Document 5.22.1

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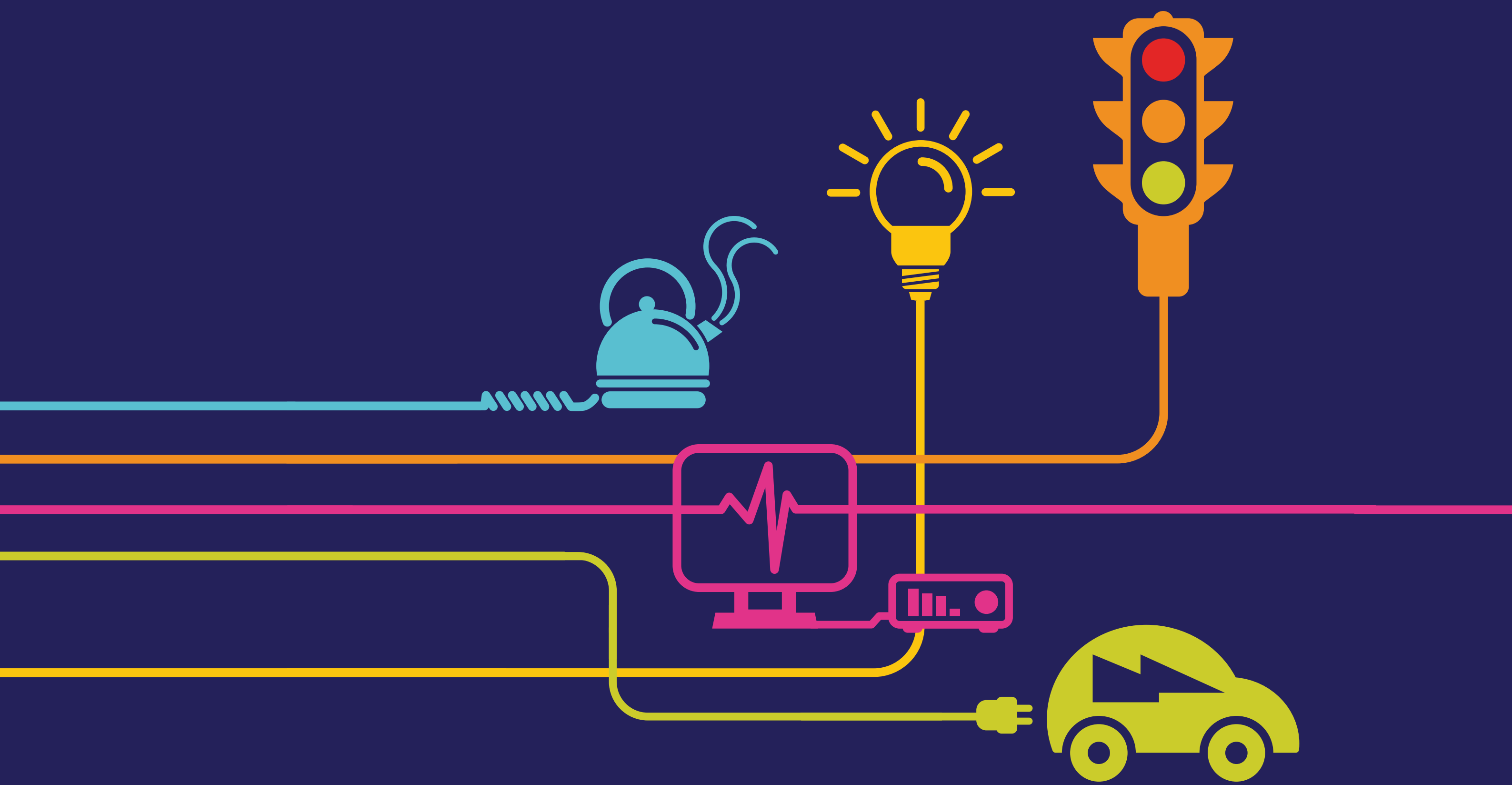
Environmental Statement Transport Assessment

Hinkley Point C Connection Project

Regulation 5(2)(q) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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ES1 EXECUTIVE SUMMARY

ES1.1 Introduction to the Transport Assessment

Background

ES1.1.1 This Transport Assessment (TA) forms part of an application to the Secretary of State for a Development Consent Order (DCO) for the Hinkley Point C Connection Project (the Proposed Development) currently being made by National Grid Electricity Transmission plc (National Grid).

ES1.1.2 The Proposed Development is classified as a Nationally Significant Infrastructure Project (NSIP) under Part 3 of the Planning Act 2008. During its construction, operational and decommissioning phases, the Proposed Development requires the transportation of various people, plant and materials to and from the development.

ES1.1.3 The TA has been prepared to provide a detailed assessment of any potential effects associated with the traffic that would be generated by the Proposed Development.

ES1.1.4 National Grid proposes to undertake the construction of the Proposed Development with as little impact on the surrounding communities, environment and businesses as possible. The analysis conducted in this TA will help inform measures to mitigate any potential effects of the Proposed Development should it be given consent.

Supplementary Documentation

ES1.1.5 The TA document is supported by, and should be read alongside, Chapter 12 of an accompanying Environmental Statement (ES) (**Volume 5.12.1**). The ES assess the likely environmental effects of the traffic associated with the Proposed Development. The ES also includes the identification of sensitive receptors and an assessment of the magnitude of any potential environmental effects.

ES1.1.6 In addition, this TA is supported by a Draft Construction Traffic Management Plan (CTMP) **(Volume 5.26.5)** which is an appendix to the Draft Construction Environmental Management Plan (CEMP) which addresses mitigation, management and monitoring measures with regard to traffic and transportation during the construction of the development.

ES1.2 Scoping and Consultation

Scoping

ES1.2.1 As part of the scoping exercise for the Proposed Development, a Scoping Report was produced setting out the proposed method for assessing the traffic and transport elements in the TA. This was submitted to the Planning Inspectorate as well as the Highways Departments of the Local Authorities potentially affected by the scheme. This included the following organisations:

- Somerset County Council (SCC) (incorporating Sedgemoor District Council (SDC) and West Somerset Council (WSC));

- North Somerset Council (NSC);
- Bristol City Council (BCC);
- South Gloucestershire Council (SGC); and
- The Highways Agency (HA).

ES1.2.2 The comments which were raised have been incorporated into the overall assessment of the Proposed Development.

Consultation

ES1.2.3 A series of meetings have taken place to discuss the proposals with the affected Local Authorities and the Highways Agency. A list of the meetings held to date has been included below:

- meeting with all Parties - 25 April 2013;
- meeting with BCC - 24 May 2013;
- meeting with SGC - 20 May 2013;
- meeting with NSC - 22 May 2013;
- meeting with JMP on behalf of SDC, WSC and SCC - 17 May 2013.
- meeting with SCC - 18 June 2013;
- meeting with NSC - 11 July 2013;
- meeting with all Parties - 15 August 2013;
- meeting with all Parties - 15 October 2013;
- meeting with all Parties - 4 November 2013; and
- meeting with JMP on behalf of SDC, WSC and SCC - 11 November 2013; and
- meeting with all Parties - 21 November 2013.

ES1.3 Legislation, Policy and Guidance

ES1.3.1 A number of policy and guidance documents have been used in the creation of this document.

National Legislation, Policy and Guidance

Relevant national policy and guidance included:

- National Policy Statements (NPS);
- National Planning Policy Framework (NPPF);
- Guidance on Transport Assessment 2007; and

- DfT Circular 02/13, The Strategic Road Network and The Delivery of Sustainable Development, 2013.

Local Legislation, Policy and Guidance

ES1.3.2 Relevant local policy and guidance also considered for this assessment includes:

- West Somerset Council Local Plan 2012 to 2032 (2012);
- Hinkley Point C Project Supplementary Planning Document (2011) (a joint document prepared by SDC and WSC);
- Sedgemoor Core Strategy 2006-2027 (2011);
- PPS1 Supplement Study: Planning and Climate Change (2010);
- Bridgwater Vision (2009);
- Somerset Future Transport Plan 2011-2026 (2011);
- North Somerset Replacement Local Plan (2007);
- North Somerset Council Core Strategy (2012);
- West of England Joint Local Transport Plan 3 2011-2026 (a joint document prepared by NSC, BCC and SGC);
- The Bristol Local Plan (1997); and
- Bristol Development Framework Core Strategy (2011).

ES1.4 Development Proposals

Development Overview

ES1.4.1 The main component of the Proposed Development is the construction of a new 400kV electricity connection of approximately 57km between Bridgwater, Somerset and Seabank Substation, near Avonmouth. The connection would comprise new overhead lines and new underground cables. It would cross the administrative boundaries of the following authorities:

- Somerset County Council;
- West Somerset District Council - Somerset County Council;
- Sedgemoor District Council - Somerset County Council;
- North Somerset Council; and
- Bristol City Council.

Development Phases

The TA considers three main phases of the Proposed Development; the construction phase, the operational phase and the decommissioning phase. Each phase has different characteristics, and therefore different traffic and transportation implications. The TA provides a detailed assessment of the traffic and transportation impacts of the construction phase.

Stopping Up Orders

ES1.4.2 Stopping Up Orders will need to be implemented at certain sections of the local road network. The Stopping Up Orders will facilitate a number of elements of construction. Diversions will be put in place to limit the impacts of the construction works.

Traffic Regulation Orders

ES1.4.3 Traffic Regulation Orders (TROs) will need to be implemented to facilitate the construction of the Proposed Development.

ES1.4.4 All proposed TROs will be site specific and agreed with the respective local authority.

Construction Timescales

ES1.4.5 It is proposed that construction works will start in late 2015, with a preliminary connection date set for October 2019. Construction Access Route and Associated Works.

Baseline Environment

ES1.4.6 The TA describes each of the eight Sections (A - H) identified. This includes the following:

- a description of those highways links to be used to access the Proposed Development;
- baseline figures for traffic flows along these links by total traffic and Heavy Goods Vehicles (HGVs) taken at both neutral and peak summer seasons;
- any PRoW, cycle or equestrian rights of way affected; and
- any public transport routes affected.

ES1.4.7 The baseline environment description can be found in section 5 of the TA.

ES1.5 Accident Analysis

Data Acquisition

ES1.5.1 As part of the analysis of the surrounding highways network, an investigation into the vehicle accident history has been undertaken. This involved personal injury accident data being obtained for the last five years from Bristol City Council, North Somerset Council, and Somerset County Council.

Comparison to National Averages

ES1.5.2 In order to fully assess the levels of accidents at the junctions identified for assessment, the accident rates at each junction have been compared with national averages. The method for calculating an average annual accident rate for each junction was taken from the "Design Manual for Roads and Bridges (DMRB, 2004) Volume 13, Section 1, Part 2, The Valuation of Costs and Benefits, The Valuation of Accidents at Junctions."

ES1.5.3 The analysis demonstrates that the predicted number of accidents at each junction calculated using the standard DMRB formula are generally significantly greater than the actual recorded accidents in the 2013 base case.

ES1.5.4 It was also concluded that the Proposed Development construction traffic would not be considered to have a significant impact on the safety at the junctions along the access route.

ES1.6 Construction Traffic Routes

Construction Access Highway

ES1.6.1 To provide access to the Proposed Development, three levels of access roads were used: Level 1 Strategic Road Network (SRN) comprising the motorway network; Level 2 Local Road Network (LRN) which provide construction access to the SRN; and Haul Roads which would be constructed where the Proposed Development cannot be accessed purely by the LRN.

Proposed Routeing Strategy

ES1.6.2 A routeing strategy has been established for each belmouth through liaison with Local Planning Authorities. The proposed routeing strategy would be followed by all construction traffic.

The methodology adopted for this development is as follows:

- shortest route from location to primary distributive road network (SRN);
- avoidance of settlements and any other sensitive receptors to reduce congestion and minimise effects, cities, towns, villages;
- origins of vehicles;
- minimise travel on established road network and use haul roads where possible; and
- a comprehensive routeing assessment was undertaken by ALE in conjunction with the Highway Authority and the LPAs to establish a routeing for all Abnormal Indivisible Load (AIL) vehicles and is presented in a separate Route Feasibility Report.

ES1.7 Assessment Methodology

Baseline Data

ES1.7.1 A baseline data collection methodology was used to establish trip generation and distribution for the Proposed Development traffic. This included gathering data from Automated Traffic Counts, collection of turning counts at assessed junctions and queue length surveys simultaneously with junction turning.

Traffic Generation Data

ES1.7.2 National Grid provided predicted traffic generation data for the construction of the Proposed Development over a five year period and was categorised into Low, Medium and High vehicles with represent light, medium and heavy goods vehicles.

Capacity Assessment

ES1.7.3 47 junctions were identified for capacity assessment and are comprised of priority and signalised junctions. Priority junctions were modelled using PICADY 5, signalised junction using LinSig 3.2 and roundabouts using ARCADY 7.

ES1.7.4 The results of the 47 junctions identified for capacity assessment were gathered using methodology agreed with the LPAs which include:

- baseline (observed) - 2013;
- future baseline (observed traffic data plus traffic growth to assessment year with traffic growth, plus committed development); and
- future baseline plus Proposed Development.

ES1.8 Strategic Road Network Assessment

Merge and Diverge Sections

ES1.8.1 To assess the impacts of the Proposed Development on the SRN, an assessment of the total traffic at the merge and diverge section of the M5 have been undertaken.

The assessment is based on key data and assumptions:

- traffic data has been extracted from the TRADS database for the mainline and slip roads of all M5 junctions assessed where available;
- the assessments have been conducted for the AM and PM network peak periods of 08.00-09.00 and 17.00-18.00; and
- total traffic used in the assessment includes baseline traffic flows, future design year of assessment and future design year plus committed development, plus Proposed Development traffic flows.

ES1.9 Highway Impacts Discussion

Baseline Scenario

ES1.9.1 In total 11 junctions were identified as operating at or over their practical capacity (0.85 RFC or 90% DoS) during the 2013/2014 baseline assessment. These include:

- A39/Puriton Hill/Bath Road - 0.85;
- M5 Junction 22/A38 Bristol Road/B3140 - 0.85;
- Dunball Roundabout (Existing Layout) - 0.83;
- A38 Bristol Road/Wylds Road (Existing Layout) - 1.07;
- Wylds Road/The Drove (Existing Layout) - 0.91;
- M5 Junction 21 - 0.91;
- M5 Junction 20/Central Way/Northern Way/B3133 Moor Lane - 0.86;
- Central Way/Southern Way - 0.91;
- Northern Way/B3133 Tickenham Road - 0.91;
- Clevedon Road/B3128 Tickenham Hill - 0.85; and
- M5 Junction 19 - 0.91.

Future Baseline Scenario

ES1.9.2 The results indicate that in the future baseline scenario, 15 junctions are predicted to operate above their practical capacity (0.85 RFC or 90% DoS). These are:

- M5 Junction 23 - 0.95 (increase from 0.58 to 0.95);
- A39/Puriton Hill - 1.00 (increase from 0.10 to 1.00);
- A39 Puriton Hill/Bath Road - 0.95 (increase from 0.85 to 0.95);
- M5 Junction 22/A38 Bristol Road/B3140 - 0.96 (increase from 0.85 to 0.96);
- Dunball Roundabout (HPC DCO Layout) - 0.96 (increase from 0.83 to 0.96);
- A38 Bristol Road/The Drove (HPC DCo Layout) - 0.89 (increase from 0.66 to 0.89);
- A38 Bristol Road/Wylds Road (HPC DCo Layout) - 1.17 (increase from 1.07 to 1.17);
- Wylds Road/The Drove (HPC DCO Layout) - 1.25 (increase from 0.91 to 1.25);
- M5 Junction 21 - 0.91;
- M5 Junction 20/Central Way/Northern Way/B3133 Moor Lane - 0.96 (increase from 0.86 to 0.96);

- Central Way/Southern Way - 1.07 (increase from 0.91 to 1.07);
- Northern Way/B3133 Tickenham Road - 0.91 (increase from 0.90 to 1.00);
- Clevedon Road/B3128 Tickenham Hill - 1.01 (increase from 0.85 to 1.01);
- M5 Junction 19 - 0.98 (increase from 0.91 to 0.98); and
- A403 St. Andrew's Way/Kings Weston Lane - 0.95 (increase from 0.71 to 1.00).

Future Baseline plus Development Scenario

ES1.9.3 The results for this scenario indicate that there are two junctions that are predicted to operate over their theoretical capacity:

- A39 Bath Road/Woolavington Hill - 1.00 (increases from 0.59 to 1.00); and
- A38 Bristol Road/Harp Road (increases from 0.48 to 1.06).

ES1.10 Mitigation, Controls and Monitoring

Construction Traffic Management Plan Objectives

ES1.10.1 A number of mitigation measures have been proposed after the investigation of the construction traffic from the Proposed Development. These are discussed in detail in the Draft CTMP (**Volume 5.26.5**).

ES1.10.2 As detailed within the Draft CTMP, the following mitigation measures are proposed during the construction of the Proposed Development:

- HGV/LGV construction vehicle identification;
- preferred HGV/LGV/staff transport construction routes;
- HGV traffic movement restrictions;
- on site vehicle movements - permitted hours;
- HGV emissions (use of Euro standard IV vehicles to limit pollution);
- banksman/presence of personnel at access;
- capping of HGV movements;
- timings of HGV movements;
- set transport shift patterns;
- Delivery Management System (DMS);
- minimising staff trips through use of welfare van services for staff transport;
- routeing staff welfare vanes along construction routes;
- cleansing of vehicles;
- nil provision for private vehicle parking at compound and laydown areas;

- PRoW Management Plan;
- National Cycle Route Management Plan;
- highway condition surveys;
- Temporary Traffic Management (TTM) procedures including diversions and traffic management associated with the implementation of Stopping Up Orders and Traffic Regulation Orders;
- complaints management procedure;
- promotional material/communications;
- Traffic Management Group (TMG) and Transport Co-ordination Officer (TCO) to be employed to implement and monitor the CTMP; and
- travel planning measures.

ES1.11 Framework Travel Plan (FTP)

<u>Indicative Framework Initiatives</u>

ES1.11.1 Due to the nature of the development, Travel Plans (TPs) will not be provided for each specific are of development. It is advised, due to Health and Safety practices, that all staff will are not permitted to enter the construction site on foot or by bicycle. However, it is envisaged that any contractor works sustainably and will be encouraged to adopt sustainable travel where possible.

ES1.11.2 A number of travel planning initiatives proposed which include:

- travel planning awareness;
- welfare van provision for staff from external locations to site;
- public transport;
- car sharing;
- construction traffic management;
- modal shift monitoring;
- travel plan co-ordinator (TPC); and
- transport review group (TRG).

ES1.12 Conclusions

ES1.12.1 The capacity assessments indicated that in the future baseline scenario (without development traffic) a total of 15 junctions would operate over their practical capacity of 0.85 RFC or 90% DoS.

ES1.12.2 When applying the Proposed Development traffic this results in a further two junctions operating over their practical capacity while the remaining 15 stay relatively unchanged in regard to their operational capacity during the highway network peak periods assessed.

ES1.12.3 This shows that the development is having a material impact on the operational capacity of two junctions only. These are:

- A39 Bath Road/Woolavington Hill; and
- A38 Bristol Road/Harp Road.

ES1.12.4 While the Proposed Development is having a very limited material impact on the operation of the surrounding highway network it is acknowledged that there are some existing capacity issues during highway network peak periods at junctions in proximity to the Proposed Development.

ES1.12.5 As such a mitigation strategy (which will be secured through the CTMP which itself will be a DCO Requirement) will restrict the movement of HGVs through any junction on the LRN shown to be above an RFC of 0.85 or 90% DoS during the highway peak periods of 08.00-09.00 and 17.00-18.00.

ES1.12.6 These include the following:

- A39/Puriton Hill;
- A39/Woolavington Hill;
- A39/Bath Road;
- Bristol Road/The Drove;
- Bristol Road/Wylds Road;
- High Street/Rodway;
- A38 Bristol Road/B3140;
- Central Way/B3133/Southern Way;
- Northern Way/B3130 Tickenham Road;
- Clevedon Road/Tickenham Hill;
- Clevedon Rd/B3128;
- King Andrew's Road/King Weston Lane;
- King Andrew's Road/King Road Avenue/Crowley Way; and
- A4 Avonmouth Road/Portway/M5.

1 INTRODUCTION

1.1 Transport Assessment

1.1.1 This Transport Assessment (TA) accompanies an application by National Grid to seek powers to construct, operate and maintain a new 400,000 volt (400kV) connection between Bridgwater Substation in Somerset and Seabank Substation, north of Avonmouth (the Proposed Development). The Proposed Development is in the administrative boundaries of Somerset and West Somerset, Sedgemoor, North Somerset, the City of Bristol, and South Gloucestershire in the southwest of England.

1.1.2 That part of the Proposed Development that comprises an electric line above ground within section 16 of the Planning Act 2008 is a Nationally Significant Infrastructure Project (NSIP) for the purposes of that Act. Under Section 31 of the Planning Act 2008, development consent is required for development to the extent that it is or forms part of an NSIP. Development consent is granted by the making of a Development Consent Order (DCO) for which application may be made under section 37 of the Planning Act 2008.

1.1.3 A more detailed description of the Proposed Development is included within section 4 of this document.

1.1.4 This TA has been prepared to provide a detailed assessment of any potential effects associated with the construction traffic that would be generated by the Proposed Development. Traffic generated during the operational phase has not been assessed as the forecast traffic volumes are minimal and significantly lower than the traffic generated during the construction phase.

1.1.5 The analysis provided in this TA will help inform measures to mitigate against any potential effects of the Proposed Development should it be granted consent.

1.1.6 This document is supported by, and should be read alongside, Chapter 12 of the accompanying Environmental Statement (ES) **(Volume 5.12.1)** which assesses the likely environmental effects of the traffic associated with the Proposed Development. The ES also includes the identification of sensitive receptors and an assessment of the magnitude of any potential environmental effects.

1.1.7 In addition, this TA is supported by a Draft Construction Traffic Management Plan (CTMP) **(Volume 5.26.5)** which is an appendix to the Draft Construction Environmental Management Plan (CEMP) which addresses mitigation, management and monitoring measures with regard to traffic and transportation during the construction of the development.

1.1.8 Together, these documents present a thorough assessment of all the traffic and transportation aspects of the Proposed Development.

2 SCOPING AND ENGAGEMENT

2.1 Introduction

2.1.1 As part of the Environmental Impact Assessment (EIA) scoping exercise for the Proposed Development (see **Volume 5.5.1**), a Scoping Report was produced for the ES setting out the proposed method for assessing the traffic and transport elements of the scheme.

2.1.2 This was submitted to the Planning Inspectorate as well as the Highways Departments of the Local Planning Authorities (LPAs) potentially affected by the scheme. This included the following organisations:

- Somerset County Council (SCC) (incorporating Sedgemoor District Council (SDC) and West Somerset Council (WSC));
- North Somerset Council (NSC);
- Bristol City Council (BCC);
- South Gloucestershire Council (SGC); and
- The Highways Agency (HA).

2.1.3 A Scoping Opinion was received from the Planning Inspectorate, which included representations from the Local Authority Highways Departments and Highways Agency.

2.1.4 The comments received have been incorporated into the overall assessment of the Proposed Development.

2.1.5 A key comment was the requirement to produce a TA assessment to accompany **Volume 5.12.** The importance of producing this TA was emphasised throughout the Scoping Opinion.

2.1.6 Other key comments from the Scoping Opinion were:

- detail must be included on the delivery of any abnormal loads to the Sandford Substation highlighting any road closures, traffic management and enabling works;
- a CTMP should be produced to accompany the TA;
- all data collection methodology should be agreed with the Local Authorities;
- details should be provided on the volume of vehicles generated during each phase of work; and
- details should be provided on the proposed form and location of accesses.

2.1.7 All points/comments raised within the Scoping Opinion have been addressed within this TA. The detailed comments are summarised within **Volume 5.12.1** and provided in more detail at **Volume 5.5.2, Appendix 5B**).

2.1.8 As the TA scoping developed, a number of Technical Notes were prepared and submitted to the LPAs and the consultants working on their behalf, namely JMP. The Technical Notes submitted included:

- Technical Note 1: Traffic Generation Methodology;
- Technical Note 2: Traffic Assessment Methodology;
- Technical Note 3: Data Collection;
- Technical Note 4: TA Scoping Note;
- Technical Note 5: Growth Factors;
- Technical Note 6: 2013 Baseline Capacity Assessments (21 junctions); and
- Technical Note 7: 2013 Baseline Capacity Assessments (All junctions).

2.1.9 The Technical Notes were produced as documents independent of the TA. Of particular relevance is the TA Scoping Note, which was written to establish the structure of this document. All comments have been addressed within the TA/Draft CTMP as appropriate.

2.1.10 In addition, two draft versions of this report have been submitted to the LPAs, The HA and JMP for comment in December 2013 and February 2014.

2.2 Other Engagement

2.2.1 A series of meetings have taken place to discuss the traffic and transportation assessment and methodologies of the Proposed Development with the affected Local Authorities and the HA. These included the following:

- meeting with all Parties – 25 April 2013;
- meeting with BCC – 24 May 2013;
- meeting with SCC – 20 May 2013;
- meeting with NSC – 22 May 2013;
- meeting with JMP on behalf of the Joint Councils – 17 May 2013.
- meeting with SCC – 18 June 2013;
- meeting with NSC – 11 July 2013;
- meeting with all Parties – 15 August 2013;
- meeting with all Parties – 15 October 2013;
- meeting with all Parties – 4 November 2013; and
- meeting with JMP – 11 November 2013;
- meeting with all Parties – 21 November 2013;
- meeting with all Parties – 13 January 2014; and
- meeting with all parties – 6 February 2014.

2.2.2 In addition to the above, teleconferences were held between National Grid, Mott MacDonald (Civil Engineers working on behalf of National Grid), Curtins and JMP on a weekly basis throughout December 2013 and January 2014.

2.2.3 The key focus of the consultation meetings was to discuss the scope of the documents to accompany the DCO application, agreeing the highway links to be used by construction traffic and agreement in principle on the location and form of the Proposed Development bellmouths.

2.2.4 Where comments were provided these were incorporated into the proposals as appropriate. These particularly related to the location of access positions and the proposed construction routes to be used by the construction traffic.

2.2.5 Subsequently, the scope of the ES and TA was agreed through an iterative consultation process along with the construction access routes to be used (subject to the appropriate mitigation), and the location and form of the vehicular access points to the development (in principle).

3 POLICY, LEGISLATION AND GUIDANCE

3.1 Introduction

3.1.1 Discussions with the Local Authorities enabled a full list of policy and legislation to be confirmed for consideration throughout the development of the TA.

3.2 National Policy and Planning Guidance

3.2.1 Relevant national policy and guidance includes:

- National Policy Statements (NPS);
- National Planning Policy Framework (NPPF);
- DfT Circular 02/13, The Strategic Road Network and The Delivery of Sustainable Development, 2013; and
- DfT Guidance on TA 2007.

<u>National Policy Statements</u>

3.2.2 The Overarching NPS for Energy (NPS EN-1) sets out the Government's policy for delivery of major energy infrastructure projects.

3.2.3 The energy NPSs set out national policy against which proposals for major energy projects will be assessed and decided on by the National Infrastructure Directorate (NID) within the Planning Inspectorate. NID will use NPSs in its examination of applications for development consent, and Ministers will use them when making decisions.

3.2.4 EN-1 advises that the transport of materials, goods and personnel to and from a development during all project phases may result in economic, social and environmental effects. The policy makes clear where appropriate mitigation measures are to be implemented. This is discussed in paragraph 5.13.8:

"Where mitigation is needed, possible demand management measures must be considered and if feasible and operationally reasonable, required, before considering requirements for the provision of new inland transport infrastructure to deal with remaining transport impacts." (Ref.TA.1)

3.2.5 Paragraph 5.13.10 also states that:

'Water-borne or rail transport is preferred over road transport at all stages of the project where cost-effective.' (Ref.TA.1)

3.2.6 The policy states the following at paragraph 5.13.3:

"If a project is likely to have significant transport implications, the applicants ES – (See section 4.2) should include a Transport Assessment, using the NATA/WebTAG139 methodology stipulated in Department for Transport guidance 140, or any successor to such methodology. Applicants should consult the

Highways Agency and Highways Authorities as appropriate on the assessment and mitigation."

National Planning Policy Framework

3.2.7 The NPPF sets out the current national transport planning policy for the town and country planning regime and outlines the important role that transport policies have to play in facilitating sustainable development. However, it should be noted that the NPPF does not set policy for testing the acceptability of NSIP.

3.2.8 From the outset, the Minister for Planning's Foreword lays the foundations for current policy thinking:

"The purpose of planning is to help achieve sustainable development…Development means growth. We must accommodate the new ways by which we will earn our living in a competitive world. We must house a rising population, which is living longer and wants to make new choices. We must respond to the changes that new technologies offer us. Our lives, and the places in which we live them, can be better, but they will certainly be worse if things stagnate." (Ref.TA.2)

3.2.9 Paragraph 14 states that at the heart of NPPF is a:

"…presumption in favour of sustainable development, which should be seen as a golden thread running through both plan making and decision making." (Ref.TA.2)

3.2.10 For decision making this means granting permission unless:

"…any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies." (Ref.TA.2)

3.2.11 Paragraph 32 of the NPPF states that:

"Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe." (Ref.TA.2)

3.2.12 In principle, the NPPF supports the development of low carbon energy and sustainable development. It is anticipated the Proposed Development would not contradict the policies relating to transport in the NPPF.

3.2.13 Throughout the NPPF and other national or local policy and guidance, Travel Plans are frequently referenced. Paragraph 36 of the NPPF states that:

"All developments which generate significant amounts of movement should be required to provide a Travel Plan."

3.2.14 The requirement for a Travel Plan has been discussed and a number of measures identified in section 16 of this report.

<u>Circular 02/13 The Strategic Road Network and The Delivery of Sustainable Development, 2013</u>

3.2.15 Circular 02/13 demonstrates the way in which the HA will engage with communities and the development industry to deliver sustainable development. Paragraph 12 states that:

"…most efficient use of the limited available capacity on the strategic road network, and because additional physical capacity is difficult, costly and takes time to provide, the HA will engage in the Local Plan process to reduce the potential for creating congestion on the strategic road network." (Ref.TA.3)

3.2.16 Paragraph 17 states that the HA will:

"…work with local authorities and developers to identify opportunities to introduce travel plan measures for individual developments and groups of development that will support sustainable transport choice." (Ref.TA.3)

3.2.17 Paragraph 45 goes onto to note that:

"…developers must ensure all environmental implications associated with their proposals, are adequately assessed and reported so as to ensure that the mitigation of any impact is compliant with prevailing policies and standards." (Ref.TA.3)

Guidance on Transport Assessment, 2007

3.2.18 The Guidance on TA is intended to assist in the determination of what level of assessment may be required for a certain development, and what should be included in the scope. The guidance defines a TA as being:

"…a comprehensive and systematic process that sets out transport issues relating to a Proposed Development. It identifies what measures would be taken to deal with the anticipated transport impacts of the scheme and to improve accessibility and safety for all modes of travel, particularly for alternatives to the car such as walking, cycling and public transport." (Ref.TA.4)

3.2.19 The guidance outlines the following 'Principles of the Assessment':

- ***Encouraging environmental sustainability*** *– by reducing the need to travel (especially by car), tackling the environmental impact of travel, ensuring the accessibility of the location and considering measures which may assist in influencing travel behaviour.*
- ***Managing the existing network*** *– by making the best possible use of existing transport infrastructure and managing access to the highway network.*
- ***Mitigating residual impacts*** *– through demand management, improvements to the local public transport network and walking/cycling facilities, minor physical improvements to existing roads and thee provision of new/expanded routes.* (Ref.TA.4)

3.2.20 The guidance clearly states that, *"A detailed TA would be required where a Proposed Development is likely to have significant transport and related environmental impacts."* It goes on to outline the following issues to be addressed in the assessment:

- *"**Reducing the need to travel, especially by car** – ensure, at the outset that thought is given to reducing the need to travel; consider the types of uses (or mix of uses) and the scale of development in order to promote multipurpose or linked trips.*
- ***Sustainable accessibility** – promote accessibility by all modes of travel, in particular public transport, cycling and walking; assess the likely travel behaviour or travel pattern to and from the proposed site; and develop appropriate measures to influence travel behaviour.*
- ***Dealing with residual trips** – provide accurate quantitative and qualitative analyses of the predicted impacts of residual trips from the Proposed Development and ensure that suitable measures are proposed to manage these impacts.*
- ***Mitigation measures** – ensure as much as possible that the proposed mitigation measures avoid unnecessary physical improvements to highways and promote innovative and sustainable transport solutions."* (Ref.TA.4)

3.2.21 **Inset 3.1** below has been taken from the guidance. It demonstrates the interrelationships between the contents of a TA.

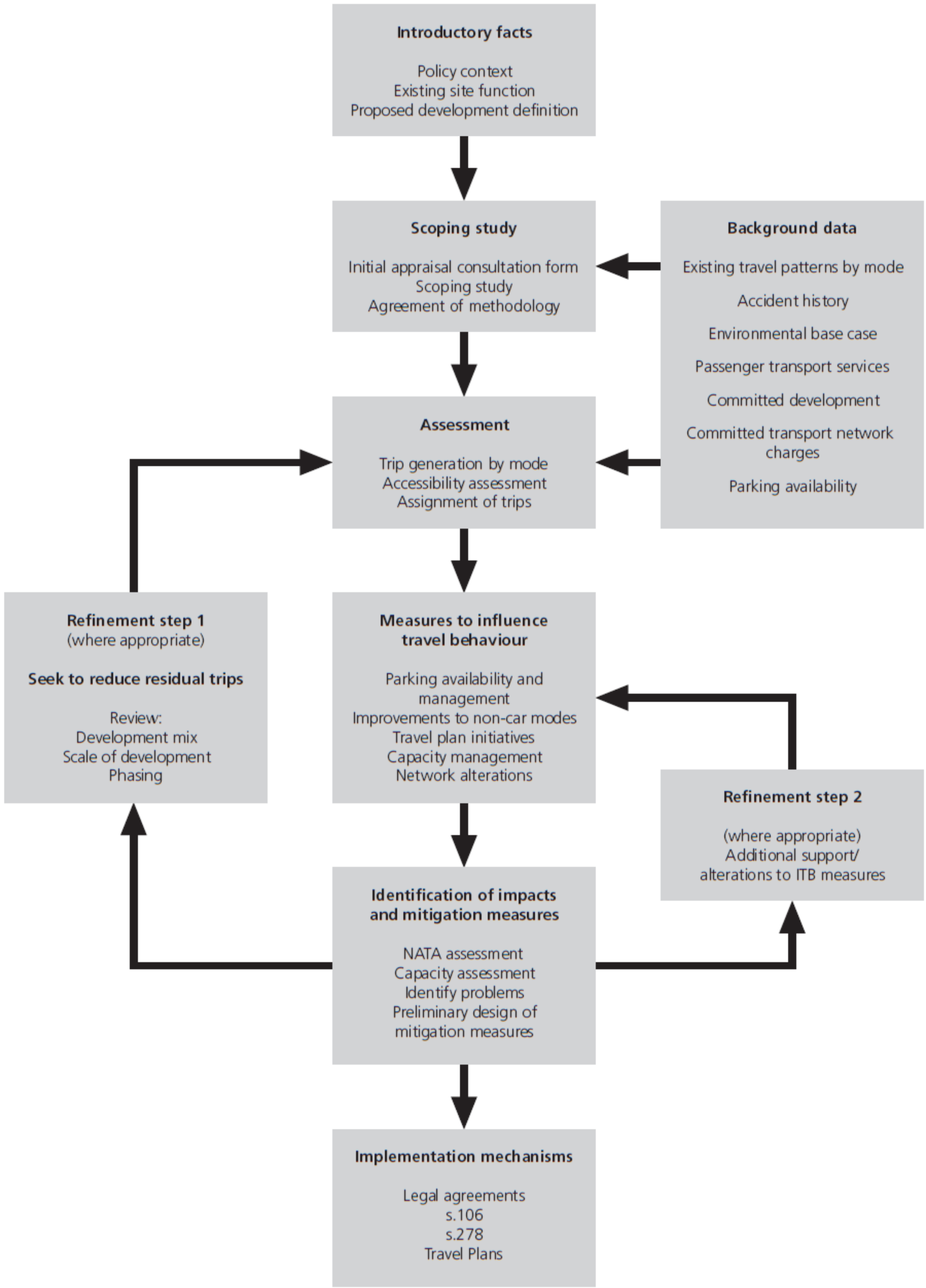
3.2.22 The guidance outlines the following headings for analysis of existing conditions. These have subsequently been used to help identify the requirements for the baseline description:

- existing site information;
- baseline transport data;
- public transport;
- walking/cycling assessment;
- road network assessment;
- traffic data and traffic forecast; and
- safety considerations and accident analysis.

3.2.23 It also outlines the following objectives, against which the the predicted impact of the Proposed Development should be analysed. These have subsequently been used to help define the remaining structure of the TA:

- ***Environmental** – impact involves reducing the direct and indirect impacts of transport facilities on the environment of both users and non-users.*
- ***Safety** – concerned with reducing the loss of life, injuries and damage to property resulting from transport incidents and crime.*
- ***Economy** – concerned with improving the economic efficiency of transport.*
- ***Accessibility** – concerned with the ability with which people can reach different locations and facilities by different modes.*
- ***Integration** – aims to ensure that all decisions are taken in the context of the Government's integrated transport policy.* (Ref.TA.4)

Inset 3.1: Interrelationships between the Contents of a Transport Assessment



3.2.24 The Guidance on TA has been referred to throughout scoping, and has been utilised for the compilation of this assessment. It has been used to influence the methodology for the following aspects of this document:

- calculating vehicular trip generation;
- trip distribution and assignment;
- travel planning; and
- mitigation measures.

3.3 Local Policy and Guidance

3.3.1 Relevant local policy (see **Volume 5.4.2, Appendix 4A**) and guidance considered includes:

- WSC Local Plan 2012 to 2032 (2012);
- Hinkley Point C Project Supplementary Planning Document (2011) (a joint document prepared by SDC and WSC);
- Sedgemoor Core Strategy 2006-2027 (2011);
- PPS1 Supplement Study: Planning and Climate Change (2010);
- Bridgwater Vision (2009);
- Somerset Future Transport Plan 2011-2026 (2011);
- North Somerset Replacement Local Plan (2007);
- NSC Core Strategy (2012);
- West of England Joint Local Transport Plan 3 2011-2026 (a joint document prepared by NSC, BCC and SGC);
- The Bristol Local Plan (1997);
- Bristol Development Framework Core Strategy (2011);
- Adopted 2nd Review Gloucestershire Structure Plan (1991-2011);
- South Gloucestershire Local Plan (2006); and
- West of England Joint Local Transport Plan 3 2011-2026 (shared with NSC and BCC).

3.3.2 A number of the guidance and policy documents have been discussed below. These are likely to have the greatest influence on the Proposed Development due to the geographical locations of the construction routes and bellmouths

3.3.3 Like the NPPF, local planning policy does not set policy for testing the acceptability of NSIP.

3.3.4 A number of the local planning policies identified within the plans referred to above (North Somerset Local Plan Policy T7 and South Gloucestershire Local Plan Policy T6) relate to the preservation of the amenity and safety of Public Rights of Way (PRoW) and other forms of access. PRoW and other public accesses have been identified as part of the baseline environment. Where the Proposed Development is considered likely to have an adverse effect on access (including PRoW), mitigation is proposed, including diversion routes proposed during construction, which is detailed in the Draft CEMP (**Volume 5.26.1**).

3.3.5 The remaining policies (Sedgemoor District Core Strategy policy D10 and South Gloucestershire saved Local Plan policy T12) set the policies against which the impacts of the Proposed Development are assessed. The Local Transport Plans, provide a range of strategic objectives for transport. As part of the Traffic Assessment, the impacts of construction traffic on local roads and public amenity have been assessed and proposals to reduce the effects of construction are detailed in the Draft CTMP (**Volume 5.26.5**).

West of England Joint Local Transport Plan 3 2011-2026

3.3.6 The West of England Joint Local Transport Plan 3 was approved by SGC on 15th December 2010, BCC and NSC on 18th January 2011, and Bath and North East Somerset Council on 20th January 2011. It aims to achieve an:

"…affordable, low carbon, accessible, integrated, efficient and reliable transport network to achieve a more competitive economy and better connected more active and healthy communities." (Ref.TA.5)

Somerset's Future Transport Plan 2011 — 2026

3.3.7 Somerset's Future Transport Plan 2011 — 2026 (FTP) replaced SCC Second Local Transport Plan (LTP2) in April 2011 and sets out a long-term strategy for helping to deliver transport priorities up until 2026.

3.3.8 The FTP contains the following aims:

- *"Help communities help themselves with regard to transport improvements;*
- *Assisting people to make smarter travel choices;*
- *Assisting people in being more active by providing more opportunities to travel in a healthy way;*
- *Manage the effect transport-related noise has on communities;*
- *Work with developers to ensure they take in to account the way people travel, and how people travel to access services;*
- *We will help hauliers choose the most appropriate routes and work to improve communication between communities and the hauliers that serve them; and*
- *Encourage people to cycle and make more trips on foot."* (Ref.TA.6)

Hinkley Point C Project Supplementary Planning Document (SPD)

3.3.9 The Hinkley Point C SPD recognises that the development of a nuclear power station is of national importance. However, there are concerns about the impact on the highway network, and paragraph 1.3 states that:

"Given the scale of development and intensity of construction activity connected with the project, any strategies should seek to avoid unacceptable impacts on landscape, the natural environment, highways infrastructure, the quality of life for

local residents, and impacts in terms of inward investment by other business sectors." (Ref.TA.7)

Bridgwater Vision (2009)

3.3.10 The Bridgwater Vision document sets out a clear aim for the area:

"To develop a 'spatial' vision for Bridgwater in order to bring about place transformation and help to create distinctiveness with a re-vitalised image and economic base, effectively repositioning the town." (Ref.TA.8)

3.3.11 Central to this strategy is the completion of seven projects. These comprise:

Project 1 – Northgate/Docks Renaissance;
Project 2 – The Clink;
Project 3 – Station Gateway;
Project 4 – Westgate;
Project 5 – Bridgwater Riverside;
Project 6 – Celebration Mile; and
Project 7 – The River.

3.3.12 None of the projects are directly affected by the construction access routes proposed as part of the Proposed Development. Furthermore, these are long term projects with implementation periods of up to 30 years, and therefore there should be minimal conflict between construction traffic.

3.3.13 Bridgwater Vision supports the general principles of sustainable development and of low carbon energy.

North Somerset Council Core Strategy

3.3.14 Of the policies within the North Somerset Core Strategy, of particular relevance to Transport and the Proposed Development is CS10: Transport and Movement. It states:

"Travel management policies and development proposals that encourage an improved and integrated transport network and allow for a wide choice of modes of transport as a means of access to jobs, homes, services and facilities will be encouraged and supported."

3.3.15 It outlines the following schemes of relevance to the Proposed Development:

- *"M5 Junction 19 improvements;*
- *Reopening of the Portishead to Bristol line for passenger services, or its use for bus rapid transit; and*
- *Junction 21 Bypass or Relief Road."*

3.3.16 In addition, Policy T/10 of the North Somerset Replacement Local Plan is focused on safety, traffic and the provision of infrastructure associated with development. It is a policy to ensure new development does not prejudice highway safety. The highway safety impact is considered in section 12.4 of this report.

4 DEVELOPMENT PROPOSALS

4.1 Introduction

4.1.1 This section of the report provides a description of the Proposed Development, focussing on those aspects with direct influence over traffic and transportation. The section includes a summary of the project description, discussing: the modification, construction and removal of the overhead lines and underground cables; construction of the cable sealing end (CSE) compounds; outlines the associated highway works and ancillary works; details the location of the laydown areas and compounds; provides a summary of the proposed components of the construction project (by section); and provides a preliminary construction programme.

4.1.2 This section also discusses the traffic and transportation characteristics of the Proposed Development including the bellmouth and haul road designs, locations and construction methodologies.

4.1.3 This section goes onto discusses the predicted number of staff to be employed on the construction project including the anticipated local and non-local quantities of staff.

4.1.4 The Proposed Development is located across the south west of England, crossing the administrative boundaries of the following authorities:

- SCC;
- WSC – SCC;
- SDC – SCC;
- NSC; and
- BCC.

4.1.5 To manage the assessment and presentation of environmental information, ‘Sections’ have been identified along the route of the 400kV connection from Bridgwater to Seabank based on areas of similar landscape character (Sections A-G inclusive). An additional Section has been defined based on the area of works for the Hinkley Line Entries (Section H). The sections are set out below and are shown at **Volume 5.1.2, Figure 1.1**.

- Section A – Puriton Ridge;
- Section B – Somerset Levels and Moors South;
- Section C – Mendip Hills;
- Section D – Somerset Levels and Moors North;
- Section E – Tickenham Ridge;
- Section F – Portishead;
- Section G – Avonmouth; and
- Section H – Hinkley Line Entries.

4.2 Project Description Summary

4.2.1 The proposed Hinkley Point C Connection project includes the following principal elements, each of which is considered in more detail below:

- construction of a 57km 400kV electricity transmission connection between Bridgwater in Somerset and Seabank, near Avonmouth, comprising:
  - installation of a 400kV overhead line; and
  - installation of 400kV underground cables.
-
- modifications to existing overhead lines at Hinkley Point, Somerset;
- construction of three 400kV cable sealing end (CSE) compounds along the route of the connection;
- construction of a 400/132kV substation at Sandford, North Somerset;
- extension of the existing 400kV substation at Seabank;
- The removal of existing 132kV overhead lines and the construction of replacement 132kV overhead lines and 132kV underground cables;
- extensions/modifications to existing 132kV substations at Churchill, Portishead, Avonmouth and Seabank;
- associated works, for example, temporary access roads, highway works, temporary construction compounds, scaffolding, work sites and ancillary works.

4.2.2 The Proposed Development is discussed in detail in **Volume 5.3.1** and the Proposed Development Plans are provided within **Volume 5.3.3, Figures 3.1 – 3.2**.

4.2.3 **Table 4.1** below details the Proposed Development components by Section.

Table 4.1 Sections and Proposed Development Components

Proposed Development Component	**Section(s)**
400kV Overhead Line Construction of a new 400kV overhead line of approximately 4.5km from the existing Hinkley to Bridgwater 275kV overhead line on Horsey Level (which would be uprated to 400kV operation) to the existing Hinkley to Melksham 400kV overhead line north of Woolavington. Construction of a new 400kV overhead line of approximately 12.75km from the existing Hinkley to Melksham 400kV overhead line north of Woolavington to a proposed CSE compound south of the Mendip Hills and the River Axe.	A and B
400kV Overhead Line Construction of a 400kV overhead line from the proposed Sandford Substation to Seabank Substation. In the Portishead/Portbury area two options are included within the DCO application: National Grid's preferred route (Option A); and an alternative route (Option B). The total length of Option A is approximately 29.8km and 31.2km for Option B.	D, E, F and G

Proposed Development Component	Section(s)
Modifications to the Overhead Lines at Hinkley Point	H
CSE Compounds Two single circuit CSE compounds of approximately 34m by 30m are proposed on Horsey Level, north of Bridgwater. A double circuit CSE compound of approximately 65m by 40m is proposed adjacent and east of the M5 motorway to the south of the Mendip Hills and the River Axe.	A (Horsey Level) B (South of Mendip Hills)
400kV Underground Cables These comprise approximately 300m of underground cables between two single circuit CSE compounds on Horsey Level, north of Bridgwater and approximately 8.5km of underground cables between a CSE compound south of the Mendip Hills and the proposed Sandford Substation.	A (Horsey Level) B, C and D (between CSE compound and Sandford Substation
Removal of Existing 132kV Overhead Lines • Approximately 53.2km of the existing overhead line (**F and G Route**) between Bridgwater and Avonmouth substations. • Approximately 9km of the existing overhead line (**W Route**) between Nailsea and Portishead Substation (to be replaced with 132kV underground cables). • Approximately 1.5km of the existing overhead line (**AT Route**) to the south of Puxton. • Approximately 550m of the existing overhead line (**N Route**) near Mead Lane, Sandford. • A short section of the existing overhead line (**BW Route**) between Portishead and Avonmouth to achieve a crossing of electrical circuits (to be replaced with 132kV underground cables). • Approximately 2.1km of existing overhead line (**G Route**) from the existing Avonmouth Substation northwards (to be replaced with 132kV underground cables). • A short section of three existing 132kV overhead lines (**G, DA and BW Routes**) in the vicinity of Seabank Substation to achieve a crossing of electrical circuits (to be replaced with 132kV underground cables).	A, B, C, D, E, F and G (F and G Route) D, E and F (W Route) D (AT and N Route) F and G (BW Routes) G (G Route) G (G, DA and BW Routes at Seabank)
Sandford Substation	D
Construction of 132kV Overhead Lines 132kV overhead line connections are required between the proposed Sandford Substation and the existing overhead lines feeding Weston-super-Mare (**AT Route**) (2.3km) and Churchill (**N Route**) (285m) and between Churchill Substation and an existing overhead line that currently passes by the substation (264m).	D

Proposed Development Component	Section(s)
Construction of 132kV Underground Cables • A short section of approximately 220m of underground cable (**Y Route**) to connect Churchill Substation with an existing overhead line that currently passes by the substation. • Approximately 600m of underground cables (**AT Route**) in the vicinity of the proposed Sandford substation. • Approximately 10km of underground cables (**W Route**) between Nailsea and Portishead Substation. • Approximately 2.3km of underground cables (**G Route**) between the existing Avonmouth substation and just south of the Bristol to Avonmouth railway line. • A short section of approximately 170m for Option A and 620m for Option B of underground cable (**BW Route**) to allow the 400kV overhead line to cross an existing 132kV overhead line to the north east of Portishead. • Three short sections of underground cable (**G, DA and BW Routes**) of between 150m and 300m to allow the 400kV overhead line to cross three existing 132kV overhead lines in the vicinity of Seabank Substation.	D (Y and AT Routes) D, E and F (W Route) F and G (BW Routes) G (G Route) G (G, DA and BW Routes at Seabank)
Seabank 400kV Substation Extension	G
Extensions/Modifications to Existing 132kV Substations Modifications are required to existing 132kV substations at Churchill, Portishead, Avonmouth and Seabank.	D (Churchill) F (Portishead) G (Avonmouth and Seabank)
Associated Works These include temporary masts and supports for overhead line construction, temporary and permanent access roads, modifications to the highway network and construction storage and working areas.	A, B ,C, D, E, F, G and H

4.3 Preliminary Construction Programme

4.3.1 A preliminary construction programme is provided in **Table 4.2** below.

Table 4.2 indicative Construction Programme

Proposed Development Component	Proposed Start Date	Proposed Finish Date
400kV Overhead Line 400kV Route	Q1 2016	Q3 2019
400kV Cable Mendip Hills Route	Q4 2015	Q3 2019
Bridgwater Tee 400kV Cable Route	Q1 2016	Q4 2016

Proposed Development Component	Proposed Start Date	Proposed Finish Date
AT Route Underground and Overhead Line	Q4 2017	Q2 2018
W Route	Q4 2015	Q3 2017
BW Route Avonmouth Option A	Q4 2015	Q2 2017
BW Route Portishead Option B	Q4 2015	Q2 2017
G Route	26/06/2017	Q2 2018
Seabank BW, G, DA Routes	Q1 2016	Q2 2018
N Route Overhead Line	Q4 2017	Q2 2018
Hinkley Line Entries	Q1 2016	Q4 2018
Y Route Churchill	Q4 2016	Q3 2017
W Route Churchill	Q4 2016	Q3 2017
Sandford 400/132kV Substation	Q3 2016	Q3 2018
Seabank 400/132kV Substation	Q3 2017	Q3 2019
Churchill 132/33kV WPD Substation	Q4 2015	Q3 2017
Portishead 132/33kV WPD Substation	Q2 2017	Q3 2017
Avonmouth132/33kV WPD Substation	Q4 2017	Q2 2018
Removal of Southern Half F Route	Q3 2017	Q3 2018
Removal of Northern Half F Route	Q3 2018	Q4 2019
Removal of 132kV G Route	Q2 2018	Q4 2019

4.4 Construction Compounds/Laydown Areas

4.4.1 During the construction of the Proposed Development a total of 23 construction compounds are proposed. Within each compound there will typically be a laydown area for the temporary storage of plant and materials, a number of welfare cabins and in some instances a small number of car parking spaces.

4.4.2 The location of each of the proposed construction compounds is shown on the Proposed Development Plans (see **Volume 5.3.3, Figures 3.1 – 3.2**) and discussed below.

<u>Bridgwater Tee (Bath Road) Compound</u>

4.4.3 The Bridgwater Tee Compound is proposed to be approximately 0.4 hectares in size. The A39 Bath Road lies immediately to the east, and the King Sedgemoor Drain is approximately 150m to the north.

4.4.4 It is proposed that the compound is assessed by a bellmouth directly off Bath Road. From the site, Junction 23 of the M5 can be accessed via the A39 Bath Road and Puriton Hill in approximately 2.1km.

A38 Bristol Road Compounds

4.4.5 Two construction compounds are proposed to the north of the A38 at Rooks Bridge. These compounds will be bisected by the OHL. One to serve the proposed overhead line components of the scheme the other the underground cable components. The proposed combined size of the compounds is approximately 6.4 hectares.

4.4.6 The two compounds would be accessed from a haul road that links to the A38 to the south. From here, Junction 22 of the M5 can be accessed via the A38 in approximately 6.8km. A haul road would also be constructed to the north of the compounds to connect with other National Grid bellmouths, compounds, laydown areas and connection to the LRN.

South of the Mendip Hills (Hams Lane) Compound

4.4.7 Approximately 1.5km to the north of the A38 Bristol Road Compounds proposals include the provision of another compound also accessed via the haul road from the A38 Bristol Road.

4.4.8 It is proposed the Hams Lane Compound will be approximately 2.8 hectares in size.

Barton Road and Castle Hill Compounds

4.4.9 The Barton Road Compound is proposed to be approximately 2.4 hectares in size while the Castle Hill Compound is proposed to be 1.3 hectares. The two compounds would be approximately five km apart with the Barton Road Compound located to the south of the Castle Hill Compound.

4.4.10 It is anticipated that both compounds will be accessed via the haul road that links the A38 Bristol Road in the south with the A368 Station Road located to the north.

4.4.11 From the compounds, Junction 22 of the M5 can be accessed via the haul road and the A38.

Towerhead Road Compound

4.4.12 The proposed Towerhead Road Compound would be approximately 2.6 hectares in size. The A368 Towerhead Road lies adjacent to the south.

4.4.13 The area would be served directly by a bellmouth to be constructed off the A368 Towerhead Road which forms part of the agreed construction access routes. From the site, Junction 22 of the M5 can be accessed via the A368 and the A38 in approximately 18km. Again this route forms part of the agreed routing strategy.

4.4.14 A haul road would also be constructed to the north of the compounds to connect with other National Grid bellmouths, compounds, laydown areas and connection to the LRN.

Sandford Substation Compound

4.4.15 The proposed Sandford Substation Compound would be approximately 2.0 hectares in size and located adjacent to the proposed substation site to the west of Nye Road.

4.4.16 Again it is proposed that the compound will be accessed via haul road from the same access that will serve the Towerhead Road Compound from the A368 Towerhead Road.

4.4.17 The compound would also access the SRN and Junction 22 of the M5 via the same route for the Towerhead Road Compound.

AT Route Overhead Line Compound

4.4.18 It is proposed that a further compound (approximately 1.1 hectares in size) is located adjacent to the Sandford Substation Compound. This would utilise the same access points from Towerhead Road as the adjacent Towerhead Road and Sandford compounds.

Churchill Compound

4.4.19 The Churchill Compound is proposed to be located directly to the north of B3133 Stoke Lane and will be approximately 7.9 hectares in size.

4.4.20 It would be accessed via a bellmouth off Iwood Lane. From here traffic would access the SRN via the B3133, the A8 and Junction 22 of the M5. This route is approximately 20km in length.

Engine Lane Compound

4.4.21 The proposed Engine Lane Compound would be approximately 1 hectare in size. The proposed access to this compound would be via Engine Lane, Queens Road, Mizzymead Road, Stockway South and North, and Clevedon Road (B3130) to the M5 (Junction 20).

Nailsea Compound

4.4.22 The proposed compound woud be approximately 1.3hectares in size and is located to the west of Nailsea. It woud be accessed via a new construction bellmouth located off Hanham Lane.

4.4.23 The compound would be accessed via the agreed routing strategy via Queens Road and those links to be used to gain access to the Engine Lane Compound.

Church Lane and Clevedon Road Compounds

4.4.24 The Church Lane and Clevedon Road compounds are proposed to be 0.7 and 0.2 hectares in size respectively. The Church Lane Compound would be located to the south of the B3130 Clevedon Road and access is proposed via Washing Pound Lane.

4.4.25 The Clevedon Road Compound would be located to the north of the B3130 Clevedon Road and would be accessed via a bellmouth directly from it.

Whitehouse Lane Compound

4.4.26 The proposed Whitehouse Lane Compound would be approximately 0.8 hectares in size and located adjacent to Whitehouse Lane and Cuckoo Lane.

4.4.27 Cuckoo Lane forms part of the agreed construction routes and a bellmouth would be constructed to serve the Proposed Development. It would also be connected via haul road.

4.4.28 It is anticipated that vehicles accessing this compound would travel from the SRN via the B3130 Clevedon Road and access the M5 at Junction 20.

Caswell Hill Compound

4.4.29 The proposed Caswell Hill Compound would be approximately 0.8 hectares in size and is located to the east of Caswell Hill and to the south of Caswell Lane.

4.4.30 The compound would be served by a bellmouth directly off Caswell Hill. From the compound, Junction 19 of the M5 can be accessed via the proposed haul road and the The Portbury Hundred.

Sheepway Compound

4.4.31 The Sheepway compound is proposed to be approximately 0.8 hectares in size and accessed via the haul road linking both The Portbury Hundred and Sheepway. From here access to the M5 would be via Junction 19.

BW Route Underground Cable West Compound

4.4.32 It proposed the compound would be approximately 0.6hectares in size and would be accessed from the haul road that connects to Caswell Lane via Sheepway.

4.4.33 Access to the SRN would be primarily via The Portbury Hundred and Junction 19 of the M5.

BW Route Underground Cable East Compound

4.4.34 The proposed compound would be approximately 0.4 hectares in size and would be located adjacent to Marsh Lane.

4.4.35 Access to the compound is proposed via the Royal Portbury Dock Road and in turn Junction 19 of the M5.

St Andrews Road Compound

4.4.36 The compound would be located adjacent to St Andrew's Road in Avonmouth with access proposed directly from it. From here Junction 19 of the M5 can be reached in approximately 1.5km to the south.

4.4.37 It is proposed that the compound would be approximately 0.6 hectares in size.

King Weston Lane Compound

4.4.38 The proposed compound would be approximately 0.3 hectares in size and would be accessed via a new construction bellmouth from King Weston Lane.

4.4.39 From here the M5 can be accessed via St Andrews Road and Crowley Way.

G Route Underground Cable Compound (East of M49)

4.4.40 The G Route UGC compound is proposed to be approximately 1.1 hectares in size and would be located to the east of the M49 approximately 500m from the King Weston Lane Compound.

4.4.41 It is proposed access to the G Route UGC compound would be via the King Weston Lane bellmouth.

<u>Seabank (Severn Road) Compound</u>

4.4.42 The proposed Seabank Compound would be approximately 1.2 hectares in size and would be accessed directly from Severn Road.

4.4.43 From here access to the M5 would be via agreed construction routes which include Severn Road, Chittening Road, St Andrew's Road and Crowley Way.

4.5 Laydown and Compound Area – Parking Provisions

4.5.1 There would be no parking provision made for staff or private vehicles. Staff transportation to site is discussed in section 7 of this TA. Parking provision within the laydown areas will be solely for operational vehicles, site engineers, site visitors, delivery vehicles and staff welfare vans. The parking spaces provided within the compound and laydown areas are therefore short term parking spaces. All vehicle movements have been accounted for within the prediction traffic generation data provided by National Grid.

4.5.2 Staff vehicles will be left at their accommodation and will not be brought to site or parked on surrounding streets.

4.6 Substations

4.6.1 A single substation would be constructed as part of the Proposed Development, this being in Section D (Sandford). In addition to the new substation there would be modifications to the Churchill Substation in Section D, the Portishead Substation in Section F, and to the Avonmouth and Seabank Substations in Section G.

4.6.2 Each of the substations has been described in relation to access and the surrounding road network below.

<u>Sandford Substation</u>

4.6.3 Sandford Substation would be situated to the west of Drove Way and Nye Road, approximately 800m north of the A368. Access is to be taken from Drove Way, with and additional AIL access taken from the A368. This would take the form of a Haul Road to the east of the site, which heads south over Mead Lane to the A368.

4.6.4 From the site, the A368 can be accessed via a priority junction with Nye Road approximately 1.1 km south of the site access on Drove Way. Nye Road has a 7.5T vehicle weight restriction. As previously explained, AIL access would be achieved by a haul road to the west of the site using an access from the A368. This would join the A368 approximately 900m west of the priority junction with Nye Road. From here, all construction traffic must travel east along the designated construction route to the A38. Junction 21 of the M5 can be accessed in approximately 15.8km via the B3133 through Congresbury, and then west along the A370.

4.6.5 Once operational the substation would be unmanned and would be accessed for maintenance via a permanent access from Nye Road.

<u>Churchill Substation</u>

4.6.6 Churchill Substation is situated to the north of the B3133 Stock Lane and west of Wood Lane to the south east of Congresbury. Works would involve upgrading the substation from 132kV capability to 400kV.

4.6.7 Access is currently taken off the B3133, and this will remain the case throughout the duration of the works. From the access, all construction traffic must travel west along the designated construction route through Congresbury and then west along the A370. Junction 21 of the M5 is accessed in approximately 9.3km.

<u>Portishead Substation</u>

4.6.8 Portishead Substation is currently situated at the eastern edge of Portishead town. Works would involve upgrading the substation from 132kV capability to 400kV.

4.6.9 Access is currently taken off an unnamed road, but there would be two Haul Roads constructed to provide access to Sheepway approximately 900m to the south, and to The Drove approximately 1.4km to the east. From the site via the haul road to the south, Junction 19 of the M5 is accessed via Sheepway, Station Road and The Portbury Hundred in approximately 2.5km. From the site via the haul road to the east, Junction 19 of the M5 is accessed via The Drove, Portbury Way, and The Royal Portbury Dock Road in approximately 3.3km.

<u>Avonmouth Substation</u>

4.6.10 Avonmouth Substation is situated along Avonmouth Way to the north of Junction 18A of the M5. Works would involve upgrading the substation from 132kV capability to 400kV.

4.6.11 Access is currently taken off Avonmouth Way, and this will be retained throughout the works. From the site, construction traffic would travel west along Avonmouth Way down the designated construction access route to Junction 18A of the M5. Access to the M5 is achieved in approximately 900m.

<u>Seabank Substation</u>

4.6.12 Seabank Substation is situated to the north and east of The A403 Severn Road. Works would involve upgrading the substation from 132kV capability to 400kV.

4.6.13 Access is currently taken off Severn Road and this would be retained throughout the works.

4.7 Traffic and Transportation Development Characteristics

4.7.1 To provide suitable access to the various locations of the construction works associated with the Proposed Development, a routeing and access assessment has been undertaken to establish:

- appropriate routeing for construction vehicles and staff;
- access locations from the LRN;
- haul roads from the accesses to the construction works (sites, compound, laydown areas);
- major road crossings;
- pedestrian and cycle networks;
- PRoW; and
- staff transportation.

4.7.2 Vehicle routeing on the existing highway network to gain access to the Proposed Development is discussed in detail in section 7of this TA.

4.7.3 Following construction of the Proposed Development it is anticipated that all haul roads and bellmouths will be removed. It is however, anticipated that some of the accesses may be requested by local farmers or land owners for the infrastructure to remain. This would require the individual to liaise formally through the planning process with the relevant LPA.

4.7.4 The haul road stone and aggregate removed will be offered to the local land owners before being taken off-site.

Accesses (Bellmouths)

4.7.5 Bellmouths would be installed on the LRN to facilitate vehicle connection between the LRN and the haul roads. Each bellmouth would be designed on a site by site basis. Discussions regarding the locations, design and visibility splays of the bellmouths have been undertaken through the consultation process with the LPAs.

4.7.6 The locations of the bellmouths are shown at **Volume 5.22.3, Figure 22.1** and have been agreed in principle with the LPAs. A full technical design for each bellmouth will be undertaken for each site on a site by site basis and would be subject to technical approval by each LPA.

4.7.7 Bellmouths would typically be priority junctions however, through the consultation and design process, it has been established that there may be bellmouth locations which would require temporary traffic management (TTM) and temporary signalisation. This will be established at the detailed design stage which will be conducted in consultation with the LPAs.

4.7.8 10m into each bellmouth access (from the road line) a lockable gate would be installed along the line of the easement fencing. All bellmouths would be designed using current design standards, however, variations may be required to reflect site specific conditions on the LRN, i.e. longer than standard visibility splays may be required to ensure road safety.

4.7.9 Other variations to the bellmouth designs would be related to the wheel cleansing facilities which would be required as part of the mitigation strategy of the CTMP.

4.7.10 Priority or signalised bellmouth designs would follow current design guidelines required for any access or junction on the public highway. As such this would include the installation of signage (semi-permanent) to assist with construction vehicle drivers, staff and general public. In addition, bellmouths would require the installation of white lining as appropriate to their location and site specific conditions. Any white lining that needs to be replaced or newly installed can be completed once the road has been fully reinstated up to ground level. Bellmouths would all be two-way working and suitable passing space would be provided at the accesses to allow two vehicles to pass at once.

Crossover Bellmouths

4.7.11 Bellmouth crossovers are bellmouths where the construction route crosses an existing road, typically these would be installed on haul road links over rural roads. These are also shown on **Volume 5.22.3, Figure 22.1**. The layout and designs of the crossover bellmouths would be site specific and all designs and layouts would be submitted to the LPAs as part of the detailed design process. Temporary traffic management (TTM) would be employed during the construction and operation of the crossover bellmouths. Priority would remain for local highway users.

Bellmouths Types

4.7.12 There are three types of bellmouth which are to be installed as part of the construction routeing discussed above, these being:

- Type 1 – Bi-directional access and egress;
- Type 2 – Uni-directional access and egress; and
- Type 3 – Crossovers.

4.7.13 The Type 1, Bi directional access and egress would be installed at locations on the LRN where there is sufficient space for the bellmouth and the bellmouth would not be constrained by localised conditions or features. As shown on the plan the typical Type 1 bellmouth would measure 35m in width and allows for two vehicles to pass simultaneously. A 15m off street area is provided for vehicles to move onto from the public highway and a 10m recessed space for the departing vehicle to use to allow opposing vehicles to pass. The Type 1 bellmouth allows for access and egress left and right turn movements.

4.7.14 The Type 2, Uni-directional access and egress would be installed at locations on the LRN where there is sufficient space for the bellmouth and the bellmouth would not be constrained by localised conditions or features. The typical Type 2 bellmouth would measure 19m in width and allows for two vehicles to pass simultaneously. The nearside carriageway line would be perpendicular to the LRN road and the arrival carriageway has a 15m and a 10m recessed bay which allows the arriving vehicle to wait off the public highway for the departing vehicle to pass. The Type 2 bellmouths allow for left turn only access movements and right turn departure movements only to be made.

4.7.15 The Type 3, Crossover bellmouth access is a crossing point on an existing road on the LRN, where the road would typically be a rural road which would be trafficked by non-construction general traffic. The crossover is provided at a width of 12m on either side with a 15m splay which facilitates vehicle storage off the public highway. A passing space is shown measuring 15m in length with an 8m taper to facilitate passing spaces for opposing vehicles.

4.7.16 **Volume 5.3.3, Figure 3.22** shows the different bellmouth types and includes AUTOTRACK swept path simulations using a Large Tipper (10.201m in length) and a Low Loader (16.633m in length).

4.7.17 The layout and designs of the bellmouths and crossovers, including TTM plans would be site specific and all designs and layouts would be submitted to the LPAs as part of the detailed design. TTM would be employed during the construction, operation and removal of all bellmouths.

Bellmouth - Construction Methodologies

4.7.18 Bellmouth construction and removal methodologies would be subject to final design, alignment, layout, submission to the respective LPAs. The construction methodologies would incorporate all variations to typical construction practices and would include any mitigation measures such as TTM procedures which may need to be implemented.

4.7.19 The full construction methodology for the bellmouths is shown in the 'Hazard Identification/Method Statement and Risk Assessment for the Ducted Road

Crossings and Access Bellmouth Installations' **(see Volume 5.3.2, Appendix 3G (10).**

Haul Roads

4.7.20 Haul roads would be constructed between the bellmouths at the LRN and the construction sites, i.e. pylons, compounds, laydown areas or substations as appropriate.

4.7.21 Regardless of site specific conditions the haul road materials would be delivered by a tipper lorry. The construction would typically be 4m in width with passing bays located at regular intervals (200m) along the haul road to allow for opposing vehicles to pass. Passing bays would be signed for driver information. The passing bays would be constructed of the same material as the haul road and would essentially form an extension of the haul road.

4.7.22 Passing bays would be 16m in length with 2m tapers back to the main haul road at both ends forming a bay with a total length of 20m.

Haul Road – Construction Methodologies

4.7.23 The full construction methodology for the bellmouths is shown in the 'Hazard Identification/Risk Assessment Method Statement for the Installation and Removal of Haul Roads (**Volume 5.3.2, Appendix 3G (9)**).

Erecting and Dismantling Across Major (Netted) Road Crossings – Construction Methodologies

4.7.24 Only after agreement that the circuit is made dead or it is deemed so by the electricity company that there is safe and sufficient clearance for scaffolding to be erected would operatives commence work in erecting scaffolding.

4.7.25 All traffic management organised for the loading/unloading of goods vehicles on public highways while delivering and or collecting materials from/to sites is to be carried out by suitably competent personnel. Approved traffic management will be introduced, agreed with the LPAs and detailed within the CTMP.

4.7.26 Once the scaffolding is erected at either side of the public highway and anchorage in place it is necessary to install netting (stringing) between the two scaffold towers. The following methodology for traffic control would be employed for single carriageway, major 'A' roads, trunk roads, dual carriageways and motorways.

4.7.27 Traffic control measures for single carriageways:

- traffic to be controlled as per agreement with local authority/police usually by one of the following methods: -
- traffic stopped using stop/go boards, along with all other relevant road signs (all as detailed in 'Safety At Street Works and Road Works - 'A Code Of Practice') (Ref TA.9);
- traffic stopped by using traffic lights, along with all other relevant road signs (all as detailed in in 'Safety At Street Works and Road Works - 'A Code Of Practice' (Ref TA.9)); and
- traffic stopped by and with Police presence. All operatives to follow instructions given by police officer in charge. A method to be agreed with police on how their instructions would be relayed to scaffolding operatives/supervision prior to any work commencing.

4.7.28 All personnel involved would wear the appropriate approved pattern high visibility vests.

4.7.29 Traffic control measures for Major ‘A’ Road, trunk roads (dual carriageways motorways:

- traffic to be controlled as per agreement with local authority/police usually by one of the following methods :-
    - traffic controlled by police presence/and their method of working (rolling block etc.); and
    - traffic controlled by method determined by local highways authority, i.e. traffic lights operated by highways personnel, road closures etc.

4.7.30 The sequence for traffic control using either traffic lights or stop/go boards is:

- only after all road signs and Traffic Lights or Stop/Go Boards are in position as per ‘Safety at Street Works and Road Works’ would operations commence;
- one operative would be tasked (designated) with operating the Traffic Lights or co-ordinating with operatives responsible for Stop/Go Board operation;
- when road is clear of traffic in both directions the Traffic Lights or Stop/Go Boards would be set to Stop in both directions on the instruction of the designated operative;
- when operatives are assured lights are on stop, and traffic is under control, scaffold erection or dismantling/netting installation or removal would commence (See procedures as follows);
- work would continue until traffic starts to build up and tail back from traffic lights in either or both directions. The designated operative tasked with controlling the traffic lights or stop/go boards would maintain vigilance, and determine when to stop scaffold operations. Traffic would not be held waiting for more than 5 minutes at any one time;
- on deciding to let traffic flow through the work area after being held under control for the limited 5 minute work interval, the designated operative would instruct operatives to cease work, secure any lose equipment and retire to a safe area;
- when the work area has being cleared of materials and operatives removed themselves to a safe area, the Traffic Lights or Stop/Go Boards would be set to Go on the designated operative’s instruction to allow traffic to move; and
- after the traffic has flowed through the work area and the road is once again clear of traffic approaching the work area in either direction, would the designated operative repeat the previous operation. The traffic lights or Stop/Go Boards would be set to stop at each end of the work area (both directions) and instructions for work to re-commence would be given when the work area is clear and traffic is under control.

4.7.31 Based on the alignment of the overhead lines it is anticipated TTM and traffic controls measures would be required on the following roads:

- A39 Puriton Hill;
- A38 (at Rooks Ridge);

- A370 Weston Road;
- Kenn Road;
- Kenmore Road;
- B3130 Clevedon Road
- Caswell Hill;
- A369 Portbury Hundred;
- Royal Portbury Dock Road;
- Victoria Road;
- A403 St Andrew's Road; and
- Severn Road.

