, and the improvement to, transport in Bracknell Forest over the next 15 years. Over the LTP period BFC plans to regenerate Bracknell Town Centre, deliver employment space to create more sustainable located jobs and meet the target delivery of 11,000 dwellings.

3.7.2. The government's five national goals are set out earlier in this section and delivery on the five basic national transport goals remains the key test for allocation of transport funding. Locally, regeneration of Bracknell Town Centre is one of the Council's highest priorities. This emphasis on development of the local economy reinforces the need to play a part in the recovery of the national economy as the country climbs out of recession. Road congestion is a constraint on the economy, and currently costs the economy billions of pounds each year and is a key factor in business location and a concern expressed in local consultations.

3.7.3. Congestion reduction will enable and encourage recovery of the local economy and will be part of a plan to provide for transport improvements to manage and accommodate the travel demands of new housing development with minimised local impacts and without pressure on congestion on local and main routes.

[3] http://www.thamesvalleyberkshire.co.uk/getfile/Public%20Documents/Strategic%20Economic%20Plan/TVB%20SEP%20-%20Implementation%20Plan.pdf?inline-view=true

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/600047/m25-south-west-quadrant-strategic-study-stage-3.pdf

3.7.4. This will be enabled through a combination of capacity improvements and the use of Intelligent Transport Systems to maximize the efficiency of the highway network along with further development and promotion of public transport and walking and cycling - which will also help to deliver on the National goals for reduction in carbon emission and equality of opportunity.

LTP Policies

3.7.5. In setting out the relevant LTP polices for the proposed improvement schemes it is necessary to appreciate the Council's thinking and approach to the proposed intervention. It initially considered major improvements to the A322/A329 corridor and judged the return to be disproportionate to the investment and decided on an approach to improve the whole corridor by section at a time over a period. Corridor-wide improvements implemented and proposed are shown in Figure 3-2.

TP1- Accessibility

- Developing a series of corridor route strategies to ensure a co-ordinated and forward-thinking approach to network improvements
- Implementing key road capacity improvements.

TP12-Traffic Management

- Facilitating the movement of traffic.
- Improving the reliability of journey times

TP13- Congestion Management

- Works and measures to improve the capacity and functionality of junctions and route corridors.

3.7.6. Through the Local Transport Plan the Council will continue to identify priority transport schemes and monitor progress on delivery of such schemes over time. Where necessary, the Council will safeguard existing facilities and land that contributes to the operation or development of a strategic transport network.

3.8. PROBLEM IDENTIFICATION

3.8.1. The A322 / A329 corridor links the M4 to the north and the M3 to the south and the Council as part of its corridor-wide improvement programme had implemented improvements at many junctions since 2015. However, there are still a number of locations needing improvements which would improve flows on the is corridor and adjacent links and junctions. For this business case two junctions have been identified, Vigar Way/A329 Jennett's Park roundabout and Sports Centre gyratory.

3.8.2. Currently there is congestion and queuing through these junctions. Figure 3-8 to Figure 3-11 have been produced using traffic data from Google map. These show indicative speed data. Variation in speeds are indicated by the following colours:

- Green indicates free flow conditions
- Yellow represents slower traffic conditions
- Red indicates very slow and dark red indicates nearly stopped or stop and go traffic.

3.8.3. Vigar Way and Jennett's Park are closely spaced junctions with just over 100m between these. Partial signalisation of Jennett's Park junction was implemented in 2015 but Vigar Way remained a roundabout. The lack of control of traffic through Vigar Way impedes the smooth operation of Jennett's Park roundabout. Often traffic queue builds up on the approaches to these roundabouts and very slow-moving traffic through the roundabout. Figure 3-7 to Figure 3-11 show slowing moving traffic through these two junctions.

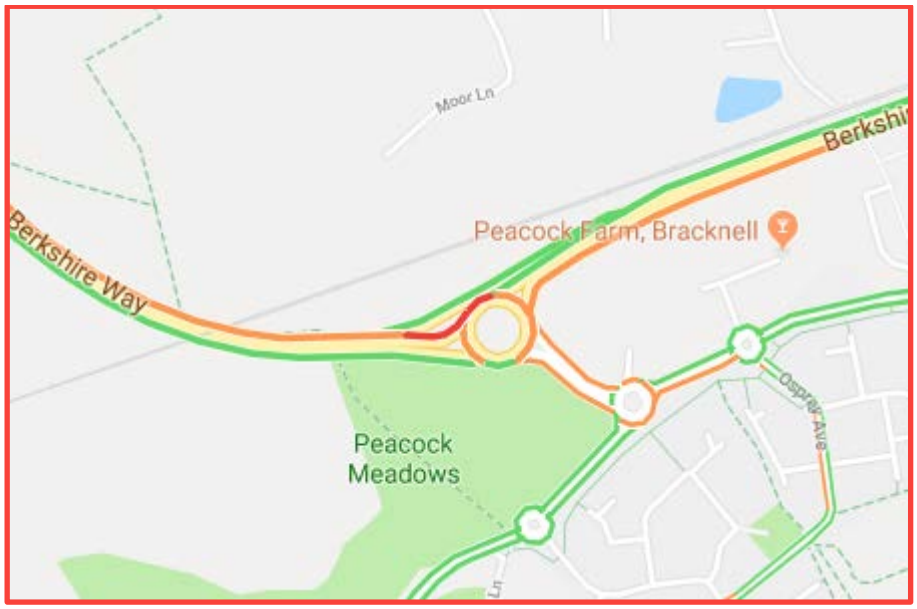


Figure 3-7: Vigar Way / Jennett's Park Evening Peak Hour

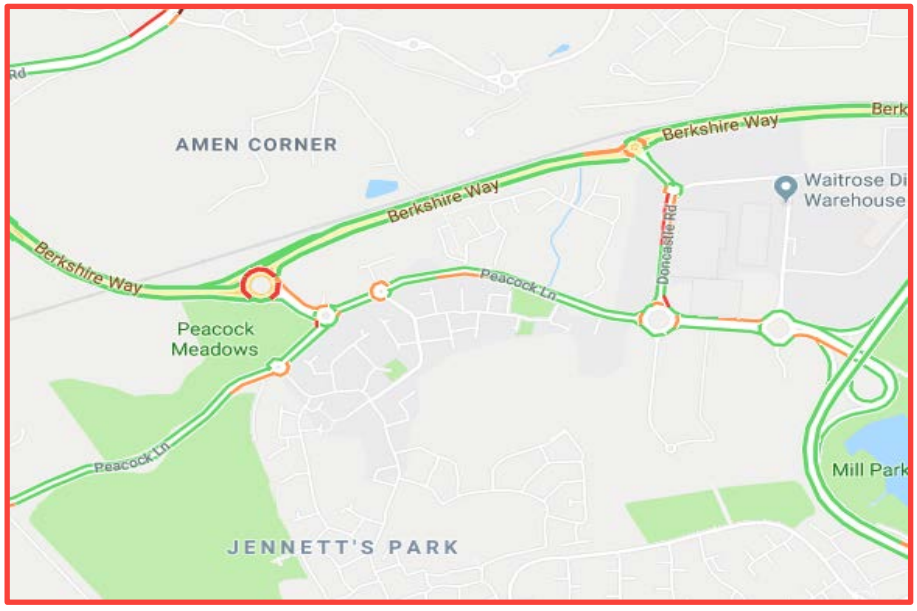


Figure 3-8: Vigar Way / Jennett's Park Evening Peak Hour

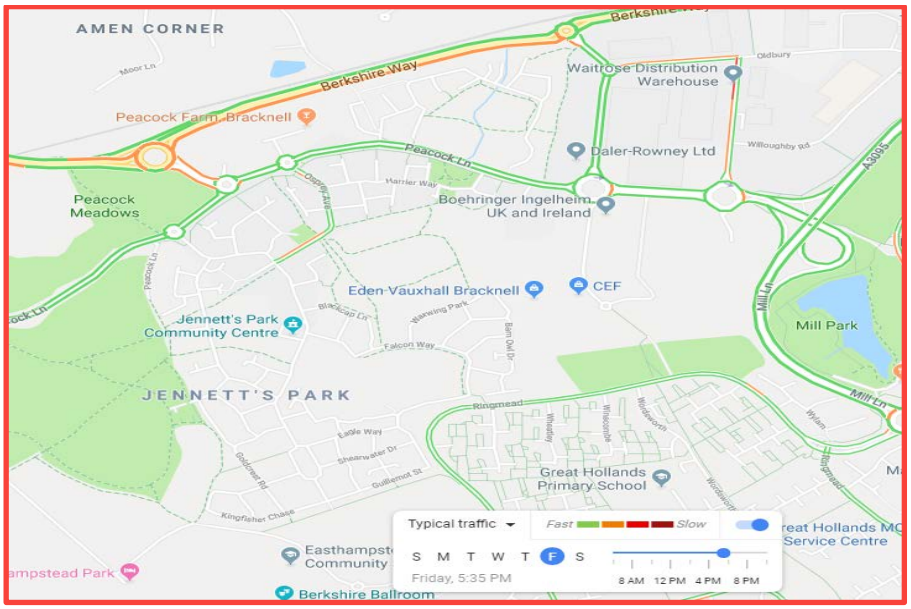


Figure 3-9: Vigar Way / Jennett's Park Evening Peak Hour

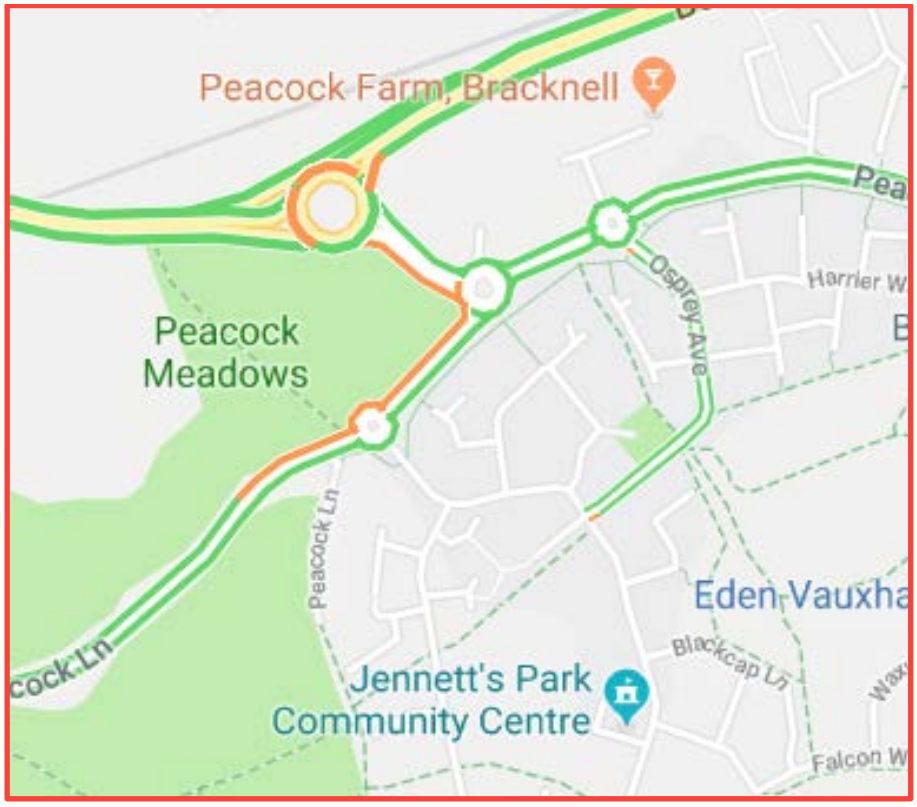


Figure 3-10: Vigar Way / Jennett's Park Morning Peak Hour

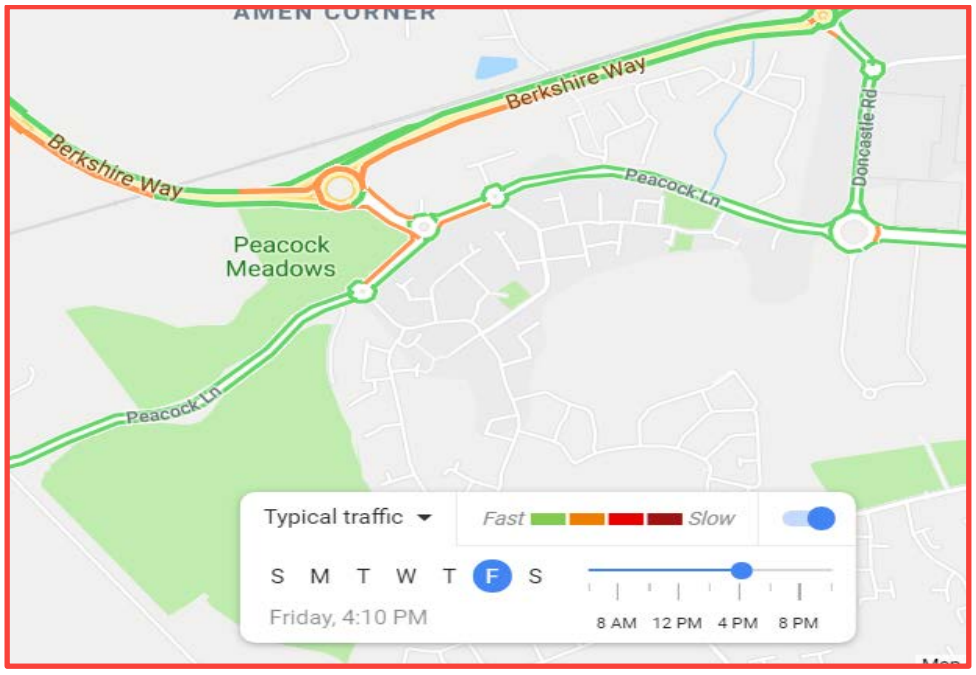


Figure 3-11: Vigar Way / Jennett's Park Inter Peak Hour

Sports Centre Gyratory

3.8.4. Circulatory capacity of the Sports Centre gyratory is inadequate and as a result traffic queue builds up on the approaches. Figure 3-12 to Figure 3-15 show slow moving traffic on the approaches to the gyratory and the gyratory itself.

