Local Plan 2036

Havant BOROUGH COUNCIL

Hayling Island Transport Assessment

Addendum
November 2019

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The Hayling Island Transport Assessment Addendum has been prepared by Havant Borough Council with traffic modelling from Systra.

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Version	Date		
0.3	6/9/19	For initial peer review	SM
0.4	22/10/19	For peer review	SM
0.5	25/10/19	Finalisation	SM
0.6	31/10/19	Finalisation	SM
0.7	7/11/19	HIIG review	SM

Contents

1. Executive Summary

1.1 The Havant Borough Local Plan sets out a vision and a framework for the future development, growth and prosperity of the Borough. The Local Plan process commenced with the adoption of the draft Local Plan Housing Statement, in December 2016. Further evidence has been obtained and consultation undertaken to prepare the Local Plan. The Local Plan aims to deliver about 10,000 new homes, and some 96,000 sqm of new employment floor space in the Borough, by 2036, including development on Hayling Island.

1.2 Crucial to ensuring that the Local Plan's proposals constitute sustainable development, is the timely provision of infrastructure, to support the amount of development proposed in various locations across the Borough. Part of the Local Plan evidence base is provided by the Mainland Transport Assessment and Hayling Island Transport Assessment. They both review the existing traffic and transport networks, examine future demand and identify required mitigation and improvements to accommodate development.

1.3 The original Hayling Island Transport Assessment (hereafter referred to as 'HITA') dated January 2019[1] reviewed through modelling the impact of additional development traffic on the local highway network and considered means of mitigating its effect through the use of packages of interventions including *inter alia* changes to highway layouts, public transport improvements, parking controls, and demand management. The HITA concluded that development could be accommodated on the mitigated highway network without a severe cumulative impact being created, but recommended that further work should be carried out to improve understanding and the costing of such measures. This Addendum is the result of that further work.

1.4 As with the original HITA, this Addendum has been prepared by Havant Borough Council with traffic modelling from Systra.

1.5 A microsimulation model, in a software package called 'Paramics'[2], was built for the HITA to assist in assessing the impact of the future development on the road and transport network on Hayling Island and any required infrastructure improvements to support and provide an evidence base for the Local Plan. This validated and calibrated model has been used in the present work.

1.6 The original mitigation packages proposed in the HITA have been reviewed and refined, and additional design resource has been invested in developing these mitigation measures to enable more detailed modelling. Specific consideration has also been given to the effect of boundary conditions at the Langstone roundabout where these were not reported in the original HITA. Where the HITA contains all necessary background information it has not been repeated in this Addendum. Therefore this report and the original HITA should be read together; however where the two do not agree (through update, extension or clarification) then this document should be taken as the latest version.

1.7 It is considered that the impact of Local Plan development can be mitigated by implementation of the measures suggested in this report. If so implemented, the overall impact of Local Plan

[1] https://www.havant.gov.uk/hayling-island-transport-assessment retrieved 12 August 2019

[2] https://www.paramics.co.uk/en/ retrieved 12 August 2019

development is not considered to represent a severe cumulative impact on the road network. The estimated cost of these mitigation measures is estimated as **£6.274m** for an initial phase of highway related interventions (from a total of some £24m of possible interventions identified) and up to **£9.55m** for various combinations of non-highway measures. Funding will be from a number of sources; the Community Infrastructure Levy (CIL) is intended to provide funding for more strategic projects, whilst S106 funding is more closely tied to interventions to address harm directly caused by the specific development; and government and Local Enterprise Partnership (LEP) funding may also feature in the funding mix.

1.8 Modelling of the various mitigation measures demonstrates some positive improvements by reducing journey times and queue lengths, especially if the measures are implemented at an early date, although these benefits are then overtaken by later development. The modelling of these measures has extended well beyond the normal requirements for a Transport Assessment and there is confidence in the effectiveness of what is now being presented. This has included considering the wider benefits associated with the proposed mitigation measures, such as reduced community severance and increased road safety which would otherwise be compromised with additional Local Plan traffic.

1.9 Inevitably further design work will need to be carried out to further refine the interventions. Many of the measures are already at an advanced stage of design on the basis that the modelling detail has required 'design at risk' to be undertaken by the council.

1.10 The form of this report is as follows:

- Chapter 2 considers the original HITA in the context of the Island's geography and traffic conditions
- Chapter 3 considers the status and role of this Addendum and highlights what has changed between this document and the original HITA
- Chapter 4 considers the outcomes of the revised and extended modelling including the revised mitigation measures in light of the decisions made at the Council meeting of 30th January
- Chapter 5 considers non-traffic interventions for walking, cycling and public transport and the role they can play in reducing the impact of traffic generated by new Local Plan development to 2036
- Chapter 6 considers the contribution and options for future role of the Hayling Billy Trail
- Chapter 7 considers all measures in the Addendum (highway and non-highway) in terms of a benefits matrix which looks at the wider societal safety, environment and severance benefits of the proposed interventions
- Chapter 8 considers the funding arrangements for the various mitigation measures identified in the Addendum report
- Chapter 9 concludes the Addendum with a review of the findings and proposals for future work.