Existing Pedestrian & Cycle Infrastructure

4.7.32 Any existing pedestrian or cycle infrastructure which may be affected by the installation of bellmouths on the LRN would be removed and incorporated into the bellmouth design. Any alternations proposed as part of proposed bellmouth or haul road to existing infrastructure would be shown on the detailed bellmouth design drawings and submitted to the respective LPAs at the detailed design stage. Following the removal of a bellmouth all infrastructure would be reinstated to its previous layout and form.

PRoW Management Plan

4.7.33 As part of the Proposed Development and the supporting traffic and transportation documentation a PRoW Management Plan has been provided in **Volume 5.26.6**.

4.7.34 The PRoW Management Plan provides the overarching strategy for management, temporary re-provision/diversion and re-instatement of those PRoW impacted by the construction of the Proposed Development. The PRoW Management Plan would address the following as appropriate:

- PRoW management for overhead line;
- PRoW management for cable;
- PRoW management for overhead line removal;
- temporary closure;
- temporary diversions; and
- permanent closures.

Stopping Up Orders and Diversions

4.7.35 As part of the Development Consent Order (DCO) for the Proposed Development temporary Stopping Up Orders will need to be implemented at certain sections of the local road network. The Stopping Up Orders will facilitate a number of elements of construction.

4.7.36 Typically the Stopping Up Orders will be required during the construction of bellmouths, culverts, temporary bridges or during the laying of cable in the highway where the carriageway is too narrow to allow for vehicles to safely pass the proposed works.

4.7.37 The location of these Stopping Up Orders are shown on the Access and Rights of Way Plans contained within the PRoW Management Plan (**Volume 5.26.6)**.

4.7.38 **Table 4.3** below details the sections of highway where Stopping Up Orders will be required.

Table 4.3 Stopping Up Locations

Highway Authority	Street to be Stopped Up	Extent of Stopping Up
Somerset County Council	Pill Road	From ST1.1 to ST1.2 as shown on Sheet 9 Section B of the Access & Rights of Way Plans
North Somerset County Council	Max Mill Lane	From ST2.1 to ST2.2 as shown on Sheet 3 Section C of the Access & Rights of Way Plans
	Mead Lane	From ST3.1 to ST3.2 as shown on Sheet 1 Section D and Sheet 1 Section D of the Access & Rights of Way Plans
	Wemberham Lane	From ST4.1 to ST4.2 as shown on Sheet 6 Section D of the Access & Rights of Way Plans
	Engine Lane	From ST5.1 to ST5.2 as shown on Sheet 11 Section D of the Access & Rights of Way Plans
	Queens Road	From ST5.3 to ST5.4 as shown on Sheet 13 Section D of the Access & Rights of Way Plans
	Hanham Way	From ST5.4 to ST5.4 as shown on Sheet 13 Section D of the Access & Rights of Way Plans
	Washing Pound Lane	From ST6.1 to ST6.2 as shown on Sheet 13 Section D of the Access & Rights of Way Plans
	Church Lane	From ST6.3 to ST6.4 as shown on Sheet 13 Section D and Sheet 1 Section E of the Access & Rights of Way Plans

4.7.39 All of the Stopping Up Orders will be temporary during the specific works they are required for.

4.7.40 Typically, in urban areas, Stopping Up orders on a single road or link will be in place for between 12 and 36 weeks, however, this road or link will be worked on in sections. Each section will be worked on for a shorter duration, therefore limiting the potential impacts of the Proposed Development.

4.7.41 It is proposed that there will be two Stopping Up Orders located in rural areas, these being Pill Road and Max Mill Lane, to facilitate the completion of the OHL programme. It is anticipated that these these Stopping Up Orders would need to be be in place for three years, however these will have a limited impact to traffic and highway network operations as they will be located on roads with limited traffic movements.

4.7.42 Diversions will be provided while the Stopping Up Orders are in place. All diversion routes will be in place for the duration of the respective order and will be are considered to be part of the temporary traffic management mitigation.

<u>Traffic Regulation Orders</u>

4.7.43 Traffic Regulation Orders (TROs) will need to be implemented to facilitate the construction of the Proposed Development. The TROs which will be required include:

- TROs, which mayy remain in force until suspended or revoked;
- Temporary orders which may last up to 18 months, with extensions available in certain cirumstances;
- Temporary orders for road works, the avoidance of danger to the public which may last for up to six months for footpaths, bridleways, cycle tracks/lanes and byways open to all traffic, or up to 18 months on other roads, with extensions available in certain circumstances.

4.7.44 All TROs will be site specific and the type applied for, the extents, designs, layout and durations of the TROs will be agreed by the respective local authority..

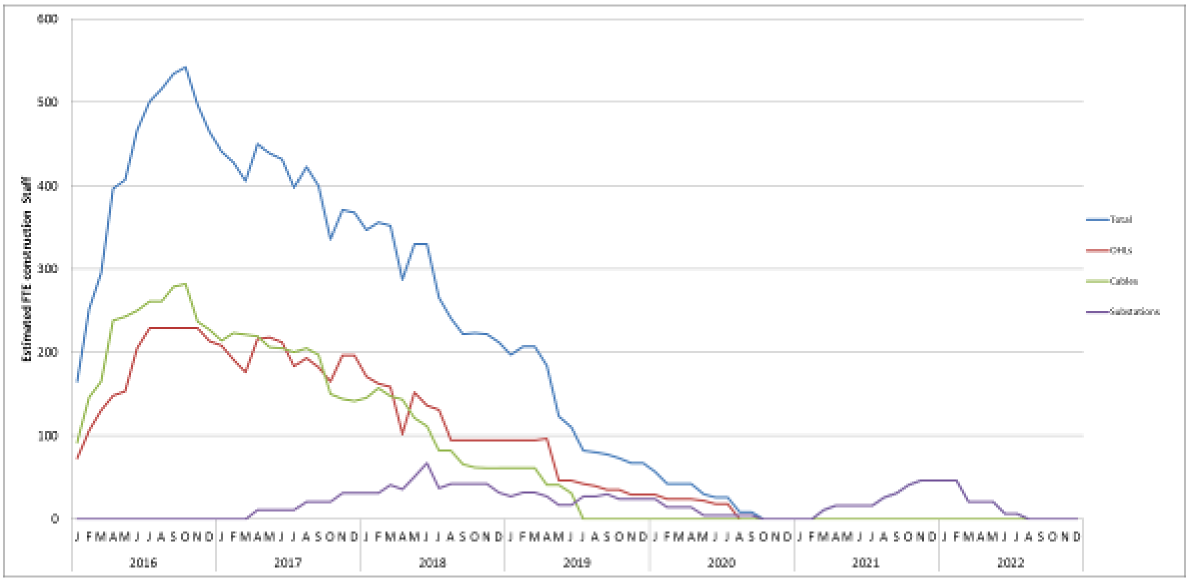
4.7.45 During the construction of the Proposed Development, TROs will predominately be used to restrict parking and to temporarily extend speed restrictions in the vicinity of bellmouths and accesses.

<u>Staff</u>

Construction Employment

4.7.46 The employment profile of the Proposed Development has been extracted from **Volume 5.15.1** (Socio-economics and Land Use)**.** The graph indicates the estimated volume of staff that would be working on the development at any one time in regard to the construction of the overhead lines, cables, substations and combined total employment between 2016 and 2022.

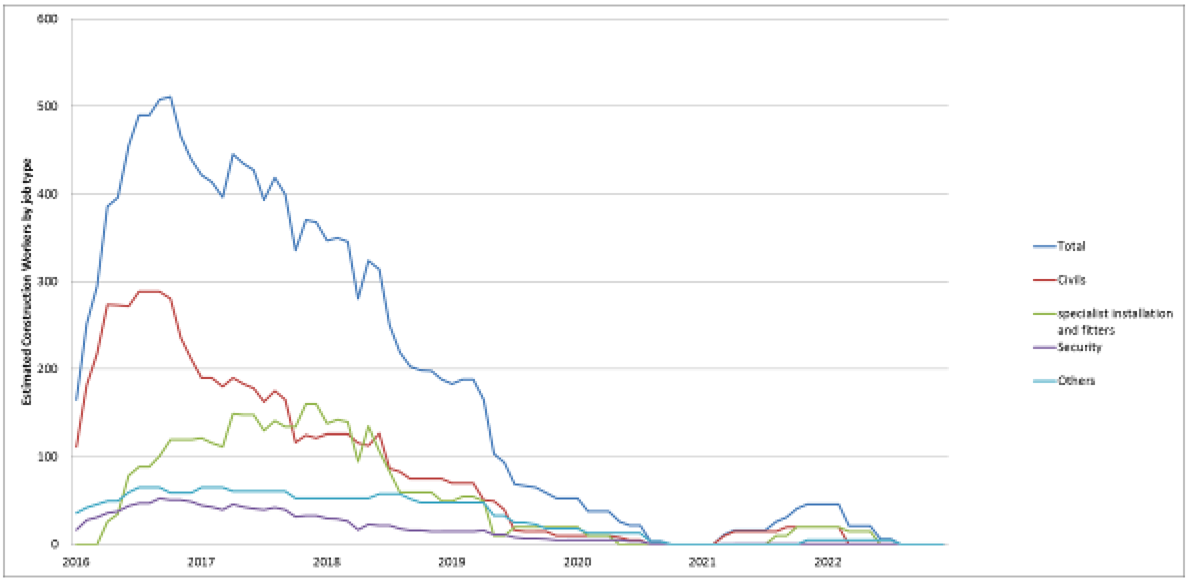
Inset 4.1: Total Employment Profile of the Proposed Development



4.7.47 The employment profile identifies that there would be range of employment totals from a low of 50 construction staff in the final years of the programme and a peak of 545 members of staff in October 2016 for the construction of the overhead lines and underground substation works which are scheduled to occur concurrently.

Inset 4.2 (again extracted from **Volume 5.15.1** shows the total employment profile by job type and relates to the construction of the civils staff, specialist installation and fitters, security staff and other for the period from 2016 to 2022.

Inset 4.2: Total Employment Profile by Job Type



4.7.48 **Table 4.3** below details the varying components of the Proposed Development which are currently estimated to be required and the duration of the following peak and monthly average staff.

Table 4.4 Indicative Construction Programme

Component	Peak Estimated Employment	Duration	Average Employment	Duration (months)
Overhead line/132kV Overhead Line removal	230	07/2016 – 11/2016	185	55
Underground cable and CSE construction	285	October 2016	155	42
Substation construction	67	June 2018	25	64

4.7.49 The peak estimated number of staff identified above does not correlate to staff trip generation at a single location, but across the study area and therefore the impacts of staff and staff travel would be lessened as a result of the spread locations of demand.

Staff – Local and Non Local

4.7.50 The workforce for the Proposed Development would be made up of local and non-local personnel.

4.7.51 It is anticipated that the demand for labour for the construction of the Proposed Development would be in the first three years (2016 – 2018) and would require trained specialists who are qualified to work on National Grid sites. These workers are often sourced from an existing National Grid pool of approved contractors who are located throughout the UK and move from site to site working on specific National Grid projects.

4.7.52 It is also anticipated that there would be scope for local employment on the project. Based on experience National Grid has identified that as well as those qualified contractors who live in the area, there would be employment opportunities for people within the five LPAs. National Grid provided a breakdown of where local employment opportunities exist across the employment types. This analysis shows that on a monthly basis between 8-25% (averaging at 17%) of the workforce onsite could be from the local labour market.

Non-local Staff Accommodation

4.7.53 From experience, National Grid anticipates that of the non-local staff required during construction of the works, the following percentage breakdown of demand on different accommodation types is likely:

- 50% stay in caravan and camping accommodation (sourced independently of National Grid;
- 20% stay in short term let properties;
- 20% stay in serviced accommodation (B&Bs, hotels); and
- 10% travel to the area from home.

Staff – Transportation

4.7.54 As part of the Proposed Development and in line with other National Grid projects, staff would be transported to the various construction sites using a welfare van services. The welfare van services would pick up staff from varying locations, either at or close to their accommodation and transport them to the appropriate area.

4.7.55 There would be no parking provided on-site for private vehicles. All parking provided within compounds, laydown areas or substations would be provided for vehicles associated with the construction of the Proposed Development, i.e. specialised construction personnel such as site engineers.

4.7.56 These welfare van services would accommodate the workforce movements across the development study area and would facilitate movement of all staff from pre-organised external pick up/drop off points (close to respective residences), to site and at the end of the working day back to the external locations.

4.7.57 The pickup/drop points off locations will be at accessible locations for all staff. It is anticipated that these locations would be close to key local locations, town centres, hotels, residential areas or public transport interchanges.

4.7.58 The pickup/drop off points would also be local to constructions sites and would not necessitate the multiple occupant vehicles to travel on the SRN. All movements of welfare vanes will be within each network, i.e. movements will be contained on the LRN within each of the networks identified.

4.7.59 The provision of staff travel in the form of welfare vanes ensures that there will be no impact from staff parking on the LRN.

4.7.60 The use of these services to transport staff will also form a key Travel Planning measure for the development.

Staff – Core Working Hours

4.7.61 Core working hours would be from 07.00 to 19.00 Mondays to Saturdays and 07.00 and 17.00 on Sundays. National Grid and WPD would require that its contractors adhere to these core working hours for each site as far as reasonably practicable or unless otherwise permitted.

4.7.62 Except in the case of emergency, any work required to be undertaken outside of core hours (not including repairs or maintenance) would be agreed with the relevant LPA.

4.7.63 To maximise productivity within the core hours, National Grid contractors would require a period of up to one hour before and up to one hour after core working hours for start-up and closedown of activities. This would include but not be limited to deliveries, movement to place of work, unloading, maintenance and general preparation works. This would not include operation of plant or machinery likely to cause a disturbance. These periods would not be considered an extension of core working hours.

Alternative Working Hours

4.7.64 Activities to include cable jointing, scaffolding and netting over railways, commissioning and abnormal deliveries may be carried out on a 24 hour day, seven day week basis.

4.7.65 Piling operations would be restricted to 08.00-17.00 on weekdays and 09.00-14.00 on Saturdays.

4.7.66 Work requiring possession of major transport infrastructure may be undertaken outside core hours for reasons of safety or operational necessity. Activities outside core working hours that could give rise to disturbance would be kept to a reasonably practicable minimum.

4.7.67 Certain other specific construction activities would require extended working hours for reasons of engineering practicability. These activities include, but are not limited to, major concrete pours, tower erection, cable installation and surveys, e.g. for wildlife or engineering purposes, may also need to be carried out outside core working hours.

4.7.68 Extended working hours outside of the identified core hours would be discussed and agreed with the relative LPA and it is considered that this would be addressed on a site by site basis.

5 BASELINE ENVIRONMENT

5.1 Introduction

5.1.1 The baseline environment has been described for each of the eight Sections identified above in the following text. This includes a description of:

- the highway network including local receptors;
- baseline traffic flow information;
- cycle route information;
- PRoW; and
- public transport information.

5.1.2 All development Sections are shown in **Volume 5.1.2, Figure 1.1** of the accompanying ES.

5.2 Section A: Puriton Ridge

5.2.1 Within Section A (and for the majority of the Proposed Development) the M5 Motorway follows a north to south alignment approximately parallel to the Proposed Development. The M5 forms part of the SRN and provides national highway connections to the Proposed Development.

5.2.2 From the M5 the highway links listed in the table below would be used to access the Proposed Development. These highway links form part of the proposed vehicle routeing strategy for the Proposed Development. From these routes access would be gained to individual bellmouths serving the Proposed Development.

Table 5.1 Section A Highway Links to be Used during Construction

Highway Link	Local Authority
A39 Puriton Hill	Sedgemoor
Bath Road (South, Section A)	Sedgemoor
Bath Road (East, Section A)	Sedgemoor
Woolavington Hill	Sedgemoor

5.2.3 The A39 Puriton Hill connects to the M5 at Junction 23. The proposed 400kV overhead line crosses the A39 Puriton Hill on the southern side of Puriton Ridge.

5.2.4 The proposed 400kV overhead lines pass over the A39 Puriton Hill as well as King’s Sedgemoor Drain – an artificial drainage channel which diverts the River Cary to discharge into the River Parrett at Dunball.

5.2.5 All construction routes referred to in the following paragraphs are shown in **Volume 5.22.3, Figure 22.1**.

5.2.6 The scope of this baseline description includes all highway links proposed to be used as construction routes in the proximity of the Proposed Development.

5.2.7 Within Section A (and for the majority of the Proposed Development) the M5 follows a north to south alignment approximately parallel to the Proposed Development and 132kV overhead line for removal.

5.2.8 The M5 forms part of the SRN and provides national highway connections to the Proposed Development.

5.2.9 The proposed construction traffic routes to be used within Section A are discussed below.

A39 Puriton Hill

5.2.10 The A39 Puriton Hill links the M5 via Junction 23 to the Proposed Development and a number of bellmouths in Section A and to the wider proposed construction access route in Section A. It also provides links to Glastonbury in the east.

5.2.11 The A39 is approximately 8m wide and comprises a single lane in each direction. There is also an intermittent footway along the edge of the southern carriageway.

5.2.12 It is subject to the national speed limit restriction (60mph) until approximately 70m from the priority junction with Bath Road, where there is a 40mph speed limit. Here, road signs indicate the presence of speed cameras.

5.2.13 Puriton Hill has very few residential properties that access off it in the vicinity of the construction access route. Where there are these are set well back from the carriageway with screening.

5.2.14 The 2013 observed flows recorded 514 vehicles travelling in an easterly direction, and 660 in a westerly direction during the AM network Peak (08:00 – 09:00). In the PM network Peak (17:00 – 18:00), there were 676 vehicles recorded travelling in an easterly direction, and 568 in a westerly direction.

A39 Bath Road (South)

5.2.15 The A39 Bath Road (South) provides links to the A39 Puriton Hill to the north and connections into Bridgwater to the south. It would provide access to one construction bellmouth.

5.2.16 The highway is formed of a single lane in each direction with an overall carriageway width of approximately 8m. There is no footway or cycle infrastructure present and it is subject to a 40mph speed limit.

5.2.17 There are limited accesses from the northern end of Bath Road, however, these become more frequent as the road passes through the more populated areas of Bridgwater.

5.2.18 There are a small number of detached houses which front the carriageway to the east and to the west adjacent to the priority junction with Puriton Hill. These residential properties are either fenced or hedged off from the road, and are generally screened by vegetation.

A39 Bath Road (East)

5.2.19 The A39 Bath Road (East) links Puriton Hill to a number of construction bellmouths within Section A via Woolavington Hill but provides no direct link to a construction bellmouth.

5.2.20 The highway comprises a single lane in each direction with an overall carriageway width of approximately 8m.

5.2.21 It is subject to a 40mph speed limit and there are a small number of detached houses to the south of the carriageway adjacent to the junction with Puriton Hill. There is intermittent screening in the form of hedges on the southern side of the carriageway.

5.2.22 Approaching the priority junction with the B3141 Woolavington Hill, there are further residential properties on the northern side of the carriageway. These all have their own access drives, and are set back from the carriageway by approximate distances of between 20m and 80m. These properties are screened by walls and vegetation.

5.2.23 Finally to the south of the carriageway approaching the junction with Woolavington Hill, there are a small number of mixed housing types fronting the carriageway. Here, there is intermittent screening from the carriageway in the form of hedges and fences.

B3139 Woolavington Hill

5.2.24 The B3141 Woolavington Hill links the A39 to a number of construction bellmouths within Section A, but provides no link from the carriageway itself. It connects to the A39 via a large priority junction with segregated inbound/outbound lanes. To the north it provides connections to the villages of Woolavington and further north East Huntspill via Lockswell.

5.2.25 Typically the highway is formed of a single carriageway in each direction with an overall carriageway width of approximately 6m. As the road continues through Woolavington, there is regular street lighting and footways are provided along both sides of the carriageway. There is a 7.5tonne weight restriction for one mile north of the junction with the A39 along Woolavington Hill.

5.2.26 Woolavington Hill provides access to a number of local developments including The Fairways Caravan Park while through the village of Woolavington there are numerous residential properties on both the eastern and western sides of the carriageway. The housing types are mixed, as is the level of screening alongside the carriageway.

Traffic Flows

5.2.27 In order to assess the baseline traffic flows along the construction access routes, a number of Automatic Traffic Counters (ATCs) were placed across the Proposed Development Sections at locations agreed with the LPAs. Due to the size of the network, the ATCs were placed at different periods between 4 June 2013 and 28 June 2013. This resulted in three ATCs (ATC numbers 1-3) being placed in Section A for a week.

5.2.28 ATC 1 was situated on the A39 Puriton Hill, to the south of the centre of Puriton. ATC 2 was placed on the A39 Bath Road, adjacent to the junction with Puriton Hill.

ATC 3 was. ATC 3 was situated on Woolavington Hill. All the ATCs in Section A were placed along proposed construction routes. All ATC survey locations are shown on **Volume 5.22.3, Figure 22.2.**

5.2.29 **Table 5.2** below shows the Annual Average Daily Traffic (AADT) flows by vehicle class for the ATCs in Section A. The classes are Light Goods Vehicles (LGVs), and Heavy Goods Vehicles (HGVs). The table includes the following:

- 24hr traffic flows for the total amount of traffic;
- 24hr traffic flows for the total amount of HGVs;
- 18hr traffic flows for the total amount of traffic; and
- 18hr traffic flows for the total amount of HGVs.

Table 5.2 AADT Baseline Neutral Day AADT Traffic Flows in Section A

ATC – Construction Access Route		**Neutral Day AADT Flows**			
		24hr Total Traffic	**24hr HGVs**	**18hr Total Traffic**	**18hr HGVs**
1	Puriton Hill	13,868	1,972	13,479	1,865
2	A39 Bath Road	12,562	1,11	12,280	1,073
3	Woolavington Hill	4,588	427	4,507	417

5.2.30 In addition to the neutral flows, there were also a selected number of counts taken during the summer to help inform construction traffic effects during the tourist season. These additional counts included ATC1 on Puriton Hill. **Table 5.3** shows the average weekday summer flows by vehicle class for ATC1.

Table 5.3 Baseline Average Summer Weekday Traffic Flows in Section A

ATC – Construction Access Route		**Average Summer Flows**			
		24hr Total Traffic	**24hr HGVs**	**18hr Total Traffic**	**18hr HGVs**
1	Puriton Hill	13,918	1,791	13,522	1,704

5.2.31 The summer counts in **Table 5.3** show a total increase of 50 vehicles (0.4%) at ATC 1.

5.2.32 All collected raw ATC data used within this assessment has been included as **Volume 5.22.2, Appendix 22A**.

5.2.33 In addition to the above, traffic data has been obtained from the HA TRADS service for the M5 on a neutral weekday in April 2013. **Table 5.4** shows the AADT flows for the total number of vehicles at Junctions 24 and 23 of the M5.

Table 5.4 AADT M5 TRADS Flows in Section A

ATC – M5 TRADS Data	**AADT Flows**	
	24hr Total Traffic	**18hr Total Traffic**
J24	52,317	50,082
J23	52,430	50,025

5.2.34 All collected raw TRADS data used within this assessment is included as **Volume 5.22.2, Appendix 22B**.

National Cycle Routes

5.2.35 National Cycle Route 3 travels through Chedzoy, Bawdrip and Crossington but is not crossed by the existing overhead lines, or the Proposed Development.

5.2.36 National Cycle Route 3 connects Land's End to Bristol. The route north of Bridgwater crosses the Somerset Levels, Mendip Hills and the Chew Valley utilising mainly country roads. National Cycle Route 33 connects Bristol and Seaton and provides links to Clevedon, Weston-Super-Mare, Bridgwater and Chard.

PRoW

5.2.37 A review of the PRoW has indicated that a total of 13 designated PRoW would be crossed by the Proposed Development in Section A as follows:

- BW/3/1
- BW/8/10
- BW/8/9
- BW/8/19
- BW/2/5
- BW/2/2
- BW/2/3
- BW/2/13
- BW/2/12
- BW/2/44
- BW/28/1
- BW/2/46
- BW/28/2

5.2.38 During June 2013, count surveys were conducted on a number of prominent PRoW during 08.00 – 18.00hrs. Within Section A two PRoW were surveyed which include the footway along the King Sedgemoor Drain adjacent to Peasey Farm, reference BW 2/3 and the PRoW to the north of Knowle.

5.2.39 The footway along the King Sedgemoor Drain indicated that two adult pedestrians, 14 adult dog walkers and two child dog walkers totalled 18 users over the 12 hour period.

5.2.40 At Knowle the survey found a total of two adult pedestrians and seventeen adult dog walkers totalled 19 users of the PRoW over the 12 hour period.

5.2.41 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects.

5.2.42 Further details of the management and effects on the identified PRoWs are provided in **Volume 5.12.1.**

Public Transport

Bus

5.2.43 The number 19 operates a hail and ride service every 2 hours, Mondays to Saturdays from Bridgwater to Street along the A39 Bath Road. Furthermore, the A39 is utilised by the 375 and X75 bus service (Wells to Bridgwater) which operates hourly Monday-Saturday with extra services during peak times, and a reduced service on Sundays and bank holidays.

5.2.44 The number 37 also runs from Puriton through Woolavington. The frequencies of these services are shown in **Table 5.5** below**.**

Table 5.5 Bus Frequencies in Section A

Service	Route	Approximate Peak Frequency		
		Mon - Fri	**Sat**	**Sun/Hols**
19	Bridgwater – Chedzoy – Moorlinch – Ashcott – Street	Every 2 Hours	Every 2 Hours	-
37	Bridgwater - Puriton - Woolavington - Street - Glastonbury - Wells	Hourly	Hourly	-
375	Wells – Bridgwater (via Glastonbury) – Street – Woolavington	30 mins	Hourly	Every 2 Hours
X75	Bawdrip – Wells (via Wells Bus Station) – Street – Glastonbury – Coxley – Upper Coxley	Hourly	-	-
619	Badgworth – Bridgwater College	1 Return College Service	-	-
755	Wedmore - Taunton	1 Tuesday Morning Service	-	-

Rail

5.2.45 The closest rail connections are in Bridgwater approximately 2km from the existing overhead lines at its closest point in Section A. Bridgwater Railway Station is located on the Bristol to Taunton Line, with Highbridge and Burnham being the preceding station to the north, and Taunton the following station to the south. No rail connections would be crossed in this Section.

5.3 Section B: Somerset Levels & Moors South

5.3.1 Section B extends from Woolavington Road north to the Mendip Hills Area of Outstanding Natural Beauty (ANOB).

5.3.2 Throughout Section B the M5 follows a north to south alignment to the west of the Proposed Development. The proposed 400kV overhead line and existing 132kV overhead line to be removed lie to the east, less than 50m from the motorway at its closest point.

5.3.3 The highway links listed within **Table 5.6** below all form part of the construction traffic routeing strategy within Section B.

Table 5.6 Section B Highway Links to be Used during Construction

Highway Link	Local Authority
B3139 Lockswell	Sedgemoor
B3141 Causeway	Sedgemoor
B3141 Church Road	Sedgemoor
B3139 Mark Road	Sedgemoor
Bennett Road	Sedgemoor
Bristol Road (A38, Section B)	Sedgemoor
A38 Turnpike Road	Sedgemoor

5.3.4 In addition to the above links that will form the primary construction routes to the Proposed Development a number of additional highway links would be crossed by construction traffic using the Proposed Development's haul road. These have been listed in **Table 5.7** and also discussed below.

Table 5.7 Section B Highway Links to be Crossed during Construction

Highway Link	Local Authority
Unnamed Lane to the west of Causeway	Sedgemoor
Woolavington Road	Sedgemoor
Middle Moor Drove	Sedgemoor
Burtle Road	Sedgemoor
Southwick Road	Sedgemoor
Butt Lake Road	Sedgemoor

Highway Link	Local Authority
Mark Causeway	Sedgemoor
Unnamed track off Harp Road	Sedgemoor
Northwick Road	Sedgemoor
Vole Road	Sedgemoor
Pill Road	Sedgemoor
Hams Lane	Sedgemoor
Webbington Road	Sedgemoor

5.3.5 The A38 runs through much of Section B. It forms part of the main diversion route should an incident occur on the M5.

5.3.6 The construction traffic routes proposed to be used within Section B have been described below.

<u>Lockswell</u>

5.3.7 Lockswell links the B3141 and B3139 to a number of proposed construction bellmouths within Section B, but provides no direct links to a construction bellmouth.

5.3.8 The carriageway itself comprises a single lane in each direction has an approximate width of 6m. It is subject to a 30mph speed restriction along its length. As the road continues through Woolavington, there is regular street lighting and intermittent footways on both sides of the carriageway.

5.3.9 There are a number of mixed residential properties lining Lockswell between Woolavington Hill and Causeway. These are generally well screened by walls, hedges, fences and vegetation. The carriageway also passes other sensitive receptors, but these are usually screened by walls and by vegetation.

<u>Causeway</u>

5.3.10 The B3139 Causeway provides a link from the north of Woolavington to areas such as East Huntspill.

5.3.11 Causeway provides direct access to four construction bellmouths. It comprises a single lane in each direction, and has an approximate width of 6m.

5.3.12 The carriageway is subject to 30mph speed restriction until the road is clear of Woolavington town. As the carriageway continues out of Woolavington, the footways and street lighting present in the town are discontinued, and the speed restriction is increased to the national speed limit.

5.3.13 At the northern edge of Woolavington, there are a small number of large detached residential properties. Before reaching the junction with Church Road and Burtle

Road, Causeway also passes agricultural buildings. These are generally all screened from the construction access route.

Woolavington Road

5.3.14 Woolavington Road would be crossed by haul road traffic. The highway provides access to residential and agricultural buildings.

5.3.15 It comprises a single lane, two-way carriageway with a width of approximately 6m. There is no marked pedestrian or cycle infrastructure present, and there is a 30mph speed restriction.

Middle Moor Drove

5.3.16 Middle Moor Drove would provide access to a construction bellmouth. The highway provides access to agricultural property.

5.3.17 It comprises a narrow track with a width of approximately 3m. There is no marked pedestrian or cycle infrastructure present, and there is a 30mph speed restriction.

Burtle Road

5.3.18 Burtle road would be crossed by haul road traffic. It comprises a single lane, two-way carriageway with a width of approximately 5m. There is no marked pedestrian or cycle infrastructure present, and there is a 30mph speed restriction.

Church Road

5.3.19 Church road links the M5 via Mark Road and the A38 and provides access to East Huntspill from its southern edge, before continuing through the village. There is no direct access to a construction bellmouth from the highway.

5.3.20 The highway comprises a single lane, two-way carriageway with an approximate width of 6m. The speed restriction changes to 30mph as the carriageway continues form Causeway. As the road continues through East Huntspill, there is regular street lighting and intermittent footways on both sides of the carriageway. There are also priority traffic calming features at points throughout the town. As the carriageway continues out of East Huntspill, the speed restriction is increased to 40mph for approximately 450m when it is returned to 30mph as the road passes through Watchfield.

5.3.21 The road passes a number of residential properties throughout East Huntspill. Some are screened by hedges, other vegetation, fences or walls whilst others front on to the carriageway. Before reaching Mark Road, Church Road also passes additional properties of a mixed nature. These are generally all screened from the construction access route, with some having little or no screening.

Southwick Road

5.3.22 Southwick Road would be crossed by haul road traffic from Causeway. The highway provides access to residential and agricultural buildings.

5.3.23 It comprises a single lane, two-way carriageway with a width of approximately 4m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

5.3.24 There are a small number of large detached residential properties on either side of the carriageway adjacent to the crossover point. These are screened by vegetation. There is also an agricultural building to the north of the carriageway which has its own access road.

Mark Road

5.3.25 The construction traffic route along the B3139 Mark Road runs west from the junction with Church Road, until it reaches Bennett Road in the east of Highbridge. The road provides no direct links to a construction bellmouth along its carriageway.

5.3.26 The highway comprises a single lane, two-way carriageway with an approximate width of 6m. Along most of the construction access route, the carriageway has a speed restriction of 30mph, although this is increased to 40mph once the carriageway has cleared residential properties in Walrow and the route approaches Bennett Road. There is no defined pedestrian or cycle infrastructure.

5.3.27 The carriageway passes a number of residential, agricultural and industrial properties. These are in general well screened from the carriageway by vegetation.

Butt Lake Road

5.3.28 Butt Lake Road would be crossed by haul road traffic. The highway provides access to agricultural property.

5.3.29 It comprises a single lane, two-way carriageway with a width of approximately 6m. There is no defined pedestrian or cycle infrastructure present, and it is subject to the national speed limit.

Mark Causeway

5.3.30 Mark Causeway would be crossed by haul road traffic. It is the main highway through the Mark area.

5.3.31 It comprises a single lane, two-way carriageway with a width of approximately 6m. There are footways on both sides of the carriageway, and there is a 30mph speed limit restriction.

Unnamed Track off Harp Road

5.3.32 The Unnamed Track off Harp Road is situated approximately 180m north of Mark Causeway. It would be crossed by the proposed haul road traffic, and provides access to agricultural property to the south of Northwich Road.

5.3.33 Adjacent to the junction with Harp Road, Coombes Cider Mill Caravan Park is to the west of the carriageway, and agricultural buildings to the south. The caravan park is well screened by vegetation along the road. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

Northwick Road

5.3.34 Northwick Road would be crossed by proposed haul road traffic. It provides access to residential and agricultural property.

5.3.35 It comprises a single lane, two-way carriageway with a width of approximately 4m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

Vole Road

5.3.36 Vole Road would be crossed by proposed haul road traffic. It provides access to agricultural property off Harp Road.

5.3.37 It comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

Pill Road

5.3.38 Pill Road would be crossed by proposed haul road traffic. It currently provides access to agricultural property.

5.3.39 It comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

5.3.40 Adjacent to the crossover location, there is a single detached residential property approximately 100m to the west. The property is well screened by vegetation and trees.

Bennett Road

5.3.41 Bennett Road links Mark Road in the south and Bristol Road in the north to the east of Highbridge, providing access to a number of industrial properties. Further north, the construction access route links to the M5 at J22. The road provides no direct links to a construction bellmouth along its carriageway

5.3.42 The highway comprises a single lane, two-way carriageway with an approximate width of 6m. The carriageway has a speed restriction of 40mph. Along both sides of the carriageway there is regular street lighting, and footways which are approximately 2m wide.

5.3.43 There are a number of industrial premises lining both sides for the length of the carriageway. The units are generally well screened by vegetation, with the majority having trees between the premises and the carriageway. In addition to the industrial units, there are some detached residential properties off Isleport Road to the east, and Lakeside to the West of the construction traffic route. These are also well screened.

Bristol Road

5.3.44 The construction traffic route along the A38 Bristol Road runs north-east from the roundabout with Bennett Road, up through Rooks Bridge and Tarnock, until it continues as the A38 Turnpike Road.

5.3.45 The A38 Bristol Road comprises a single lane, two-way carriageway with a typical carriageway width of 9m. There are right turning lanes at regular intervals along the road, increasing the overall carriageway width at these points. In addition to this, there are grassed central reservations to the north of junction 22 of the M5. The speed restriction is predominantly 50mph, although this is reduced in areas where there is a higher concentration of receptors. There is a narrow footway to the west side for much of the length of the carriageway.

5.3.46 As the construction access route approaches Rooksbridge, the speed of traffic is restricted to 30mph. As Bath Road continues through Rooksbridge, there are intermittent footways on both sides of the carriageway, which vary in width up to approximately 2m. At the northern edge of Rooksbridge, the speed limit along the carriageway is increased to 50mph.

5.3.47 The carriageway passes a variety of receptors along its length, including industrial, agricultural, and residential properties. In general, these are well screened from the construction access route.

<u>Hams Lane</u>

5.3.48 Hams Lane would be crossed by the proposed haul road traffic. It provides access to agricultural property adjacent to the M5.

5.3.49 It comprises a single carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

<u>Webbington Road</u>

5.3.50 Webbington Road would be crossed by the proposed haul road traffic. It provides a link east across the M5 from Loxton. A mixture of agricultural and residential properties are accessed off the carriageway.

5.3.51 It comprises a single lane, two-way carriageway with a width of approximately 6m. There is an intermittent footpath along the carriageway, and there is a 30mph speed limit restriction.

5.3.52 Adjacent to the crossover point, there is a single detached residential property approximately 80m to the west and a group of agricultural buildings a similar distance to the east. The residential property is well screened by vegetation and trees.

<u>Turnpike Road</u>

5.3.53 Turnpike Road continues through Lower Weare, and skirts along the south eastern side of Cross. It provides access to a number of residential and agricultural properties. The construction traffic route along the A38 Turnpike Road runs north-east from Tarnock, through Lower Weare until it continues as the A38 Bridgwater Road. It provides a major link to the southern parts of the Mendip Hills, but no direct links to a construction bellmouth from the carriageway itself.

5.3.54 The A38 Turnpike Road comprises a single lane, two-way carriageway with an approximate carriageway width of 8m. From Bristol Road the speed restriction is 50mph. This is reduced to 30mph as the road passes through Lower Weare, before increasing back up to 50mph as the carriageway continues out of Lower Weare.

5.3.55 Throughout Lower Weare, there is a footway on both sides of the carriageway of varying width up to approximately 2.5m. The footways are discontinued as the road passes out of Lower Weare. As the carriageway approaches Bridgwater Road, the speed limit is decreased to 40mph.

5.3.56 The carriageway passes a mixture of businesses, and residential or agricultural properties. In general these are well screened, and often set back from the construction access route.

Traffic Flows

5.3.57 In order to assess the baseline traffic flows along the construction access routes, a total of 43 ATCs were placed across the Sections. This resulted in six ATCs (ATC numbers 4-9) being placed in Section B along the proposed construction routes for a full week.

5.3.58 ATC 4 was situated on Causeway, to the north of Woolavington town. ATC 5 was placed on the B3139 Mark Road in the village of Watchfield, adjacent to the junction with Woolavington Hill. AT6 3 was situated on the A38 Bristol Road to the north east of Highbridge. ATC 7 was placed on Harp Road, close to the village of Mark. ATC 8 was situated on Southwick Road, off Butt Lake Road to the south of Mark. ATC 9 was also placed on the A38 Bristol Road, but was instead located in Rooks Bridge. ATC numbers 4, 5, 6 and 9 were placed along proposed major construction routes, whilst numbers 7 and 8 were along proposed minor construction routes (see **Volume 5.22.3, Figure 22.2**). **Table 5.8** shows the AADT flows by vehicle class for the ATCs in Section B.

Table 5.8 AADT Baseline Neutral Day AADT Traffic Flows in Section B

ATC – Construction Access Route		**Neutral Day AADT Flows**			
		24hr Total Traffic	**24hr HGVs**	**18hr Total Traffic**	**18hr HGVs**
4	Causeway	3,093	252	3,037	245
5	B3139 Mark Road	3,930	302	3,861	292
6	A38 Bristol Road	13,512	1,827	13,004	1,675
7	Harp Road	3,106	269	3,059	259
8	Southwick Road	601	39	591	38

5.3.59 In addition, traffic data has been obtained from the HA TRADS service for the M5 on a neutral weekday in April 2013. **Table 5.9** shows the AADT flows for the total number of vehicles at Junction 22 of the M5 obtained from the HA.

Table 5.9 AADT M5 TRADS Flows in Section B

ATC – M5 TRADS Data	**AADT Flows**	
	24hr Total Traffic	**18hr Total Traffic**
J22	53,794	51,354

Cycling

5.3.60 National Cycle Route 33 travels from Woolavington to East Huntspill in Section B. The Proposed Development would cross over Burtle Road, which forms part of the cycle route. National Cycle Route 33, which connects Bristol and Seaton and provides links to Clevedon, Weston-Super-Mare, Bridgwater and Chard.

PRoW

5.3.61 A review of the PRoW has indicated that a total of ten designated PRoW would be affected by the Proposed Development in Section B as follows:

- BW/37/13
- BW/37/12
- BW/13/22
- BW/13/28
- AX/23/10
- AX/23/14
- AX/17/12
- AX/21/3
- AX/2/15
- AX/21/7

5.3.62 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.3.63 The footway at Huntspill Moor north of the Huntspill River was surveyed to provide an indication of the usage of PRoW reference BW 13/22 and BW13/28 which form part of National Cycle Route 33. The survey found that 22 adult cyclists and one adult dog walker totalled 23 users over the 12 hour period.

5.3.64 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects.

Public Transport

Bus

5.3.65 In the vicinity of the Proposed Development, bus stops are located along the A38. The A38 is utilised by the 102 service (Weston-Super-Mare to Puriton) which runs twice daily Monday-Friday, and three times a day on Saturdays. Bus stops are also located along the B3139. The frequencies of these services are shown in **Table 5.10**.

Table 5.10 Bus Frequencies in Section B

Service	Route	Approximate Peak Frequency		
		Mon - Fri	**Sat**	**Sun/Hols**
37	Bridgwater – Puriton – Woolavington – Street – Glastonbury – Wells	Hourly	Hourly	-
78	Portishead – Clevedon – Weston-Super-Mare – Lympsham – Bridgwater	1 Return College Service	-	-

Service	Route	Approximate Peak Frequency		
		Mon - Fri	Sat	Sun/Hols
79	Weston-Super-Mare – Lympsham – Bridgwater	1 Return College Service	-	-
102	Weston-Super-Mare – Bridgwater (via East Brent) – Burnham – Highbridge – Puriton	90 mins	Three services	-
619	Badgworth – Bridgwater College	1 Return College Service	-	-
620	Cheddar – Bridgwater	1 Return College Service	-	-
670	Wookey Hole – Wells – Burnham	Hourly	Hourly	-
755	Wedmore – Taunton	1 Tuesday Morning Service	-	-

Rail

5.3.66 The closest rail connections to the site are at Highbridge approximately 4km to the west of the Proposed Development at its closest point. No rail connections would be crossed in this section of the route.

5.4 Section C: Mendip Hills

5.4.1 Section C extends through the Mendip Hills. The Proposed Development would cross the Lox Yeo River and the A371 before crossing the A368 at Sandford.

5.4.2 The highway links used for construction traffic in Section C are included in the **Table 5.11** below.

Table 5.11 Section C Highway Links to be Used during Construction

Highway Link	Local Authority
A38 Bristol Road (Section C)	North Somerset
New Road (Section C)	North Somerset
A368 Dinghurst/Greenhill/Towerhead Rd	North Somerset

5.4.3 In addition to the above links that would form the primary construction routes to the Proposed Development a number of additional highway links would be crossed by construction traffic using the Proposed Development's haul road. These have been listed in **Table 5.12** and also discussed below.

Table 5.12 Section C Highway Links to be Crossed during Construction

Highway Link	Local Authority
Castle Hill	Sedgemoor
Max Mill Lane	North Somerset

5.4.4 Within Section C at the southern edge of the section, the Proposed Development borders the M5 at Webbington before passing through the Mendip Hills Area of Outstanding Natural Beauty (AONB) as 400kV Underground Cables. The existing 132kV line for removal broadly follows the proposed 400kV overhead lines. At the southern edge of the Section, there is a Proposed Compound/Laydown Area.

5.4.5 As the Proposed Development continues north east, it crosses the Lox Yeo River. The Lox Yeo River is a short river which rises at Winscombe and flows south west through the Mendip Hills for approximately 6km to join the River Axe near Loxton.

5.4.6 The A38 runs through much of Section C. It forms part of the main diversion route should an incident occur on the M5.

5.4.7 There are a number of other local highway links that, while not identified as a construction route, would be crossed by development traffic. These highway links have also been discussed below.

Bridgwater Road

5.4.8 The A38 Bridgwater Road links the Proposed Development in Section C across the Mendip Hills AONB, but provides no direct links to a construction bellmouth from the carriageway.

5.4.9 The highway comprises a single lane, two-way carriageway. The carriageway has a varying width from between approximately 8m and 14m as sections including central reservations, deceleration lanes and right-hand turning lanes increase the overall width.

5.4.10 From Turnpike Road the speed restriction is 40mph. As the carriageway rises into the Mendip Hills, a footway can be found on the western side of the road for much of the remaining carriageway.

5.4.11 Continuing north from the junction with Turnpike Road, the carriageway passes a small number of residential and agricultural buildings. It also passes a hotel. These are generally well screened from the construction access route by vegetation.

Bristol Road

5.4.12 The A38 Bristol Road links the Proposed Development in Section C across the Mendip Hills AONB, but provides no direct links to a construction from the carriageway itself.

5.4.13 The carriageway comprises a single lane, two-way carriageway approximately 8m wide. The overall carriageway width is increased at instances where right-turning lanes or bus laybys are present.

5.4.14 The carriageway passes under a pedestrian footbridge towards Winscombe. From Bridgwater Road the speed restriction is 40mph along the length of the carriageway until the construction access route continues along New Road.

5.4.15 Continuing north from the Sidcot Lane/Fountain Lane/Bridgwater Road junction, the carriageway passes through Widscombe and Sidcot. Here the construction route passes a number of detached residential properties, before passing Sidcot School. Although this section of the A38 is heavily lined by trees and vegetation and the properties are well screened from the carriageway, a number of school children use the Sidcot Lane/Fountain Lane/Bridgwater Road junction as a crossing point to reach residential properties and playing fields to the west.

5.4.16 The carriageway goes on to pass properties in the village of Star. These are residential properties set back approximately 15m from the carriageway. The properties also have screening from the construction access route, with vegetation, trees and walls or fences all lining the highway.

New Road

5.4.17 The A38 New Road links the Proposed Development in Section C across the Mendip Hills AONB, but provides no direct links to a construction Bellmouth from the carriageway itself. It follows from the A38 Bristol Road across the section boundary into Section D.

5.4.18 The highway comprises a single lane, two-way carriageway approximately 7m wide. From Bristol Road the speed restriction is 40mph along the length of the carriageway until the construction access route continues into Section D. There is also a solid white line along much of the carriageway to indicate that overtaking is not permissible.

5.4.19 Continuing north, the road is lined by thick trees and other vegetation which screen a number of large detached residential properties off Doleberrow from the construction traffic. Before the junction with Skinners Lane, there are a small number of terraced houses on the eastern side of the carriageway. These are not screened by vegetation, and instead front the road. New Road continues through Section D.

Towerhead Road

5.4.20 To the north of the boundary of the AONB and of Section C is the A368 Towerhead Road at Sandford. It connects to the A38 in Winscombe and with the A370 to the west of the M5 close to Weston-Super-Mare, also providing access to the M5 via Junction 21. The highway provides access to two construction bellmouths.

5.4.21 Towerhead Road comprises a single lane, two-way carriageway approximately 7m in width. Travelling in a westerly direction, the speed restriction is initially 30mph but is shortly increased to the national speed limit. A narrow footway is located on the southern side of the carriageway, and there is a ditch to the northern side.

5.4.22 Adjacent to the construction bellmouths, is an industrial unit screened by vegetation to the east. Approximately 200m to the west, there is a small number of detached residential and agricultural buildings. These are well screened from the proposed haul road by vegetation and trees.

Castle Hill

5.4.23 Castle Hill would be crossed by the proposed haul road traffic. It provides access to residential properties, businesses and agricultural properties.

5.4.24 The highway comprises a single lane, two-way carriageway with a width of approximately 8m. There is no defined pedestrian or cycle infrastructure present, and there is 50mph speed limit restriction.

Max Mill Lane

5.4.25 Max Mill Lane would be crossed by the proposed haul road traffic. It provides access to residential properties, businesses and agricultural properties.

5.4.26 The highway comprises a single lane, two-way carriageway with a width of approximately 4m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

Traffic Flows

5.4.27 In order to assess the baseline traffic flows along the construction access routes, a total of 43 ATCs were placed across the Sections. This resulted in 1 ATC (ATC number 10) being placed in Section C for a full week.

5.4.28 ATC 10 was situated on the A38 New Road, to the south of the village of Churchill. ATC 10 was placed along a proposed major construction route. **Table 5.13** shows the AADT flows for Section C.

Table 5.13 AADT Baseline Neutral Day AADT Traffic Flows in Section C

ATC – Construction Access Route		Average Summer Flows			
		24hr Total Traffic	24hr HGVs	18hr Total Traffic	18hr HGVs
10	New Road	11,997	1,035	11,393	981
11	Dinghurst Road	7,425	684	6,914	659

5.4.29 In addition to the neutral flows, there were also a selected number of counts taken during the summer to help inform construction traffic effects during the tourist season. These additional counts included ATC10. **Table 5.14** shows the average weekday summer flows by vehicle class for ATC10.

Table 5.14 Baseline Average Summer Weekday Traffic Flows in Section C

ATC – Construction Access Route		Average Summer Flows			
		24hr Total Traffic	24hr HGVs	18hr Total Traffic	18hr HGVs
10	New Road	12,013	1,097	11,420	1,031

5.4.30 The summer counts in **Table 5.14** show a total increase of 16 vehicles (0.1%) at ATC 10.

Cycling

5.4.31 National Cycle Route 26 passes through Winscombe. It connects Yatton to Axbridge and Cheddar and follows a disused railway line. As such the route is mainly off-road with short on-road sections. The Proposed Development does not cross the cycle way, however, to the north of the Mendip Hills AONB it comes within 500m.

PRoW

5.4.32 A review of the PRoW has indicated that a total of nine designated PRoW would be crossed by the Proposed Development in Section C as follows:

- AX/21/7
- AX/29/28
- AX/3/21
- AX/29/14
- AX/29/16
- AX/3/4
- AX/3/1
- AX/3/53
- AX/3/22

5.4.33 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.4.34 The bridleway at Mendip Way in Webbington was surveyed to provide an indication of the usage of PRoW reference AX 15/1 and AX 15/3. The survey found that 23 adult pedestrians, 30 adult cyclists and one adult dog walker totalled 54 users over the 12 hour period.

5.4.35 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects.

Public Transport

Bus

5.4.36 There are bus stops along the A371 within Section C. First Bus and Bakers Coaches jointly operate the 121 service (Weston-Super-Mare to Bristol) along the A371. The 126 also runs a regular service along the A38 throughout Section C. The frequencies of these services are shown in **Table 5.15.**

Table 5.15 Bus Frequencies in Section C

Service	**Route**	**Approximate Peak Frequency**		
		Mon - Fri	**Sat**	**Sun/Hols**
121	Weston-Super-Mare – Langford – Bristol Airport – Bristol Centre	Every 2 Hours	Every 2 Hours	Every 2 Hours
126	Weston-Super-Mare – Wells (Via Locking, Winscombe, Axbridge, Cheddar)	Hourly	Hourly	4 Services

Rail

5.4.37 The closest rail connections to the site are at Weston Milton approximately 6km to the north-west of the Proposed Development. Weston Milton Railway Station is located on the Bristol to Taunton Line, with Worle being the preceding station to the north east, and Weston-Super-Mere the following station to the south west. No rail connections would be crossed in this Section of the route.

5.5 Section D: Somerset Levels & Moors North

5.5.1 Section D comprises the area from the Mendip Hills north to Tickenham Ridge. The highway links to be used to access the Proposed Development are listed in **Table 5.16** below.

Table 5.16 Section C Highway Links to be Used during Construction

Highway Link	Local Authority
New Road (Section D)	North Somerset
Bristol Road (B3139)	Sedgemoor
Stock Lane	North Somerset
Dinghurst Road	North Somerset
Pye Corner	North Somerset
Greenhill Road	North Somerset
Station Road	North Somerset
Towerhead Road	North Somerset
The Unnamed Section of the A370 and Somerset Avenue	North Somerset
May’s Green Lane	North Somerset
Ettlingen Way	North Somerset
Central Way	North Somerset
Unnamed Section of the B3133	North Somerset
Davis Lane	North Somerset
Manmoor Lane	North Somerset

Highway Link	Local Authority
Kennmoor Road	North Somerset
Nailsea Wall	North Somerset
Northern Way	North Somerset
Clevedon Road	North Somerset
Stock Way North	North Somerset
Stock Way South	North Somerset
Mizzymead Road	North Somerset
Queens Road	North Somerset
Hannah More Road	North Somerset
St Mary's Grove	North Somerset
Engine Lane	North Somerset
Blackfriars Road	North Somerset
North Street	North Somerset
Hanham Way	North Somerset

5.5.2 In addition to the above, those highway links that would be crossed by the Development's haul road have been listed in the **Table 5.17** below.

Table 5.17 Section C Highway Links to be Crossed during Construction

Highway Link	Local Authority
Mead Lane	North Somerset
Drove Way	North Somerset
Dolemoor Lane	North Somerset
Havage Drove	North Somerset

Highway Link	Local Authority
North Drove	North Somerset
North Drove	North Somerset
Church Lane	North Somerset

5.5.3 At the southern edge of Section D the Proposed Development passes the M5 approximately 3.5km to the east. Here, there are proposals for a Sandford 400/132kV Substation, with associated work area and compound/laydown area off Nye Road. The main construction access is proposed to be off the A368 Station Road. Approximately 1km north west of Sandford, the Proposed Development continues in a northerly direction as overhead lines rather than underground cable routes. The Proposed Development continues as two separate lines, as the proposed route for 132kV overhead line continues north east for approximately 3km crossing over Havage Drove until it reaches an existing western power distribution 132kV overhead line. The proposed route for 400kV overhead line continues north east, where it passes over Drove Way.

5.5.4 The A370 runs through much of Section D. It forms part of the main diversion route should an incident occur on the M5.

5.5.5 The highway links to be utilised in Section D have been described below.

New Road

5.5.6 The A38 New Road links the Proposed Development in Section D to areas across the Mendip Hills AONB to areas in Section C, but provides no direct links to a construction bellmouth from the carriageway itself.

5.5.7 The A38 New Road comprises a single lane, two-way carriageway approximately 7m wide. Continuing into Section D from Section C, the speed restriction remains 40mph along the highway. A narrow footway can be found on the eastern side of the road.

5.5.8 Continuing north from the priority junction with Skinners Lane, there are a number of residential properties on both sides of the carriageway. The properties are well screened by walls or fences, and by hedges or vegetation.

Bristol Road

5.5.9 The A38 and B3133 Bristol Road link the Proposed Development in Section D to areas across the Mendip Hills AONB to areas in Section C, but provide no direct link to a construction bellmouth from the carriageway itself.

5.5.10 The highway comprises a single lane, two-way carriageway which is typically 9m wide. The carriageway is wider at certain intervals, for example where there are bus laybys.

5.5.11 The speed restriction along the road is 40mph, until approximately 100m from the mini-roundabout junction with Stock Lane where the limit is reduced to 30mph.

Footways are present on both sides of the carriageway, which are approximately 2m wide. There is regular street lighting as the road passes through Churchill.

5.5.12 Continuing north-east from the junction with New Road, the carriageway passes through a residential area in the east of Churchill containing a number of mixed residential properties predominantly on the northern side of the carriageway. The highway also passes a number of public houses and Churchill Preschool off Ladymead Lane. There is generally a good level of screening from the construction access route, and the access to the preschool is not taken directly from the construction access route.

Stock Lane

5.5.13 The B3133 Stock Lane links the Proposed Development in Section D to Congresbury via Brinsea Road, but provides no direct links to a construction bellmouth from the carriageway itself.

5.5.14 The highway comprises a single lane, two-way carriageway which is approximately 6m wide. From the mini-roundabout junction with Bristol Road, the speed restriction continues to be 30mph.

5.5.15 As the road narrows, there are road signs present to indicate the potential presence of equestrians as well as to warn for the potentially dangerous highway layout. As the carriageway widens, the speed limit is increased to 40mph. There are ditches present at various intervals along both sides of the carriageway.

5.5.16 Along Stock Lane, the construction access route passes a number of receptors of differing variety. Adjacent to the junction with the B3133, the carriageway passes a number of residential properties to the west. They are generally well screened from the route by hedgerows and vegetation, and are set back approximately 15m from the highway. Continuing north, the highway passes a University of Bristol campus to the east and industrial premises to the west. Before reaching Iwood Lane, the carriageway passes Miltons Lodge and some additional residential properties. They are generally well screened from the route by hedgerows and vegetation.

Dinghurst Road

5.5.17 The A368 Dinghurst Road links the Proposed Development in Section D to the A38, but provides no direct links to a construction bellmouth from the carriageway itself.

5.5.18 The highway comprises a single lane, two-way carriageway of varying width between approximately 5m and 9m. A path which is approximately 1.5m wide is present on the northern side of the carriageway for approximately 400m.

5.5.19 Travelling in a westerly direction and as the road forks to the left, road signs warn of an impending narrowing of the carriageway. There is a 30mph speed restriction along most of the length of the carriageway, but this is increased adjacent to a priority junction with Hillers Lane.

5.5.20 The carriageway passes a number of receptors along its length. Firstly, the highway passes Bartholomew’s Beautiful Barns – Somerset Self Catering Holiday Cottages, and The Nelson Arms public house. Both are screened from the carriageway by vegetation. As the road continues west, it passes a number of residential properties. Although most are well screened from any construction traffic by hedges, other vegetation and walls, there are instances where external walls have no screening from the carriageway.

Pye Corner

5.5.21 The A368 Pye Corner provides a link along the A368. It comprises a single lane, two-way carriageway with a right-hand tuning lane when travelling in an easterly direction to provide access to a private access road. In consequence of the right-hand turning lane, the total carriageway width is approximately 10m. There are pedestrian crossing islands and regular street lighting present.

5.5.22 Heading west from Dinghurst Road, the carriageway passes a large vegetable growing plant to the north. The carriageway also passes residential properties which are well screened from the construction access route.

Greenhill Road

5.5.23 The A368 Greenhill Road continues west from Greenhill Lane through Sandford until a junction with Station Road. It provides no direct links to a construction bellmouth from the carriageway itself.

5.5.24 The highway comprises a single lane, two-way carriageway which is approximately 7m wide. A path which is approximately 1.5m wide is present on the northern side of the carriageway, and this is joined by a footway on the southern side as the carriageway continues through Sandford. Here, the speed limit is reduced from 40mph to 30mph.

5.5.25 As the road travels west through the village, there is regular street lighting on both sides of the carriageway. Road signs warn of the presence of a school, and there are 'School – Keep – Clear' road markings as the carriageway passes the school entrances.

5.5.26 There are a number of residential properties and small businesses along the construction access route. These are generally set back from the carriageway, and screened from the traffic. The construction traffic would also pass Sandford Primary School. The school has little screening from the construction traffic and the entrance is located along Greenhill Road. It is likely that a number of school children would walk along Greenhill Road during the peak periods.

Station Road

5.5.27 The A368 Station Road continues west from the junction with Greenhill Road through the western end of Sandford until the carriageway continues as Towerhead Road.

5.5.28 The carriageway comprises a single lane, two-way carriageway which is approximately 7m wide. A path which is approximately 1.5m wide is present on both sides of the carriageway.

5.5.29 There is a 30mph speed restriction along the length of the carriageway. As the road travels west through the village, there is regular street lighting on both sides of the carriageway.

5.5.30 The construction access route passes a number of residential and business properties. The properties are screened from the construction access route by fencing and vegetation.

Towerhead Road

5.5.31 The A368 Towerhead Road has already been discussed in the Section C baseline analysis, as it marks the C/D Section boundary.

5.5.32 Adjacent to the construction bellmouths, is an industrial unit screened by vegetation to the east. Approximately 200m to the west, there is a small number of detached residential and agricultural buildings. These are well screened from the proposed haul road by vegetation and trees.

Mead Lane

5.5.33 Travelling north into Section D from Towerhead Road, Mead Lane would be crossed by the proposed haul road traffic. It provides access to a number of residential properties, before an agricultural property at its most northern point.

5.5.34 The highway comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and it is subject to a 30mph speed limit restriction.

Drove Way

5.5.35 Drove Way would be crossed by the proposed haul road traffic. It provides access to agricultural properties.

5.5.36 The highway comprises a single lane, two-way carriageway with a width of approximately 4m. There is no defined pedestrian or cycle infrastructure present, the road is subject to a 30mph speed limit restriction.

Dolemoor Lane

5.5.37 Dolemoor Lane would be crossed by the proposed haul road traffic. It provides access to agricultural properties.

5.5.38 The highway comprises a single lane, two-way carriageway with a width of approximately 8m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

Somerset Avenue

5.5.39 The A370 Somerset Avenue links from J21 of the M5 to Congresbury, providing a link to the Proposed Development across Section D. It provides links to two construction bellmouths.

5.5.40 The highway comprises a single lane, two-way carriageway which is approximately 9m wide. Adjacent to J21 of the M5, there is a bus lane heading towards the roundabout for approximately 300m. On the northern side of the carriageway, there is a shared footway and cycleway which is approximately 1.5m wide. This runs for approximately 400m to the east, where it continues as a pedestrian footway only.

5.5.41 As the carriageway runs through Hewish, there is regular street lighting on the western side of the road. The road passes St Anne's C of E Controlled Primary School, and here there are road signs to warn of its presence with and 'School – Keep – Clear' road markings as the carriageway passes the school entrance. There are also road signs to indicate the presence of speed cameras enforcing the 50mph limit which is imposed on the carriageway. It is considered that there would be a large number of school children around the entrance during the peak hours.

5.5.42 The construction access route passes a number of residential properties and businesses along its length. The properties are generally well screened from the road by hedges and other vegetation.

May’s Green Lane

5.5.43 May’s Green Lane runs from the A370 south through May’s Green until reaching Puxton Road. It provides access to a construction bellmouth.

5.5.44 The highway comprises a single lane, two-way carriageway which narrows from approximately 6m to approximately 3m. After approximately 400m from the junction with the A370 Somerset Avenue, the 30mph speed restriction is increased to the national speed limit.

5.5.45 The carriageway passes a number of detached residential properties and an industrial unit. Although some of these properties are well screened from the road by hedges and other vegetation, some residential properties are situated in close proximity to the carriageway and have no screening from the construction traffic.

Havage Drove

5.5.46 Havage Drove would be crossed by the proposed haul road traffic. It serves industrial and agricultural properties.

5.5.47 The highway comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

5.5.48 The route would pass a small number of residential and industrial properties, which are well screened by vegetation.

Ettlingen Way

5.5.49 Ettlingen Way heads west from J21 of the M5 to a roundabout with Central Way. The road no direct links to a construction bellmouth along the carriageway itself.

5.5.50 The highway is comprised of two-lanes in a westerly direction and one lane in an easterly direction. The two directions of traffic are separated by solid white line to indicate that it is not permissible to pass a vehicle by travelling on to the other side of the carriageway. The overall carriageway width is approximately 10.5m, and the road has a speed restriction of 40mph.

5.5.51 Heading west from J21, there are a number of industrial units, before passing a number of residential properties. The properties are well screened by a thick row of vegetation.

Central Way

5.5.52 Central Way heads south west the roundabout with Ettlingen Way join the B3133 at a roundabout junction with Southern Way. The road provides no direct links to a construction bellmouth along the carriageway itself.

5.5.53 From the roundabout junction with Ettlingen Way, Central Way a duel lane, two-way carriageway which is approximately 18m wide. A grassed central reservation is present. Approximately 250m south, the carriageway is reduced to a single lane in each direction and the total width is narrowed to approximately 8m.

5.5.54 As the carriageway continues, road signs warn vehicles of an impending school and there are speed camera signs to enforce the 40mph speed limit.

5.5.55 There are also pedestrian crossing islands and Pelican crossings complete with dropped kerbs and tactile paving. As the road continues through Clevedon, there is a narrow footway and street lighting on the east side of the carriageway.

5.5.56 The carriageway passes a large number of residential properties of mixed type, but as the carriageway is well lined with trees and other vegetation and the properties are separated from the road by fences and walls, they are well screened from the construction route. The construction access route also passes Yeo Moor Primary and Secondary Schools, which are well screened from any traffic. It is considered that a number of pupils may cut through surrounding residential streets and pedestrian walkways to the carriageway.

Unnamed Section of the B3133

5.5.57 The B3133 continues south from the roundabout with Southern Way and Central Way until it reaches Kenn Road. The road provides a link to the Proposed Development from J20 of the M5 via Central Way, but provides no direct links to a construction bellmouth along the carriageway itself.

5.5.58 The highway comprises a single lane, two-way carriageway which is approximately 7m wide. The carriageway has a 30mph speed limit. Adjacent to the roundabout junction with Central Way, there is a pedestrian crossing island complete with dropped kerbs and tactile paving.

5.5.59 Approximately 80m south, there is a Zebra crossing facility, also complete with dropped kerbs, tactile paving and in addition flashing beacons. For the majority of the carriageway, there is a footway on the western side of the road which is approximately 2m wide. This terminates adjacent to the priority junction with Davis Lane. On the eastern side of the carriageway is a narrower path.

5.5.60 The construction access route passes a number of residential and industrial properties, as well as businesses. These are generally well screened by vegetation and fencing.

Davis Lane

5.5.61 To the south of Clevedon, Davis Lane forms part of the construction access route off along the B3133. After crossing the M5 the route also links to Manmoor Lane. The road has no direct links to a construction bellmouth from the carriageway itself.

5.5.62 Davis Lane comprises a single lane, two-way carriageway which is approximately 5m wide. The carriageway is subject to the national speed limit restriction. Along the carriageway are road signs warning motorists of the impending road layout.

Manmoor Lane

5.5.63 Manmoor Lane forms part of a construction access route off Davis Lane and the B3133 Tickenham Road. The road has no direct links to a construction bellmouth along the carriageway itself.

5.5.64 Manmooor Lane comprises a single lane, two-way carriageway which is approximately 5m wide. The carriageway is subject to the national speed limit restriction.

5.5.65 From Davis Lane until Tickenham Road, Manmoor Lane passes only a small number of properties, all of which are screened by hedges and vegetation.

Kennmoor Road

5.5.66 Carrying on south from Davis Lane, Kennmoor Road forms part of the designated construction access. The road directly links to two construction bellmouths.

5.5.67 Kennmoor Road comprises a single lane, two-way carriageway which is approximately 5m wide. The carriageway is subject to the national speed limit restriction.

5.5.68 From Davis Lane heading south, Kennmoor Road passes a small number of residential properties, agricultural buildings and businesses. These properties are screened from the construction traffic.

Nailsea Wall

5.5.69 Carrying on east from Davis Lane, Nailsea Wall forms part of a construction access route off the B3133. It links directly to a construction bellmouth.

5.5.70 Nailsea Wall comprises a single lane, two-way carriageway which is approximately 5m wide. The carriageway is subject to the national speed limit restriction. Along the carriageway are road signs warning motorists of the impending road layout.

5.5.71 From Davis Lane to the construction bellmouth, the carriageway passes a small number of detached residential properties to the south of the carriageway. These are mostly well screened by vegetation, although one property fronts the road without any screening between itself and the carriageway.

Northern Way

5.5.72 Northern Way heads north east from the roundabout with the B3133 and Central Way to re-join the B3133 on Tickenham Road at a priority junction at the start of Section E. The road provides a link to the Proposed Development from J20 of the M5 via Ettlingen Way, but provides no direct links to a construction bellmouth from the carriageway itself.

5.5.73 From the roundabout junction with Southern Way and the B3133 Ettlingen Way, Northern Way is a single lane, two-way carriageway which is approximately 9m wide. There is a 30mph speed restriction along the length of the carriageway.

5.5.74 As the carriageway continues north, there is a footway on the western side of the carriageway, and intermittently on the eastern side. The width of the footways is approximately 2m. Street lighting is also present on the eastern side of the road.

5.5.75 From the roundabout with Southern Way and the B3133 Ettlingen Way, the carriageway passes a large number of mixed residential properties. As the carriageway is well lined with trees and other vegetation and the properties are separated from the road by fences and walls, they are well screened from the construction route. There are also grass verges at certain points on either side of the road meaning that the properties are set back from the construction route.

Clevedon Road (Section D)

5.5.76 The B3130 Clevedon Road runs south from the D/E Section boundary at Tickenham Hill, down through northern parts of Nailsea to a junction with Stock Way North. Although the road provides no direct access to a construction bellmouth from the carriageway itself, it does provide a link to various Proposed Construction Accesses in Nailsea.

5.5.77 Clevedon Road comprises a single lane, two-way carriageway which is approximately 6m wide. From the junction with Tickenham Hill, the carriageway is subject to the national speed limit restriction. This is reduced to a 30mph speed limit approximately 700m further along the carriageway.

5.5.78 Road signs along the carriageway indicate the impending presence of Tickenham C of E Primary School. As the carriageway continues through the residential areas of Nailsea, there are footways on both sides of the road. Street lighting is also present. At the junction with Stock Way North, there is a Pelican crossing complete with dropped kerbs and tactile paving.

5.5.79 The construction access route passes a number of residential properties and businesses. Although some of the properties are screened by walls and vegetation, there are some external walls of other properties which directly front the road.

Stock Way North

5.5.80 The construction access route continues west from a priority junction with Clevedon Road along Stock Way North until a min-roundabout junction with Stock Road South. The road provides no access to a construction bellmouth from the carriageway itself.

5.5.81 Stock Way North comprises a single lane, two-way carriageway which is approximately 10m wide. There is a 30mph speed restriction along the carriageway.

5.5.82 At the junction with Clevedon Road, there is a Pelican crossing complete with dropped kerbs and tactile paving. There is a footway on either side of the carriageway which is approximately 2m wide, and there is street lighting at regular intervals.

5.5.83 The carriageway passes a number of residential properties and businesses. These are generally well screened from the construction traffic, with some residential properties being unscreened.

Stock Way South

5.5.84 The construction access route continues south east the min-roundabout junction with Stock Road North to a mini-roundabout junction with Mizzymead Road. The road provides no access to a construction bellmouth from the carriageway itself.

5.5.85 Stock Way South comprises a single lane, two-way carriageway which is approximately 8m wide. There is a 30mph speed restriction along the road. Along the carriageway, there are pedestrian crossing islands and a Pelican crossing complete with dropped kerbs and tactile paving. There is also a footway on either side of the carriageway which is approximately 2m wide, and there is street lighting at regular intervals.

5.5.86 The carriageway passes a number of residential properties, businesses and other properties. These are generally well screened from the construction traffic, with some residential properties being unscreened.

Mizzymead Road

5.5.87 The construction access route continues south from the mini-roundabout junction with Stock Way South to a priority junction with Queens Road. The road provides no access to a construction bellmouth from the carriageway itself.

5.5.88 Mizzymead Road comprises a single lane, two-way carriageway which is approximately 7m wide. There is a 30mph speed restriction along the road. Adjacent to the mini-roundabout with Stock Way South there is a Zebra crossing complete with dropped kerbs, tactile paving and flashing beacons. No Waiting At Any Time (NWAAT) restrictions are present at intervals.

5.5.89 Along the length of the carriageway, there is a footway on either side of the road which is approximately 2-3m wide. There is also street lighting at regular intervals.

5.5.90 The highway passes a number of residential properties and Nailsea. All are well screened from any construction traffic. The school takes its primary access points via Mizzymead Road, and it is envisaged that a large number of school children would travel along the carriageway at peak periods.

<u>Queens Road</u>

5.5.91 Queens Road continues east from Station Road until it meets a priority junction with Hannah More Road. At this point, the construction access route splits along Hannah More Road to the south and continues along Queens Road to a Junction with North Street and Hanham Way. The road provides no access to a construction bellmouth from the carriageway itself.

5.5.92 Queens Road comprises a single lane, two-way carriageway which is approximately 10m wide. The carriageway is wider where there are right-hand turning lanes present. There is a 40mph speed restriction along the road.

5.5.93 Along the length of the carriageway, there is a footway on either side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

5.5.94 There are a number of residential properties on both sides of the carriageway. These properties are very well screened from any construction traffic by fencing and walls and thick vegetation, until the access continues past Mizzymead Road to the junction with North Street and Hanham Way. Here, the properties are still generally screened by vegetation and walls, but to a lesser extent.

<u>Hannah More Road</u>

5.5.95 Hannah More Road continues south from Queens Road, passing Blackfriars Road where the construction access route splits west, and continues to St Mary's Grove. The road provides no access to a construction bellmouth from the carriageway itself.

5.5.96 Hannah Moor Road comprises a single lane, two-way carriageway which is approximately 7m wide. At the junction with Queens Road, there is a pedestrian crossing island complete with dropped kerbs and tactile paving. There is a 30mph speed restriction along the road.

5.5.97 Along the length of the carriageway, there is a footway on either side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

5.5.98 The carriageway passes a number of residential properties and offices. These are well screened from the proposed construction access route by walls, fencing and vegetation.

<u>St Mary's Grove</u>

5.5.99 St Mary's Grove continues south west from Hannah More Road until a priority junction with Engine Lane. The road provides no access to a construction bellmouth from the carriageway itself.

5.5.100 St Mary's Grove comprises a single lane, two-way carriageway which is approximately 6m wide. There is a 30mph speed restriction along the road. Along the length of the carriageway, there is a footway on either side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

5.5.101 Heading west from Hannah More Road to Engine Lane, the carriageway passes a number of residential properties on both sides. The properties are generally well screened from the proposed construction access route by walls, fences and vegetation. However there are instances where properties have little or no screening, and have external walls located close to the carriageway.

Engine Lane

5.5.102 Engine Lane runs north from St Mary's Grove along the westernmost edge of Nailsea town, passing Blackfriars Road until it reaches a priority junction with North Street. The road provides direct access to two construction bellmouths.

5.5.103 Engine Lane comprises a single lane, two-way carriageway which is approximately 6m wide. There is a 30mph speed restriction along the road.