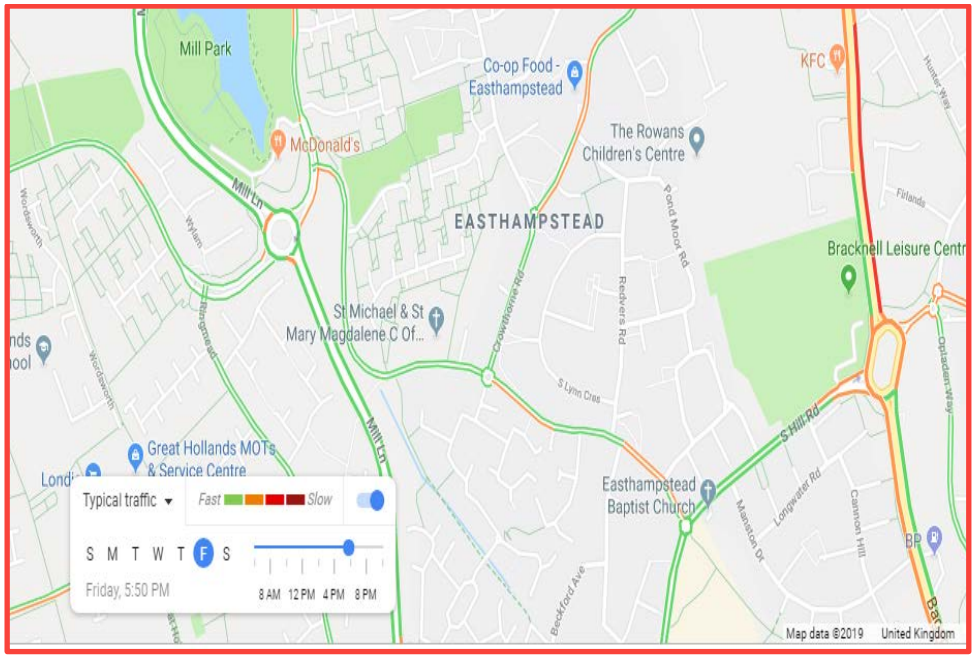


Figure 3-12: Sports Centre Gyratory Morning Peak Hour

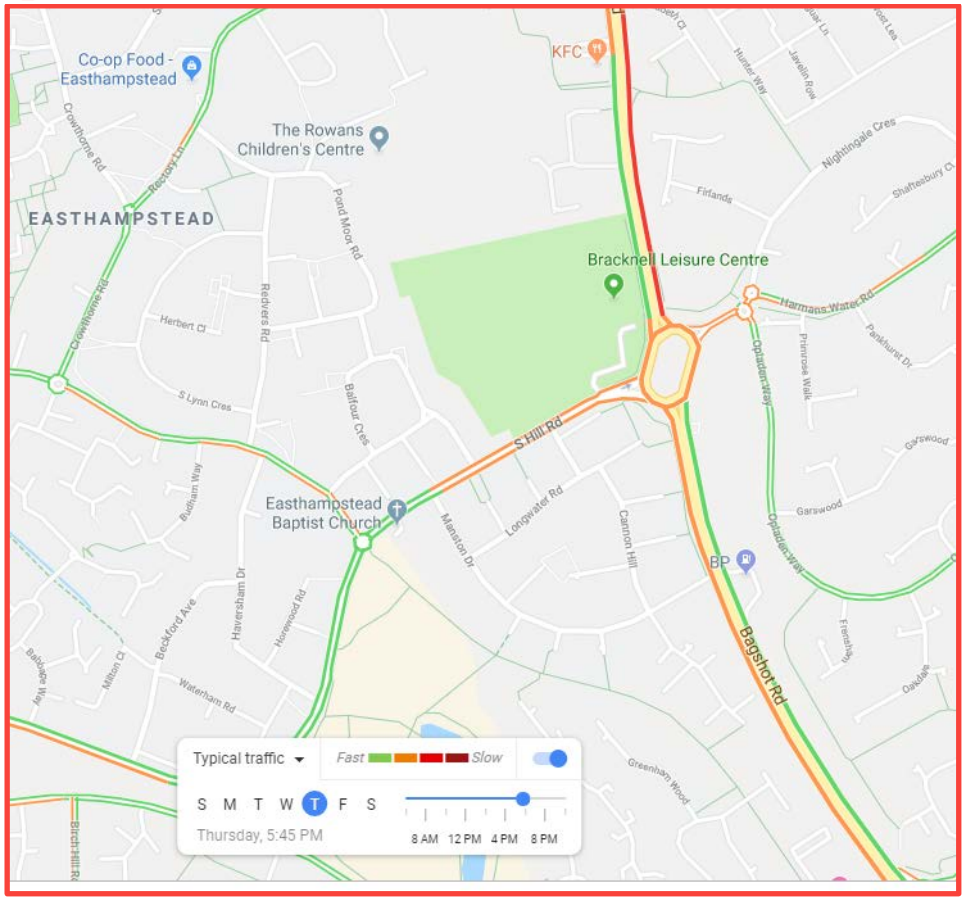


Figure 3-13: Sports Centre Gyratory Evening Peak Hour

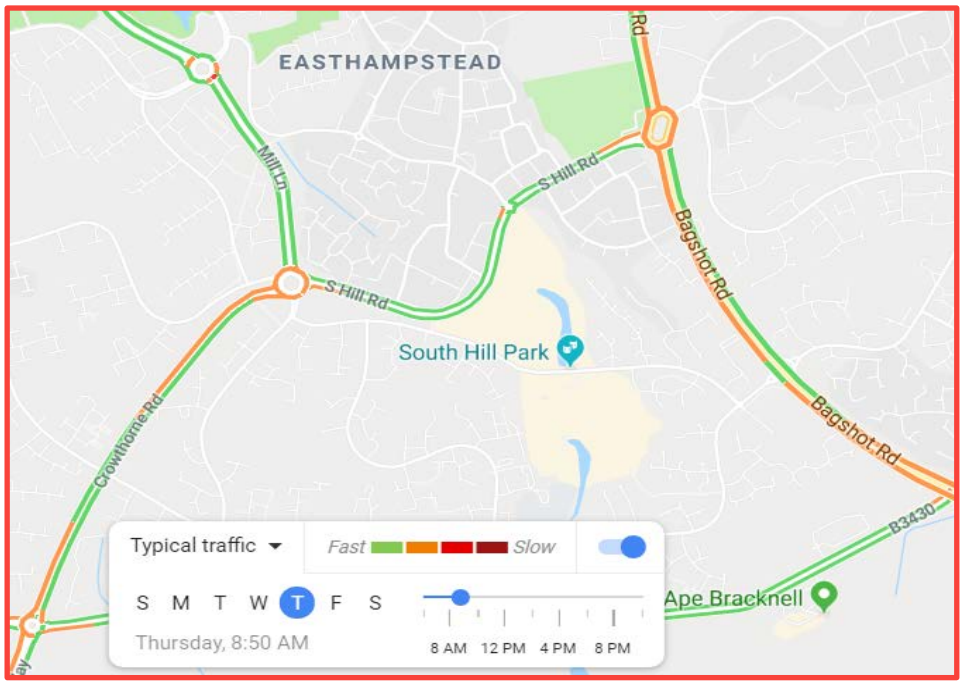


Figure 3-14: Sports Centre Gyratory Evening Peak Hour

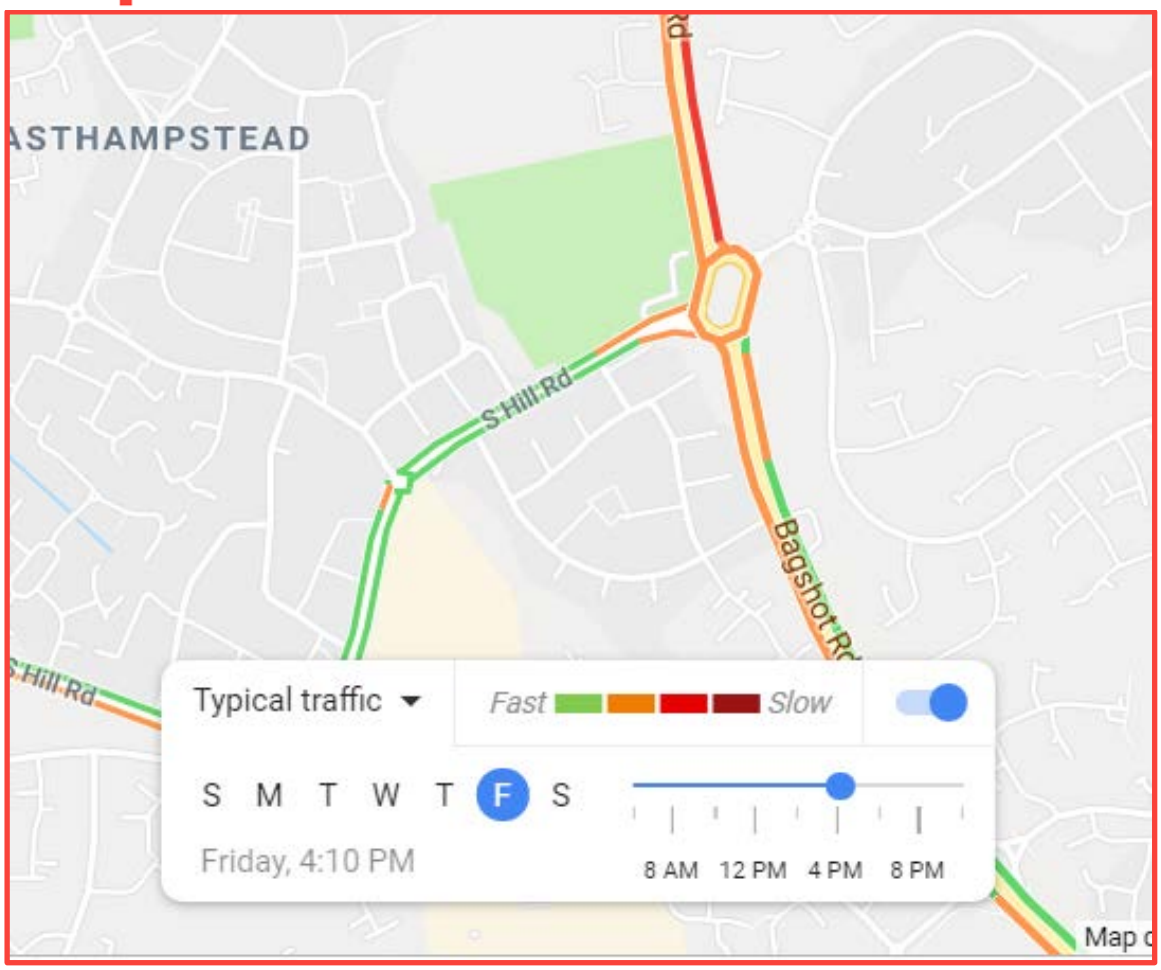


Figure 3-15: Sports Centre Gyratory Morning Peak Hour

3.8.5. For Vigar Way/Jennett's Park, the base year operational assessment shows 95.4 % and 98.7% degree of saturation in the AM and PM peak respectively. Observed queue data indicates that on average 14 vehicles queue on the southbound arm of the Vigar Way and maximum queue of 17 vehicles in the evening peak. In the morning maximum number of vehicles queuing is 13.

3.8.6. Forecast year Do Minimum assessment (2026) for Vigar Way/Jennett's Park shows 109.1% and 111.5% degree of saturation in the AM and PM peak respectively. For 2036 the degree of saturation is 124.9% and 136.1% in the AM and PM peak respectively.

3.8.7. Base year assessment for Sports Centre Roundabout shows a degree of saturation of 94.1% and 86.7% in the AM and PM respectively. Forecast year Do Minimum assessment (2026) shows 106.2% and 99.7% degree of saturation in the AM and PM peak. In 2036, the degree of saturation is 113.5 and 107.0%.

3.8.8. Geographical location of the Bracknell Forest Borough provides with a very good road links, located between the M3 and M4 motorways, however this does not mean journeys within the borough are free flowing. Bracknell Forest still suffers from congestion, which affect journey time reliability and adds unnecessary stress to a journey.

3.8.9. Figure 3-16 shows the main employment centres within Bracknell and the A and B roads including the A329 and A322 corridor. This corridor is fundamental to the regeneration of the Bracknell Town Centre. BFC continually works to reduce congestion and increase journey time reliability. The proposed improvements at Vigar Way and Sports Centre are part of this continual improvement.

3.8.10. As set out in Section 3.6 of this report, and Figure 3-3, Vigar Way and Sports Centre improvements are part of a wider corridor wide programme. A number of improvements have already been implemented, except, Vigar Way, Sports Centre and Downshire Way.

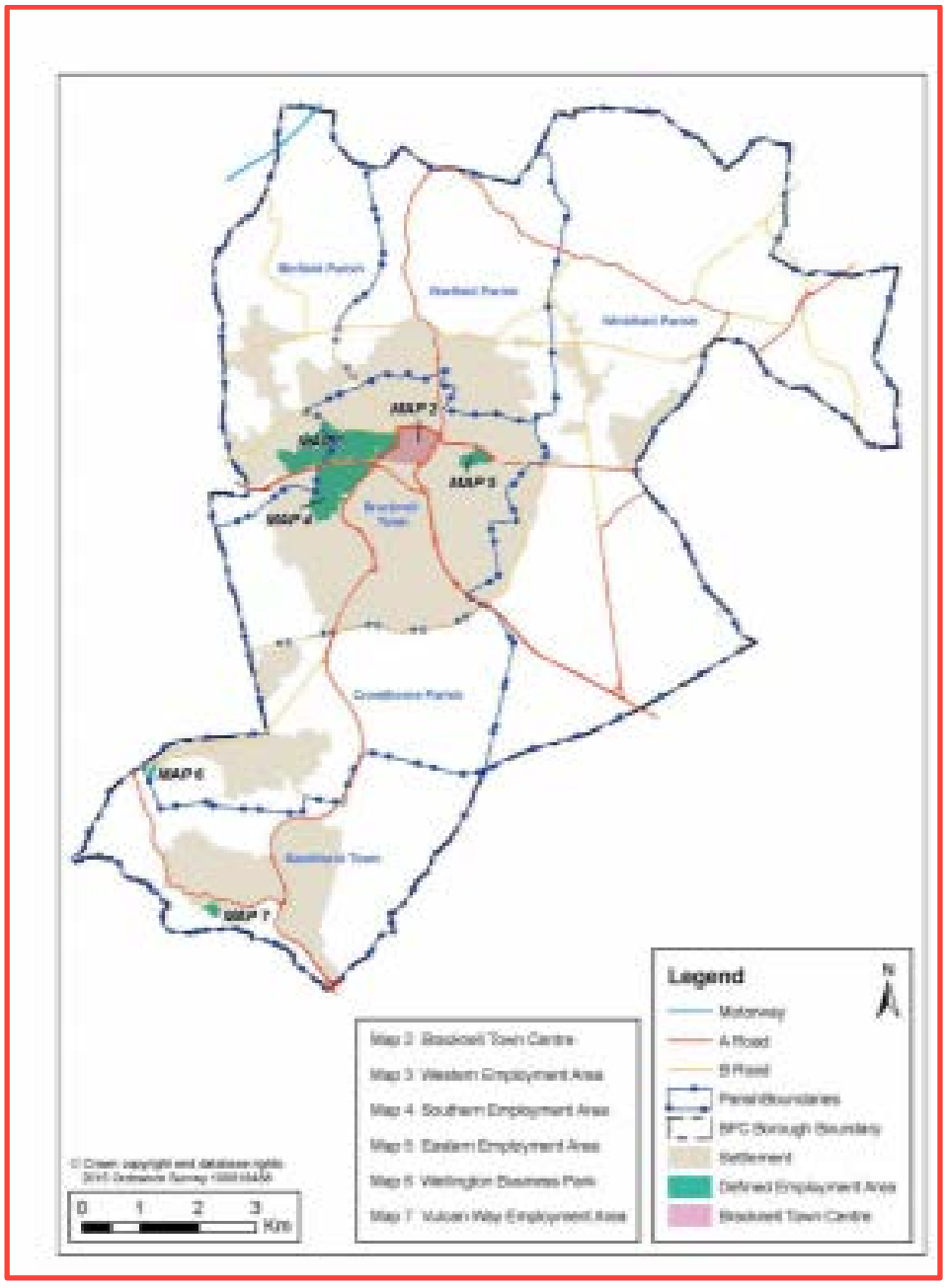


Figure 3-16: Main employment centres in Bracknell Forest Borough

3.9. IMPACT OF NOT CHANGING

3.9.1. The proposed improvements are part of a corridor-wide improvement plan over a period to deliver incremental improvement to journey times without needing heavy investment on major infrastructure projects to achieve similar or desired outcome. If the proposed improvements are not implemented, the long-term benefits to be delivered from a number of schemes would be in jeopardy as individual scheme would fail to deliver the expected contributions to the overall outcome. Therefore, the growth in traffic will further exacerbate traffic condition and resulting in a deterioration of the performance of the A322 and A329. This in turn would prompt Planning Authority to refuse permission for major developments which could have adverse impact on the local economy.

3.9.2. Modelled results show that in 2026 the operation capacity of these two junctions will exceed 85% degree of saturation in 2026 and in 2036 113.5% degree of saturation.

3.9.3. For the reasons cited above and the reality of the A322/A329 corridor improvements are fundamental to the full realisation of Regeneration of Bracknell Town Centre, the impact of these two schemes not materialising will result in more unreliable and longer journey times and adverse impact on the local economy.

3.10. INTERNAL AND EXTERNAL DRIVERS FOR CHANGE

3.10.1. Figure 3-3 shows the locations of improvements for this corridor and full benefits are to be derived once all the improvements have been implemented. These two schemes will contribute to the overall benefits of the corridor. Many sites shown on the SALP plan above could be delayed if the proposed improvements do not go ahead.

3.11. OTHER SCHEME OPTIONS CONSIDERED

3.11.1. For the A322/A329 corridor BFC had examined various schemes including major infrastructure over the years. Whist these schemes had the potential to relieve congestion and improve journey time reliability, delivery of these were reliant on substantial investment over and above what the Council could afford to invest. Some developer improvements have been received and are provided in the financial case. Also, the return was not commensurate with the investment. Hence the Council explored approaches to other practical low-cost solution. As a result, it came up with a corridor wide improvement plan over a period that will require continuous investment that the Council could raise the necessary finances for. This involves improvements at identified sites and making greater use of urban traffic control. It is this approach that the Council has adopted to deliver improvements that provide much better value for money and the Vigar Way and Sports Centre junctions improvements are part of this package. However, the following options were considered for Vigar Way.

3.12. VIGAR WAY OPTIONS APPRAISAL

3.12.1. Concept Option 1 – Signalised roundabout. The first concept option was to introduce signal control to the roundabout. This option would require very little physical alteration of the existing layout of the junction, other than to provide stop lines and traffic signal infrastructure at each junction entry point and on the internal circulation. It was decided however that due to the size of the junction along with the level of traffic expected to pass through the junction in the future, the option would not be progressed further as it would not provide sufficient capacity at the internal stop lines.

3.12.2. Concept Option 2 – Small signalised junction. The second option was to introduce a signalised junction to create control over the traffic approaching Berkshire Way. This option worked well, but the additional traffic generated by housing developments that will be built in the future indicated that a larger junction would be required.

3.12.3. Concept Option 3 – Large signalised junction – Option 3 provided a larger footprint and additional capacity to accommodate higher levels of traffic.

3.12.4. Final Concept option – Large signalised junction with segregated movements. This option allowed for the introduction of segregated turning movements on all arms to allow much more flexibility of movement around the junction resulting in increased efficiency. This option allows for the following movements;

3.12.5. The left turn from Vigar Way to run while the Peacock Lane East arm is running.

3.12.6. The straight-ahead movement from Peacock Lane East can run while the Peacock Lane West arm is running.

3.12.7. The left turn from Peacock Lane West can run while the Vigar Way arm is running.

3.13. SPORTS CENTRE OPTIONS APPRAISAL

3.13.1. Before 2012, Sports Centre Roundabout operated as a standard roundabout, suffering from significant levels of queuing and delay, particularly for vehicles approaching from the east and west on the minor arms of the junction. Over a period of years, successive phases of development have increased capacity at the junction, reducing queuing and delay in the process

- Phase 1 – Road Markings. Phase 1 of improvement was the introduction of spiral marking on the roundabout to create more defined routes around the roundabout.
- Phase 2 – Widening to the link between Sports Centre Roundabout and Opladen Way. Constructed in 2012, the widening of this link provided additional capacity for the westbound movements onto Sports Centre Roundabout.
- Phase 3 - Introduction of traffic signals. Added in 2014, traffic signals were introduced to the main A322 arms to allow traffic from Harmanswater Road to the east and South Hill Road to the west to access the roundabout more easily. This improvement led to reduced levels of queuing and delay.