1.11 The Appendices provide summary (Appendix A) and more detailed (Appendix B) consideration of the modelling process and results, together with Linsig modelling results (Appendix C), junction traffic weights (Appendix D) and a matrix of mitigation measures scored against societal benefits (Appendix E).

Glossary and Abbreviations

Glossary

LinSig is a software tool by JCT Consultancy which allows traffic engineers to model traffic signals and their effect on traffic capacities and queuing. As well as modelling the effects of traffic signals LinSig also optimises signal timings to reduce delay or increase capacity at a junction or group of interlinked junctions.

Paramics uses a car-following and lane-changing model to show the correlation of numerical data for road networks under differing conditions through the use of computer graphics. A Paramics model is represented by a combination of “nodes, links and other associated objects” to replicate real life geometry constraints. Upon release from an “origin zone”, each vehicle attempts to complete its journey towards a “destination zone” whilst being bounded by physical and dynamic vehicle parameters. Through the use of microsimulation, Paramics allows users to simulate individual vehicle movements to predict future travel pattern behaviour as a result from a change in traffic volume or geometric road layout.

Abbreviations

APV	Amphibious Passenger Vehicle
CAV	Connected Autonomous Vehicle
CIL	Community Infrastructure Levy
DMRB	Design Manual for Roads and Bridges
ECP	England Coast Path
HBC	Havant Borough Council
HCC	Hampshire County Council
HCS	Hampshire County Council Countryside Service
HITA	Hayling Island Transport Assessment published January 2019
HOV	High Occupancy Vehicles
ITS	Intelligent Transport System(s)
LCWIP	Local Cycling and Walking Infrastructure Plan
LEP	Local Enterprise Partnership
NCN	National Cycle Network
NPPF	National Planning Policy Framework
PCN	Penalty Charge Notice
PRoW	Public Right of Way
ROMANSE	Road Management System for Europe
RTPI	Real Time Passenger Information
SRTM	Sub-Regional Transport Model
SRtS	Safe Routes to School
TA	Transport Assessment
TCF	Transforming Cities Fund
TEMPro	Trip End Model Presentation Program
TRO	Traffic Regulation Order

2. Introduction and Background

2.1 The National Planning Policy Framework (NPPF) makes clear that Local Plans should plan positively for the development needs of the area, including employment, housing, infrastructure and retail. The impact of the Local Plan and other future development on the local road network needs to be assessed and evaluated and possible mitigation identified and tested.

2.2 Government policy requires all Local Plans to be supported by a robust transport evidence base. This is normally produced in the form of a strategic Transport Assessment (TA) providing a thorough assessment of the transport implications of development on the traffic and transport network.

2.3 To support the emerging Local Plan, Havant Borough Council commissioned two Transport Assessments (TAs) – one covering the Borough's mainland areas using the Hampshire Sub-regional Transport Model (SRTM) and one, more detailed assessment, covering Hayling Island and Langstone.

2.4 The Hayling Island Transport Assessment (HITA) published in January 2019 was prepared by Havant Borough Council with technical support from Campbell Reith and traffic modelling from Systra. It examined the operation of the existing transport infrastructure and networks. The assessment tested various development scenarios, through a Paramics Microsimulation model, developed by Systra, and reported on the potential transport related implications of the proposed land allocations within the Local Plan which included 1087 additional dwellings within the Plan period. The study also considered and tested mitigation measures that could be employed to offset any significant transport impacts. It concluded by recommending further work on the mitigation options it presented.

2.5 The approval of the HITA at Extraordinary Council of the pre-submission Local Plan on 30th January 2019 included a request (recorded at minute 51(n)[3]) that this further work be advanced and delivered before the submission of the Local Plan to the Secretary of State for Housing, Communities and Local Government. This Addendum contains the results of that further work.

2.6 Hayling Island currently has approximately 17,500 residents and a number of small businesses, with a major influx of visitors who are attracted to the island's beaches and holiday camps. The geography is unusual (but in no way unique) in that the A3023 is the only road linking the island with the mainland via a bridge, and all major statutory services are situated on or adjacent to this route. Beyond the Island, the A3023 passes through Langstone, immediately north of the bridge, before reaching the grade separated Langstone roundabout with the A27 trunk road and the B2149 for access to Havant town centre.