5.5.104 Along the length of the carriageway, there is a footway on the eastern side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

5.5.105 The carriageway passes a variety of receptors to the east of the highway. Heading north, Engine Lane passes residential properties before passing allotments. As it nears Blackfriars Road, there are a number of industrial units to the west. All the properties are generally screened from the construction traffic by walls and vegetation.

Blackfriars Road

5.5.106 Blackfriars Road links Engine Lane to Hannah More Road. The road provides no direct access to a construction bellmouth from the carriageway itself.

5.5.107 Blackfriars Road comprises a single lane, two-way carriageway which is approximately 6m wide. There is a 30mph speed restriction along the road.

5.5.108 Along the length of the carriageway, there is a footway on either side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

North Street

5.5.109 North Street runs north east from a priority junction with Engine Lane until a priority junction with Hanham Way. The road provides no direct access to a construction bellmouth from the carriageway itself.

5.5.110 North Street comprises a single lane, two-way carriageway which is approximately 6m wide. There is a 30mph speed restriction along the road.

5.5.111 Along the length of the carriageway, there is an intermittent footway on either side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

5.5.112 Residential properties line the carriageway along its length on both sides. In general these properties are well screened from the carriageway by walls and vegetation, however, some are not. The road also passes shops which are unscreened, but set back from the carriageway.

Hanham Way

5.5.113 Hanham Way runs north west from a priority junction with North Street until it reaches a junction with Causeway and North Drove. Hanham Way provides direct access to two construction bellmouths.

5.5.114 Hanham Way comprises a single lane, two-way carriageway which is approximately 6m wide. There is a 30mph speed restriction along the road.

5.5.115 Along the length of the carriageway, there is a footway on either side of the road which is approximately 2m wide. There is also street lighting at regular intervals.

5.5.116 Detached residential properties line the carriageway. The properties are well screened from the carriageway by fences and vegetation, and there is a grass verge for a section of the road on the western side of the carriageway.

North Drove

5.5.117 North Drove would be crossed by the proposed haul road traffic. It serves agricultural property.

5.5.118 It comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

Church Lane

5.5.119 Church Lane would be crossed by the proposed haul road traffic. It serves a business, some residential and agricultural property, and a church.

5.5.120 It comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a national speed limit restriction.

5.5.121 At the crossover point, there is a detached residential property approximately 80m to the west. This is well screened by trees and vegetation. Another 50m further west lies Christ Church Nailsea, also well screened from any construction traffic. Approximately 100m to the east, there is Tickenham Cattery. It is also screened from construction traffic.

Traffic Flows

5.5.122 In order to assess the baseline traffic flows along the construction access routes, a total of 43 Automatic Traffic Counts (ATCs) were placed across the Sections. This resulted in 12 ATCs (ATC numbers 11-22) being placed in Section D for a full week.

5.5.123 ATC 11 was situated on the A368 Dinghurst Road, in the village of Churchill. ATC 12 was placed to the north east of ATC 11 on the A38 Bristol Road. ATC 13 was situated on the B3133 Stock Lane, adjacent to the junction with Brinsea Lane south of Congresbury. ATC 14 was placed on the A370 in the village of Hewish. ATC 15 was situated on the A370 Station Road on the northern edge of Congresbury. ATC 16 was placed along Lampley Road, north of Yatton and adjacent to the junction with North End Road and Kenn Road. ATC 17 was situated on Kennmoor Road, to the north of Yatton. ATC 18 was placed to along the B3133 Kenn Road to the south of the junction with Kenn Street. ATC 19 was placed along Kenn Street. ATC 20 was situated along Nailsea Wall to the east of a junction with Kennmoor

Road. ATC 21 was placed on the B3133 at the southern tip of Clevedon. ATC 22 was situated along Manmoor Lane adjacent to the junction with Cook's Lane. **Table 5.18** shows the AADT flows by vehicle class for the ATCs in Section D.

Table 5.18 AADT Baseline Neutral Day AADT Traffic Flows in Section D

ATC – Construction Access Route		Neutral Day AADT Flows			
		24hr Total Traffic	24hr HGVs	18hr Total Traffic	18hr HGVs
11	Dinghurst Road	6,907	665	6,673	635
12	A38 Bristol Road	17,204	1,380	1,6421	1,324
13	Stock Lane	6,792	661	6,640	642
14	A370	18,730	1,660	18,082	1,571
14*	A370	17,015	1,188	16,360	1,116
15	Station Road	19,066	1,525	18,437	1,440
16	Lampley Road	9,965	826	9,573	793
17	Kennmoor Road	3,018	133	2,977	131
18	Kenn Road	10,304	871	10,111	846
19	Kenn Street	811	72	801	70
20	Nailsea Wall	1,820	134	1,769	130
21	B3133	14,286	1,085	14,034	1,055
22	Manmoor Lane	4,044	202	3,979	197

*ATC 14 was placed in two separate locations. Both counts have been included.

5.5.124 In addition to the neutral flows, there were also a selected number of counts taken during the summer to help inform construction traffic effects during the tourist season. These additional counts included ATC11, 12 and 15. **Table 5.19** shows the average weekday summer flows by vehicle class for ATC11, 12 and 15.

Table 5.19 Baseline Average Summer Weekday Traffic Flows in Section D

ATC – Construction Access Route		Average Summer Flows			
		24hr Total Traffic	24hr HGVs	18hr Total Traffic	18hr HGVs
11	Dinghurst Road	7,233	687	6,914	659
12	A38 Bristol Road	17,515	1,430	16,652	1,356
15	Station Road	18,428	1,528	17,914	1,445

5.5.125 The summer counts in **Table 5.19** show a 24hr total increase of 326 vehicles (4.7%) at ATC 11, and 311 (1.8%). The summer counts showed a reduction in traffic flow at ATC 15.

5.5.126 Traffic data has been obtained from the HA TRADS service for the M5 on a neutral weekday in April 2013. **Table 5.20** shows the AADT flows for the total number of vehicles at Junction 21 and 20 of the M5 obtained from the HA.

Table 5.20 AADT M5 TRADS Flows in Section D

ATC – M5 TRADS Data	AADT Flows	
	24hr Total Traffic	18hr Total Traffic
J21	53,761	51,360
J20	62,244	59,200

<u>Cycling</u>

5.5.127 National Cycle Route 26 passes through Sandford. It connects Yatton to Axbridge and Cheddar and follows a disused railway line. As such the route is mainly off-road with short on-road sections. The proposed 400kV overhead line crosses the cycleway.

5.5.128 The Proposed Development would also cross National Cycle Route 410 which is also known as the Avon Cycleway. It connects Clevedon with a number of small towns and villages to the south-east of Nailsea. The route runs along Nailsea Wall and Manmoor Lane.

<u>PRoW</u>

Walking

5.5.129 A review of the PRoW has indicated that a total of 42 designated PRoW would be crossed by the Proposed Development in Section D as follows:

- AX/29/48
- AX/29/48
- AX/3/42
- AX/24/11
- AX/24/12
- AX/24/13

- AX/3/43
- AX/24/10
- AX/24/7A
- AX/16/22
- AX/16/21
- AX/16/44
- LA/21/28
- LA/21/31
- LA/11/6
- LA/21/40
- LA/21/32
- LA/10/2
- LA/21/37
- LA/13/1
- LA/13/49
- LA/13/50
- LA/13/2
- LA/13/4
- LA/13/6
- LA/13/5
- LA/13/21
- LA/13/44
- LA/13/10
- LA/13/1
- LA/13/8
- LA/13/9
- LA/13/45
- LA/13/1
- LA/16/18
- LA/16/21
- LA/16/20
- LA/16/1
- AX/14/58
- AX/14/59
- AX/14/60
- AX/14/57

5.5.130 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.5.131 The footway off Nye Road to the north of Sandford was surveyed to provide an indication of the usage of PRoW reference AX 29/76 and AX 29/48. The survey found that 45 adult pedestrians, 822 adult cyclists, 9 child cyclists, and 24 adult dog walkers totalled 900 users over the 12 hour period.

5.5.132 A footpath at Ken Moor off Nye Road where it joins the Avonmouth Cycleway (Route 410) to the north of Sandford was surveyed to provide an indication of the usage of PRoW reference AX 29/76 and AX 29/48. The survey found that 6 adult pedestrians, 218 adult cyclists, and 6 adult equestrians totalled 230 users over the 12 hour period.

5.5.133 It is clear from the number of users in Section D that a number of pedestrians, equestrians, and particularly cyclists use PRoW in Section D.

5.5.134 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects. The PRoW Management Plan is provided at **Volume 5.26.6**.

<u>Public Transport</u>

Bus

5.5.135 Bus stops at various points along the B3130, some of which are in the vicinity of the Proposed Development. Hourly services run along this route to Bristol and Clevedon. The frequencies of these services are shown in **Table 5.21**.

Table 5.21 Bus Frequencies in Section D

Service	Route	Approximate Peak Frequency		
		Mon - Fri	Sat	Sun/Hols
1	Weston-Super-Mare – Congresbury – Yatton – Backwell – Bristol	Hourly	Hourly	Hourly
X1	Weston-Super-Mare – Congresbury – Backwell – Bristol	20 mins	20 mins	-
X6	Bristol – Clevedon	30 mins	Hourly	-
121	Weston-Super-Mare – Langford – Bristol Airport – Bristol Centre	Every 2 Hours	Every 2 Hours	Every 2 Hours
126	Weston-Super-Mare – Wells (Via Locking, Winscombe, Axbridge, Cheddar)	Hourly	Hourly	4 Services

Rail

5.5.136 The closest railway station to the Proposed Development is Yatton, approximately 1.5km to the east at its closest point to the Proposed Development. Yatton Railway Station is located on the Bristol to Exeter Line, with Nailsea and Blackwell being the preceding station to the north east, and Worle the following station to the south west. No rail connections would be crossed in this section of the route.

5.6 Section E: Tickenham Ridge

5.6.1 In Section E, the proposed route for 400kV overhead line and the proposed route for the 132kV underground cable will cross the M5 between junctions 19 and 20 close to Clapton-in-Gordano as well as Cadbury Camp Lane, Naish Hill and Caswell Hill.

5.6.2 The highway links in the **Table 5.22** below form part of the construction routeing strategy through Section E.

Table 5.22 Section E Highway Links to be Used during Construction

Highway Link	Local Authority
Tickenham Road	North Somerset
Clevedon Road (Section E)	North Somerset
Cuckoo Lane	North Somerset
Whitehouse Lane	North Somerset

Highway Link	Local Authority
Caswell Hill	North Somerset

5.6.3 The above links have been described below. No highway links are crossed by haul roads in Section E.

Tickenham Road

5.6.4 The B3130 Tickenham Road links the Proposed Development in Section D and J20 of the M5 to the Proposed Development in Section E. The road provides no direct links to a construction bellmouth from the carriageway itself.

5.6.5 Tickenham Road comprises a single lane, two-way carriageway which is approximately 7m wide. From the roundabout junction with Northern Way, there is a national speed limit restriction in place for approximately 1.1km to the east. Here, the limit is reduced to 40mph.

5.6.6 The carriageway passes a small number of industrial units. These are well screened from the road by vegetation and walls.

Clevedon Road (Section E)

5.6.7 The B3130 Clevedon Road continues east from Tickenham Road into Section E. the carriageway provides access to four construction bellmouths.

5.6.8 Clevedon Road comprises a single lane, two-way carriageway which is approximately 7m wide. From Tickenham Road, the carriageway is subject to a 40mph speed limit, which is reduced to 30mph as the carriageway passes through Tickenham.

5.6.9 Throughout Tickenham there is street lighting and an intermittent footway on both sides of the highway which is approximately 2m wide. Road signs warn of the presence of Tickenham Church of England Primary School, and there are 'School – Keep – Clear' road markings as the carriageway passes the school entrances. The school is accessed off Clevedon Road, and it is anticipated that a number of students would use the footways along the road during the peak periods. The school itself is screened from the carriageway by a wall and vegetation.

5.6.10 There is also a Pelican crossing complete with dropped kerbs and tactile paving. As the carriageway continues out of Tickenham, the footways and street lighting are discontinued and the speed limit is increased firstly to 40mph, and then to the national speed limit.

5.6.11 Prior to reaching the junction with the B3128 Clevedon Road, the speed limit is returned to 40mph. Along the B3128, the speed limit is again increased to the national speed limit.

5.6.12 In addition, the carriageway passes a number of residential properties and a church. They are generally well screened from the construction route.

Cuckoo Lane

5.6.13 Cuckoo Lane links a number of construction bellmouths to the Proposed Development, but does not provide direct access to a construction bellmouth from the carriageway itself.

5.6.14 The highway comprises a two-way, single lane carriageway approximately 5m wide. There is no defined pedestrian or cycle infrastructure, and the highway is subject to the national speed limit.

5.6.15 Between the junction with the B3128 and Whitehouse Lane, Cuckoo Lane passes a small number of large residential properties to the west of the carriageway. All of these properties are well screened from the carriageway by trees, hedges and other thick vegetation.

Whitehouse Lane

5.6.16 Whitehouse Lane continues north from Cuckoo Lane to Caswell Hill provides direct access to three construction bellmouths.

5.6.17 The highway comprises a two-way, single lane carriageway approximately 6m wide. There is no defined pedestrian or cycle infrastructure, and there is a ditch on both sides of the carriageway. The highway is subject to the national speed limit.

5.6.18 Between the junction with Cuckoo Lane and Caswell Hill, Whitehouse Lane passes a single detached residential property adjacent to the junction with Caswell Hill. The property is well screened from the carriageway by hedges and other thick vegetation, as well as a stone wall.

Caswell Hill

5.6.19 Caswell Hill continues north from Whitehouse Lane until the E/F Section boundary at the M5. It provides no direct route to a construction bellmouth from the carriageway itself.

5.6.20 The highway comprises a two-way, single lane carriageway approximately 5m wide. There is no defined pedestrian or cycle infrastructure, and the highway is subject to the national speed limit.

5.6.21 Between the junction with Whitehouse Lane and the construction bellmouth, Caswell Hill passes an agricultural building with associated residential property adjacent to the tunnel under the M5, to the north of the carriageway. The property is well screened from the road by hedges and other thick vegetation, as well as a stone wall.

Traffic Flows

5.6.22 In order to assess the baseline traffic flows along the construction access routes, a total of 43 ATCs were placed across the Sections. This resulted in five ATCs (ATC numbers 23-27) being placed in Section E for a full week.

5.6.23 ATC 23 was situated on the B3130 Clevedon Road to the east of Clevedon. ATC 24 was placed on the same road, further east of ATC 23 and north of Nailsea. ATC 25 was situated on the B3128 Tickenham Hill, again to the north of Nailsea. ATC 26 was placed on Whitehouse Lane, south of the junction with Caswell Hill. ATC 27 was situated on Caswell Hill, adjacent to the tunnel under the M5. All the ATCs in Section E were placed along major construction routes. **Table 5.23** shows the AADT flows for the ATCs in Section E.

Table 5.23 AADT Baseline Neutral Day AADT Traffic Flows in Section E

ATC		**AADT Flows**			
		24hr Total Traffic	**24hr HGVs**	**18hr Total Traffic**	**18hr HGVs**
23	Clevedon Road	13,404	915	13,216	890
24	Clevedon Road	11,489	809	11,302	788
25	Tickenham Hill	8,927	508	8,761	491
26	Whitehouse Lane	7,271	280	7,158	275
27	Caswell Hill	901	55	876	54

Cycling

5.6.24 The Proposed Development crosses National Cycle Route 410 the Avon Cycleway adjacent to the M5. The route is a large circuit of Bristol, and mostly comprises an on-road route. The Proposed Development would cross the cycle route adjacent to the junction between Caswell Lane and Caswell Hill.

PRoW

5.6.25 A review of the PRoW has indicated that a total of ten designated PRoW would be crossed by the Proposed Development in Section E as follows:

- LA/16/1
- LA/20/84
- LA/20/26
- LA/15/24
- LA/20/91
- LA/20/29
- LA/20/56
- LA/15/20
- LA/15/20
- LA/15/13

5.6.26 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.6.27 The footway off Nye Road to the north of Sandford was surveyed to provide an indication of the usage of PRoW reference AX 29/76 and AX 29/48. The survey found that 45 adult pedestrians, 822 adult cyclists, 9 child cyclists, and 24 adult dog walkers totalled 900 users over the 12 hour period.

5.6.28 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects. The PRoW Management Plan is provided at **Volume 5.26.6**.

Public Transport

Bus

5.6.29 Services X7 and 66 run between Temple Meads/Clevedon, Bristol/Walton St Mary, and Congresbury/Nailsea respectively. Services X8 and X9 run express serves from Nailsea to Bristol. The frequencies of these services are shown in **Table 5.24**.

Table 5.24 Bus Frequencies in Section E

Service	Route	Approximate Peak Frequency		
		Mon - Fri	Sat	Sun/Hols
X5	Nailsea – Weston-super-Mere	Hourly	-	-
X6	Bristol - Clevedon	30 mins	Hourly	-
X7	Bristol – Chepstow	Hourly	Hourly	Every 2 Hours
X8	Bristol – Clevedon/Nailsea	30 mins	30 mins	Hourly
X9	Bristol - Nailsea	30 mins	-	-
66	Congresbury – Nailsea	Hourly	Hourly	-

Rail

5.6.30 The closest railway station to the Proposed Development is Nailsea and Backwell approximately 4km to the south at its closest point. Nailsea and Backwell Railway Station is located on the Bristol to Exeter Line, with the preceding station being either Parson Street or Bristol Temple Meads to the north east, and Yatton being the following station to the south west. No rail connections would be crossed in this section of the route.

5.7 Section F: Portishead

5.7.1 In Section F, the 400kV overhead line splits down two alternatives with the Alternative Route (Option B) and the 132kV underground cable following the existing 132kV overhead line north, and Proposed Route (Option A) for the 400kV overhead cable alignment heading north east from the M5. Both options of the Proposed Development would cross the A369 Portbury Hundred. In addition to this, The Portbury Hundred along with Sheepway form part of the construction access route during the construction phase.

5.7.2 The highway links in the **Table 5.25** below form part of the construction routeing strategy through Section F.

Table 5.25 Section F Highway Links to be Used during Construction

Highway Link	Local Authority
Caswell Lane	North Somerset
The Portbury Hundred (Section F)	North Somerset
Sheepway	North Somerset

5.7.3 In addition to the above, those highway links that would be crossed by the Development's haul road have been listed in the **Table 5.26** below.

Table 5.26 Section F Highway Links to be Crossed during Construction

Highway Link	Local Authority
Wharf Lane	North Somerset

5.7.4 In the vicinity of the Proposed Development, The Portbury Hundred comprises a two-way carriageway with a width of approximately 10.5m. There are two lanes when travelling in an easterly direction, and one lane when travelling in a westerly direction.

5.7.5 A section of Option B for the proposed 400kV overhead line crosses Wharf Lane. It is a single lane carriageway lined by hedges approximately 3m in width.

5.7.6 In the vicinity of the Proposed Development, Sheepway comprises a two-way carriageway with a width of approximately 7.5m.

5.7.7 The M5 runs adjacent to the Proposed Development, approximately 100m at its nearest point.

5.7.8 The highway links proposed to be utilised within Section F have been discussed below.

<u>Caswell Lane</u>

5.7.9 Caswell Lane provides a short construction access link from Caswell Hill to two construction bellmouths.

5.7.10 There is no defined pedestrian or cycle infrastructure, and the highway is subject to the national speed limit.

<u>The Portbury Hundred</u>

5.7.11 The A369 Portbury Hundred links a number of construction bellmouths to the Proposed Development across Section F, and also provides direct access to two construction bellmouths.

5.7.12 The highway is comprised of two-lanes in an easterly direction, and one lane in a westerly direction. The two directions of traffic are separated by solid white line to indicate that it is not permissible to pass a vehicle by travelling on to the other side of the carriageway.

5.7.13 After the priority junction with Station Road, the highway converts to a single lane, two-way carriageway. The overall carriageway width is approximately 10.5m, and the road has a national speed limit restriction imposed on it.

5.7.14 There are footways on both sides of the carriageway which vary in width. There is also a pedestrian bridge which spans the carriageway and M5. Adjacent to the priority junction with Station Road, there are pedestrian crossing islands complete with dropped kerbs and tactile paving.

5.7.15 The Portbury Hundred passes no significant receptors until after a priority junction with Station Road. After here, the road passes a large industrial estate approximately 100m to the north which is well screened from the carriageway by vegetation.

Sheepway

5.7.16 Sheepway heads north-east from a roundabout with Bristol Road, Wyndham Way and The Portbury Hundred before re-joining The Portbury Hundred at a priority junction via Station road. It provides access to three construction bellmouths.

5.7.17 The highway comprises a single lane, two-way carriageway with a width of approximately 5m. There is a little pedestrian infrastructure adjacent to property along the carriageway, but much of the carriageway has no pedestrian or cycle provision. There is a 40mph speed restriction along the length of the carriageway.

5.7.18 The carriageway passes a number of residential and industrial properties, as well as some businesses. All the properties are well screened from the carriageway by vegetation and walls, and many of the residential properties are well set back from the road.

Wharf Lane

5.7.19 Wharf Lane would be crossed by the proposed haul road traffic. It serves residential and agricultural properties.

5.7.20 It comprises a single lane, two-way carriageway with a width of approximately 3m. There is no defined pedestrian or cycle infrastructure present, and there is a 40mph speed limit restriction.

Traffic Flows

5.7.21 In order to assess the baseline traffic flows along the construction access routes, a total of 43 ATCs were placed across the Sections. This resulted in 2 ATCs (ATC numbers 28 and 29) being placed in Section F for a full week.

5.7.22 ATC 28 was situated on Sheepway, in an area also called Sheepway to the west of a large industrial area. ATC 29 was placed on the A369 The Portbury Hundred, adjacent to the junction with Sheepway. Both the ATCs in Section F were placed along proposed major construction routes. **Table 5.27** shows the AADT flows for Section F.

Table 5.27 AADT Baseline Neutral Day AADT Traffic Flows in Section F

ATC		AADT Flows			
		24hr Total Traffic	24hr HGVs	18hr Total Traffic	18hr HGVs
28	Sheepway	1,204	172	1,185	169
29	The Portbury Hundred	26,765	1,677	26,187	1,614

Cycling

5.7.23 Within Section F, the Proposed Development crosses national cycle route 334, which runs as an on-road route along Sheepway, and national cycle route 24 which comprises an off-road route approximately 75m north of The Portbury Hundred adjacent to Sheepway. Route 334 connects Sheepway to the south-western edges of Bristol, and number 24 connects Portishead to the centre of Bristol and then on to North Somerset.

5.7.24 The Alternative Route crosses no additional cycle routes or lanes which have not already been discussed.

PRoW

5.7.25 A review of the PRoW has indicated that a total of seven designated PRoW would be crossed by the Proposed Development in Section F as follows:

- LA/15/13
- LA/15/15
- LA/15/22
- LA/15/2/60
- LA/15/2/40
- LA/15/2/20
- LA/15/21

5.7.26 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.7.27 The footway off Gordano Round adjacent to Noah's Ark Zoo Farm was surveyed to provide an indication of the usage. The survey found that one adult pedestrian used the PRoW over the 12 hour period.

5.7.28 The pedestrian footway to link Station Road over the M5 was also surveyed to provide an indication of usage along LA 15/1, LA 15/2 and LA 15/3. The survey found that 38 adult pedestrians, 12 child pedestrians, 58 adult cycles and five adult dog walkers totalled 113 users. The survey showed that the pedestrian bridge across the M5 is well used.

5.7.29 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects. The PRoW Management Plan is provided at **Volume 5.26.6**.

Public Transport

Bus

5.7.30 There are bus stops on the A369 (The Portbury Hundred). These are well utilised by multiple services which include the 358/359 (Bristol to Portishead) which runs frequent services on weekdays, weekends, and bank holidays.

5.7.31 The 125 runs along The Portbury Hundred frequently Monday to Saturday. The X3 also runs frequently to Bristol. There are additional stops on Sheepway which serve the X3 and X2. The frequencies of these services are shown in **Table 5.28**.

Table 5.28 Bus Frequencies in Section F

Service	Route	Approximate Peak Frequency		
		Mon - Fri	Sat	Sun/Hols
X2	Bristol Bus Station – Pill – Portishead – Pill - Bristol Bus Station	30 mins	30 mins	Hourly
X3	Bristol Bus Station – Portishead - Bristol – Bus Station	30 mins	30 mins	Hourly
125	Weston-super-Mere – Portishead	Hourly	Hourly	-
777A	Westerleigh Village – St Johns Lane – Portishead Gordano School	1 Return School Service	-	-
777B	Westerleigh – Whiteladies Road – Portishead Gordano School	1 Return School Service	-	-

Rail

5.7.32 The closest rail connections to the site are at Avonmouth and Shirehampton, both of which are approximately 3.2km from the Proposed Development at their closest points.

5.7.33 Avonmouth Railway Station is situated on the Severn Beach Line with Shirehampton being the preceding station to the south east, and St Andrews Road the following station to the north.

5.7.34 Shirehampton Railway Station is also situated on the Severn Beach Line with Sea Mills being the preceding station to the south east, and Avonmouth the following station to the north.

5.7.35 No rail connections would be crossed in this section of the route, although the Proposed Development does cross a disused railway line adjacent to The Portbury

Hundred. The disused railway section between Portishead and Portbury (Station Road Bridge) is safeguarded in the North Somerset Replacement Local Plan under policy T/1.

5.7.36 The Alternative Route affects no additional public transport infrastructure which has already been discussed.

5.8 Section G: Avonmouth

5.8.1 In Section G the Proposed Development would cross Royal Portbury Dock Road and Marsh Lane. Marsh Lane forms part of the designated construction traffic route. The M5 runs adjacent to the Proposed Development, approximately 100m at its nearest point.

5.8.2 The highway links in the **Table 5.29** below form part of the construction routeing strategy through Section G.

Table 5.29 Section G Highway Links to be Used during Construction

Highway Link	**Local Authority**
Royal Portbury Dock Road	North Somerset
Unnamed Track off Royal Portbury Dock	North Somerset
Portbury Way	North Somerset
M5 J18A	Bristol
Bristow Broadway	Bristol
Portway	Bristol
West Town Road	Bristol
Victoria Road	Bristol
King Road	Bristol
Crowley Way	Bristol
Avonmouth Way	Bristol
St Andrew’s Road	Bristol
Kings Weston Lane	Bristol
Smoke Lane	Bristol

Highway Link	Local Authority
Poplar Way West	Bristol
Poplar Way East	Bristol
Packgate Road	Bristol
Chittening Road	Bristol
Severn Road	Bristol
Ableton Lane	Bristol
Minor’s Lane	South Gloucestershire/Bristol

5.8.3 At the northernmost point of the Section, there are works at the existing Seabank 400/132kV Substation which would link to an existing 400kV overhead line. Here there are also small sections of proposed 132kV overhead line, underground cable and proposed temporary 132kV overhead line.

5.8.4 These highway links proposed to be used within Section G have been discussed below.

Royal Portbury Dock Road

5.8.5 The Construction access route along Royal Portbury Dock Road continues north from J19 of the M5 over a roundabout junction with Portbury Way to an unnamed track. The road does not provide a direct access to a construction bellmouth on the carriageway itself.

5.8.6 The highway comprises a single lane, two-way carriageway with a width of approximately 8m. There is a footway on the western side of the road which is approximately 2m wide.

5.8.7 As the carriageway continues over a roundabout with Portbury Way, there are pedestrian crossing islands. There is a 30mph speed restriction along the length of the carriageway, and there is street lighting present.

5.8.8 Along the length of the carriageway, the route passes a number of industrial units. The units are set back from the carriageway and well screened by trees and other vegetation.

Unnamed Track off Royal Portbury Dock Road

5.8.9 The construction access route branches east off Royal Portbury Dock Road along an unnamed track. The track provides access to a construction bellmouth.

Portbury Way

5.8.10 The construction access route branches west off Royal Portbury Dock Road along Portbury Way. The track provides access to a construction bellmouth.

5.8.11 The highway comprises a single lane, two-way carriageway with a width of approximately 8m. There is a footway on both sides of the road which are approximately 2m wide.

5.8.12 As the carriageway continues over a roundabout with Portbury Way, there are pedestrian crossing islands. There is a 30mph speed restriction along the length of the carriageway, and there is street lighting present.

5.8.13 The carriageway passes a number of industrial units. It is generally well screened by trees and vegetation.

M5 J18A

5.8.14 J18A of the M5 links a number of construction bellmouths to the motorway network, but provides no direct access to any particular construction bellmouth from the carriageway itself.

5.8.15 J18A is formed of between two and four lanes in each direction, with a hard shoulder in addition along each direction. The overall road width is approximately 38m when including the hard shoulder. There is a national speed limit restriction along the length of the carriageway, and street lighting is present.

5.8.16 Between J18A and the A4 dumbbell roundabout to the west, the carriageway passes a number of industrial, storage and distribution, and retail units on either side of the carriageway. The buildings are generally well screened from the carriageway by hedgerows and other vegetation.

Bristow Broadway

5.8.17 The A4 Bristow Broadway continues south from the dumbbell roundabout to a roundabout with Portway. It links a number of construction bellmouths to the Proposed Development, but provides no direct access to any particular construction bellmouths.

5.8.18 The highway comprises a dual lane carriageway in either direction, separated by a grassed central reservation. The total carriageway width excluding the central reservation is approximately 16m.

5.8.19 On the western side, there is a shared foot and cycle way which is approximately 3m wide. Along the highway, there is a Toucan crossing complete with dropped kerbs and tactile paving. There is a 40mph speed limit restriction along the length of the carriageway, and street lighting is present.

5.8.20 There are a number of residential properties in the vicinity off residential streets such as Cook Street and Akeman Way. These are screened by vegetation and walls or fencing.

Portway

5.8.21 Portway leads south from the southernmost dumbbell roundabout, and links a number of construction bellmouths. It provides no direct access to any particular construction bellmouth from the carriageway itself.

5.8.22 The A4 Portway is formed of three lanes in a southerly direction, and two lanes in a northerly direction. There is also a central reservation. The overall carriageway width excluding the central reservation is approximately 18m.

5.8.23 There are footways on both sides of the highway which are approximately 2m wide. The carriageway passes under a pedestrian footbridge approximately 100m south of the roundabout junction with Bristow Broadway. There is a 40mph speed limit restriction along the length of the carriageway, and street lighting is present.

5.8.24 The carriageway passes a number of residential properties and Avonmouth C of E Primary School. The property is well screened from the construction access route. Although a number of students may cross the road during peak periods, the A4 is an established as a busy road. There is a pedestrian footbridge to aid movement approximately 100m north of the school, and signalised pedestrian crossings approximately 250m to the south.

West Town Road

5.8.25 West Town Road leads west from the priority junction with Portbury to link a number of construction bellmouths to the wider road network. The road provides no direct access to a construction bellmouth from the carriageway itself.

5.8.26 The highway comprises a single lane, two-way carriageway approximately 7m in width. As the carriageway passes over a level crossing, the speed limit is 20mph.

5.8.27 There are NWAAT restrictions at intermittent points along the carriageway, and street lighting is present. There is a footway on the eastern side of the carriageway which is approximately 1.5m wide.

5.8.28 West Town Road passes under the M5 before the construction access route joins Victoria Road. It passes storage and distribution units on both sides of the carriageway.

Victoria Road

5.8.29 Victoria Road leads north from West Town Road, linking the wider construction access route to a construction bellmouth.

5.8.30 The highway comprises a single lane, two-way carriageway approximately 7m in width. There is a 20mph speed restriction imposed on the highway. There are NWAAT restrictions at intermittent points along the carriageway, and street lighting is present.

5.8.31 There is a footway on the eastern side of the carriageway which is approximately 1.5m wide.

5.8.32 The carriageway widens as it passes through the Bristol Port Company Avonmouth Dock controlled barriers.

5.8.33 Heading north from West Town Road, the carriageway passes a number of industrial, storage and distribution units and docklands on both sides of the carriageway including unit occupied by Ascent Scientific and Mathias and Sons. These properties are approximately 100m from the carriageway at their closest points, and are well screened by vegetation. The carriageway also passes the Bristol Docks Ferry Landing.

King Road

5.8.34 King Road leads south-east from Victoria Road to the roundabout with Crowley Way. It provides no direct access to a construction bellmouth from the carriageway itself.

5.8.35 The highway comprises a duel lane, one-way carriageway (in an easterly direction) approximately 7m in width. There is a 30mph speed restriction imposed on the highway.

5.8.36 There is a footway on the northern side of the carriageway which is approximately 2m wide, and street lighting is present.

5.8.37 On the south side of the carriageway, it passes The Bristol Port Company. To the north, land adjacent to the road is used for storage and distribution. There are small amounts of vegetation screening on both sides of the carriageway.

Crowley Way

5.8.38 The A4 Crowley Way leads east from the roundabout junction with King Road and St. Andrew's Road to the northern end of the dumbbell roundabout. It provides no direct access to any construction bellmouth from the carriageway itself.

5.8.39 The highway comprises a duel lane, two way carriageway with a central reservation. The overall carriageway width excluding the central reservation totals approximately 14m.

5.8.40 To the south of the carriageway, there is a shared foot and cycle way which is approximately 2m wide.

5.8.41 There is a 40mph speed restriction along the length of the highway. Adjacent to the roundabout with St Andrew's Road and King Road, there is a Toucan crossing complete with dropped kerbs and tactile paving. Street lighting is present.

5.8.42 The duel carriageway passes industrial units to the north and south. These are currently occupied by businesses such as Barry Shaddick Tyres Ltd, UK Storage Company, and Wellington Welding Supplies Ltd. There is little screening from the construction traffic with fencing at certain intervals, although the units are generally set back from the carriageway.

Avonmouth Way

5.8.43 Avonmouth Way leads east from the roundabout junction with Crowley Way, Portway and the M5 J18A. The road provides direct access to two construction bellmouths.

5.8.44 The highway comprises a single lane, two way carriageway with an approximate width of 10m. There is a footway on both sides of the carriageway.

5.8.45 There is a 40mph speed restriction along the length of the highway, and street lighting is present.

5.8.46 Heading east from the roundabout, the carriageway passes a number of industrial units on both the northern and southern side. All of the units are set back from the carriageway, and the majority are well screened by vegetation and trees.

St Andrew's Road

5.8.47 The A403 St Andrew's Road leads north from a roundabout with the A4 Crowley Way and King Road, until it meets Smoke Lane approximately 2km north. The carriageway itself provides no direct access to any particular construction bellmouth.

5.8.48 The highway comprises a single lane, two way carriageway with a typical carriageway width of 10m. On both sides of the carriageway, there is a footway which is approximately 2m wide.

5.8.49 There is a 40mph speed restriction along the length of the highway. Adjacent to the priority junction with Kings Weston Lane, there is a Pelican crossing complete with dropped kerbs and tactile paving. Here, the footway on the western side of the carriageway is discontinued. Street lighting is present along the length of the carriageway.

5.8.50 The carriageway passes a number of industrial premises. There is some vegetation screening from the carriageway at various points along the road, especially at the railway station.

Kings Weston Lane

5.8.51 Kings Weston Lane leads east from a priority junction with St Andrew's Road, providing direct access to two construction bellmouths as it reaches Avonmouth Way.

5.8.52 The highway comprises a single lane, two-way carriageway with a width of approximately 7m. Heading east from St Andrew's Road there is a footway on both sides of the carriageway which is approximately 2m wide. This is discontinued as the highway passes over a disused level crossing.

5.8.53 There is a 40mph speed restriction along the length of the highway, and street lighting is present.

5.8.54 The carriageway passes a number of industrial premises. These are screened by vegetation along its length, and the construction access route terminates as it reached the construction bellmouths before King Weston Lane crosses the M5.

Smoke Lane

5.8.55 The A403 Smoke Lane continues north east from St Andrew's Road, over a roundabout junction with Poplar Way West where the construction access route splits south east, until it reaches Chittening Road.

5.8.56 The highway comprises a single lane, two-way carriageway with a width of approximately 7m.

5.8.57 There is a footway on both sides of the carriageway which is approximately 2m wide, and there is also a 40mph speed restriction along the length of the highway. Street lighting is present.

5.8.58 As the carriageway continues from St Andrew's Road, there are industrial units on both sides. All the units are relatively well screened from the construction traffic by walls and vegetation.

Poplar Way West

5.8.59 Poplar Way West runs south east from the roundabout junction with Smoke Lane to a roundabout junction with Poplar Road East. There is no direct access to a construction bellmouth from the carriageway itself.

5.8.60 The highway comprises a single lane in each direction, two way carriageway with a typical carriageway width of 10m. Heading east from Smoke Lane, there is a footway on both sides of the carriageway which is approximately 2m wide.

5.8.61 To the south of the carriageway, this comprises a shared foot and cycleway. The highway passes under a pedestrian footbridge approximately 300m east of Smoke Lane, which provides a link between employment areas to the north and south of the highway.

5.8.62 Adjacent to the roundabout with Poplar Way East, there is a pedestrian crossing island complete with tactile paving and dropped kerbs. There is a 40mph speed restriction along the length of the highway, and street lighting is present.

5.8.63 As the carriageway continues from the roundabout with Smoke Lane, Poplar Way West passes a large area of vehicle storage associated with Bristol Street Commercials on both sides of the length of the carriageway. These are well screened by hedges and other vegetation.

Poplar Way East

5.8.64 Poplar Way East continues south east from the roundabout junction with Poplar Way West to a roundabout junction with Packgate Road. There is no direct access to a particular construction bellmouth from the carriageway itself, but the road forms the access to construction bellmouths off Packgate Road.

5.8.65 The highway comprises a single lane in each direction, two way carriageway with a typical carriageway width of 10m.

5.8.66 Heading east from Poplar Way West, there is a footway on both sides of the carriageway which is approximately 2m wide. To the south of the carriageway, this comprises a shared foot and cycleway.

5.8.67 Adjacent to the roundabout with Poplar Way East, there is a pedestrian crossing island complete with tactile paving and dropped kerbs. There is a 40mph speed restriction along the length of the highway, and street lighting is present.

5.8.68 As the carriageway continues south east from the roundabout, Poplar Way East passes industrial units on both sides of the road. The units are unscreened from the construction traffic.

Packgate Road

5.8.69 Packgate Road comprises a small section of construction access route to the north east of the roundabout junction with Poplar Way East. It provides direct access to a construction bellmouth.

5.8.70 The highway comprises a single lane in each direction, two way carriageway with a typical carriageway width of approximately 7m.

5.8.71 Adjacent to the roundabout with Poplar Way West, there is a pedestrian crossing island with dropped kerbs and tactile paving. There is a shared footway and cycleway on the northern side of the carriageway which is approximately 2m wide.

5.8.72 There is a 40mph speed restriction along the length of the highway, and street lighting is present.

Chittening Road

5.8.73 The A403 Chittening Road continues north east from Smoke Lane to a priority junction with Severn Road. The road provides a direct access to construction bellmouth.

5.8.74 The highway comprises a single lane in each direction, two-way carriageway with a typical carriageway width of 7m.

5.8.75 There is a footway on the eastern side of the carriageway which is approximately 2m wide, and there is also a 40mph speed restriction along the length of the highway. Street lighting is present.

5.8.76 From Smoke Lane, the carriageway passes industrial units. There is thick vegetation screening from the construction traffic at intermittent intervals.

Severn Road

5.8.77 Severn Road continues south east from a priority junction with Chittening Road. The road provides a direct access to a construction bellmouth.

5.8.78 The highway comprises a single lane in each direction, two-way carriageway with a typical carriageway width of approximately 6m.

5.8.79 There is no designated pedestrian or cycling infrastructure, and there is a 40mph speed restriction along the length of the highway.

5.8.80 For the length of the carriageway, the AbleWaste Management Plant is situated on both the northern and southern side of the road. There is some screening from the construction traffic, as there is vegetation on both sides of the carriageway.

Ableton Lane

5.8.81 Ableton Lane continues north east from a priority junction with Severn Road. The road provides a direct access to a construction bellmouth.

5.8.82 The highway comprises a single lane in each direction, two-way carriageway with a typical carriageway width of approximately 5m.

5.8.83 There is no designated pedestrian or cycling infrastructure, and there is a 40mph speed restriction along the length of the highway.

5.8.84 The carriageway passes the previously described Able Waste Management to the west of the road, and an industrial site with associated vehicle storage to the east. Both are well screened by trees and thick vegetation from the carriageway.

Minor’s Lane

5.8.85 Minor’s Lane comprises a small section of construction access at the most northern part of Section G. It provides direct access to a construction bellmouth.

5.8.86 The highway comprises a single lane in each direction, two-way carriageway with a typical carriageway width of approximately 5m.

5.8.87 There is no designated pedestrian or cycling infrastructure, and there is a 40mph speed restriction along the length of the highway.

Traffic Flows

5.8.88 In order to assess the baseline traffic flows along the construction access routes, a total of 43 Automatic Traffic Counts (ATCs) were placed across the Sections. This resulted in three ATCs being placed in Section G for a full week.

5.8.89 ATC 30 was situated on Victoria Road, adjacent to the junction with West Town Road. ATC 32 was due to be placed on St Andrew's Road adjacent to the junction with Kings Weston Lane, although this was not completed due to road works. ATC 33 was placed on Kings Weston Lane, adjacent to a junction with Ballast Lane. All the ATCs in Section A were placed along major construction routes (see **Volume 5.22.3, Figure 22.2)**. **Table 5.30** shows the AADT flows for Section G.

Table 5.30 AADT Flows in Section G

ATC		**AADT Flows**			
		24hr Total Traffic	**24hr HGVs**	**18hr Total Traffic**	**18hr HGVs**
30	Victoria Road	2,034	629	1,928	600
32	St Andrew's Road	No counts completed due to road works			
33	Kings Weston Lane	8,054	1,214	7,540	1,173

Cycling

5.8.90 Within Section G the Proposed Development again crosses National Cycle Route 24 which in the vicinity of the site comprises an off-road route which runs adjacent to the M5. The route 24 connects Portishead to the centre of Bristol and then on to North Somerset.

5.8.91 The Proposed Development crosses national cycle route 41 twice; firstly adjacent to the M5 in Avonmouth, and secondly adjacent to the M49 on Lawrence Weston Road. Route 41 connects the west of Bristol to Avonmouth, and continues up the west coast of England through Gloucester. The Proposed Development also crosses local off-road cycle routes along the A4, and the A403 St Andrew's Road.

5.8.92 The Proposed Development also crosses regional route 10, which runs along Moorhouse lane adjacent to the M49.

5.8.93 The Alternative Route crosses no additional cycle routes or lanes which have not already been discussed.

PRoW

5.8.94 A review of the PRoW has indicated that a total of 16 designated PRoW would be crossed by the Proposed Development in Section G as follows:

- LA/15/21
- LA/8/66
- LA/8/67
- LA/8/6
- BCC/17/10
- BCC/6/10
- BCC/5/10
- BCC/4/10
- BCC/4/20
- BCC/554/10
- BCC/555/10
- BCC/555/20
- BCC/556/20
- BCC/555/30
- OAY/11
- ORN/27

5.8.95 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.8.96 The footway providing access to the nature reserve off Sheepway was surveyed to provide an indication of the usage of PRoW reference LA15/15. The survey found that 57 adult pedestrians, four child pedestrians, 36 adult cyclists, two child cyclists, and 24 adult dog walkers used the PRoW over the 12 hour period. It is clear that this is a well utilised PRoW.

5.8.97 A separate PRoW Management Plan has been produced; this contains further details of PRoWs that would be affected by the Proposed Development together with proposed management procedures to minimise the effects. The PRoW Management Plan is provided at **Volume 5.26.6**.

Public Transport

Bus

5.8.98 The 40/40A, 41 and 501 buses all run services along Avonmouth Road. The 40 runs daily services, the 41 runs regular services Mondays – Fridays excluding bank holidays, and the 501 runs frequent services on Mondays – Saturdays. The frequencies of these services are shown in **Table 5.31**.

Table 5.31 Bus Frequencies in Section G

Service	**Route**	**Approximate Peak Frequency**		
		Mon - Fri	**Sat**	**Sun/Hols**
40A	Cribbs Causeway – Lawrence Weston – Shirehampton – Blackboy Hill – Bristol Centre	30 mins (late services)	30 mins (late services)	30 mins
41	Avonmouth – Shirehampton – Blackboy Hill – Bristol Centre	20 mins	20 mins	-
501	Abbey Wood – Avonmouth	Hourly	Hourly	-

Service	Route	Approximate Peak Frequency		
		Mon - Fri	Sat	Sun/Hols
777A	Westerleigh Village – St Johns Lane – Portishead Gordano School	1 Return School Service	-	-
777B	Westerleigh – Whiteladies Road – Portishead Gordano School	1 Return School Service	-	-

Rail

5.8.99 The closest rail connection to the site is in Avonmouth which is situated adjacent to the proposed route for the 400kV overhead line. Avonmouth Railway Station is situated on the Severn Beach Line with Shirehampton being the preceding station to the south east, and St Andrews Road the following station to the north.

5.8.100 The Proposed Development would cross the Severn Beach Line to the north of Avonmouth Station.

5.9 Section H: Hinkley Line Entries

5.9.1 In this Section, the routes cross Wick Moor Drove at three separate points, and Middle Moor Drove twice before connecting to the proposed new Shurton Substation at the proposed Hinkley Point C Power Station.

5.9.2 The highway links in the **Table 5.32** below form part of the construction routeing strategy through Section H.

Table 5.32 Section H Highway Links to be Used during Construction

Highway Link	Local Authority
Unnamed Section of A39 (Adjacent to Dunball Roundabout)	North Somerset
A38 Bristol Road (Section H)	North Somerset
The Drove	North Somerset
Western Way	North Somerset
Homberg Way	North Somerset
Quantock Road	North Somerset

Highway Link	Local Authority
New Road (Section H)	North Somerset
Main Road (Section H)	North Somerset
Unnamed Section of the A39 (South of Cannington)	North Somerset
High Street (Section H)	North Somerset
Rodway	North Somerset
Withycombe Hill	North Somerset
Wick Moor Drove	North Somerset
Unnamed Lane off Wick Moor Drove	North Somerset

5.9.3 In addition to the above, those highway links that would be crossed by the Development's haul road have been listed in the **Table 5.33** below.

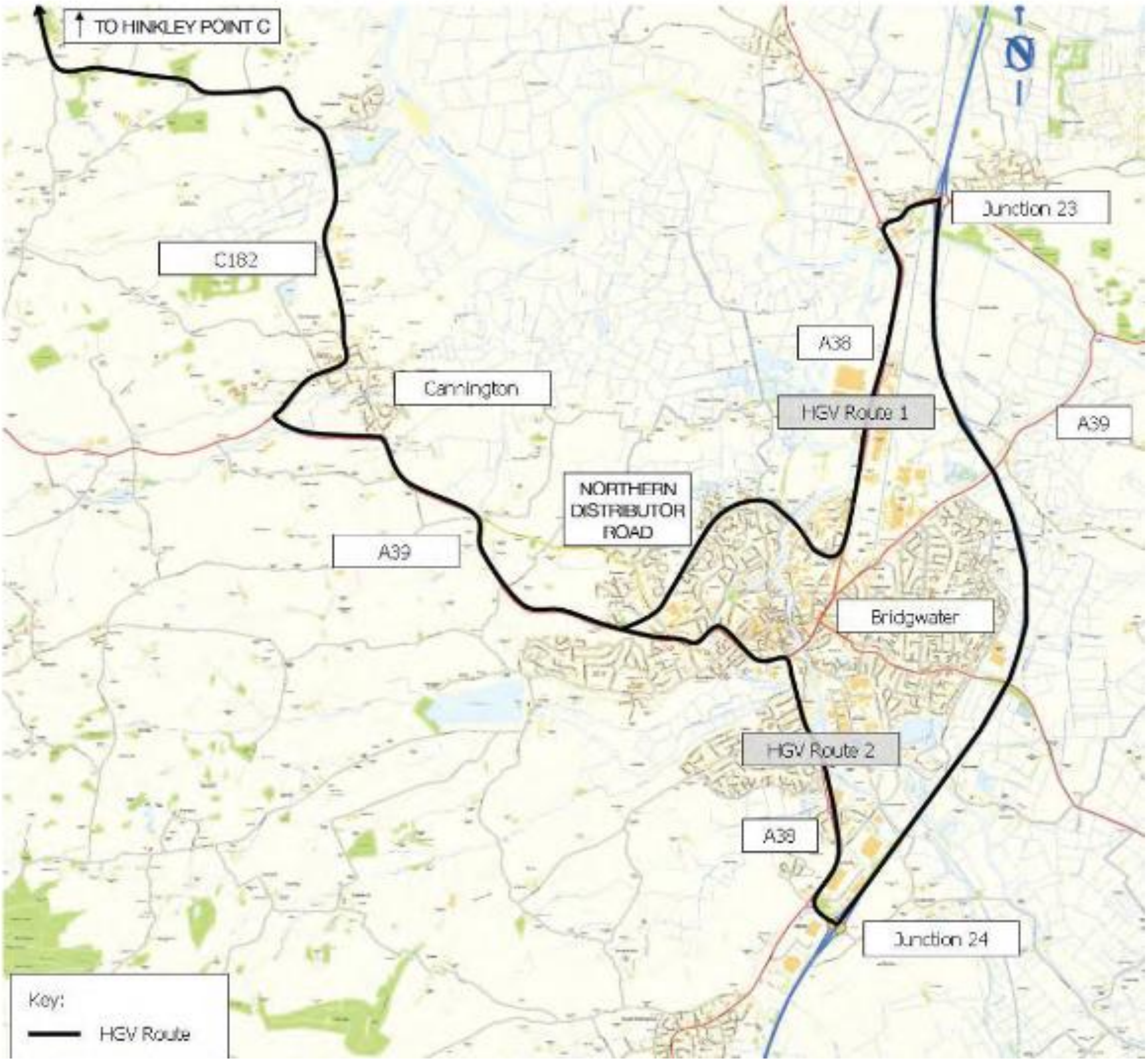
Table 5.33 Section H Highway Links to be Crossed during Construction

Highway Link	Local Authority
Unnamed Track to the North of Wick	North Somerset

5.9.4 The highway links proposed to be utilised as part of Section H have been described below.

5.9.5 In addition, throughout Section H, there are also construction access routes associated with the construction of the Hinkley Point C power station. These are shown in **Inset 5.1** below and are also described below.

Inset 5.1: Hinkley Point C Power Station Construction Access Routes.



Unnamed Section of A39 (Adjacent to Dunball Roundabout)

5.9.6 From junction 23 of the M5, the A39 heads south west on an unnamed section of the A39 approximately 500m to the Dunball roundabout. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.7 The carriageway comprises a two-way carriageway with two lanes in each direction with a grassed central reservation.

5.9.8 It has a typical carriageway width of approximately 14m excluding the central reservation. There is no designated pedestrian or cycling infrastructure, and the duel carriageway is subject to the national speed limit restriction.

5.9.9 There are a number of detached residential properties and industrial units adjacent to the highway. These are well screened from the carriageway by trees and thick vegetation.

Bristol Road (Section H)

5.9.10 From a roundabout junction with the A39, The A38 Bristol Road heads south in to the centre of Bridgwater until it reaches a signalised junction with The Drove. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.11 Heading south from the Dunball Roundabout, the carriageway comprises a two-way carriageway with two lanes in each direction with a wide grassed central reservation.

5.9.12 The highway has a typical carriageway width of approximately 14m excluding the central reservation.

5.9.13 A footway is present along the western side of the highway which is approximately 2m wide, and an intermittent footway is also present on the western side adjacent to receptors. The duel carriageway is subject to the national speed limit restriction.

5.9.14 As the carriageway approaches Bridgwater, the speed limit is reduced to 40mph and street lighting starts to line the highway. Continuing southwards, the carriageway narrows to a single lane in each direction, and an approximate typical width of 7m. The central reservation is discontinued, and there is a pedestrian crossing island. Here the speed limit is further reduced to 30mph as the carriageway continues to The Drove.

5.9.15 There are footways on both sides of the carriageway which are approximately 2m wide, and NWAAT restrictions are present.

5.9.16 There are a variety of receptors located along the highway. The level of screening from the construction traffic varies along the length of the carriageway.

The Drove

5.9.17 The A39, The Drove continues west from a signalised junction with Bristol Road, until it reaches a signalised junction with Western Way. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.18 As the carriageway continues west from Bristol Road, it comprises a two-way carriageway with one lane in each direction with a typical width of 7m. There is a Pelican crossing located at the junction with The Drove.

5.9.19 The speed limit is 30mph along the length of the carriageway, and street lighting is present. There are footways on both sides of the carriageway which are approximately 2m wide, and NWAAT restrictions are present at intermittent intervals.

5.9.20 At the signalised junction with Western Way, there is a small section of a shared footway and cycleway leading to a Toucan crossing.

5.9.21 Continuing west from Bristol Road, the road passes industrial units and businesses. The carriageway is generally well screened by trees and other vegetation, and there is a grassed verge which sets the units back approximately 7m from the road.

Western Way

5.9.22 Continuing north west from a signalised junction with The Drove, the A39 Western Way meets Homberg Way adjacent to the priority junction with Reedmoor Gardens. Here the A39 and designated construction access continue southwest. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.23 As the carriageway continues west from The Drove, it comprises a two-way carriageway with one lane in each direction with a typical width of 7m.

5.9.24 At the signalised junction with The Drove, there is a Toucan crossing. The speed limit is 30mph along the length of the carriageway, and street lighting is present.

5.9.25 There is a footway on the southern side of the carriageway which is approximately 2m wide. On the northern side is a shared foot and cycleway and as the highway continues west, this also becomes present on the southern side of the carriageway. NWAAT restrictions are present at intermittent intervals.

5.9.26 As the carriageway continues west, it widens before reaching a Pelican crossing complete with dropped kerbs and tactile paving. The combined cycleway and walkway continues on the northern side of the carriageway, but reverts to a footway only on the southern side.

5.9.27 The highway passes a number of residential properties. These are well screened from any construction traffic by walls, tall hedging and other vegetation.

Homberg Way

5.9.28 The A39 continues south west from Western Way as Homberg Way until it goes west along Quantock Road. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.29 As the highway continues west from Western Way, it comprises a two-way carriageway with one lane in each direction with a typical width of 7m.

5.9.30 The carriageway widens to accommodate right-hand turning lanes into various residential developments.

5.9.31 The highway passes a number of pedestrian crossing features including a Toucan crossing and pedestrian crossing islands which are complete with dropped kerbs and tactile paving. The speed limit is 30mph along the length of the carriageway, and street lighting is present.

5.9.32 There is a footway on the southern side of the carriageway which is approximately 2m wide. On the northern side is a shared foot and cycleway. As the shared foot and cycleway is discontinued on the northern side of the carriageway, it continues on the southern side. NWAAT restrictions are present at intermittent intervals along the highway.

5.9.33 There are a number of residential properties on the north and south sides of the carriageway as Homberg Way continues south west. These are all well screened from any construction traffic by hedges and other vegetation.

Quantock Road

5.9.34 The A39 Quantock Road continues west from the roundabout with Homberg Way, before heading north to meet New Road in a total of approximately 2km. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.35 As the highway continues west from Homberg Way, it comprises a two-way carriageway with one lane in each direction with a typical width of 7m. The speed limit starts at 30mph, and street lighting is present.

5.9.36 There is a footway on the southern side of the carriageway which is approximately 1.5m wide. As the speed restriction is increased firstly to 40mph and then the national speed limit, the footway on the southern side of the carriageway is discontinued.

5.9.37 From the roundabout junction, the carriageway passes residential properties on both sides before passing a cemetery on the southern side of the highway. The receptors are generally well screened by trees, other vegetation and walls.

New Road (Section H)

5.9.38 The A39 New Road continues north west from Quantock Road until the A39 continues as Main Road. There is no access to any construction bellmouths from the carriageway itself.

5.9.39 As the highway continues from Quantock Road, it comprises a two-way carriageway with one lane in each direction with a typical width of 7m. The carriageway is subject to the national speed limit, and there is no defined pedestrian or cycle infrastructure present.

Main Road (Section H)

5.9.40 After passing the priority junction with Limestone Hill, the A39 continues north as Main Road until it reaches a roundabout junction with an unnamed section of the A39. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.41 As the highway continues from Quantock Road, it comprises a two-way carriageway with one lane in each direction with a typical width of 7m.

5.9.42 The carriageway is subject to the national speed limit. As the highway approaches Cannington, there is a footway on the eastern side of the carriageway which is approximately 1.5m wide.

5.9.43 The highway passes a small number of residential properties and retail units. These are generally well screened from any construction traffic by a wall, trees and other vegetation.

Unnamed Section of the A39 (South of Cannington)

5.9.44 West from the junction with Main Road, an unnamed section of the A39 continues north as Main Road until it reaches a roundabout junction with High Street. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.45 As the highway continues west from a roundabout junction with Main Road, it comprises a single lane, two-way carriageway with a width of approximately 7m.

5.9.46 The carriageway is subject to the national speed limit, and there is no defined pedestrian or cycle infrastructure present. Before reaching the roundabout with High Street, the carriageway passes a signalised cattle crossing.

5.9.47 There are a small number of residential properties in the vicinity of the construction access route. These are well screened.

High Street (Section H)

5.9.48 The designated construction route continues north east to Cannington from the roundabout with the unnamed section of the A39. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.49 As the highway continues from the A39, it comprises a two-way carriageway with one lane in each direction with a typical width of 6m.

5.9.50 From the roundabout, the carriageway is subject to a 40mph speed limit, and there is no defined pedestrian or cycle infrastructure present until the highway reaches the western areas of Cannington. Here, there is a reduction of the speed limit to 30mph, and footways which are approximately 1.5m are found on both sides.

5.9.51 As the highway continues through Cannington, there are NWAAT restrictions and a Zebra crossing complete with tactile paving, dropped kerbs and flashing beacons.

5.9.52 The highway passes a number of residential properties and businesses. Some of the properties are well screened, whereas others front the carriageway and have no screening from construction traffic.

Rodway

5.9.53 The designated construction route continues north along Rodway towards Combwich, where the carriageway continues as Withycombe Hill. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.54 As the highway continues north from High Street, it comprises a two-way carriageway with one lane in each direction with a typical width of 6m.

5.9.55 The carriageway is subject to a 30mph speed limit until approximately 600m north of High Street, where it is increased to 40mph. Here, the footways which were on both sides of the highway are discontinued. Further north, the speed restriction along the highway is increased to the national speed limit.

5.9.56 The highway passes a number of receptors including residential properties, Bridgwater College, and Cannington Pitch and Putt golf course. The carriageway is lined with vegetation, and the properties are well screened from the construction access route.

5.9.57 Bridgwater College has two entrances, both of which are on the construction access route. It is anticipated that there would be a number of pedestrians in the vicinity of the college during peak hours.

Cannington Bypass

5.9.58 Construction of the Cannington Bypass will is part of a DCO application in support of the Hinkely Point C Power Station development, enabling vehicles travelling to and from the power station to bypass the village of Cannington. The EDF DCO Application states that the construction period would be for a period of 21 months following planning approval for the power station. Hinkley Point C Power station was approved 19 March 2013. Following this it is anticipated that construction is due to begin in 2014. Following completion of the bypass, the predicted construction traffic will bypass the village of Cannington.

Withycombe Hill

5.9.59 The designated construction route continues north west for approximately 6km along Withycombe Hill towards Wick Moor Drove, where the designated construction access route continues. There is no access to any construction bellmouths from the carriageway itself. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.60 As the highway continues north from Rodway, it comprises a two-way carriageway with one lane in each direction and a typical width of 7m.

5.9.61 The carriageway is subject to the national speed limit, and there is no defined pedestrian or cycle infrastructure present.

5.9.62 The carriageway passes a small number of residential properties and agricultural units. These are well screened from the construction access route by vegetation.

Wick Moor Drove

5.9.63 Wick Moor Drove links the Proposed Hinkley Point substation to Withycombe Hill. The road links directly to four construction bellmouths. The highway also forms part of the Hinkley Point C power station construction access route.

5.9.64 As the highway continues north Withycombe Hill, it comprises a single lane, two-way carriageway with a width of approximately 7m.

5.9.65 The carriageway is subject to the national speed limit, and there is no defined pedestrian or cycle infrastructure present.

Unnamed Lane off Wick Moor Drove

5.9.66 There is an additional section of designated construction access off an unnamed lane approximately 650m south of the Power Station. The lane links directly to two construction bellmouths.

5.9.67 As the highway continues north east from Withycombe Hill, it comprises a two-way carriageway with one lane in each direction and a typical width of 4m.

5.9.68 The carriageway is subject to the national speed limit, and there is no defined pedestrian or cycle infrastructure present.

Traffic Flows

5.9.69 In order to assess the baseline traffic flows along the construction access routes, a total of 43 ATCs were placed across the Sections. This resulted in 2 ATCs (ATC numbers 39 and 40) being placed in Section H for a full week. ATC 39 was situated on Wick Moor Drove, to the north east of Shurton. ATC 40 was placed on the Unclassified Road North of Wick. ATC numbers 39 and 40 were placed along proposed major construction routes. **Table 5.34** shows the AADT flows by vehicle class for the ATCs in Section H.

Table 5.34 AADT Baseline Neutral Day AADT Traffic Flows in Section H

ATC		AADT Flows			
		24hr Total Traffic	**24hr HGVs**	**18hr Total Traffic**	**18hr HGVs**
39	Wick Moor Drove	2,509	245	2,476	240
40	Unclassified Road North of Wick	236	17	229	15

Cycling

5.9.70 There is no cycle infrastructure local to the Proposed Development within Section H that is anticipated to be affected due to any physical closures or management.

Section H - PRoW

5.9.71 A review of the PRoW has indicated that a total of 7 designated PRoW would be affected by the development proposals in Section H. All of the affected PRoW can be viewed in the PRoW Implementation Plan. Those PRoW specifically affected in Section H are as follows:

- WL 23/70;
- WL 23/60;
- WL 23/61;
- WL 23/110;
- WL 23/71;
- WL 23/64; and
- WL 23/62.

5.9.72 During June 2013, count surveys were conducted at 11 locations to ascertain an indication of typical off-peak usage of the PRoWs. Each location was surveyed constantly on one day between 08:00 and 18:00.

5.9.73 The alternative PRoW route for the coastal path while The Hinkley Point C Power Station is being constructed was surveyed to provide an indication of the usage of PRoW reference WL23/95. The survey found that six adult pedestrian used the PRoW over the 12 hour period.

5.9.74 The PRoW Management Plan is to be read alongside the baseline assessment of PRoW. This contains more details of the PRoW, including management and mitigation.

Public Transport

Bus

5.9.75 The number 14 and 24 buses run along much of the construction access route, and provide a service throughout Bridgwater to Cannington and Combwich. Number 21 and 75 also run from the Dunball Roundabout to the centre of Bridgwater, and on to Taunton. The frequencies of these services are shown in **Table 5.35**.

Table 5.35 Bus Frequencies in Section H

Service	**Route**	**Approximate Peak Frequency**		
		Mon - Fri	**Sat**	**Sun/Hols**
14	Bridgwater – Wembdon – Cannington – Nether Stowey – Watchet	Hourly	Hourly	-
15	Bridgwater – Wembdon – Cannington – Nether Stowey – Watchet – Minehead	1 Afternoon College Service	-	-
21	Taunton – Bridgwater – Burnham-on-Sea – Weston-Super-Mare	20 mins	30 mins	Hourly
24	Bridgwater – Wembdon – Cannington – Stogursey – Nether Stowey	Hourly	Hourly	-
75	Burnham-on-Sea – Berrow – Weston-Super-Mare	30 mins	30 mins	-
X75	Bridgewater – Woolavington – Street – Glastonbury – Wells	30 mins	Hourly	-
78	Portishead – Clevedon – Weston-Super-Mare – Lympsham – Bridgwater	1 Return College Service	-	-

Service	Route	Approximate Peak Frequency		
		Mon - Fri	Sat	Sun/Hols
79	Weston-Super-Mare – Lympsham – Bridgwater	1 Return College Service	-	-

Rail

5.9.76 The closest railway station to the Proposed Development lies in Bridgwater approximately 13km to the east. No rail connections would be crossed in this Section.

5.10 Baseline Traffic

5.10.1 Annual Average Daily Traffic (AADT) flows have been collected along the proposed construction routes described above. They were collected by the means of an Automatic Traffic Count (ATC) placed at 40 separate link locations.

5.10.2 In addition to the neutral flows, there were also a selected number of counts taken during the summer to help inform construction traffic effects during the tourist season. These were taken at ATC locations 1, 9, 10, 11, 12 and 15.

5.10.3 Both counts have been compared alongside each other in in **Table 5.36** below.

Table 5.36 Traffic Flows across the Construction Access Route.

ATC – Construction Access Route		Neutral Day AADT Flows		Average Summer Flows	
		24hr Total Traffic	24hr HGVs	24hr Total Traffic	24hr HGVs
1	Puriton Hill	13,868	1,972	13,918	1,791
2	A39 Bath Road	12,562	1,11	-	-
3	Woolavington Hill	4,588	427	-	-
4	Causeway	3,093	252	-	-
5	B3139 Mark Road	3,930	302	-	-
6	A38 Bristol Road	13,512	1,827	-	-
7	Harp Road	3,106	269	-	-
8	Southwick Road	601	39	-	-
9	Butt Lake Road	15,959	1,573	16,534	1,578
10	New Road	11,997	1,035	12,013	1,097
11	Dinghurst Road	6,907	665	7,233	687
12	A38 Bristol Road	17,204	1,380	17,515	1,430
13	Stock Lane	6,792	661	-	-
14	A370	18,730	1,660	-	-

ATC – Construction Access Route		Neutral Day AADT Flows		Average Summer Flows	
		24hr Total Traffic	24hr HGVs	24hr Total Traffic	24hr HGVs
14 [2]	A370	17,015	1,188	-	-
15	A370 Station Road	19,066	1,525	18,428	1,528
16	Lampley Road	9,965	826	-	-
17	Kennmoor Road	3,018	133	-	-
18	Kenn Road	10,304	871	-	-
19	Kenn Street	811	72	-	-
20	Nailsea Wall	1,820	134	-	-
21	B3133	14,286	1,085	-	-
22	Manmoor Lane	4,044	202	-	-
23	Clevedon Road	13,404	915	-	-
24	Clevedon Road	11,489	809	-	-
25	Tickenham Hill	8,927	508	-	-
26	Whitehouse Lane	7,271	280	-	-
27	Caswell Hill	901	55	-	-
28	Sheepway	1,204	172	-	-
29	The Portbury Hundred	26,765	1,677	-	-
30	Victoria Road	2,034	629	-	-
32	St Andrew's Road	No counts completed due to road works			
33	Kings Weston Lane	8,054	1,214	-	-
39	Wick Moor Drove	2,509	245	-	-
40	Unclassified Road North of Wick	236	17	-	-

[2]As indicated in the plans, ATC 14 was placed in two separate locations. Both counts have been included.

5.10.4 At ATC 1, there was a 0.35% increase in total traffic in the summer flows when compared to the neutral flows. This increase is considered to be insignificant.

5.10.5 At ATC 9, there was a 3.60% increase in total traffic in the summer flows when compared to the neutral flows. This increase is considered to be insignificant.

5.10.6 At ATC 10, there was a 0.13% increase in total traffic in the summer flows when compared to the neutral flows. This increase is considered to be insignificant.

5.10.7 At ATC 11, there was a 4.72% increase in total traffic in the summer flows when compared to the neutral flows. This increase is considered to be insignificant.

5.10.8 At ATC 12, there was a 1.80% increase in total traffic in the summer flows when compared to the neutral flows. This increase is considered to be insignificant.

5.10.9 At ATC 15, there was a 3.35% decrease in total traffic in the summer flows when compared to the neutral flows.

5.10.10 TRADS data was collected for junctions 20-22 of the M5 to indicate the number of vehicles travelling along the SRN. This is contained in **Table 5.37** below:

Table 5.37 TRADS Data

ATC – M5 TRADS Data	AADT Flows	
	24hr Total Traffic	**18hr Total Traffic**
J22	53,794	51,354
J21	53,761	51,360
J20	62,244	59,200

6 ROAD SAFETY

6.1 Introduction

6.1.1 As part of the analysis of the surrounding highway network, an investigation into the vehicle accident history along those links and junctions to be used by construction traffic has been undertaken. This is referred to as rthe study area.

6.1.2 This involves personal injury accident data being obtained for the last five years from BCC, NSC, and SCC. The raw accident data is included at **Volume 5.22.2, Appendix 22C**.

6.2 Summary of Accidents

6.2.1 SCC had a total of 145 accidents across the study area over a time period of five years. This includes 126 slight accidents, 17 serious accidents and two fatal accidents (the two fatal accidents are described as Fatal Accidents 1 – 2 in the following paragraphs). Following analysis, the majority of accidents were caused by vehicles colliding with the rear of other vehicles when approaching or joining a roundabout.

6.2.2 NSC had a total of 195 accidents across the study area over a time period of five years. This includes 173 slight accidents, 19 serious accidents and three fatal accidents (the three fatal accidents are described as Fatal Accidents 3 – 5 in the following paragraphs). Upon analysis, the distribution of accidents was commonly at junctions along major roads.

6.2.3 BCC had a total of 42 accidents across the study area over a period of five years. This includes 33 slight accidents, eight serious accidents and one fatal accident (the fatal accident is described as Fatal Accident 6 in the following paragraphs). Following analysis of the study area, the majority of accidents were caused by collisions at roundabout junctions or on the roundabouts themselves.

6.2.4 As the accidents were typically found to cluster around junctions, accident records for all the junctions have been assessed at these locations in detail in the following paragraphs.

6.2.5 After a review of the accident data along the highway links to be used during construction no significant correlations in accidents or clusters of accidents were identified to suggest that highway condition, layout or design were significant contributory factors.

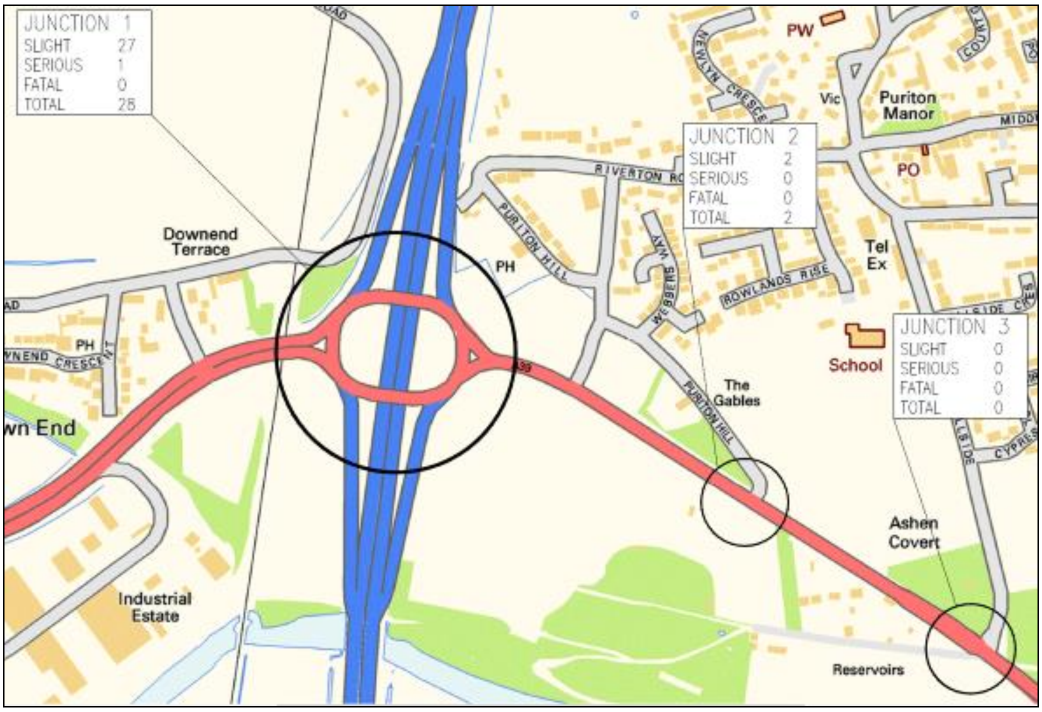
6.2.6 Accidents have been grouped by geographical locations with junction references provided in **Table 8.1** of this report.

<u>Recorded Accidents by Geographical Group</u>

Group 1

6.2.7 Group 1 includes Junctions 1 – 3. The accidents have been represented in **Inset 6.1**.

Inset 6.1: Five Year Accidents at Junctions 1 - 3

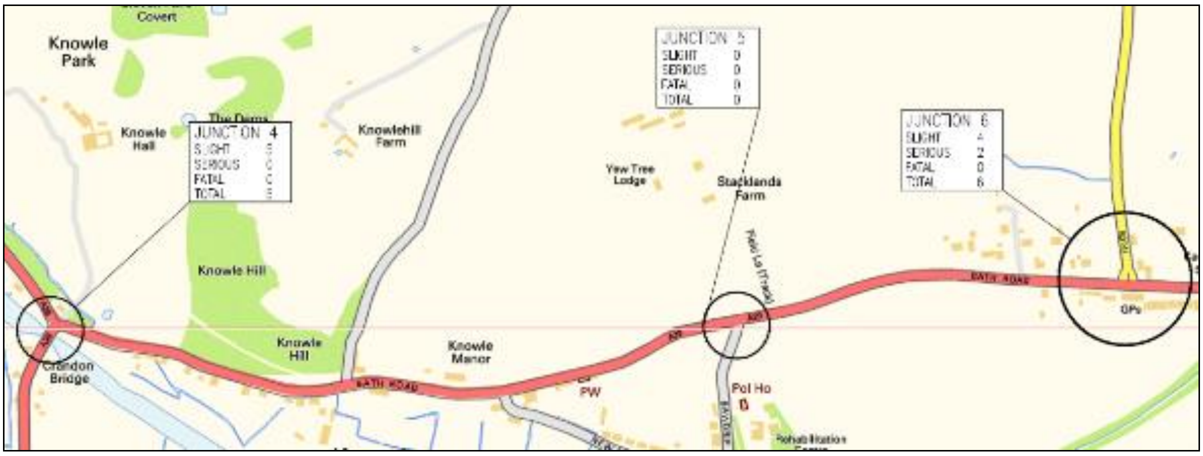


6.2.8 **Inset 6.1** shows that there have been 28 accidents at Junction 1, including one serious accident. There were also two slight accidents at the junction 2.