- Phase 4 – Additional internal circulation. This option will provide additional internal stacking space for east/west and west/east movements whilst significantly reducing the level of blocking in the north/south and south/north directions of travel. This option will also provide additional capacity for traffic heading from the roundabout into the Crown Wood and Hanworth areas of Bracknell along Opladen Way and Harmanswater Road.

3.14. LOCAL AND SCHEME OBJECTIVES

3.14.1. BFC went through a consultation process in Autumn 2009 to develop a set of local transport objectives to steer LTP 3. The aim was to get an understanding where members of the public, businesses, organisations and council officers felt emphasis should lie when developing schemes to direct investment. Members, officers, businesses and public were consulted. As a result the following objectives in order of priority was established:

- To reduce delays associated with traffic congestion and improve reliability of journey times
- To maintain and improve, where feasible, the local transport network
- To ensure and promote accessibility by sustainable modes of transport
- To secure necessary transport infrastructure and services to support sustainable development
- To protect and enhance the quantity and quality of natural resources including water, air quality and the natural environment
- To reduce greenhouse gas emissions from transport
- To reduce casualties and improve safety on the local transport network
- To enhance the street environment

3.14.2. The objectives that are more pertinent to the proposed improvements are:

- reducing delays associated with traffic congestion and improve reliability of journey times
- maintaining and improving where feasible, the local transport network.

3.15. MEASURE OF SUCCESS

3.15.1. Preliminary assessment of the improvements indicated there is adequate benefits to be derived from the schemes and thereby contributing to the scheme objectives too. Management Case. Whilst, criteria for assessment of level of success is set out below, the key scheme benefit indicators by objective and desired outcomes are set out under the Management Case.

Table 3-1: Criteria for Assessment of Level of Success

Scheme	Assessment criteria
Vigar Way/Jennett's Park	Coordinated operation of the junction resulting in reduced delays and overall improvement to junction throughput. Reduce queues.
Sports Centre Gyratory	Reduce delays and queues on the approaches to junction. Improve circulatory flow

3.16. CONSTRAINTS

3.16.1. The main constraint associated with delivering the schemes is securing the necessary funding from LEP.

3.17. INTERDEPENDENCIES

3.17.1. The scheme is not dependent upon any specific factors for successful delivery. It is also worth noting, that the scheme is to be carried out within adopted highway and does not require planning permission. Utility diversion works estimates have been included within the costing of the schemes and taken account of in the concept design.

3.18. STAKEHOLDERS

3.18.1. Bracknell Forest Council have engaged with necessary stakeholders throughout the option development process and will continue to do so throughout the development of the scheme.

3.18.2. Under the New Roads and Streetworks Act, all service main locations have been identified and necessary diversions will be co-ordinated within the scheme. During works, effective temporary traffic management will ensure the junction/route remains operational at all times. This will include working hours restricted to outside rush hour and temporary diversion routing during resurfacing which would be carried out overnight/weekends. All those affected by the works will be consulted (e.g. neighbouring local authorities, Utilities companies Berkshire Fire and Rescue Service) and kept informed throughout, including Waitrose who have one of their main distribution depots nearby, and who use the A322/A329 to access the M3 and M4.

4

ECONOMIC CASE

4. ECONOMIC CASE

4.1. INTRODUCTION

4.1.1. The Economic case assessment is undertaken to ensure that all the options are assessed and to fulfil the treasury's requirements for appraisal and demonstrating value for money. Information is presented on the following:

- Options appraised
- Assumptions
- Sensitivity and risk profile
- Appraisal Summary Table
- Value for Money statement.

4.2. OPTIONS APPRAISED

4.2.1. Option assessment was undertaken as described in Section 3.11 In addition to the design, safety and deliverability aspects, the formation of the preferred option also took due consideration of the economic, social and environmental impact of the scheme. Overall this sought to maximise the level of ongoing benefits from the scheme, whilst minimising the capital and maintenance costs across the life-time of the scheme.

4.2.2. The schemes have been assessed using the stand-alone junction analysis tools program LINSIG Version 3 for the Vigar Way / Jennett's Park and Sports Centre junction. Base year models (2019) and forecast year models (2026 and 2036) have been produced.

4.3. ASSUMPTIONS

4.3.1. The economic assessment is undertaken to ensure that the full extent of the impact of the scheme on the public account is understood and to ensure that the scheme offers value for money. The principals for this assessment are set out in WebTAG and have been followed within this economic appraisal.

4.3.2. To enable the scheme value for money to be calculated and to inform scheme design and environmental assessment, two traffic models have been developed. Local junction models using Linsig have been utilised to evaluate the proposed engineering scheme designs in detail and ensure that they will function effectively.

4.3.3. The schemes have been assessed using the stand-alone junction analysis tools program LINSIG Version 3 for the Vigar Way/Jennett's Park and Sports Centre junction.

4.3.4. As the two proposed schemes are isolated from one another the two schemes have been assessed independently. Given the nature of the proposed improvements the traffic flows along the affected section of the A329/A322 corridor is expected to be stable whilst the traffic will experience less delays at these junctions.

4.3.5. Undertaking operational assessment of isolated junction may give rise to concern that the flows used in the assessment is likely to be underestimated because of no assignment effect has been built in to the estimation of forecast demand flows. This could have the following consequences in relation to the design of the scheme and scheme economics:

- Difficult to demonstrate that the proposed scheme is adequate to accommodate the forecast demand
- Difficult to demonstrate robustness of the scheme economics.

4.4. FORECAST YEAR GROWTH FACTORS

4.4.1. To demonstrate robustness of the assessment, forecast growth factors were developed for the Bracknell Forest area and applied to the junction demand. The alternative approach would have been to use growth factors that is more akin to the corridor that is expected to be lower than the factor for the Bracknell area. Traffic growth figures for Bracknell Cordon (See Appendix 1 Table A1) show between 2016 and 2017 there have been decreases in the AM peak flow (-2.05) and for outer Bracknell an increase of 1.5%. Figures for the PM peak show a small increase (0.1%) for the Bracknell cordon and a decrease of -1.5% for the outer cordon.

4.4.2. TEMPRO growth factors have been derived for developing forecast demand. The growth factors used in the LINSIG assessment are significantly higher than the historic trend. The following growth factors have been used to derive forecast demand:

- 2026:
  - AM peak: 8.4%
  - Inter peak: 4.0%
  - PM peak: 8.4%
- 2036:
  - AM peak: 15.4%
  - Inter peak: 20.0%
  - PM peak: 15.7%.

4.4.3. The above approach gives an assurance that by carrying out isolated junction modelling the demand flows have not been under estimated hence there is a degree of robustness in the proposed junction capacity and economic assessment. It is acknowledged that use of higher than desired growth factors can sometimes exaggerate the economics benefits if the scheme is over designed. Depending on the final outcome of the economics assessment a judgement can be made on whether or not a sensitivity analysis would be necessary. A sensitivity analysis will be undertaken if it is deemed necessary.

4.4.4. The other factor to consider is the potential re-routing of strategic traffic because of the improvements. Figures 3-5 and 3-15 depict this corridor and other corridors and key places served by these corridors. Given the scale of the improvements that have been proposed and the configuration of the corridors there is unlikely to be re-routing of strategic traffic of significant magnitude.

4.4.5. For the reasons cited above and taking a proportionality approach for scheme costing less than £2m, an appraisal based isolated junction assessment is both reasonable and justifiable.

4.5. OPERATIONAL JUNCTION MODELLING APPROACH

4.5.1. Local junction models (LinSig) have been utilised to evaluate the proposed engineering scheme designs in detail and ensure they will function effectively.

LINSIG Model Development

4.5.2. LinSig models have been developed for the two schemes. The methodology used to produce Vigar Way model and Sports Centre model was conducted in accordance with JCT standard approach with additional measures based upon JCT advice and industry standard practices. Models have been developed for the AM peak, Inter peak PM peak hour.

Vigar Way Network Development

4.5.3. The LinSig networks have been developed to represent the layout of the junctions and were built using information from drawings, Google map, knowledge of the junctions and observed survey data. Key aspects of the network development are summarised below:

- All lane lengths were measured from Google Earth
- Except for roundabout circulatory lanes, saturation flows were calculated using the RR67 algorithm within LinSig
- Saturation flows for roundabout circulatory lanes, were manually set to 1900PCU/Hr in accordance with JCT guidance for roundabout circulatory lanes
- Connectors links were added to replicate vehicle movements in accordance with existing lane markings. Cruise speeds of 35kph were assumed for all links, as no observational data was available
- Give-way coefficients and maximum flows of 0.33 and 1,000 PCUs/hr respectively, were initially used for the Vigar Way / Peacock Lane roundabout entries, in accordance with JCT recommended values. In some cases, the maximum flows were reduced in order to more accurately reflect the observed queues
- For the partially-signalled Jennets Park roundabout, the Vigar Way give way entry downstream of the signals, was given a coefficient of 1.0 and maximum flow of 1100PCUs/hr, to reflect the likely difference in driver behaviour at this entry. Advice was sought from JCT and this represents their standard approach for give-ways in such situations. The eastbound give-way entry used the same parameters as the Vigar Way / Peacock Lane roundabout entries
- Existing traffic signal parameters for the Berkshire Way westbound entry to the Jennets Park roundabout were derived from the original base model supplied to WSP. The cycle time was optimised using LinSig, to give the best PRC (practical reserve capacity) and overall delay. A cycle time of 52 seconds was used for all scenarios.

4.5.4. Figure 4-1 shows the LinSig network structure for the Vigar Way / Jennett's Park.

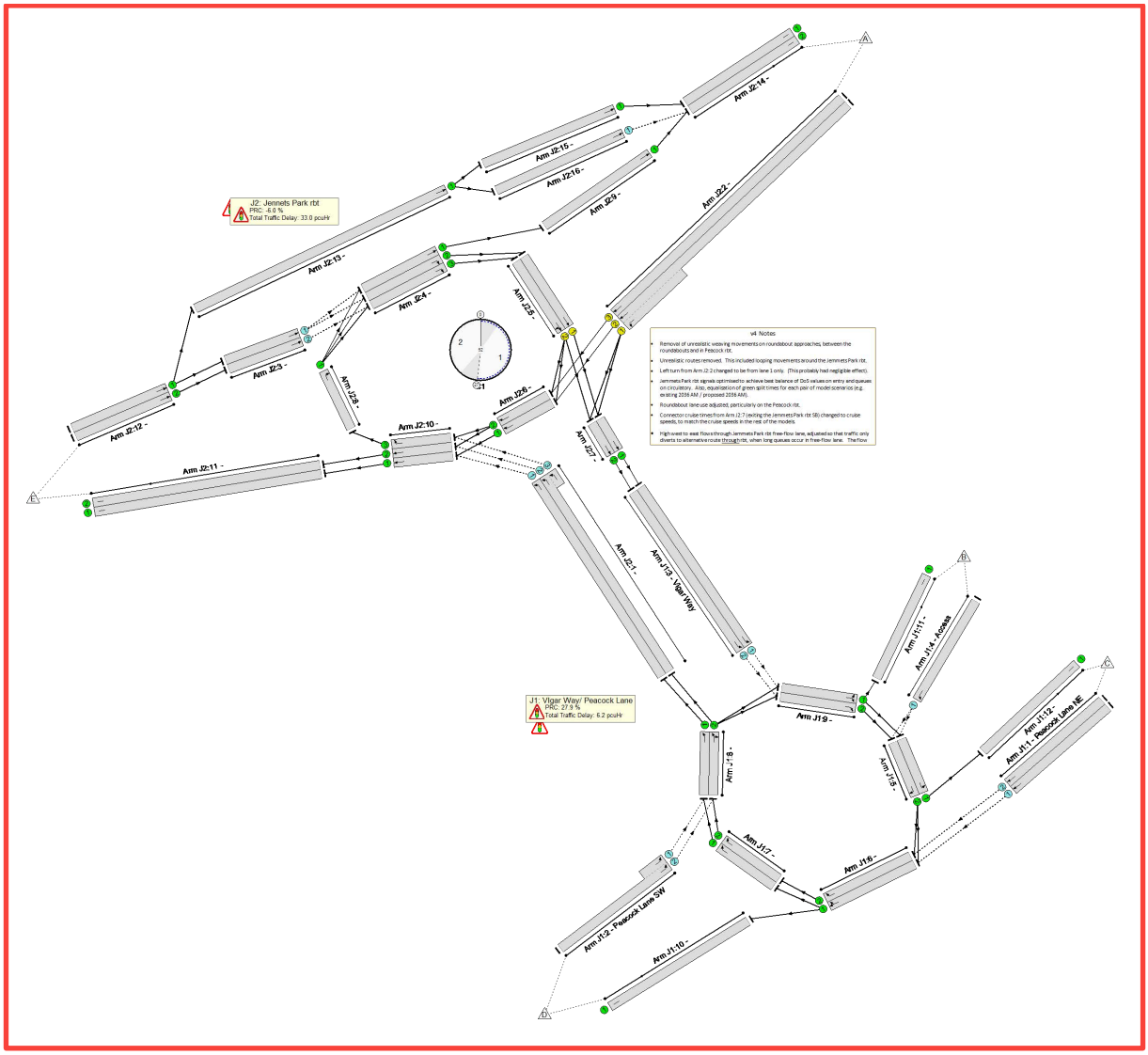


Figure 4-1: Vigar Way / Jennetts Park LINSIG Network Structure

Vigar Way Base Model Results

4.5.5. For both Vigar Way and Jennets Park roundabouts, full junction counts were available from the
14 March 2019 survey data and used in the base year model. 2019 traffic surveys did not include queue data however, queue data were available for Vigar Way roundabout from the 19 April 2018 traffic survey. It is worth noting that the surveyed flows observed in 2018 were significantly higher than the 2019 flows.

4.5.6. Models were developed for AM peak, Inter peak and PM peak hour. Full input data and model results are provided in Tables B1 to B3 in Appendix B. Summary of the LINSIG results for the Jennett's Park / Vigar Way Junction are provided in Table 4-1 to Table 4-3.

Table 4-1: 2019 Base Year Model Network Summary Results (Vigar Way / Jennett's Park)

	Actual Flow (PCU)	Demand Flow (PCU)	Degree of Saturation	Total Delay (pchHr)
AM Peak	5,900	5,900	95.4	39.2
Inter Peak	4,109	4,109	72.1	15.4
PM Peak	6,166	6,166	98.7	66.9

Table 4-2: 2019 Base Year Model Network Summary Results (Vigar Way)

	Degree of Saturation	Total Delay (pchHr)	Max Queue (pcu)for this Junction
AM Peak	70.4	6.2	7.4 (Vigar Way SB)
Inter Peak	40.6	2.0	3.8 (Vigar Way)
PM Peak	98.4	21.0	20.3 (Vigar Way SB)

Table 4-3: 2019 Base Year Model Network Summary Results (Jennett's Park)

	Degree of Saturation	Total Delay (pchHr)	Max Queue (pcu)for this Junction
AM Peak	95.4	33.0	15.1 (Vigar Way NB)
Inter Peak	72.1	13.3	8 (A329 WB)
PM Peak	98.7	45.9	25.3 (A329 WB)

4.5.7. The observed and modelled queue comparison is provided in Table 4-1 to Table 4-5.

Table 4-4: 2019 AM peak Vigar Way (Modelled Versus Observed Queues)

	AM Peak	
	Observed av.Queue (veh) Ln1/Ln2	Modelled queue (pcu) Ln1/Ln2
Vigar Way SB	5.2/5.7	4.9/7.4
Peacock Lane WB	5.0/3.0	0.5/0.5
Peacock Lane EB	3.0/16.0	-/0.4

Table 4-5: 2019 PM peak Vigar Way (Modelled Versus Observed Queues)

	PM Peak	
	Observed av.Queue (veh) Ln1/Ln2	Modelled queue (pcu) Ln1/Ln2
Vigar Way SB	14/9	10.7/20.3
Peacock Lane WB	8/7	0.4/0.4
Peacock Lane EB	2/4	-/0.3

4.5.8. The above tables show that there are differences between the modelled and observed queues for some arms. Two factors that could explain the reason for difference are:

- Demand data is based on 2019 survey data
- Queue data is based on 2018 survey data

4.5.9. It must be noted that the observed queue is in vehicles whereas the modelled queue is in pcu however, this would not account for all the differences.

4.5.10. A comparison of 2018 and 2019 full junction count data shows that the 2018 observed data is significantly higher for some arms of the junction than the 2019. A summary of the comparison is provided in Table 4-6.

Table 4-6: Traffic Flow Comparison (2018 and 2019)

	2018 AM (veh)	2019 AM (veh)	Difference between 2018 and 2019
Peacock Lane WB	1,061	821	240
Peacock Lane EB	1,071	705	366
Vigar Way SB	857	794	63
	2018 PM (veh)	2019 PM (veh)	
Peacock Lane WB	958	681	277
Peacock Lane EB	677	583	94
Vigar Way SB	1,374	1,191	183

4.5.11. The above results show that all entry arms have higher flows in 2018 compared to 2019. This could be the main reason why the model which is based on 2019 observed demand data is finding difficult to re-produce observed queue data that were collected in 2018.