2.7 A map of Hayling Island and Langstone and the connection to the A27 and the mainland can be seen in Figure 1.

2.8 Traffic flows on the A3023 can be particularly heavy, not only during peak hours, but in the hours in interpeak and at weekends. During school holiday periods, and particularly in the summer, traffic

[3] http://havant.moderngov.co.uk/mgAi.aspx?ID=14196 retrieved 12 August 2019

flows are at their highest and there is often a continuous procession of vehicles during daylight hours making joining or crossing the traffic stream difficult. Access for emergency vehicles can be inhibited by the constrained network at these times. The speed limit on the A3023 varies between 30mph and 40mph.

2.9 Due to the lack of employment and facilities on the Island, there is a higher than average proportion of off-Island travel to destinations beyond the immediate area. This has the potential to limit the possible gains from modal shift (i.e. to walking and cycling) because typical journey length is longer than would be experienced elsewhere. This is further considered in chapter 5.

2.10 Any disruption to traffic flow on the A3023 within Langstone, on the bridge, or on Hayling Island, impacts very quickly on other roads in the area due to the traffic sensitive nature of these routes. Should traffic congestion tail back onto the mainline of the A27 trunk road, this leads to the hazard of stationary or slow-moving traffic on a high-speed dual- carriageway, and into Havant town centre, therefore further reducing the resilience of the network, impacting journey reliability and reducing the attractiveness of the area for business investment and regeneration.

2.11 The background to the study including its scope, objectives and methodology; the background data used for modelling; of the Local Plan itself with development locations and a review of the existing transport networks on the Island, are all as contained in the original HITA and so are not repeated here. Reference should be made to the earlier document for this information.