Group 2

6.2.9 Group 2 includes Junctions 4 – 6. The accidents have been represented in **Inset 6.2**.

Inset 6.2: Five Year Accidents at Junctions 4 - 6

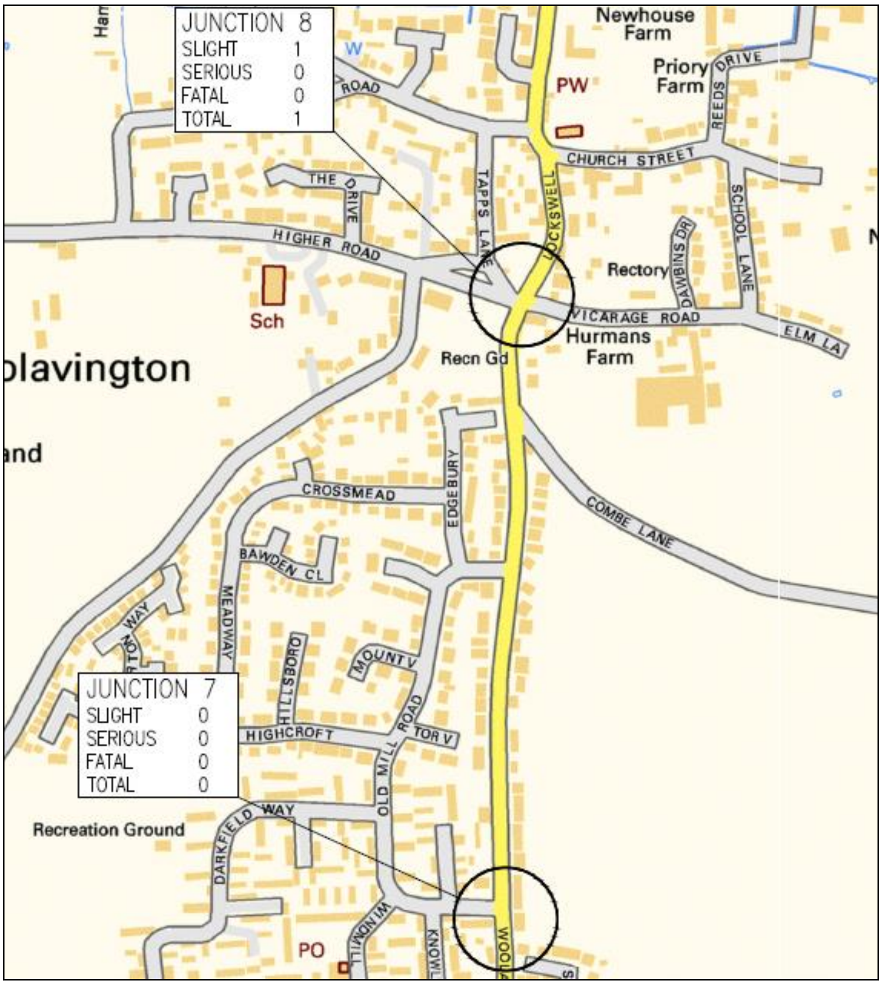


6.2.10 **Inset 6.2** shows that there have been five slight accidents at Junction 4. Moving eastward to junction 6, a total of six accidents occurred within the five year study period. Two of these were serious accidents.

Group 3

6.2.11 Group 3 includes Junctions 7 – 8. The accidents have been represented in **Inset 6.3**.

Inset 6.3: Five Year Accidents at Junctions 7 - 8

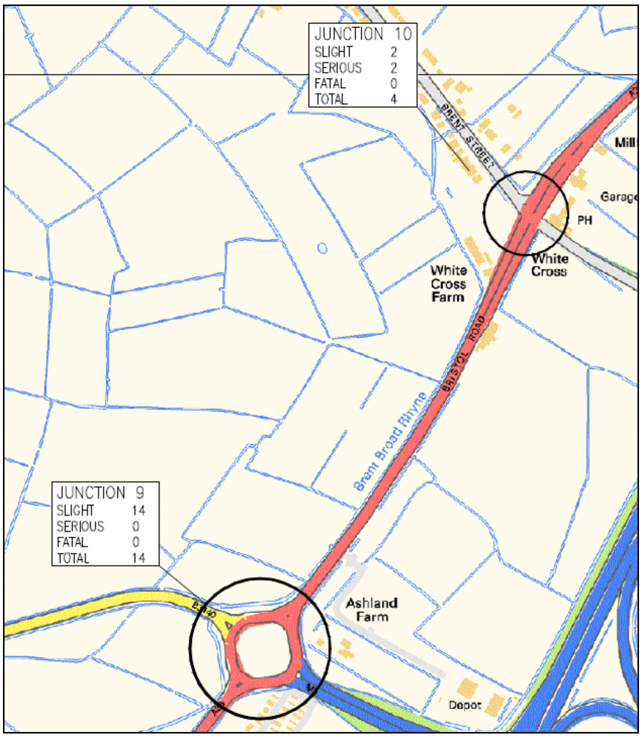


6.2.12 **Inset 6.3** shows that there has been just one single slight accident in the five year study period.

Group 4

6.2.13 Group 4 includes Junctions 9 – 10. The accidents have been represented in **Inset 6.4**

Inset 6.4: Five Year Accidents at Junctions 9 - 10

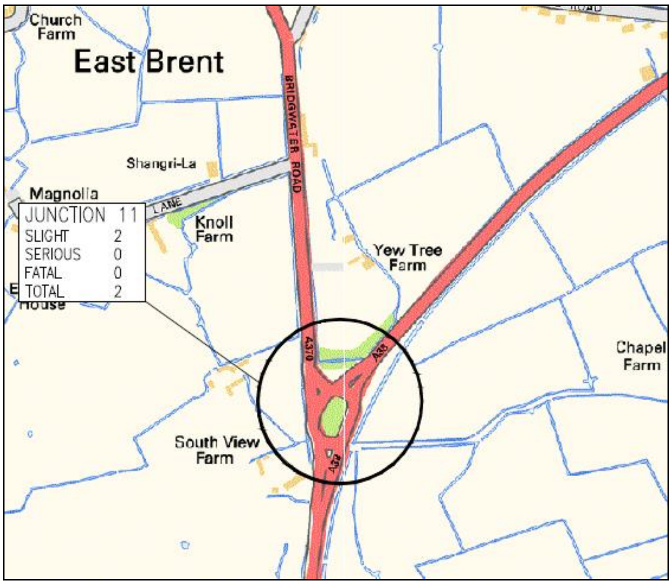


6.2.14 **Inset 6.4** shows that there have been 14 slight accidents at junction 9. To the north, Junction 10 was found to have four accidents, two of these were serious accidents, over the five year study period.

Group 5

6.2.15 Group 5 includes Junction 11 alone. The accidents have been represented in **Inset 6.5**.

Inset 6.5: Five Year Accidents at Junction 11

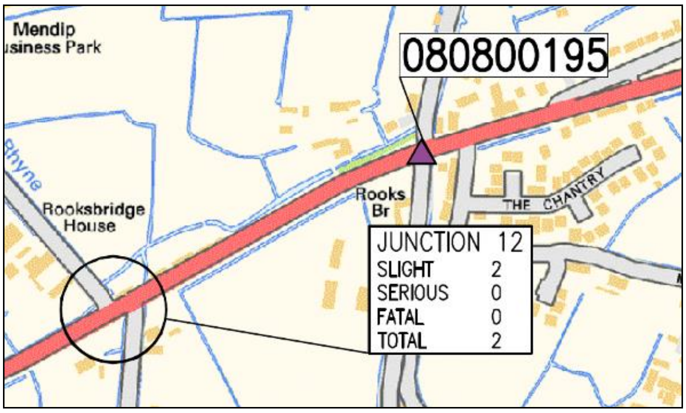


6.2.16 **Inset 6.5** shows that there have been two slight accidents at junction 11 in the five year study period.

Group 6

6.2.17 Group 6 includes Junction 12 alone. The accidents have been represented in **Inset 6.6**

Inset 6.6: Five Year Accidents at Junction 12

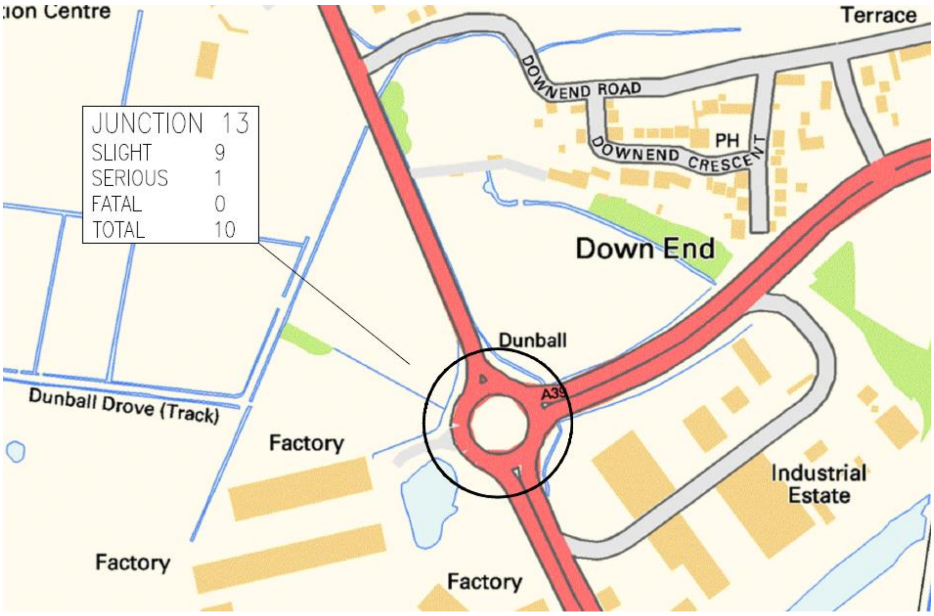


6.2.18 **Inset 6.6** shows that there have been two slight accidents at junction 12 in the five year study period. It also shows the approximate location of Fatal Accident 4 (080800195). Fatal Accident 4 has been described later in the Section.

Group 7

6.2.19 Group 7 contains Junction 13. The accidents have been represented in **Inset 6.7**.

Inset 6.7: Five Year Accidents at Junction 13

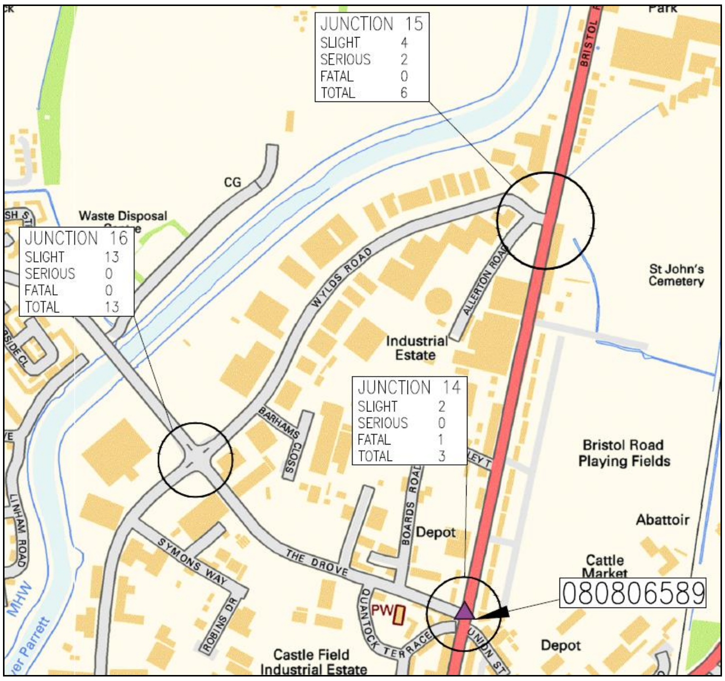


6.2.20 Inset 12.7 shows that there have been nine slight accidents and one serious accident in the last five year study period at junction 13.

Group 8

6.2.21 Group 8 includes Junctions 14 – 16. The accidents have been represented in **Inset 6.8**.

Inset 6.8: Five Year Accidents at Junctions 14 - 16

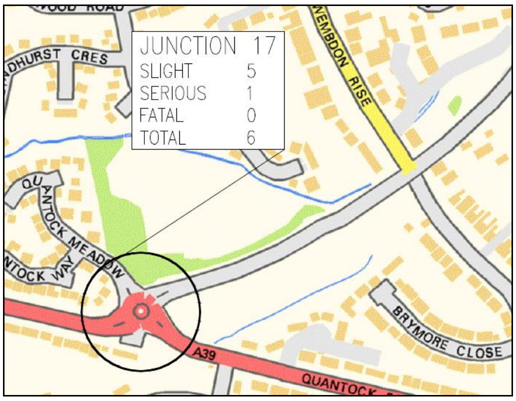


6.2.22 **Inset 6.8** shows that there have been two slight accidents and Fatal Accident 1 (080806589) at junction 14. Fatal Accident 1 has been described later in the Section. There have been a total of four slight and two serious accidents at Junction 15, and 13 slight accidents at junction 16.

Group 9

6.2.23 Group 9 includes Junction 17 alone. The accidents have been represented in **Inset 6.9**.

Inset 6.9: Five Year Accidents at Junction 17



6.2.24 **Inset 6.9** shows that there have been five slight accidents and one serious accident at junction 17 during the five year study period.

Group 10

6.2.25 Group 10 includes Junctions 18 – 20. The accidents have been represented in **Inset 6.10**.

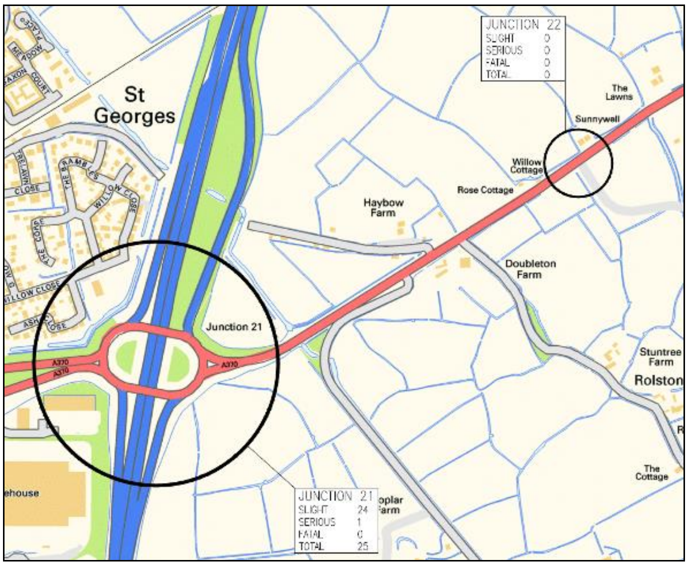
Inset 6.10: Five Year Accidents at Junctions 18 – 20

6.2.26 **Inset 6.10** shows that there have been a total of seven slight accidents at Junctions 18-20. The approximate location of Fatal Accident 2 (101008166) is also shown. Fatal Accident 2 has been described later in the Section.

Group 11

6.2.27 Group 11 includes Junctions 21 – 22. The accidents have been represented in **Inset 6.11**.

Inset 6.11: Five Year Accidents at Junctions 21 - 22

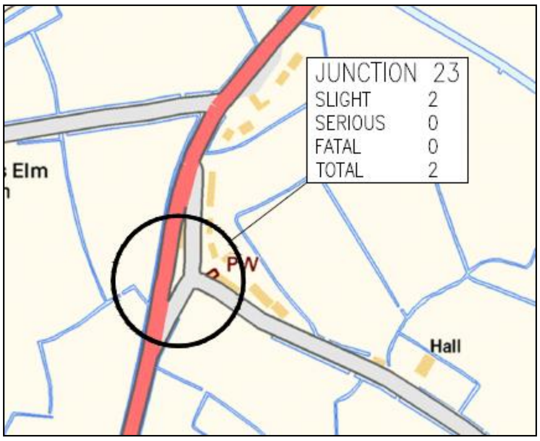


6.2.28 **Inset 6.11** shows that there have been 24 slight accidents and one serious accident at junction 21. To the north east, Junction 22 was found to have no recorded accidents over the five year study period.

Group 12

6.2.29 Group 12 includes Junction 23 alone. The accidents have been represented in **Inset 6.12.**

Inset 6.12: Five Year Accidents at Junction 23

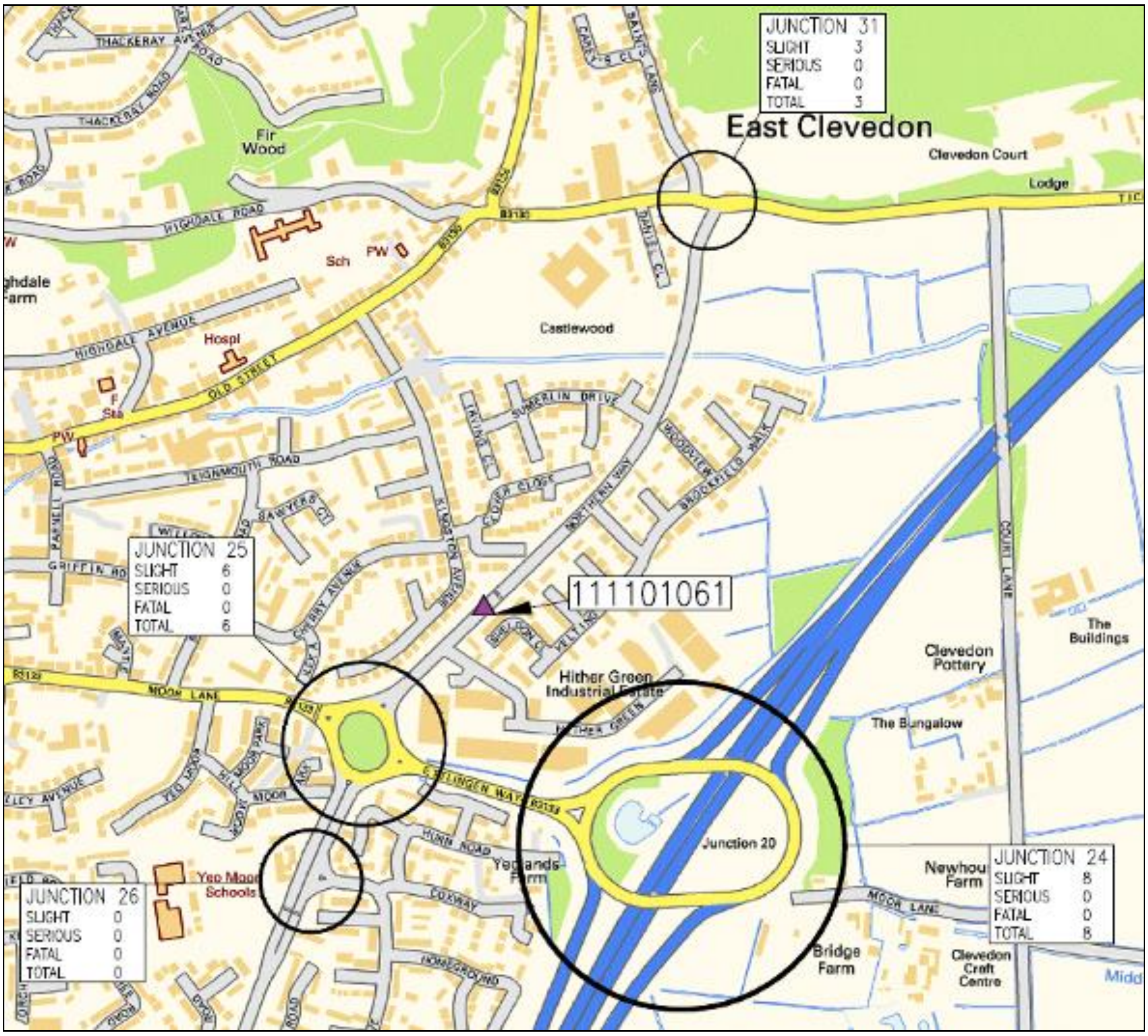


6.2.30 **Inset 6.12** shows that there have been 2 slight accidents at junction 23.

Group 13

6.2.31 Group 13 includes Junctions 24 – 26 and 31. The accidents have been represented in **Inset 6.13**.

Inset 6.13: Five Year Accidents at Junctions 24 – 26 and 31

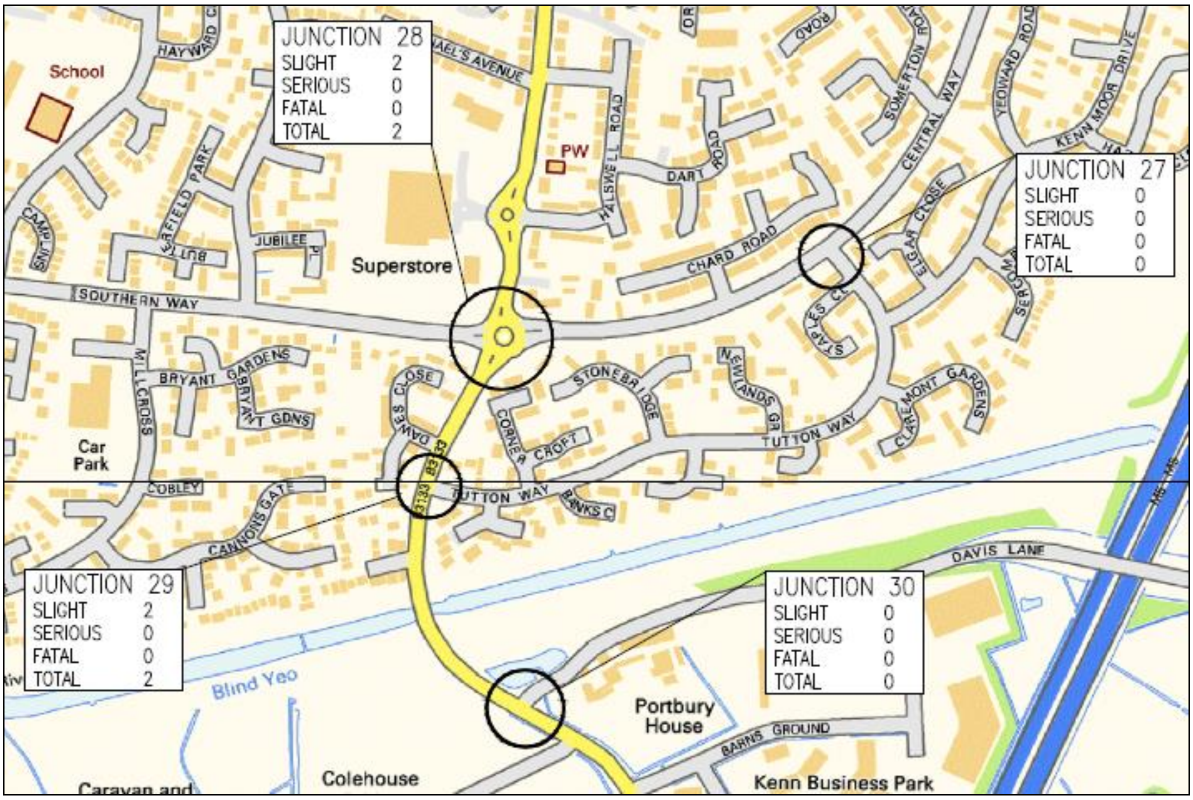


6.2.32 **Inset 6.13** shows that there have been 8 slight accidents at junction 23. A total of a further nine slight accidents were recorded at junctions 25 and 31, whereas there were no recorded accidents at Junction 26 over the five year study period. The approximate location of Fatal Accident 5 (111101061) is also illustrated. Fatal Accident 5 has been described later in the Section.

Group 14

6.2.33 Group 14 includes Junctions 27 – 30. The accidents have been represented in **Inset 6.14**.

Inset 6.14: Five Year Accidents at Junctions 27 – 30

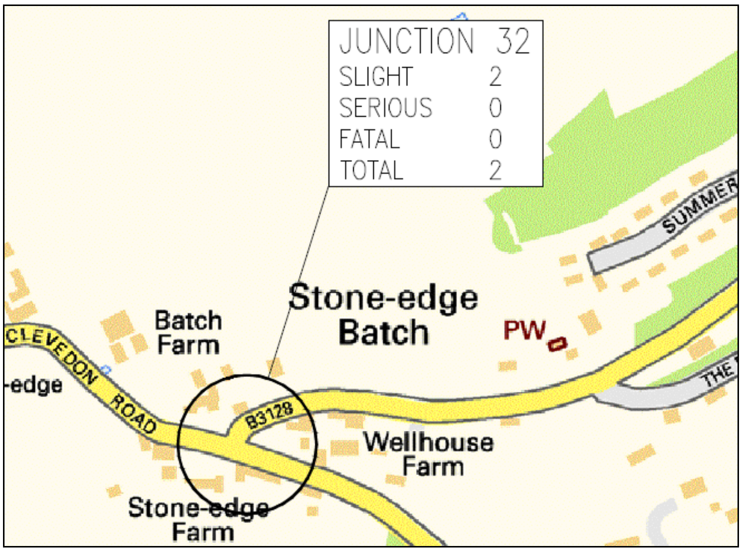


6.2.34 **Inset 6.14** shows that there were a total of four slight accidents recorded. Junctions 27 and 30 had no recorded accidents over the five year study period.

Group 15

6.2.35 Group 15 includes Junction 32 alone. The accidents have been represented in **Inset 6.15**.

Inset 6.15: Five Year Accidents at Junction 32

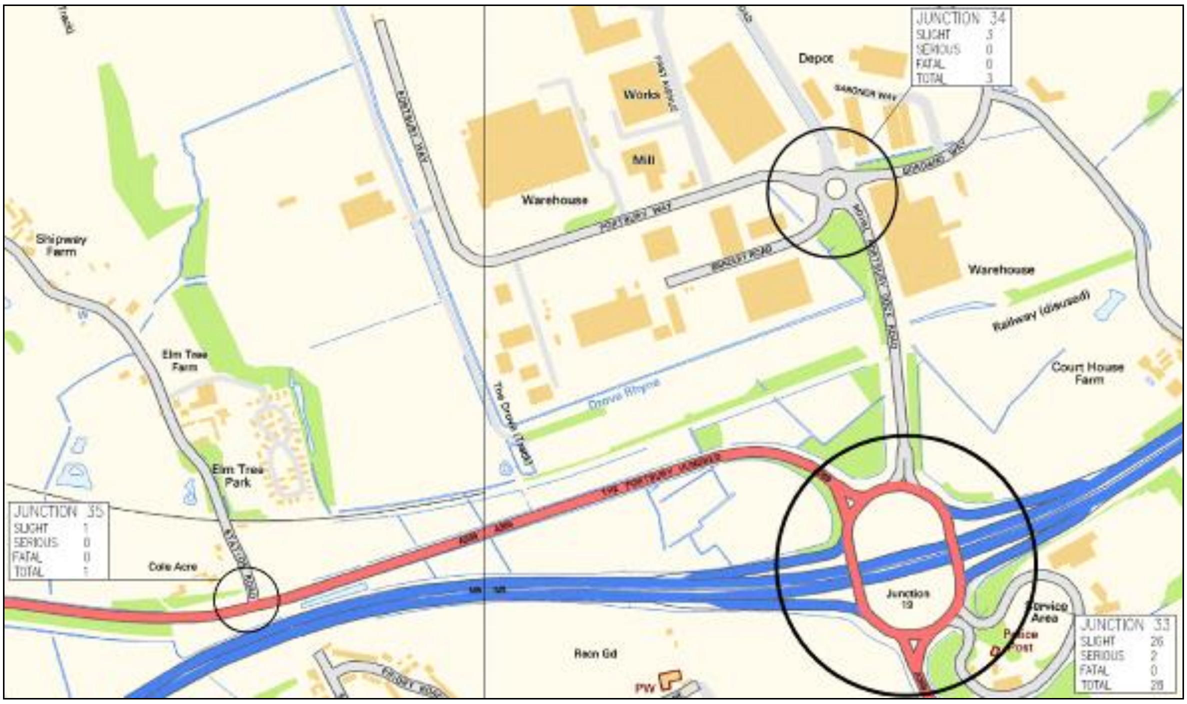


6.2.36 **Inset 6.15** shows that there have been 2 slight accidents at junction 32 over the five year study period.

Group 16

6.2.37 Group 16 includes Junctions 33 – 35. The accidents have been represented in **Inset 6.16**.

Inset 6.16: Five Year Accidents at Junctions 33 – 35

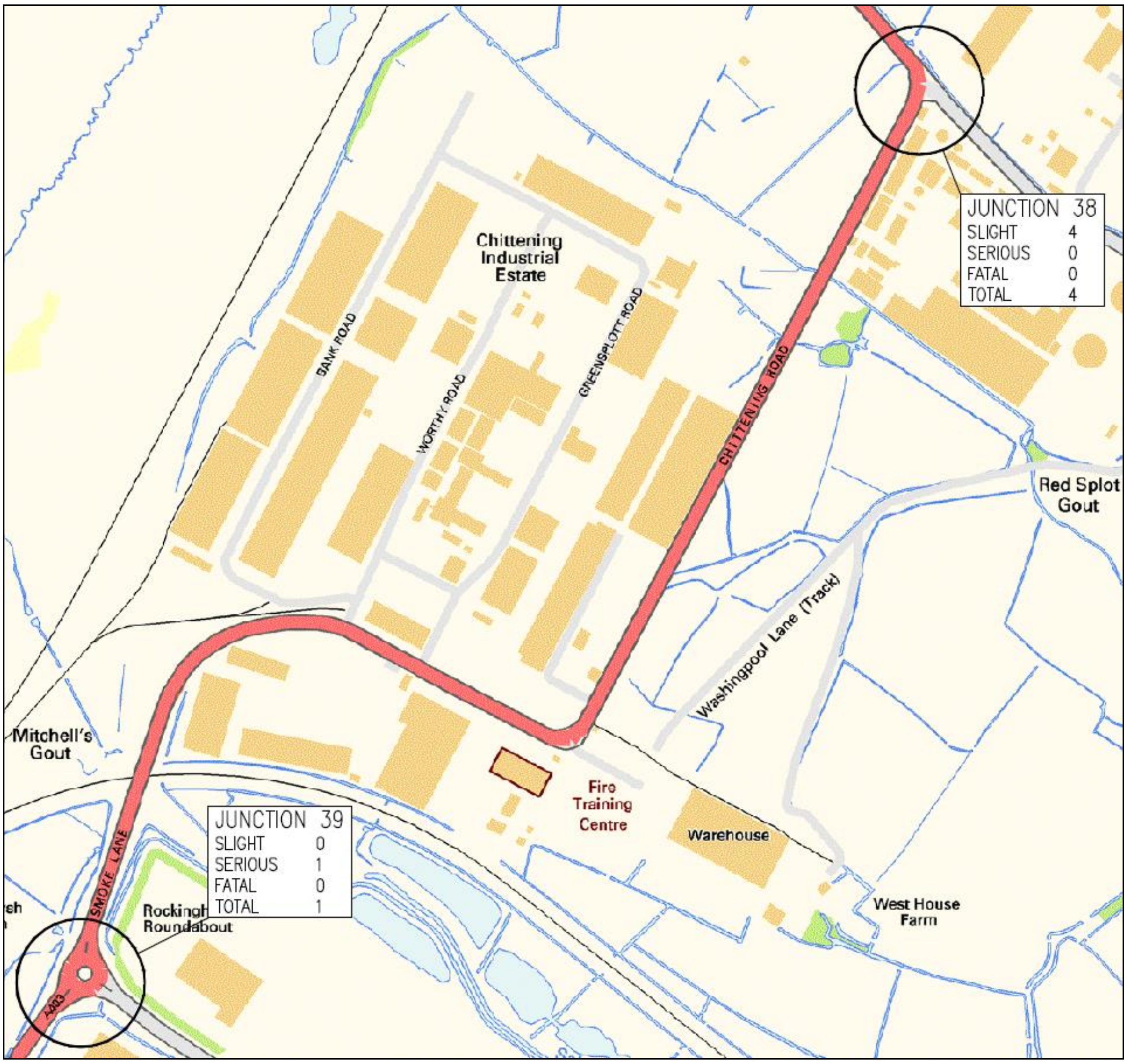


6.2.38 **Inset 6.16** shows that there have been 26 slight and two serious accidents at junction 33. A total of four slight accidents were also recorded over the five year study period at Junctions 34 and 35.

Group 17

6.2.39 Group 17 includes Junctions 38 and 39. The accidents have been represented in **Inset 6.17**.

Inset 6.17: Five Year Accidents at Junctions 38 – 39

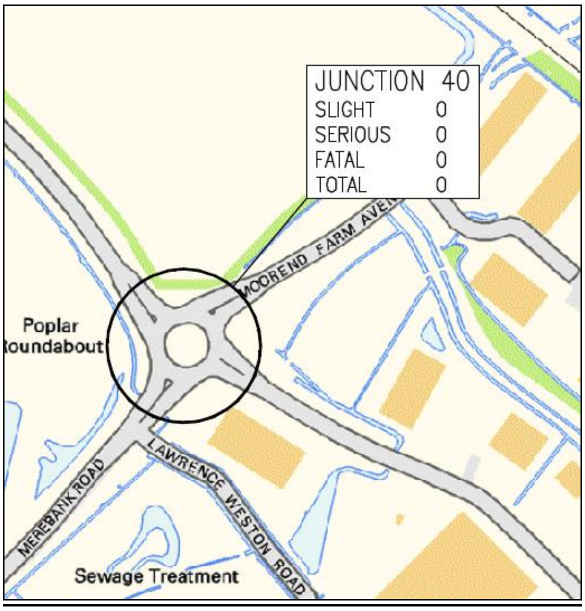


6.2.40 **Inset 6.17** shows that there have been four slight accidents at Junction 38 and one serious accident at Junction 39 across the five year study period.

Group 18

6.2.41 Group 18 contains Junction 40. The accidents have been represented in **Inset 6.18**.

Inset 6.18: Five Year Accidents at Junction 40

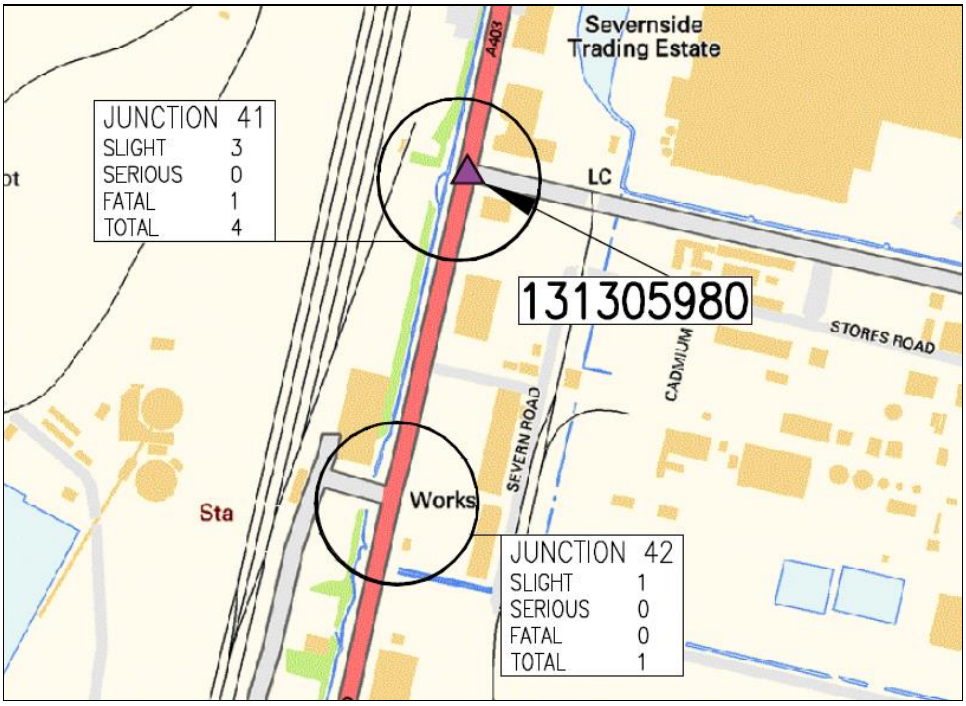


6.2.42 **Inset 6.18** shows that there have been no recorded accidents over the five year study period at Junction 40.

Group 19

6.2.43 Group 19 includes Junctions 41 and 42. The accidents have been represented in **Inset 6.19**.

Inset 6.19: Five Year Accidents at Junctions 41 – 42

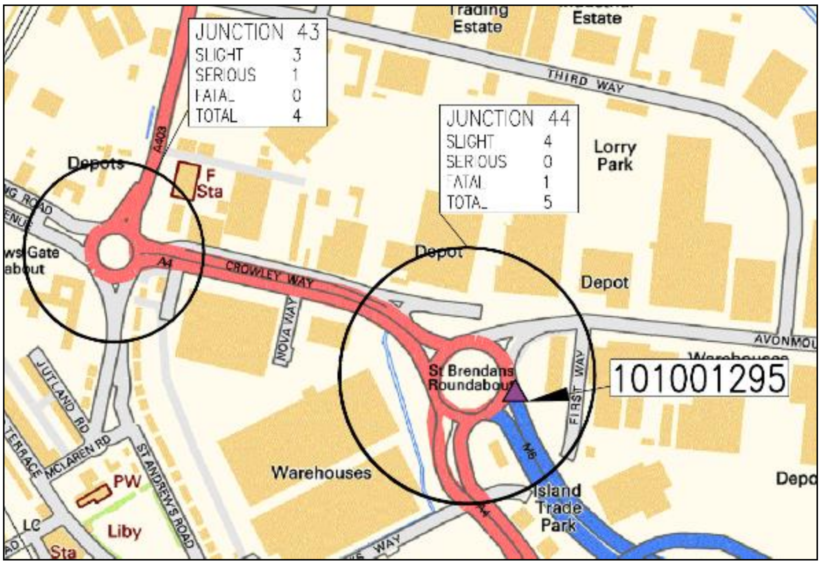


6.2.44 **Inset 12.19** shows that there have been a total of four slight accidents at Junctions 41 and 42 over the five year study period. A fatal accident also occurred at Junction 41. This was Fatal Accident 8 (131305980), which has been described later in this Section.

Group 20

6.2.45 Group 20 includes Junctions 43 – 44. The accidents have been represented in **Inset 6.20**.

Inset 6.20: Five Year Accidents at Junctions 43 – 44

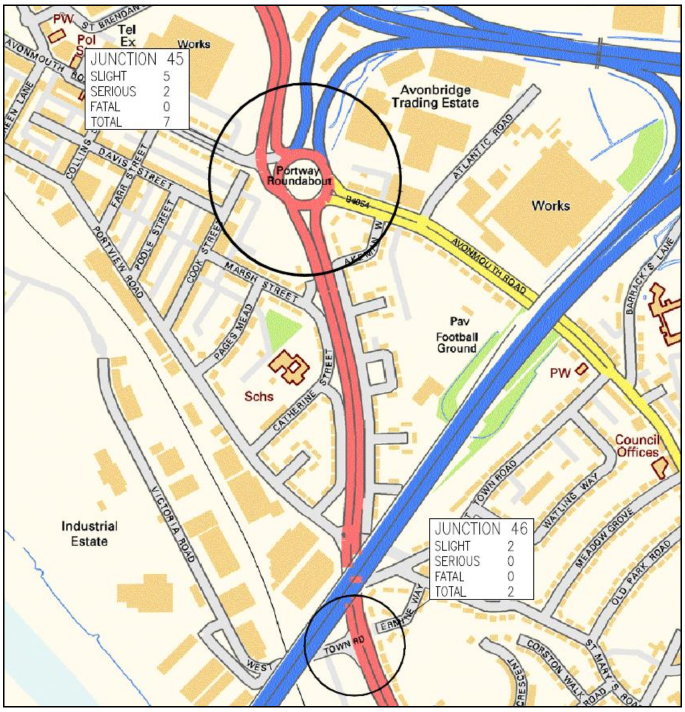


6.2.46 **Inset 6.20** shows that there have been three slight accidents and one serious accident at junction 43. Fatal Accident 8 has been described later in the Section. At junction 44, there have been four serious accidents and a fatal accident within the five year study period. This was Fatal Accident 8 (101001295), which has been described later in this Section.

Group 21

6.2.47 Group 21 includes Junctions 45 – 46. The accidents have been represented in **Inset 6.21.**

Inset 6.21: Five Year Accidents at Junctions 45 – 46.

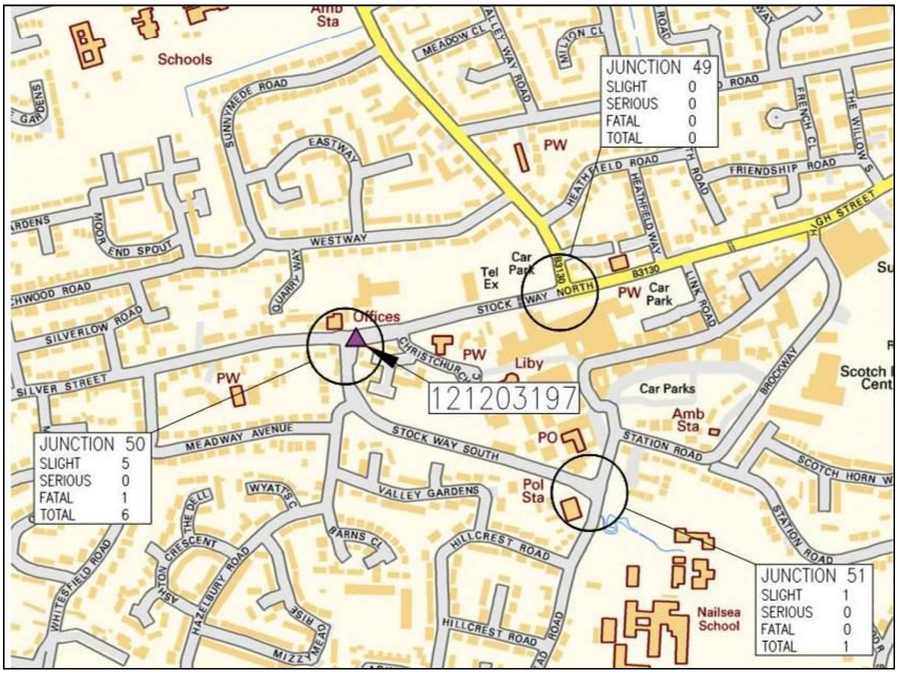


6.2.48 **Inset 6.21** shows that there have been five slight accidents and two serious accidents at junction 45. To the south, Junction 46 was found to have two slight accidents recorded over the five year study period.

Group 22

6.2.49 Group 22 includes Junctions 49 – 51. The accidents have been represented in **Inset 6.22.**

Inset 6.22: Five Year Accidents at Junctions 49 – 51.



6.2.50 **Inset 6.22** shows that there have been no accidents at Junction 49 with five slight and 1 serious accidents at Junction 50 over the five year study period. A single slight accident was recorded at Junction 51 over the five year study period.

<u>Recorded Accidents by Link</u>

A38 between Junction 22 and 23 of the M5

6.2.51 A total of 20 slight accidents were recorded on the A38 along with two serious accidents over the five year study period. These accidents all occurred between the junction of Market Street and Junction 22 of the M5 corridor. Accidents were spread along this link with no significant clustering observed.

A38 North of Junction 22 of the M5

6.2.52 A total of 45 slight accidents were recorded on the A38 north of Junction 22 of the M5, along with ten serious accidents and two fatal accidents over the five year study period. The accidents were spread along the A38 in this location with no significant clustering observed.

A38 South of Junction 23 of the M5

6.2.53 A total of nine slight accidents and three serious accidents that were recorded on the A38 over the five year study period. Accidents were spread along this link with a small cluster of four accidents recorded approximately 450m south of the Dunball Roundabout.

6.2.54 Of these four accidents, two occurred as a result of driver error, with the other two attributed to causational factors other than the road design or layout. The observed clustering does not therefore identify a significant accident problem.

A38 Bristol Road (Langford)

6.2.55 There were 12 slight accidents, one serious accident and one fatal accident recorded over the five year study period. The accidents were spread along this link with no significant clustering observed.no significant clustering observed..

A39 Puriton Hill

6.2.56 There were a total of 18 slight accidents recorded on the A39 Puriton Hill during the 5 year assessment period with a total of two serious accidents over the same 5 year period. The recorded accidents on the A39 Puriton Hill were observed to be spread along the link between the M5 Junction 23 and Woolavington Hill, with no significant observed clustering.

Drove Way/Western Way

6.2.57 There were ten slight accidents and three serious accidents recorded over the five year study period. The accident analysis indicates that recorded accidents were spread along Western Way with a cluster of five accidents at the junction of Western Way and Chilton Road.

6.2.58 Of these five accidents two involved cyclists being knocked off their bikes, one of which resulted from cyclist error and the other from driver error. There was a single rear end shunt and a single accident resulting from a vehicle turning across an oncoming vehicle. These are both attributed to driver error. The final accident resulted when two mopeds travelling in the same direction came together as they entered the junction to travel north/west. This is again contributed to driver error. No consistent causational factor was present amongst these five accidents with no accidents attributed to the design or layout of the junction

A370

6.2.59 A total of 35 slight accidents and four serious accidents recorded over the five year study period. Accidents were spread along the section of the A370 included within the study area with no observed clustering.

B3130 Clevedon Road

6.2.60 There were a total of 14 slight accidents recorded on the B3130 Clevedon Road during the five year assessment period. During this period a total of two serious accidents were also recorded with a single fatal accident also recorded. This fatal accident is reviewed later in this report.

6.2.61 A review of the location of the accidents illustrates a spread along the B3130 with no observed significant clustering across the five year period.

B3128 Tickenham Hill

6.2.62 There were a total of 11 slight accidents recorded on the B3128 Tickenham Hill over the five year assessment period with an additional 4 serious accidents recorded. A review of the accidents on the B3128 identified that they were spread across the link with no observed significant clustering of accidents.

Queens Road

6.2.63 A total of five accidents were recorded on Queens Road with four slight and a single serious accident recorded over the five year assessment period. The serious accident occurred at the junction with Station Road with the remaining four slight accidents spread across the link. No significant clustering of accidents was observed.

Mizzymead

6.2.64 There were a total three slight accidents recorded on Mizzymead during the five year assessment period. These accidents were spread long Mizzymead with no observed significant clustering.

Avonmouth Road

6.2.65 A total of 4 accidents were recorded on Avonmouth Road during the five year assessment period, all of which were classed as slight in severity. These accidents were observed to have occurred along the length of Avonmouth Road with no observed significant clustering at any points along the link.

A4 Portway

6.2.66 There were three slight accidents recorded on the A4 Portway during the five year assessment period. These accidents were spread along the A4 Portway with no observed significant clustering of accidents at any single point.

St. Andrew's Road

6.2.67 There were 11 slight accidents, three serious accidents and one fatal accident recorded over the five year study period. Observed accidents were spread along St. Andrew's Road with a cluster of four accidents recorded at the junction of St. Andrew's Lane and Third Way.

6.2.68 Of the four accidents recorded at the junction of St, Andrew's Road and Third Way, one involved a rear end shunt, two involved vehicles pulling out from Third Way and colliding with vehicles on St. Andrews's Road and the fourth resulted from an overtaking vehicle on St. Andrew's Road. It is noted that all these accidents occurred in different years and that the four accidents resulted from driver error rather than any factors relating to the design or layout of the junction.

Stock Lane

6.2.69 There were seven slight accidents and one serious accident recorded over the five year study period on Stock Lane. These seven accidents were spread along Stock Lane with no observed significant clustering.

Smoke Lane

6.2.70 A total of three slight accidents and one serious accident were recorded over the five year study period. All accidents were spread along Smoke Lane with no significant observed clustering.

Severn Road

6.2.71 There were nine slight accidents recorded over the five year study period. All accidents occurred within 500m of the junction between Severn Road and Smoke Lane with a cluster of four accidents occurring adjacent to the two site access points approximately 230m east of Smoke Lane.

6.2.72 All four of these accidents resulted from driver error with a loss of control contributing to three of the accidents. Of these three, one occurred in icy conditions and one in wet/damp conditions which suggests the conditions were a major factor in the accident. The fourth accident occurred when a vehicle overtook another on the bend of Severn Road causing the vehicle being overtaken to lose control and crash. The accidents suggest that driving conditions were a major factor in two of the crashes with driver error therefore contributing to all of them. No accidents are attributed to the design or layout of the road.

Fatal Accidents

6.2.73 In total, there have been 9 fatal accidents across the study area over the five year study period. The fatal accidents have been described below:

Fatal Accident 1

6.2.74 The first fatal accident occurred on the A38 Bristol Road heading south towards Bridgwater town centre. Accident records indicate one vehicle turned right towards The Drove into an oncoming vehicle.

6.2.75 There is nothing to suggest in the accident records that highway layout or condition were significant contributory factors to Fatal Accident 1.

Fatal Accident 2

6.2.76 The second fatal accident occurred on an unnamed section of the A39 and involved a motorcyclist losing control on a test drive.

6.2.77 There is nothing to suggest in the records that highway layout or condition were significant contributory factors to Fatal Accident 2.

Fatal Accident 3

6.2.78 The third fatal accident occurred along the A38 Bristol Road when a vehicle travelling south west toward East Brent collided with a pedestrian who was in the middle of the carriageway.

6.2.79 There is nothing to suggest that highway layout or condition were significant contributory factors to Fatal Accident 3.

Fatal Accident 4

6.2.80 Fatal Accident 4 occurred on the on the A38 Bristol Road at junction with Biddisham Lane. A vehicle, travelling at speed around a left hand bend, reacted to two stationary vehicles, lost control and collided with an oncoming vehicle in the opposite lane.

6.2.81 There is nothing to suggest that highway layout or condition were significant contributory factors to Fatal Accident 4.

Fatal Accident 5

6.2.82 Fatal Accident 5 occurred on Northern Way when a vehicle veered onto the opposite side of the carriageway and mounted the pavement. In doing so, it collided with a pedestrian.

6.2.83 There is nothing to suggest the highway layout or condition were significant contributory factors to Fatal Accident 5.

Fatal Accident 6

6.2.84 Fatal Accident 6 occurred on the B3130 when a vehicle left the carriageway and struck a tree. The records suggest that the driver was distracted in the vehicle.

6.2.85 There is nothing to suggest the highway layout or condition were significant contributory factors to Fatal Accident 6.

Fatal Accident 7

6.2.86 The seventh fatal accident occurred on The Portbury Hundred occurred when a motorcycle and car collided.

6.2.87 There is nothing to suggest that highway layout or condition were significant contributory factors to Fatal Accident 7.

Fatal Accident 8

6.2.88 The eighth fatal accident occurred on the M5 exit of the Crowley Way junction. A vehicle lost control while exiting a roundabout on the slip road and struck a pedestrian who was standing on the verge waiting for a lift.

6.2.89 There is nothing to suggest that highway layout or condition were significant contributory factors to Fatal Accident 8.

Fatal Accident 9

6.2.90 The ninth fatal accident occurred at the Stockway North/Stockway South mini-roundabout junction. A car turning right from Stockway South to Stockway North failed to give way and collided with a cyclist.

6.2.91 There is nothing to suggest that highway layout or condition were significant contributory factors to Fatal Accident 9.

Comparison to National Average

6.2.92 In order to fully assess the levels of accidents at the junctions identified for assessment, the accident rates at each junction have been compared with national averages.

Methodology

6.2.93 The method for calculating an average annual accident rate for each junction was taken from the Design Manual for Roads and Bridges (DMRB, 2004) Volume 13, Section 1, Part 2, The Valuation of Costs and Benefits, The Valuation of Accidents at Junctions.

6.2.94 The methodology involves applying the recorded traffic flows to either the Cross Product (C) model, or Inflow (I) model depending on the type of junction. Both models take the same basic form of:

$$A = a\,(f)^b$$

Where: A is the annual number of accidents;

f is a function of traffic flow dependant on the model;

a is a coefficient which varies depending on the junction type, fixed at the national value provided in DMRB; and

b is a power which varies depending on the junction type, fixed at the national value provided in DMRB.

6.2.95 In the Cross Product model, (f) is the value produced by multiplying the combined inflow from the two major opposing links by the sum of the inflows on the other one or two minor links. Inflows are measured in thousands of vehicles per annual average day.

6.2.96 In the Inflow model, (f) is the value of the total inflow from all links in thousands of vehicles per annual average day.

6.2.97 Once an average annual national accident rate was calculated, it was multiplied by five to generate an average for five years.

Analysis

6.2.98 The annual DMRB base rate has then been compared to the actual accident counts, with the results displayed in **Table 6.1** below. All junctions with a negative percentage difference show that the actual accident count is less than the DMRB predicted count.

Table 6.1 National Accident Comparison

Current Annual Accidents				
Junction	Actual Accident Records	DMRB Base Rate	Difference	
			Count	%
1	5.6	4.1	-1.5	36.9%
2	0.4	0.4	0.0	5.5%
3	0	1.2	1.2	-100.0%
4	1	1.9	0.9	-46.6%
5	0	1.3	1.3	-100.0%
6	1.2	1.1	-0.1	8.8%
7	0	0.4	0.4	-100.0%
8	0.2	0.8	0.6	-75.2%
9	2.8	4.3	1.5	-34.6%
10	0.8	1.7	0.9	-51.6%
11	0.4	1.5	1.1	-73.1%
12	0.4	1.2	0.8	-67.3%
13	2	1.1	-0.9	88.0%

Current Annual Accidents				
Junction	**Actual Accident Records**	**DMRB Base Rate**	**Difference**	
			Count	**%**
14	0.6	1.4	0.8	-57.8%
15	1.2	1.7	0.5	-27.8%
16	2.6	3.8	1.2	-31.6%
17	1.2	1.7	0.5	-27.7%
18	0.6	0.6	0.0	-2.7%
19	0.6	0.5	-0.1	25.1%
20	0.2	0.2	0.0	5.5%
21	5	6.4	1.4	-22.4%
22	0	1.7	1.7	-100.0%
23	0.4	0.0	-0.4	0%
24	1.6	1.9	0.3	-17.4%
25	1.2	4.6	3.4	-74.0%
26	0	1.0	1.0	-100.0%
27	0	0.9	0.9	-100.0%
28	0.4	3.4	3.0	-88.1%
29	0.4	0.7	0.3	-41.2%
30	0	0.7	0.7	-100.0%
31	0.6	2.7	2.1	-77.9%
32	0.4	1.3	0.9	-68.7%
33	5.6	7.2	1.6	-22.4%
34	0.6	0.3	-0.3	75.6%
35	0.2	0.6	0.4	-66.1%
38	0.8	0.7	-0.1	21.5%
39	0.2	0.3	0.1	-39.1%
40	0	0.2	0.2	-100.0%
41	0.8	1.2	0.4	-35.5%
42	0.2	0.0	-0.2	0%
43	0.8	1.1	0.3	-28.7%
44	1	3.0	2.0	-66.9%
45	1.4	3.7	2.3	-62.4%
46	0.4	1.5	1.1	-73.9%
49	0	1.1	1.1	-100.0%
50	1.2	0.2	-1.0	686.2%
51	0.2	0.3	0.1	-36.9%

6.2.99 The above table demonstrates that the predicted number of accidents at each junction calculated using the DMRB formula are generally significantly greater than the actual recorded accidents.

6.2.100 Only Junction 50 had an increase in actual accidents in comparison to the DMRB predictions. On closer inspection this was a very small increase, and amounted to a total of an additional 0.5 accidents a year (2.5 accidents over five years). This is viewed as an insignificant difference. It should also be noted that the greatest level of traffic predicted to occur as a result of the Proposed Development was assessed. In reality this level of traffic will not occur throughout the whole construction period but only for a short period of time during key construction phases. This is discussed in later sections of this report.

6.2.101 **Table 6.2** shows a comparison between the worst case base year including committed development, and the worst case base year plus the Proposed Development.

Table 6.2 Development Accident Comparison

Future Situation				
Junction	**DMRB Worst Case Year Base**	**DMRB Worst Case Year + Construction Traffic**	**Additional Annual Accidents**	
			Count	**% Increase**
1	6.4	7.1	0.7	10.9%
2	0.5	0.5	0.0	2.9%
3	1.3	1.3	0.0	2.6%
4	2.0	2.1	0.1	6.7%
5	1.4	1.4	0.0	2.3%
6	1.2	1.3	0.1	10.2%
7	0.4	0.5	0.0	9.1%
8	0.8	0.9	0.1	7.1%
9	4.7	4.9	0.3	5.7%
10	1.7	1.7	0.0	2.9%
11	1.6	1.8	0.1	7.7%
12	1.3	1.3	0.1	5.6%
13	2.0	2.2	0.2	9.1%
14	1.6	1.7	0.0	2.5%
15	1.9	1.9	0.0	2.0%
16	4.1	4.0	0.0	-0.9%
17	1.9	3.4	1.6	83.8%
18	0.8	0.9	0.0	3.0%
19	0.6	0.7	0.1	17.8%
20	0.3	0.4	0.1	29.6%
21	7.4	8.1	0.7	9.6%
22	1.9	2.0	0.2	8.9%
23	0.0	0.0	0.0	0%
24	2.2	2.5	0.3	14.5%
25	5.2	5.4	0.2	3.6%
26	1.1	1.1	0.0	1.6%
27	0.9	1.0	0.0	1.6%
28	3.8	4.0	0.1	3.3%
29	0.7	0.8	0.0	1.9%

Future Situation				
Junction	DMRB Worst Case Year Base	DMRB Worst Case Year + Construction Traffic	Additional Annual Accidents	
			Count	% Increase
30	0.8	0.8	0.1	9.8%
31	3.3	5.0	1.7	51.2%
32	1.4	1.4	0.0	1.9%
33	8.4	8.6	0.2	1.9%
34	0.4	0.4	0.0	1.9%
35	0.6	0.8	0.1	20.0%
38	0.8	0.8	0.0	4.6%
39	0.5	0.5	0.1	13.6%
40	0.3	0.3	0.0	15.6%
41	1.4	1.4	0.0	3.0%
42	0.7	0.7	0.1	10.4%
43	1.4	1.4	0.0	2.9%
44	3.7	4.1	0.3	8.4%
45	4.5	4.8	0.2	4.7%
46	1.7	1.7	0.0	0.2%
49	1.2	1.2	0.0	2.3%
50	0.2	0.2	0.0	9.3%
51	0.4	0.4	0.1	14.5%

6.2.102 Following a review of the figures in the table above, it is clear that the majority of the junctions have a small increase in annual accident rate. Only Junctions 17 and 31 are forecast to have more than one additional accident per year, with an additional 1.6 and 1.7 annual accidents respectively. These junctions have a 51.2% and 83.8% increase in accident rates, and the rates would still be comfortably within the predicted DMRB accident rates in Table 6.1 should the Proposed Development proceed. The Proposed Development construction traffic is therefore not considered to have a significant impact on the safety at the junctions.

6.2.103 Of those junctions which have a relatively high percentage increase in accident rates in comparison to the other assessed junctions, Junctions 17, 20 and 31 are the most significant and have increases of 81.38%, 29.6% and 51.2% respectively. On closer inspection, this increase only accounts for an additional 1. 6, 0.7 and 1.6 accidents per year, totalling an additional four accidents at the two junctions over a five year period. The Proposed Development construction traffic is therefore not considered to have a significant impact on the safety at the junctions.

Conclusion

6.2.104 In conclusion, it is evident that no junctions assessed have unusually high existing levels of accidents based on the above methodology. Furthermore, after consulting the accident records, there is nothing to suggest that highway layout or condition were significant contributory factors in any of the fatal accidents along the proposed construction access routes.

6.2.105 It is therefore considered that the proposed construction routes to be used to access the development will not be significantly adversely affected due to the proposed increases in traffic from the construction of the Proposed Development.

Links to the Hinkley Point C Transport Assessment

6.2.106 A TA was also produced for the Hinkley Point C power station. It conducted its own accident analysis into its construction access route, which included some junctions analysed in this TA for the connection project.

6.2.107 There were some differences in the accident data analysis across the two assessments. These are summarised in the points below:

- Accident data was collected for a period of five and a half years between January 2005 and June 2010 in the Hinkley Point C TA. This compares to a five year period between January 2008 and December 2012 in this assessment.
- The Hinkley Point C TA uses the Somerset Road Safety Partnership (SRSP) methodology for assigning an accident to a specific junction. In this TA, it was done on a case-by-case basis using the distance from the junction, the nature of the road (i.e. urban or rural), and the description of the accident on record in order to categorise accidents.

6.2.108 The results cannot therefore be directly compared across the two TAs. However, analysis in the Hinkley Point C TA outlines three junctions as 'Accident Cluster Sites' which are included in this TA as a section of the Construction Access Route. These comprise:

- The Drove/Wylds Road junction;
- A39/B3141 Woolavington Hill junction; and
- A38/A39 Dunball roundabout.

6.2.109 The Drove/Wylds Road Junction (Junction 15) was found to have 13 accidents in the Hinkley Point C TA, in comparison to six in this TA. The analysis in this TA concluded that Junction 15 had an increase of approximately 0.6 or 11% in comparison to the national average over the five year period.

6.2.110 A39/B3141 Woolavington Junction (Junction 6) was found to have 15 accidents in the Hinkley Point C TA, in comparison to six in this TA. The analysis in this TA concluded that Junction 6 had a decrease of approximately 3.9 or 39% in comparison to the national average over the five year period.

6.2.111 The A38/A39 Dunball roundabout (Junction 13) was found to have 12 accidents in the Hinkley Point C TA, in comparison to 10 in this TA. The analysis in this TA concluded that Junction 13 had a decrease of approximately 1 or 32.9% in comparison to the national average over the five year period.

6.2.112 In conclusion, it can be seen that a more recent review of accident data would not suggest that either Junction 15 or Junction 6 could be considered an 'Accident Cluster Site.' Junction 13 showed a marginal decrease on the accident levels assessed in the Hinkley Point C TA, and has been demonstrated as being within the appropriate national average accident rates. It is therefore considered that there is no reason to consider the above three junctions as areas of concern.

Construction Traffic Route and Bellmouth Safety

6.2.113 During scoping and consultation, a number of safety concerns were raised by the Local Authorities and HA in regards to the use of a number of highway links. Where this was the case an alternative construction route has been identified and subsequently agreed with the relevant authority.

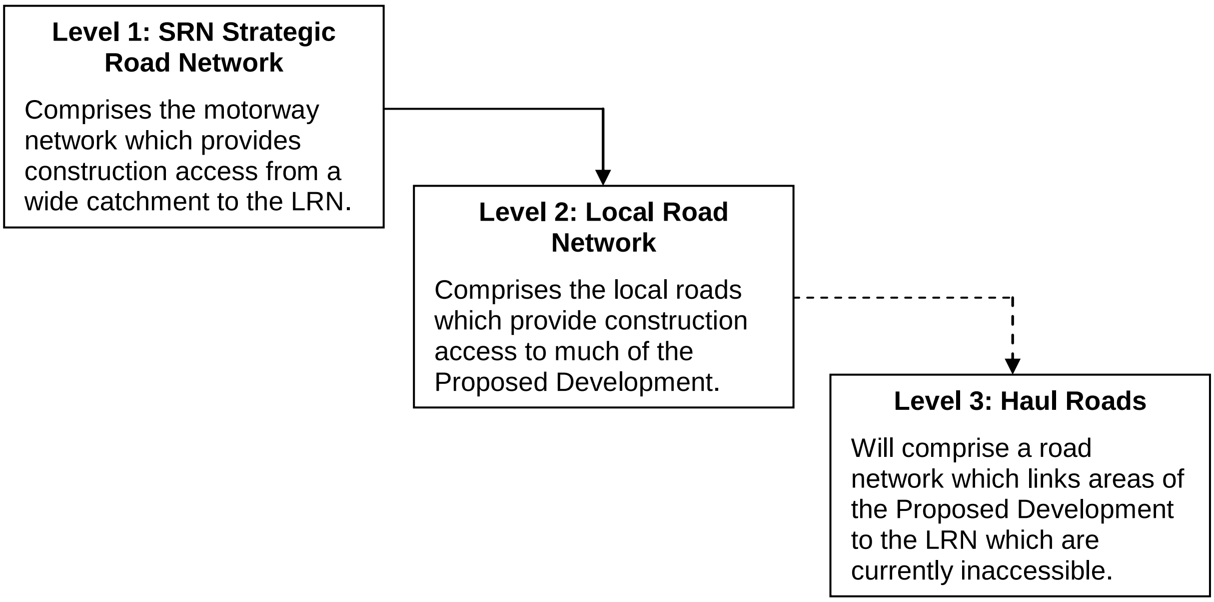
6.2.114 Similarly the potential risk to highway safety of a number of proposed bellmouth positions was raised by the LPAs. Where this occurred alternative access positions were put forward and subsequently agreed.

7 CONSTRUCTION TRAFFIC ROUTES

7.1 Introduction

7.1.1 In order to provide access to the Proposed Development, there are three levels of access roads will be used, as identified in **Inset 7.1** below:

Inset 7.1: Construction Access Hierarchy



7.2 Strategic Road Network

7.2.1 The SRN comprises the motorway network which runs approximately parallel to the majority of the Proposed Development. From south to north, the access points to serve the Proposed Development from the SRN are as follows:

- M5 Junction 23;
- M5 Junction 22;
- M5 Junction 21;
- M5 Junction 20;
- M5 Junction 19; and
- M5 Junction 18A/18.

M5 Junction 23

7.2.2 From Section A in the south, Junction 23 of the M5 firstly provides access to the SRN. Here, the A39 Puriton Hill is the primary route to the east of the motorway to serve areas in Section A and B, and the A38 Bristol Road heads south and to the west to Section H and the power station.

M5 Junction 22

7.2.3 Approximately 8km north, the next access point to the SRN is at Junction 23 of the M5. Here the A38 Bristol Road is again accessed, and construction vehicles can head either north or south along the carriageway before heading east to the required areas in Section B and C along the designated construction access.

M5 Junction 21

7.2.4 Approximately 15km north, Junction 21 of the M5 is the next available point to access the SRN. Here the A370 is accessed, and construction vehicles would travel east along the carriageway before heading south to the required area along the designated construction access.

M5 Junction 20

7.2.5 Approximately 9km north from Junction 21, Junction 20 of the M5 is the next available point to access the SRN. Here the B3133 Kenn Road is the initial primary route to the south and then east of the junction, and the B3130 Tickenham Road is the route to the north and east. The construction vehicles accessing Junction 20 of the M5 would be serving Section D.

M5 Junction 19

7.2.6 Approximately 10.5km further north east, Junction 19 of the M5 is the next available point to access the SRN. Here there are three primary routes from the junction to areas of the Proposed Development. To the south west the Portbury Hundred, Caswell Hill and the use of a haul road would serve the Proposed Development areas in Section E, to the north west areas in Section F would be served primarily by the A369 The Portbury Hundred, and to the north other areas in Section F would be served by The Royal Portbury Dock Road.

M5 Junction 18A/18

7.2.7 Approximately 3.5km north east from Junction 19, Junctions 18A and 18 of the M5 are the next available points to access the SRN. Here, access is also provided from the M49. There are three primary routes from the junction to areas of the Proposed Development. These include the A4 Portway to the south, Avonmouth Way to the east and the A4 Crowley Way to the west and north. These routes all serve the Proposed Development areas in Section G. Notably, the HA are also responsible for the adjoining roundabouts to the M5 Junction 18 and 18A on the A4, namely the Portway roundabout, St Brendans and St Andrews roundabout.

7.3 Local Road Network

7.3.1 In order to provide construction access to the SRN, a LRN has been established for construction traffic. Each road on the designated LRN has been provided in **Table 7.1** below in relation to its section and nearest access to the SRN.

Proposed Off-Site Highway Improvements - Factory Lane

7.3.2 Factory Lane is an access road which forms a priority junction to the east of the B3141 Church Road and provides access small light industrial warehousing and local business premises. As such Factory Lane is currently used by private vehicles, light, medium and heavy goods vehicles.

7.3.3 Under the Development Proposals it is proposed that a haul road would be linked from the eastern end of Factory Lane travelling north to link with the A38, east of Rook Bridge (bellmouth reference: C-LD10-BM01), where the haul road would link with the proposed construction route. At this point the proposed construction traffic would be travelling between Junction 22 of the M5 and Factory Lane.

7.3.4 Through consultation with SCC it was established that the existing geometric layout of the B3141/Factory Lane junction is insufficient to accommodate the HGV traffic associated with the construction of the haul road and the Proposed Development.

7.3.5 Through the consultation process it has been agreed that the junction would be modified to facilitate the vehicles movements through acquisition (via a Compulsory Purchase Order) of land to the north east of the junction, taken from the existing land plot of the Bason Bridge Inn public house.

7.3.6 The junction layout, geometrical design, visibility splays and detailed design would be agreed with SCC prior to any works being undertaken.

7.3.7 This would also benefit the existing users of the Factory Lane junction and would remain in place following the construction of the Proposed Development.

7.4 Haul Roads

7.4.1 In cases where the Proposed Development cannot be accessed purely by the existing LRN and to keep construction traffic off the public highway wherever possible, Haul Roads would be constructed.

7.4.2 The haul roads would provide to access to the Proposed Development and would connect a number of bellmouths.

7.4.3 A description of the haul road construction process is contained within full construction methodology has been produced by National Grid. The full construction methodology for the bellmouths is shown in the ‘Hazard Identification/Risk Assessment Method Statement for the Installation and Removal of Haul Roads (**Volume 5.3.2, Appendix 3G (9)**).

7.5 Proposed Routeing Strategy

7.5.1 Through liaison with the LPAs a routeing strategy has been established for each bellmouth.

7.5.2 The proposed routeing strategy would be followed by all construction traffic. The methodology adopted for the development of the routing strategy is as follows:

- shortest route from location to primary distributive road network (SRN);
- avoidance of settlements and any other sensitive receptors to reduce congestion and minimise effects, cities, towns, villages;
- origins of vehicles; and
- minimise travel on established road network and use haul roads where possible.

7.5.3 It is anticipated that once vehicles are on the SRN the trips would quickly dissipate into the wider transport network.

7.5.4 **Table 7.1** below provides a detailed routeing strategy indicating each bellmouth and the proposed routeing strategy to the SRN.