Vigar Way – Development of Proposed Model V4

4.5.12. The base model was used as the starting point for construction of the proposed model. The existing Vigar Way / Peacock Lane roundabout was replaced with the proposed signalised junction, based upon the supplied CAD drawing. The Jennets Park Roundabout model remains as per the existing arrangement with all parameters fixed at this point.

4.5.13. For the Proposed signalisation of the Vigar Way Peacocks Lane junction, the LinSig model layout was based upon the CAD design provided. Lane geometries including lane lengths and turning radii were measured from the CAD drawing.

4.5.14. Each turning movement on the junction entries is separately signalled, to maximise the opportunity for combining compatible movements.

4.5.15. The Stage sequence is illustrated in Figure 4-2. Phases A and B control the Peacock Lane westbound approach.

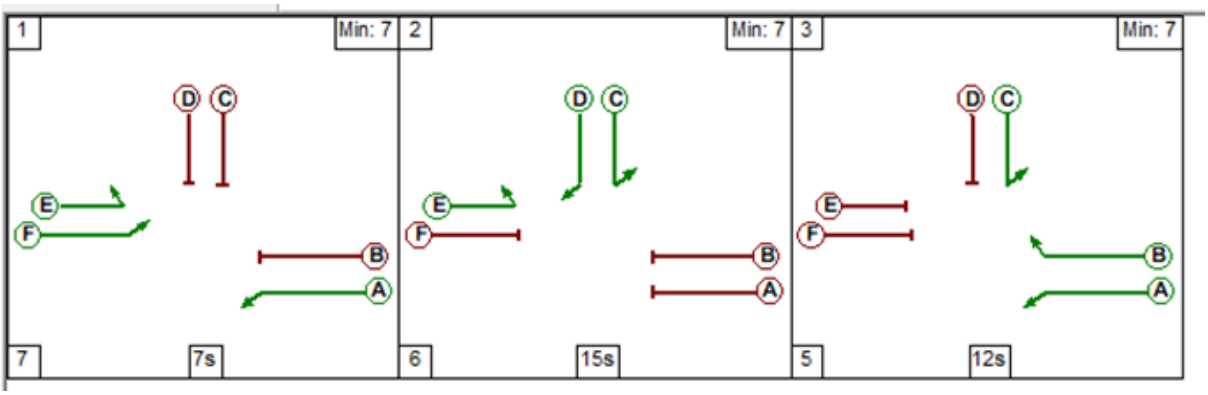


Figure 4-2: Stage Sequence - Vigar Way

4.5.16. The access arrangements for the development were also amended in the proposed model. The entrance to the development for vehicles coming from the Jennets Park roundabout, will be via a slip road from Vigar Way southbound, whilst from Peacock Lane (west), traffic will go straight ahead into Peacock Lane (east) and turn left at the next roundabout. It was assumed that Traffic leaving the development site bound for Peacock Lane (west) or the A329, will enter the modelled network from Peacock Lane (east). Exiting traffic to Peacock Lane eastbound, will not enter the modelled network.

4.5.17. Traffic flow sets were derived from 2019 observed traffic flows, with the addition of the forecast development flows for each peak perioded. At the time of the survey, the development was partially completed, and so zero development flows were assumed for year 2019.

Vigar Way Forecast - Do Minimum Model Results

4.5.18. The forecast year (2026 and 2036) Do Minimum model results are provided in Table 4-7..

Table 4-7: Forecast year – Do Minimum Results

	2026			2036		
	Vigar Way and Jennett's Park Network					
	AM	IP	PM	AM	IP	PM
Deg.Sat	109.1%	80.1%	111.5%	124.9%	87.6%	136.1%
Total delay (pcuHr)	78.3	19.5	187.1	158.8	24.9	426.8
	Vigar Way Junction					
Deg.Sat	79.9%	45.9%	110.0%	87.7%	51.0%	119.2%
Total delay (pcuHr)	8.7	2.5	64.6	11.8	2.9	114.1
	Jennett's Park					
Deg.Sat	109.1%	80.1%	111.5%	124.9%	87.6%	136.1%
Total delay(pcuHr)	69.5	17.0	122.5	147.0	21.9	312.7

Vigar Way Do Something Model Results

4.5.19. The existing Vigar Way roundabout is proposed to be replaced with a signalised junction. The forecast year (2026 and 2036) Do Something model results are provided in Table 4-8.

Table 4-8: Forecast year – Do Something Results

	2026			2036		
	Vigar Way and Jennett's Park Network					
	AM	IP	PM	AM	IP	PM
Deg.Sat	113.2%	80.1%	111.5%	129.7%	87.6%	136.1%
Total delay (pcuHr)	91.8	21.3	139.1	162.3	27.0	333.9
	Vigar Way Junction					
Deg.Sat	79.4%	49.7%	90.1%	84.1%	51.4%	95.3%
Total delay (pcuHr)	13.0	4.7	15.8	16.7	5.3	21.9
	Jennett's Park					
Deg.Sat	113.2%	80.1	111.5%	129.7%	87.6%	136.1%
Total delay(pcuHr)	78.9	16.6	123.4	145.6	21.6	312.0

4.5.20. The network performance results show that there is an improvement to the operation of the Vigar Way junction by signalising it and there is an overall network benefit, mainly in the PM Peak.

4.5.21. For Jennett's Park there is a slight reduction in delays on the westbound arm (less than 2 secs) in the PM. But in reality, the main benefits to Jennett's Park will be due to the reduction in queue on the exit arm of the Vigar Way. In the Do Minimum in 2036, the PM model shows 62/98 PCUs in lane 1 and 2. In the Do Something, 1/0. It is also worth recognising that by improving Vigar Way, southbound traffic on Jennett's Park would exit the junction smoothly and the traffic wanting to join the A329 will also reach the junction quicker than before.

4.5.22. It is worth noting that the Jennett's Park junction results indicate that some improvements will be needed for this junction. Hence signalising the northbound arm of Vigar Way with the Jennett's Park roundabout should be explored.

Conclusion

4.5.23. The base model shows there is less queue on the westbound arm of the Peacock Lane (0.4/0.4) than the 2018 observed queue (8/7). Although model (that uses 2019 data) does not show the same number of vehicles queuing in terms of magnitude the model reflects the queue data observed in 2018. For example; in 2018, demand flows is 958 vehicles and in 2019, 681vehicles using Peacock Lane (WB). The base model does reflect the delays and queues associated with observed demand characteristics at this junction and it is considered a suitable tool for testing the proposed improvements.

4.5.24. Furthermore, the base model and the forecast models of the existing roundabout (do minimum) show the roundabout is oversaturated on the Vigar Way southbound arm in the PM peak. This is due to significantly higher traffic on the arm in the PM peak (1453 PCUs) versus 936 PCUs in the AM peak.

4.5.25. The signals (do something) can increase capacity and allow the arm and the overall junction to operate within capacity. This will be reflected in the economic assessment whereby there is substantial savings to be derived in the PM peak.

4.5.26. The western arm of the Jennett's Park will have a slight reduction in delays (less than 2secs) and corresponding queue because of the scheme. But the major benefits to Jennet's Park come from the reduction in queue on the exit arm of Jennett's Park.

4.6. SPORTS CENTRE GYRATORY NETWORK DEVELOPMENT

4.6.1. The Sports Centre junction is currently a signalised gyratory the proposed improvements consists additional capacity to the circulatory capacity in both directions. The LinSig networks have been developed to represent the layout of the junctions and were built using information from drawings, Google map, knowledge of the junctions and observed survey data. The methodology used to produce this junction was conducted in accordance with JCT standard approach.

4.6.2. Key aspects of the network development are summarised below:

- The saturation flows on the signal-controlled lanes was set to 1900pcu/hr as per the latest JCT signal controlled guidance.
- Flare length is based on 1pcu / 6-8m which represents the on-site dimension.
- Give-way Coefficients are set to 0.35
- Saturation flows at Give Way were set 10 1900 puc/hr
- Lane width reflects existing width
- Connector links have been coded to replicate vehicle movements in accordance with existing lane markings.
- All the link connectors have been coded using standard cruise speed of 35km/h.
- All the link connectors coding has been based on standard Platoon Dispersion coefficient of 35
- Assignment is set to Customised Delay Based Assignment with High thoroughness and normal behaviour.
- Existing traffic signal parameters were derived from the original base model supplied to WSP. The cycle time was optimised using LinSig, to give the best PRC (practical reserve capacity) and overall delay. A cycle time of 90 seconds was used for all scenarios.

4.6.3. This is an existing signalised junction and it tends to get over-saturated in both the AM peak hour and the PM peak hour but more in the AM peak hour. The base model reflects accurately the junction configuration on the ground and operational parameters and has been developed using industry standard. The base is quite s robust and suitable for testing interventions.

4.6.4. The Sports Centre Junction network structure is shown in Figure 4-3

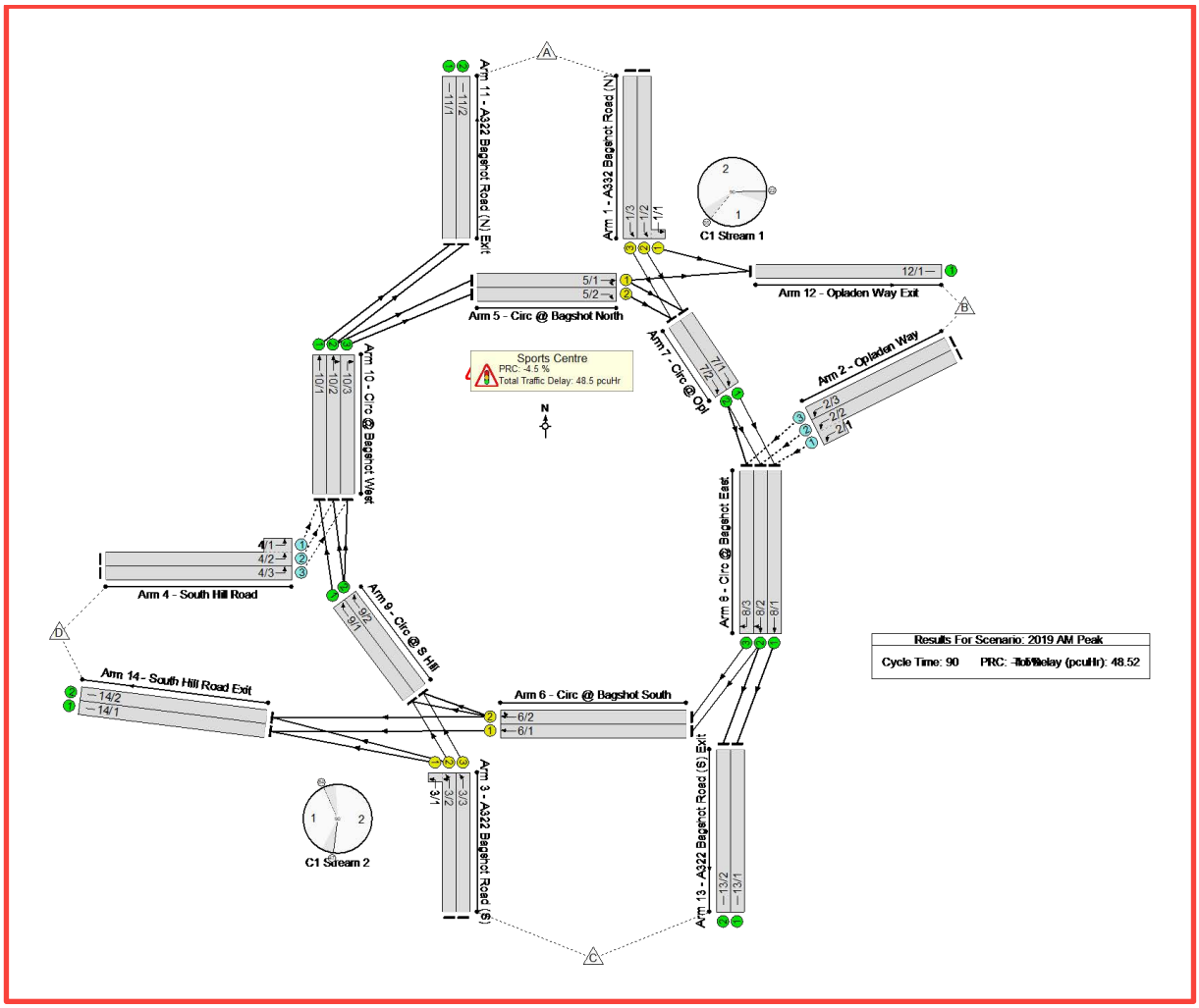


Figure 4-3: Sports Centre Junction Network Structure

Sports Centre Base Model Results

4.6.5. For this junction 2019 observed traffic flows full junction counts were available and used to develop the base year model.

4.6.6. Models were developed for the AM peak, Inter peak and PM peak hour. Full input data and model results are provided in Tables C1 to C3 in Appendix C. A summary of the results are provided in Table 4-9..

Table 4-9: 2019 Base Model Network Summary Results – Sports Centre

	Actual Flow (PCU)	Demand Flow (PCU)	Degree of Saturation	Total Delay (pchHr)	Mean Max Queue (pcu)
AM Peak	4,682	4,682	94.1%	48.5	27.3 (A322 Bagshot Rd NB entry arm)
Inter Peak	3,788	3,788	59.9%	19.0	10.8 (A322 Bagshot Rd SB entry arm)
PM Peak	4,921	4,921	86.7%	44.4	21.4 (A322 Bagshot Rd NB entry arm)

Sports Centre Forecast Do Minimum Model Results

4.6.7. The forecast year (2026 and 2036) Do Minimum model results are provided in Table 4-10.

Table 4-10: Forecast Do Minimum Results (2026 and 2036)

	2026			2036		
	Sports Centre Roundabout					
	AM	IP	PM	AM	IP	PM
Deg.Sat	106.2%	65.7%	99.7%	113.5%	70.4%	107.0%
Total delay (pcuHr)	135	22.7	81.8	235.5	27.6	163.4

4.6.8. The Do Something model includes additional circulatory lanes in the northbound and southbound directions. LinSig 2026 and 2036 model results are provided in Table 4-11.

Table 4-11: Forecast Do Something Results (2026 and 2036)

	2026			2036		
	Sports Centre Roundabout					
	AM	IP	PM	AM	IP	PM
Deg.Sat	106.1%	62.1	96.9	112.9%	67.6%	106.1%
Total delay (pcuHr)	134.6	23.1	72.8	233.4	26.1	155.3

4.6.9. The network performance results show that there is an improvement to the operation of the Sports Centre junction with addition circulatory lanes in the north and southbound directions. Given the scale of the proposed intervention, the overall operational benefits are likely to small and the model reflects that.

4.7. CONCLUSION

4.7.1. The base model reflects the layout of the junction as is on the ground and the operational parameters and has been constructed to JCT recommended approach. The existing junction becomes over saturated in the AM peak and PM peak and the model reproduces that. It is a reliable model for testing the proposed intervention. Given the proposed improvement is to increase circulatory capacity by adding a lane, the overall operational benefits are likely to be small and the model reflects that.

4.8. TRANSPORT BENEFITS

4.8.1. The operational performance of the Vigar Way /Jennett's Park and Sports Centre junctions with and without the proposed improvements have been assessed using LinSig Version 3. A bespoke spreadsheet has been developed to monetise the change in delay due to proposed improvements.

4.9. ECONOMICS MODEL PARAMETERS

4.9.1. For the economic assessment, LinSig output change in Total Delay pcuHr has been used. The expected opening year of the scheme is 2021.

4.9.2. Planned opening year of the scheme is 2022. Do Minimum and Do Something models have been developed for two forecast years (2026 and 2036) with the 2036 forecast year being roughly 15 years after scheme opening year. In relation to the scheme opening year the first modelled year 2026 which is roughly 5 years after the opening year. The economic assessment has been carried out assuming the opening year is 2026. The appraisal period 60 years is from 2022 to 2081. Economic assessment does not include benefits/disbenefits between 2022 and 2025 and the final year of the appraisal is 2081, has not been extend to 2085.

4.9.3. Peak hour models for the AM peak, inter peak and PM peaks have been developed. The modelled period benefits were calculated initially for the opening year by applying annualisation factors based on:

- 253 normal working days
- AM peak: 0700-10:00
- Inter peak: 10:00-16:00
- PM peak: 16:00-19:00.

4.9.4. Peak hour to peak period factor is provided below. For Vigar Way and Jennet Park, combined peak hour period count data have been used.

4.9.5. Vigar Way Jennett's Park Peak period and Peak Hour flows:

- AM peak period = 41,848 vehs
- AM Peak hour = 15, 450 vehs
- Factor = 2.71

- PM Peak period = 44,840 vehs
- PM Peak hour = 16,106 vehs
- Factor =2.78.

4.9.6. Sports Centre peak period and peak hour flows

- AM peak period: 24,342 vehicles
- AM Peak hour: 8,970 vehicles
- Factor: 2.71

- PM peak period: 27,772 vehicles
- Peak hour: 9,520 vehicles
- Factor: 2.92 (economic analysis assumes a factor of 3).

4.9.7. Based on observed data, annualisation factor for each time period has been derived to convert peak hour flows into annual flows representing these time periods. Annualisation factors are shown in Table 4-12.