7.5.5 All agreed construction routes to be used are shown at **Volume 5.22.3, Figure 22.1**.

Table 7.1 Breakdown of the Proposed Routeing Strategy

Section	Bellmouth	LRN	SRN	Routeing
H	ZZ7-BM01	A39	23	M5 Junction 23, A39, A38 Bristol Road, A39 The Drove/Western Way/Homberg Way/Quantock Rd/New Rd/Main Rd, A39, High St, Rodway, Withycombe Hill, Un-named Road (At, Wick, leading to Whitewick Lane)
H	ZG7-BM01	A39	23	M5 Junction 23, A39, A38 Bristol Road, A39 The Drove/Western Way/Homberg Way/Quantock Rd/New Rd/Main Rd, A39, High St, Rodway, Withycombe Hill, Un-named Road (At, Wick, leading to Whitewick Lane)
H	VQ3C-BM01	A39	23	M5 Junction 23, A39, A38 Bristol Road, A39 The Drove/Western Way/Homberg Way/Quantock Rd/New Rd/Main Rd, A39, High St, Rodway, Withycombe Hill, Wick Moor Drove
H	JP3-BM01	A39	23	M5 Junction 23, A39, A38 Bristol Road, A39 The Drove/Western Way/Homberg Way/Quantock Rd/New Rd/Main Rd, A39, High St, Rodway, Withycombe Hill, Wick Moor Drove
H	JP1-BM01	A39	23	M5 Junction 23, A39, A38 Bristol Road, A39 The Drove/Western Way/Homberg Way/Quantock Rd/New Rd/Main Rd, A39, High St, Rodway, Withycombe Hill, Wick Moor Drove
A	VQ043R-BM01	A39 Puriton Hill	23	M5 Junction 23, A39 Puriton Hill, A39 Bath Road (South)
A	C-ZGA3-BM01	-	23	M5 Junction 23, A39 Puriton Hill
A/B	C-ZGA4-BM01	A39 Bath Road (East)	23	M5 Junction 23, A39 Puriton Hill, A39 Bath (East), B3141, B3139
A/B	C-ZGA12-BM01	A39 Bath Road (East)	23	M5 Junction 23, A39 Puriton Hill, A39 Bath (East), B3141, B3139
A/B	C-ZGA13-BM01	A39 Bath Road (East)	23	M5 Junction 23, A39 Puriton Hill, A39 Bath (East), B3141, B3139, Middle Moor Drove
A/B	C-LD3-BM01	A39 Bath Road (East)	23	M5 Junction 23, A39 Puriton Hill, A39 Bath (East), B3141, B3139
B	C-LD9-BM01	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road, Bennett Road, B3139 Mark road, B3141 Church Road/Causeway
B	Junction 01*	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road, Bennett Road, B3139 Mark road, B3141 Church Road, Factory Lane
B	C-LD10-BM01	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road
B	400-UG-BM01	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road

Section	Bellmouth	LRN	SRN	Routeing
B/C	400-UG-BM10	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road/Turnpike Road/Bridgwater Road/Bristol Road/New Road, A368 Dinhurst Road/Greenhill Rd/Station Rd/Towerhead Road
B/C/D	400-UG-BM11	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road/Turnpike Road/Bridgwater Road/Bristol Road/New Road, A368 Dinhurst Road/Greenhill Rd/Station Rd/Towerhead Road
D	C-LD39-BM01	A370	21	M5 Junction 21, A370
D	AT29-BM01	A370	21	M5 Junction 21, A370, Maysgreen Lane, Puxton Road
B/C/D	Y-Route-BM01	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road/Turnpike Road/Bridgwater Road/Bristol Road/New Road/Bristol Rd, B3133, B3133 Stock Lane, Wood Lane
B/C/D	Y-Route-BM02	A38 Bristol Road	22	M5 Junction 22, A38 Bristol Road/Turnpike Road/Bridgwater Road/Bristol Road/New Road/Bristol Rd, B3133, B3133 Stock Lane, Wood Lane
D	C-LD53-BM01	A370	21	M5 Junction 21, A370
D	C-LD54-BM01A	B3133	20	M5 Junction 20, B3133 Ettlingen Way, Central Way, B3133, B3133 Kenn Road
D	C-LD62-BM01	B3133	20	M5 Junction 20, B3133 Ettlingen Way, Central Way, B3133, Davis Ln, Kennmoor Road
D	C-LD70-BM01	B3133	20	M5 Junction 20, B3133 Ettlingen Way, Central Way, B3133, Davis Ln, Kennmoor Road
D	C-LD74-BM01	B3133	20	M5 Junction 20, B3133 Ettlingen Way, Central Way, B3133, Davis Ln, Nailsea Wall
D	C-LD76-BM01	B3130	20	M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd, Stock Way North, Stock Way South, Mizzymead Rd, Queens Rd, Hanham Way
D	W-Route-BM01.1 & W-Route-BM02	B3130	20	M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd, Stock Way North, Stock Way South, Mizzymead Rd, Queens Rd, Hanham Way
D	W-Route-BM00.1	B3130 (A370) (Contingency)	20 (21)	In: M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd, Stock Way North, Stock Way South, Mizzymead Rd, Queens Rd, Hannah More Rd, Blackfriars Rd, Engine Lane Out: Engine Lane, St. Mary's Grove, Hannah More Rd, Queens Rd, Mizzymead Rd, Stock Way South, Stock Way North, B3130 Clevedon Rd/Tickenham, Northern Way, B3133 Ettlingen Way, M5 Junction 20

Section	Bellmouth	LRN	SRN	Routeing
D	W-Route-BM01	B3130 (A370) (Contingency)	20 (21)	In: M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd, Stock Way North, Stock Way South, Mizzymead Rd, Queens Rd, Hannah More Rd, Blackfriars Rd, Engine Lane Out (Primary): Engine Lane, St. Mary's Grove, Hannah More Rd, Queens Rd, Mizzymead Rd, Stock Way South, Stock Way North, B3130 Clevedon Rd/Tickenham, Northern Way, B3133 Ettlingen Way, M5 Junction 20 Out (Secondary): Engine Lane, North Street, Queens Rd, Mizzymead Rd, Stock Way South, Stock Way North, B3130 Clevedon Rd/Tickenham, Northern Way, B3133 Ettlingen Way, M5 Junction 20
D	W-Route-BM04.1	B3130	20	M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd
D	W-Route-BM05	B3130	20	M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd
E	W-Route-BM06	B3130	20	M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd
D	C-LD79-BM01	B3130	20	M5 Junction 20, B3133 Ettlingen Way, Northern Way, B3130 Tickenham Rd/Clevedon Rd
E/F	W-Route-BM07	A369	19	In: M5 Junction 19, A369 The Portbury Hundred, [Haul Road], Caswell Lane, Caswell Hill, Whitehouse Lane. Out: Whitehouse Lane, [Haul Road], Caswell Lane, [Haul Road], (Left Turn out) A369 The Portbury Hundred, (Around Roundabout) A369 The Portbury Hundred, M5 Junction 19.
E/F	W-Route-BM08	A369	19	In: M5 Junction 19, A369 The Portbury Hundred, [Haul Road], Caswell Lane, (Caswell Hill, Whitehouse Lane)*. *Could use W-Route-BM09 for these 5 towers Out: Caswell Lane, [Haul Road], (Left Turn out) A369 The Portbury Hundred, (Around Roundabout) A369 The Portbury Hundred, M5 Junction 19.

Section	Bellmouth	LRN	SRN	Routeing
E/F	W-Route-BM09	A369	19	In: (circular route via W-Route-BM08): M5 Junction 19, A369 The Portbury Hundred, [Haul Road], Caswell Lane, (Caswell Hill, Whitehouse Lane)*. *Could use W-Route-BM09 direct for these 5 towers Out: Caswell Lane, [Haul Road], (Left Turn out) A369 The Portbury Hundred, (Around Roundabout) A369 The Portbury Hundred, M5 Junction 19.
F	C-LD92-BM01	A369	19	In: M5 Junction 19, A369 The Portbury Hundred, [Haul Road], Caswell Lane Out: Caswell Lane, [Haul Road], (Left Turn out) A369 The Portbury Hundred, (Around Roundabout) A369 The Portbury Hundred, M5 Junction 19.
F	W-Route-BM10	A369 The Portbury Hundred	19	In: M5 Junction 19, A369 The Portbury Hundred, [Haul Road], to Caswell Lane Out: From Caswell Lane, [Haul Road], (Left Turn out) A369 The Portbury Hundred, (Around Roundabout) A369 The Portbury Hundred, M5 Junction 19.
F	W-Route-BM11 & W-Route-BM11.1	A369 The Portbury Hundred	19	M5 Junction 19, A369 The Portbury Hundred, Sheepway
F	W-Route-BM12	A369 The Portbury Hundred	19	M5 Junction 19, A369 The Portbury Hundred, Sheepway
F	BW-P-BM01	Royal Portbury Dock Rd	19	M5 Junction 19, Royal Portbury Dock Road, Portbury Way
F	C-LD95A-BM02	A369 The Portbury Hundred	19	In: M5 Junction 19, A369 The Portbury Hundred, Out: (Left Turn out) A369 The Portbury Hundred, (Around Roundabout) A369 The Portbury Hundred, M5 Junction 19.
F	C-LD96-BM01	A369 The Portbury Hundred	19	M5 Junction 19, A369 The Portbury Hundred
G	P-LD101-BM01	Royal Portbury Dock Rd	19	M5 Junction 19, Royal Portbury Dock Road, Private Road(s)
G	C-LD107-BM01	A4 Portway	18/18A	M5 Junction 18/18A, A4 Portway, West Town Road, Victoria Road
G	G-Route-BM01	-	18/18A	M5 Junction 18/18A, Avonmouth Way
G	G-Route-BM02	-	18/18A	M5 Junction 18/18A, Avonmouth Way
G	C-LD119-BM01	A403	18/18A	M5 Junction 18/18A, A4 Crowley Way, A403 St. Andrew's Road/Smoke Lane, Poplar Way West, Poplar Way East, Packgate Road
G	C-LD121-BM01	A403	18/18A	M5 Junction 18/18A, A4 Crowley Way, A403 St. Andrew's Road/Smoke Lane/Chittening Rd, Severn Road

Section	Bellmouth	LRN	SRN	Routeing
G	C-LD124-BM01	A403	18/18A	M5 Junction 18/18A, A4 Crowley Way, A403 St. Andrew's Road/Smoke Lane/Chittening Rd, Severn Road, Ableton Road
G	C-LD127-BM01	A403	18/18A	M5 Junction 18/18A, A4 Crowley Way, A403 St. Andrew's Road/Smoke Lane/Chittening Rd, Severn Road, Ableton Road, Minors Lane
G	Seabank-BM01	A403	18/18A	M5 Junction 18/18A, A4 Crowley Way, A403 St. Andrew's Road/Smoke Lane/Chittening Rd/Severn Rd

<u>Staff Routeing</u>

7.5.6 The majority of staff working on the project would be non-local specialist workers who would be temporarily living in the vicinity of their respective construction works.

7.5.7 Staff transport to the construction sites would be facilitated by welfare van services which would be organised to pick up staff from agreed localities exterior to the construction works. Staff would be picked up at these locations prior to the start of the working day, transported to their respective working locations and returned by welfare van to the local pick up/drop off points at the end of the working day.

7.5.8 Give that the construction sites would not provide any private vehicle parking, the welfare van services would be therefore negate single car occupancy trips and reduce the number of vehicles on the LRN. The use of the min-bus services also ensures that the Developer and those undertaking the construction of the works are able to route the services along the proposed construction traffic routes.

7.5.9 A staff Travel Plan will be implemented as a mitigation measure to create a sustainable staff travel profile. Staff transport through welfare van service provision would form the primary measure of the Travel Plan mitigation measures.

<u>Stone and Aggregate Deliveries</u>

7.5.10 The origin of stone and aggregate to be used for the development is dependent on the location of suitable quarries. The quarries to be used for the Proposed Development have not been identified at this stage in the development process. However, for this TA, a number of local quarries that potentially could provide material to the development have been identified.

7.5.11 Irrespective of origin all deliveries, including stone and aggregate deliveries would following the routeing methodology described above.

7.5.12 In many instances the likely quarries to be used would be located close to the SRN (see **Volume 5.22.3, Figure 22.3**). All quarry vehicles would be required to use an agreed routeing strategy described above to access the development. The routeing from each quarry is discussed below and detailed with trip generation in **Table 10.2** of this report. The following quarries have been considered for deliveries;

- Gurney Slade;
- Halecombe;
- Whately;
- Torr Works;

- Callow Roak;
- Batts Combe; and
- Stancombe.

7.5.13 For this assessment a number of sensitivity tests have been undertaken looking at whether these trips would arrive from the north or south of the Proposed Development. This is discussed in the following sections of this report.

7.5.14 It should be noted that any stone deliveries would not exceed existing operational conditions or agreements, including those relating to traffic generation and routeing, for any quarry used to supply material to the development.

7.5.15 Of those quarries identified as potential suppliers as part of this sensitivity assessment, approximately eight are located to the east of the development. Furthermore, a number of these are located close to one another as shown on **Volume 5.22.3, Figure 22.3.**

7.5.16 In the instances where the quarries are grouped it is anticipated that they use the same strategic route to access the development and this would be different from the primary construction routes identified above.

7.5.17 It is envisaged that Gurney Slade, Halecombe, Whatley, Torr Works and Moons Hill quarries would all use the A361, A39 and either the M5 or Woolavington Hill to access the development. There are no other suitable routes, utilising key highway links to access the development.

7.5.18 Similarly Collow Rock and Batts Combe quarries would only use the A371, A38 and the M5 to access the development, while Stancombe Quarry would use the A370 and the M5 to access the development.

7.5.19 The routeing options described above have been considered when carrying out the traffic analysis undertaken as part of this assessment. In the event that all of the eight quarries are used, it is envisaged that the number of daily and peak period deliveries would be in line with the programme for the construction of the haul road. The daily and predicted peak period stone and aggregate deliveries are discussed in details in section 10.

<u>Abnormal Indivisible Loads (AIL)</u>

7.5.20 Following a comprehensive routeing assessment undertaken by ALE in conjunction with the HA, and the appropriate LPAs the routeing of the AIL vehicles has established and has been presented in a separate Route Feasibility Report included at **Volume 5.22.2, Appendix 22D**.

7.5.21 AIL trip generation is discussed in section 8.3 of this report.

8 ASSESSMENT METHODOLOGY

8.1 Introduction

8.1.1 This section of the TA discusses the baseline data collection methodology as well as the methodology used to establish the trip generation and distribution for the Proposed Development traffic.

8.2 Baseline Survey Data

8.2.1 In order to assess junction capacity it is necessary to firstly obtain baseline traffic data at key points on the LRN and SRN across road network under consideration within the study area. The collection of baseline traffic data was undertaken using three industry standard methodologies, these being:

- collection of Automatic Traffic Counts (ATCs) along significant road links; and
- collection of turning counts at the assessed junctions; and
- queue length surveys undertaken simultaneously with the junction turning counts.

ATC Data Collection

8.2.2 The ATC data was collected over a period of seven days within June (Tuesday 4 June to Friday 28 June 2013). These were commissioned by Curtins, and an independent traffic survey company undertook the surveys. They were undertaken in a neutral month, as specified by guidance set out by the Department for Transport (DfT) in the document "Guidance on TA".

8.2.3 In addition to the neutral flows, there were also a selected number of counts taken during the summer months to help inform construction traffic effects during the tourist season. These were conducted on 8 August 2013 to 15 August 2013. These seasonal counts were at ATC locations 1, 9, 10, 11, 12, and 15.

8.2.4 **Volume 5.22.3, Figure 22.2** shows the study area and all the locations of the ATC counts conducted**.**

ATC Count Methodology

8.2.5 The traffic movements were recorded using pressure sensors installed at each of the ATC locations. The results were then analysed by the independent traffic survey company in order to capture and record the required information. This information included quantified traffic movements by vehicle type (light and heavy goods) for each of the seven days, presented in 60 minute segments

Junction Turning Count – Data Collection

8.2.6 Initially, Curtins identified 28 junctions within the study area which required further assessment, i.e. capacity assessment (3/10/2013).

8.2.7 Subsequent to this, the LPAs/JMP identified an additional 20 junctions which also required further assessment (29/10/2013).

8.2.8 Following changes to the construction routeing strategy through Nailsea as a result of discussions with the LPAs, three further junctions were identified for assessment.

8.2.9 During the scoping process with the LPAs, it was agreed that a total of 51 junctions would be assessed as part of this TA. Of these it was established that 4 of the junctions were not on the construction routes and 47 of the junctions therefore were to be assessed as part of the TA.

8.2.10 **Table 8.1** below identifies the 51 junctions identified during the scoping process and the 47 junctions identified for further assessment and turning count and queue length surveys.

Table 8.1 Junctions Identified for Analysis

Curtins Reference	JMP Reference	Junction
1	1	M5 Junction 23
2	13	Dunball Roundabout (HPC DCO Layout)
3	15	Bristol Road/Wylds Road (HPC DCO Layout)
4	14	Bristol Road/The Drove (HPC DCO Layout)
5	16	Wylds Road/The Drove (HPC DCO Layout)
6	17	Quantock Road/Hombery Way
7	18	A39/Main Road
8	19	A39/High Street
9	20	High Street/Fore Street/Rodway
10	2	A39/Puriton Hill
11	3	A39 Puriton Hill/Hillside
12	4	A39 Puriton Hill/Bath Road
13	5	A39 Bath Road/Bawdrip Lane
14	6	A39 Bath Road/Woolavington Hill
15	7	Woolavington Hill/Old Mill Road
16	8	Woolavington Hill/Higher Road/Vicarage Road
17	9	M5 Junction 22/A38 Bristol Road/B3140
18	10	A38 Bristol Road/Harp Road
19	11	A38 Bristol Road/A370 Bridgewater Road
20	12	A38 Bristol Road/Rooksbridge Road
21	21	M5 Junction 21
22	22	A370/Cowslip Lane
23	23	A370/Maysgreen Lane
24	24	M5 Junction 20
25	25	M5 Junction 20/Central Way/Nothern Way/B3133 Moor Lane
26	26	Central way/Kenn Moor Drive
27	27	Central Way/Tutton Way
28	28	Central Way/B3133/Southern way
29	29	B3133/Tutton Way

Curtins Reference	JMP Reference	Junction
30	30	B3133/Davis Lane
31	31	Northern Way/B3130 Tickenham Road
32	32	Clevedon Road/B3128 Tickenham Hill
33	**36**	**Clevedon Road/Portbury Lane**
34	**-**	**Dark Lane/Station Road**
35	33	M5 Junction 19
36	34	Royal Portbury Dock Road/Gordano Way/Portbury Way
37	35	The Portbury Hundred/Station Road
38	**36**	**Mill Lane/High Street/Caswell Lane**
39	44	M5/A4/Avonmouth Way
40	38	A403 Chittening Road/Severn Road
41	39	A403 Smoke Lane/Poplar Way West
42	40	Poplar way west/Poplar Way East/Merebank Road/Moorend Farm Avenue
43	41	A403 St. Andrew's Road/Kings Weston Lane
44	42	A403 St. Andrew's Road/St. George's Industrial Estate
45	43	A403 St. Andrew's Road/King Road Avenue/Crowley Way
46	45	A4 Bristol Broadway/Avonmouth Road/Portway/M5
47	46	A4 Portbury/West Town Road
48	**47**	**Kings Weston Lane/Long Cross**
49	48	B3120 Clevedon Road/Stock Way North
50	49	Stock Way North/Stock Way South
51	50	Stock Way South/Mizzymead Road

Note: Junctions highlighted in bold are not on the construction routes

8.2.11 As shown in the table, 4 of the 51 junctions identified are not are located on the construction routes and therefore have not been assessed further. The above 47 junctions have been split into 9 distinct geographic groups based on the proximity and links to the SRN. These networks are as follows:

- Junctions 1 – 8;
- Junction 9 – 12;
- Junction 13 – 16;
- Junction 17 – 20;
- Junctions 21 – 23;
- Junctions 24 – 32;
- Junctions 33 – 35;
- Junctions 38 – 47: and

- Junctions 49 – 51.

8.2.12 Following further liaison with the LPAs it was agreed that an additional junction should also be included as part of this assessment. The junction is the proposed A39 Access roundabout which is proposed as part of the Huntspill Energy Park development infrastructure upgrades. This junction has therefore been included in the sensitivity analysis detailed in section 12 of this report.

8.2.13 The surveys were commissioned by Curtins, and an independent traffic survey company undertook the surveys. They were undertaken in a neutral month, as specified by guidance set out by the DfT in the document "Guidance on TA".

Turning Count and Queue Length Survey Methodology

8.2.14 Due to the size of the road network under consideration and the developing nature of scoping discussions, the counts were undertaken over three separate survey periods, these being:

- survey period 1 – 15/10/2013 – 25/10/2013;
- survey period 2 – 18/11/2013 – 29/11/2013; and
- survey period 3 – 21/01/2014 – 13/02/2014.

8.2.15 The surveys were undertaken for a 48-hour period from 07:00 – 19:00 on a neutral day (Tuesday, Wednesday or Thursday) at every junction.

8.2.16 Survey period 1 recorded:

- quantified traffic movements by vehicle type (light and heavy goods) between 07:00 – 19:00, data to be presented in 15 minute segments; and
- queue length data recorded to be presented in 5 minute segments.

8.2.17 The surveys undertaken in survey period 1 were undertaken for a 24 hour period between 07:00 – 19:00.

8.2.18 At the request of the LPAs, the second set of surveys (survey period 2) was undertaken for a period of no less than two neutral days. Similarly the surveys conducted as part of the third survey period (survey period 3) were conducted for a period of two days.

8.2.19 This was in order to ensure that the traffic count data which is collected is valid and representative of normal traffic conditions, such as planned or unplanned highway works. A definitive list of planned highway works was not available from the LPAs.

8.2.20 The traffic movements were recorded using cameras installed at locations around each of the 47 junctions. These cameras were positioned to record the traffic movements and behaviour which included:

- quantified traffic movements by vehicle type (light and heavy goods) between 07:00 – 19:00, data to be presented in 15 minute segments; and
- queue length data recorded to be presented in 5 minute segments.

8.2.21 Queue length data is collected simultaneously during the turning count data collection periods. The queue length data would enable the baseline junction capacity assessments to be validated.

8.2.22 AM and PM Baseline Network diagrams for each of the nine networks within the study area are contained in **Volume 5.22.2, Appendix 22E**.

8.3 Traffic Generation Data

8.3.1 National Grid has provided the predicted traffic generation data for the construction of the Proposed Development for a five year period from 1st January 2016 to 31st December 2020 (based on the existing development programme).

8.3.2 **Table 8.2** below shows a list and breakdown of the traffic generation data provided.

Table 8.2 List and Breakdown of Traffic Generation Data Provided

Name/Reference	Timescale	Timescale format	Vehicle Types
400kv Overhead Line & Cable	2016 - 2020	Daily	Light, Medium and Heavy
Overhead Line Compound	2016 – 2020	Daily	Light, Medium and Heavy
Sandford Substation	2016 – 2018	Weekly	Light, Medium and Heavy
Seabank Substation	2016 – 2019	Weekly	Light and Heavy

8.3.3 The predicted construction traffic categorises the vehicles into low, medium and high which represent light, medium and heavy goods vehicles.

8.3.4 **Table 8.3** below provides the classification of the light, medium and heavy vehicles by type as detailed in the traffic generation data.

Table 8.3 Light, Medium and Heavy Goods Vehicles by Vehicle Type

Light	Medium	Heavy
Car	Excavator	40 tonne truck
Van	Winch Tractor	Low Loader
4x4 pick-up	Tractor and Trailer	Flat Bed
4x4 transit	7 tonne truck	Truck
Welfare Van		Crane

Abnormal Indivisible Loads (AILs)

8.3.5 There will be a total of four AIL trip generated over the whole construction period. The ALE produced AIL Report (**Document Reference: ALE/14-12426/A**) has been produced on the basis of the AIL vehicle having the following key dimensions and weight:

- length – 8570 mm;
- width – 5292 mm;

- height – 4750 mm; and
- weight – 170 t.

8.3.6 As part of the development there is a requirement to transport four electrical transformers to the Sandford Substation.

<u>Trip Distribution by Grouping</u>

8.3.7 Based on the locations of bellmouths, it has been possible to group them by the agreed construction routes proposed to be used.

8.3.8 In total 23 groups have been created and are shown on **Volume 5.22.3, Figure 22.4.**

8.3.9 The key factors in determining the 23 groups were:

- direction of travel (on the LRN to the nearest connection to the SRN);
- nearest connection to the primary distributive road network; and
- location of the haul road.

8.3.10 **Table 8.4** details the 23 groups and the bellmouths assigned to each.

Table 8.4 Trip Distribution - Grouping

<table>
<tr><th>Group</th><th>Traffic Generator Reference</th><th>Group</th><th>Traffic Generator Reference</th></tr>
<tr><td rowspan="5">1</td><td>ZZ7-BM01</td><td rowspan="4">13</td><td>C-LD76-BM01</td></tr>
<tr><td>ZG7-BM01</td><td>W-Route-BM01.1 & W-Route-BM02</td></tr>
<tr><td>VQ3C-BM01</td><td>W-Route-BM00.1</td></tr>
<tr><td>JP3-BM01</td><td>W-Route-BM01</td></tr>
<tr><td>JP1-BM01</td><td rowspan="4">14</td><td>W-Route-BM04.1</td></tr>
<tr><td rowspan="6">2</td><td>VQ043R-BM01</td><td>W-Route-BM05</td></tr>
<tr><td>C-ZGA3-BM01</td><td>W-Route-BM06</td></tr>
<tr><td>C-ZGA4-BM01</td><td>C-LD79-BM01</td></tr>
<tr><td>C-ZGA12-BM01</td><td rowspan="5">15</td><td>W-Route-BM07</td></tr>
<tr><td>C-ZGA13-BM01</td><td>W-Route-BM08</td></tr>
<tr><td>C-LD3-BM01</td><td>W-Route-BM09</td></tr>
<tr><td rowspan="2">3</td><td>C-LD9-BM01</td><td>C-LD92-BM01</td></tr>
<tr><td>Junction 01</td><td>W-Route-BM10</td></tr>
<tr><td>4</td><td>C-LD10-BM01</td><td rowspan="2">16</td><td>W-Route-BM11 & W-Route-BM11.1</td></tr>
<tr><td>5</td><td>400-UG-BM01</td><td>W-Route-BM12</td></tr>
<tr><td rowspan="3">6</td><td>400-UG-BM10</td><td>17</td><td>BW-P-BM01</td></tr>
<tr><td>400-UG-BM11</td><td rowspan="2">18</td><td>C-LD95A-BM02</td></tr>
<tr><td>C-LD39-BM01</td><td>C-LD96-BM01</td></tr>
<tr><td>7</td><td>AT29-BM01</td><td>19</td><td>P-LD101-BM01</td></tr>
<tr><td>8</td><td>Y-Route-BM01</td><td>20</td><td>C-LD107-BM01</td></tr>
</table>

Group	Traffic Generator Reference	Group	Traffic Generator Reference
	Y-Route-BM02	21	G-Route-BM01
9	C-LD53-BM01		G-Route-BM02
10	C-LD54-BM01A	22	C-LD119-BM01
11	C-LD62-BM01	23	C-LD121-BM01
	C-LD70-BM01		C-LD124-BM01
12	C-LD74-BM01		C-LD127-BM01
-	-		Seabank-BM01

9 TRAFFIC GROWTH AND COMMITTED DEVELOPMENT

9.1 Introduction

9.1.1 In order to generate future baseline traffic flows it is necessary to apply a growth factor to the observed traffic flows, and include additional traffic from committed developments.

9.1.2 A methodology was agreed with the LPAs and the HA in regard to growthing the observed traffic across the network. This included the use of industry standard software TEMPro to factor up the background traffic while also adding traffic flows from known committed developments which were specified.

9.1.3 Growth factors have been obtained from the following two datasets for LGVs and HGVs respectively:

- TEMPro (Trip End Model Presentation Program); and
- National Transport Model (NTM) Factors (ITEA DfT data).

9.1.4 A description of each method of obtaining growth factors is supplied in the paragraphs below. The committed developments are discussed in subsequent paragraphs.

9.2 TEMPro (Trip End Model Presentation Program)

9.2.1 TEMPro is a software package published by the DfT which allows users to generate growth factors which can be applied to observed traffic data in order to establish forecast future year scenarios. The software produces growth factors based on various input parameters which can be tailored to suit the needs of a particular geographical locations and road type.

9.2.2 TEMPro also employs the use of the National Trip End Model (NTEM) forecasts to allow growth factor forecasts to be made based on population, employment, households – by car ownership, trip ends and simple traffic growth factors.

<u>Geographical Locations</u>

9.2.3 TEMPro allows growth factors to be tailored to specific geographical locations, with local NTEM forecasts influencing the resulting growth factors.

9.2.4 Due to the scale of the highway network under consideration and number of junctions to be assessed as part of the traffic assessment associated with the Proposed Development, a number of geographical locations have been considered.

9.2.5 Three discreet areas have been assumed for the coverage of the highway network and junctions to be assessed as part of the TA based on the LPAs responsible for each area of the highway network. The areas used are as follows:

- North Somerset;
- Somerset; and
- Bristol.

Road Types

9.2.6 TEMPro also allows users to specify the road types for which the growth factors are to be applied to. The options are as follows:

- All roads.
- Urban – Motorway.
- Urban – Trunk.
- Urban – Principal.
- Urban – Minor.
- Urban – All.
- Rural – Motorway.
- Rural – Trunk.
- Rural – Principal.
- Rural – Minor.
- Rural – All.

9.2.7 Due to the scale of the assessment area, and the number of different road types and locations associated with the junctions to be assessed as part of the TA, a growth factor has been extracted from TEMPro which reflects 'All Roads' for each geographical area.

9.3 National Transport Model (NTM) Factors (ITEA DfT data)

9.3.1 To generate growth factors for HGVs, data produced by the ITEA division of the DfT, based on the NTM was used. The growth factors are based on 2013 base year data and represent percentage changes up to the year 2035.

9.3.2 This allows a growth factor for each future year to be derived; and in this case for the geographical area of the south west. The growth factors extracted are representative for all road types.

Future Baseline Years

9.3.3 When considering which future years to generate growth factors for, it has been necessary to consider the peak generation of each Assessment Group. It is not considered appropriate to assess a single future year scenario as in many instances each Assessment Group generates a peak number of vehicles in a different year to the next and would therefore not represent the worst case scenario.

9.3.4 Therefore each Assessment Group, or combination of Assessment Groups depending on the bellmouth location and routeing, has been assessed during its respective peak cumulative generating year. As a result growth factors for 2016, 2017, 2018 and 2019 have been extracted. No Assessment Groups were predicted to generate peak construction trips during 2020.

9.3.5 **Table 9.1** below sets out each Assessment Group and details the peak traffic generating year, the location of the Assessment Group and the resulting growth factors as extracted from TEMPro and the NTM.

Table 9.1 Growth Factors

Group	Location	Peak year	AM Growth factor (LGV from 2013 – peak year)	AM Growth factor (HGV from 2013 – peak year)	PM Growth factor (LGV from 2013 – peak year)	PM Growth factor (HGV from 2013 – peak year)
1	Somerset	2016	1.0255	1.015	1.0284	1.015
2	Somerset	2016	1.0255	1.015	1.0284	1.015
3	Somerset	2018	1.0629	1.029	1.0685	1.029
4	Somerset	2018	1.0629	1.029	1.0685	1.029
5	Somerset	2018	1.0629	1.029	1.0685	1.029
6	North Somerset	2018	1.0629	1.029	1.0685	1.029
7	North Somerset	2016	1.0255	1.015	1.0284	1.015
8	North Somerset	2016	1.0255	1.015	1.0284	1.015
9	North Somerset	2016	1.0255	1.015	1.0284	1.015
10	North Somerset	2018	1.0629	1.029	1.0685	1.029
11	North Somerset	2019	1.0964	1.035	1.0982	1.035
12	North Somerset	2019	1.0964	1.035	1.0982	1.035
13	North Somerset	2016	1.0255	1.015	1.0284	1.015
14	North Somerset	2019	1.0964	1.035	1.0982	1.035
15	North Somerset	2019	1.0964	1.035	1.0982	1.035
16	North Somerset	2019	1.0964	1.035	1.0982	1.035
17	North Somerset	2016	1.0255	1.015	1.0284	1.015
18	North Somerset	2017	1.0674	1.022	1.0647	1.022
19	North Somerset	2019	1.0964	1.035	1.0982	1.035
20	Bristol	2017	1.0674	1.022	1.0647	1.022
21	Bristol	2017	1.0674	1.022	1.0647	1.022
22	Bristol	2017	1.0674	1.022	1.0647	1.022
23	Bristol	2017	1.0674	1.022	1.0647	1.022

*Group 2 is split into two distinct cumulative links, these being the B3141 (Woolavington Hill) and the A39 (Puriton Hill)

9.3.6 Each of the nine distinct road networks includes a number of trip generating groups, which compromise of the proposed bellmouths. For the purposes of assessment, where multiple trip generating groups are included within a distinct road network, the assessment year adopted is based on the peak year furthest in the future. This assessment year forms the basis of the growth factors used to growth observed traffic to the appropriate assessment year.

9.3.7 **Table 9.2** below identifies the singular and combined cumulative peak year per group and the year of assessment for which the capacity assessments would be undertaken.

Table 9.2 Group Peak and Assessment Years

Groups	Peak Year	Growth Factor Year applied/Assessment Year
1,2	2016 (cumulative)	2016
1	2016	
2	2016	
3,4,5,8	2018 (cumulative)	2018
4,5,8	2018 (cumulative)	
1	2016	2016
1	2016	2016
6,7,9	2018 (cumulative)	2018
10,11,12,13,14,15	2019 (cumulative)	2019
10,11,12,13	2018 (cumulative)	
14,15	2019 (cumulative)	
16,17,18,19	2019 (cumulative)	2019
16,18	2019 (cumulative)	
17,19	2019 (cumulative)	
20,21,22,23	2016 (cumulative)	2017
20	2017	
22	2016	
23	2017	
13	2019	2019

9.3.8 The table identifies the peak year for each group which is represents the year with the highest trip generation on a single day. In the instance of a junction being assessed against the impacts of a single group, the growth factor from this peak year is used. For example, group 1 has a peak year of 2016, therefore the capacity assessments would be undertaken on junctions 13 – 16 and 17 -20 with a 2016 growth factor applied and 2016 would be the year of assessment.

9.3.9 Where two or more groups are combined which have different peak years, the growth factor used for future capacity assessments has been taken as the furthest in the future, which is equal to the larger growth factor. For example, groups 10, 11, 12 and 13 have a peak combined year of 2018 and groups 14 and 15 have a peak combined year of 2019. These groups are then combined as they all use a single junction to form a combined group of 10, 11, 12, 13, 14 and 15. As such the larger growth factor has been applied for this assessment. It is therefore considered that as a result of this combined assessment, groups 10, 11, 12 and 13 would use the 2019 growth factor and this would be the year of assessment.

9.3.10 Using the approach of peak traffic generation year for construction traffic and the highest year (furthest year) ensures that the worst case scenario assessment would be conducted in terms of predicted construction traffic and background traffic.

9.4 Committed Development

9.4.1 As agreed with the LPAs and the HA, future baseline traffic flows would also incorporate traffic flows from a number of committed developments.

9.4.2 These traffic flows would be distributed through the highway network and would be added to the future baseline traffic established through the use of TEMPro growth factors (as discussed above).

9.4.3 During discussions with the LPAs it was identified that seven committed developments should be included within a cumulative assessment of the Proposed Development. These seven committed developments and their respectively locations being:

- Hinkley Point C Power Station (plus three associated developments (Somerset);
- Huntspill Energy Park (ROF, Somerset);
- North West Nailsea (see land allocation within draft local plan) – approximately 450 dwellings (North Somerset);
- Weston Villages, (build out would be approx. 2,435 by 2020) (North Somerset);
- Rockingham Park Development (Bristol); and
- Former Rodia Site (ASDA distribution warehouse) (Bristol).

9.4.4 An overview of each of the committed developments is provided below including key traffic generation and routeing details which would be included within the assessment of the Proposed Development contained herein.

Hinkley Point C (HPC) Power Station

9.4.5 HPC Power Station granted planning consent in March 2013 and is located 12km north of Bridgwater. It is forecast that both the traffic generated by the construction phase as well as operational traffic would impact on the LNR in the vicinity of the Proposed Development and Bridgwater.

9.4.6 The HPC Power Station development includes:

- two permanent nuclear islands, including turbine halls;
- two conventional islands, including turbine halls;
- a cooling pumphouse for each reactor unit;
- sea bed cooling intakes and outfall structures with bored tunnels connecting to each pumphouse;
- energy transmission infrastructure; and
- fuel, waste and ancillary management storage facilities.

9.4.7 The HPC Power Station development also includes a public information centre, access and parking facilities for workers, visitors and deliveries for the main nuclear plant, the National Grid 400kV substation and landscaped areas.

9.4.8 In addition to the main power station development there are also three other major traffic generating developments associated with HPS, these being:

- J23 Park and Ride facility;
- Cannington Park and Ride facility; and
- HP Accommodation Campus.

9.4.9 Junction 23 M5 Hinkley Point C Associated Development would feature:

- park and Ride Facility for 1300 vehicles;
- freight Management Facility including hardstanding for 85 HGV's and ancillary buildings;
- worker induction centre and welfare facilities including 120 car parking spaces; and
- the scheme would involve site access and highways improvements at Dunballs Roundabout (A38), landscape and ecological mitigation as well as other ancillary development.

9.4.10 The Cannington Park and Ride site comprises of 5.2ha of land to the south of the village of Cannington in Sedgemoor and is located to the north of the A39. The proposed park and ride facility would provide parking spaces for workforce and public visitors, motorcycle parking, cycles, mini-buses and buses. The Proposed Development would compromise of:

- two park and ride location for workforce (132 car, disabled and vans/mini bus parking spaces;
- visitor parking (120 cars, mini buses, motorcycle and buses);
- a priority junction access off the A39; and
- widening of the A39 and provision of a footway between the site access and the A39 eastern roundabout.

9.4.11 Bridgwater Accommodation Campus A and C are associated developments of HPC and would be utilised as part of the accommodation strategy to house workers. Bridgwater A would comprise of:

- 25 buildings to house 850 workers with car parking; and
- football pitches and amenities.

9.4.12 Bridgwater C - Accommodation campus would provide:

- for 150 occupants in 4 buildings including car parking; and
  a 5 a side football pitch.

HPC Trip Generation

9.4.13 The HPC TA states that the HPC assessment is based on a 60%/40% split between J23 and J24, where the split would be applied to the HGV trip generation.

Table 9.1 (summarised below) details the predicted the daily HGV traffic associated with the freight management centres are:

- AM Peak (2013) – 15 arrival trips and 8 departure trips (23 two-way trips);
- PM Peak (2013) – 9 arrival trips and 18 departure trips (27 two-way trips)
- AM Peak (2016) – 13 arrival trips and 7 departure trips (20 two-way trips);
- PM Peak (2016) – 8 arrival trips and 16 departure trips (24 two-way trips);
- AM Peak (2021) – 12 arrival trips and 7 departure trips (20 two-way trips); and
- PM Peak (2021) – 7 arrival trips and 14 departure trips (23 two-way trips).

9.4.14 As detailed in the Freight Management Strategy for the development the split for HGV traffic associated with the HPC development would follow two routes from M5 (Junction 23) of the, these being:

- HGV Route 1 – M5 (Junction 23), A38 Bristol Road, Northern Distributor Road (NDR – now re-classified as A39), The A39 west of Quantock roundabout, Cannington High Street (prior to the bypass becoming operation) and Cannington bypass, once it is operational, and the C182); and
- HGV Route 2 – M5 (Junction 24), A38 Taunton Road the A39 west of the Taunton Road/Broadway junction, Cannington High Street (prior to any new bypass) and Cannington bypass once it is operational and then the C182.

9.4.15 It should be noted that the only section where HGV Route 2 is on the Proposed Development construction routes is between the Quantock roundabout and the HPC power station. Notably, HGV Route 1 and HGV Route 2 join at the Quantock roundabout.

9.4.16 Through liaison with the SCC Highways and Commissioning Department it has been established that HGV movements are subject to both daily and peak hour maxima traffic flows, i.e. AM and PM peak period absolute maximum peak period construction traffic flows. It was established that these flows represent an agreed portion of maximum number of construction vehicles allowed to pass through the network in the peak periods. The use of these flows and the 2016 network data (to represent 2020 design year) has been validated by SCC.

9.4.17 Regarding the absolute maximum peak period HGV traffic flows, SCC stated “The absolute maxima are 30 movements (two-way) in the AM Peak and 40 in the PM Peak.

9.4.18 Therefore, based on the above recommendations the HPC committed development HGV traffic flows for the future year scenario HGV Route 1 (J23) would be:

- AM Peak Period – 9 HGV and 6 LGV arrival trips from M5 Junction 23 to HPC and 5 HGV and 4 LGV departure trips from HPC (total two-way ; and
  PM Peak Period – 6 HGV and 4 LGV arrival trips from M5 Junction 23 to HPC and 11 HGV and 8 LGV departure trips from HPC.

9.4.19 The remainder of the absolute maximum peak traffic would use Junction 24 (HGV Route 1)

9.4.20 For the purposes of this assessment and ensuring a worst case assessment, the total absolute maximum peak period traffic has been applied to both HGV Routes 1 and 2. Therein the combined total remains valid on the construction routes between the Quantock roundabout and the HPC power station. Therefore, the AM and PM peak trip generation for HPC used is:

- AM Peak Period – 13 HGV and 6 LGV arrival trips from M5 Junction 23 to HPC and 7 HGV and 4 LGV departure trips from HPC (30 total two-way); and
  PM Peak Period – 10 HGV and 4 LGV arrival trips from M5 Junction 23 to HPC and 18 HGV and 8 LGV departure trips from HPC (40 total two-way).

9.4.21 **Table 9.3** below details the HPC J23 Park and Ride AM peak trip generation by route.

Table 9.3 HPC J23 Park and Ride AM Peak Trip Generation

Route	AM Peak Arrivals			AM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
North	4	0	4	0	0	**0**
South	8	0	8	1	0	**1**
East	11	0	11	1	0	**1**
Total	**23**	**0**	**23**	**2**	**0**	**2**

9.4.22 **Table 9.4** below details the HPC J23 Park and Ride PM Peak trip generation by route.

Table 9.4 HPC J23 Park and Ride PM Peak Trip Generation

Route	PM Peak Arrivals			PM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
North	0	0	**0**	30	0	**30**
South	0	0	**0**	51	0	**51**
East	0	0	**0**	76	0	**76**
Total	**0**	**0**	**0**	**156**	**0**	**156**

9.4.23 **Table 9.5** below details the HPC J23 Park and Ride AM peak trip generation by route.

Table 9.5 HPC Cannington Park and Ride AM Peak Trip Generation

Route	AM Peak Arrivals			AM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
North	1	0	**1**	0	0	**0**
South	1	0	**1**	0	0	**0**
East	1	0	**1**	0	0	**0**

Route	AM Peak Arrivals			AM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
Total	**3**	**0**	**3**	**0**	**0**	**0**

9.4.24 **Table 9.6** below details the HPC J23 Park and Ride PM Peak trip generation by route.

Table 9.6 HPC Cannington Park and Ride PM Peak Trip Generation

Route	PM Peak Arrivals			PM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
North	0	0	**0**	4	0	**4**
South	0	0	**0**	8	0	**8**
East	0	0	**0**	11	0	**11**
Total	**0**	**0**	**0**	**23**	**0**	**23**

9.4.25 **Table 9.7** below details the AM peak trip generation for the bus services which would serve the HPC J23 Park and Ride, Cannington Park and Ride and the Bridgwater Campuses A and C.

Table 9.7 HPC AM Peak Bus Service Trip Generation for the J23 Park and Ride, Cannington Park and Ride and Accommodation Campuses A and C.

Route	AM Peak Arrivals			AM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
J23 P&R	0	6	**6**	0	6	**6**
Cannington P&R	2	6	**8**	0	6	**6**
Bridgwater Campus A&C	0	6	**6**	0	6	**6**
Total	**2**	**18**	**0**	**18**	**18**	**0**

9.4.26 **Table 9.8** below details the PM peak trip generation for the bus services which would serve the HPC J23 Park and Ride, Cannington Park and Ride and the Bridgwater Campuses A and C.

Table 9.8 HPC PM Peak Bus Service Trip Generation for the J23 Park and Ride, Cannington Park and Ride and Accommodation Campuses A and C.

Route	PM Peak Arrivals			PM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
J23 P&R	0	16	**16**	0	16	**16**
Cannington P&R	2	12	**14**	0	12	**12**
Bridgwater Campus A&C	0	12	**12**	0	12	**12**
Total	**2**	**40**	**0**	**40**	**40**	**0**

9.4.27 The vehicles associated with the J23 Park and Ride, the Cannington Park and Ride and the Bridgwater A and C campuses have been routed in accordance with the routeing plans contained within the EDF ES, Annex 7 TA (Ref: TA.10), these being:

- J23 Park and Ride – J23 Park and Ride Bus Route 2013 and 2016 (Drawing A059108-35-18-017);
- Cannington Park and Ride – Cannington Park and Ride Route 2013 and 2016 (Drawing A059108-35-18-006); and
- Bridgwater A and C Campuses.

Huntspill Energy Park (HEP) Royal Ordnance Factory

9.4.28 The HEP site is located at the site of the former Royal Ordnance Factory which approximately 5km north of Bridgwater, to the north of the A39 Puriton Hill. The HEP development (Document Reference: PBA, Huntspill Energy Park, TA (April 2013) would provide employment and energy land uses with associated infrastructure which would include:

- 32,250m^2 of B1a, b or c (employment);
- 43,600m^2 of B2 (employment);
- 99,462m^2 of B8 (employment);
- 50MW Biomass Plant (energy)(detailed on Masterplan);
- 50MW Energy from Waste (EfW)(energy)(detailed on Masterplan);
- plot J – 800MW Combined Cycle Gas Turbine (CCGT) (energy)(detailed on Masterplan); and
  plot K - 50MW Gas Peaking Plant (energy) (detailed on Masterplan).

9.4.29 As part of the outline application, the HEP development would also provide the following infrastructure: Public open space; land safeguarded for the re-instatement of a rail freight terminal; footpaths; cycle routes; landscaping and drainage; and associated works.

9.4.30 Detailed within the outline planning applications, the separate detailed applications would be submitted in the near future for: Two rugby pitches, associated changing rooms, car parking and relocation of an existing football pitch; minor alterations to the layout of an existing fishing club; and a new skate park.

9.4.31 The HEP TA details the assessment of seven access options and determines that the preferred access option is Option 2, which is:

> Option 2 – From the A39 south of Puriton, at its junction with Hillside, around the south and east of the village to a proposed new entry into the Energy Park at its south-west corner

9.4.32 There are two distinct predicted operational phases which represent the construction programme for the B1, B2 and B8 land-uses of the HEP development, these being: Phase 1 2018 and Full Development 2033.

HEP Trip Generation

9.4.33 Table 7.8 and 7.9 of the HEP TA details the predicted operational trip generation for the HEP for 2018 and 208 respectively where 2018 represents Phase 1 only and 2028 represents the full development. For the purposes of inclusion within the assessment contained herein, the 2018 trip generation figures would be incorporated into the future year capacity assessments and would use the distribution flows detailed in Table 7.10.

9.4.34 **Table 9.9** below details the HEP AM peak trip generation by route.

Table 9.9 HEP AM Peak Trip Generation

Route	AM Peak Arrivals			AM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
M5 south	127	50	177	69	69	**138**
A39 and A38 south	217	6	223	99	9	**108**
A39 East	80	6	86	25	9	**34**
A38 North	54	0	54	14	0	**14**
M5 North	50	63	113	17	87	**104**
Total	**528**	**125**	**650**	**215**	**173**	**397**

9.4.35 **Table 9.10** below details the HEP PM peak trip generation by route.

Table 9.10 HEP PM Peak Trip Generation

Route	AM Peak Arrivals			PM Peak Departures		
	LGVs	HGVs	Total	LGVs	HGVs	Total
M5 south	67	58	**125**	228	30	**258**
A39 and A38 south	141	7	**148**	243	4	**247**
A39 East	14	7	**21**	65	4	**69**
A38 North	27	0	**27**	27	0	**27**
M5 North	21	73	**94**	40	38	**78**
Total	**270**	**145**	**415**	**215**	**173**	**679**

<u>Locking Parklands – Weston Villages</u>

9.4.36 The site for the proposed Weston Villages mixed use development is located to the north of the A372 and the south of the A370 to the east of Weston-super Mare. The outline application which was supported by a WSP produced TA (Document/Project Reference: 11031025, date: 17/05/2013). The outline application was for a mixed-use development to take place in two phases (Phase 1 and Phase 2) which includes:

- up to 1,200 residential dwellings (excluding 250 dwellings consented under Phase 1 and 2);

- up to 5.5 ha of employment development (B1, B2 and B8)(excluding employment development consented under Phase 1);
- up to 2.1 ha of retail/services café/restaurant/drinking establishment/takeaway/community facility uses (use class B1/2/3/4/5 and D1);
- up to 5.15 ha leisure use (D2) with ancillary uses;
- primary school (approximately 2.4 ha); and
- secondary education (approximately 1.8 ha within site boundary), approximately 32.4 ha of landscaping, open space, necessary infrastructure works (includes elements within Phase 1 and 2) and creation of new access from A371.

Locking Parklands Trip Generation

9.4.37 Section 7 – Development Trips of the Locking Parklands TA calculates the trip rates for residential (50/50 split for private and affordable), B1 and B2, Education (primary school), retail and leisure uses in 2016 and 2026.

9.4.38 **Table 9.11** below details the Locking Parkland AM and PM network peak period trip generation as detailed in Table 4.4 of the Locking Parklands TA.

Table 9.11 Rockingham Park AM and PM Network Peak Period Trip Generation (including HGV's)

Locking Parklands	AM (08:00 – 09:00)			PM (17:00 – 18:00)		
	In	Out	Total	In	Out	Total
2016	351	208	**559**	292	290	**581**
2026	835	641	**1477**	741	799	**1540**

9.4.39 Trip distribution as detailed in the Locking Parklands TA is based on a 60%/40% split between the proposed signalised access and the existing access respectively.

9.4.40 Trip distribution has been extracted from the AM and PM Peak Hour Phase 2 Development at Weston Airfield network diagrams as contained in Appendix I of the Locking Parklands TA.

Winterstoke Park

9.4.41 Winterstoke Park is a mixed use development located at Weston Park Phase 2, Western Super-mare. The site is located by Winterstoke Road to the west of the A371 Locking Moor Road to the east. Winterstoke Park is accessed via the Cross Airfield Link (CAL) road which connects Winterstoke Road and Locking Moor Road. The schedule of development for the outline planning permission included:

- 1,650 residential dwellings (including affordable housing);
- 3.8 ha of employment (B1, B2 and B8); and
- a primary school.

Winterstoke Park Trip Generation

9.4.42 Trip generation and distribution information has been extracted from the PFA produced TA (Dated: August 2013). Section 4 of the Winterstoke Park TA states that part of the previously approved employment development towards the west of the Application Site is to be replaced by part of the new residential development proposed. Consequently, in terms of cumulative trip generation to/from Weston Park as a whole, the new employment development does not constitute new development. Therefore in modelling terms the employment development is already included within the development background traffic generation from the earlier phases of development at Weston Park. In addition to this the Winterstoke Park TA states that the primary school is considered to be an ancillary development and has not been modelled explicitly.

9.4.43 **Table 9.12** below details the Winterstoke Park AM and PM network peak period trip generation as detailed in Table 4.4 of the Winterstoke Park TA.

Table 9.12 Winterstoke Park AM and PM Network Peak Period Trip Generation

Peak Period	Departures	Arrivals	Two-way
AM Peak (08:00 – 09:00)	488	123	611
PM Peak (17:00 – 18:00)	198	462	660

<u>Land at Rockingham Park, Smoke Lane, Avonmouth, Bristol, BC11 0YW</u>

9.4.44 The site is located to the north of Avonmouth within the BCC administrative area and some 10km north west of the centre of Bristol. The residential area of Avonmouth lies approximately 2.9 km south of the site.

9.4.45 The outline application is for an industrial estate scheme with a total floor space of approximately 16,000 m^2 including:

- B1 (b) R&D;
- B1 (c) Light Industry;
- B2 General Industry; and
- B8 Storage or Distribution.

9.4.46 The split of the above uses within the total floor space is not confirmed but is likely to include a high proportion of B8 uses. No B1 (a) office use is proposed.

9.4.47 For the purposes of producing a reasonable assessment of the traffic impact of the potential development mix it is assumed that 60% of the floor space would be B8 use with the balance of 40% comprising B1 and B2 uses. No date for scheme opening and completion of the scheme is available. The scheme is likely to be phased over a three year period. For the purposes of this assessment, it has been assumed that the scheme is fully built out during the assessment year.

9.4.48 The main road access to the site is via the A403. The A403 is the access road to the industrial area of Avonmouth. To the south it links with the A4 Crowley Way at the St Andrew's traffic signal controlled roundabout junction, while to the north it links with the M48 Junction 1 at Aust. Access to the M5 Junction 18 is provided to the east of the St Andrew's junction via the St Brendan's traffic signal controlled roundabout junction. Access to the A4 Portway to central Bristol, as well as the M5, is via the Portway traffic signal controlled roundabout junction to the south of the St Brendan's junction.

9.4.49 The M5 north of Junction 18 provides access to the northern areas of Bristol along with the M4 at the Almondsbury Interchange. At M5 Junction 18A, to the immediate north of Junction 18, access is provided to the M49, which provides access to south Wales. The M5 south of Junction 18 provides access to the south west.

9.4.50 The M48 provides access to Chepstow to the west and to the M4 to the east.

9.4.51 Trip generation and distribution information has been extracted from the KTC produced TA (Dated: December 2011). Section 3 of the KTC produced TA details the trip rates and the predicted trip generation of the development.

9.4.52 **Table 9.13** below details the Rockingham Park AM and PM network peak period trip generation as detailed in Table 3.5 – Total Development Traffic Flows of the KTC produced TA.

Table 9.13 Rockingham Park AM and PM Network Peak Period Trip Generation (including HGV's)

Peak Period	**Arrivals**		**Departures**		**Two-way**	
	Total	HGVs	**Total**	HGVs	**Total**	HGVs
AM Peak (08:00 – 09:00)	**62**	5	**28**	6	**90**	11
PM Peak (17:00 – 18:00)	**17**	3	**47**	3	**64**	6
Total	**79**	**8**	**75**	**9**	**154**	**17**

9.4.53 Trip distribution has been extracted from the AM and PM Peak hour network diagrams as contained in Appendix H1 of the KTC produced TA.

9.4.54 For the purposes of this assessment, where vehicle travel beyond the extent of the network diagram used in the KTC produced TA, traffic would be routed through the LRN under assessment within this assessment and proportioned according to the existing traffic flow, i.e. 2013 observed traffic flows.

Former Rhodia Site (Asda Distribution Centre)

9.4.55 IMA Transport Planning has been commissioned by Bericote Properties Ltd to provide transport and highways advice to support a hybrid (part detailed, part outline) planning application for redevelopment of the Portside site at Avonmouth.

9.4.56 The detailed element of the application seeks permission for:

- B8 floor space totalling 45,007m^2; and
- B2 floor space totalling 12,188m^2.

9.4.57 The outline element of the application seeks permission for B2 or B8 floor space totalling 12,696m2. The site has two extant permissions:

- 09/03511/P (granted on 21st December 2009); and
- Hybrid application for up to 100,000m2 with detailed planning for 11,420m2 B2/B8 use in a single building 09/04076/F (granted on 21st December 2009).

9.4.58 **Table 9.14** below details the Former Rhodia Site (Asda Distribution Centre) AM and PM network peak period trip generation as detailed in Table 3.5 – Total Development Traffic Flows of the TA.

Table 9.14 Former Rhodia Site (Asda Distribution Centre) AM and PM Network Peak Period Trip Generation (including HGVs)

Peak Period	**St Andrews Access (LGVs)**			**Kings West Lane Access (HGVs)**		
	In	**Out**	**Total**	**In**	**Out**	**Total**
AM Peak	109	73	**182**	105	52	**157**
PM Peak	36	51	**87**	27	120	**147**
Total	**145**	**124**	**269**	**132**	**172**	**304**

9.4.59 The trip distribution for the committed development detailed in the IMA TA is based on a historic distribution patter (derived from the adjoining Cabot Park development), where the following core methodology is:

- 70% - 80% of traffic arrives/departs to the south of the network;
- 15% - 25% of traffic arrives/departs to the north of the network; and
- 5% of traffic arrives/departs via Kings Weston Lane.

10 CONSTRUCTION TRAFFIC – PREDICTED TRIP GENERATION AND DISTRIBUTION

10.1 Introduction

10.1.1 This section of the TA discusses the predicted trip generation and distribution of the Proposed Development.

10.1.2 National Grid has provided the predicted traffic generation data for the construction of the Proposed Development for a five year period from 1st January 2016 to 31st December 2020 (based on the existing development programme).

Table 10.1 below shows a list and breakdown of the traffic generation data provided.

Table 10.1 List and Breakdown of Traffic Generation Data Provided

Name/Reference	Timescale	Timescale Format	Vehicle Types
400kv Overhead Line & Cable	2016 - 2020	Daily	Light, Medium and Heavy
Overhead Line Compound	2016 – 2020	Daily	Light, Medium and Heavy
Sandford Substation	2016 – 2018	Weekly	Light, Medium and Heavy
Seabank Substation	2016 – 2019	Weekly	Light and Heavy

10.1.3 The predicted construction traffic categorises the vehicles into low, medium and high which represent light, medium and heavy goods vehicles.

10.1.4 **Table 10.2** below provides the classification of the light, medium and heavy vehicles by type as detailed in the traffic generation data.

Table 10.2 Light, Medium and Heavy Goods Vehicles by Type

Light	Medium	Heavy
Car	Excavator	40 tonne truck
Van	Winch Tractor	Low Loader
4x4 pick-up	Tractor and Trailer	Flat Bed
4x4 transit	7 tonne truck	Truck
Welfare Van		Crane

10.1.5 The raw traffic generation data per bellmouth has been included as **Volume 5.22.2, Appendix 22F** and is shown visually on Network Traffic Flow Diagrams contained within **Volume 5.22.2, Appendix 22E**.

10.1.6 The daily two-way traffic data encompasses all aspects of construction of the Proposed Development.

10.1.7 The distribution of the predicted construction traffic would be from the M5 to each bellmouth and back to the M5. For the purposes of this assessment this fundamentally means that the origin and destination of the construction traffic are the M5 and each bellmouth respectively.

10.1.8 Given the locations of each bellmouth there are some sections of the LRN which would have construction traffic flows from more than one bellmouth between their respective location and the M5, therein, there is a cumulative value of construction traffic along the network which needs to be established in order to conduct a robust capacity assessment.

10.1.9 This has been done by grouping the bellmouths as discussed in detail within section 8. In total 23 construction traffic groups have been identified.

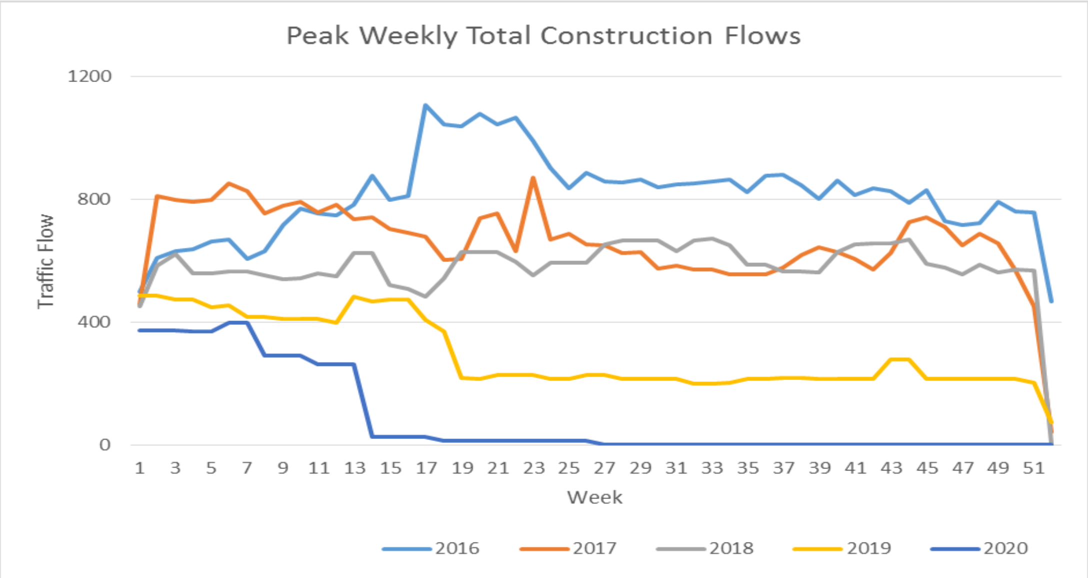
10.1.10 This data has been analysed to establish trip profiles for each bellmouth and an assessment undertaken to establish the cumulative impacts at points on the LRN and SRN where construction traffic flows from more than one bellmouth are predicted.

10.2 Construction Traffic Profiling

10.2.1 The highest vehicle flows are expected to occur for a limited time (approximately six weeks) throughout construction after which they are anticipated to reduce significantly.

10.2.2 **Inset 10.1** below shows the predicted profile of all vehicles across the whole Proposed Development on a week by week basis during construction.

Inset 10.1: Vehicle Profiling



10.3 Peak Cumulative Construction Traffic Generation Profiles per Group

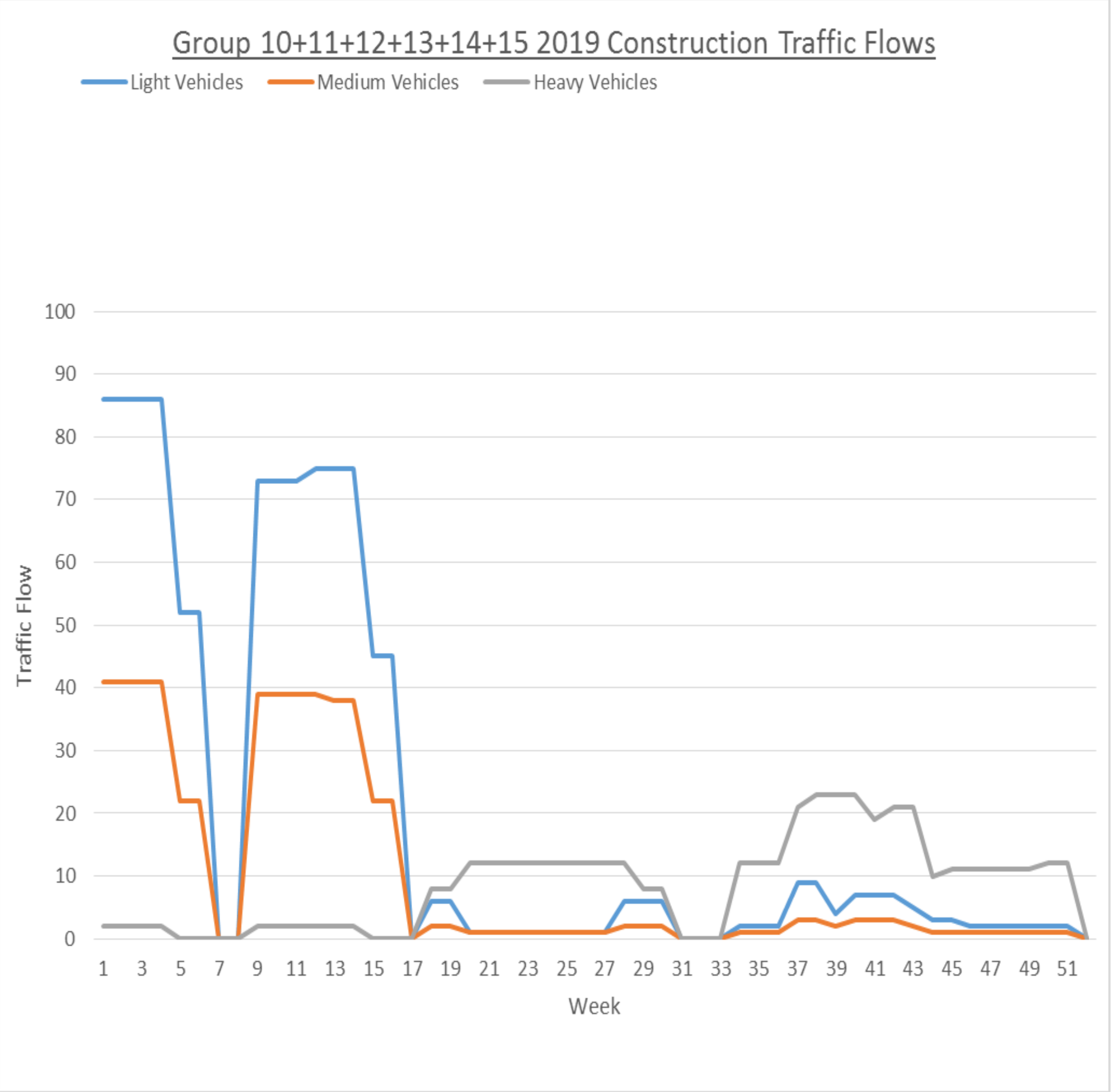
10.3.1 While the above allows the construction traffic to be viewed on a weekly basis across the whole development the raw data supplied by National Grid allows for the daily vehicle profiles to be interrogated per bellmouth or cumulatively by group of bellmouths.

10.3.2 A number of graphs have been included at the rear of this report which show the profiles for all off the 23 groups used within this assessment.

10.3.3 These illustrate the fluctuation in the trips generated for each group and duration of the peaks at each group over each 12 month period from 2016 to 2020. These graphs are included at **Volume 5.22.2, Appendix 22G**.

10.3.4 An example has been included below that shows the combined profile of Groups 10,11,12,13,14 and 15 in the peak generation year of 2019.

Inset 10.2: Example Group Traffic Profile



10.3.5 This analysis has allowed the peak periods of traffic generation by vehicle type to be established separately and combined allowing for the duration of peaks to be established.

10.3.6 The graph included above is typical of the profile of construction traffic in that there are defined peaks for a limited period of time before the anticipated volume of construction traffic reduces significantly.

10.3.7 Using the approach of peak traffic generation year for construction traffic and the highest year (furthest year) ensures that the worst case scenario assessment would be conducted in terms of predicted construction traffic and background traffic.

10.3.8 **Table 10.3** below represents the peak daily two-way traffic generation occurring for groups 1 to 23 and also shows the duration of that peak. It should be noted the daily peak could be occur on single day or multiple days within a week. Where more than one group is indicated this represents a cumulative assessment.

10.3.9 The table shows the peak daily two-way traffic generation per vehicle type, per group. The total peak two-way flows indicated in the table are not necessarily the sum of the peak light, medium and heavy flows indicated but the highest combination of all three vehicle types occurring on the same day. For example, the total peak two-way traffic generation for group 5 is 195 vehicles. This means that highest traffic generation associated with group 5 is 195 vehicles for a single day. This is not the sum of the individual peaks of light, medium and heavy movements (173+22+75) as these peaks do not occur on the same day as one another.

Table 10.3 Combined Grouping Assessment Years Duration of Peak Traffic

Group(s)	Assessment Year	Light		Medium		Heavy		Total		Notes
		Two-way Traffic	Peak Duration (weeks)	Two-way Traffic	Peak Duration (weeks)	Two-way Traffic	Peak Duration (weeks)	Two-way Traffic	Peak Duration (weeks)	
1	2016	128	3	32	4	44	9	204	9	
2	2016	139	1	32	1	42	2	198	1	1
3	2018	66	6	26	6	15	11	92	6	
4	2018	54	7	22	7	0	5	13	7	
5	2018	173	7	22	7	75	13	195	7	
8	2016	12	6	24	3	24	3	48	2	
4,5,8	2018	173	13	38	4	75	13	270	7	
6	2017	159	1	66	11	142	1	245	1	
7	2016	10	1	2	1	9	1	21	1	2
9	2016	22	1	11	1	9	1	33	1	
6,7,9	2018	173	7	22	7	75	13	195	7	
10	2018	43	2	19	2	1	2	62	2	
11	2019	37	4	18	4	12	2	56	4	
12	2017	15	3	5	3	12	1	21	3	3
13	2016	12	7	18	2	57	1	85	1	
14	2017	56	6	22	6	34	5	79	6	
15	2016	13	2	28	2	81	1	99	1	4
10,11,12,13,14,15	2019	86	4	41	4	23	2	129	4	
10,11,12,13	2018	79	1	36	1	7	1	115	1	

Group(s)	Assessment Year	Light		Medium		Heavy		Total		Notes
		Two-way Traffic	Peak Duration (weeks)	Two-way Traffic	Peak Duration (weeks)	Two-way Traffic	Peak Duration (weeks)	Two-way Traffic	Peak Duration (weeks)	
14,15	2016	48	2	23	4	12	9	70	3	
16	2019	45	3	22	3	0	0	67	3	
17	2016	12	12	5	3	16	10	19	13	5
18	2017	22	1	11	1	1	4	33	1	
19	2016	9	3	2	3	7	3	18	3	
16,18	2019	45	3	22	3	8	2	67	3	
20	2017	22	1	11	1	1	7	33	1	
21	2017	22	1	36	5	39	1	67	1	
22	2017	75	51	8	51	3	51	86	51	
23	2018	35	2	14	7	46	1	74	1	6
20,21,22,23	2016	48	2	19	2	29	1	83	1	

10.3.10 **Table 10.3** above shows that the highest peak duration for any single group is 51 weeks for group 22. During this time the bellmouths within that group will generate 86 two-way movements (75 light, 8 medium and 3 heavy) per day.

10.3.11 Groups 2, 7, 12, 15, 17 and 23 which are annotated with notes 1 to 6 respectively as having two peaks within the assessment year. The notes for each of these assessments are:

- Note 1 – Group 2, there are two separate one week peaks of 32 medium vehicle two-way traffic movements in the 2016 assessment year;
- Note 2 – Group 7, there are two separate one week peaks of 10, 9 and 21 light, medium and heavy two-way traffic movements in the 2016 assessment year;
- Note 3 – Group 12, there are two separate one week peaks of 12 two-way traffic movements in the 2017 assessment year;
- Note 4 – Group 15, there are two separate two week peaks of 13 two-way traffic movements in the 2016 assessment year;
- Note 5 – Group 17, there are two separate week peaks of 5 two-way traffic movements in the 2016 assessment year; and
- Note 6 – Group 23, there are two separate week peaks of 7 two-way traffic movements in the 2017 assessment year.

10.4 Contingency

10.4.1 For this TA a 20% growth factor has been applied to all traffic generation figures supplied by National Grid.

10.4.2 The 20% contingency factor represents a variant of the volume of construction traffic which may arise due to the ground conditions which may impact on the laying of the haul road and the construction of the foundations for the pylons. However, National

Grid consider the 20% contingency factor is a generous contingency and in their experience any additional traffic as a result of ground conditions would result in less than 20% additional construction traffic.

10.4.3 The 20% contingency factor has been applied to the predicted construction traffic data which would be used within the all junction capacity assessments, thus ensuring a robust assessment of the potential impacts of the Proposed Development.

10.5 Cumulative Peak Daily Two-way Traffic Flows

10.5.1 Based on the grouping and the routeing of the construction traffic the highest cumulative daily, AM peak and peak two-way traffic flows have been established for each group and for each cumulative assessment. In order to establish the AM and PM peak two-way flows the following assumptions have been made:

- 50% of the light goods vehicles travel in the AM and PM network peak periods; and
- 12.5% of the medium and heavy goods (medium and high) vehicles travel in the AM and PM network peak periods.

10.6 Quarries – Stone and Aggregate Deliveries

10.6.1 As detailed in section 7 of this report the routeing options for stone and aggregate vehicles will be based on the location of suitable quarries and a number of potential quarries have been identified to the east of the site in the Mendip Hills.

10.6.2 National Grid has indicated that up to 20% of aggregates could arrive from the east. **Table 10.4** below shows the anticipated peak hour vehicle movements associated with bringing in aggregates from Mendip quarries (as discussed in section 7.5). The peak year has been identified along with those groups affected.

Table 10.4 Mendip Quarry Peak Period Trip Generation

<table>
<tr><th rowspan="2">Quarry Name</th><th rowspan="2">Route</th><th>Year</th><th>Group</th><th colspan="2">No of Deliveries</th></tr>
<tr><th></th><th></th><th>AM</th><th>PM</th></tr>
<tr><td>Gurney Slade</td><td rowspan="4">Route 1: M5 Junction 23, A39, A38 Bristol Road, A39 The Drove/Western Way/Homberg Way/Quantock Rd/New Rd/Main Rd, A39, High St, Rodway, Withycombe Hill, Wick Moor Drove.
Route 2: M5 Junction 23, A39 Puriton Hill, A39 Bath (East), B3141 Woolavington Hill, B3139 Causeway.</td><td rowspan="4">2018</td><td rowspan="4">1,2</td><td rowspan="4">8</td><td rowspan="4">9</td></tr>
<tr><td>Halecombe</td></tr>
<tr><td>Whately</td></tr>
<tr><td>Torr Works</td></tr>
<tr><td>Callow Rock</td><td rowspan="2">M5 Junction 22, A38 Bristol Road,</td><td rowspan="2">2018</td><td rowspan="2">4,5</td><td rowspan="2">8</td><td rowspan="2">9</td></tr>
<tr><td>Batts Combe</td></tr>
<tr><td>Stancombe</td><td>M5 Junction 21, A370</td><td>2018</td><td>6,7,9</td><td>8</td><td>9</td></tr>
</table>

10.6.3 The above trips would be added to the capacity assessments at the junctions along the construction routes as noted in the above table.

10.7 Key Assumptions and Considerations

10.7.1 Distribution through M5 junctions and any junction we have no distribution for are assumed to be split by two of the following:

- 100% to and from the north;
- 100% to and from the east;
- 100% to and from south; and
- 100% to and from the west.

10.7.2 Medium and High vehicles have been classed together with a Passenger Car Unit (PCU) factor of 2 used for both. This is a unit of measure in transport models.

10.7.3 The total peak and/or cumulative peak traffic generation associated with each group or groups have been passed through all junctions within the appropriate distinct network.

10.8 Staff Trip Generation

10.8.1 As overall assessment of the predicted number of staff has been conducted for the Proposed Development for the following key construction periods:

- overhead lines;
- underground cables; and
- substations.

10.8.2 As detailed in section 4, compound and laydown areas would not provide and private vehicle parking for staff. Staff would be transported from their local accommodation to the construction site by welfare vanes which would be included within Travel Plan as a measure for ensuring the staff travel profile is sustainable.

10.8.3 The predicted trip generation for staff, i.e. welfare vanes have been included within the construction traffic generation data supplied by National Grid and as such are included within the overall capacity assessments for the Proposed Development within the eight established networks.

10.9 Change Requests

10.9.1 As part of the public consultation process a number of change requests have been made over the life of the project. Through discussions with the LPAs a single change request (cr109) has been identified which has resulted in the need for additional construction traffic generation to be included within the capacity assessment, namely Change Request 109 (cr109).

10.9.2 Cr109 resulted in an overhead line alignment change (3/10/13) between C-LD9 and C-LD25 (bellmouth references) at Marks Causeway (now C-LD10 to C-LD18) has resulted in a change to the alignment of the haul road of the connection of the haul road between Marks Causeway and the A38 east of the Rooks Bridge compared with the length pre-change request.