Table 4-12: Annualisation Factors

Time Period	Annualisation Factor	
	Jennett's Park and Vigar Way	Sports Centre
07:00-10:00	685	687
10:00-16:00	1518	1518
16:00-19:00	704	759

4.9.8. The percentage split of vehicle classes is based on 2019 observed data and are shown in Table 4-13.

Table 4-13: Percentage Split of Vehicles Classes

% Split	AM Peak	PM Peak	Inter Peak
Car	89%	88%	79%
LGV	8%	9%	14%
HGV	3%	2%	8%

4.9.9. The Value of Time (VoT) in £/hr in 2010 market prices were taken from May 2019 TAG Databook and shown in Table 4-14.

Table 4-14: Value of Time (2010 Market Prices)

	AM Peak: £hr	Inter Peak: £/hr	PM Peak: £/hr
Average Car	11.33	10.88	10.67
Average LGV	13.93	13.93	13.93
OGV1	14.35	14.35	14.35
OGV2	14.35	14.35	14.35
Bus	83.18	88.73	75.46

4.9.10. A 60-year appraisal period has been used for this assessment.

ECONOMIC ASSESSMENT

4.9.11. A LinSig model incorporating both the A329 Jennett's Park Roundabout and Vigar Way roundabout was developed. In the Do Minimum model Vigar Way was modelled as roundabout and in the Do Something it is modelled as a signalised junction. Total delay PCU hour (pcuHr) was obtained from LinSig model outputs for the Do Minimum scenario and Do Something Scenario for 2026 and 2036. Change in total delay between Do Something and Do Minimum were monetised using TAG Databook values described above.

4.9.12. The Do Something model analysis with Vigar Way junction signalised shows that in the AM and Inter peak there is more delay than in the Do Minimum. However, in the PM peak, a reduction in delay is achieved. Both the increase in delay in the AM peak and Inter peak and the reduction in delay in the PM peak have been used in the economic assessment.

4.9.13. The change in delay was converted to monetised values using TAG Databook values. The output for the opening year, in this case 2026 and the 15 year after opening year (2036) benefits are provided in Table 4-15 to Table 4-17. The values are in 2010 Market prices.

Table 4-15: Vigar Way 2026 and 2036 - Assessment Year Benefits In 2010 Market Prices

Assessment Year	AM Peak	Inter Peak	PM Peak
2026	-£108,000	-£31,000	£380,000
2036	-£28,000	-£36,000	£736,000

Table 4-16: Sports Centre 2026 and 2036 - Assessment Year Benefits in 2010 Market Prices

Assessment Year	AM Peak	Inter Peak	PM Peak
2026	£3,000	-£8,000	£76,000
2036	£17,000	£26000	£69,000

4.9.14. To derive Present Value of Benefits (PVB) for the 60 year appraisal period, the 2026 opening year benefits were assumed to be constant up to 2036. The 2036-year benefits were assumed to be constant up to 2081. To calculate PVB for the 60-year appraisal period the monetised benefits were discounted to 2010. In line with Green Book Guidance, 3.5% for the first 30 years and further 3.0 for the next 30 years have been used. The resulting PVB for the appraisal period is given in Table 4-17.

Table 4-17: Present Value of Benefits - Vigar Way and Sports Centre

	Monetised Benefits of Both Schemes	
	Opening year PVB £'000	Appraisal Period PVB £m
Vigar Way Benefits	139	7.8
Sports Centre benefits	41	1.5
Total		9.3

4.9.15. Table 4-18 to Table 4-19 shows the makeup of the scheme costs for the economic assessment. The tables show cost components for economic assessment and includes 20% optimism bias (OB). Similar information is provided in the Financial Case, but without the OB.

Sensitivity analysis

4.9.16. For Vigar Way, benefits mainly come from the PM peak, and it tends to have a higher annualisation factor (because of the peak hour to peak period factor) than the AM peak which produces dis benefits. Does this mean that the dis benefits have been under estimated whilst the benefits have been over estimated? To address this a sensitivity analysis has been carried out using the standard annualization factor 759 (253 days x 3 hours for each period) has been for both peaks. The resulting PVB is £8.5m, which is £0.7m higher using differential annualization factor for AM and PM peak.

Table 4-18: Vigar Way – Scheme Cost Components

Scheme Cost Element	Cost (£) Q3 2019 Prices
Site Clearance	£8,160
Enabling works	£10,200
Construction	£481,603
Signals, signs and road markings	£160,660
Drainage	£10,157
Traffic management	£200,000
Risks and contingencies	£169,285
Staff cost	£183,918
Preliminaries	£159,928
Inflation	£26,123
Stats	£113,488
Optimism bias	£282,006
Total	£1,805,528

Table 4-19: Sports Centre- Scheme Cost Components

Scheme Cost Element	Cost (£) Q3 2019 Prices
Site Clearance	£2,400
Enabling works	£34,204
Construction	£162,665
Signals, signs and road markings	£18,495
Drainage	£2,822
Traffic management	£30,000
Risks and contingencies	£53,626
Staff cost	£53,773
Preliminaries	£46,759
Inflation	£7,518
Stats	£105,396
Optimism Bias	£82,452
Total	£600,110

4.9.17. The above scheme costs have been converted to Present Value of Costs (PVC) to be compatible with the Present Value of Benefits (PVB). Conversion of scheme cost in Q3 2019 prices to PVC 2010 is set out in the Table 4-20 to Table 4-21.

Table 4-20: Vigar Way- Conversion of 2019 Scheme Costs to PVC 2010 Prices

Vigar Way				
	Q3 2019 price			
Year of spending	Construction	Land	Prep &Supervision	Total
2020/2021	£1,621,611	£0	£183,918	£1,805,528
	2010 Price			
2010 prices	£1,388,826	£0	£157,516	£1,546,342
	Market Price			
Market prices	£1,652,703	£0	£187,444	£1,840,146
	PVC 2010 discounted			
PVC 2010 discounted	£1,212,639	£0	£137,533	£1,350,172

Table 4-21: Sports Centre- Conversion of 2019 Scheme Costs to PVC 2010 Prices

Sports Centre				
	Q3 2019 prices			
Year of spending	Construction	Land	Prep &Supervision	Total
2020/2021	£546,338	£0	£53,773	£600,111
	2010 Price			
	£467,910	£0	£46,054	£513,964
	Market Price			
	£556,813	£0	£54,804	£611,617
	PVC Discounted			
	£408,551	£0	£40,212	£448,763

4.9.18. Table 4-22 shows the combined costs for the two schemes.

Table 4-22: Combined Cost of Both Schemes – PVC 2010

	Vigar Way	Sports Centre	Total
PVC 2010	£1350,172	£448,763	£1,798,935

4.9.19. Benefit to cost ratio for the funding bid is set out in Table 4-23

Table 4-23: Benefit to Cost Ratio for Combined Scheme

	£(m)
Present Value of Benefits (PVB)	£9.32
Present Value of Costs (PVC)	£1.80
Net Present Value (NPV)	£7.52
Benefit to Cost Ratio (BCR)	5.18

4.10. SENSITIVITY AND RISK PROFILE

4.10.1. Budget available to BFC for these two schemes and the capital costs of the scheme excluding OB above are reported in the Financial Case.

4.10.2. The cost estimate was recently reviewed by BFC in 2019 and is considered by BFC to be up-to-date, robust and complete (including utilities costs).

4.10.3. The scheme cost was provided to WSP by Bracknell Forest Council (BFC). The base cost estimate for the two schemes **is £2,041,180** which is in Quarter 3 2019 prices and includes:

- Vigar Way/A329 Jennett's Park: £1,523,522
- A322 Sports Centre gyratory: £517,658.

4.10.4. An allowance for inflation has been applied to the costs to adjust the costs from 2019 prices to 2020/21 prices as:

- Vigar Way: £26,123
- A322 Sports Centre gyratory: £7,518.

4.10.5. An allowance has been included to cover contingencies and risk within the project delivery as:

- Vigar Way: £169,285
- A322 Sports Centre gyratory: £53,773.

4.10.6. Future maintenance works associated with the scheme will be added to the maintenance inventory and funded from BFC's maintenance budgets.

4.10.7. As part of the funding package set out in the Financial Case, BFC will be funding £440,000 through developer contribution and Council Capital Programme.

4.11. APPRAISAL SUMMARY TABLE

4.11.1. Appraisal Summary Table (AST) is provided in Appendix D

4.12. VALUE FOR MONEY STATEMENT

4.12.1. Value for money is summarised in Table 4-24.

Table 4-24: Value for Money Statement

	Assessment	Detail
Initial BCR	5.56	Calculated using bespoke spreadsheet methodology
Qualitative assessment	Slightly beneficial	
Optimism Bias	Scheme cost includes 20% optimism bias	
Value for Money	Very High	BCR is in the Very High category which is supported by the qualitative assessment

4.12.2. The two schemes would yield a Benefit to Cost Ratio (BCR) of 5.18 which represents a Very High value for money category.

5

FINANCIAL CASE

5. FINANCIAL CASE

5.1. INTRODUCTION

5.1.1. Economic viability and value for money for the schemes are set out in the Economic Case section of this report. This section, Financial case focusses on the affordability of the proposal and its funding arrangements. It presents the financial profile of the scheme and the impact of the proposed deal on the Department's budgets and accounts.

5.1.2. The financial case for the Vigar Way and Sports Centre junctions as part of A322/A395 Corridor Improvements is based on significant scheme development and the identification and costing of the preferred option.

5.1.3. The financial case follows a defined structure as specified by government. Following this structure ensures all the necessary information is provided and enables efficient assessment of the proposal. Information is presented on the following:

- Costs
- Budgets / Funding Cover
- Accounting implications.

5.2. COSTS

5.2.1. The scheme cost was provided to WSP by Bracknell Forest Council (BFC). The costs are based on the concept designs and are then calculated using BFC Term Contractor agreed schedule of rates. The base cost estimate for the two schemes is **£2,041,180** which is in Quarter 3 2019 prices and includes:

- Vigar Way: £1,523,522
- A322 Sports Centre gyratory: £517,658.

5.2.2. Table 5-1 and Table 5-2 show the cost breakdown for Vigar Way and Sports Centre Gyratory.

Table 5-1: Vigar Way – Scheme Cost Breakdown

Scheme Cost element	Cost (£) Q3 2019 prices
Site Clearance	£8,160
Enabling works	£10,200
Construction	£481,603
Signals, signs and road markings	£160,660
Drainage	£10,157
Traffic management	£200,000
Risks and contingencies	£169,285
Staff cost	£183,918
Preliminaries	£159,928
Inflation	£26,123
Stats	£113,488
Total	**£1,523,522**

Table 5-2: Sports Centre – Scheme Cost Breakdown

Scheme Cost element	Cost (£) Q3 2019 prices
Site Clearance	£2,400
Enabling works	£34,204
Construction	£162,665
Signals, signs and road markings	£18,495
Drainage	£2,822
Traffic management	£30,000
Risks and contingencies	£53,626
Staff cost	£53,773
Preliminaries	£46,759
Inflation	£7,518
Stats	£105,396
Total (rounded)	**£517,658**

5.3. INFLATION

5.3.1. An allowance for inflation has been applied to the costs to adjust the costs from 2019 prices to 2020/21 prices. 3 Percent inflation has been applied to construction related costs

- Vigar Way: £26,123
- A322 Sports Centre gyratory: £7,518.

5.4. CONTINGENCIES AND RISK

5.4.1. An allowance has been included to cover contingencies and risk within the project delivery as:

- Vigar Way: £169,285
- A322 Sports Centre gyratory: £157,418.

5.5. OPTIMISM BIAS

5.5.1. Optimism bias refers to the tendency for scheme promoters to be overly optimistic about scheme costs. DfT, WebTAG Unit A1.2 sets out the recommended contingency which should be added to the scheme costs. However, in line with HM Treasury guidance document "Early financial cost estimates of infrastructure programmes and projects and the treatment of uncertainty and risk- March 2015" optimism bias should not be included in project funding. The risk-adjusted scheme cost estimate is therefore considered robust for the Financial Case, but optimism bias has been included in the economic appraisal.

5.6. FINAL SCHEME COSTS

5.6.1. Table 5-3 indicates the costs associated with the proposed scheme including inflation and contingency and risk allowance.

Table 5-3: Summary of Final Scheme Costs (2019 Q3)

Cost element	Vigar Way	A322 Sports Centre Gyratory
Estimated scheme cost	£1,328,114	£352,957
Inflation adjustment to 2020/2021	£26,123	£7,215
Contingency & Risk	£169,285	£157,418
Total	**£1,523,522**	**£517,589**

5.7. BUDGET AND FUNDING SOURCES

5.7.1. The proposed improvements at Vigar Way / Jennett's and Sports Centre gyratory are part of the A322 / A329 corridor-wide improvements. The total cost of the two schemes is £2.04m with £1.6m funded through the TVBLEP Growth Deal and the balance £0.44m is funded from the Council's Capital Programme.

5.7.2. The funding sources and spend profile is shown in Table 5-4. There will be contribution from developers. The £2.04m excludes an allowance for optimism bias. In the economic appraisal, optimism bias has been factored into the scheme cost.

Table 5-4: Funding Sources and Spend Profile

Source of funding	2019/2020	2020/2021	Total
Amount from TVBLEP	-	£1.6m	£1.6m
Council Capital Programme	-	£0.22	£0.22
Other sources- S106 contribution	-	£0.22	£0.22
Total scheme cost	**-**	**-**	**£2.04m**

5.8. WHOLE LIFE COSTS

5.8.1. Future maintenance works associated with the scheme will be added to the maintenance inventory and funded from BFC's maintenance budgets. The junctions are being replaced with alternative schemes of a similar footprint, the highways assets of which will fall within our existing BFC maintenance budget. It is anticipated that the provision of new or upgraded assets (such as drainage system and pavement/footways) not likely to affect BFC's maintenance liabilities and any change will be marginal.

6

COMMERCIAL CASE

6. COMMERCIAL CASE

6.1. INTRODUCTION

6.1.1. This section sets out the Commercial Case and demonstrates that BFC has a well-structured process for achieving a viable procurement for these two schemes. To enable successful procurement the following elements are in place:

- Procurement strategy
- Payment and charging mechanisms
- Risk allocation and transfer
- Contract length
- Human resource issues
- Contract management

6.2. PROCUREMENT STRATEGY

6.2.1. Due to the projects being small in scale with a limited scope of works, there is no complexity in terms of construction tasks, site access etc. Third party land is not required for the scheme and some of the construction work for both schemes can be undertaken off-line, simplifying any traffic management issues.

6.2.2. Routes to procurement have been clarified and simplified with the use of the Council's Highway Term Contractor as the principal contractor for the overall construction project. Through the use of "Target Costing", any cost overruns or cost savings will be shared between the contractor and the Council with no financial risk to the LTB. This approach involves joint working with the contractor at the design and programming stages to minimise the costs and to share the risks. The risks are manged through joint working with the contractor at the design and programming stages and continuous monitoring of costs and progress to minimise costs overrun.

6.2.3. Delivery through BFC's existing highways term contract would not strictly be a procurement process as it is an existing contract. The contract is based on an agreed schedule that is utilised to determine a bill of quantities for any specific works. This provides BFC certainty on the magnitude of costs for delivering work. Given the relatively standard nature of the scheme, in highway design terms, this approach is considered to be an appropriate approach.

6.3. PAYMENT AND CHARGING MECHANISMS

6.3.1. Bracknell Forest Council will submit an annual invoice for each financial year together with a certificate of work completed. Slough Borough Council (acting as accountable body for the BLTB) will satisfy itself of the correctness of the certificate before paying the invoice.

6.3.2. Should the scheme experience any minor delays to its programme (no more than 10 weeks), Bracknell Forest Council will report these delays and the reasons for them, and the proposed remedial action to the next available meeting of the BLTB.

6.3.3. In the event that the scheme experiences major delays to its programme (11 weeks or longer) Bracknell Forest Council will be required to seek permission from BLTB to reschedule any payments that are due, or that may be delayed in falling due because of the delay to the programme.

6.3.4. Should it become apparent to Bracknell Forest Council that it will not be possible to deliver the scheme at all, written notice shall be given to Slough Borough Council (acting as accountable body for the BLTB). No further monies will be paid to Bracknell Forest Council after this point. In addition, consideration will be given to recovering any monies paid to Bracknell Forest Council in respect of this scheme.

6.3.5. If the overall scheme achieves savings against budget, these savings will be shared by the BLTB and the other funders noted above in proportion to the amounts committed to the original budget. Slough Borough Council (acting as accountable body for the BLTB) reserves the right to claw back any such savings amounts, and any repayments due as a consequence of scheme failure.

6.4. RISK ALLOCATION AND TRANSFER

6.4.1. Overall, the risks associated with delivering the project are considered to be straightforward and amenable to well-understood management practices.

6.4.2. The scheme is also to be carried out within adopted highway and therefore does not require planning permission.

6.5. CONTRACT LENGTH

6.5.1. The two schemes will be delivered through existing term services contractor, RIS. Under the terms of the contract, RIS will provide services to BFC until 2025. The expected duration for constructing both schemes is around 12 months starting Autumn 2020 and completion by Autumn 2021.

6.6. HUMAN RESOURCE ISSUES

6.6.1. There are no HR issues associated with the contracting for this scheme.

6.7. CONTRACT MANAGEMENT

6.7.1. During construction, the site will be managed by an experienced resident engineer. The resident engineer will be responsible for the day to day management of the contract. Site engineers, clerks of works and quantity surveyors will also assist the resident engineer.

6.7.2. Regular progress meetings will be held to monitor progress on site. The project manager will also attend these site meetings and if need be, will provide technical support and assistance to the site team.

6.7.3. Separate risk reduction meetings will also be held on a regular basis by the site team and the contractor.

6.7.4. If needs be the project manager will inform the management team of any significant events that can be appropriately dealt with.

6.7.5. BFC will meet with the contractor on a monthly basis throughout the construction period, or more frequently if this is deemed necessary by the Project Manager. The contractor will be contractually obliged to provide monthly progress and financial updates to BFC, which will include updates to the project programme.

7

MANAGEMENT CASE

7. MANAGEMENT CASE

7.1. INTRODUCTION

7.1.1. This Section sets out the Management Case. It describes how the scheme will be delivered using project management best practice, confirms the project is deliverable within the timescales, and demonstrates an appropriate governance structure and assurance framework to oversee the project.

7.1.2. The Management Case follows Her Majesty's Treasury guidance on delivering public value from spending proposals. To enable efficient assessment of the proposals and to demonstrate the Council's management capability for successful delivery of the schemes the following elements of project management are in place:

- Evidence of similar projects
- Programme / project dependencies
- Governance, organisational structure and roles
- Programme / project plan
- Assurance and approvals plan
- Communications and stakeholder management
- Programme / project reporting
- Implementation of work streams
- Key issues for implementation
- Contract management
- Risk management strategy
- Benefits realisation plan
- Monitoring and evaluation
- Contingency plan
- Options.

7.2. EVIDENCE OF SIMILAR PROJECTS

7.2.1. Since 2010 BFC has implemented many similar improvements scheme along the A322 / A329 corridor improvements. The following schemes were completed successfully within budget and on time:

- Partial signalisation of Horse and Groom Roundabout
- Twin Bridges Gyratory – full signalisation of the northern section of the roundabout alongside further capacity enhancements on the southern half to allow for better control of the movements through the junction.
- Jennett's Park Roundabout- Partial signalisation of the roundabout to improve movements out of Bracknell using the westbound approach
- Hilton Roundabout- Traffic signal optimisation to link with adjacent corridor improvements
- Coral Reef Roundabout. Replacement of the existing roundabout with a fully signalised crossroads to allow for more efficient junction operation and reduction of queuing levels on all approach arms.

7.3. PROJECT DEPENDENCIES

7.3.1. Both scheme programmes are relatively free from dependencies, with the exception of the requirement for utilities diversions.

Utility Diversions

7.3.2. It is anticipated that some utility diversions will be required as a consequence of the schemes. These diversions could involve some engineering challenges; however, early contractor involvement will mitigate against any potential utility or construction risks. Trial holes will be undertaken to establish the location of apparatus in key areas to ensure an accurate assessment of impacts and costs can be made at this stage of the project.

7.3.3. Investigation by trial holes will be undertaken early in the process along with early co-ordination with utility companies identified through the completed C3 process to minimise risk during the construction programme.

7.4. GOVERNANCE, ORGANISATIONAL STRUCTURE & ROLES

7.4.1. BFC would establish a clear and robust structure to provide accountability and an effectual decision-making process for the management of the Vigar Way and Sports Centre junctions Improvements. The following members of staff would have dedicated roles on the project:

Neil Mathews: Head of Transport Development – Project Delivery Manager

Nick Rose: Transport Engineering Manager – Project Manager

Stuart Jefferies: Transport Strategy and Implementation Manager – Steering Group

7.4.2. Ultimate responsibility for delivery of the scheme rests with BFC, who will assume an overall project management role and establish a Steering Group chaired by an officer from the Council's Transport Management section. The Steering Group will meet on a regular basis to review progress, update the risk register, and make key strategic decisions.

7.4.3. The day-to-day management and delivery of the project will be the responsibility of the Place, Planning and Regeneration Department and the Engineering projects team within it. They will work closely with the Term Contractors and other delivery partners, and also form a point of contact for stakeholders.

7.4.4. The usual Council governance procedures will apply to all aspects of the project management, with issues being escalated in accordance with Council protocols as necessary.

7.4.5. A detailed breakdown of the BFC specific meetings (along with the attendees, scope and output of each) which make up the established governance process is set out below.

7.4.6. The Council's governance procedures are documented and can be found on the Council's Website.

7.5. PROJECT PLAN

7.5.1. A provisional Project Plan has been developed. It covers each key stage of the project and the critical path. The tasks that have a critical end date that affect the delivery timescale are highlighted on the Project Plan. The plan will be reviewed and updated on regular basis and will be considered at fortnightly Steering Group meetings.

7.5.2. The Project Manager will have overall responsibility for delivering the tasks required to achieve key milestones. Key milestones, timescales and tasks are summarised below:

- Full Business Case ready for submission: October 2019
- Approval sought from TVBLEP: November 2019
- Detailed design begins: December 2019
- Establishment of contracting arrangements: Spring 2020
- Works begin on ground: Summer/Autumn 2020
- Completion works: Autumn 2021.

7.5.3. Delivery of the scheme to be managed in co-ordination with the delivery of other works on the Highway including the A3095 corridor improvement works and schemes being carried out by Wokingham Borough Council close by at Coppid Beech roundabout. Therefore, works may carry on after March 2021, but this is due to co-ordination of works and managing the network and disruption rather than poor management. Discussions have been held with the LEP to explain the phasing of delivery between Bracknell and Wokingham.

7.6. ASSURANCE AND APPROVALS PLAN

7.6.1. Project assurance and approvals are the main responsibility of the Steering Group Chair supported by the Steering Group who will also ensure the quality of the work carried out. The scheme will be managed in line with the Project Plan and the Steering Group will sign off each stage and give the go / no go decision to start the following stage.

7.7. COMMUNICATIONS AND STAKEHOLDER MANAGEMENT

7.7.1. BFC have a tried and tested Stakeholder Engagement process which is used on all significant projects. Effective use of the process has resulted in limited adverse feedback from the public and ensured successful delivery of schemes both from a project management and public relations perspective.

7.7.2. The main aim from the Stakeholder Engagement process is to ensure that stakeholders and members of the public are kept informed throughout the development and implementation of a scheme. This can range from keeping key stakeholders updated with critical information, essential to the successful delivery of the scheme to providing information to the public.

7.7.3. A range of target audiences are identified, including: those who will benefit (directly or indirectly) from the scheme; those affected (directly or indirectly); those who may have an interest without being directly affected; those with a statutory role; and those involved in the funding of the scheme.

7.7.4. The level of information provided to each group will vary based upon the specific needs ranging from intensive consultation, general consultation, through to information provision.

7.7.5. A detailed stakeholder management strategy will be developed that identifies specific stakeholders and interest groups, categorises them in terms of impact, and establishes the required level of engagement.

7.8. PROJECT REPORTING

7.8.1. Progress Reports will be produced by the Project Manager and comprise updates on:

- General progress
- Project finances
- Issues
- Risks and governance meeting dates.

7.8.2. The report identifies any areas of concern or where decisions are required by the Steering Group.

7.9. RISK MANAGEMENT STRATEGY

7.9.1. Project risk will be managed as an on-going process as part of the scheme governance structure. A scheme risk register is maintained and updated at each of the two-weekly Steering Group meetings. Responsibility for the risk register being maintained is held by BFC's Senior Responsible Officer and is reported as part of the monthly Progress Reports.

7.9.2. Any high residual impact risks are then identified on the highlight report for discussion at the Steering Group meeting. Required mitigation measures are discussed and agreed at the meeting and actioned by BFC's Project Manager, as appropriate.

7.9.3. This section details the strategy that will be in place during the construction of the schemes. Early statutory utility enquiries have been undertaken and have been taken into account during the costing of the scheme. These early investigations are then reflected in the risk and contingency values

7.10. BENEFITS REALISATION AND MONITORING

7.10.1. The purpose of benefits realisation is to plan for and track the benefits that are expected to be accrued over the lifetime of the scheme. The plan will detail the activities required to track the progress of the scheme including project milestones and responsibilities.

7.10.2. Monitoring will take place prior to scheme opening (baseline) and at predefined intervals upon successful delivery of the scheme, notably:

- One-year post scheme opening
- Three years post scheme opening
- Five years scheme opening.

7.10.3. The key scheme benefits indicators set out against the scheme objectives include those shown in Table 7-1.

Table 7-1: Scheme Benefits Indicator

Objective	Desired outcomes
Reduce congestion between M4 and M3 and between reading, Wokingham, Bracknell and Bagshot	Reduction in travel time
Improve journey time reliability	Reduction in day to day variability of travel time
Improve accessibility to Bracknell town centre and employment areas	Reduction in journey times to and from the town centre and employment areas
Improve connectivity to the strategic road network	Reduction in journey times to and from to and from the strategic road network
Improve road safety and reduce the risk of accidents	Reduction in accidents along the scheme corridor

7.10.4. Table 7-2 shows the framework for assessing the above outputs. The target set to be achieved are based on modelling and other similar schemes which will be continuously monitored.

Table 7-2: Scheme Performance Assessment Framework

Monitoring Indicator	Measurement	Target
Improvement to journey times between m4 & m3 and between Reading, Wokingham, Bracknell and Bagshot	Conduct peak hour journey time surveys	10% reduction in peak hour journey times
Improve journey time reliability	Conduct peak hour journey time surveys across a number of days	5% reduction in day-to-day travel time variability
Improve accessibility to Bracknell town centre and employment areas	Conduct peak hour journey time surveys	10% reduction in peak hour journey times
Improve connectivity to the strategic road network	Conduct peak hour journey time surveys	10% reduction in peak hour journey times
Improve road safety and reduce the risk of accidents	Analyse road traffic collision data along scheme corridor	5% reduction in accidents along the scheme

7.10.5. BFC will conduct a full evaluation of the impact of the scheme in the period after it is completed. The Council will prepare evaluation reports one year, three years and five years after scheme opening, using the information to be collected as set out above to gauge the impact of the scheme on the traffic network, and assess the success in meeting the scheme objectives. Unexpected effects of the scheme will be reported upon and, where appropriate, remedial measures identified. Surveys will be undertaken pre-construction to identify the baseline level of traffic flow and queuing across the junctions. These will then inform the scheme evaluations to show the levels of success post implementation.

Appendix A

CHANGES IN TRAFFIC AROUND BRACKNELL

CENTRAL BRACKNELL CORDON - MORNING PEAK TRAFFIC FLOWS

Number	Location	2001 AAWF	2002 AAWF	2003 AAWF	2004 AAWF	2005 AAWF	2006 AAWF	2007 AAWF	2008 AAWF	2009 AAWF	2010 AAWF	2011 AAWF	2012 AAWF	2013 AAWF	2014 AAWF	2015 AAWF	2016 AAWF	2017 AAWF	Growth % 01 - 17	Growth % 07 - 17	Growth % 12 17	Growth % 16 - 17
82	A329 Skimped Hill Lane	2,403	2,463	2,307	2,183	1,957	1,847	2,076	2,174	2,092	1,933	2,192	1,901	1,337	1,217	1,993	2,195	2,217	-7.7%	6.8%	16.6%	1.0%
86	A329 East of Met Office roundabout	3,090	3,271	3,162	3,160	3,160	2,877	2,473	2,612	2,612	2,612	3,041	3,371	3,049	3,049	2,991	3,097	3,059	-1.0%	23.7%	-9.3%	-1.2%
234	A3095 Mill Lane	4,430	4,430	4,430	4,430	4,410	4,373	4,342	4,242	4,137	4,301	4,229	3,986	4,096	3,239	3,909	3,980	4,144	-6.5%	-4.6%	4.0%	4.1%
235	A322 Downshire Way	4,758	4,731	4,875	4,840	4,798	4,787	4,621	4,526	4,222	4,605	4,776	4,587	4,587	4,587	4,610	4,783	4,581	-3.7%	-0.9%	-0.1%	-4.2%
236	Market Street	1,258	1,258	1,158	1,214	1,198	1,208	1,219	1,274	1,150	1,171	1,235	1,221	1,399	1,274	1,531	1,581	1,391	10.6%	14.1%	13.9%	-12.0%
237	Station Way	1,158	1,054	944	911	1,011	1,012	979	921	988	982	981	839	718	632	417	417	417	-64.0%	-57.4%	-50.3%	0.0%
238	High Street	1,693	1,693	1,525	1,639	1,615	1,646	1,720	1,655	1,639	1,611	1,612	1,565	1,545	1,545	1,684	1,745	1,593	-5.9%	-7.4%	1.8%	-8.7%
241	Broad Lane	1,212	1,212	1,127	1,177	1,196	1,208	1,062	1,168	1,151	1,192	1,161	1,254	1,254	1,254	1,186	1,264	1,277	5.4%	20.2%	1.8%	1.0%
	TOTAL	20,002	20,112	19,528	19,554	19,345	18,958	18,492	18,572	17,991	18,407	19,227	18,724	17,985	16,797	18,321	19,062	18,679	-6.6%	1.0%	-0.2%	-2.0%

OUTER BRACKNELL CORDON - MORNING PEAK TRAFFIC FLOWS

Number	Location	2001 AAWF	2002 AAWF	2003 AAWF	2004 AAWF	2005 AAWF	2006 AAWF	2007 AAWF	2008 AAWF	2009 AAWF	2010 AAWF	2011 AAWF	2012 AAWF	2013 AAWF	2014 AAWF	2015 AAWF	2016 AAWF	2017 AAWF	Growth % 01 - 17	Growth % 07 - 17	Growth % 12 17	Growth % 16 - 17
3	A329 London Road	3,559	3,233	3,383	3,434	3,131	3,407	3,524	3,424	3,317	3,367	3,370	3,214	2,812	2,907	3,089	3,308	2,954	-17.0%	-16.2%	-8.1%	-10.7%
29	B3408 London Road	4,841	4,616	4,162	4,454	4,458	4,709	4,740	4,586	4,586	4,586	4,145	4,677	4,230	3,491	4,396	4,528	4,471	-7.6%	-5.7%	-4.4%	-1.3%
73	A322 Bagshot Road - nr Sports Centre	6,541	6,728	6,480	6,988	6,402	6,894	6,894	6,344	5,975	5,464	6,398	6,379	6,379	5,812	5,974	5,475	5,851	-10.5%	-15.1%	-8.3%	6.9%
88	A3095 Mill Lane	6,222	6,252	6,378	6,359	6,669	6,617	6,487	6,365	6,212	6,310	6,190	6,283	4,497	4,502	6,176	5,875	6,350	2.1%	-2.1%	1.1%	8.1%
89	Long Hill Road	1,756	1,777	1,530	1,776	1,779	1,621	1,445	1,411	1,173	1,129	1,239	1,232	1,234	1,234	1,237	1,137	1,300	-26.0%	-10.0%	5.5%	14.3%
180	A322 Bagshot Road - South of B3430	9,153	7,338	8,096	7,292	7,082	8,467	8,576	8,672	7,851	7,798	8,290	8,288	7,374	7,502	7,318	7,411	7,679	-16.1%	-10.5%	-7.3%	3.6%
181	Temple Way	1,510	1,586	1,553	1,516	1,619	1,617	1,560	1,564	1,439	1,559	1,543	1,540	1,225	1,225	1,626	1,706	1,589	5.2%	1.9%	3.2%	-6.9%
182	Harvest Ride	1,130	1,168	1,166	1,202	1,236	1,184	1,126	1,099	986	849	849	1,089	1,089	896	1,055	1,036	1,075	-4.9%	-4.5%	-1.3%	3.8%
229	A3095 Crowthorne Road	4,960	4,960	4,662	5,014	4,941	4,890	4,826	4,525	4,732	4,729	4,312	4,506	4,475	4,278	4,835	4,870	4,786	-3.5%	-0.8%	6.2%	-1.7%
230	B3430 Nine Mile Road	2,565	2,565	2,524	2,491	2,414	2,486	2,497	2,497	2,369	2,468	2,379	2,400	2,549	2,332	2,357	2,226	2,363	-7.9%	-5.4%	-1.5%	6.2%
232	Peacock Lane	1,948	1,948	1,948	1,891	2,176	1,926	1,905	1,991	1,814	1,917	2,321	2,390	1,938	2,178	2,586	2,706	2,597	33.3%	36.3%	8.7%	-4.0%
244	B3018 Binfield Road	1,750	1,750	1,488	1,671	1,745	1,845	1,809	1,135	1,584	1,521	1,625	1,655	1,230	1,192	1,364	1,131	1,131	-35.4%	-37.5%	-31.7%	0.0%
245	Terrace Road South	1,676	1,669	1,681	1,571	1,765	1,789	1,732	1,683	1,645	1,645	1,507	1,615	1,122	1,347	1,703	1,758	1,727	3.0%	-0.3%	6.9%	-1.8%
247	B3034 Forest Road	774	1,019	808	989	989	1,298	1,298	803	803	825	813	799	799	912	1,105	1,115	1,091	41.0%	-15.9%	36.5%	-2.2%
	TOTAL	48,385	46,609	45,859	46,648	46,406	48,750	48,419	46,099	44,486	44,167	44,981	46,067	40,953	39,808	44,821	44,282	44,964	-7.1%	-7.1%	-2.4%	1.5%