10.9.3 It is therefore considered that the construction of the haul road would require more materials and therefore result in an increase in the number of vehicles used to deliver the materials. In order to account for this increase and to be robust and an additional 20 HGV two way trips have been added to group 4 which would travel between the A38 Rooks Bridge and Marks Causeway during the construction of the haul road. From the A38 the vehicles would travel west to Junction 22 on the M5. Similarly, in order to conduct a robust 4 two-way trips have been added to the trips associated with the quarries as detailed in section 10.6 above.

10.9.4 AM and PM Development construction traffic generation network diagrams for each of the eight networks within the study area are contained in **Volume 5.22.2, Appendix 22E**.

11 JUNCTION ASSESSMENT SCOPE

11.1 Introduction

11.1.1 This section of the report outlines the junction assessment scope which has been agreed throughout the scoping process with the LPAs.

11.2 Junction Capacity Assessment

11.2.1 The 47 junctions discussed above which have been identified for capacity assessment are comprised of priority, and signalised junctions. For the purposes of modelling each junction appropriately, each junction was modelled using industry-standard software packages which are relevant to the particular junction type, these include:

- priority junctions were modelled using PICADY 5/8;
- signal controlled junctions were modelled using LinSig 3.2; and
- roundabouts were modelled using ARCADY 7/8.

11.3 Hours of Assessment

11.3.1 It was agreed with the LPAs and the HA that the local highway network peak periods to be assessed would comprise 08.00-09.00 and 17.00-18.00.

11.4 Assessment Scenarios

11.4.1 Three key scenarios have been tested as part of this assessment. These are:

- existing baseline scenario (2013/2014 as agreed with the LPAs);
- future baseline scenario (based on future peak traffic generations for the development); and
- future baseline + development scenario.

11.4.2 In a number of circumstances baseline traffic flows were collected in 2014. Where this has been the case it has been identified in the existing baseline assessments.

11.5 Interpretation of Model Results

11.5.1 PICADY and ARCADY results refer to the Ratio of Flow to Capacity (RFC) and queue length predicted on each arm of the junction. An RFC of 1.00 indicates that the arm in question is operating at its theoretical capacity, whilst an RFC of 0.85 or less indicates that the arm is operating within its practical capacity.

11.5.2 LinSig results refer to the Degree of Saturation (DoS) and Mean Maximum Queue (MMQ) predicted in each lane of the junction. A DoS of 100% indicates that the lane in question is operating at its theoretical capacity (point of saturation), whilst a DoS of 90% or less indicates that the lane is operating within its practical capacity.

12 HIGHWAY IMPACT

12.1 Introduction

12.1.1 This section of the TA presents the results from the junction capacity assessments undertaken for the 47 junctions identified for analysis in **Table 8.1**.

12.1.2 The capacity assessment methodologies and years of assessment which have been agreed with the LPAs are:

- baseline (observed) – 2013;
- future baseline (observed traffic data plus traffic growth to assessment year with traffic growth, plus committed development); and
- future baseline plus Proposed Development.

12.1.3 Three sensitivity tests have been conducted to assess the potential impacts of:

- local quarries which may provide stone and aggregate from the Mendips;
- Seabank Power Station; and
- A39 Access roundabout junction.

12.1.4 The tables contained within this section provide a summary of the modelling results, full outputs and observed queue data can be found in **Volume 5.22.2, Appendix 22H**.

12.2 Baseline Capacity Assessment Results

<u>Junction 1 – M5 Junction 23</u>

12.2.1 **Table 12.1** provides the 2014 Baseline capacity assessment results for Junction 23 of the M5.

Table 12.1 Junction 1 – M5 Junction 23

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5 S/B Off slip	0.75	2.66	0.39	0.84	3.64	0.44
A39 (east)	1.45	4.79	0.58	0.78	3.27	0.43
M5 N/B off slip	0.57	3.56	0.57	0.66	2.86	0.39
A39 (west)	0.49	2.19	0.49	1.37	3.82	0.57

Capacity

12.2.2 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the M5 Junction 23 junction and that there is significant residual capacity available.

Queues

12.2.3 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. On site queue observations were taken against which the above model has been validated.

<u>Junction 2 – A39/Puriton Hill</u>

12.2.4 **Table 12.2** provides the 2013 Baseline capacity assessment results for the A39/Puriton Hill priority junction.

Table 12.2 Junction 2 - A39/Puriton Hill

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Puriton Hill	A39	0.11	10.57	0.10	0.02	7.99	0.02
A39 (S)	A39 (N) & Puriton Hill	0.01	5.39	0.01	0.01	4.25	0.01

Capacity

12.2.5 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A39/Puriton Hill junction and that there is significant residual capacity available.

Queues

12.2.6 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 3 – Hillside/A39 Puriton Hill</u>

12.2.7 **Table 12.3** provides the 2013 Baseline capacity assessment results for the Hillside/Puriton Hill junction.

Table 12.3 Junction 3 - A39/Puriton Hill

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Southern Arm	A39 & Hillside	0.00	0.00	0.00	0.00	0.00	0.00
A39 (E)	Southern Arm, A39 (W) & Hillside	0.03	6.29	0.03	0.07	7.05	0.06
Hillside	A39 & Southern Arm	0.18	11.38	0.15	0.16	10.23	0.14
A39 (W)	A39 (E), Southern Arm & Hillside	0.01	4.62	0.01	0.00	4.09	0.00

Capacity

12.2.8 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Hillside/A39 Puriton Hill junction and there is significant residual capacity available.

Queues

12.2.9 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 4 – A39 Puriton Hill/Bath Road

12.2.10 **Table 12.4** below provides the 2014 Baseline capacity assessment results for the A39 Puriton Hill/Bath Road junction.

Table 12.4 Junction 4 – A39 Puriton Hill/Bath Road

Item	Lane Description	AM Obs 2013			PM Obs 2013		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	Puriton Hill Ahead	48	5	2	60	7	3
1/2	Puriton Hill Right	75	5	3	71	5	3
2/1	A39 (E) Left	31	2	1	22	2	0
2/2	A39 (E) Ahead	85	12	6	76	9	4
3/1	A39 (S) Right Left	84	11	5	75	9	4

Capacity

12.2.11 The 2014 Baseline capacity assessment results indicate that the A39 Puriton Hill/Bath Road junction currently operates under capacity, however the A39 (E) ahead movement operates a practical capacity with an 85% Degree of Saturation (DoS) being 85% in the AM peak.

Queues

12.2.12 The 2014 Baseline capacity assessment indicates that the highest mean maximum queue (MMQ) at the junction is 12 pcus which is shown on the A39 East in the AM peak. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 5 – A39 Bath Road/Bawdrip Lane

12.2.13 **Table 12.5** below provides the 2013 Baseline capacity assessment results for the A39 Bath Road/Bawdrip Lane junction.

Table 12.5 Junction 5 – A39 Bath Road/Bawdrip Lane

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Bawdrip Lane	A39 (W) & Northern Arm	0.02	8.11	0.02	0.01	7.66	0.01
Bawdrip Lane	A39 (E) & Northern Arm	0.06	16.21	0.06	0.05	16.49	0.05
A39 (E)	Bawdrip Lane, A39 (W) & Northern Arm	0.00	0.00	0.00	0.00	0.00	0.00
Northern Arm	A39 (E), Bawdrip Lane & A39 (W)	0.00	0.00	0.00	0.00	0.00	0.00
A39 (W)	A39 (E), Bawdrip Lane & Northern Arm	0.04	5.42	0.03	0.03	4.01	0.02

Capacity

12.2.14 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A39 Bath Road/Bawdrip Lane junction and there is significant residual capacity available.

Queues

12.2.15 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 6 – A39 Bath Road/Woolavington Hill

12.2.16 **Table 12.6** below provides the 2013 Baseline capacity assessment results for the A39 Bath Road/Woolavington Hill junction.

Table 12.6 Junction 6 – A39 Bath Road/Woolavington Hill

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Woolavington Hill	A39 (W)	0.27	9.01	0.22	0.18	8.40	0.15
Woolavington Hill	A39 (E)	0.93	25.13	0.49	0.83	27.18	0.46
A39 (W)	A39 (E) & Woolavington Hill	0.35	4.38	0.14	1.17	6.00	0.35

Capacity

12.2.17 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A39 Bath Road/Bawdrip lane junction. The highest RFC value at the junction is 0.49 which is shown on the Woolavington Hill to Bath Road movement in the AM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.18 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 7 – Old Mill Road/B3141 Woolavington Hill

12.2.19 **Table 12.7** below provides the 2013 Baseline capacity assessment results for the Old Mill Road/B3141/Woolavington Hill junction.

Table 12.7 Junction 7 - Old Mill Road/B3141 Woolavington Hill

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Old Mill Road	B3141 (N)	0.06	7.11	0.05	0.03	6.59	0.03
Old Mill Road	B3141 (S)	0.21	9.97	0.17	0.19	10.44	0.16
B3141 (N)	B3141 (S) & Old Mill Road	0.03	5.86	0.02	0.12	6.18	0.07

Capacity

12.2.20 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Old Mill Road/B3141 Woolavington Hill junction. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.21 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 8 – Woolavington Hill/Higher Road/Vicarage Road

12.2.22 **Table 12.8** below provides the 2013 Baseline capacity assessment results for the Old Mill Woolavington Hill/Higher Road/Vicarage Road junction.

Table 12.8 Junction 8 – Woolavington Hill/Higher Road/Vicarage Road

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Vicarage Road	B3141 (N), B3141 (S) & Higher Road	0.07	7.94	0.07	0.07	7.79	0.06
B3141 (N)	Vicarage Road, B3141 (S) & Higher Road	0.06	5.86	0.04	0.09	6.52	0.06
Higher Road	B3141 (N), Vicarage Road & B3141 (S)	0.22	9.37	0.18	0.60	12.24	0.38
A3141 (S)	B3141 (N), Vicarage Road & Higher Road	0.01	5.33	0.01	0.03	5.53	0.02

Capacity

12.2.23 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Woolavington Hill/Higher Road/Vicarage Road junction. The highest RFC value at the junction is 0.38 which is shown on the Higher Road to B3141 Woolavington Hill (north) movement in the PM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.24 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 9 – M5 (Junction 22)/A38 Bristol Road/B3140

12.2.25 **Table 12.9** below provides the 2014 Baseline capacity assessment results for the M5 (Junction22)/A38 Bristol Road and the B3140.

Table 12.9 Junction 9 – M5 (Junction 22)/A38 Bristol Road/B3140

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5	1.18	3.70	0.52	3.17	7.60	0.76
A38 Bristol Road south	0.87	4.46	0.44	1.89	9.90	0.65
B3140	5.38	22.23	0.85	1.26	8.26	0.56
A38 Bristol Road north	2.51	6.68	0.71	1.69	4.57	0.62

12.2.26 The 2014 Baseline capacity assessment indicates that the M5 (junction 22)/A38 Bristol Road/B3140 junction is operating within capacity.

Capacity

12.2.27 The 2014 Baseline capacity assessment results indicate that in the AM peak period the B3140 has an RFC values of 0.85 and in the PM peak period the M5 has an RFC value of 0.76.

Queues

12.2.28 The 2014 Baseline capacity assessment indicates that there are significant queues occurring on the B3140 in the AM peak. During the PM peak period the M5 arm shows a queue value of 7 vehicles. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 10 – A38 Bristol Road/Harp Road/Brent Street

12.2.29 **Table 12.10** below provides the 2013 Baseline capacity assessment results for the A38 Bristol Road/Harp Road/Brent Street junction.

Table 12.10 Junction 10 – A38 Bristol Road/Harp Road/Brent Street

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Harp Road	A38 (N), A38 (S) & Brent Street	0.76	14.32	0.43	0.56	13.70	0.36
A38 (N)	Harp Road, A38 (S) & Brent Street	0.00	0.00	0.00	0.00	0.00	0.00
Brent Street	A38 (N) & Harp Road	0.18	12.00	0.15	0.18	13.79	0.15
Brent Street	Harp Road & A38 (S)	0.57	26.58	0.37	0.35	29.23	0.26
A38 (S)	A38 (N), Harp Road & Brent Street	0.17	8.41	0.15	0.43	11.53	0.30

Capacity

12.2.30 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A38 Bristol Road/Harp Road/Brent Street junction. The highest RFC value at the junction is 0.43 which is shown on the Harp Road arm of the junction in the AM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.31 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 11 – A38 Bristol Road/Bridgwater Road</u>

12.2.32 **Table 12.11** below provides the 2014 Baseline capacity assessment results for the A38 Bristol Road/Bridgwater Road junction.

Table 12.11 Junction 11 – A38 Bristol Road/Bridgwater Road

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
A38 Bristol Road north	0.65	3.15	0.37	0.58	2.94	0.36
A38 Bristol Road south	0.85	2.48	0.44	0.29	1.67	0.22
Bridgewater Road	0.66	3.72	0.39	0.53	2.76	0.34

Capacity

12.2.33 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the A38 Bristol Road/Harp Road/Brent Street junction. The highest RFC value at the junction is 0.48 which is shown on the Harp Road arm of the junction in the PM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.34 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 12 – A38 Bristol Road/Rooksbridge Road

12.2.35 **Table 12.12** below provides the 2014 Baseline capacity assessment results for the A38 Bristol Road/Rooksbridge Road junction.

Table 12.12 Junction 12 – A38 Bristol Road/Bridgwater Road

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Pill Road	0.02	9.91	0.02	0.02	9.69	0.02
A38 Bristol Road east	1.01	5.04	0.29	0.38	4.76	0.14
Rooksbridge Road	0.22	10.32	0.18	0.27	10.44	0.21
A38 Bristol Road west	0.02	4.37	0.01	0.01	4.22	0.01

Capacity

12.2.36 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the A38 Bristol Road/Rooksbridge Road junction that there is significant residual capacity available. The highest RFC value predicted at the junction is 0.29 on the A38 Bristol Road east during the AM peak period.

Queues

12.2.37 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 13 – Dunball Roundabout (Existing Layout)

12.2.38 **Table 12.13** below provides the 2013 Baseline capacity assessment results for the Dunball Roundabout junction.

Table 12.13 Junction 13 – Dunball Roundabout

Arm	AM Dev 2013			PM Dev 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A39	0.17	2.57	0.13	0.14	2.31	0.10
A39 Bristol Road south	0.71	2.57	0.40	1.59	3.75	0.61
Industrial Estate	0.00	0.00	0.00	0.00	0.00	0.00
A39 Bristol Road north	5.10	12.77	0.83	1.38	4.99	0.57

Capacity

12.2.39 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Dunball Roundabout junction that there is significant residual capacity available. The highest RFC value predicted at the junction is 0.83 on the A39 Bristol Road North during the AM peak period.

Queues

12.2.40 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 14 – Bristol Road/The Drove (Existing Layout)

12.2.41 **Table 12.14** below provides the 2013 Baseline capacity assessment results for the Bristol Road/The Drove junction.

Table 12.14 Junction 14 – Bristol Road/The Drove

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1+1/2	A38 Ahead Right	51 : 51	7	3	50 : 55	6	3
2/1	Bristol Road Left Ahead	60	12	3	66	14	4
3/1+3/2	The Drove Right Left	58 : 58	5	4	65 : 62	8	5
J2: Union Street							
4/1	Union Street Left	5	0	0	4	0	0
6/1	A38 (S) Ahead Right	36	0	0	40	0	0

Capacity

12.2.42 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Bristol Road/The Drove junction that there is significant residual capacity available. The highest DoS value predicted at the junction is 66% on Bristol Road Left Ahead during the PM peak period.

Queues

12.2.43 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 15 – Bristol Road/Wylds Road (Existing Layout)

12.2.44 **Table 12.15** below provides the 2013 Baseline capacity assessment results for the Bristol Road/Wylds Road junction.

Table 12.15 Junction 15 – Bristol Road/Wylds Road

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Wylds Road	29.39	185.53	1.07	9.91	92.65	0.95
A38 Bristol Road	5.13	38.69	0.86	1.28	16.47	0.56

Capacity

12.2.45 The 2013 Baseline capacity assessment results indicate the Bristol Road/Wylds Road junction is operating over capacity. The highest RFC value predicted at the junction is 1.07 on Wylds Road during the AM peak period.

Queues

12.2.46 The 2013 Baseline capacity assessment indicates a maximum queue of 30 vehicles on Wylds Road. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 16 – Wylds Road/The Drove (Existing Layout)

12.2.47 **Table 12.16** below provides the 2013 Baseline capacity assessment results for the Wylds Road/The Drove junction.

Table 12.16 Junction 14 – Wylds Road/The Drove

Item	Lane Description	AM Obs 2013			PM Obs 2013		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1+1/2	Wylds Road Left Ahead Right	79.8 : 79.8	11	6.8	83.5 : 83.5	8	6.1
2/1	The Drove Left Ahead Right	38.0	6	1.9	48.6	9	2.7
3/1+3/2	E Quay Right Left Ahead	55.1 : 55.1	7	3.0	87.9 : 87.9	16	8.1
4/1	Western Way Ahead Right Left	82.3 : 82.3	19	7.2	90.8 : 90.8	23	10.7

Capacity

12.2.48 The 2013 Baseline capacity assessment results indicate that Bristol Road/The Drove junction is operating above the practical level of DoS. The highest DoS value predicted at the junction is 90.8% on Western Way Ahead Right Left during the PM peak period.

Queues

12.2.49 The 2013 Baseline capacity assessment indicates a maximum queue of 23 PCUs on Western Way Ahead Right Left.

Junction 17 – Quantock Road/Hombery Way

12.2.50 **Table 12.17** below provides the 2014 Baseline capacity assessment results for the Quantock Road/Hombery Way junction.

Table 12.17 Junction 17 – Quantock Road/Hombery Way

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Quantock Road	0.77	4.55	0.43	1.13	5.42	0.53
A39	0.80	3.76	0.43	0.72	3.64	0.42
Quantock Meadow	0.04	5.27	0.04	0.02	5.25	0.02
Homeberg Way	0.83	4.07	0.44	0.55	3.28	0.35

Capacity

12.2.51 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the Quantock Road/Hombery Way junction that there is significant residual capacity available. The highest RFC value predicted at the junction is 0.53 on Quantock Road during the PM peak period.

Queues

12.2.52 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 18 – A39/Main Road

12.2.53 **Table 12.18** below provides the 2013 Baseline capacity assessment results for the A39/Main Road junction.

Table 12.18 Junction 18 – A39/Main Road

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Main Road south	0.61	3.12	0.36	0.66	3.13	0.39
A39	0.31	3.06	0.22	0.22	2.75	0.17
Main Road north	1.16	9.27	0.53	1.40	9.60	0.58

Capacity

12.2.54 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A39/Main Road junction that there is significant residual capacity available. The highest RFC value is 0.58 on Main Road north during the PM peak period.

Queues

12.2.55 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. The maximum queue comprises only a single vehicle. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 19 – A39/High Street

12.2.56 **Table 12.19** below provides the 2013 Baseline capacity assessment results for the A39/High Street junction.

Table 12.19 Junction 19 – A39/High Street

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
High Street	0.08	2.90	0.07	0.06	2.51	0.05
A39 south	0.22	3.04	0.16	0.27	2.93	0.21
A39 west	0.30	2.58	0.22	0.20	2.28	0.16

Capacity

12.2.57 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A39/High Street junction that there is significant residual capacity available. The highest RFC value is 0.22 on the A39 west during the AM peak period.

Queues

12.2.58 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with no queues on any arms of the junction throughout both peak periods. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 20 – High Street/Fore Street/Rodway

12.2.59 **Table 12.20** and **Table 12.21** below provide the 2013 Baseline capacity assessment results for the High Street/Fore Street/Rodway, east and west respectively.

Table 12.20 High Street/Fore Street/Rodway (east)

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Rodway	High Street	0.79	10.38	0.43	1.78	15.41	0.64
Fore Street	Rodway	1.35	12.39	0.55	0.68	8.44	0.38

Table 12.21 High Street/Fore Street/Rodway (west)

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
High Street	Rodway south	0.10	7.55	0.09	0.00	0.00	0.00
Rodway north	High Street	0.23	6.09	0.12	0.39	5.50	0.17

Capacity

12.2.60 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the High Street/Fore Street/Rodway junctions. The highest RFC value recorded at High Street/Fore Street/Rodway is 0.64 during the PM peak period.

Queues

12.2.61 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 2 vehicles on Rodway during the PM peak. A validation exercise has been undertaken from queue data recorded at the junctions.

<u>Junction 21 – M5 Junction 21</u>

12.2.62 At the time of assessment and upgrade scheme was being implemented at Junction 21 of the M5 corridor so it was not possible to undertake a traffic count in this location.

12.2.63 This junction has however been modelled for the future year assessments based on the upgraded layout using data supplied by the LPA.

<u>Junction 22 – A370/Cowslip Lane</u>

12.2.64 **Table 12.22** below provides the 2013 Baseline capacity assessment results for the A370/Cowslip Lane.

Table 12.22 Junction 22 – A370/Cowslip Lane

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Cowslip Lane	A370 south	0.02	10.27	0.02	0.05	8.01	0.04
Cowslip Lane	A370 north	0.00	0.00	0.00	0.04	16.18	0.04
A370 south	Cowslip Lane	0.03	7.62	0.03	0.02	6.31	0.02

Capacity

12.2.65 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A370/Cowslip Lane. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.66 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 23 – A370/Maysgreen Lane

12.2.67 **Table 12.23** below provides the 2013 Baseline capacity assessment results for the A370/Maysgreen Lane.

Table 12.23 Junction 23 – A370/Maysgreen Lane

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Maysgreen Lane	A370 south	0.00	0.00	0.00	0.00	0.00	0.00
Maysgreen Lane	A370 North	0.00	0.00	0.00	0.00	0.00	0.00
A370 south	Maysgreen Lane	0.00	0.00	0.00	0.01	7.88	0.01

Capacity

12.2.68 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the A370/Maysgreen Lane. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.69 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 24 – M5 Junction 20

12.2.70 **Table 12.24** below provides the 2014 Baseline capacity assessment results for the M5 Junction 20.

Table 12.24 Junction 24 – M5 Junction 20

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5 southbound off slip	0.46	3.13	0.31	1.46	5.56	0.59
M5 northbound off slip	1.17	4.35	0.53	0.99	5.15	0.49
Ettlingen Way	1.40	3.08	0.58	1.02	2.59	0.50

Capacity

12.2.71 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with Junction 20 of the M5. The highest RFC value at the junction is 0.59 which is shown on the M5 southbound off slip during the PM peak period. The capacity assessment results indicate that there is residual capacity available.

Queues

12.2.72 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 25 – M5 Junction 20/Central Way/Northern Way/Moor Lane

12.2.73 **Table 12.25** below provides the 2014 Baseline capacity assessment results for the M5 Junction 20.

Table 12.25 Junction 25 - M5 Junction 20/Central Way/Northern Way/Moor Lane

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
B3133	2.27	5.65	0.69	5.87	12.67	0.86
Central Way	4.16	12.62	0.81	1.65	6.40	0.62
Moor Lane	1.92	13.48	0.66	1.25	8.24	0.56
Northern Way	1.96	7.53	0.66	2.36	8.13	0.70

Capacity

12.2.74 The 2014 Baseline capacity assessment results indicate that the highest RFC value at the junction is 0.86 which is shown on the B3133 arm of the junction during the PM peak period. This is over the desirable practical 0.85 capacity. The results also indicate that the Central Way arm of the junction has a RFC of 0.81 in the AM peak period.

Queues

12.2.75 The 2014 Baseline capacity assessment indicates that the highest number of queuing vehicles is shown on B3133 arm of the junction with a total of six vehicles queuing in the PM peak period. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 26 – Central Way/Kenn Moore Drive

12.2.76 **Table 12.26** below provides the 2013 Baseline capacity assessment results for the Central Way/Kenn Moore Drive.

Table 12.26 Junction 26 – Central Way/Kenn Moore Drive

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Ken Moor Drive	Central Way south	0.06	6.44	0.06	0.03	7.01	0.03
Ken Moor Drive	Central Way north	0.60	13.58	0.38	0.31	13.07	0.24
Central way south	Ken Moor Drive	0.02	7.27	0.01	0.06	8.09	0.05

Capacity

12.2.77 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Central Way/Kenn Moore Drive. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.78 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 27 – Central Way/Tutton Way</u>

12.2.79 **Table 12.27** below provides the 2013 Baseline capacity assessment results for the A370/Maysgreen Lane.

Table 12.27 Junction 27 – Central Way/Tutton Way

Arm		**AM Obs 2013**			**PM Obs 2013**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Tutton Way	Central Way south	0.41	12.15	0.29	0.42	16.69	0.29
Central Way south	Tutton Way	0.11	8.27	0.10	0.15	9.64	0.13

Capacity

12.2.80 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Central Way/Kenn Moore Drive. The highest RFC value at the junction is 0.29 which is shown on the Tutton Way arm of the junction in both the AM and PM peak periods. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.81 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 28 – Central Way/B3133/Southern Way</u>

12.2.82 **Table 12.28** below provides the 2014 Baseline capacity assessment results for the Central Way/B3133/Southern Way.

Table 12.28 Junction 28 – Central Way/B3133/Southern Way

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Central Way	1.68	7.47	0.62	4.69	16.74	0.83
B3133 south	0.91	4.95	0.47	2.11	9.24	0.68
Southern Way	2.72	10.69	0.73	1.47	7.95	0.60
B3133 north	8.43	43.14	0.91	3.11	17.26	0.76

Capacity

12.2.83 The 2014 Baseline capacity assessment results indicate that the B3133 (north) has an RFC value of 0.91 during the AM peak period. This is over the practical capacity of 0.85.

Queues

12.2.84 The 2014 Baseline capacity assessment indicates that the highest queues are 7 vehicles on Central Way and the B3133 (north) in the PM peak period. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 29 – B3133/Tutton Way</u>

12.2.85 **Table 12.29** below provides the 2013 Baseline capacity assessment results for the B3133/Tutton Way.

Table 12.29 Junction 29 – B3133/Tutton Way

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Tutton Way	B3133 south	0.07	8.65	0.06	0.09	8.31	0.09
Tutton Way	B3133 north	0.20	16.98	0.17	0.22	22.40	0.18
B3133 south	Tutton Way	0.11	4.55	0.06	0.62	4.27	0.19

Capacity

12.2.86 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the B3133/Tutton Way junction. The highest RFC value at the junction is 0.19 which is shown on the B3133 South arm of the junction in the PM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.87 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 30 – B3133/Davis Lane

12.2.88 **Table 12.30** below provides the 2013 Baseline capacity assessment results for the B3133/Davis Way junction.

Table 12.30 Junction 30 – B3133/Davis Lane

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Davis Lane	B3133 south	0.07	8.13	0.07	0.04	9.15	0.04
Davis Lane	B3133 north	0.21	17.33	0.17	0.52	25.45	0.35
B3133 south	Davis Lane	0.15	4.54	0.08	0.37	4.21	0.14

Capacity

12.2.89 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the B3133/Davis Way junction. The highest RFC value at the junction is 0.35 which is shown on the Davis Lane arm of the junction during the PM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.2.90 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 31 – Northern Way/B3130 Tickenham Road

12.2.91 **Table 12.31** below provides the 2014 Baseline capacity assessment results for the Northern Way/B3130 Tickenham Road junction.

Table 12.31 Junction 31 – Northern Way/B3130 Tickenham Road

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Tickenham Road east	2.36	10.85	0.70	3.21	13.17	0.77
Northern Way	8.36	27.15	0.90	2.01	8.29	0.67
Tickenham Road west	5.77	25.63	0.86	2.21	11.27	0.69

Capacity

12.2.92 The 2014 Baseline capacity assessment results indicate both Northern Way and Tickenham Road west are operating with an RFC over the 0.85 desirable capacity value during the AM peak period.

Queues

12.2.93 The 2014 Baseline capacity assessment indicates that there is a highest queue of 4 vehicles in the AM peak on Northern Way and Tickenham Road west. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 32 – B3128/Clevedon Road

12.2.94 **Table 12.32** below provides the 2014 Baseline capacity assessment results for the B3128/Clevedon Road.

Table 12.32 Junction 32 – B3128/Clevedon Road

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
B3128	Clevedon Road east	0.71	17.26	0.42	1.15	31.92	0.55
B3128	Clevedon Road west	2.26	41.25	0.70	4.80	58.93	0.85
Clevedon Road east	B3128	3.05	18.38	0.68	1.09	8.01	0.41

Capacity

12.2.95 The 2014 Baseline capacity assessment results indicates that in the PM peak period the B3128 (to Clevedon Road west) is operating at practical capacity with an RFC value of 0.85, whilst Clevedon Road operates with a highest RFC of 0.67 in the AM peak period. The junction is therefore operating sufficiently

Queues

12.2.96 The 2014 Baseline capacity assessment indicates that in the PM peak period when the B3128 operates with a RFC of 0.96 the maximum predicted queue length is 10 vehicles on the movement to Clevedon Road (west). A validation exercise has been undertaken from queue data recorded at the junction.

Junction 33 – M5 Junction 19

12.2.97 **Table 12.33** below provides the 2014 Baseline capacity assessment results for the M5 Junction 19.

Table 12.33 Junction 33 – M5 Junction 19

Item	Lane Description (Controller 1)	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHer)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 N/B Off-slip Left	48%	4	2	31%	2	1
1/2	M5 N/B Off-slip Left Ahead	48%	4	2	31%	2	1
1/3	M5 N/B Off-slip Ahead	42%	7	2	45%	8	2
2/1	The Portbury Hundred Left Ahead	68%	12	4	32%	4	2
2/2	The Portbury Hundred Ahead	69%	13	5	33%	5	2
2/3	The Portbury Hundred Ahead	54%	9	3	54%	9	3
3/1	Royal Portbury Dock Road Left Ahead	64%	3	1	86%	6	3
3/2	Royal Portbury Dock Road Ahead	18%	1	0	48%	2	1
7/1	South Circ Ahead	31%	1	0	21%	1	0
7/2	South Circ Ahead Right	71%	18	3	74%	22	2
7/3	South Circ Right	46%	4	1	30%	3	1

Item	Lane Description (Controller 1)	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHer)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
8/1	West Circ Ahead Right	74%	16	4	23%	3	1
8/2	West Circ Right	75%	9	3	55%	4	2
8/3	West Circ Right	37%	1	1	41%	1	1
Item	**Lane Description (Controller 2)**	**AM Base 2014**			**PM Base 2014**		
		DoS (%)	**MMQ (pcu)**	**Delay (pcuHr)**	**DoS (%)**	**MMQ (pcu)**	**Delay (pcuHr)**
1/1	North Circ Left	18%	3	1	17%	3	1
1/2	North Circ Ahead	85%	19	6	89%	23	9
1/3	North Circ Right	14%	1	1	29%	3	1
2/1	M5 S/B Off-slip U-Turn	7%	0	0	4%	0	0
2/2	M5 S/B Off-slip Ahead Left	86%	22	8	91%	25	10
2/3	M5 S/B Off-slip Ahead	57%	11	3	82%	20	7
3/1	East Circ Ahead	56%	8	2	48%	7	2
3/2	East Circ Right	64%	14	2	69%	2	1
3/3	East Circ Right	10%	1	0	7%	1	0
5/1	Service Station Exit Left	18%	1	0	20%	1	0
5/2	Service Station Exit Ahead	71%	4	2	76%	6	2
7/1	Martcombe Road Left	58%	11	3	64%	10	4
7/2	Martcombe Road Ahead	46%	8	2	48%	7	3
7/3	Martcombe Road Ahead	58%	11	3	53%	8	3

Capacity

12.2.98 The 2014 future baseline capacity assessment results indicate that Junction 19 of the M5 is forecast to operate close to capacity during the PM peak period. The maximum DoS value is 91% for the M5 southbound off slip ahead and left movement during the PM peak period.

Queues

12.2.99 The 2014 future baseline capacity assessment results indicate that Junction 19 of the M5 is forecast to experience a maximum queue of 25 vehicles for the southbound off slip during the PM peak period. A review of the existing layout confirms that this queue, and all other forecast queues on the M5 slip roads could be accommodated without blocking back onto the M5 corridor.

Junction 34 – Royal Portbury Dock Road/Gordano Way/Portbury Way

12.2.100 **Table 12.34** below provides the 2013 Baseline capacity assessment results for the Royal Portbury Dock Road/Gordano Way/Portbury Way junction.

Table 12.34 Royal Portbury Dock Road/Gordano Way/Portbury Way

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Gordano Way	0.10	2.62	0.08	0.18	2.75	0.14
Royal Portbury Dock Road south	0.41	2.45	0.26	0.14	2.34	0.09

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Bradley Road	0.15	4.18	0.09	0.06	2.50	0.05
Portbury Way	0.04	2.93	0.03	0.06	2.13	0.05
Royal Portbury Dock Road north	0.12	4.07	0.07	0.18	3.02	0.13

Capacity

12.2.101 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Royal Portbury Dock Road/Gordano Way/Portbury Way junction that there is significant residual capacity available. The maximum RFC value is 0.26 on Royal Portbury Dock Road south during the AM peak.

Queues

12.2.102 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with very limited queuing on all arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 35 – The Portbury Hundred/Station Road</u>

12.2.103 **Table 12.35** below provides the 2013 Baseline capacity assessment results for the Portbury Hundred/Station Road junction.

Table 12.35 The Portbury Hundred/Station Road

Arm		AM Obs 2013			PM Obs 2013		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Station Road	The Portbury Hundred (E)	0.20	14.15	0.15	0.07	9.73	0.05
Station Road	The Portbury Hundred (W)	0.00	0.00	0.00	0.00	0.00	0.00
The Portbury Hundred (E)	The Portbury Hundred (W) & Station Road	0.10	14.76	0.08	0.13	9.98	0.11

Capacity

12.2.104 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Portbury Hundred/Station Road junction that there is significant residual capacity available. The maximum RFC value is 0.15 on Station Road during the AM peak.

Queues

12.2.105 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with no queues recorded. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 38 – Severn Road/Chittening Road

12.2.106 **Table 12.36** below provides the 2013 Baseline capacity assessment results for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction.

Table 12.36 Severn Road/Chittening Road

Arm		AM Obs 2013			PM Obs 2013		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Severn Road east	Chittening Road	0.17	8.30	0.12	0.06	6.73	0.05
Severn Road east	Severn Road north	0.36	12.06	0.24	0.23	10.38	0.18
Chittening Road	Severn Road east	0.21	11.28	0.14	0.36	9.37	0.25

Capacity

12.2.107 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Severn Road/Chittening Road junction and that there is significant residual capacity available. The highest RFC value recorded is 0.25 on Chittening Road during the PM peak period.

Queues

12.2.108 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction, with very limited queuing on all arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 39 – A403 Smoke Lane/Poplar Way West

12.2.109 **Table 12.37** below provides the 2013 baseline capacity assessment results for the A403 Smoke Lane/Poplar Way West junction.

Table 12.37 A403 Smoke Lane/Poplar Way West

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Poplar Way west	0.19	4.28	0.13	0.20	3.68	0.16
A403 Smoke Lane south	0.61	3.81	0.34	0.67	3.95	0.37
A403 Smoke Lane north	0.89	4.98	0.44	0.58	4.07	0.34

Capacity

12.2.110 The 2013 baseline capacity assessment results indicate that there are no capacity issues associated with the A403 Smoke Lane/Poplar Way West junction and that there is significant residual capacity available. The highest RFC value recorded is 0.44 on the A403 Smoke Lane north during the AM peak period.

Queues

12.2.111 The 2013 baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction, with minimal queues on all arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 40 – Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue

12.2.112 **Table 12.38** below provides the 2013 Baseline capacity assessment results for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction.

Table 12.38 Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue

Arm	AM Obs 2013			PM Obs 2013		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Poplar way east	0.12	3.44	0.08	0.22	3.09	0.17
Merebank Road	0.27	2.64	0.20	0.14	2.70	0.10
Poplar way west	0.12	2.54	0.09	0.12	2.39	0.10
Moorend Farm Avenue	0.04	3.07	0.03	0.09	2.52	0.07
Poplar way east	0.12	3.44	0.08	0.22	3.09	0.17

Capacity

12.2.113 The 2013 Baseline capacity assessment results indicate that there are no capacity issues associated with the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction and that there is significant residual capacity available. The highest RFC value recorded is 0.20 on Merebank Road during the AM peak period.

Queues

12.2.114 The 2013 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 41 – A403 St. Andrew's Road/Kings Weston Lane

12.2.115 **Table 12.39** below provides the 2014 Baseline capacity assessment results for the A403 St. Andrew's Road/Kings Weston Lane junction.

Table 12.39 A403 St. Andrew's Road/Kings Weston Lane

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	67%	12	4	71%	13	5
2/1	Kings Weston Lane Left Right	66%	6	3	69%	9	4
3/1	St Andrews Road (S) Ahead	54%	10	2	38%	6	2

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
3/2	St Andrews Road (S) Right	66%	8	4	66%	5	3

Capacity

12.2.116 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the A403 St. Andrew's Road/Kings Weston Lane junction. The highest Degree of saturation (DoS) is 71% on St. Andrews Road (N) left ahead during the PM peak period.

Queues

12.2.117 The 2014 Baseline capacity assessment indicates a peak queue of 13 PUCs on St. Andrews Road during the PM peak period. A validation exercise has been undertaken from queue data recorded at the junction.

<u>Junction 42 – A403 St. Andrew's Road/St. George's Industrial Estate</u>

12.2.118 **Table 12.40** below provides the 2014 Baseline capacity assessment results for the A403 St. Andrew's Road/St. George's Industrial Estate junction.

Table 12.40 – A403 St. Andrew's Road/St. George's Industrial Estate

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	68%	19	3	53%	12	2
1/2	St Andrews Road (N) Right	10%	0	0	17%	1	0
2/1	Distribution Centre Left	0%	0	0	0%	0	0
2/2	Distribution Centre Ahead Right	0%	0	0	0%	0	0
3/1	St Andrews Road (S) Left Ahead	45%	10	1	61%	17	2
3/2	St Andrews Road (S) Right	0%	0	0	0%	0	0
4/1	St Georges Industrial Estate Left	18%	1	0	9%	0	0
4/2	St Georges Industrial Estate Ahead Right	28%	1	1	12%	1	0

Capacity

12.2.119 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the A403 St. Andrew's Road/St. George's Industrial Estate junction. The maximum DoS is 61% on St. Andrews Road (S) left and ahead during the PM peak period.

Queues

12.2.120 The 2014 Baseline capacity assessment indicates that a maximum queue of 19 PCUs is predicted on St. Andrews Road (N) Left and Ahead. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 43 – A403 St. Andrew's Road/King Road Avenue/Crowley Way

12.2.121 **Table 12.41** below provides the 2014 Baseline capacity assessment results for the A403 St. Andrew's Road/King Road Avenue/Crowley Way junction.

Table 12.41 A403 St. Andrew's Road/King Road Avenue/Crowley Way

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	A403 St. Andrew's Road Left	30%	4	1	44%	7	2
1/2	A403 St. Andrew's Road Left	31%	5	1	46%	8	2
1/3	A403 St. Andrew's Road Ahead	10%	2	0	6%	1	0
2/1	Crowley Road Left Ahead	18%	2	1	6%	1	0
2/2	Crowley Road Ahead	48%	9	2	24%	4	1
2/3	Crowley Road Ahead	46%	8	2	23%	4	1
3/1	McLaren Road Left Ahead	47%	4	2	46%	3	2
4/1	King Road Avenue Ahead Left	46%	2	1	43%	3	1
4/2	King Road Avenue Ahead	45%	2	1	41%	3	1
8/1	North Circ Ahead	23%	2	1	24%	2	1
8/2	North Circ Right	11%	0	0	14%	0	0
9/1	East Circ Ahead	9%	2	1	13%	2	1
9/2	East Circ Right	8%	1	1	1%	0	0
10/1	South Circ Ahead	13%	2	0	1%	0	0
10/2	South Circ Right	35%	1	1	18%	1	0
10/3	South Circ Right	34%	1	0	17%	1	0
11/1	West Circ Ahead	15%	1	0	6%	0	0
11/2	West Circ Ahead	21%	1	0	14%	1	0
11/3	West Circ Right Ahead	32%	1	0	19%	1	0

Capacity

12.2.122 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the A403 St. Andrew's Road/King Road Avenue/Crowley Way junction with a maximum DoS of 48% on Crowley Way.

Queues

12.2.123 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 9 PCUs associated with the Crowley Way Ahead movement during the AM peak period. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 44 – M5/A4/Avonmouth Way

12.2.124 **Table 12.42** below provides the 2014 Baseline capacity assessment results for the M5/A4/Avonmouth Way roundabout.

Table 12.42 M5/A4/Avonmouth Way

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	Avonmouth Way Left	55%	3	2	64%	9	4
1/2	Avonmouth Way Ahead Left	59%	4	2	66%	10	4
1/3	Avonmouth Way Ahead	39%	2	1	9%	1	0
2/1	M5 Ahead Left	63%	10	4	30%	3	1
2/2	M5 Ahead	63%	10	4	30%	3	1
2/3	M5 Ahead	65%	11	4	34%	4	2
2/4	M5 Ahead	21%	3	1	24%	3	1
3/1	Bristow Broadway Left	19%	2	1	18%	1	1
3/2	Bristow Broadway Ahead Left	21%	2	1	21%	2	1
3/3	Bristow Broadway Ahead	65%	9	4	66%	7	3
4/1	Crowley Road Ahead Left	24%	3	1	63%	7	3
4/2	Crowley Road Ahead	27%	4	1	66%	8	4
4/3	Crowley Road Ahead	26%	4	1	65%	8	4
4/4	Crowley Road Ahead	15%	2	1	32%	4	2
4/5	Crowley Road Ahead	17%	2	1	33%	4	2
5/1	North Circ Ahead	8%	0	0	27%	1	1
5/2	North Circ Ahead	12%	0	0	31%	1	1
5/3	North Circ Ahead	17%	1	0	32%	2	1
5/4	North Circ Right	7%	0	0	13%	0	0
5/5	North Circ Right	7%	0	0	14%	0	0
6/1	East Circ Ahead	11%	3	1	18%	4	1
6/2	East Circ Right Ahead	14%	3	1	24%	4	1
6/3	East Circ Right	7%	0	0	4%	0	0
7/1	Ahead	33%	1	1	10%	0	0
7/2	Ahead	37%	9	1	11%	2	0
7/3	Right Ahead	46%	9	1	17%	3	0
7/4	Right	12%	1	0	9%	1	0
8/1	West Circ Ahead	61%	2	1	17%	0	0
8/2	West Circ Right Ahead	40%	4	1	24%	3	1
8/3	West Circ Right	8%	0	0	6%	0	0
9/1	W/B Exit Ahead	32%	1	0	13%	0	0
9/2	W/B Exit Ahead	35%	1	0	14%	0	0
9/3	W/B Exit Ahead	10%	0	0	9%	0	0

Capacity

12.2.125 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the M5/A4/Avonmouth Way roundabout with a maximum Dos of 66% on both Avonmouth Way Ahead Left and Crowley Way Ahead during the PM peak.

Queues

12.2.126 The 2014 Baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 11 PCUs recorded on the M5 ahead arm during the AM peak. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 45 – A4 Bristol Broadway/Avonmouth Road/Portway/M5

12.2.127 **Table 12.43** below provides the 2014 Baseline capacity assessment results for the A4 Bristol Broadway/Avonmouth Road/Portway/M5 roundabout.

Table 12.43 A4 Bristol Broadway/Avonmouth Road/Portway/M5

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 Left	65	6	3	61	5	2
1/2	M5 Ahead	72	6	3	55	4	2
1/3	M5 Ahead	72	8	3	51	4	2
1/4	M5 Ahead	20	1	1	24	1	1
2/1	B4054 Left	10	1	0	6	0	0
2/2	B4054 Ahead	27	2	1	17	1	1
2/3	B4054 Ahead	62	5	2	50	4	2
3/1	Portway (S) Ahead	44	4	1	18	1	0
3/2	Portway (S) Ahead	34	3	1	44	5	1
3/3	Portway (S) Ahead	34	3	1	44	5	1
3/4	Portway (S) Ahead	19	2	1	20	2	1
4/1	Portway (N) U-Turn Left	37	3	1	69	6	3
4/2	Portway (N) Left	15	1	0	49	4	2
6/1	Ahead	47	1	1	39	1	0
6/2	Ahead	48	1	1	47	0	0
7/1	Ahead	25	4	1	18	3	1
7/2	Ahead	27	1	1	14	1	0
9/1	East Circ Ahead	56	3	1	50	4	1
9/2	East Circ Ahead	68	4	2	70	6	2
9/3	East Circ Right	11	0	0	13	0	0
10/1	South Circ Right	46	4	1	45	2	1
10/2	South Circ Right	62	1	1	62	1	1
11/1	West Circ Ahead	57	4	2	63	4	2
11/2	West Circ Ahead	57	4	2	63	4	2
11/3	West Circ Right	21	1	0	22	1	0
12/1	North Circ Ahead	48	3	1	66	4	2
12/2	North Circ Right	26	1	0	30	1	0
12/3	North Circ Right	18	0	0	46	1	1

Capacity

12.2.128 The 2014 baseline capacity assessment results indicate that there are no capacity issues associated with the M5/A4/Avonmouth Way roundabout with a maximum Dos of 72% on the M5 Ahead during the AM peak.

Queues

12.2.129 The 2014 baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 8 PCUs recorded on the M5 Ahead during the AM peak. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 46 – A4 Portbury/West Town Road

12.2.130 **Table 12.44** below provides the 2014 Baseline capacity assessment results for the A4 Portbury/West Town Road junction.

Table 12.44 A4 Portbury/West Town Road

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/2+1/1	A4 Portway (E) Left Ahead	52 : 52%	8	2	42 : 42%	7	2
1/3	A4 Portway (E) Ahead	49%	8	2	41%	6	1
2/1	W Town Road Left	31%	3	1	56%	5	3
3/1	A4 Potway (W) Ahead	69%	1	1	63%	1	1
3/2	A4 Portway (W) Right	45%	3	2	10%	1	0
3/3	A4 Portway (W) Right	44%	3	2	9%	1	0

Capacity

12.2.131 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the A4 Portbury/West Town Road junction that there is significant residual capacity available. The maximum DoS predicted of 69% on the A4 Portway (W) Ahead movement during the AM peak period.

Queues

12.2.132 The 2014 Baseline capacity assessment indicates a maximum queue of 9 vehicles on the A4 Portway (E) arm of the junction for the Left Ahead movement. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 49 – Clevedon Road/Stock Way North

12.2.133 **Table 12.45** below provides the 2014 Baseline capacity assessment results for the Clevedon Road/Stock Way North junction.

Table 12.45 Junction 49 – Clevedon Road/Stock Way North

Item	Lane Description	AM Obs 2014			PM Obs 2014		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1+1/2	Clevedon Road Left Right	62 : 62%	6	3	57 : 57%	4	3
2/1+2/2	Stock Wat (East) Ahead Right	49 : 49%	5	2	59 : 59%	6	3
3/1	Stock Way (West) Ahead Left	59%	6	3	38%	4	2

Capacity

12.2.134 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the junction between Clevedon Road and Stockway North. The maximum DoS value recorded is 62% on Clevedon Road.

Queues

12.2.135 The 2014 Baseline capacity assessment indicates that there are no issues resulting from queuing on any arm of the junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 50 – Stock Way North/Stock Way South

12.2.136 **Table 12.46** below provides the 2014 Baseline capacity assessment results for the Stock Way North/Stock Way South junction.

Table 12.46 Stock Way North/Stock Way South

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Stock Way North	0.52	7.32	0.33	1.12	9.93	0.53
Stock Way South	0.49	7.51	0.32	0.44	7.93	0.30
Silver Street	0.17	3.26	0.14	0.11	2.92	0.10

Capacity

12.2.137 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the Stock Way North/Stock Way South junction during the peak periods. The maximum RFC value recorded is 0.53 on Stock Way North during the PM peak period.

Queues

12.2.138 The 2014 Baseline capacity assessment indicates a maximum queue of 2 vehicles on Stock Way north during the PM peak period. This indicates that there are no queuing issues associated with the Stock Way North/Stock Way South junction. A validation exercise has been undertaken from queue data recorded at the junction.

Junction 51 – Stock Way South/Mizzymead Road

12.2.139 **Table 12.47** below provides the 2014 Baseline capacity assessment results for the Stock Way South/Mizzymead junction.

Table 12.47 Stock Way South/Mizzymead Road

Arm	AM Obs 2014			PM Obs 2014		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Mizzymead Road North	0.19	4.52	0.16	0.93	7.49	0.48
Mizzymead Road South	1.44	9.69	0.59	0.73	7.19	0.42
Stock Way South	0.56	8.91	0.35	0.56	8.02	0.35

Capacity

12.2.140 The 2014 Baseline capacity assessment results indicate that there are no capacity issues associated with the Stock Way South/Mizzymead Road junction during the peak periods. The maximum RFC value recorded is 0.59 on Mizzymead Road South during the AM peak period.

Queues

12.2.141 The 2014 Baseline capacity assessment indicates a maximum queue of 2 vehicles on Mizzymead Road South during the PM peak period. This indicates that there are no queuing issues associated with the Stock Way South/Mizzymead Road junction. A validation exercise has been undertaken from queue data recorded at the junction.

12.3 Future Baseline Capacity Assessment Results

Junction 1 – M5 Junction 23

12.3.1 **Table 12.48** below provides the 2016 future baseline capacity assessment results for the M5 Junction 23.

Table 12.48 Junction 1 – M5 Junction 23

Item	Lane Description	AM Base 2016			PM Base 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 S/B Off-slip Left	67%	16	5	94%	25	13
1/2	M5 S/B Off-slip Ahead	89%	27	11	69%	14	6
2/1	A39 (E) Left	76%	8	2	82%	14	3
2/2	A39 (E) Ahead	59%	6	1	82%	10	3
2/3	A39 (E) Ahead	82%	15	3	82%	16	3
3/1	M5 N/B Off-slip Left	62%	11	5	36%	7	2
3/2	M5 N/B Off-slip Ahead	79%	17	7	71%	20	6
4/1	A39 (W) Left	56%	13	4	67%	18	5
4/2	A39 (W) Ahead	82%	24	9	90%	34	11
10/1	South Circ (Signals) Ahead	63%	7	2	68%	7	3
10/2	South Circ (Signals) Ahead Right	66%	13	3	65%	15	4
11/1	East Circ (Signals) Ahead	37%	5	1	44%	13	5
11/2	East Circ (Signals) Ahead Right	56%	2	1	87%	9	6
12/1	North Circ Ahead	89%	23	8	95%	28	12
12/2	North Circ Right	24%	5	0	37%	17	3

Capacity

12.3.2 The 2016 future baseline capacity assessment results indicate that the M5 Junction 23 would be close to capacity with a highest DoS of 95% expected on the northern circulatory. This is above the practical capacity of 90% and indicates that this section of the junction would operate insufficiently.

Queues

12.3.3 The 2016 future baseline capacity assessment indicates a maximum queue of 34 PCUs on the A39 (W) ahead. The MMQ on the M5 southbound off slip peaks at 27 PCUs during the AM peak and 25 PCUs during the PM peak period. These queues could be accommodated on the southbound slip road without blocking back onto the M5 corridor. The MMQ on the northbound M5 off slip peaks at 17 PCUs during the AM peak and 20 PCUs during the PM peak. This level of queuing could be accommodated on the M5 northbound off slip without causing blocking on the M5 corridor.

Junction 2 – A39/Puriton Hill

12.3.4 **Table 12.49** below provides the 2016 future baseline capacity assessment results for the A39/Puriton Hill priority junction.

Table 12.49 Junction 2 - A39/Puriton Hill

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Puriton Hill	A39	3.91	346.43	1.00	0.17	59.11	0.15
A39 (S)	A39 (N) & Puriton Hill	0.01	4.62	0.01	0.01	3.60	0.01

Capacity

12.3.5 The 2016 future baseline capacity assessment results indicate that Puriton Hill is projected to reach capacity during the AM peak period with a predicted RFC value of 1.00. Significant residual capacity is anticipated to be available on the A39 during both AM and PM peak periods however.

Queues

12.3.6 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 3 – Hillside/A39 Puriton Hill

12.3.7 **Table 12.50** below provides the 2016 future baseline capacity assessment results for the Hillside/Puriton Hill junction.

Table 12.50 Junction 3 - A39/Puriton Hill

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Southern Arm	A39 & Hillside	0.00	0.00	0.00	0.00	0.00	0.00
A39 (E)	Southern Arm, A39 (W) & Hillside	0.03	6.51	0.03	0.08	8.01	0.07
Hillside	A39 & Southern Arm	0.22	13.14	0.18	0.20	12.77	0.17
A39 (W)	A39 (E), Southern Arm & Hillside	0.01	4.61	0.01	0.00	3.81	0.00

Capacity

12.3.8 The 2016 future baseline capacity assessment results indicate that no capacity issues associated with the Hillside/A39 Puriton Hill junction are anticipated, and that there would be significant residual capacity available.

Queues

12.3.9 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 4 – A39 Puriton Hill/Bath Road

12.3.10 **Table 12.51** below provides the 2016 future baseline capacity assessment results for the A39 Puriton Hill/Bath Road junction.

Table 12.51 Junction 4 – A39 Puriton Hill/Bath Road

Item	Lane Description	AM Base 2016			PM Base 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	Puriton Hill Ahead	50%	6	2	77%	11	4
1/2	Puriton Hill Right	80%	6	4	75%	6	3
2/1	A39 (E) Left	32%	2	1	22%	2	0
2/2	A39 (E) Ahead	92%	17	9	78%	10	4
3/1	A39 (S) Right Left	95%	16	10	81%	11	5

Capacity

12.3.11 The 2016 future baseline capacity assessment results indicate that the A39 Puriton Hill/Bath Road junction is forecast to operate with a highest Degree of Saturation (DoS) of 95% during the AM peak on the A39 (S) Right Left arm of the junction. This is above the practical capacity of 90% DoS.

Queues

12.3.12 The 2016 future baseline capacity assessment indicates that the highest predicted mean maximum queue (MMQ) at the junction is 17 pcus which is shown on the A39 (E) Ahead during the AM peak.

Junction 5 – A39 Bath Road/Bawdrip Lane

12.3.13 **Table 12.52** below provides the 2016 future baseline capacity assessment results for the A39 Bath Road/Bawdrip Lane junction.

Table 12.52 Junction 5 – A39 Bath Road/Bawdrip Lane

Arm		AM Base 2016			PM Base 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Bawdrip Lane	A39 (W) & Northern Arm	0.02	8.80	0.02	0.01	7.92	0.01
Bawdrip Lane	A39 (E) &	0.08	20.11	0.07	0.07	20.83	0.07

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
	Northern Arm						
A39 (E)	Bawdrip Lane, A39 (W) & Northern Arm	0.00	0.00	0.00	0.00	0.00	0.00
Northern Arm	A39 (E), Bawdrip Lane & A39 (W)	0.00	0.00	0.00	0.00	0.00	0.00
A39 (W)	A39 (E), Bawdrip Lane & Northern Arm	0.04	5.34	0.03	0.03	3.74	0.02

Capacity

12.3.14 The 2016 future baseline capacity assessment results indicate that there are no capacity issues anticipated at the A39 Bath Road/Bawdrip lane junction and that significant residual capacity would be available.

Queues

12.3.15 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 6 – A39 Bath Road/Woolavington Hill

12.3.16 **Table 12.53** below provides the 2016 future baseline capacity assessment results for the A39 Bath Road/Woolavington Hill junction.

Table 12.53 Junction 6 – A39 Bath Road/Woolavington Hill

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Woolavington Hill	A39 (W)	0.30	9.82	0.23	0.20	9.40	0.17
Woolavington Hill	A39 (E)	1.35	36.23	0.59	1.20	38.61	0.56
A39 (W)	A39 (E) & Woolavington Hill	0.50	4.20	0.17	1.43	6.43	0.39

Capacity

12.3.17 The 2016 future baseline capacity assessment results indicate that there are no capacity issues forecast at the A39 Bath Road/Bawdrip lane junction. The highest resulting RFC value is 0.59 which is shown on the Woolavington Hill to Bath Road movement during the AM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.18 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 7 – Old Mill Road/B3141 Woolavington Hill

12.3.19 **Table 12.54** below provides the 2016 future baseline capacity assessment results for the Old Mill Road/B3141/Woolavington Hill junction.

Table 12.54 Junction 7 - Old Mill Road/B3141 Woolavington Hill

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Old Mill Road	B3141 (N)	0.06	7.13	0.06	0.03	6.60	0.03
Old Mill Road	B3141 (S)	0.21	10.02	0.18	0.19	10.51	0.16
B3141 (N)	B3141 (S) & Old Mill Road	0.03	5.85	0.02	0.12	6.19	0.08

Capacity

12.3.20 The 2016 future baseline capacity assessment results indicate that no capacity issues are forecast at the Old Mill Road/B3141 Woolavington Hill junction. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.3.21 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 8 – Woolavington Hill/Higher Road/Vicarage Road

12.3.22 **Table 12.55** below provides the 2016 future baseline capacity assessment results for the Old Mill Woolavington Hill/Higher Road/Vicarage Road junction.

Table 12.55 Junction 8 – Woolavington Hill/Higher Road/Vicarage Road

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Vicarage Road	B3141 (N), B3141 (S) & Higher Road	0.07	7.97	0.07	0.07	7.82	0.06
B3141 (N)	Vicarage Road, B3141 (S) & Higher Road	0.07	5.86	0.04	0.10	6.52	0.06
Higher Road	B3141 (N), Vicarage Road & B3141 (S)	0.23	9.46	0.19	0.63	12.57	0.39
A3141 (S)	B3141 (N), Vicarage Road & Higher Road	0.01	5.33	0.01	0.03	5.51	0.02

Capacity

12.3.23 The 2016 future baseline capacity assessment results indicate that there are no capacity issues anticipated at the Woolavington Hill/Higher Road/Vicarage Road junction. The highest RFC value at the junction is 0.39 which is shown on the Higher Road to B3141 (N) movement in the PM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.24 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 9 – M5 (Junction 22)/A38 Bristol Road/B3140

12.3.25 **Table 12.56** below provides the 2016 future baseline capacity assessment results for the M5 (Junction22)/A38 Bristol Road and the B3140.

Table 12.56 Junction 9 – M5 (Junction 22)/A38 Bristol Road/B3140

Arm	AM Base 2016			PM Base 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5	1.38	4.09	0.56	5.00	11.38	0.83
A38 Bristol Road south	1.04	5.08	0.49	3.35	16.76	0.77
B3140	13.93	54.33	0.96	1.81	11.18	0.64
A38 Bristol Road north	3.36	8.49	0.77	2.13	5.41	0.68

Capacity

12.3.26 The 2016 future baseline capacity assessment indicates a maximum RFC value of 0.96 forecast on the B3140 during the AM peak period which is above the practical capacity of 0.85.

Queues

12.3.27 The 2016 future baseline capacity assessment indicates that there are significant queues occurring on the A38 Bristol Road south with a queue of 14 vehicles predicted on the B3140 during the AM peak period. This level of queuing can be accommodated on the B3140. The maximum queue recorded on the M5 is 5 vehicles during the PM peak period. This level of queuing can be accommodated on the M5 off slip without blocking back onto the M5 corridor.

Junction 10 – A38 Bristol Road/Harp Road/Brent Street

12.3.28 **Table 12.57** below provides the 2016 future baseline capacity assessment results for the A38 Bristol Road/Harp Road/Brent Street junction.

Table 12.57 Junction 10 – A38 Bristol Road/Harp Road/Brent Street

Arm		AM Base 2016			PM Base 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Harp Road	A38 (N), A38 (S) & Brent Street	0.91	16.19	0.48	0.69	15.73	0.41
A38 (N)	Harp Road, A38 (S) & Brent Street	0.00	0.00	0.00	0.00	0.00	0.00

Arm		AM Base 2016			PM Base 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Brent Street	A38 (N) & Harp Road	0.24	14.47	0.19	0.26	18.28	0.21
Brent Street	Harp Road & A38 (S)	0.86	38.99	0.47	0.57	47.33	0.37
A38 (S)	A38 (N), Harp Road & Brent Street	0.19	8.90	0.16	0.52	13.04	0.34

Capacity

12.3.29 The 2016 future baseline capacity assessment results indicate that there are no capacity issues forecast for the A38 Bristol Road/Harp Road/Brent Street junction. The highest RFC value forecast at the junction is 0.48 which is shown on the Harp Road arm of the junction during the AM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.30 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

<u>Junction 11 – A38 Bristol Road/Bridgwater Road</u>

12.3.31 **Table 12.58** below provides the 2018 future baseline capacity assessment results for the A38 Bristol Road/Bridgwater Road junction.

Table 12.58 Junction 11 – A38 Bristol Road/Bridgwater Road

Arm	AM Base 2016			PM Base 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A38 Bristol Road north	0.72	3.29	0.40	0.66	3.11	0.39
A38 Bristol Road south	0.95	2.62	0.47	0.76	2.28	0.42
Bridgewater Road	0.75	3.97	0.42	0.80	3.90	0.44

Capacity

12.3.32 The 2018 future baseline capacity assessment results indicate that there are no capacity issues forecast at the A38 Bristol Road/Harp Road/Brent Street junction. The highest RFC value anticipated at the junction is 0.47 which is shown on the A38 Bristol Road south arm of the junction during the AM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.33 The 2018 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 12 – A38 Bristol Road/Rooksbridge Road

12.3.34 **Table 12.59** below provides the 2016 future baseline capacity assessment results for the A38 Bristol Road/Rooksbridge Road junction.

Table 12.59 Junction 11 – A38 Bristol Road/Bridgwater Road

Arm	**AM Base 2016**			**PM Base 2016**		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Pill Road	0.02	10.21	0.02	0.02	10.08	0.02
A38 Bristol Road east	1.18	5.20	0.32	0.47	4.73	0.16
Rooksbridge Road	0.24	10.70	0.19	0.29	10.87	0.23
A38 Bristol Road west	0.02	4.32	0.02	0.01	4.18	0.01

Capacity

12.3.35 The 2016 future baseline capacity assessment results indicate that there are no capacity issues forecast at the A39 Bristol Road/Rooksbridge Road junction. The highest RFC value anticipated at the junction is 0.47 which is shown on the A38 Bristol Road south arm of the junction during the AM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.36 The 2018 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 13 – Dunball Roundabout (Existing Layout)

12.3.37 **Table 12.60** below provides the 2016 future baseline capacity assessment results for the Dunball Roundabout.

Table 12.60 Junction 13 – Dunball Roundabout

Arm	**AM Dev 2016**			**PM Dev 2016**		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
A39	0.32	2.84	0.23	0.40	2.60	0.27
A38 Bristol Road south	1.15	3.19	0.51	2.62	5.31	0.72
Industrial Estate	0.00	0.00	0.00	0.00	0.00	0.00
A38 Bristol Road north	16.28	39.39	0.96	1.88	6.45	0.65

Capacity

12.3.38 The 2016 plus development capacity assessment results indicate that there are capacity issues associated with the Dunball Roundabout junction and that there is minimal practical capacity available. The highest RFC value predicted at the junction is 0.96 on the A38 during the AM peak period.

Queues

The 2016 plus development capacity assessment indicates that highest queue predicted is 17vehicles on both the A38 Bristol Road North during the AM peak period.

Junction 13 – Dunball Roundabout (HPC DCO Layout)

12.3.39 **Table 12.61** below provides the 2016 future baseline capacity assessment results for the Dunball Roundabout (HPC DCO Layout)

Table 12.61 Junction 13 – Dunball Roundabout (HPC DCO Layout)

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A39	0.35	3.03	0.24	0.40	2.63	0.27
A38 Bristol Road south	1.14	3.19	0.51	2.62	5.32	0.72
Industrial Estate	0.00	0.00	0.00	0.00	0.00	0.00
A38 Bristol Road north	16.21	39.23	0.96	1.88	6.45	0.65

Capacity

12.3.40 The 2016 plus development capacity assessment results indicate that there are capacity issues forecast at the Dunball Roundabout junction (HPC DCO Layout). The highest RFC value predicted at the junction is 0.96 on the A38 Bristol Road north during the AM peak period. This is above the practical capacity of 0.85.

Queues

The 2016 plus development capacity assessment indicates that highest queue predicted is 17 vehicles on the A38 Bristol Road north during the AM peak period.

Junction 14 – Bristol Road/The Drove (Existing Layout)

12.3.41 **Table 12.62** below provides the 2016 future baseline capacity assessment results for the Bristol Road/The Drove junction layout.

Table 12.62 Junction 14 – Bristol Road/The Drove

Item	Lane Description	AM Base 2016			PM Base 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
J1: The Drove/Bristol Road Signals							
1/1+1 /2	A38 Ahead Right	65 : 65	9	5	93 : 93	19	12
2/1	Bristol Road Left Ahead	71	15	5	81	19	7
3/1+3 /2	The Drove Right Left	71 : 71	10	6	84 : 89	15	9
	J2: Union Street						
4/1	Union Street Left	5	0	0	4	0	0
6/1	A38 (S) Ahead Right	37	0	0	41	0	0

Capacity

12.3.42 The 2016 future baseline capacity assessment results indicate that there are capacity issues associated with the Bristol Road/The Drove junction. The highest DoS value predicted at the junction is 93% on the A38 Bristol Road during the PM peak period which is above the practical capacity of 90%.

Queues

12.3.43 The 2016 future baseline capacity assessment indicates that highest queue predicted is 19 vehicles on the A38 Bristol Road northbound and southbound arms during the PM peak period.

Junction 14 – Bristol Road/The Drove (HPC DCO Layout)

12.3.44 **Table 12.63** below provides the 2016 future baseline capacity assessment results for the Bristol Road/The Drove (HPC DCO Layout) junction.

Table 12.63 Junction 14 – Bristol Road/The Drove (HPC DCO Layout)

Item	Lane Description	AM Base 2016			PM Base 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
J1: The Drove/Bristol Road Signals							
1/1+1 /2	A38 Ahead Right	62 : 65%	9	5	89 : 89%	17	9
2/1	Bristol Road Left Ahead	71%	15	5	89%	22	9
3/1+3 /2	The Drove Right Left	71 : 71%	10	6	75 : 89%	13	7
	J2: Union Street						
4/1	Union Street Left	5%	0	0	4%	0	0
6/1	A38 (S) Ahead Right	37%	0	0	41%	0	0

Capacity

12.3.45 The 2016 future baseline capacity assessment results indicate that there are capacity issues associated with the Bristol Road/The Drove (HPC DCO Layout junction. The highest DoS value predicted at the junction is 89% on the A38 Bristol Road during the PM peak period which is approaching its practical capacity of 90% DoS.

Queues

12.3.46 The 2016 future baseline capacity assessment indicates that highest queue predicted is 22 vehicles on Bristol Road northbound during the PM peak period.

Junction 15 – Bristol Road/Wylds Road (Existing Layout)

12.3.47 **Table 12.64** below provides the 2016 future baseline capacity assessment results for the existing Bristol Road/Wylds Road junction layout.

Table 12.64 Junction 15 – Bristol Road/Wylds Road

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Wylds Road	Bristol Road north	71.27	521.69	1.28	32.78	269.85	1.14
Bristol Road north	Wylds Road	23.83	339.24	1.50	2.04	25.75	0.68

Capacity

12.3.48 The 2016 future baseline capacity assessment results indicate that the Bristol Road/Wylds Road junction is predicted to operate over capacity during both AM and PM peak periods. The 2016 future baseline capacity assessment results indicate that in the AM peak period Bristol Road north would have a predicted maximum RFC value of 1.50 with Wylds Road predicted to have an RFC value of 1.28.

Queues

12.3.49 The 2016 future baseline capacity assessment indicates that significant queues are predicted to occur on Wylds Road during the AM peak period with a maximum queue of 72 vehicles. The PM peak predicts a maximum queue of 32 vehicles also on Wylds Road.

<u>Junction 15 – Bristol Road/Wylds Road (HPC DCO Layout)</u>

12.3.50 **Table 12.65** below provides the 2016 future baseline capacity assessment results for the M5 Junction 23 roundabout.

Table 12.65 Junction 15 – Bristol Road/Wylds Road (HPC DCO Layout)

Arm		AM Base 2016			PM Base 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Wylds Road	Bristol Road north	50.22	311.82	1.17	18.16	155.13	1.03
Bristol Road north	Wylds Road	8.93	76.93	1.01	1.51	18.90	0.60

Capacity

12.3.51 The 2016 future baseline capacity assessment results indicate that the A38 Bristol Road/Wylds Road junction is predicted to operate over capacity during both AM and PM peak periods. The 2016 future baseline capacity assessment results indicate that in the AM peak period Wylds Road would have a predicted maximum RFC value of 1.17 and during the PM peak a predicted maximum of 1.03. Bristol Road north is predicted to have a maximum RFC value of 1.01 during the AM peak period.

Queues

12.3.52 The 2016 future baseline capacity assessment indicates that significant queues are predicted to occur on Wylds Road during the AM peak period with a maximum queue of 51 vehicles. The PM peak predicts a maximum queue of 19 vehicles.

Junction 16 – Wylds Road/The Drove (Existing Layout)

12.3.53 **Table 12.66** below provides the 2016 future baseline capacity assessment results for the existing Wylds Road/The Drove junction layout.

Table 12.66 Junction 16 – Wylds Road/The Drove

Item	Lane Description	AM Base 2016			PM Base 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1+1 /2	Wylds Road Left Ahead Right	93.5 : 104.5	23	19.0	99.5 : 99.5	17	14.3
2/1	The Drove Left Ahead Right	49.1	9	2.7	73 .1	16	5.1
3/2+3 /1	E Quay Right Left Ahead	66.2 : 66.2	8	3.7	107.4 : 107.4	39	31.4
4/1+4 /2	Western Way	102.9 : 102.9	59	35.2	105.8 : 105.8	69	48.1

Capacity

12.3.54 The 2016 future baseline capacity assessment results indicate that the Wylds Road/The Drove junction is predicted to operate over capacity during both AM and PM peak periods. The 2016 future baseline capacity assessment results indicate a predicted maximum DoS value of 107% during the PM peak on East Quay and a predicted maximum of 105% on Western Way during the PM peak period.

Queues

12.3.55 The 2016 future baseline capacity assessment indicates that significant queues are predicted to occur on Western Way during the PM peak period with a maximum queue of 69 PCUs. The AM peak predicts a maximum queue of 59 PCUs.

Junction 16 – Wylds Road/The Drove (HPC DCO Layout)

12.3.56 **Table 12.67** below provides the 2016 future baseline capacity assessment results for the Wylds Road/The Drove (HPC DCO Layout).

Table 12.67 Junction 16 – Wylds Road/The Drove (HPC DCO Layout)

Item	Lane Description	AM Base 2016			PM Base 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	The Drove Ahead Right Left	55%	10	3	77%	21	6
2/2+2/1	East Quay Left Ahead Right	87 : 87%	10	6	125 : 125%	81	74
3/1	Western Way Left	17%	2	1	19%	3	1
3/2+3/3	Western Way Left Right Ahead	103 : 103%	53	36	125 : 125%	129	114
4/1+4/2	Wylds Road Right Ahead Left	74 : 99%	9	7	85 : 85%	8	6
9/2+9/1	Left Ahead	88 : 88%	27	10	87 : 87%	31	10

Capacity

12.3.57 The 2016 future baseline capacity assessment results indicate that the Wylds Road/The Drove (HPC DCO Layout) junction is predicted to operate over capacity during both AM and PM peak periods. The 2016 future baseline capacity assessment results indicate a predicted maximum DoS value of 103% during the AM peak on Western Way and a predicted maximum of 125% on East Quay and Western Road during the PM peak period.

Queues

12.3.58 The 2016 future baseline capacity assessment indicates that significant queues are predicted to occur on Western Way during the AM peak period with a maximum queue of 53 PCUs. The PM peak predicts a maximum queue of 129 PCUs.

Junction 17 – Quantock Road/Homberg Way

12.3.59 **Table 12.68** below provides the 2016 future baseline capacity assessment results for the Quantock Road/Hombery Way junction.

Table 12.68 Junction 17 – Quantock Road/Hombery Way

Arm	AM Base 2016			PM Base 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Quantock Road	0.93	5.14	0.47	1.55	6.75	0.60
A39	1.00	4.24	0.48	1.21	4.85	0.53
Quantock Meadow	0.05	5.68	0.04	0.03	6.26	0.03
Homeberg Way	1.04	4.67	0.50	0.72	3.84	0.41

Capacity

The 2016 future baseline capacity assessment results indicate that there are no capacity issues forecast for the Quantock Road/Hombery Way junction. The highest RFC value predicted at the junction is 0.60 on Quantock Road during the PM peak period.

Queues

12.3.60 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 18 – A39/Main Road

12.3.61 **Table 12.69** below provides the 2016 future baseline capacity assessment results for the A39/Main Road junction.

Table 12.69 Junction 18 – A39/Main Road

Arm	AM Base 2016			PM Base 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Main Road south	0.77	3.51	0.41	0.93	3.76	0.46
A39	0.41	3.46	0.27	0.46	3.65	0.28
Main Road north	1.34	10.52	0.57	2.00	13.52	0.67

Capacity

12.3.62 The 2016 future baseline capacity assessment results indicate that no capacity issues are forecast for the A39/Main Road junction. The highest RFC value predicted is 0.67 on Main Road north during the PM peak period.