CENTRAL BRACKNELL CORDON - PM PEAK TRAFFIC FLOWS

Number	Location	2001 AAWF	2002 AAWF	2003 AAWF	2004 AAWF	2005 AAWF	2006 AAWF	2007 AAWF	2008 AAWF	2009 AAWF	2010 AAWF	2011 AAWF	2012 AAWF	2013 AAWF	2014 AAWF	2015 AAWF	2016 AAWF	2017 AAWF	Growth % 01 - 17	Growth % 07 - 17	Growth % 12 17	Growth % 16 - 17
82	A329 Skimped Hill Lane	2,051	2,216	2,178	2,107	1,885	2,207	1,951	1,975	1,987	2,149	2,153	2,183	1,950	1,938	2,467	2,692	2,840	38.5%	45.6%	30.1%	5.5%
86	A329 East of Met Office roundabout	3,707	3,707	3,418	3,649	3,649	3,451	2,989	2,783	2,783	2,783	3,308	3,751	3,319	3,319	3,373	3,388	3,467	-6.5%	16.0%	-7.6%	2.3%
233	Doncastle Road	3,893	3,765	3,291	3,979	4,013	3,753	3,838	3,793	3,775	3,775	3,775	3,775	1,023	966	966	966	1,177	-69.8%	-69.3%	-68.8%	21.8%
234	A3095 Mill Lane	4,635	4,635	4,115	5,485	4,505	4,392	4,395	4,368	4,125	4,309	4,037	4,181	4,003	3,966	4,298	4,121	4,094	-11.7%	-6.8%	-2.1%	-0.7%
235	A322 Downshire Way	4,730	4,733	4,934	4,460	4,892	4,930	4,876	4,668	4,601	4,710	4,891	4,570	4,629	4,629	4,658	4,835	4,695	-0.7%	-3.7%	2.7%	-2.9%
236	Market Street	1,202	1,202	1,262	1,282	1,284	1,335	1,364	1,116	1,093	1,093	1,230	1,362	1,475	1,401	1,595	1,732	1,516	26.1%	11.1%	11.3%	-12.5%
237	Station Way	1,129	1,053	1,052	1,046	1,102	1,089	1,083	1,057	1,011	983	825	733	758	706	448	474	474	-58.0%	-56.2%	-35.4%	0.0%
238	High Street	1,476	1,476	1,468	1,464	1,478	1,463	1,514	1,374	1,397	1,404	1,439	1,468	1,558	1,558	2,094	2,183	2,098	42.1%	38.6%	42.9%	-3.9%
241	Broad Lane	1,218	1,218	1,200	1,189	1,245	1,291	1,109	1,285	1,265	1,293	1,300	1,416	1,416	1,416	1,402	1,467	1,519	24.7%	37.0%	7.3%	3.5%
	TOTAL	24,041	24,005	22,918	24,661	24,053	23,911	23,119	22,419	22,037	22,499	22,958	23,438	20,131	19,899	21,301	21,858	21,880	-9.0%	-5.4%	-6.6%	0.1%

OUTER BRACKNELL CORDON - PM PEAK TRAFFIC FLOWS

Number	Location	2001 AAWF	2002 AAWF	2003 AAWF	2004 AAWF	2005 AAWF	2006 AAWF	2007 AAWF	2008 AAWF	2009 AAWF	2010 AAWF	2011 AAWF	2012 AAWF	2013 AAWF	2014 AADT	2015 AADT	2016 AADT	2017 AADT	Growth % 01 - 17	Growth % 07 - 17	Growth % 12 17	Growth % 16 - 17
3	A329 London Road	2,984	3,555	3,618	3,708	3,588	3,478	3,719	3,604	3,388	3,492	3,490	3,651	3,443	3,486	3,398	3,440	3,104	4.0%	-16.5%	-15.0%	-9.8%
29	B3408 London Road	4,916	4,741	4,060	4,285	5,041	4,639	4,798	4,819	4,819	4,819	4,313	4,796	4,758	4,427	4,407	4,499	4,360	-11.3%	-9.1%	-9.1%	-3.1%
73	A322 Bagshot Road - nr Sports Centre	7,518	7,251	7,007	7,487	7,030	7,561	7,561	7,290	6,946	6,238	7,083	6,911	6,911	6,429	6,307	6,186	6,412	-14.7%	-15.2%	-7.2%	3.7%
88	A3095 Mill Lane	6,251	6,300	6,249	6,253	6,338	6,305	6,182	6,080	5,785	5,953	5,873	5,985	6,147	6,147	5,797	5,797	5,385	-13.9%	-12.9%	-10.0%	-7.1%
89	Long Hill Road	1,679	1,679	1,547	1,613	1,599	1,455	1,497	1,444	1,301	1,232	1,320	1,318	1,383	1,383	1,444	1,282	1,519	-9.5%	1.5%	15.3%	18.5%
180	A322 Bagshot Road - South of B3430	8,108	7,131	7,573	6,803	6,525	8,202	8,483	8,655	8,127	8,127	8,153	8,245	7,852	7,734	6,994	7,085	7,247	-10.6%	-14.6%	-12.1%	2.3%
181	Temple Way	1,446	1,551	1,351	1,545	1,534	1,583	1,555	1,557	1,488	1,351	1,631	1,567	1,501	1,501	1,647	1,679	1,624	12.3%	4.4%	3.7%	-3.3%
182	Harvest Ride	1,135	1,091	1,215	1,234	1,282	1,253	1,209	1,173	976	951	951	1,169	1,169	1,169	1,184	1,201	1,235	8.8%	2.2%	5.6%	2.8%
229	A3095 Crowthorne Road	4,589	4,589	4,571	4,707	4,760	4,812	4,650	4,238	4,501	4,485	4,409	4,582	4,214	4,453	4,456	4,533	4,395	-4.2%	-5.5%	-4.1%	-3.0%
230	B3430 Nine Mile Road	2,749	2,749	2,725	2,723	2,670	2,635	2,678	2,637	2,572	2,564	2,345	2,485	2,497	2,305	2,252	2,061	2,121	-22.8%	-20.8%	-14.6%	2.9%
232	Peacock Lane	1,921	1,921	1,386	1,620	1,764	1,656	1,661	1,744	1,679	1,825	2,146	2,431	2,442	2,616	2,732	2,809	2,555	33.0%	53.8%	5.1%	-9.0%
244	B3018 Binfield Road	1,648	1,648	1,616	1,713	1,740	1,885	1,885	1,188	1,605	1,514	1,563	1,525	1,637	1,777	1,880	1,819	1,809	9.8%	-4.0%	18.6%	-0.5%
245	Terrace Road South	1,628	1,385	1,568	1,637	1,626	1,578	1,687	1,639	1,561	1,561	1,472	1,491	1,478	1,558	1,607	1,640	1,624	-0.2%	-3.7%	8.9%	-1.0%
247	B3034 Forest Road	789	1,053	707	907	907	907	1,144	834	834	878	869	865	877	1,066	1,048	1,053	1,018	29.0%	-11.0%	17.7%	-3.3%
	TOTAL	47,361	46,644	45,193	46,235	46,404	47,949	48,709	46,902	45,582	44,990	45,618	47,021	46,309	46,052	45,153	45,084	44,408	-6.2%	-8.8%	-5.6%	-1.5%

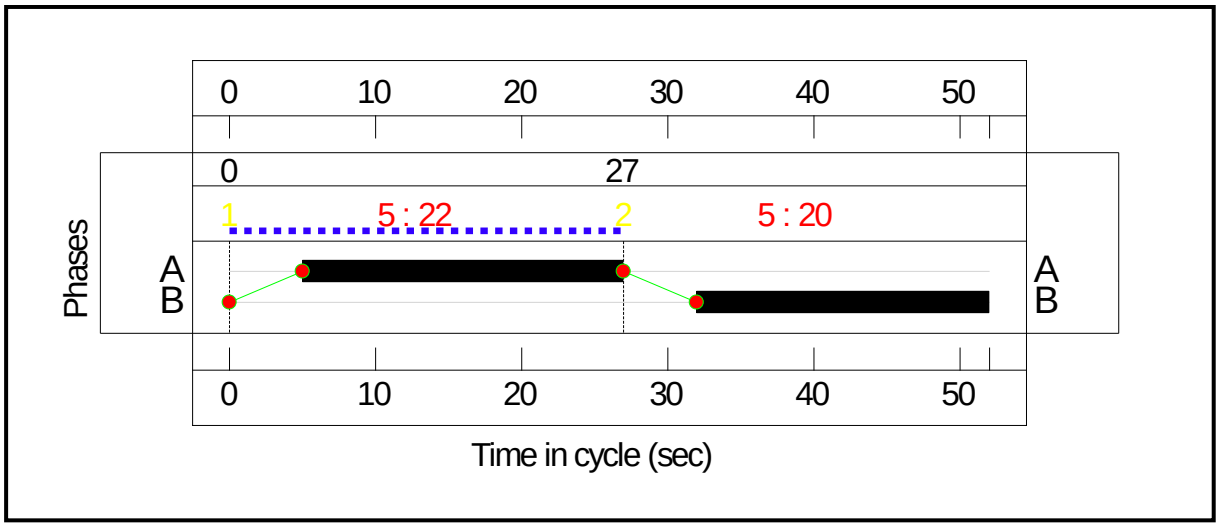
Appendix B

VIGAR WAY BASE MODEL RESULTS

Full Input Data and Results

Scenario 1: '2019 AM Peak ' (FG1: '2019 Observed AM Peak', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Total Delay (pcuHr)	Mean Max Queue (pcu)
Network	-	-	95.4%	-	39.2	-
J1: VIgar Way/ Peacock Lane	-	-	70.4%	-	6.2	-
1/1	417	850	49.1%	417	0.5	0.5
1/2	416	850	49.0%	416	0.5	0.5
2/2+2/1	713	780+730	45.6 : 48.9%	713	0.4 (0.2+0.2)	0.4
3/1	346	595	58.1%	346	1.0	4.9
3/2	454	645	70.4%	454	1.9	7.4
4/1	0	760	0.0%	0	0.0	0.0
5/1	476	1906	25.0%	476	0.2	0.2
5/2	455	1938	23.5%	455	0.2	0.2
6/1	872	1996	43.7%	872	0.4	0.4
6/2	416	1938	21.5%	416	0.1	0.1
7/1	249	1976	12.6%	249	0.1	0.1
7/2	416	1938	21.5%	416	0.1	0.1
8/1	606	2115	28.7%	606	0.2	0.2
8/2	772	2083	37.1%	772	0.3	0.3
9/1	476	1976	24.1%	476	0.2	0.2
9/2	455	1938	23.5%	455	0.2	0.2
J2: Jennets Park rbt	-	-	95.4%	-	33.0	-
1/1	606	635	95.4%	606	8.8	15.1
1/2+1/3	641	635+149	81.7 : 81.7%	641	3.6 (3.0+0.6)	8.1
2/2+2/1	755	834+103	80.5 : 80.5%	755	4.8 (4.4+0.4)	10.4
2/3	671	775	86.5%	671	5.7	11.8

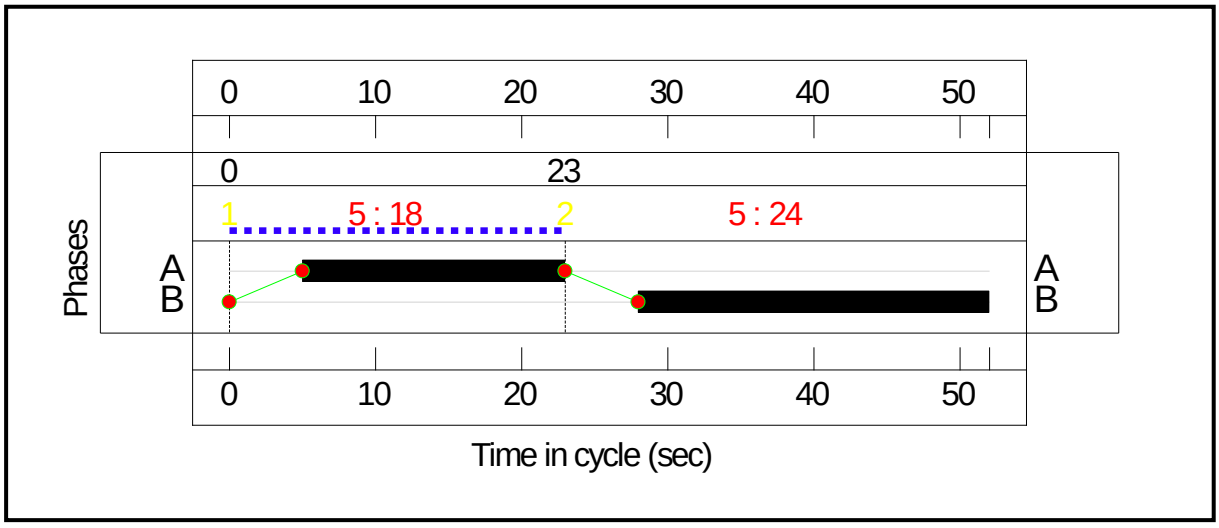
Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Total Delay (pcuHr)	Mean Max Queue (pcu)
3/1	619	959	64.5%	619	0.9	0.9
3/2	409	959	42.6%	409	0.4	0.4
5/1	310	823	37.7%	310	1.1	3.2
5/2	409	908	45.1%	409	1.6	4.5
9/1	431	1940	22.2%	431	0.1	0.1
13/1	1900	2120	89.6%	1900	4.2	4.2
15/1	1400	1980	70.7%	1400	1.2	1.2
16/1	500	857	58.3%	500	0.7	0.7

C1 PRC for Signalled Lanes (%): 4.0 Total Delay for Signalled Lanes (pcuHr): 13.19 Cycle Time (s): 52

PRC Over All Lanes (%): -6.0 Total Delay Over All Lanes(pcuHr): 39.24

Scenario 2: '2019 IP Peak' (FG2: '2019 Observed Inter Peak', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Total Delay (pcuHr)	Mean Max Queue (pcu)
Network	-	-	98.7%	-	66.9	-
J1: VIgar Way/ Peacock Lane	-	-	98.4%	-	21.0	-
1/1	349	776	45.0%	349	0.4	0.4
1/2	348	776	44.8%	348	0.4	0.4
2/2+2/1	591	844+794	34.9 : 37.3%	591	0.3 (0.1+0.1)	0.3
3/1	550	638	86.2%	550	4.6	10.7
3/2	677	688	98.4%	677	13.1	20.3
4/1	0	539	0.0%	0	0.0	0.0
5/1	717	1906	37.6%	717	0.3	0.3
5/2	678	1938	35.0%	678	0.3	0.3
6/1	1027	1970	52.1%	1027	0.5	0.5
6/2	348	1938	18.0%	348	0.1	0.1
7/1	123	1976	6.2%	123	0.0	0.0
7/2	348	1938	18.0%	348	0.1	0.1
8/1	419	2115	19.8%	419	0.1	0.1
8/2	643	2066	31.1%	643	0.2	0.2
9/1	717	1976	36.3%	717	0.3	0.3
9/2	678	1938	35.0%	678	0.3	0.3
J2: Jennets Park rbt	-	-	98.7%	-	45.9	-
1/1	419	533	78.6%	419	3.1	6.8
1/2+1/3	475	533+70	78.8 : 78.8%	475	3.2 (2.9+0.3)	6.8
2/2+2/1	976	993+70	91.8 : 91.8%	976	8.3 (7.9+0.5)	17.2
2/3	911	923	98.7%	911	15.7	25.3

Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Total Delay (pcuHr)	Mean Max Queue (pcu)
3/1	521	982	53.1%	521	0.6	0.6
3/2	646	982	65.8%	646	1.0	1.0
5/1	521	680	76.7%	521	3.7	8.1
5/2	646	750	86.2%	646	5.7	11.6
9/1	55	1940	2.8%	55	0.0	0.0
13/1	1824	2120	86.0%	1824	3.0	3.0
15/1	1400	1980	70.7%	1400	1.2	1.2
16/1	424	982	43.2%	424	0.4	0.4

C1 PRC for Signalled Lanes (%): -9.7 Total Delay for Signalled Lanes (pcuHr): 33.49 Cycle Time (s): 52

PRC Over All Lanes (%): -9.7 Total Delay Over All Lanes(pcuHr): 66.91

Appendix C

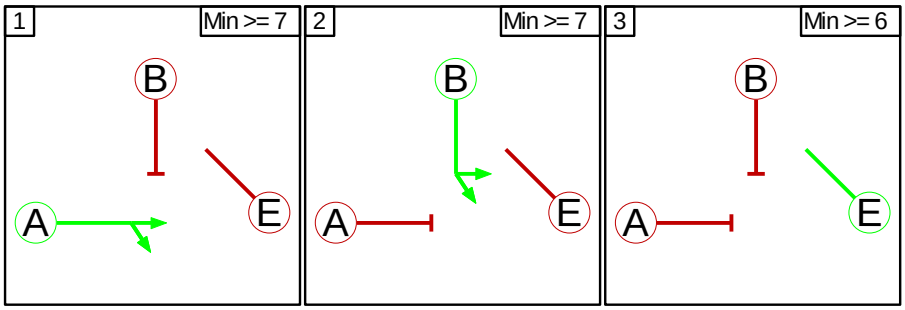
SPORTS CENTRE BASE MODEL

Tables C1 to C3

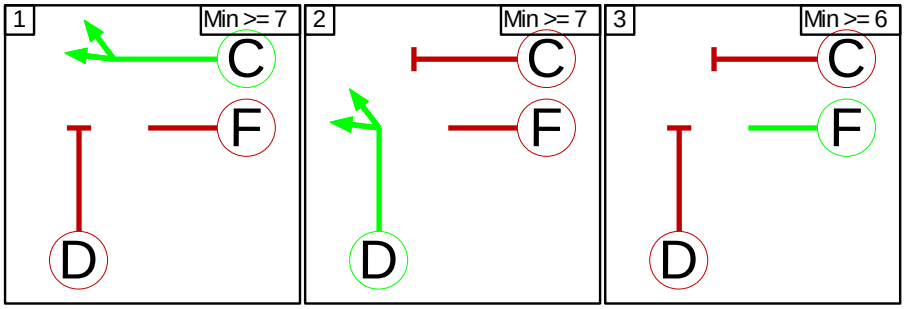
Sports Centre Roundabout

Stage Diagram

Stage Stream: 1

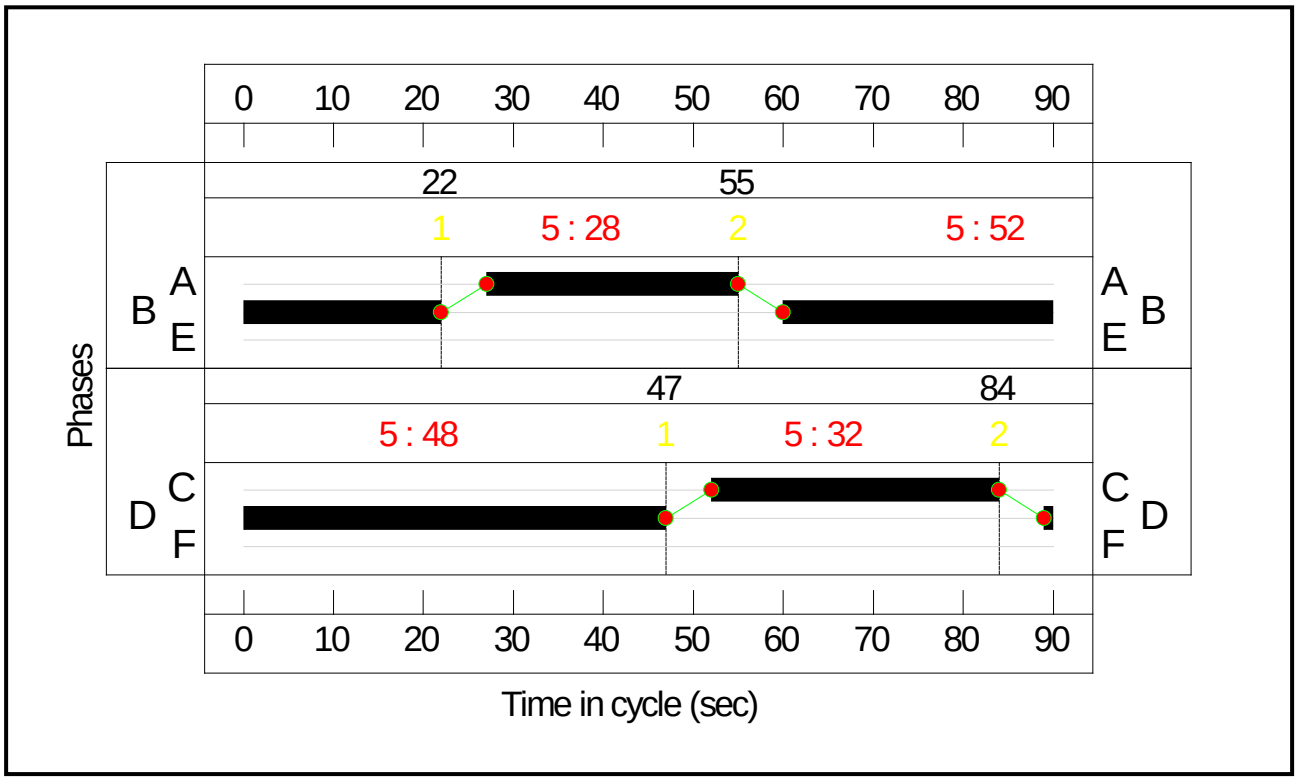


Stage Stream: 2



Scenario 1: '2019 AM Peak ' (FG1: '2019 AM Peak', Plan 1: 'Network Control Plan 1')

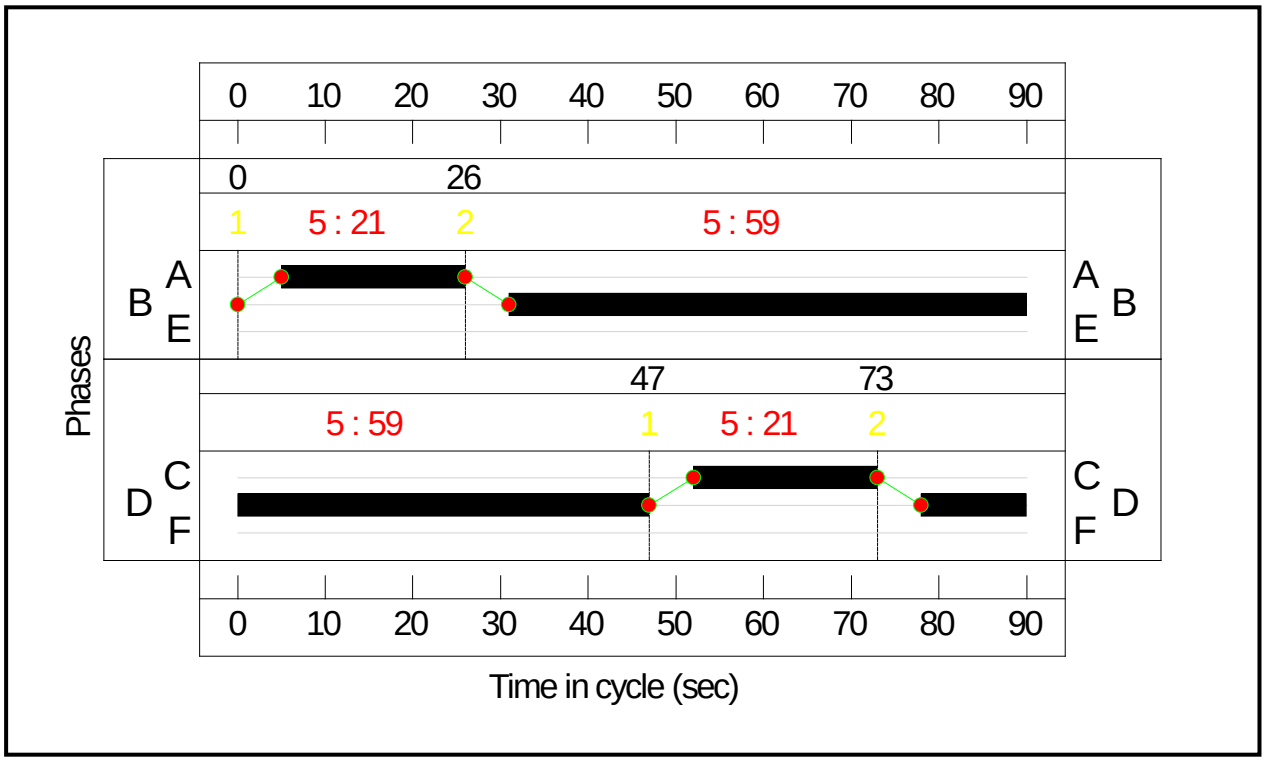
Signal Timings Diagram



Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Queue (pcu)
Network: BFC Conecpt Layout with Minor Sprial Tweaks	-	-	94.1%	48.5	-
Sports Centre	-	-	94.1%	48.5	-
1/2+1/1	623	920+206	55.3 : 55.3%	2.5	9.7
1/3	611	1119	54.6%	2.5	9.8
2/2+2/1	404	531+249	51.8 : 51.8%	0.7	2.9
2/3	310	531	58.4%	0.9	3.8
3/2+3/1	968	797+247	92.7 : 92.7%	10.5	27.3
3/3	957	1034	92.5%	10.4	27.2
4/2+4/1	597	318+318	94.1 : 93.8%	9.0	12.7
4/3	212	318	66.7%	1.8	4.9
5/1	332	612	54.2%	2.9	6.4
5/2	213	612	34.8%	1.5	2.5
6/1	437	697	62.7%	3.2	9.0
6/2	347	697	49.8%	2.6	6.4
C1 Stream: 1 PRC for Signalled Lanes (%): 62.6 Total Delay for Signalled Lanes (pcuHr): 9.42 Cycle Time (s): 90					
C1 Stream: 2 PRC for Signalled Lanes (%): -3.0 Total Delay for Signalled Lanes (pcuHr): 26.68 Cycle Time (s): 90					
PRC Over All Lanes (%): -4.5 Total Delay Over All Lanes(pcuHr): 48.52					

Scenario 2: '2019 Inter Peak' (FG2: '2019 Inter Peak', Plan 1: 'Network Control Plan 1')

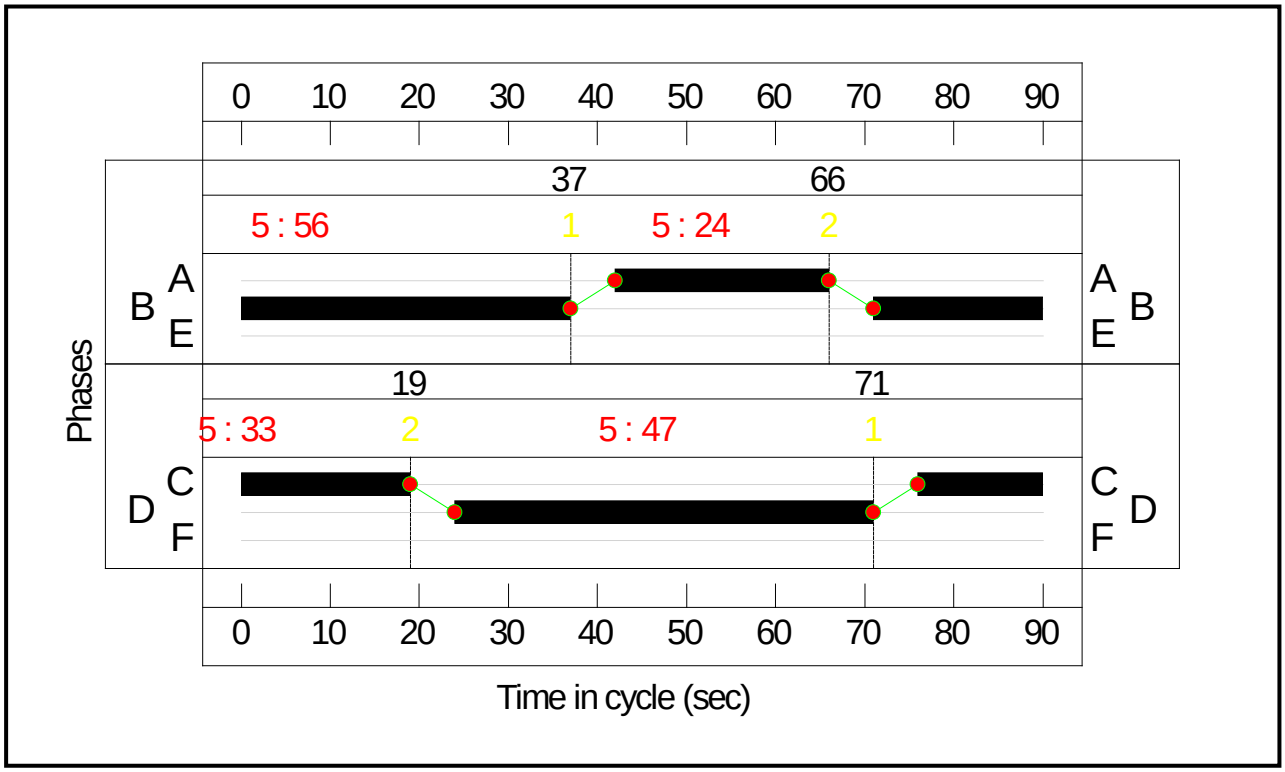
Signal Timings Diagram



Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Queue (pcu)
Network: BFC Conecpt Layout with Minor Sprial Tweaks	-	-	59.9%	19.0	-
Sports Centre	-	-	59.9%	19.0	-
1/2+1/1	752	1079+193	59.1 : 59.1%	2.4	10.8
1/3	744	1267	58.7%	2.4	10.8
2/2+2/1	217	463+235	31.1 : 31.1%	0.3	1.1
2/3	129	463	27.9%	0.2	0.9
3/2+3/1	703	1188+79	55.5 : 55.5%	2.2	9.7
3/3	703	1267	55.5%	2.2	9.8
4/2+4/1	435	476+476	44.7 : 46.6%	0.6	2.1
4/3	105	476	22.1%	0.2	0.6
5/1	278	464	59.9%	2.8	6.8
5/2	105	464	22.6%	0.9	2.2
6/1	278	464	59.9%	2.9	6.9
6/2	205	464	44.1%	1.8	4.7
C1 Stream: 1 PRC for Signalled Lanes (%): 50.4 Total Delay for Signalled Lanes (pcuHr): 8.60 Cycle Time (s): 90					
C1 Stream: 2 PRC for Signalled Lanes (%): 50.4 Total Delay for Signalled Lanes (pcuHr): 9.11 Cycle Time (s): 90					
PRC Over All Lanes (%): 50.4 Total Delay Over All Lanes(pcuHr): 18.98					

Scenario 3: '2019 PM Peak' (FG3: '2019 PM Peak', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Item	Demand Flow (pcu)	Capacity (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Queue (pcu)
Network: BFC Conecpt Layout with Minor Sprial Tweaks	-	-	86.7%	44.4	-
Sports Centre	-	-	86.7%	44.4	-
1/2+1/1	868	975+236	71.7 : 71.7%	3.9	15.5
1/3	857	1203	71.2%	3.9	15.5
2/2+2/1	329	357+230	56.1 : 56.1%	1.1	3.4
2/3	192	357	53.8%	0.9	3.2
3/2+3/1	872	856+162	85.6 : 85.6%	7.2	21.3
3/3	866	1013	85.5%	7.2	21.4
4/2+4/1	669	387+387	86.4 : 86.7%	6.0	10.2
4/3	268	387	69.3%	2.1	6.0
5/1	382	528	72.4%	4.9	9.5
5/2	268	528	50.8%	3.3	5.5
6/1	386	718	53.8%	2.5	7.0
6/2	253	718	35.2%	1.5	3.8
C1 Stream: 1 PRC for Signalled Lanes (%): 24.3 Total Delay for Signalled Lanes (pcuHr): 15.98 Cycle Time (s): 90					
C1 Stream: 2 PRC for Signalled Lanes (%): 5.1 Total Delay for Signalled Lanes (pcuHr): 18.36 Cycle Time (s): 90					
PRC Over All Lanes (%): 3.9 Total Delay Over All Lanes(pcuHr): 44.39					

Appendix D

APPRAISAL SUMMARY TABLE

WSP House
70 Chancery Lane
London
WC2A 1AF

wsp.com

Appraisal Summary Table

Date produced:	21	10	2019

Contact:	
Name	
Organisation	WSP
Role	

Name of scheme:	Jennett's Park/Vigar Way and Sports Centre
Description of scheme:	Replace Vigar Way with Signal junction. Add circulatory capacity to Sports Centre Gyratory

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Junction improvements will enable transport and business users to benefit from reductions in delay.	Value of journey time changes(£) Net journey time changes (£): 0 to 2min / 2 to 5min / > 5min		£1.45m	
	Reliability impact on Business users	Slightly beneficial, especially in the PM peak		slightly beneficial		
	Regeneration	given the scale of improvement not assessed				
	Wider Impacts					
Environmental	Noise	No significant increase in strategic traffic re-routing, impact on noise level is negligible		Negligible		
	Air Quality	No significant increase in strategic traffic re-routing, impact on air quality is negligible		Negligible		
	Greenhouse gases	A decrease in greenhouse gas emissions is anticipated due to proposed junction improvement which are expected to alleviate reduce delays and queue.	Change in non-traded carbon over 60y (CO2e) Change in traded carbon over 60y (CO2e)	Negligible		
	Landscape	Improvement is mostly within the existing foot print and highway boundary. Landscape is not likely to be affected.		Negligible		
	Townscape	Not Applicable				
	Historic Environment	Not Applicable		Negligible		
	Biodiversity	Improvement is mostly within the existing foot print and highway boundary. Impact on biodiversity is minimal or none.		Negligible		
	Water Environment	Improvement is mostly within the existing foot print and highway boundary. Impact on Water Environment is neutral..		Negligible		
Social	Commuting and Other users	Junction improvements will enable commuters and other users to benefit from reductions in delay.	Value of journey time changes(£) Net journey time changes (£): 0 to 2min / 2 to 5min / > 5min		£7.87m	
	Reliability impact on Commuting and Other users	Slightly beneficial		slightly beneficial		
	Physical activity	no change expected as a result of proposed schemes				
	Journey quality	no change expected as a result of proposed schemes				
	Accidents	not assessed				
	Security	no change expected as a result of proposed schemes				
	Access to services	no change expected as a result of proposed schemes				
	Affordability	no change expected as a result of proposed schemes				
	Severance	none				
	Option and non-use values	none				
Public Account	Cost to Broad Transport Budget				£1.8m	
	Indirect Tax Revenues	Given the scale of the proposed improvements no likelihood of generating indirect tax revenue.				