Queues

12.3.63 The 2016 future baseline capacity assessment indicates that there are no issues forecast as a result of queuing on any arms of the junction. The maximum queue comprises two vehicles.

Junction 19 – A39/High Street

12.3.64 **Table 12.70** below provides the 2016 future baseline capacity assessment results for the A39/High Street junction.

Table 12.70 Junction 19 – A39/High Street

Arm	AM Base 2016			PM Base 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
High Street	0.16	3.54	0.11	0.24	3.83	0.14
A39 south	0.32	3.53	0.21	0.47	3.69	0.29
A39 west	0.31	2.68	0.23	0.21	2.41	0.17

Capacity

12.3.65 The 2016 future baseline capacity assessment results indicate that there are no capacity issues forecast for with the A39/High Street junction and that significant residual capacity would be available. The highest RFC value forecast is 0.29 on the A39 south during the PM peak period.

Queues

12.3.66 The 2016 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with minor queues on all arms of the junction throughout both peak periods.

<u>Junction 20 – High Street/Fore Street/Rodway</u>

12.3.67 **Table 12.71** and **Table 12.72** below provides the 2016 future baseline capacity assessment results for the High Street/Fore Street/Rodway, east and west respectively.

Table 12.71 High Street/Fore Street/Rodway (east)

Arm		**AM Base 2016**			**PM Base 2016**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Rodway	High Street	0.85	10.92	0.45	2.06	17.35	0.67
Fore Street	Rodway	1.62	14.26	0.59	0.78	9.21	0.41

Table 12.72 High Street/Fore Street/Rodway (west)

Arm		**AM Base 2016**			**PM Base 2016**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
High Street	Rodway south	0.39	11.78	0.21	0.46	14.53	0.19
Rodway north	High Street	0.67	8.57	0.27	2.10	11.24	0.53

Capacity

12.3.68 The 2016 future baseline capacity assessment results indicate that Rodway is predicted to operate within capacity during both AM and PM peak periods with a maximum RFC value of 0.68 during the PM peak. There are also no capacity issues associated with the High Street/Fore Street/Rodway (west) junctions

Queues

12.3.69 The 2016 future baseline capacity assessment indicates that there is a predicted queue of 2 vehicles on Rodway during the AM peak. There are no issues as a result of queuing on any arms of the western junction with a maximum queue of 2 vehicles on Rodway north during the PM peak.

<u>Junction 21 – M5 Junction 21 (Future Layout)</u>

12.3.70 **Table 12.73** below provides the 2018 future baseline capacity assessment results for Junction 21 of the M5

Table 12.73 Junction 21 – M5 Junction 21

Item	**Lane Description**	**AM Base 2018**			**PM Base 2018**		
		DoS (%)	**MMQ (pcu)**	**Delay (pcuHr)**	**DoS (%)**	**MMQ (pcu)**	**Delay (pcuHr)**
J2: M5 Junction 21 (Controller 1)							
1/1	M5 N/B Off-slip Left	47	4	2	66	6	3
1/2	M5 N/B Off-slip Left Ahead	50	5	2	68	6	3

Item	Lane Description	AM Base 2018			PM Base 2018		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
2/2	A370 (W) Ahead	87	14	4	91	14	5
5/1	South Circ Ahead	54	8	1	73	27	4
5/2	South Circ Ahead	52	5	1	65	8	2
5/3	South Circ Ahead Right	49	5	1	65	8	2
J2: M5 Junction 21 (Controller 2)							
1/1	North Circ Ahead	54	9	3	75	12	5
1/2	North Circ Ahead Right	57	10	3	77	12	5
2/1	M5 S/B Off-slip Left Ahead	9	1	0	13	2	0
2/2	M5 S/B Off-slip Ahead	54	11	3	77	20	5
2/3	M5 S/B Off-slip Ahead	57	11	3	85	25	7
4/1	East Circ Ahead	32	8	3	24	7	2
4/2	East Circ Right	60	2	1	80	3	2
4/3	East Circ Right	62	2	1	87	4	3
5/1	A370 Left	15	2	1	15	2	1
5/2	A370 Ahead	56	10	3	73	12	5

Capacity

12.3.71 The 2018 future baseline capacity assessment results indicate that the M5 Junction 21 junction is predicted to operate over the practical capacity of 90% during the PM peak period. The 2018 future baseline capacity assessment results indicate a predicted maximum DoS value of 91% during the PM peak on the A370 (W) Ahead.

Queues

12.3.72 The 2018 future baseline capacity assessment indicates that significant queues are predicted to occur within the junction on the Southern Circulatory Ahead during the PM peak period with a maximum queue of 27 vehicles.

Junction 22 – A370/Cowslip Lane

12.3.73 **Table 12.74** below provides the 2018 future baseline capacity assessment results for the A370/Cowslip Lane.

Table 12.74 Junction 22 – A370/Cowslip Lane

Arm		AM Base 2018			PM Base 2018		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Cowslip Lane	A370 south	0.02	10.44	0.02	0.05	8.20	0.05
Cowslip Lane	A370 north	0.00	0.00	0.00	0.05	18.08	0.04
A370 south	Cowslip Lane	0.04	7.80	0.03	0.02	6.47	0.02

Capacity

12.3.74 The 2018 future baseline capacity assessment results indicate that there are no capacity issues forecast at the A370/Cowslip Lane junction. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.75 The 2018 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 23 – A370/Maysgreen Lane

12.3.76 **Table 12.75** below provides the 2018 future baseline capacity assessment results for the A370/Maysgreen Lane.

Table 12.75 Junction 23 – A370/Maysgreen Lane

Arm		AM Base 2018			PM Base 2018		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Maysgreen Lane	A370 south	0.00	0.00	0.00	0.00	0.00	0.00
Maysgreen Lane	A370 North	0.00	0.00	0.00	0.00	0.00	0.00
A370 south	Maysgreen Lane	0.00	0.00	0.00	0.01	8.07	0.01

Capacity

12.3.77 The 2018 future baseline capacity assessment results indicate that there are no capacity issues forecast at the A370/Maysgreen Lane junction. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.78 The 2018 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction.

Junction 24 – M5 Junction 20

12.3.79 **Table 12.76** below provides the 2019 future baseline capacity assessment results for the M5 Junction 20.

Table 12.76 Junction 24 – M5 Junction 20

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5 southbound off slip	0.55	3.45	0.35	2.11	7.34	0.68
M5 northbound off slip	1.53	5.19	0.60	1.32	6.32	0.57
Ettlingen Way	1.76	3.53	0.63	1.20	2.80	0.54

Capacity

12.3.80 The 2019 future baseline capacity assessment results indicate that there are no capacity issues forecast at Junction 20 of the M5. The highest RFC value forecast at the junction is 0.57 which is shown on the M5 southbound arm of the junction in the PM peak period. The capacity assessment results indicate that there would be residual capacity available.

Queues

12.3.81 The 2019 future baseline capacity assessment forecasts that there would be no issues as a result of queuing on any arms of the junction. The maximum queue predicted on the M5 southbound off slip is 3 vehicles during the PM peak period. This queue can be accommodated on the M5 southbound off slip without blocking onto the M5 corridor. The highest queue predicted on the M5 northbound off slip is 2 vehicles during the AM peak period which could be accommodated on the northbound off slip without blocking back onto the M5 corridor.

Junction 25 – M5 Junction 20/Central Way/Northern Way/Moor Lane

12.3.82 **Table 12.77** below provides the 2019 future baseline capacity assessment results for the M5 Junction 20.

Table 12.77 Junction 25 – M5 Junction 20/Central Way/Northern Way/Moor Lane

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
B3133	3.23	7.41	0.76	16.45	33.08	0.96
Central Way	10.17	29.28	0.92	2.47	8.83	0.71
Moor Lane	3.82	25.24	0.80	1.86	11.26	0.65
Northern Way	2.97	10.58	0.75	3.84	12.33	0.80

Capacity

12.3.83 The 2019 future baseline capacity assessment results indicate that the capacity on Central Way and the B3133 are predicted to exceed the practical RFC value of 0.85. The highest RFC value forecast at the junction is 0.96 which is shown on the B3133 arm of the junction during the PM peak period. The results also indicate that the Central Way arm of the junction would have an RFC of 0.92 during the AM peak period.

Queues

12.3.84 The 2019 future baseline capacity assessment indicates a forecast queue of 17 vehicles on the B3133 during the PM peak period. This level of queuing could be accommodated on the B3133 without blocking back to the M5 Junction 20 roundabout.

Junction 26 – Central Way/Kenn Moore Drive

12.3.85 **Table 12.78** below provides the 2019 future baseline capacity assessment results for the Central Way/Kenn Moore Drive.

Table 12.78 Junction 26 – Central Way/Kenn Moor Drive

Arm		AM Base 2019			PM Base 2019		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Ken Moor Drive	Central Way south	0.07	6.74	0.07	0.04	7.43	0.04
Ken Moor Drive	Central Way north	0.78	16.05	0.44	0.39	15.32	0.28
Central way south	Ken Moor Drive	0.02	7.37	0.01	0.06	8.49	0.06

Capacity

12.3.86 The 2019 future baseline capacity assessment results indicate that there are no capacity issues forecast at the Central Way/Kenn Moore Drive junction. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.87 The 2019 future baseline capacity assessment indicates that there are no issues forecast as a result of queuing on any arms of the junction.

Junction 27 – Central Way/Tutton Way

12.3.88 **Table 12.79** below provides the 2019 future baseline capacity assessment results for the A370/Maysgreen Lane.

Table 12.79 Junction 27 – Central Way/Tutton Way

Arm		AM Base 2019			PM Base 2019		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Tutton Way	Central Way south	0.57	15.34	0.36	0.70	26.09	0.41
Central Way south	Tutton Way	0.13	8.67	0.11	0.18	10.57	0.15

Capacity

12.3.89 The 2019 future baseline capacity assessment results indicate that there are no capacity issues forecast for the Central Way/Tutton Way junction. The highest RFC value at the junction is 0.41 which is shown on the Tutton Way arm of the junction during the PM peak period. The capacity assessment results indicate that there is significant residual capacity available.

Queues

12.3.90 The 2019 future baseline capacity assessment indicates that there are no issues forecast as a result of queuing on any arms of the junction.

Junction 28 – Central Way/B3133/Southern Way

12.3.91 **Table 12.80** below provides the 2019 future baseline capacity assessment results for the Central Way/B3133/Southern Way.

Table 12.80 Junction 28 – Central Way/B3133/Southern Way

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Central Way	2.18	8.96	0.68	11.30	37.68	0.94
B3133 south	1.13	5.63	0.52	3.43	13.90	0.78
Southern Way	4.58	16.77	0.82	2.16	10.73	0.69
B3133 north	36.51	148.20	1.07	6.74	35.33	0.89

Capacity

12.3.92 The 2019 future baseline capacity assessment results indicate that Central Way and the B3133 (north) would exceed the practical capacity of 0.85 during the PM peak period.

Queues

12.3.93 The 2019 future baseline capacity assessment indicates that the highest queue forecast is 37 vehicles on the B3133 north during the PM peak period. This level of queuing would block back through the junction of the B3133 and Halswell Road to the north.

Junction 29 – B3133/Tutton Way

12.3.94 **Table 12.81** below provides the 2019 future baseline capacity assessment results for the B3133/Tutton Way.

Table 12.81 Junction 29 – B3133/Tutton Way

Arm		AM Base 2019			PM Base 2019		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Tutton Way	B3133 south	0.08	9.13	0.07	0.11	9.03	0.10
Tutton Way	B3133 north	0.26	20.22	0.21	0.31	29.27	0.23
B3133 south	Tutton Way	0.14	4.44	0.07	1.03	4.20	0.24

Capacity

12.3.95 The 2019 future baseline capacity assessment results indicate that no capacity issues are forecast at the B3133/Tutton Way junction. The highest RFC value forecast at the junction is 0.24 which is shown on the B3133 south arm of the junction during the PM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.96 The 2019 future baseline capacity assessment indicates that there are no issues anticipated as a result of queuing on any arms of the junction.

Junction 30 – B3133/Davis Lane

12.3.97 **Table 12.82** below provides the 2019 future baseline capacity assessment results for the B3133/Davis Way junction.

Table 12.82 Junction 30 – B3133/Davis Lane

Arm		AM Base 2019			PM Base 2019		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Davis Lane	B3133 south	0.08	8.63	0.08	0.05	10.24	0.05
Davis Lane	B3133 north	0.27	20.57	0.21	0.81	36.37	0.46
B3133 south	Davis Lane	0.21	4.39	0.10	0.58	4.13	0.18

Capacity

12.3.98 The 2019 future baseline capacity assessment results indicate that no capacity issues are forecast at the B3133/Davis Way junction. The highest RFC value forecast at the junction is 0.46 on Davis Lane during the PM peak period. The capacity assessment results indicate that there would be significant residual capacity available.

Queues

12.3.99 The 2019 future baseline capacity assessment indicates that there are no issues anticipated as a result of queuing on any arms of the junction.

Junction 31 – Northern Way/B3130 Tickenham Road

12.3.100 **Table 12.83** below provides the 2019 future baseline capacity assessment results for the Northern Way/B3130 Tickenham Road junction.

Table 12.83 Junction 31 – Northern Way/B3130 Tickenham Road

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Tickenham Road east	3.46	14.81	0.78	5.61	21.51	0.86
Northern Way	25.56	71.57	1.00	2.89	10.95	0.75
Tickenham Road west	13.65	55.28	0.96	3.22	15.24	0.77

Capacity

12.3.101 The 2019 future baseline capacity assessment results indicate that the junction is forecast to reach capacity with a maximum RFC value of 1.00 on Northern Way during the AM peak period.

Queues

12.3.102 The 2019 future baseline capacity assessment indicates that a maximum queue of 26 vehicles is forecast during the AM peak period on Northern Way. This queue can be accommodated on Northern Way without blocking the access into Sumerlin Drive to the south of the junction.

Junction 32 – B3128/Clevedon Road

12.3.103 **Table 12.84** below provides the 2019 future baseline capacity assessment results for the B3128/Clevedon Road.

Table 12.84 Junction 32 – B3128/Clevedon Road

Arm		**AM Base 2019**			**PM Base 2019**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
B3128	Clevedon Road east	1.59	36.26	0.63	7.44	185.27	1.01
B3128	Clevedon Road west	4.16	71.60	0.83	13.27	140.88	1.01
Clevedon Road east	B3128	4.03	22.82	0.74	1.43	8.74	0.47

Capacity

12.3.104 The 2019 future baseline capacity assessment results indicate that the B3128 is forecast to have an RFC value of 1.01 during the PM peak period. This is above the maximum value of 1.00 and indicates that the junction is forecast to exceed capacity during the PM peak period.

Queues

12.3.105 The 2019 future baseline capacity assessment indicates that in the PM peak period when the B3128 operates with a RFC of 1.01 the maximum predicted queue length is 14 vehicles on the movement to Clevedon Road (west).

Junction 33 – M5 Junction 19

12.3.106 **Table 12.85** below provides the 2019 future baseline capacity assessment results for the M5 Junction 19.

Table 12.85 Junction 33 – M5 Junction 19

Item	Lane Description (Controller 1)	AM Base 2019			PM Base 2019		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 N/B Off-slip Left	48%	4	2	49%	3	1
1/2	M5 N/B Off-slip Left Ahead	49%	4	2	49%	3	1
1/3	M5 N/B Off-slip Ahead	46%	8	2	34%	5	1
2/1	The Portbury Hundred Left Ahead	71%	13	5	58%	7	3
2/2	The Portbury Hundred Ahead	73%	14	5	60%	8	3
2/3	The Portbury Hundred Ahead	54%	9	3	92%	17	10
3/1	Royal Portbury Dock Road Left Ahead	83%	4	3	93%	12	6
3/2	Royal Portbury Dock Road Ahead	24%	1	0	48%	2	1
7/1	South Circ Ahead	34%	1	0	25%	3	1
7/2	South Circ Ahead Right	75%	19	3	82%	12	3
7/3	South Circ Right	48%	4	1	34%	6	1
8/1	West Circ Ahead Right	76%	17	5	19%	3	1
8/2	West Circ Right	79%	11	4	49%	9	2
8/3	West Circ Right	41%	1	1	30%	1	1
Item	**Lane Description (Controller 2)**	**AM Base 2019**			**PM Base 2019**		
		DoS (%)	**MMQ (pcu)**	**Delay (pcuHr)**	**DoS (%)**	**MMQ (pcu)**	**Delay (pcuHr)**
1/1	North Circ Left	15%	3	1	21%	3	1
1/2	North Circ Ahead	85%	20	7	94%	24	10
1/3	North Circ Right	18%	1	0	35%	6	1
2/1	M5 S/B Off-slip U-Turn	8%	0	0	5%	0	0
2/2	M5 S/B Off-slip Ahead Left	86%	21	8	92%	27	11
2/3	M5 S/B Off-slip Ahead	66%	13	4	85%	22	8
3/1	East Circ Ahead	55%	8	3	52%	11	5
3/2	East Circ Right	68%	2	1	86%	3	3
3/3	East Circ Right	8%	1	0	9%	2	1
5/1	Service Station Exit Left	19%	1	0	27%	1	0
5/2	Service Station Exit Ahead	63%	3	1	70%	5	2
7/1	Martcombe Road Left	62%	11	4	65%	12	4
7/2	Martcombe Road Ahead	47%	8	3	48%	8	3
7/3	Martcombe Road Ahead	67%	13	4	51%	9	3

Capacity

12.3.107 The 2019 future baseline capacity assessment results indicate that Junction 19 of the M5 is forecast to operate close to capacity during the AM and PM peak periods. The maximum DoS value is 94% for the North circulatory Ahead movement during the PM peak period.

Queues

12.3.108 The 2019 future baseline capacity assessment results indicate that Junction 19 of the M5 is forecast to experience a maximum queue of 27 vehicles for the southbound off slip during the PM peak period. This queue, and all other forecast queues on the M5 slip roads could be accommodated without blocking back onto the M5 corridor.

Junction 34 – Royal Portbury Dock Road/Gordano Way/Portbury Way

12.3.109 **Table 12.86** below provides the 2019 future baseline capacity assessment results for the Royal Portbury Dock Road/Gordano Way/Portbury Way junction.

Table 12.86 Royal Portbury Dock Road/Gordano Way/Portbury Way

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Gordano Way	0.11	2.63	0.09	0.18	2.75	0.14
Royal Portbury Dock Road south	0.46	2.51	0.29	0.14	2.34	0.09
Bradley Road	0.17	4.26	0.10	0.06	2.50	0.05
Portbury Way	0.04	2.94	0.03	0.06	2.13	0.05
Royal Portbury Dock Road north	0.13	4.11	0.07	0.18	3.02	0.13

Capacity

12.3.110 The 2019 future baseline capacity assessment results indicate that there are no forecast capacity issues associated with the Royal Portbury Dock Road/Gordano Way/Portbury Way junction. The maximum RFC value forecast was 0.29 on Royal Portbury Dock Road south during the AM peak.

Queues

12.3.111 The 2019 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with no queues on any arms of the junction.

Junction 35 – The Portbury Hundred/Station Road

12.3.112 **Table 12.87** below provides the 2019 future baseline capacity assessment results for the Portbury Hundred/Station Road junction.

Table 12.87 The Portbury Hundred/Station Road

Arm		AM Base 2019			PM Base 2019		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Station Road	The Portbury Hundred (E)	0.35	24.01	0.24	0.10	14.14	0.08
Station Road	The Portbury Hundred (W)	0.00	0.00	0.00	0.00	0.00	0.00
The Portbury Hundred (E)	The Portbury Hundred (W) & Station Road	0.12	17.04	0.09	0.15	10.86	0.12

Capacity

12.3.113 The 2019 future baseline capacity assessment results indicate that there are no forecast capacity issues associated with the Portbury Hundred/Station Road junction and that there is significant residual capacity available. The maximum RFC value forecast was 0.24 on Station Road during the AM peak.

Queues

12.3.114 The 2019 future baseline capacity assessment indicates that there are no issues as a result of the forecasted queuing on any arms of the junction.

<u>Junction 38 – Severn Road/Chittening Road</u>

12.3.115 **Table 12.88** below provides the 2017 future baseline capacity assessment results for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction.

Table 12.88 Severn Road/Chittening Road

Arm		**AM Base 2017**			**PM Base 2017**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Severn Road east	Chittening Road	0.35	9.87	0.21	0.10	7.41	0.08
Severn Road east	Severn Road north	0.44	13.97	0.28	0.30	12.79	0.23
Chittening Road	Severn Road east	0.37	12.90	0.21	0.80	12.06	0.39

Capacity

The 2017 future baseline capacity assessment results indicate that there are no capacity issues forecast at the Severn Road/Chittening Road junction and that there would be significant residual capacity available. The highest RFC value forecast was 0.39 on Chittening Road during the PM peak period.

Queues

12.3.116 The 2017 future baseline capacity assessment indicates that there are no issues as a result of forecasted queuing on any arms of the junction.

<u>Junction 39 – A403 Smoke Lane/Poplar Way West</u>

12.3.117 **Table 12.89** below provides the 2017 future baseline capacity assessment results for the A403 Smoke Lane/Poplar Way West junction.

Table 12.89 A403 Smoke Lane/Poplar Way West

Arm	**AM Base 2017**			**PM Base 2017**		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Smoke Lane	0.91	5.11	0.44	0.56	4.08	0.33
Poplar Way West	0.18	4.16	0.13	0.21	3.71	0.16
St Andrew's Road	0.62	3.82	0.34	0.65	3.93	0.36
Access	0.03	3.91	0.03	0.05	3.70	0.05

Capacity

12.3.118 The 2017 future baseline capacity assessment results indicate that there are no capacity issues associated with the A403 Smoke Lane/Poplar Way West junction. The highest RFC value recorded is 0.44 on Smoke Lane during the AM peak period.

Queues

12.3.119 The 2017 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction, with minimal queues on all arms of the junction.

Junction 40 – Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue

12.3.120 **Table 12.90** below provides the 2017 future baseline capacity assessment results for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction.

Table 12.90 Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue

Arm	AM Base 2017			PM Base 2017		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Poplar way east	0.12	3.43	0.08	0.24	3.13	0.18
Merebank Road	0.30	2.69	0.22	0.14	2.69	0.11
Poplar way west	0.13	2.55	0.10	0.14	2.39	0.11
Moorend Farm Avenue	0.04	3.08	0.03	0.09	2.55	0.08
Poplar way east	0.12	3.43	0.08	0.24	3.13	0.18

Capacity

12.3.121 The 2017 future baseline capacity assessment results indicate that there are no capacity issues forecast at the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction. The highest RFC value forecasted was 0.22 on Merebank Road during the AM peak period.

Queues

12.3.122 The 2013 Baseline capacity assessment indicates that there are no issues as a result of forecasted queuing on any arms of the junction, with only a single queuing vehicle present on all arms of the junction.

Junction 41 – A403 St. Andrew's Road/Kings Weston Lane

12.3.123 **Table 12.91** below provides the 2017 future baseline capacity assessment results for the A403 St. Andrew's Road/Kings Weston Lane junction.

Table 12.91 A403 St. Andrew's Road/Kings Weston Lane

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	92%	20	10	95%	22	12
2/1	Kings Weston Lane Left Right	89%	12	7	94%	21	11
3/1	St Andrews Road (S) Ahead	63%	13	3	47%	8	2
3/2	St Andrews Road (S) Right	93%	18	10	92%	10	7

Capacity

12.3.124 The 2017 future baseline capacity assessment results indicate that there are no forecast capacity issues associated with the A403 St. Andrew's Road/Kings Weston Lane junction. The highest Degree of saturation (DoS) forecasted was 95% on St. Andrews Road (N) left ahead during the PM peak period. This is above the desirable maximum of 90% and indicates that this arm of the junction is predicted to operate insufficiently. Kings Weston Lane and St. Andrew’s Road (S) Right are also forecast to exceed 90% and operate insufficiently in 2017.

Queues

12.3.125 The 2017 future baseline capacity assessment indicates an anticipated peak queue of 22 PUCs on St. Andrews Road during the PM peak period. This level of queuing could be accommodated on St. Andrews Lane without blocking any local site access points.

<u>Junction 42 – A403 St. Andrew's Road/St. George's Industrial Estate</u>

12.3.126 **Table 12.92** below provides the 2017 future baseline capacity assessment results for the A403 St. Andrew's Road/St. George's Industrial Estate junction.

Table 12.92 A403 St. Andrew’s Road/St. George’s Industrial Estate

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	82%	29	6	73%	22	4
1/2	St Andrews Road (N) Right	11%	1	0	11%	1	0
2/1	Distribution Centre Left	8%	0	0	6%	0	0
2/2	Distribution Centre Ahead Right	13%	1	0	9%	0	0
3/1	St Andrews Road (S) Left Ahead	62%	18	2	69%	22	3
3/2	St Andrews Road (S) Right	65%	4	2	22%	1	1
4/1	St Georges Industrial Estate Left	19%	1	0	10%	0	0
4/2	St Georges Industrial Estate Ahead Right	31%	2	1	13%	1	0

Capacity

12.3.127 The 2017 future baseline capacity assessment results indicate that there are no forecast capacity issues at the A403 St. Andrew's Road/St. George's Industrial Estate. The highest predicted DoS is 82% on St Andrew's Road during the AM peak.

Queues

12.3.128 The 2017 future baseline capacity assessment indicates that a maximum forecast queue of 29 PCUs are predicted on St. Andrews Road (N) left and ahead.

<u>Junction 43 – A403 St. Andrew's Road/King Road Avenue/Crowley Way</u>

12.3.129 **Table 12.93** below provides the 2017 Baseline capacity assessment results for the A403 St. Andrew's Road/King Road Avenue/Crowley Way junction.

Table 12.93 A403 St. Andrew's Road/King Road Avenue/Crowley Way

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	37%	6	2	55%	10	2
1/1	A403 St. Andrew's Road Left	39%	7	2	57%	11	3
1/2	A403 St. Andrew's Road Left	11%	2	0	6%	1	0
1/3	A403 St. Andrew's Road Ahead	18%	3	1	6%	1	0
2/1	Crowley Road Left Ahead	61%	13	3	28%	4	1
2/2	Crowley Road Ahead	59%	12	3	26%	4	1
2/3	Crowley Road Ahead	58%	5	2	55%	3	2
3/1	McLaren Road Left Ahead	47%	2	1	54%	3	2
4/1	King Road Avenue Ahead Left	47%	3	1	54%	3	2
4/2	King Road Avenue Ahead	25%	2	1	27%	2	1
8/1	North Circ Ahead	12%	0	0	18%	0	0
8/2	North Circ Right	11%	2	1	15%	2	1
9/1	East Circ Ahead	9%	2	1	1%	0	0
9/2	East Circ Right	13%	2	0	1%	0	0
10/1	South Circ Ahead	46%	1	1	21%	1	0
10/2	South Circ Right	44%	1	1	19%	1	0
10/3	South Circ Right	21%	1	0	8%	0	0
11/1	West Circ Ahead	26%	1	0	16%	1	0
11/2	West Circ Ahead	42%	2	1	22%	1	0
11/3	West Circ Right Ahead	37%	6	2	55%	10	2

Capacity

12.3.130 The 2017 Baseline capacity assessment results indicate that the A403 St. Andrew's Road/King Road Avenue/Crowley Way junction is forecast to operate within capacity with a maximum DoS of 61% on the Crowley Way during the AM peak period.

Queues

12.3.131 The 2017 Baseline capacity assessment indicates a forecast maximum queue of 13 PCUs associated with the Crowley Way during the AM peak period. This level of queuing could be accommodated on Crowley Way but it could restrict access out from Evelyn Lane.

Junction 44 – M5/A4/Avonmouth Way

12.3.132 **Table 12.94** below provides the 2017 Baseline capacity assessment results for the M5/A4/Avonmouth Way roundabout.

Table 12.94 M5/A4/Avonmouth Way

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	Avonmouth Way Left	55%	3	2	64%	9	4
1/2	Avonmouth Way Ahead Left	59%	4	2	66%	10	4
1/3	Avonmouth Way Ahead	39%	2	1	9%	1	0
2/1	M5 Ahead Left	63%	10	4	30%	3	1
2/2	M5 Ahead	63%	10	4	30%	3	1
2/3	M5 Ahead	65%	11	4	34%	4	2
2/4	M5 Ahead	21%	3	1	24%	3	1
3/1	Bristow Broadway Left	19%	2	1	18%	1	1
3/2	Bristow Broadway Ahead Left	21%	2	1	21%	2	1
3/3	Bristow Broadway Ahead	65%	9	4	66%	7	3
4/1	Crowley Road Ahead Left	24%	3	1	63%	7	3
4/2	Crowley Road Ahead	27%	4	1	66%	8	4
4/3	Crowley Road Ahead	26%	4	1	65%	8	4
4/4	Crowley Road Ahead	15%	2	1	32%	4	2
4/5	Crowley Road Ahead	17%	2	1	33%	4	2
5/1	North Circ Ahead	8%	0	0	27%	1	1
5/2	North Circ Ahead	12%	0	0	31%	1	1
5/3	North Circ Ahead	17%	1	0	32%	2	1
5/4	North Circ Right	7%	0	0	13%	0	0
5/5	North Circ Right	7%	0	0	14%	0	0
6/1	East Circ Ahead	11%	3	1	18%	4	1
6/2	East Circ Right Ahead	14%	3	1	24%	4	1
6/3	East Circ Right	7%	0	0	4%	0	0
7/1	Ahead	33%	1	1	10%	0	0
7/2	Ahead	37%	9	1	11%	2	0
7/3	Right Ahead	46%	9	1	17%	3	0
7/4	Right	12%	1	0	9%	1	0
8/1	West Circ Ahead	61%	2	1	17%	0	0
8/2	West Circ Right Ahead	40%	4	1	24%	3	1
8/3	West Circ Right	8%	0	0	6%	0	0
9/1	W/B Exit Ahead	32%	1	0	13%	0	0
9/2	W/B Exit Ahead	35%	1	0	14%	0	0
9/3	W/B Exit Ahead	10%	0	0	9%	0	0

Capacity

12.3.133 The 2017 future baseline capacity assessment results indicate that there are no forecast capacity issues associated with the M5/A4/Avonmouth Way roundabout with a maximum Dos of 66% on Avonmouth Way Left Ahead and Crowley Way Ahead during the PM peak.

Queues

12.3.134 The 2017 future baseline capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 11 PCUs recorded on the M5 during the AM peak.

Junction 45 – A4 Bristol Broadway/Avonmouth Road/Portway/M5

12.3.135 **Table 12.95** below provides the 2017 future baseline capacity assessment results for the A4 Bristol Broadway/Avonmouth Road/Portway/M5 roundabout.

Table 12.95 A4 Bristol Broadway/Avonmouth Road/Portway/M5

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 Left	69%	7	3	61%	6	2
1/2	M5 Ahead	77%	7	3	57%	4	2
1/3	M5 Ahead	76%	9	4	49%	4	2
1/4	M5 Ahead	21%	1	1	24%	1	1
2/1	B4054 Left	10%	1	0	6%	0	0
2/2	B4054 Ahead	29%	2	1	20%	1	1
2/3	B4054 Ahead	66%	6	3	57%	5	2
3/1	Portway (S) Ahead	70%	9	3	31%	3	1
3/2	Portway (S) Ahead	35%	3	1	55%	6	2
3/3	Portway (S) Ahead	35%	3	1	55%	6	2
3/4	Portway (S) Ahead	19%	2	1	25%	2	1
4/1	Portway (N) U-Turn Left	54%	4	2	77%	8	4
4/2	Portway (N) Left	29%	2	1	53%	5	2
6/1	Ahead	56%	1	1	54%	1	1
6/2	Ahead	56%	1	1	57%	1	1
7/1	Ahead	36%	5	1	19%	2	1
7/2	Ahead	38%	2	1	20%	0	0
9/1	East Circ Ahead	68%	5	2	68%	6	3
9/2	East Circ Ahead	79%	6	4	80%	8	4
9/3	East Circ Right	12%	0	0	13%	0	0
10/1	South Circ Right	52%	2	1	37%	2	1
10/2	South Circ Right	71%	2	2	51%	1	1
11/1	West Circ Ahead	58%	4	2	80%	6	3
11/2	West Circ Ahead	58%	4	2	80%	6	3
11/3	West Circ Right	22%	1	0	28%	1	1
12/1	North Circ Ahead	51%	4	2	75%	6	3
12/2	North Circ Right	41%	1	1	61%	1	1
12/3	North Circ Right	32%	1	1	69%	2	2

Capacity

12.3.136 The 2017 future baseline capacity assessment results indicate that there are no forecast capacity issues associated with the M5/A4/Avonmouth Way roundabout with a maximum Dos of 80% on the eastern and western circulatory during the PM peak.

Queues

12.3.137 The 2017 future baseline capacity assessment indicates that there are no issues as a result of forecast queuing on any arms of the junction with a maximum queue of 9 PCUs forecast on the M5 Ahead and Portway (S) ahead arm during the AM peak.

<u>Junction 46 – A4 Portbury/West Town Road</u>

12.3.138 **Table 12.96** below provides the 2017 future baseline capacity assessment results for the A4 Portbury/West Town Road junction.

Table 12.96 A4 Portbury/West Town Road

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/2+1 /1	A4 Portway (E) Left Ahead	64 : 64%	12	3	42 : 42%	7	2
1/3	A4 Portway (E) Ahead	62%	12	3	41%	7	2
2/1	W Town Road Left	35%	3	1	56%	6	3
3/1	A4 Potway (W) Ahead	80%	2	2	78%	2	2
3/2	A4 Portway (W) Right	51%	3	2	9%	1	0
3/3	A4 Portway (W) Right	51%	3	2	9%	1	0

Item	Lane Description	AM Base 2017			PM Base 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/2+1 /1	A4 Portway (E) Left Ahead	64 : 64%	12	3	42 : 42%	7	2
1/3	A4 Portway (E) Ahead	62%	12	3	41%	7	2
2/1	W Town Road Left	35%	3	1	56%	6	3
3/1	A4 Potway (W) Ahead	80%	2	2	78%	2	2
3/2	A4 Portway (W) Right	51%	3	2	9%	1	0
3/3	A4 Portway (W) Right	51%	3	2	9%	1	0

Capacity

12.3.139 The 2017 future baseline capacity assessment results indicate that there are no capacity issues associated with the A4 Portbury/West Town Road junction that there is significant residual capacity available. The maximum DoS predicted of 80% on the A4 Portway (W) Ahead movement during the AM peak period.

Queues

12.3.140 The 2017 future baseline capacity assessment indicates a maximum forecast queue of 12 vehicles on the A4 Portway (E) arm of the junction for the Left Ahead movement during the AM peak period.

Junction 49 – Clevedon Road/Stock Way North

12.3.141 **Table 12.97** below provides the 2019 future baseline capacity assessment results for the Clevedon Road/Stock Way North junction.

Table 12.97 Clevedon Road/Stock Way North

Item	Lane Description	AM Base 2019			PM Base 2019		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1+1/2	Clevedon Road Left Right	67 : 67%	7	4	62 : 62%	5	3
2/1+2/2	Stock Way (East) Ahead Right	53 : 53%	5	3	65 : 65%	7	3
3/1	Stock Way (West) Ahead Left	64%	7	3	41%	4	2

Capacity

12.3.142 The 2019 future baseline capacity assessment results forecast no capacity issues at the Clevedon Road/Stock Way North junction with a maximum DoS predicted of 67% on Clevedon Road during the AM peak.

Queues

12.3.143 The 2019 future baseline capacity assessment indicates a maximum forecast queue of 7 vehicles on Clevedon Road. Therefore no forecast issues arise as a result of queuing on any arms of the junction.

Junction 50

12.3.144 **Table 12.98** below provides the 2019 future baseline capacity assessment results for the Stock Way North/Stock Way South junction.

Table 12.98 Stock Way North/Stock Way South

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Stock Way North	0.59	7.70	0.36	1.38	11.21	0.58
Stock Way South	0.56	7.88	0.35	0.51	8.45	0.33
Silver Street	0.19	3.38	0.16	0.12	2.99	0.11

Capacity

12.3.145 The 2019 future baseline capacity assessment results indicate that no capacity issues are forecast at the junction of Stock Way North/Stock Way South. The highest RFC value forecast is 0.58 on Stock Way North during the PM peak.

Queues

12.3.146 The 2019 future baseline capacity assessment indicates that no issues are forecast as a result of queuing at the junctions of Stock Way North/Stock Way South, with a maximum predicted queue of 2 vehicles on Stock Way North during the PM peak.

Junction 51

12.3.147 **Table 12.99** below provides the 2019 future baseline capacity assessment results for the Stock Way South/Mizzymead Road junction.

Table 12.99 Stock Way South/Mizzymead Road

Arm	AM Base 2019			PM Base 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Mizzymead Road North	0.22	4.64	0.18	1.15	8.44	0.54
Mizzymead Road South	1.83	11.28	0.64	0.87	7.83	0.46
Stock Way South	0.67	9.89	0.39	0.66	8.70	0.39

Capacity

12.3.148 The 2019 future baseline capacity assessment results indicate that no capacity issues are forecast at the junction of Stock Way South/Mizzymead Road during either the AM or PM peak periods. The maximum RFC value predicted is 0.64 on Mizzymead Road South during the AM peak.

Queues

12.3.149 The 2019 future baseline capacity assessment indicates that no issues are forecast as a result of queuing on any arms of the StockWay South/Mizzymead Road junction as the maximum forecast queue is 2 vehicles on Mizzymead Road.

Summary

12.3.150 The results of the future year baseline modelling identify a total of six junctions which are predicted to operate at, or exceed their theoretical maximum RFC/DoS of 1.00/100%. These junctions are listed below:

- Junction 2 - A39/Puriton Hill;
- Junction 15 - Bristol Road/Wylds Road (HPC DCO Layout);
- Junction 16 - Wylds Road/The Drove (HPC DCO Layout);
- Junction 28 - Central Way/B3133/Southern Way;
- Junction 31 – Northern Way/B3130 Tickenham Road; and
- Junction 32 – B3128/Clevedon Road.

12.3.151 The results of the future baseline modelling highlight a number of congestion points on the highway network which has been assessed. The first surrounds Junction 23 of the M5 corridor with the A38 and A39 corridors to the east and west of the M5 reaching capacity during their respective future baseline scenarios.

12.3.152 The second area of congestion is adjacent to Junction 20 of the M5 corridor, located close to Clevedon and Nailsea. Central Way/Southern Way/B3133 is a roundabout junction and is predicted to exceed an RFC of 1.00 on the B3133 North during the 2019 AM peak period. The junction of Northern Way and Tickenham Road is a roundabout junction which is predicted to reach capacity for the Northern Way movement during the 2019 AM assessment. The B3128/Clevedon Road junction is a priority junction which is predicted to exceed capacity on the B3128 during the PM peak period.

12.4 Future Baseline plus Development Capacity Assessment Results

Junction 1 – M5 Junction 23

12.4.1 **Table 12.100** below provides the 2016 plus development capacity assessment results for the M5 Junction 23.

Table 12.100 Junction1 – M5 Junction 23

Item	Lane Description	AM Dev 2016			PM Dev 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 S/B Off-slip Left	76%	19	7	95%	26	13
1/2	M5 S/B Off-slip Ahead	97%	37	18	71%	15	6
2/1	A39 (E) Left	77%	9	2	95%	27	8
2/2	A39 (E) Ahead	62%	8	1	94%	25	7
2/3	A39 (E) Ahead	87%	18	5	92%	22	6
3/1	M5 N/B Off-slip Left	67%	14	5	35%	7	2
3/2	M5 N/B Off-slip Ahead	81%	19	8	69%	19	6
4/1	A39 (W) Left	57%	13	4	69%	20	5
4/2	A39 (W) Ahead	83%	24	9	90%	37	11
10/1	South Circ (Signals) Ahead	72%	9	3	76%	9	3
10/2	South Circ (Signals) Ahead Right	74%	17	4	73%	19	5
11/1	East Circ (Signals) Ahead	43%	7	3	70%	18	8
11/2	East Circ (Signals) Ahead Right	59%	2	1	90%	9	7
12/1	North Circ Ahead	99%	36	20	96%	27	13
12/2	North Circ Right	25%	5	0	44%	20	4

Capacity

12.4.2 The 2016 plus development capacity assessment results indicate that Junction 23 of the M5 is predicted to exceed the practical maximum DoS of 90% during the AM peak period with a predicted DoS value of 99% on the North Circ Ahead movement.

Queues

12.4.3 The 2016 plus development capacity assessment indicates a forecast MMQ of 36 PCUs on the North Circulatory Ahead movement during the AM peak period. The maximum forecast queue on the M5 slip roads is on the southbound off slip during the PM peak period. This queue of 26 PCUs can be safely accommodated on the slip road without blocking back onto the M5 corridor.

Junction 2 – A39/Puriton Hill

12.4.4 **Table 12.101** below provides the 2016 plus development capacity assessment results for the A39/Puriton Hill priority junction.

Table 12.101 Junction 2 - A39/Puriton Hill

Arm		AM Dev 2016			PM Dev 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Puriton Hill	A39	16.20	6839.76	5.50	0.70	266.03	0.47
A39 (S)	A39 (N) & Puriton Hill	0.01	4.64	0.01	0.01	3.51	0.01

Capacity

12.4.5 The 2016 plus development capacity assessment results forecast that the A39/Puriton Hill junction will exceed capacity with a peak RFC of 5.50 during the AM peak period of Puriton Hill.

Queues

12.4.6 The 2016 plus development capacity assessment indicates that the highest predicted queuing figure is 17 at the Puriton Hill junction during the AM peak period.

Junction 3 – Hillside/A39 Puriton Hill

12.4.7 **Table 12.102** below provides the 2016 plus development capacity assessment results for the Hillside/Puriton Hill junction.

Table 12.102 Junction 3 - A39/Puriton Hill

Arm		AM Dev 2016			PM Dev 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Southern Arm	A39 & Hillside	0.00	0.00	0.00	0.00	0.00	0.00
A39 (E)	Southern Arm, A39 (W) & Hillside	0.03	6.84	0.03	0.08	8.03	0.07
Hillside	A39 & Southern Arm	0.24	14.77	0.20	0.21	13.48	0.17
A39 (W)	A39 (E), Southern Arm & Hillside	0.01	4.41	0.01	0.00	3.85	0.00

Capacity

12.4.8 The 2016 plus development capacity assessment results forecast no capacity issues associated with the Hillside/A39 Puriton Hill junction.

Queues

12.4.9 The 2016 plus development capacity assessment indicates that there would be no issues as a result of queuing on any arms of the junction.

Junction 4 – A39 Puriton Hill/Bath Road

12.4.10 **Table 12.103** below provides the 2016 plus development capacity assessment results for the A39 Puriton Hill/Bath Road junction.

Table 12.103 Junction 4 – A39 Puriton Hill/Bath Road

Item	Lane Description	AM Dev 2016			PM Dev 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	Puriton Hill Ahead	56	7	2	77	11	4
1/2	Puriton Hill Right	98	13	10	88	8	5
2/1	A39 (E) Left	33	3	1	22	2	0
2/2	A39 (E) Ahead	93	18	9	91	14	8
3/1	A39 (S) Right Left	101	24	18	93	16	9

Capacity

12.4.11 The 2016 plus development capacity assessment results forecast that the A39 Puriton Hill/Bath Road junction will exceed capacity with the highest Degree of Saturation (DoS) being 101% during the AM peak on the A39 (S) Right Left arm of the junction.

Queues

12.4.12 The 2016 plus development capacity assessment indicates that the highest mean maximum queue (MMQ) forecast at the junction is 24 PCUs which is shown on the A39 (S) Right Left during the AM peak.

Junction 5 – A39 Bath Road/Bawdrip Lane

12.4.13 **Table 12.104** below provides the 2016 plus development capacity assessment results for the A39 Bath Road/Bawdrip Lane junction.

Table 12.104 Junction 5 – A39 Bath Road/Bawdrip Lane

Arm		AM Dev 2016			PM Dev 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Bawdrip Lane	A39 (W) & Northern Arm	0.02	8.89	0.02	0.02	8.35	0.02
Bawdrip Lane	A39 (E) & Northern Arm	0.09	22.37	0.08	0.08	24.26	0.08
A39 (E)	Bawdrip Lane, A39 (W) & Northern Arm	0.00	0.00	0.00	0.00	0.00	0.00
Northern Arm	A39 (E), Bawdrip Lane & A39 (W)	0.00	0.00	0.00	0.00	0.00	0.00
A39 (W)	A39 (E), Bawdrip Lane &	0.05	5.05	0.04	0.03	3.79	0.03

Arm		AM Dev 2016			PM Dev 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
	Northern Arm						

Capacity

12.4.14 The 2016 plus development assessment results forecast no capacity issues associated with the A39 Bath Road/Bawdrip lane junction during either the Am or PM peak periods.

Queues

12.4.15 The 2016 plus development capacity assessment indicates that there are no forecast issues as a result of queuing on any arms of the junction.

Junction 6 – A39 Bath Road/Woolavington Hill

12.4.16 **Table 12.105** below provides the 2016 plus development capacity assessment results for the A39 bath Road/Woolavington Hill junction.

Table 12.105 Junction 6 – A39 Bath Road/Woolavington Hill

Arm		AM Dev 2016			PM Dev 2016		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Woolavington Hill	A39 (W)	0.32	10.29	0.24	0.24	11.05	0.19
Woolavington Hill	A39 (E)	1.66	43.80	0.64	9.70	174.00	1.00
A39 (W)	A39 (E) & Woolavington Hill	0.55	4.26	0.18	1.44	6.45	0.39

Capacity

12.4.17 The 2013 plus development capacity assessment results indicate that the Woolavington Hill to A39 (east) junction is predicted to reach capacity with an RFC of 1.00 during the PM peak period.

Queues

12.4.18 The 2016 plus development capacity assessment indicates the highest predicted queuing figure is 10 during the PM peak period on the Woolavington Hill to A39(east) junction.

Junction 7 – Old Mill Road/B3141 Woolavington Hill

12.4.19 **Table 12.106** below provides the 2016 plus development capacity assessment results for the Old Mill Road/B3141/Woolavington Hill junction.

Table 12.106 Junction 7 - Old Mill Road/B3141 Woolavington Hill

Arm		**AM Dev 2016**			**PM Dev 2016**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Old Mill Road	B3141 (N)	0.06	7.45	0.06	0.03	6.65	0.03
Old Mill Road	B3141 (S)	0.23	10.68	0.19	0.20	11.04	0.17
B3141 (N)	B3141 (S) & Old Mill Road	0.03	5.95	0.02	0.15	5.81	0.08

Capacity

12.4.20 The 2016 plus development capacity assessment results indicate that there are no capacity issues forecast at the Old Mill Road/B3141 Woolavington Hill junction.

Queues

12.4.21 The 2016 plus development capacity assessment indicates that there are no issues forecast as a result of queuing on any arms of the junction.

Junction 8 – Woolavington Hill/Higher Road/Vicarage Road

12.4.22 **Table 12.107** below provides the 2016 plus development capacity assessment results for the Old Mill Woolavington Hill/Higher Road/Vicarage Road junction.

Table 12.107 Junction 8 – Woolavington Hill/Higher Road/Vicarage Road

Arm		**AM Dev 2016**			**PM Dev 2016**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Vicarage Road	B3141 (N), B3141 (S) & Higher Road	0.07	8.20	0.07	0.07	8.23	0.07
B3141 (N)	Vicarage Road, B3141 (S) & Higher Road	0.07	6.05	0.05	0.12	6.09	0.07
Higher Road	B3141 (N), Vicarage Road & B3141 (S)	0.23	9.96	0.19	0.66	13.19	0.40
A3141 (S)	B3141 (N), Vicarage Road & Higher Road	0.01	5.04	0.01	0.03	5.63	0.03

Capacity

12.4.23 The 2016 plus development capacity assessment results indicate that there are no capacity issues forecast at the Woolavington Hill/Higher Road/Vicarage Road junction. The highest RFC value at the junction is 0.40 which is shown on the Higher Road to B3141 Woolavington Hill (north) movement in the PM peak period.

Queues

12.4.24 The 2016 plus development capacity assessment indicates that there no issues are forecast as a result of queuing on any arms of the junction.

Junction 9 – M5 (Junction 22)/A38 Bristol Road/B3140

12.4.25 **Table 12.108** below provides the 2018 plus development capacity assessment results for the M5 (Junction22)/A38 Bristol Road and the B3140.

Table 12.108 Junction 9 – M5 (Junction 22)/A38 Bristol Road/B3140

Arm	AM Dev 2018			PM Dev 2018		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5	2.15	5.44	0.65	10.30	21.97	0.92
A38 Bristol Road south	1.41	6.89	0.56	10.55	52.50	0.94
B3140	69.64	229.72	1.15	3.05	19.27	0.76
A38 Bristol Road north	5.00	11.46	0.82	3.68	8.28	0.78

Capacity

12.4.26 The 2018 plus development capacity assessment indicates that the M5 (junction 22)/A38 Bristol Road/B3140 junction is predicted to exceed capacity during the AM peak period. The maximum RFC value forecast is 1.15 on the B3140 during the AM peak period.

Queues

12.4.27 The 2018 plus development capacity assessment indicates that there are significant queues forecast on the B3140 during the AM peak of 70 vehicles. Queuing on the M5 slip roads is predicted to reach 11 vehicles during the PM peak. These queues can be accommodated without causing blocking onto the M5 corridor.

Junction 10 – A38 Bristol Road/Harp Road/Brent Street

12.4.28 **Table 12.109** below provides the 2018 Baseline capacity assessment results for the A38 Bristol Road/Harp Road/Brent Street junction.

Table 12.109 Junction 10 – A38 Bristol Road/Harp Road/Brent Street

Arm		AM Dev 2018			PM Dev 2018		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Harp Road	A38 (N), A38 (S) & Brent Street	1.11	20.01	0.53	0.89	20.44	0.48
A38 (N)	Harp Road, A38 (S) & Brent Street	0.00	0.00	0.00	0.00	0.00	0.00
Brent Street	A38 (N) & Harp Road	0.57	31.37	0.37	1.38	85.52	0.61
Brent Street	Harp Road & A38 (S)	3.46	176.96	0.86	4.17	383.07	1.06
A38 (S)	A38 (N), Harp Road & Brent Street	0.22	10.11	0.18	0.65	16.52	0.40

Capacity

12.4.29 The 2018 plus development capacity assessment results indicate that the A38 Bristol Road/Harp Road/Brent Street junction is forecast to exceed capacity during the PM peak period. The highest RFC value forecast at the junction is 1.06 which is shown on the Brent Street arm of the junction during the PM peak period.

Queues

12.4.30 The 2018 plus development capacity assessment indicates a maximum forecast queue of 5 vehicles on Brent Street during the PM peak period. This can be accommodated on Brent Street.

<u>Junction 11 – A38 Bristol Road/Bridgwater Road</u>

12.4.31 **Table 12.110** below provides the 2018 plus development capacity assessment results for the A38 Bristol Road/Bridgwater Road junction.

Table 12.110 Junction 11 – A38 Bristol Road/Bridgwater Road

Arm	AM Dev 2018			PM Dev 2018		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A38 Bristol Road north	1.09	4.15	0.48	1.06	4.03	0.49
A38 Bristol Road south	1.33	3.18	0.54	1.01	2.68	0.48
Bridgewater Road	0.87	4.60	0.45	0.90	4.39	0.47

Capacity

12.4.32 The 2018 plus development capacity assessment results indicate that there are no forecast capacity issues associated with the A38 Bristol Road/Bridgewater Road junction. The highest RFC value at the junction is 0.54 which is shown on Bristol Road south during the AM peak period.

Queues

12.4.33 The 2018 plus development capacity assessment indicates that there are no issues forecast as a result of queuing on any arms of the junction.

<u>Junction 12 – A39 Bristol Road/Rooksbridge Road</u>

12.4.34 **Table 12.111** below provides the 2018 plus development assessment results for the A39 Bristol Road/Rooksbridge Road junction.

Table 12.111 Junction 14 – A39 Bristol Road/Rooksbridge Road

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Pill Road	0.03	12.50	0.03	0.03	12.44	0.03
A38 Bristol Road east	2.17	6.04	0.42	0.80	4.71	0.21
Rooksbridge Road	0.28	12.52	0.22	0.34	12.47	0.25
A38 Bristol Road west	0.02	4.29	0.02	0.01	4.25	0.01

Capacity

12.4.35 The 2018 plus development capacity assessment results indicate that there are no capacity issues forecast at the A39 Bristol Road/Rooksbridge Road junction.

Queues

The 2016 future baseline capacity assessment indicates that highest queue predicted is 2 vehicles on the A38 Bristol Road east during the AM peak period. This can be safely accommodated on this link.

Junction 13 – Dunball Roundabout (Existing Layout)

12.4.36 **Table 12.112** below provides the 2016 future baseline capacity assessment results for the Dunball Roundabout junction.

Table 12.112 Junction 13 – Dunball Roundabout

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A39	0.46	3.22	0.29	0.42	2.68	0.28
A39 Bristol Road south	1.17	3.24	0.52	3.18	6.13	0.76
Industrial Estate	0.00	0.00	0.00	0.00	0.00	0.00
A39 Bristol Road north	17.04	41.14	0.96	2.04	7.03	0.66

Capacity

12.4.37 The 2016 plus development capacity assessment results indicate that there are capacity issues associated with the Dunball Roundabout junction and that there is minimal residual capacity available. The highest RFC value predicted at the junction is 96 on the A38 during the PM peak period which is higher than the maximum practical RFC of 0.85.

Queues

The 2016 plus development capacity assessment indicates that highest queue predicted is 18 vehicles on the A38 Bristol Road north during the AM peak period.

Junction 13 – Dunball Roundabout (HPC DCO Layout)

12.4.38 **Table 12.113** below provides the 2016 future baseline capacity assessment results for the Dunball Roundabout junction.

Table 12.113 Junction 13 – Dunball Roundabout (HPC DCO Layout)

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A39	0.46	3.22	0.29	0.42	2.69	0.28
A38 Bristol Road south	0.97	2.94	0.47	3.18	6.14	0.76
Industrial Estate	0.00	0.00	0.00	0.00	0.00	0.00
A38 Bristol Road north	16.97	40.98	0.96	2.04	7.03	0.66

Capacity

12.4.39 The 2016 plus development capacity assessment results indicate that there are capacity issues forecast with the Dunball Roundabout (HPC DCO Layout) junction and that there is minimal residual capacity available. The highest RFC value predicted at the junction is 0.96 on the A38 during the PM peak period which is above the maximum practical RFC of 0.85.

Queues

The 2016 plus development capacity assessment indicates that highest queue predicted is 17 vehicles on both the A38 Bristol Road north during the AM peak period.

Junction 14 – Bristol Road/The Drove (Existing Layout)

12.4.40 **Table 12.114** below provides the 2016 plus development capacity assessment results for the Bristol Road/The Drove junction.

Table 12.114 Junction 14 – Bristol Road/The Drove

Item	Lane Description	AM Dev 2016			PM Dev 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
J1: The Drove/Bristol Road Signals							
1/1+1 /2	A38 Ahead Right	76 : 76%	12	6	96 : 96%	21	14
2/1	Bristol Road Left Ahead	76%	16	6	85%	20	8
3/1+3 /2	The Drove Right Left	66 : 74%	10	6	93 : 93%	20	12
	J2: Union Street						
4/1	Union Street Left	5%	0	0	4%	0	0
6/1	A38 (S) Ahead Right	37%	0	0	41%	0	0

Capacity

12.4.41 The 2016 future baseline capacity assessment results indicate that there are capacity issues associated with the Bristol Road/The Drove junction that there is minimal residual capacity available. The highest DoS value predicted at the junction is 96% on the A38 during the PM peak period which is above the maximum practical DoS of 90%

Queues

The 2016 future baseline capacity assessment indicates that highest queue predicted is 21 vehicles on both the A38 and Bristol Road during the PM peak period.

Junction 14 – Bristol Road/The Drove (HPC DCO Layout)

12.4.42 **Table 12.115** below provides the 2016 plus development capacity assessment results for the Bristol Road/The Drove (HPC DCO Layout) junction.

Table 12.115 Junction 14 – Bristol Road/The Drove (HPC DCO Layout)

Item	Lane Description	AM Dev 2016			PM Dev 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
J1: The Drove/Bristol Road Signals							
1/1+1 /2	A38 Ahead Right	76 : 76%	12	6	91 : 91%	18	10
2/1	Bristol Road Left Ahead	76%	16	6	89%	22	9
3/1+3 /2	The Drove Right Left	66 : 74%	10	6	88 : 89%	18	10
	J2: Union Street						
4/1	Union Street Left	5%	0	0	4%	0	0
6/1	A38 (S) Ahead Right	37%	0	0	41%	0	0

Capacity

12.4.43 The 2016 future baseline capacity assessment results indicate that there are capacity forecast at the Bristol Road/The Drove (HPC DCO Layout) junction. The highest DoS value predicted at the junction is 96% on the A38 during the PM peak period which is above the maximum practical DoS of 90%.

Queues

The 2016 future baseline capacity assessment indicates that highest queue predicted is 21 vehicles on both the A38 and Bristol Road during the PM peak period.

<u>Junction 15 – Bristol Road/Wylds Road (Existing Layout)</u>

12.4.44 **Table 12.116** below provides the 2016 plus development capacity assessment results for the M5 Junction 23 roundabout.

Table 12.116 Junction 15 – Bristol Road/Wylds Road

Arm		AM Dev 2016			PM Dev 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Wylds Road	Bristol Road north	73.37	542.46	1.29	43.87	365.32	1.22
Bristol Road north	Wylds Road	27.40	385.41	1.57	2.52	31.92	0.72

Capacity

12.4.45 The 2016 plus development capacity assessment results indicate that the Bristol Road/Wylds Road junction is predicted to exceed capacity during both AM and PM peak periods. The 2016 plus development capacity assessment results indicate that in the AM peak period Bristol Road has a predicted maximum RFC value of 1.57.

Queues

12.4.46 The 2016 plus development capacity assessment indicates that significant queues are predicted to occur on Wylds Road during the AM peak period with a maximum queue of 74 vehicles. The PM peak predicts a maximum queue of 44 vehicles.

Junction 15 – Bristol Road/Wylds Road (HPC DCO Layout)

12.4.47 **Table 12.117** below provides the 2016 plus development capacity assessment results for the M5 Junction 23 roundabout.

Table 12.117 Junction 15 – Bristol Road/Wylds Road (HPC DCO Layout)

Arm		**AM Dev 2016**			**PM Dev 2016**		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Wylds Road	Bristol Road north	52.09	328.46	1.18	26.79	221.13	1.10
Bristol Road north	Wylds Road	9.67	88.29	1.04	1.76	22.21	0.64

Capacity

12.4.48 The 2016 plus development capacity assessment results indicate that the Bristol Road/Wylds Road junction is predicted to operate over capacity during both AM and PM peak periods. The 2016 plus development capacity assessment results indicate that in the AM peak period Wylds Road has a predicted maximum RFC value of 1.18 and during the PM peak a predicted maximum of 1.10.

Queues

12.4.49 The 2016 plus development capacity assessment indicates that significant queues are predicted to occur on Wylds Road during the AM peak period with a maximum queue of 52 vehicles. The PM peak predicts a maximum queue of 27 vehicles.

Junction 16 – Wylds Road/The Drove (Existing Layout)

12.4.50 **Table 12.118** below provides the 2016 plus development capacity assessment results for the Wylds Road/The Drove junction.

Table 12.118 Junction 14 – Wylds Road/The Drove

Item	**Lane Description**	**AM Dev 2016**			**PM Dev 2016**		
		DoS (%)	**MMQ (pcu)**	**Delay (pcuHr)**	**DoS (%)**	**MMQ (pcu)**	**Delay (pcuHr)**
1/1+1 /2	Wylds Road Left Ahead Right	93.5 : 104.5	23	19.0	100.9 : 100.9	18	15.9
2/1	The Drove Left Ahead Right	57.4	12	3.4	72.7	16	5.0
3/1+3 /2	E Quay Right Left Ahead	66.2 : 66.2	8	3.7	111.7 : 111.7	48	40.4
4/1	Western Way Ahead Right Left	104.0 : 104.0	64	40.5	113.1 : 113.1	109	86.9

Capacity

12.4.51 The 2016 plus development capacity assessment results indicate that Bristol Road/The Drove junction is operating above the desirable maximum level of DoS. The highest DoS value predicted at the junction is 113% on Western Way Ahead Right Left during the PM peak period.

Queues

12.4.52 The 2016 plus development capacity assessment indicates a maximum queue of 109 PCUs on Western Way Ahead Right Left during the PM peak period.

Junction 16 – Wylds Road/The Drove (HPC DCO Layout)

12.4.53 **Table 12.119** below provides the 2016 plus development capacity assessment results for the Wylds Road/The Drove.

Table 12.119 Junction 16 – Wylds Road/The Drove

Item	Lane Description	AM Dev 2016			PM Dev 2016		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	The Drove Ahead Right Left	64	13	4	78	18	6
2/2+2/1	East Quay Left Ahead Right	87 : 87	10	6	128 : 128	89	79
3/1	Western Road Left	19	3	1	18	3	1
3/2+3/3	Western Road Left Right Ahead	103 : 103	50	33	109 : 125	100	83
4/1+4/2	Wylds Road Right Ahead Left	74 : 99	9	7	85 : 85	11	7
9/2+9/1	Left Ahead	88 : 88	28	10	92 : 9	33	13

Capacity

12.4.54 The 2016 future baseline capacity assessment results indicate that the Wylds Road/The Drove junction is predicted to operate over capacity during both AM and PM peak periods. The 2016 future baseline capacity assessment results indicate a predicted maximum DoS value of 103% during the AM peak on Western Road and a predicted maximum of 128% on East Quay during the PM peak period.

Queues

12.4.55 The 2016 future baseline capacity assessment indicates that significant queues are predicted to occur on Western Road during the AM peak period with a maximum queue of 50 vehicles. The PM peak predicts a maximum queue of 100 vehicles.

Junction 17 – Quantock Road/Hombery Way

12.4.56 **Table 12.120** below provides the 2016 plus development capacity assessment results for the Quantock Road/Hombery Way junction.

Table 12.120 Junction 17 – Quantock Road/Hombery Way

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Quantock Road	1.02	5.62	0.49	1.57	6.86	0.60
A39	1.04	4.34	0.49	1.52	5.50	0.58
Quantock Meadow	0.05	5.75	0.05	0.03	6.95	0.03
Homeberg Way	1.33	5.34	0.56	0.75	3.94	0.41

Capacity

12.4.57 The 2016 plus development capacity assessment results indicate that there are no capacity issues forecast at the Quantock Road/Hombery Way junction. The highest RFC value predicted at the junction is 0.60 on the Quantock Road during the PM peak period.

Queues

12.4.58 The 2016 plus development capacity assessment indicates that there are no forecast issues as a result of queuing on any arms of the junction.

<u>Junction 18 – A39/Main Road</u>

12.4.59 **Table 12.121** below provides the 2016 plus development capacity assessment results for the A39/Main Road junction.

Table 12.121 Junction 18 – A39/Main Road

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Main Road south	0.94	3.82	0.46	0.96	3.82	0.47
A39	0.44	3.56	0.28	0.59	3.88	0.34
Main Road north	1.37	10.76	0.57	2.49	16.92	0.72

Capacity

12.4.60 The 2016 plus development forecast capacity assessment results indicate that there are no capacity issues associated with the A39/Main Road junction that there would be significant residual capacity available. The highest RFC value is 0.72 on Main Road north during the PM peak period.

Queues

12.4.61 The 2016 plus development capacity forecast assessment indicates that there are no issues as a result of queuing on any arms of the junction. The maximum queue comprises three vehicles.

<u>Junction 19 – A39/High Street</u>

12.4.62 **Table 12.122** below provides the 2016 plus development capacity assessment results for the A39/High Street junction.

Table 12.122 Junction 19 – A39/High Street

Arm	AM Dev 2016			PM Dev 2016		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
High Street	0.18	3.67	0.12	0.33	3.73	0.20
A39 south	0.44	3.69	0.27	0.49	3.78	0.30
A39 west	0.33	2.81	0.24	0.22	2.43	0.17

Capacity

12.4.63 The 2016 plus development capacity assessment results indicate that there are no capacity issues predicted at the A39/High Street junction. The highest RFC value is 0.30 on the A39 south during the PM peak period.

Queues

12.4.64 The 2016 plus development capacity forecast assessment indicates that there are no issues as a result of queuing on any arms of the junction with minimal queues on all arms of the junction throughout both peak periods.

Junction 20 – High Street/Fore Street/Rodway

12.4.65 **Table 12.123** and **Table 12.124** below provides the 2016 plus development capacity assessment results for the High Street/Fore Street/Rodway, east and west respectively.

Table 12.123 High Street/Fore Street/Rodway (east)

Arm		AM Dev 2016			PM Dev 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Rodway	High Street	0.88	11.21	0.46	1.85	15.99	0.65
Fore Street	Rodway	1.78	15.60	0.61	0.75	8.90	0.40

Table 12.124 High Street/Fore Street/Rodway (west)

Arm		AM Dev 2016			PM Dev 2016		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
High Street	Rodway south	0.75	12.74	0.38	0.52	14.92	0.21
Rodway north	High Street	0.79	9.14	0.30	5.21	21.83	0.77

Capacity

12.4.66 The 2016 plus development capacity assessment results indicate that there are no forecasted capacity issues associated with the High Street/Fore Street/Rodway junctions. The highest RFC value occurs on Rodway north at 0.77 during the PM peak period.

Queues

12.4.67 The 2016 plus development capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 5 vehicles on Rodway north during the PM peak.

Junction 21 – M5 Junction 21

12.4.68 **Table 12.125** below provides the 2018 plus development capacity assessment results for the Wylds Road/The Drove.

Table 12.125 Junction 21 – M5 Junction 21

Item	Lane Description	AM Dev 2018			PM Dev 2018		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
J2: M5 Junction 21 (Controller 1)							
1/1	M5 N/B Off-slip Left	54%	6	3	67%	6	3
1/2	M5 N/B Off-slip Left Ahead	56%	7	3	70%	7	4
2/2	A370 (W) Ahead	92%	19	6	96%	24	8
5/1	South Circ Ahead	55%	10	1	75%	27	4
5/2	South Circ Ahead	54%	5	1	68%	9	2
5/3	South Circ Ahead Right	54%	5	1	67%	8	2
J2: M5 Junction 21 (Controller 2)							
1/1	North Circ Ahead	51%	10	3	76%	12	5
1/2	North Circ Ahead Right	55%	10	3	78%	13	5
2/1	M5 S/B Off-slip Left Ahead	24%	4	1	14%	2	1
2/2	M5 S/B Off-slip Ahead	62%	12	4	77%	20	5
2/3	M5 S/B Off-slip Ahead	68%	14	5	85%	25	7
4/1	East Circ Ahead	31%	8	3	24%	7	2
4/2	East Circ Right	57%	1	1	81%	4	3
4/3	East Circ Right	62%	1	1	88%	5	4
5/1	A370 Left	17%	2	1	34%	4	2
5/2	A370 Ahead	58%	10	4	80%	14	6

Capacity

12.4.69 The 2018 plus development capacity assessment results indicate that the M5 Junction 21 junction is predicted to exceed practical capacity during both AM and PM peak periods. The 2018 plus development capacity assessment results indicate a predicted maximum DoS value of 92% during the AM peak on the A370 (W) and a predicted maximum of 96% on the S370 (W) during the PM peak period.

Queues

12.4.70 The 2016 future baseline capacity assessment indicates that the maximum queues are predicted to occur on the south circulatory during the AM peak period with a maximum queue of 27 vehicles. Queues on the M5 slip roads peak at 25 on the southbound off slip but can safely be accommodated without blocking the M5 corridor.

Junction 22 – A370/Cowslip Lane

12.4.71 **Table 12.126** below provides the 2018 plus development capacity assessment results for the A370/Cowslip Lane.

Table 12.126 Junction 22 – A370/Cowslip Lane

Arm		AM Dev 2018			PM Dev 2018		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Cowslip Lane	A370 south	0.02	10.53	0.02	0.06	9.13	0.05
Cowslip Lane	A370 north	0.00	0.00	0.00	0.06	22.26	0.05
A370 south	Cowslip Lane	0.04	7.86	0.03	0.02	7.17	0.02

Capacity

12.4.72 The 2018 plus development capacity assessment results indicate that there are no capacity issues forecast at the A370/Cowslip Lane junction.

Queues

12.4.73 The 2018 plus development capacity assessment indicates that there would be no issues as a result of queuing on any arms of the junction.

<u>Junction 23 – A370/Maysgreen Lane</u>

12.4.74 **Table 12.127** below provides the 2018 plus development capacity assessment results for the A370/Maysgreen Lane.

Table 12.127 Junction 23 – A370/Maysgreen Lane

Arm		AM Dev 2018			PM Dev 2018		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Maysgreen Lane	A370 south	0.00	0.00	0.00	0.00	0.00	0.00
Maysgreen Lane	A370 North	0.00	0.00	0.00	0.00	0.00	0.00
A370 south	Maysgreen Lane	0.00	0.00	0.00	0.01	8.76	0.01

Capacity

12.4.75 The 2018 plus development capacity assessment forecast results indicate that there would be no capacity issues associated with the A370/Maysgreen Lane.

Queues

12.4.76 The 2018 plus development capacity assessment indicates that there are no predicted issues as a result of queuing on any arms of the junction.

<u>Junction 24 – M5 Junction 20</u>

12.4.77 **Table 12.128** below provides the 2019 plus development capacity assessment results for the M5 Junction 20.

Table 12.128 Junction 24 – M5 Junction 20

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
M5 southbound off slip	0.78	4.04	0.42	3.15	10.82	0.76
M5 northbound off slip	2.42	7.50	0.70	1.60	7.31	0.61
Ettlingen Way	1.95	3.80	0.65	1.90	3.73	0.65

Capacity

12.4.78 The 2019 plus development capacity assessment results indicate that there are no capacity issues forecast at Junction 20 of the M5. The highest RFC value at the junction is 0.76 which is shown on the M5 southbound arm of the junction during the PM peak period.

Queues

12.4.79 The 2019 plus development capacity assessment indicates that there would be no issues as a result of queuing on any arms of the junction. Queues on the M5 off slips can be accommodated on the existing off slips without blocking back onto the M5 corridor.

Junction 25 – M5 Junction 20/Central Way/Northern Way/Moor Lane

12.4.80 **Table 12.129** below provides the 2019 plus development capacity assessment results for the M5 Junction 20.

Table 12.129 Junction 25 – M5 Junction 20/Central Way/Northern Way/Moor Lane

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
B3133	4.50	9.69	0.82	21.67	41.91	0.98
Central Way	13.49	38.62	0.95	3.52	11.70	0.78
Moor Lane	4.55	30.35	0.83	2.22	13.52	0.69
Northern Way	3.33	11.61	0.77	6.13	19.19	0.87

Capacity

12.4.81 The 2019 plus development capacity assessment results indicate that the forecast capacity on two of the arms will exceed the practical capacity threshold for existing junctions. The highest RFC value at the junction is 0.98 which is shown on the B3133 arm of the junction during the PM peak period. The results also indicate that the Central Way arm of the junction would have an RFC value of 0.95 during the AM peak period.

Queues

12.4.82 The 2019 plus development capacity assessment indicates that the highest number of queuing vehicles predicted would occur on the B3133 arm of the junction with a total of 22 vehicles queuing during the PM peak period.

Junction 26 – Central Way/Kenn Moore Drive

12.4.83 **Table 12.130** below provides the 2019 plus development capacity assessment results for the Central Way/Kenn Moore Drive.

Table 12.130 Junction 26 – Central Way/Kenn Moore Drive

Arm		AM Dev 2019			PM Dev 2019		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Ken Moor Drive	Central Way south	0.07	6.90	0.07	0.04	7.46	0.04
Ken Moor Drive	Central Way north	0.82	16.94	0.45	0.41	16.08	0.29
Central way south	Ken Moor Drive	0.02	7.50	0.01	0.06	8.49	0.06

Capacity

12.4.84 The 2019 plus development capacity assessment results indicate that there are no capacity issues forecast at the Central Way/Kenn Moore Drive junction. The capacity assessment results indicate that there is significant residual capacity available with the highest RFC value predicted 0.45 on Ken Moor Drive during the AM peak period.

Queues

12.4.85 The 2019 plus development capacity assessment indicates that there are no issues predicted as a result of queuing on any arms of the junction.

Junction 27 – Central Way/Tutton Way

12.4.86 **Table 12.131** below provides the 2019 plus development capacity assessment results for the A370/Maysgreen Lane.

Table 12.131 Junction 27 – Central Way/Tutton Way

Arm		AM Dev 2019			PM Dev 2019		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Tutton Way	Central Way south	0.64	17.34	0.39	0.87	32.45	0.47
Central Way south	Tutton Way	0.13	8.98	0.11	0.18	10.59	0.15

Capacity

12.4.87 The 2019 plus development capacity assessment results indicate that there are no capacity issues predicted at the Central Way/Tutton Way junction. The highest RFC value at the junction is 0.47 which is shown on the Tutton Way arm of the junction in the PM peak period.

Queues

12.4.88 The 2019 plus development capacity assessment indicates that there are no issues predicted as a result of queuing on any arms of the junction.

<u>**Junction 28 – Central Way/B3133/Southern Way**</u>

12.4.89 **Table 12.132** below provides the 2019 plus development capacity assessment results for the Central Way/B3133/Southern Way.

Table 12.132 Junction 27 – Central Way/Tutton Way

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Central Way	2.68	10.35	0.72	11.34	37.69	0.94
B3133 south	1.15	5.70	0.53	5.48	20.59	0.85
Southern Way	4.65	17.04	0.83	2.57	12.82	0.72
B3133 north	37.78	152.89	1.07	11.08	57.77	0.95

Capacity

12.4.90 The 2019 plus development capacity assessment results indicate that the B3133 (north) is predicted to operate over capacity during the AM peak period. The highest RFC value predicted is 1.07 on the B3133 north during the PM peak.

Queues

12.4.91 The 2019 plus development capacity assessment indicates that the highest queue predicted is 38 vehicles on B3133 (north) during the AM peak period.

<u>**Junction 29 – B3133/Tutton Way**</u>

12.4.92 **Table 12.133** below provides the 2019 plus development capacity assessment results for the B3133/Tutton Way.

Table 12.133 Junction 29 – B3133/Tutton Way

Arm		AM Dev 2019			PM Dev 2019		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Tutton Way	B3133 south	0.09	9.50	0.08	0.12	9.24	0.10
Tutton Way	B3133 north	0.29	22.09	0.23	0.36	34.41	0.26
B3133 south	Tutton Way	0.16	4.47	0.08	1.31	4.11	0.27

Capacity

12.4.93 The 2019 plus development capacity assessment results indicate that there are no capacity issues forecast for the B3133/Tutton Way junction. The highest RFC value at the junction is 0.27 which is shown on the B3133 south arm of the junction in the PM peak periods.

Queues

12.4.94 The 2019 plus development capacity assessment indicates that there are no forecast issues as a result of queuing on any arms of the junction.

Junction 30 – B3133/Davis Lane

12.4.95 **Table 12.134** below provides the 2019 plus development capacity assessment results for the B3133/Davis Way junction.

Table 12.134 Junction 30 – B3133/Davis Lane

Arm		AM Dev 2019			PM Dev 2019		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Davis Lane	B3133 south	0.09	9.15	0.08	0.07	14.88	0.07
Davis Lane	B3133 north	0.33	23.92	0.24	1.98	68.00	0.69
B3133 south	Davis Lane	0.23	4.45	0.10	0.73	3.99	0.20

Capacity

12.4.96 The 2019 plus development capacity assessment results indicate that there are no capacity issues predicted at the B3133/Davis Way junction. The highest RFC value at the junction is 0.69 which is shown on the Davis Lane arm of the junction in the PM peak period.

Queues

12.4.97 The 2019 plus development capacity assessment indicates that there are no issues predicted as a result of queuing on any arms of the junction.

Junction 31 – Northern Way/B3130 Tickenham Road

12.4.98 **Table 12.135** below provides the 2019 plus development capacity assessment results for the Northern Way/B3130 Tickenham Road junction.

Table 12.135 Junction 31 – Northern Way/B3130 Tickenham Road

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Tickenham Road east	4.00	16.70	0.80	8.25	30.45	0.90
Northern Way	42.82	107.74	1.04	3.27	12.08	0.77
Tickenham Road west	16.71	66.51	0.98	3.41	16.18	0.78

Capacity

12.4.99 The 2019 plus development capacity assessment results forecast that the junction of Northern Way and the B3130 Tickenham Road would exceed capacity during the AM peak period. The highest RFC value forecast is 1.04 on Northern Way during the AM Peak period.

Queues

12.4.100 The 2019 plus development capacity assessment indicates that there is a highest predicted queue of 43 vehicles during the AM peak on Northern Way.

Junction 32 – B3128/Clevedon Road

12.4.101 **Table 12.136** below provides the 2019 plus development capacity assessment results for the B3128/Clevedon Road.

Table 12.136 Junction 32 – B3128/Clevedon Road

Arm		AM Dev 2019			PM Dev 2019		
From	To	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
B3128	Clevedon Road east	3.57	81.37	0.84	8.97	222.81	1.05
B3128	Clevedon Road west	5.80	99.86	0.90	17.26	178.35	1.05
Clevedon Road east	B3128	5.00	26.55	0.78	1.68	8.96	0.50

Capacity

12.4.102 The 2019 plus development capacity assessment results forecast that in the PM peak period the B3128 to Clevedon Road (east) shows a RFC values of 1.05, whilst Clevedon Road (west) operates with a highest RFC of 1.05 during the PM peak period. These results therefore forecast the junction to exceed capacity during the 2019 plus development scenario.

Queues

12.4.103 The 2019 plus development capacity assessment indicates the maximum predicted queue length is 18 vehicles on the B3128 to Clevedon Road (west) during the PM peak period.

Junction 33 – M5 Junction 19

12.4.104 **Table 12.137** below provides the 2019 future baseline capacity assessment results for the M5 Junction 19.

Table 12.137 Junction 33 – M5 Junction 19

Item	Lane Description (Controller 1)	AM Dev 2019			PM Dev 2019		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 N/B Off-slip Left	48	4	2	49	3	1
1/2	M5 N/B Off-slip Left Ahead	49	4	2	49	3	1
1/3	M5 N/B Off-slip Ahead	46	8	2	34	5	1
2/1	The Portbury Hundred Left Ahead	71	13	5	58	7	3
2/2	The Portbury Hundred Ahead	73	14	5	60	8	3
2/3	The Portbury Hundred Ahead	54	9	3	92	17	10
3/1	Royal Portbury Dock Road Left Ahead	83	4	3	93	12	6
3/2	Royal Portbury Dock Road Ahead	24	1	0	48	2	1
7/1	South Circ Ahead	34	1	0	25	3	1
7/2	South Circ Ahead Right	75	19	3	82	12	3
7/3	South Circ Right	48	4	1	34	6	1
8/1	West Circ Ahead Right	76	17	5	19	3	1
8/2	West Circ Right	79	11	4	49	9	2
8/3	West Circ Right	41	1	1	30	1	1
Item	**Lane Description (Controller 2)**	**AM Dev 2019**			**PM Dev 2019**		
		DoS (%)	**MMQ (pcu)**	**Delay (pcuHr)**	**DoS (%)**	**MMQ (pcu)**	**Delay (pcuHr)**
1/1	North Circ Left	15	3	1	21	3	1
1/2	North Circ Ahead	85	20	7	94	24	10
1/3	North Circ Right	18	1	0	35	6	1
2/1	M5 S/B Off-slip U-Turn	8	0	0	5	0	0
2/2	M5 S/B Off-slip Ahead Left	86	21	8	92	27	11
2/3	M5 S/B Off-slip Ahead	66	13	4	8	22	8
3/1	East Circ Ahead	55	8	3	52	11	5
3/2	East Circ Right	68	2	1	86	3	3
3/3	East Circ Right	8	1	0	9	2	1
5/1	Service Station Exit Left	19	1	0	27	1	0
5/2	Service Station Exit Ahead	63	3	1	70	5	2
7/1	Martcombe Road Left	62	11	4	65	12	4
7/2	Martcombe Road Ahead	47	8	3	48	8	3
7/3	Martcombe Road Ahead	67	13	4	51	9	3

Capacity

12.4.105 The 2019 future baseline capacity assessment results indicate that Junction 19 of the M5 is predicted to operate close to capacity during the AM and PM peak periods. The maximum DoS value forecast is 94% for the north circulatory during the PM peak period which is above the practical capacity of 90%.

Queues

12.4.106 The 2019 future baseline capacity assessment results indicate that Junction 19 of the M5 experiences a maximum queue of 27 vehicles for the southbound off slip during the PM peak period. This queue could be accommodated on the slip road without blocking back onto the M5 corridor.

Junction 34 – Royal Portbury Dock Road/Gordano Way/Portbury Way

12.4.107 **Table 12.138** below provides the 2019 plus development capacity assessment results for the Royal Portbury Dock Road/Gordano Way/Portbury Way junction.

Table 12.138 Royal Portbury Dock Road/Gordano Way/Portbury Way

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Gordano Way	0.11	2.63	0.09	0.20	2.85	0.16
Royal Portbury Dock Road south	0.46	2.52	0.29	0.15	2.35	0.10
Bradley Road	0.16	4.25	0.10	0.07	2.53	0.06
Portbury Way	0.05	2.97	0.03	0.07	2.17	0.06
Royal Portbury Dock Road north	0.13	4.11	0.07	0.20	3.07	0.15

Capacity

12.4.108 The 2019 plus development capacity assessment results predicts that there are no capacity issues associated with the Royal Portbury Dock Road/Gordano Way/Portbury Way junction. The maximum RFC value is 0.29 on Royal Portbury Dock Road south during the AM peak.

Queues

12.4.109 The 2019 plus development capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with minimal queues forecast on any arms of the junction.

Junction 35 – The Portbury Hundred/Station Road

12.4.110 **Table 12.139** below provides the 2019 plus development capacity assessment results for the Portbury Hundred/Station Road junction.

Table 12.139 The Portbury Hundred/Station Road

Arm		AM Dev 2019			PM Dev 2019		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Station Road	The Portbury Hundred (E)	0.40	25.26	0.26	0.25	15.09	0.18
Station Road	The Portbury Hundred (W)	0.00	0.00	0.00	0.00	0.00	0.00
The Portbury Hundred (E)	The Portbury Hundred (W) & Station Road	0.30	18.38	0.22	0.17	11.56	0.13

Capacity

12.4.111 The 2019 plus development capacity assessment results indicate that there are no capacity issues predicted at the Portbury Hundred/Station Road junction. The maximum RFC value forecast is 0.26 on Station Road during the AM peak.

Queues

12.4.112 The 2019 plus development capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with minimal queues predicted.

<u>Junction 38 – Severn Road/Chittening Road</u>

12.4.113 **Table 12.140** below provides the 2017 plus development capacity assessment results for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction.

Table 12.140 Severn Road/Chittening Road

Arm		AM Dev 2017			PM Dev 2017		
From	**To**	**Queue (Vehs)**	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
Severn Road east	Chittening Road	0.34	9.26	0.20	0.15	7.29	0.11
Severn Road east	Severn Road north	0.44	14.09	0.28	0.32	13.60	0.24
Chittening Road	Severn Road east	0.44	11.84	0.25	0.83	12.29	0.40

Capacity

12.4.114 The 2017 plus development capacity assessment results indicate that there are no capacity issues predicted at the Severn Road/Chittening Road junction. The highest RFC value forecast is 0.40 on Chittening Road during the PM peak period.

Queues

12.4.115 The 2017 plus development capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction, with minimal queues forecast on any arms of the junction.

<u>Junction 39 – A403 Smoke Lane/Poplar Way West</u>

12.4.116 **Table 12.141** below provides the 2017 plus development capacity assessment results for the A403 Smoke Lane/Poplar Way West junction.

Table 12.141 A403 Smoke Lane/Poplar Way West

Arm	AM Dev 2017			PM Dev 2017		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Smoke Lane	0.95	5.33	0.45	0.60	4.17	0.35
Poplar Way West	0.18	4.19	0.13	0.28	3.93	0.21
St Andrew's Road	0.77	4.12	0.40	0.66	3.97	0.36
Access	0.03	3.55	0.03	0.05	3.70	0.05

Capacity

12.4.117 The 2017 plus development capacity assessment results indicate that there are no capacity issues forecast at the A403 Smoke Lane/Poplar Way West junction. The highest RFC value predicted is 0.45 on Smoke Lane during the AM peak period.

Queues

12.4.118 The 2017 plus development capacity assessment indicates that there are no issues as a result of predicted queuing on any arms of the junction, with minimal queues on any arms of the junction.

Junction 40 – Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue

Table 12.142 below provides the 2017 plus development capacity assessment results for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction.

Table 12.142 Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue

Arm	AM Dev 2017			PM Dev 2017		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Poplar way east	0.13	3.46	0.08	0.30	3.26	0.22
Merebank Road	0.30	2.69	0.22	0.15	2.74	0.11
Poplar way west	0.16	2.56	0.13	0.14	2.41	0.11
Moorend Farm Avenue	0.04	3.13	0.03	0.09	2.55	0.08

Capacity

12.4.119 The 2017 plus development capacity assessment results indicate that there are no capacity issues forecast for the Poplar Way West/Poplar Way East/Merebank Road/Moorend Farm Avenue junction. The highest RFC value forecast is 0.22 on Merebank Road during the AM peak period and Poplar Way east during the PM peak period.

Queues

12.4.120 The 2017 plus development capacity assessment indicates that there are no predicted issues as a result of queuing on any arms of the junction, with only a single queuing vehicle present on any arm.

Junction 41 – A403 St. Andrew's Road/Kings Weston Lane

12.4.121 **Table 12.143** below provides the 2017 plus development capacity assessment results for the A403 St. Andrew's Road/Kings Weston Lane junction.

Table 12.143 A403 St. Andrew's Road/Kings Weston Lane

Item	Lane Description	AM Dev 2017			PM Dev 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	93	21	11	98	29	16
2/1	Kings Weston Lane Left Right	89	12	7	100	29	18
3/1	St Andrews Road (S) Ahead	70	16	4	46	8	2
3/2	St Andrews Road (S) Right	93	18	10	92	10	7

Capacity

12.4.122 The 2017 plus development capacity assessment results indicate that junction is predicted to reach capacity during the PM peak period with a forecast DoS of 100% on Kings Weston Lane.

Queues

12.4.123 The 2017 plus development capacity assessment indicates a forecast peak queue of 29 PCUs on St. Andrews Road and Kings Weston Lane during the PM peak period.

Junction 42 – A403 St. Andrew's Road/St. George's Industrial Estate

12.4.124 **Table 12.144** below provides the 2017 capacity assessment results for the A403 St. Andrew's Road/St. George's Industrial Estate junction.

Table 12.144 A403 St. Andrew's Road/St. George's Industrial Estate

Item	Lane Description	AM Dev 2017			PM Dev 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	83%	29	6	78%	25	5
1/2	St Andrews Road (N) Right	11%	1	0	19%	1	1
2/1	Distribution Centre Left	8%	0	0	6%	0	0
2/2	Distribution Centre Ahead Right	13%	1	0	9%	0	0
3/1	St Andrews Road (S) Left Ahead	67%	21	3	69%	23	3
3/2	St Andrews Road (S) Right	65%	4	2	22%	1	1
4/1	St Georges Industrial Estate Left	19%	1	0	10%	0	0
4/2	St Georges Industrial Estate Ahead Right	31%	2	1	13%	1	0

Capacity

12.4.125 The 2017 plus development capacity assessment results indicates that no capacity issues are forecast at the A403 St. Andrew’s Road/St. George’s Industrial Estate junction. The highest forecast DoS is 83% during the AM peak on St. Andrew's Road (N).

Queues

12.4.126 The 2017 plus development capacity assessment indicates that a maximum queue of 29 PCUs is forecast on St. Andrew's Road (N) during the AM peak period.

<u>Junction 43 – A403 St. Andrew's Road/King Road Avenue/Crowley Way</u>

12.4.127 **Table 12.145** below provides the 2017 plus development capacity assessment results for the A403 St. Andrew's Road/King Road Avenue/Crowley Way junction.

Table 12.345 A403 St. Andrew's Road/King Road Avenue/Crowley Way

Item	Lane Description	AM Dev 2017			PM Dev 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	St Andrews Road (N) Left Ahead	37	6	1	58	11	3
1/1	A403 St. Andrew's Road Left	38	6	2	60	12	3
1/2	A403 St. Andrew's Road Left	10	2	0	6	1	0
1/3	A403 St. Andrew's Road Ahead	18	2	1	6	1	0
2/1	Crowley Road Left Ahead	64	14	4	28	5	1
2/2	Crowley Road Ahead	62	13	3	26	4	1
2/3	Crowley Road Ahead	62	5	3	55	3	2
3/1	McLaren Road Left Ahead	47	2	1	54	3	2
4/1	King Road Avenue Ahead Left	47	3	1	54	3	2
4/2	King Road Avenue Ahead	26	2	1	27	2	1
8/1	North Circ Ahead	13	0	0	18	0	0
8/2	North Circ Right	11	2	1	15	2	1
9/1	East Circ Ahead	9	2	1	1	0	0
9/2	East Circ Right	13	2	0	1	0	0
10/1	South Circ Ahead	48	2	1	21	1	0
10/2	South Circ Right	46	2	1	20	1	0
10/3	South Circ Right	23	1	0	8	0	0
11/1	West Circ Ahead	27	1	0	16	1	0
11/2	West Circ Ahead	44	2	1	22	1	0
11/3	West Circ Right Ahead	37	6	1	58	11	3

Capacity

12.4.128 The 2017 plus development capacity assessment results indicate that a maximum DoS of 64% is predicted on the Crowley Road during the AM peak period.

Queues

12.4.129 The 2017 plus development capacity assessment indicates a maximum queue of 14 PCUs associated with the Crowley Way arm of the junction during the AM peak period.

Junction 44 – M5/A4/Avonmouth Way

12.4.130 **Table 12.146** below provides the 2017 plus development capacity assessment results for the M5/A4/Avonmouth Way roundabout.

Table 12.446 M5/A4/Avonmouth Way

Item	Lane Description	AM Dev 2017			PM Dev 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	Avonmouth Way Left	62	5	2	72%	10	4
1/2	Avonmouth Way Ahead Left	64	5	3	74%	11	5
1/3	Avonmouth Way Ahead	2	1	1	10%	1	0
2/1	M5 Ahead Left	63	9	4	33%	3	1
2/2	M5 Ahead	63	9	4	34%	4	2
2/3	M5 Ahead	65	10	4	37%	4	2
2/4	M5 Ahead	44	6	2	26%	3	1
3/1	Bristow Broadway Left	54	7	3	27%	2	1
3/2	Bristow Broadway Ahead Left	56	7	3	30%	3	1
3/3	Bristow Broadway Ahead	65	9	4	72%	8	4
4/1	Crowley Road Ahead Left	24	3	1	73%	9	4
4/2	Crowley Road Ahead	28	4	1	75%	10	5
4/3	Crowley Road Ahead	27	3	1	74%	10	5
4/4	Crowley Road Ahead	32	4	2	63%	8	4
4/5	Crowley Road Ahead	33	4	2	64%	8	4
5/1	North Circ Ahead	7	0	0	31%	1	1
5/2	North Circ Ahead	11	0	0	34%	2	1
5/3	North Circ Ahead	17	1	0	36%	2	1
5/4	North Circ Right	13	0	0	25%	0	0
5/5	North Circ Right	14	0	0	26%	0	0
6/1	East Circ Ahead	20	5	1	32%	8	1
6/2	East Circ Right Ahead	25	6	1	36%	9	1
6/3	East Circ Right	5	0	0	4%	0	0
7/1	Ahead	29	1	0	11%	0	0
7/2	Ahead	34	8	1	13%	3	0
7/3	Right Ahead	40	8	1	18%	3	0
7/4	Right	24	5	0	10%	1	0
8/1	West Circ Ahead	49	2	1	20%	0	0
8/2	West Circ Right Ahead	49	13	2	26%	3	1
8/3	West Circ Right	8	0	0	7%	0	0
9/1	W/B Exit Ahead	41	0	0	16%	0	0
9/2	W/B Exit Ahead	43	0	0	18%	0	0
9/3	W/B Exit Ahead	12	1	0	10%	0	0

Capacity

12.4.131 The 2017 plus development capacity assessment results indicate that there are no capacity issues forecast for the M5/A4/Avonmouth Way roundabout with a maximum DoS of 75% predicted on Crowley Road during the PM peak.

Queues

12.4.132 The 2017 plus development capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 11 PCUs predicted on Avonmouth Way during the PM peak.

Junction 45 – A4 Bristol Broadway/Avonmouth Road/Portway/M5

12.4.133 **Table 12.147** below provides the 2017 plus development capacity assessment results for the A4 Bristol Broadway/Avonmouth Road/Portway/M5 roundabout.

Table 12.147 A4 Bristol Broadway/Avonmouth Road/Portway/M5

Item	Lane Description	AM Dev 2017			PM Dev 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1	M5 Left	69	7	3	61	6	2
1/2	M5 Ahead	78	7	3	59	4	2
1/3	M5 Ahead	77	9	4	48	4	2
1/4	M5 Ahead	40	3	1	27	2	1
2/1	B4054 Left	10	1	0	6	0	0
2/2	B4054 Ahead	29	2	1	20	1	1
2/3	B4054 Ahead	66	6	3	57	5	2
3/1	Portway (S) Ahead	73	9	3	34	3	1
3/2	Portway (S) Ahead	37	4	1	58	6	2
3/3	Portway (S) Ahead	37	4	1	58	6	2
3/4	Portway (S) Ahead	20	2	1	26	2	1
4/1	Portway (N) U-Turn Left	55	4	2	82	10	5
4/2	Portway (N) Left	29	2	1	52	5	2
6/1	Ahead	57	5	1	54	1	1
6/2	Ahead	57	5	1	57	1	1
7/1	Ahead	36	2	1	20	2	1
7/2	Ahead	47	0	0	21	0	0
9/1	East Circ Ahead	69	6	3	67	6	3
9/2	East Circ Ahead	81	7	4	81	8	4
9/3	East Circ Right	23	1	0	15	0	0
10/1	South Circ Right	66	4	2	37	2	1
10/2	South Circ Right	66	2	1	48	1	1
11/1	West Circ Ahead	61	4	2	85	6	4
11/2	West Circ Ahead	61	4	2	85	6	4
11/3	West Circ Right	23	1	0	29	1	1
12/1	North Circ Ahead	51	4	2	75	7	3
12/2	North Circ Right	42	1	1	58	1	1
12/3	North Circ Right	33	1	0	72	2	2

Capacity

12.4.134 The 2017 plus development capacity assessment results indicate that there are no capacity issues forecast for the M5/A4/Avonmouth Way roundabout with a maximum Dos of 81% on the eastern circulatory during the PM peak.

Queues

12.4.135 The 2017 plus development capacity assessment indicates that there are no issues as a result of queuing on any arms of the junction with a maximum queue of 12

PCUs predicted on Avonmouth Way Left Ahead during the PM peak. The forecast queues on the M5 peak at 9 PCUs which can be accommodated without blocking to mainline M5 corridor.

Junction 46 – A4 Portbury/West Town Road

12.4.136 **Table 12.148** below provides the 2017 plus development capacity assessment results for the A4 Portbury/West Town Road junction.

Table 12.148 A4 Portbury/West Town Road

Item	Lane Description	AM Dev 2017			PM Dev 2017		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/2+1 /1	A4 Portway (E) Left Ahead	64 : 64%	12	3	48 : 48%	8	2
1/3	A4 Portway (E) Ahead	62%	12	3	47%	8	2
2/1	W Town Road Left	35%	3	1	60%	6	3
3/1	A4 Potway (W) Ahead	81%	2	2	79%	2	2
3/2	A4 Portway (W) Right	51%	4	2	10%	1	0
3/3	A4 Portway (W) Right	51%	4	2	10%	1	0

Capacity

12.4.137 The 2017 future baseline capacity assessment results indicate that there are no capacity issues associated with the A4 Portbury/West Town Road junction that there is significant residual capacity available. The maximum DoS predicted of 81% on the A4 Portway (W) Ahead movement during the AM peak period.

Queues

12.4.138 The 2017 future baseline capacity assessment indicates a maximum forecast queue of 12 vehicles on the A4 Portway (E) arm of the junction for the Left Ahead movement during the AM peak period.

Junction 49 – Clevedon Road/Stock Way North

12.4.139 **Table 12.149** below provides the 2019 plus development capacity assessment results for the Clevedon Road North junction.

Table 12.149 Clevedon Road/Stock Way North

Item	Lane Description	AM Dev 2019			PM Dev 2019		
		DoS (%)	MMQ (pcu)	Delay (pcuHr)	DoS (%)	MMQ (pcu)	Delay (pcuHr)
1/1+1 /2	**Clevedon Road Left Right**	70 : 70%	7	4	68 : 68%	5	4
2/1+2 /2	**Stock Wat (East) Ahead Right**	58 : 58%	6	3	67 : 67%	7	4
3/1	**Stock Way (West) Ahead Left**	72%	8	4	49%	5	2

Capacity

12.4.140 The 2019 plus development capacity assessment results indicate that no capacity issues are forecast at the junction of Clevedon Road/Stock Way North. The maximum RFC value predicted is 70% on Clevedon Road during the AM peak.

Queues

12.4.141 The 2019 plus development capacity assessment indicates no forecast queuing issues at the junction of Clevedon Road/Stock Way North. The highest queue forecast is 8 PCUs on Stock Way (West) during the AM peak. This queue can be accommodated on Stock Way.

Junction 50 Stock Way North/Stock Way South

12.4.142 **Table 12.150** below provides the 2019 plus development capacity assessment results for the Stock Way North/Stock Way South junction.

Table 12.150 Stock Way North/Stock Way South

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Stock Way North	0.88	10.03	0.45	1.52	12.00	0.60
Stock Way South	0.68	9.04	0.38	0.69	9.66	0.39
Silver Street	0.34	3.82	0.25	0.13	3.10	0.11

Capacity

12.4.143 The 2019 plus development capacity assessment results indicate that no capacity issues are forecast at the junction of Stock Way North/Stock Way South. The highest RFC value predicted is 0.60 on Stock Way North during the PM peak.

Queues

12.4.144 The 2019 plus development capacity assessment indicates a forecast maximum queue of 2 vehicles on Stock Way North during the PM peak period.

Junction 51

12.4.145 **Table 12.151** below provides the 2019 plus development capacity assessment results for the Stock Way South/Mizzymead Road junction.

Table 12.151 Stock Way South/Mizzymead Road

Arm	AM Dev 2019			PM Dev 2019		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
Mizzymead Road North	0.23	4.80	0.18	1.17	8.62	0.54
Mizzymead Road South	2.10	12.45	0.67	1.07	8.77	0.51
Stock Way South	0.91	11.45	0.46	0.75	9.39	0.41

Capacity

12.4.146 The 2019 plus development capacity assessment results indicate that no capacity issues are forecast at the junction of Stock Way South/Mizzymead. The highest forecast RFC value is 0.67 on Mizzymead Road South during the AM peak period.

Queues

12.4.147 The 2019 plus development capacity assessment indicates a maximum forecast queue of 3 vehicles on Mizzymead Road during the AM peak period. This queue can be accommodated on Mizzymead Road.

Summary

12.4.148 The results of the future design year modelling identify a total of 11 junctions which are predicted to operate at, or exceed their theoretical maximum RFC/DoS of 1.00/100%. These junctions are listed below:

- Junction 2 – A39/Puriton Hill;
- Junction 4 – Puriton Hill/Bath Road;
- Junction 6 – A39 Bath Road/Woolavington Hill;
- Junction 9 – M5 Junction 22/A38 Bristol Road/B3140;
- Junction 10 – Bristol Road/Harp Road;
- Junction 15 - Bristol Road/Wylds Road (Existing and HPC DCO Layout);
- Junction 16 – Wylds Road/The Drove (HPC DCO Layout);
- Junction 28 – Central Way/B3133 Southern Way;
- Junction 31 – Northern Way/Tickenham Road;
- Junction 32 – Clevedon Road/Tickenham Hill; and
- Junction 41 – A403 St. Andrew's Road/Kings Weston Lane.

12.4.149 The results of the future baseline modelling highlight a number of congestion points on the highway network which has been assessed. The first surrounds Junction 23 of the M5 corridor with the A38 and A39 corridors to the east and west of the M5 reaching capacity during their respective future design year scenarios.

12.4.150 The second area of congestion is at Junction 22 of the M5 where the slips roads join the A38 Bristol Road corridor. This junction is predicted to reach capacity during the 2016 assessment.

12.4.151 The third area of congestion includes junction at and surrounding Junction 20 of the M5 corridor. These junctions are predicted to exceed capacity during the 2019 future design year scenario.

12.4.152 The final junction predicted to exceed capacity during the future design year scenario is on the A403 St. Andrew's Road at the junction with Kings Weston Lane. This junction is located in Bristol, north of Junction 18 of the M5 corridor.

12.5 Sensitivity Testing

12.5.1 Three sensitivity tests have been undertaken as part of this assessment. The first assesses the potential for aggregate for the development to arrive from quarries located in the Mendips to the east of the development. The second reviews the impact the proposed SSE Seabank power station may have in regards to the volume of traffic using the local highway network to access the site during construction. The third provides a capacity assessment of the proposed A39 Access roundabout proposed as part of the Huntspill Energy Park infrastructure upgrades.

Mendip Quarry Sensitivity Tests

12.5.2 The potential for quarries to deliver stone to the development from the Mendip Hills is discussed in section 7. The quarries identified as potentially being able to supply aggregate to the development are all located close to the SRN.

12.5.3 National Grid has indicated that up to 20% of aggregate deliveries could arrive from these quarries.

12.5.4 This would result in changes to a number of junction models. The overall volume of traffic travelling to the Proposed Development would remain the same, however, the directional flow and distribution would differ based on an alternative vehicle origin and destination.

12.5.5 Of the junctions modelled those in **Table 12.152** below have been revisited as part of the Mendip quarry sensitivity test.

Table 12.152 Mendip Quarry Sensitivity Test Locations

Junction	Junction Reference
A39 Bath Road/Woolavington Hill;	6
A39 Bath Road/Bawdrip Lane;	5
A39 Puriton Hill/Bath Road;	4
A39 Puriton Hill/Hillside;	3
A39/Puriton Hill;	2
M5 Junction 23;	1
A38 Bristol Road/Harp Road;	10
A38 Bristol Road/A370 Bridgwater Road;	11
A38/Rooksbridge Road;	12
M5 Junction 22/A38 Bristol Road/B3140;	9
A370/Cowslip Lane;	22
A370/Maysgreen Lane; and	23
M5 Junction 21.	21

Summary of Results

12.5.6 **Table 12.153** below provides a summary of the highest RFC value or DoS value forecast for each junction during the plus development assessment against the highest RFC or DoS value forecast during the Mendip Quarry Sensitivity test. These results represent the value for a single arm.

12.5.7 Full results of the sensitivity tests can be found in **Volume 5.22.2, Appendix 22I**.

Table 12.153 Mendip Quarry Sensitivity Test Summary Results

Junction Reference	Plus Development Peak RFC/DoS	Mendip Quarry Sensitivity Peak RFC/DoS
6	1.00	1.01
5	0.08	0.08
4	101%	102%
3	0.20	0.20
2	5.50	6.92
1	99%	98%
10	1.06	0.92
11	0.54	0.53
12	0.42	0.41
9	1.15	1.14
22	0.05	0.05
23	0.01	0.01
21	96%	96%

12.5.8 The above results summary indicates that as a result of the Mendip Quarry Sensitivity Tests, a total of three junctions are predicted to experience an increase in RFC or DoS value. The largest increase is demonstrated through Junction 2 with an increase from 5.50 to 6.92. However as this junction is already forecast to be significantly over capacity, it is not considered that this forecast increase is realistic due to the unreliability of the model once it exceeds a value of 1.0.

12.5.9 A total of five junctions are predicted to experience a drop in peak RFC or DoS as a result of the Mendip Quarry Sensitivity Test. The remaining five junctions are predicted to retain the existing highest RFC or DoS value. The largest increase in capacity is forecast at Junction 10 where the RFC value is forecast to drop from 1.06 to 0.92. This effectively takes the junction from exceeding capacity to operating within capacity.

12.5.10 The remaining five junctions are forecast to remain with the same peak RFC or DoS value as the plus development scenario.

<u>Seabank Power Station Sensitivity Tests</u>

12.5.11 Traffic generation and distribution has been provided by URS for the proposed Seabank power Station Development in Bristol, Avon.

12.5.12 As no application for a DCO has yet been made in respect of the Seabank Power Station the development has been assessed as a sensitivity test rather than a committed development.

12.5.13 The junctions in **Table 12.154** below would be affected if the development were to go ahead.

Table 12.154 Seabank Sensitivity Test Locations

Junction	Junction Reference
A403 Chittening Road/Severn Road	38
A403 Smoke Lane/Poplar Way West	39
A403 St Andrews Road/King Western Lane	41
A403 St Andrews Road/St Georges Industrial Estate	42
A403 St Andrews Road/King Road Avenue/Crowley Way	43
M5 J18/A4/Avonmouth Way	44
Bristol Broadway / Avonmouth Road / Portway / M5	45
A4 Portway / West Town Road	46

Summary of Results

12.5.14 **Table 12.155** below provides a summary of the highest RFC value or DoS value forecast for each junction during the plus development assessment against the highest RFC or DoS value forecast during the Seabank power station Sensitivity test. These results represent the value for a single arm.

12.5.15 Full results of the sensitivity tests can be found in **Volume 5.22.2, Appendix 22I**.

Table 12.155 Seabank Sensitivity Test Summary Results

Junction Reference	Plus Development Peak RFC/DoS	Seabank Sensitivity Peak RFC/DoS
38	0.31	0.39
39	0.45	0.48
41	100%	100%
42	83%	85%
43	64%	65%
44	75%	76%
45	85%	85%
46	81%	82%

12.5.16 The above results demonstrate that all junctions assessed as part of the Seabank Sensitivity Test show a forecast decrease in capacity with the peak RFC or DoS figures increasing for all junctions.

12.5.17 Junctions 38, 39, 42, 43, 44 45 and 46 all remain within capacity during the Seabank Sensitivity Tests despite the increase in traffic flows resulting from the Seabank development.

12.5.18 Junction 41 is first forecast to exceed capacity during the 2017 future baseline assessment case and as a result, any increase in vehicle flows would likely exacerbate capacity problems at the junction.

A39 Access Roundabout Sensitivity Test

12.5.19 As part of the proposed Huntspill Energy Park development a number of infrastructure upgrades are proposed to the local highway network to serve the site and the potential traffic generation associated with it. As the A39 Access roundabout would form part of one of the approve construction routes, it has been agreed that this should be modelled to review the impact of the proposed development through the new roundabout.

12.5.20 The junction has been modelled using geometry and traffic flows from the TAR submitted with the planning application for the Huntspill Energy Park.

12.5.21 As the A39 Access roundabout is not currently in place, only two capacity assessment methodologies have been undertaken – Future Baseline and Future Baseline Plus Development.

12.5.22 The traffic flows extracted from the Huntspill Energy Park TAR represent 2018 traffic flows. The peak assessment year for the proposed development in that location is 2016. Therefore both the 2016 committed development traffic and the peak construction flows have been added to the 2018 flows in order to provide a robust assessment case.

12.5.23 **Table 12.156** below provide a summary of the 2018 Future Baseline model results.

Table 12.156 A39 Access roundabout

Arm	AM Base 2018			PM Base 2018		
	Queue (Vehs)	Delays (s)	RFC	Queue (Vehs)	Delays (s)	RFC
A39 Access	0.78	3.68	0.42	1.07	4.78	0.49
A39 Puriton Hill east	0.52	3.25	0.32	0.80	3.76	0.42
A39 Puriton Hill west	0.92	3.62	0.46	1.50	4.67	0.58
Puriton Hill	0.02	4.92	0.01	0.00	0.00	0.00

Capacity

12.5.24 The 2018 Future Baseline capacity assessment results indicate that there are no capacity issues predicted at the junction with a maximum RFC value of 0.58 predicted on the A39 Puriton Hill west arm of the junction.

Queues

12.5.25 The 2018 Future Baseline capacity assessment indicates a maximum queue of 2 vehicles on the A39 Puriton Hill west. This could be accommodated on the A39 Puriton Hill west arm without causing any blocking back to local junctions.

12.5.26 **Table 12.157** below provide a summary of the 2018 Future Baseline model results.

Table 12.157 A39 Access roundabout

Arm	AM Dev 2018			PM Dev 2018		
	Queue (Vehs)	**Delays (s)**	**RFC**	**Queue (Vehs)**	**Delays (s)**	**RFC**
A39 Access	0.82	3.88	0.43	1.07	4.79	0.49
A39 Puriton Hill east	0.52	3.26	0.32	0.98	4.12	0.47
A39 Puriton Hill west	1.10	3.94	0.50	1.51	4.68	0.58
Puriton Hill	0.02	5.21	0.02	0.00	0.00	0.00

Capacity

12.5.27 The 2018 Future Baseline Plus Development capacity assessment results indicate that there are no capacity issues predicted at the junction with a maximum RFC value of 0.58 predicted on the A39 Puriton Hill west arm of the junction.

Queues

12.5.28 The 2018 Future Baseline Plus Development capacity assessment indicates a maximum queue of 2 vehicles on the A39 Puriton Hill west. This could be accommodated on the A39 Puriton Hill west arm without causing any blocking back to local junctions.

12.5.29 Full modelling outputs of the above junction can be found in **Volume 5.22.2, Appendix 22H.**

13 Strategic Road Network Assessment

13.1 Introduction

13.1.1 In order to conduct an assessment of the impacts of the Proposed Development on the SRN an assessment of the total traffic at the merge and diverge sections of the M5 has been undertaken. The flows at the merge and diverge sections of Junctions 18-23 have been assessed for the future year scenarios set out in **Table 9.1** above.

13.1.2 The merge and diverge assessment reviews the configuration of major junction interchanges against traffic flows to determine a suitable design of a merge/diverge lane. This is based upon the total traffic entering and exiting the motorway slip lanes and the mainline flow on the motorway during a peak hour. For the purposes of this assessment the peak hour flows during the AM and PM peak have been used.

13.1.3 The assessment uses the industry standard methodology detailed in Design Manual for Roads and Bridges, Volume 6, Section 2, Part 1, TD22/06, February 2006).

13.1.4 The assessment is based on the following key data and assumptions where appropriate:

- traffic data has been extracted from the TRADS database for the mainline and slip roads of all M5 junctions assessed where available;
- the assessments have been conducted for the AM and PM network peak periods of 08.00-09.00 and 17.00-18.00; and
- total traffic used in the assessment includes baseline traffic flows (with growth factors applied to the future design year of assessment (Table 9.1), plus committed development, plus Proposed Development traffic flows.

13.1.5 DMRB sets out a number of suggested layouts for both merge and diverge lanes onto and off from a motorway. These layouts are referenced using letters from A to H for merge layouts and A to E for diverge layouts.

13.1.6 The merge layouts listed are as follows:

- A – Taper Merge;
- B – Parallel Merge;
- C – Ghost Island Merge;
- D – 2 Lane Urban Merge;
- E – Lane Gain;
- F – Lane gain with Ghost Island Merge (Option 1 – Preferred)
- F – Land Gain with Ghost Island Merge (Option 2 – Alternative)
- G – 2 Lane Gain with Ghost Island; and
- H – Alternative Ghost Island Merge with Auxiliary Lane.

13.1.7 The diverge layouts listed are as follows:

- A – Taper Diverge;

- B – (Option 1 – Preferred) – Ghost Island Diverge including for conversion of existing taper diverge
- B – (option 2 – Not preferred) – Parallel Diverge;
- C – Lane Drop at taper Diverge;
- D – (Option 1 – Preferred) – Ghost Island Diverge for Lane Drop including for conversion of existing Lane Drop at taper Diverge;
- D – (Option 2 – Not Preferred) – L:ane Drop at taper Diverge; and
- E – 2 Lane Drop.

13.1.8 **Table 13.1** details the assessment of the merge and diverge assessment for Junction 18 to 23 of the M5.

Table 13.1 M5 Junctions 18 to 23 Merge and Diverge Assessment

Junction	Direction	AM Peak Flow	PM Peak Flow	Existing Layout Reference	DMRB Appropriate Layout
18	N/B Mainline	4454	3262	N/A	
	N/B Diverge	620	548	B	A/C
	N/B Merge	No Data Available			
	S/B Mainline	2749	4671	N/A	
	S/B Diverge	701	564	A	A
	S/B Merge	501	511	E	A/D
19	N/B Mainline	3835	4367	N/A	
	N/B Diverge	811	606	A	A
	N/B Merge	1887	1454	E	F
	S/B Mainline	2510	4446	N/A	
	S/B Diverge	1087	3549	C	C/E
	S/B Merge	478	278	F	A
20	N/B Mainline	3431	3236	N/A	
	N/B Diverge	813	625	A	C
	N/B Merge	909	608	E	E

Junction	Direction	AM Peak Flow	PM Peak Flow	Existing Layout Reference	DMRB Appropriate Layout
	S/B Mainline	2492	3727	N/A	
	S/B Diverge	511	896	A	A
	S/B Merge	530	885	A	A/D
21	N/B Mainline	2087	2121	N/A	
	N/B Diverge	402	369	A	A
	N/B Merge	2001	1460	B	F
	S/B Mainline	1922	2184	N/A	
	S/B Diverge	1050	2010	A	A/D
	S/B Merge	459	419	A	A
22	N/B Mainline	2012	2225	N/A	
	N/B Diverge	727	838	A	A
	N/B Merge	No Data Available			
	S/B Mainline	2059	2002	N/A	
	S/B Diverge	376	660	A	A
	S/B Merge	1026	849	A	A/D
23	N/B Mainline	1559	1940	N/A	
	N/B Diverge	962	831	A	A
	N/B Merge	931	1120	A	A
	S/B Mainline	1901	1798	N/A	
	S/B Diverge	1121	882	A	A
	S/B Merge	832	1511	A	A

13.2 Junction 18

13.2.1 The northbound diverge flows for Junction 18 of the M5 suggest a required layout of A – Taper Diverge or C – Lane Drop at taper Diverge. Currently the existing diverge lane provides B – Parallel Diverge. This existing layout provides extra capacity for diverging traffic and as such it is considered that this layout would remain suitable for the increased traffic levels.

13.2.2 There was no data available within the TRADS database for the northbound merging flows onto the M5 at Junction 18.

13.2.3 The southbound diverge flows suggest a layout of A – Taper Diverge, as is currently provided on site.

13.2.4 The southbound merge flows suggest a requirement for a layout of either A – Taper Merge or D – Lane Urban Merge. The existing merging layout comprises E – Lane Gain. Whilst this is not the recommended merging layout, the land gain does provide additional capacity for traffic into the M5 corridor, and is considered to be fit for purpose to accommodate the increases in traffic flows onto the M5 in the future.

13.3 Junction 19

13.3.1 The northbound diverge flows for Junction 19 of the M5 suggest a required layout of A – Taper Diverge as is provided on site. As such it is considered that this layout would remain suitable for the increased traffic levels.

13.3.2 The northbound merge flows for Junction 19 of the M5 suggest a required layout of F – Lane Gain with Ghost Island Merge. The existing merging lane provides E – Lane Gain which suggests that additional capacity may be required to accommodate future increases in traffic through the junction. However, the effect of the Proposed Development traffic on this requirement is considered insignificant as even with the removal of all development traffic (29 vehicles) at this location, the suggested layout remains F – Lane gain with Ghost Island Merge.

13.3.3 The southbound diverge flows suggest a layout of C – Lane Drop at Taper Diverge or E – 2 Lane Drop. Currently layout C – Land Drop at taper Diverge is provided on site and is considered therefore to be suitable to serve the forecast traffic flows.

13.3.4 The southbound merge flows suggest a requirement for layout A – Taper Merge. The existing merging layout comprises F – Lane Gain with Ghost Island Merge. Whilst this is not the recommended merging layout, the land gain does provide additional capacity for traffic into the M5 corridor, and is considered to be fit for purpose to accommodate the increases in traffic flows onto the M5 in the future.

13.4 Junction 20

13.4.1 The northbound diverge flows for Junction 20 of the M5 suggest a required layout of C – Lane Drop at Taper Diverge. The currently layout provides layout A – Taper Diverge which retains capacity on the M5 corridor whilst retaining capacity on the offlsip. It is therefore considered that this layout would be suitable to serve the forecast traffic flows.

13.4.2 The northbound merge flows for Junction 20 of the M5 suggest a required layout of E – Lane Gain as is currently provided on site. It is therefore considered that this layout would remain suitable to serve the forecast traffic flows.

13.4.3 The southbound diverge flows suggest a layout of A - Taper Diverge as is provided on site and is considered therefore to be suitable to serve the forecast traffic flows.

13.4.4 The southbound merge flows suggest a requirement for layout A – Taper Merge or D – 2 Lane Urban Merge. The existing merging layout comprises A – taper Merge which is therefore considered to be fit for purpose to accommodate the increases in traffic flows onto the M5.

13.5 Junction 21

13.5.1 The northbound diverge flows for Junction 21 of the M5 suggests a required layout of A – Taper Diverge. The current layout provides layout A – Taper Diverge which is therefore considered be suitable to serve the forecast traffic flows.

13.5.2 The northbound merge flows for Junction 21 of the M5 suggest a required layout of F – Lane Gain with Ghost Island Merge. The current layout provides B – Parallel Merge. The effect of the Proposed Development traffic on this requirement is, however, considered insignificant as even with the removal of all development traffic (116 vehicles) at this location, the suggested layout remains F – Lane gain with Ghost Island Merge. The temporary nature of the Proposed Development trips further limits the potential impact at this location.

13.5.3 The southbound diverge flows suggest a layout of A - Taper Diverge or D – Ghost Island diverge for Lane Drop including for conversion of existing Lane Drop at taper Diverge. Currently layout A – Taper Diverge is provided on site and is considered therefore to be suitable to serve the forecast traffic flows.

13.5.4 The southbound merge flows suggest a requirement for layout A – Taper Merge or. The existing merging layout comprises A – taper Merge which is therefore considered to be fit for purpose to accommodate the increases in traffic flows onto the M5.

13.6 Junction 22

13.6.1 The northbound diverge flows for Junction 22 of the M5 suggest a required layout of A – Taper Diverge. The currently layout provides layout A – Taper Diverge which is therefore considered be suitable to serve the forecast traffic flows.

13.6.2 There was no data available within the TRADS database for the northbound merging flows onto the M5 at Junction 22.

13.6.3 The southbound diverge flows suggest a requirement for layout A – Taper Diverge or. The existing merging layout comprises A – Taper Diverge which is therefore considered to be fit for purpose to accommodate the increases in traffic flows onto the M5.

13.6.4 The southbound merge flows suggest a layout of A - Taper Merge or D – 2 Lane Urban Merge. Currently layout A – Taper Merge is provided on site and is considered therefore to be suitable to serve the forecast traffic flows.

13.7 Junction 23

13.7.1 The northbound diverge flows for Junction 23 of the M5 suggest a required layout of A – Taper Diverge. The current layout provides layout A – Taper Diverge which is therefore considered be suitable to serve the forecast traffic flows.

13.7.2 The northbound merge flows for Junction 23 suggest a layout of A – Taper Merge as is provided on site. This existing layout is therefore considered acceptable to serve the forecast traffic flows.

13.7.3 The southbound diverge flows suggest a requirement for layout A – Taper Diverge or. The existing merging layout comprises A – Taper Diverge which is therefore considered to be fit for purpose to accommodate the increases in traffic flows onto the M5.

13.7.4 The southbound merge flows suggest a layout of A - Taper Merge or D – 2 Lane Urban Merge. Currently layout A – Taper Merge is provided on site and is considered therefore to be suitable to serve the forecast traffic flows.

14 HIGHWAYS IMPACTS

14.1 Introduction

14.1.1 This section of the TA discusses the results described in the preceding two sections.

14.1.2 **Inset 14.1** below provides a summary of the capacity assessment results. It identifies the peak RFC or DoS recorded for the junction for each of the key three assessment scenarios (2013/2014 baseline, future baseline and future baseline + development).

14.1.3 This section describes discusses practical capacity as over 0.85 RFC or 90% and absolute capacity as being over 1.00 RFC or 100% DoS.

14.1.4 This enables those junctions that are currently experiencing capacity issues or those that will experience capacity issues in the future to be identified.

Inset 14.1 Modelling Results Summary

		2013 Baseline		Future Baseline		Future Design Year	
JMP Ref.	Junction	Max RFC / DoS	Queue	Max RFC / DoS	Queue	Max RFC / DoS	Queue
1	M5 Junction 23	0.58	1	0.95	31	0.99	44
2	A39 / Puriton Hill	0.10	0	1.00	4	5.50	16
3	A39 Puriton Hill / Hillside	0.15	0	0.18	0	0.20	0
4	A39 Puriton Hill / Bath Road	0.85	12	0.95	16	1.01	24
5	A39 Bath Road / Bawdrip Lane	0.06	0	0.07	0	0.08	0
6	A39 Bath Road / Woolavington Hill	0.49	1	0.59	1	1.00	10
7	Woolavington Hill / Old Mill Road	0.17	0	0.18	0	0.19	0
8	Woolavington Hill / Higher Road / Vicarage Road	0.38	1	0.39	1	0.40	1
9	M5 Junction 22/ A38 Bristol Road / B3140	0.85	7	0.96	18	1.15	57
10	A38 Bristol Road / Harp Road	0.43	1	0.48	1	1.06	1
11	A38 Bristol Road / A370 Bridgewater Road	0.44	1	0.47	1	0.54	1
12	A38 Bristol Road / Rooksbridge Road	0.29	1	0.32	1	0.42	1
13	Dunball Roundabout (Existing + HPC DCO Layout)	0.83	5	0.96	16	0.96	17
14	Bristol Road / The Drove (Existing + HPC DCO Layout)	0.66	-	0.89	19	0.91	21
15	Bristol Road / Wylds Road (Existing + HPC DCO Layout)	1.07	16	1.17	50	1.18	52
16	Wylds Road / The Drove (Existing + HPC DCO Layout)	0.91	-	1.25	129	1.28	100
17	Quantock Road / Hombery Way	0.53	1	0.60	2	0.60	2
18	A39 / Main Road	0.58	1	0.67	2	0.72	2
19	A39 / High Street	0.22	0	0.29	0	0.30	0
20	High Street / Fore Street / Rodway	0.64	2	0.67	2	0.77	2
21	M5 Junction 21	0.91	14	0.91	14	0.96	24
22	A370 / Cowslip Lane	0.04	0	0.05	0	0.05	0
23	A370 / Maysgreen Lane	0.01	0	0.01	0	0.01	0
24	M5 Junction 20	0.58	2	0.68	3	0.76	5
25	M5 Junction 20 / Central Way / Northern Way / B3133 Moor Lane	0.86	8	0.96	28	0.98	36
26	Central way / Kenn Moor Drive	0.38	1	0.44	1	0.45	1
27	Central Way / Tutton Way	0.29	0	0.41	1	0.47	1
28	Central Way / B3133 / Southern way	0.91	7	1.07	62	1.07	48
29	B3133 / Tutton Way	0.19	0	0.24	1	0.27	1
30	B3133 / Davis Lane	0.35	1	0.46	1	0.69	2
31	Northern Way / B3130 Tickenham Road	0.90	4	1.00	8	1.04	13
32	Clevedon Road / B3128 Tickenham Hill	0.85	10	1.01	13	1.05	15
33	M5 Junction 19	0.91	-	0.98	24	0.99	24
34	Royal Portbury Dock Road / Gordno Way / Portbury Way	0.26	0	0.29	0	0.29	0
35	The Portbury Hundred / Station Road	0.15	0	0.24	0	0.26	0
38	A403 Chittening Road / Severn Road	0.25	0	0.39	1	0.40	1
39	A403 Smoke Lane / Poplar Way West	0.44	1	0.45	1	0.46	1
40	Poplar way west / Poplar Way East / Merebank Road / Moorend Farm Avenue	0.20	1	0.22	0	0.22	0
41	A403 St. Andrew's Road / Kings Weston Lane	0.71	13	0.95	22	1.00	29
42	A403 St. Andrew's Road / St. George's Industrial Estate	0.68	19	0.82	29	0.83	29
43	A403 St. Adnrew's Road / King Road Avenue / Crowley Way	0.48	9	0.61	13	0.64	14
44	M5 / A4 / Avonmouth Way	0.66	10	0.69	11	0.75	10
45	A4 Bristol Broadway / Avonmouth Road / Portway / M5	0.72	8	0.80	8	0.85	6
46	A4 Portbury / West Town Road	0.11	0	0.14	0	0.14	0
49	Clevedon Road / /Stockway North	0.62	6	0.67	7	0.72	8
50	Stockway North / Stockway South	0.53	1	0.58	1	0.60	2
51	Stockway South / Mizzymead	0.59	1	0.64	2	0.67	2

14.2 2013/2014 Baseline Scenario

14.1.5 In total 11 junctions were identified as operating at or over their practical capacity (0.85 RFC or 90% DoS) during the 2013 baseline assessment. These include:

- (4) A39/Puriton Hill/Bath Road – 0.85;
- (9) M5 Junction 22/A38 Bristol Road/B3140 – 0.85;
- (13) Dunball Roundabout (Existing Layout) – 0.83;
- (15) A38 Bristol Road/Wylds Road (Existing Layout) – 1.07;
- (16) Wylds Road/The Drove (Existing Layout) – 0.91;
- (21) M5 Junction 21 – 0.91;
- (25) M5 Junction 20/Central Way/Northern Way/B3133 Moor Lane – 0.86;
- (28) Central Way/Southern Way – 0.91;
- (31) Northern Way/B3133 Tickenham Road – 0.91;
- (32) Clevedon Road/B3128 Tickenham Hill – 0.85; and
- (33) M5 Junction 19 – 0.91.

14.1.6 What is clear from the baseline results is that a the above junctions are currently operating at or very close to capacity during the highway network peak periods assessed.

14.3 Future Baseline Scenario

14.1.7 The Future Baseline scenario takes into account background traffic factored to an appropriate design year plus any committed development traffic in the area. For this assessment it has been assumed that all of the committed developments have been built out and the full level of traffic being generated by them assessed.

14.1.8 The results indicate that in the future baseline scenario, 15 junctions are predicted to operate above their theoretical capacity (0.85 RFC or 90% DoS). These are:

- (1) M5 Junction 23 – 0.95 (increase from 0.58 to 0.95);
- (2) A39/Puriton Hill – 1.00 (increase from 0.10 to 1.00);
- (4) A39 Puriton Hill/Bath Road – 0.95 (increase from 0.85 to 0.95);
- (9) M5 Junction 22/A38 Bristol Road/B3140 – 0.96 (increase from 0.85 to 0.96);
- (13) Dunball Roundabout (HPC DCO Layout) – 0.96 (increase from 0.83 to 0.96);
- (14) A38 Bristol Road/The Drove (HPC DCO Layout) – 0.89 (increase from 0.66 to 0.89);
- (15) A38 Bristol Road/Wylds Road (HPC DCO Layout) – 1.17 (increase from 1.07 to 1.17);
- (16) Wylds Road/The Drove (HPC DCO Layout) – 1.25 (increase from 0.91 to 1.25);
- (21) M5 Junction 21 – 0.91
- (25)M5 Junction 20/Central Way/Northern Way/B3133 Moor Lane – 0.96 (increase from 0.86 to 0.96);
- (28) Central Way/Southern Way – 1.07 (increase from 0.91 to 1.07);
- (31) Northern Way/B3133 Tickenham Road – 0.91 (increase from 0.90 to 1.00);
- (32) Clevedon Road/B3128 Tickenham Hill – 1.01 (increase from 0.85 to 1.01);
- (33) M5 Junction 19 – 0.98 (increase from 0.91 to 0.98); and

- (41) A403 St. Andrew's Way/Kings Weston Lane – 0.95 (increase from 0.71 to 1.00).

14.1.9 The results of the Future Baseline capacity assessments undertaken indicate that three of the junctions (M5 Junction 23, A39/Puriton Hill and A38 Bristol Road/The Drove) operating over theoretical capacity were operating under the theoretical capacity threshold during the Baseline scenario. Notably, the RFC at the A39/Puriton Hill rises from 0.10 to 1.00 (absolute capacity).

14.1.10 Many of the changes in the operation of the junctions assessed can in this instance be attributed to the large amounts of committed development occurring in proximity to the Proposed Development.

14.1.11 For example the large change in the operation of the A39/Puriton Hill junction is a result of the Hunstpill Energy Park committed development which is predicted to generate over 400 two-way vehicle movements during the AM peak period and over 600 in the PM peak period.

14.1.12 There are, however, proposals to mitigate the impacts at this junction and a new roundabout is proposed at the A39 Puriton Hill between Puriton Hill and Hill side. This junction forms part of a larger scheme of works to improve links to the proposed Huntspill Energy Park from the M5 Corridor to the west.

14.1.13 What is clear from the future baseline assessment is that a number of junctions are operating at or above capacity during the highway peak periods assessed.

14.4 Future Baseline + Development Scenario

14.1.14 The Future Baseline + Development scenario takes into account future background traffic (including the committed development traffic) plus the traffic predicted to be generated by the Proposed Development.

14.1.15 This scenario identifies 17 junctions which are predicted to operate above theoretical capacity (0.85 RFC or 90% DoS) during the AM and PM peak hour assessments. This is an increase from 15 junctions operating over their theoretical capacity in the future baseline scenario.

14.1.16 This indicates that the Proposed Development traffic would cause two junctions of those assessed to exceed their theoretical capacity thresholds. These are:

- (6) A39 Bath Road/Woolavington Hill – 1.00 (increases from 0.59 to 1.00); and
- (10) A38 Bristol Road/Harp Road (increases from 0.48 to 1.06).

14.1.17 The two junctions identified above are along key routes to be used during the construction. Junction 6 (A39 Bath Road/Woolavington Hill) will be effected by traffic from assessment group 2 while Junction 10 will be effected by traffic from assessment groups 4, 5 and 8.

14.1.18 Assessment group 2 is anticipated to generate a peak of 198 two-way daily vehicle movements of which 85 are anticipated to occur during AM and PM peak periods. This peak in traffic is anticipated to last for a single week after which it reduces.

14.1.19 Similarly, assessment groups 4, 5 and 8 are anticipated to generate a peak of 270 two-way daily vehicle movements of which 179 are anticipated to occur during AM and PM peak periods. This peak traffic generation is anticipated to occur for 7 weeks after which it reduces.

14.1.20 It should also be noted that any potential impacts as a result of the Proposed Development construction traffic will be temporary.

14.1.21 The remaining results from the future baseline with development traffic assessments indicate that Proposed Development is not anticipated to have a material impact on the operation of the other junctions assessed.

14.1.22 While the Proposed Development traffic can be seen not to be a contributory factor in a number of junctions operating over their theoretical capacity it is acknowledged that adding any additional traffic is likely to exacerbate pre-existing capacity issues.

14.1.23 As a result a number of mitigation measures have been proposed to minimise the potential impacts from the development. These are summarised within the following Section and set out in detail as part of the Draft CTMP (**Volume 5.26.5**).

14.5 SRN Merge/Diverge Assessments

14.5.1 The Merge and Diverge assessment of the SRN identifies that all but two of the existing Motorway junctions provide appropriate layout to serve the future traffic flows predicted along each link.

14.5.2 The merge lanes identified as requiring a new layout were the northbound merge at Junction 19 of the M5 and the northbound merge at Junction 21 of the M5. The impact of the Proposed Development at these two junctions is 29 vehicles (Junction 19) and 116 vehicles (Junction 21). It is worth noting that these proposed trips are temporary due to the nature of this development.

14.5.3 A review of the design guidance set out in Design Manual for Roads and Bridges, Volume 6, Section 2, Part 1 (TD22/06, February 2006) (Ref: TA.11) identifies that without the proposed developments set out within this document, the suggested layout for both merges would remain the same.

14.5.4 It is therefore considered that the impact of the proposed development on the infrastructure provided as part of the merge lane at Junctions 19 and 231 of the M5 is insignificant.

15 MITIGATION, CONTROLS AND MONITORING

15.1 Introduction

15.1.1 After investigating the potential effects of the construction traffic from the Proposed Development a number of mitigation measures are proposed.

15.1.2 These are provided below; however, they are set out in detail within the accompanying Draft CTMP which should be read in conjunction with this assessment.

15.1.3 The Objectives of the Draft CTMP are set out in **Table 15.1** below.

Table 15.1 Objectives of the Draft CTMP

Objective	Description
A	Ensure that movements of people and materials are achieved in a safe, efficient, timely and sustainable manner.
B	Keep freight and construction traffic to a minimum during network peaks in order to reduce the impact on the highway network during busy periods.
C	Ensure that the impact and disruption to the local communities and tourists is minimised.
D	Minimise construction trips where reasonable practical.
E	Ensure the continued monitoring, review and subsequent improvement of the CTMP and mitigation measures contained herein.
F	Limit the impacts on the SRN and LRN.
G	Limit the impacts on the natural and built environment.

15.2 Mitigation Measures

15.2.1 The Draft CTMP **(Volume 5.26.5)** outlines a number of issues and constraints identified at the strategic planning and design phase and how it is proposed they are mitigated (see also **Table 15.2** below)..

Table 15.2 Issues and Constraints

No	Issue/Constraint	Mitigated at Stage	Mitigation
1	Sensitive, built up areas (villages, towns) to be avoided by temporary construction traffic due to congestion, reduction of safety and air and noise pollution.	Construction route planning stage	Final construction routeing agreed with LPAs
2	Avoidance, if possible of built up areas to remove conflicts with parking areas and local roads and streetscapes	Construction route planning stage	Final construction routeing agreed with LPAs
3	Avoidance of narrow rural roads	Construction route planning stage	Final construction routeing agreed with LPAs
4	Limited visibility at bellmouths	Bellmouth design stage.	Bellmouth locations and designs agreed with LPAs
5	Impacts on pedestrian (PRoW), cyclist (National Cycle Network, Sustrans and local routes) and local equestrian routes	Construction route planning and Bellmouth design stages.	Where pedestrian, cyclist and equestrian networks has been impacted by the Proposed Development, re-provision through alternate alignment has been proposed and agreed with LPAs.
6	Construction traffic impacts on capacity of junctions and links on the construction routes (SRN and local highway network).	Transport and Construction route planning stage, TA capacity analysis, CTMP and mitigation	Final construction routeing, capacity sensitive junctions identified. Capacity assessments to be undertaken with the TA and agreed with LPAs
7	Environmental interests in the local area, i.e. conservation areas, monuments, listed buildings and Sites of Specific Scientific Interest (SSSI)	ES	As appropriate to the specific local issues and constraints listed, mitigation provided within the ES.

15.2.2 As identified within the previous sections of this report there are a number of junctions that will be used by the Proposed Development's construction traffic that would be operating over their theoretical capacity. These junctions are as follows:

- (1) M5 Junction 23;
- (2) A39/Puriton Hill;
- (4) A39 Puriton Hill/Bath Road;

- (6) A39 Bath Road/Woolavington Hill;
- (9) M5 Junction 22/A38 Bristol Road/B3140;
- (10) A38 Bristol Road/Harp Road;
- (13) Dunball Roundabout;
- (14) A38 Bristol Road/The Drove;
- (15) A38 Bristol Road/Wylds Road;
- (16) Wylds Road/The Drove;
- (21) M5 Junction 21;
- (25) M5 Junction 20/Central Way/Northern Way/B3133 Moor Lane;
- (28) Central Way/Southern Way;
- (31) Northern Way/B3133 Tickenham Road;
- (32) Clevedon Road/B3128 Tickenham Hill;
- (33) M5 Junction 19; and
- (41) A403 St Andrew's Way/Kings Weston Way.

15.2.3 While the anticipated impacts of the Proposed Development at these locations are for the most part immaterial, and all temporary, National Grid will to restrict HGV movements during the peak periods of assessment (08.00 – 09.00 and 17.00 – 18.00) at the junctions listed above. These restricted hours will be secrued by a DCO requirement.

15.2.4 While no specific restriction is proposed on the strategic road network, all vehicles accessing the above junctions will be required to use the SRN therefore limiting the vehicles that can use these junctions during the peak periods identified. This would significantly reduce the volume of constructions vehicles travelling through the SRN junctions that form part of this assessment.

15.2.5 In addition to the above vehicle timing restrictions, and detailed/securedwithin the CTMP the following mitigation will also be implemented during the construction of the Proposed Development.

- implement a TMG;
- vehicle identification methods;
- use of preferred construction routes;
- restriction of HGV movements;
- dispersed timings of HGV movements on the LRN;
- Incident Management Plan;
- PRoW Management Plan;
- complaints management procedure;
- vehicle wheel cleaning;
- banksmend vehicle movement monitoring;
- highway condition surveys;

- Temoprary Traffic Management Procedures (TTM);
- distribution of communication and promotional material; and
- AIL Movements.

16 FRAMEWORK TRAVEL PLAN

16.1 Introduction

16.1.1 Due to the nature of the Proposed Development, it would be impractical to provide Travel Plans (TPs) for each specific area of development. Also it should be noted that due to health and safety practices, staff (both National Grid and construction staff), will not be permitted to enter the construction site on-foot or by bicycle.

16.1.2 It is envisaged, however, that any contractor working on-site would work sustainably and encourage sustainable travel initiatives wherever possible.

16.1.3 As such a number of travel planning initiatives have been discussed below which fall under the following headings:

- travel planning awareness;
- welfare van provision for staff from external locations to site;
- public transport;
- car sharing;
- construction traffic management;
- modal shift monitoring;
- travel plan co-ordinator (TPC); and
- transport review group (TRG).

16.2 Indicative Framework Initiatives

Travel Planning Awareness

16.2.1 A key initiative of a TP will be the distribution of travel planning material. All employees could receive an introductory pack before starting work as such packs can be critical in influencing travel patterns. The contents of the packs could include, but not necessarily be limited to:

- introduction to TPs;
- website produced with up to date information on Proposed Development transport services, locations and timings;
- literature on the health benefits of walking, cycling and environmental benefits of sustainable modes of transport;
- maps showing local pick up and drop off points for welfare van services;
- details of public transport services, including timetables and routes; and
- details of the TPC.

Staff Welfare van Transport Service

16.2.2 Welfare van services will be provided to allow staff to gain access to and from external locations to the site.

16.2.3 These services will be arranged and co-ordinated according to designated shift patterns and will allow staff to be picked up and dropped off at key locations, i.e. central town locations/residential locations.

16.2.4 The provision of these services will ensure that the staff travel profile will be sustainable.

Public Transport

16.2.5 It is anticipated that there may be some locally employed members of staff who may choose to use public transport to access a welfare van pick up location as such public transport information including timetables could be provided in Introductory Packs, and on staff notice boards.

Car Sharing

16.2.6 There will be no on-site parking provision for staff who wish to travel by car, however, a car sharing data base would be created to identify those members of staff that live in the same area so that they could travel to the local accommodation together.

Construction Traffic Management

16.2.7 Sustainable movement of plant and materials will be adopted wherever possible. This will include ensuring vehicles arrive and exit the site loaded where practical.

16.2.8 In addition, plant and materials will be sourced locally where possible.

Travel Plan Co-ordinator (TPC)

16.2.9 The primary support and leadership for implementing a TP should come from an individual with a specific remit for delivering the measures proposed within the TP. This person is appointed as the TPC.

16.2.10 The TPC would assume overall responsibility of the CTMP once adopted. The roles and responsibilities of the TPC are as follows:

- co-ordinate and attend and TRG meetings;
- prepare annual monitoring report to present to TRG;
- be the first point of contact in case of any problems or information relating to the CTMP; and
- ensure that the CTMP is meeting the objectives set out above.

17 SUMMARY AND CONCLUSIONS

17.1.1 This TA forms part of an application to the Secretary of State for a DCO for the Hinkley Point C Connection Project (the Proposed Development) currently being made by National Grid Electricity Transmission plc (National Grid) for the following principal elements:

- construction of a 57km 400kV electricity transmission connection between Bridgwater in Somerset and Seabank, near Avonmouth, comprising:
- Installation of a 400kV overhead line; and
- Installation of 400kV underground cables.
- modifications to existing overhead lines at Hinkley Point, Somerset;
- construction of three 400kV Cable Sealing End (CSE) compounds along the route of the connection;
- construction of a 400/132kV substation at Sandford, North Somerset;
- extension of the existing 400kV substation at Seabank;
- the removal of existing 132kV overhead lines and the construction of replacement 132kV overhead lines and 132kV underground cables;
- extensions/modifications to existing 132kV substations at Churchill, Portishead, Avonmouth and Seabank; and
- associated works, for example, temporary access roads, highway works, temporary construction compounds, work sites and ancillary works.

17.1.2 To provide suitable access to the various locations of the construction works associated with the Proposed Development, a routeing and access assessment has been undertaken to establish:

- appropriate routeing for construction vehicles and staff;
- access locations from the LRN; and
- haul roads from the accesses to the construction works (sites, compound, and laydown areas).

17.1.3 Following this a full set of construction access routes have been agreed with the LPAs and the HA.

17.1.4 Bellmouths would be installed on the LRN, at agreed locations with the LPAs, to facilitate vehicle connection between the LRN and the haul roads. Each bellmouth would be designed on a site by site basis. Discussions regarding the locations, design and visibility splays of the bellmouths have been undertaken through the consultation process with the LPAs.

17.1.5 Haul roads would be constructed between the bellmouths at the LRN and the construction sites, i.e. pylons, compounds, laydown areas or substations as appropriate.

17.1.6 A highway accident review has been undertaken assessing the routes to be used to access the Proposed Development from the SRN. After consulting local accident records there were no significant correlations found in the location, circumstances or timings of the accidents to suggest that highway layout, condition or design were significant contributory factors.

17.1.7 Furthermore, an assessment against national averages has been undertaken and no differences were found to suggest a significantly higher accident rate along those routes to be used for the construction traffic associated with the Proposed Development.

17.1.8 Daily, classified, two-way traffic generation data has been provided for the Proposed Development. This is broken down for a number of key bellmouths providing access from the LRN to the Proposed Development.

17.1.9 A 20% contingency factor has been added to all predicted development traffic.

17.1.10 For this assessment those bellmouths located in proximity to one another that will use the same route to/from the SRN to the Proposed Development have been grouped.

17.1.11 In total 23 separate groups of traffic generating bellmouths have been identified and the cumulative traffic generation assessed.

17.1.12 A number of groups may combine along a single link to reach the SRN. In this instance a further cumulative assessment has been undertaken looking at the peak cumulative assessment of those groups.

17.1.13 Profiles of construction traffic throughout the Proposed Development programme have been assessed and an indication of the duration of the peak volumes of construction traffic identified.

17.1.14 In most cases the peak volume of construction traffic lasts for a relatively short period of time after which it reduces significantly.

17.1.15 All impacts associated with the traffic generated by the Proposed Development would be temporary. Once operational very few vehicle trips would be generated by the development.

17.1.16 Following scoping discussions the LPAs provided a list of 47 junctions along the proposed construction routes to be assessed in regard to capacity.

17.1.17 Three scenarios were assessed which included:

- observed baseline traffic flows;
- future baseline traffic flows taking account of future traffic growth and committed developments; and
- future baseline traffic flows plus the Proposed Development’s construction traffic.

17.1.18 The capacity assessments indicated that in the future baseline scenario (without development traffic) a total of 15 junctions would operate over their practical capacity of 0.85 RFC or 90% DoS.

17.1.19 When applying the Proposed Development traffic this results in a further two junctions operating over their practical capacity while the remaining 15 stay relatively unchanged in regard to their operational capacity during the highway network peak periods assessed.

17.1.20 This shows that the development is having a material impact on the operational capacity of two junctions only. These are:

- A39 Bath Road/Woolavington Hill; and
- A38 Bristol Road/Harp Road.

17.1.21 While the Proposed Development is having a very limited material impact on the operation of the surrounding highway network it is acknowledged that there are some existing capacity issues during highway network peak periods at junctions in proximity to the Proposed Development.

17.1.22 As such a mitigation strategy has been identified that will restrict the movement of HGVs through any junction on the LRN shown to be above an RFC of 0.85 or 90% DoS during the highway peak periods of 08.00-09.00 and 17.00-18.00.

17.1.23 These include the following:

- A39/Puriton Hill;
- A39/Woolavington Hill;
- A39/Bath Road;
- Bristol Road/The Drove;
- Bristol Road/Wylds Road;
- High Street/Rodway;
- A38 Bristol Road/B3140;
- Central Way/B3133/Southern Way;
- Northern Way/B3130 Tickenham Road;
- Clevedon Road/Tickenham Hill;
- Clevedon Rd/B3128;
- King Andrew's Road/King Weston Lane;
- King Andrew's Road/King Road Avenue/Crowley Way; and
- A4/Avonmouth Road/Portway/M5.

17.1.24 In addition to the above, further comprehensive mitigation is proposed in regards to the construction traffic associated with the Proposed Development as set out in the accompanying Draft CTMP. This includes:

- HGV/LGV construction vehicle identification;
- preferred HGV/LGV/staff transport construction routes;
- HGV traffic movement restrictions;
- on site vehicle movements – permitted hours;
- HGV emissions (use of Euro standard IV vehicles to limit pollution);
- banksman/Presence of personnel at access;
- capping of HGV movements;

- timings of HGV movements;
- set transport shift patterns;
- Delivery Management System (DMS);
- minimising staff trips through use of welfare van services for staff transport;
- routeing staff welfare vanes along construction routes;
- cleansing of Vehicles;
- nil provision for private vehicle parking at Compound and Laydown Areas;
- PRoW Management Plan;
- highway condition surveys;
- Temporary Traffic Management (TTM) Procedures;
- Complaints management procedures;
- promotional material/communications;
- TMG and Transport Co-ordination Officer (TCO) to be employed to implement and monitor the CTMP; and
- Travel Planning Measures.

17.1.25 A number of Travel Planning measures will be implemented by National Grid, however, given the nature and location of the Proposed Development construction staff will not be permitted to enter the site on-foot, by bicycle or in their own private vehicles.

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