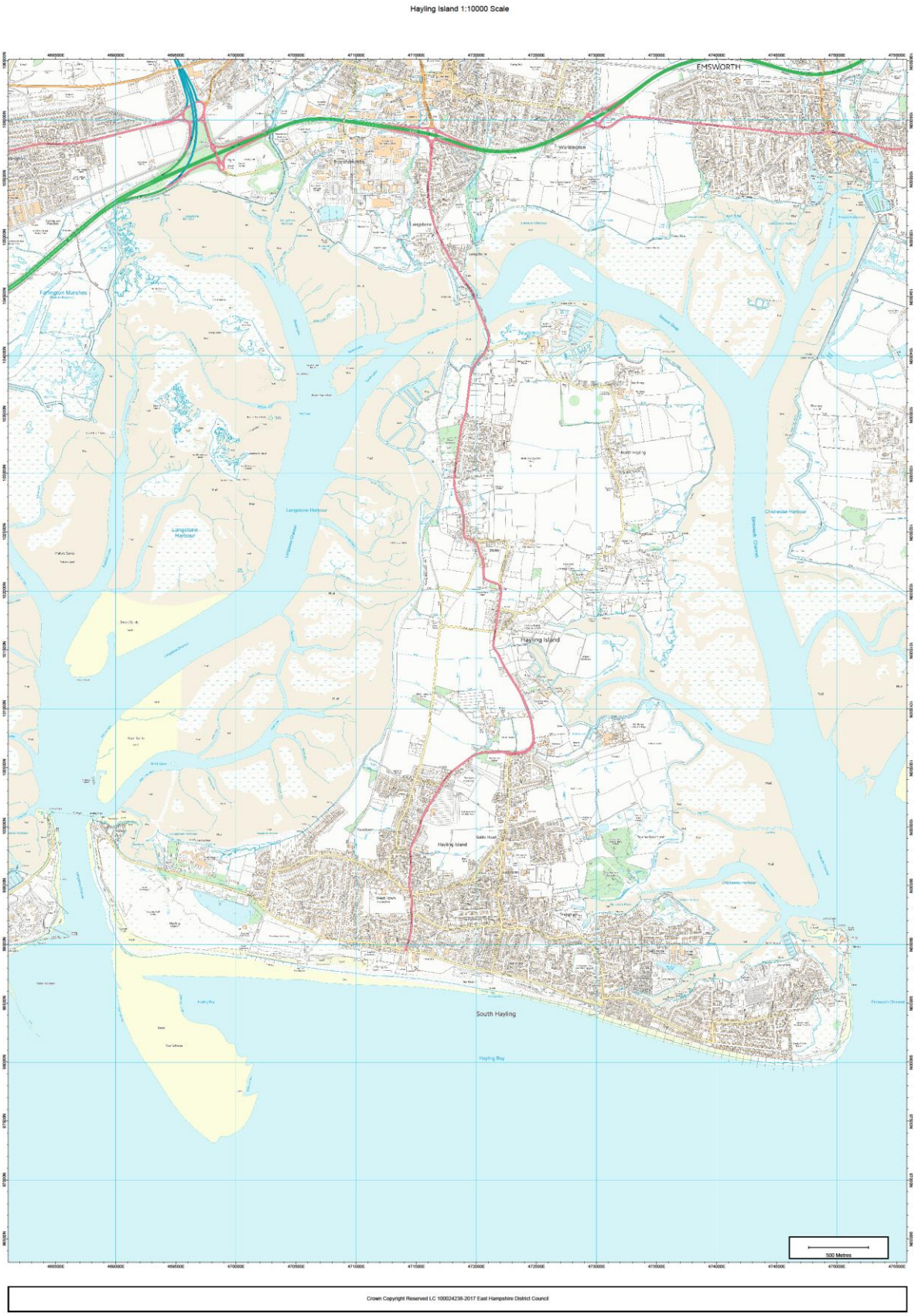


Figure 1: Hayling Island

3. The Addendum

Status of this document

3.1 The present document forms an Addendum to the original Hayling Island Transport Assessment (HITA) published by Council in January 2019. All information in the HITA is relevant and still applies unless specifically updated in this document. The HITA contains all necessary background information and so it has not been repeated in this Addendum. This report and the original HITA should be read together; however where the two contradict (through update, extension or clarification) then this document should be taken as the latest version.

Reason for the Addendum

3.2 The HITA considered[4] the impact of traffic growth on Hayling Island using different 'scenarios'. Following calibration, the principal scenarios modelled were:

- Baseline: existing road layout with committed development and background traffic growth in accordance with TEMPro forecasts;
- Do Minimum: baseline condition plus Local Plan 2036 sites added (i.e. reflects impact of all development in Local Plan assuming no changes to existing highway network); and
- Do Something: different intervention scenarios were then tested using the model and compared to the baseline and Do Minimum conditions to assess the potential for mitigating the specific effects of Local Plan sites on the highway network to avoid severe cumulative harm to the highway network.

3.3 The HITA made assumptions about locations for the Local Plan sites and their point of access to the network. Sites were added to the model by assigning their traffic to a specific node in the model and the impact of the additional traffic tested.

3.4 For the 'Do Something' tests, a range of possible mitigation options on the A3023 were identified and tested in packages. These are more fully described in the HITA itself[5] but in summary, package 1 considered 'friction reduction' measures together with junction changes at Manor Road / Church Road / Havant Road ('Mill Rythe') and at Woodbury Avenue / Langstone Technology Park; package 2 extended package 1 with junction changes at Northney Road, Copse Lane and West Lane; whilst package 3 added to packages 1 and 2 a comprehensive upgrade of West Lane to create a new route for the A3023 in the southern part of the Island (between Castlemans Lane and Manor Road). Together, the estimated cost of implementing all measures in the original packages 1, 2 and 3 was in excess of £24m.

3.5 The primary outputs from the model were in terms of journey time and queue length. The model's calibration and validation, where Bluetooth data, records of journey times driven as test journeys and Google traffic data was compared to model outputs, provide assurance that the model reflects the existing highway conditions within acceptable modelling limits (+/- 15%). This includes sections of the network at the northern end of the route where traffic from Hayling interacts with traffic in

[4] HITA January 2019; Section 9 discusses the model design, calibration, validation and scenario testing process in full

[5] HITA January 2019; refer to tables 16, 17, 18

Havant town centre and the wider trunk road network via its junction with the A27 at Langstone roundabout.

3.6 Given the nature of the highway network on the Island with its lack of alternative route options and the single lane bridge over Chichester Harbour at Langstone, the HITA recommended further work be carried out to test the mitigation measures at a future date whilst recognising that the role of the Transport Assessment was to identify *A* solution, not necessarily *THE* solution, to traffic growth. This is still the case in terms of the detail of some of the proposed measures.

3.7 Notwithstanding this recognition of the need for future work, at the Council meeting on 30th January an amendment[6]) was approved as follows:

> *"n) Delegates authority to the Planning Policy Manager, in consultation with the Cabinet Lead for Communities, Development and Housing, to publish version two of the Hayling Island and Mainland Transport Assessments, in order to clarify the mitigation packages needed to accommodate development, prior to the submission of the Havant Borough Local Plan 2036 to the Secretary of State for Housing, Communities and Local Government."*

3.8 This report is the result of that further work. As it only updates certain elements of the original HITA it is considered to be an 'Addendum' to the report rather than a 'version 2' because much in the original HITA remains valid.

What has changed in this Addendum?

3.9 Four major changes in the HITA scenarios have been brought forward into this Addendum:

- Traffic from the 'Rook Farm' development site is assumed to join A3023 Manor Road at a new junction to the south of the Hayling Island Holiday Park instead of at St Marys Road, this being in accordance with the latest Local Plan (this means that journey time data in Appendix A to this report differs from that in the original HITA)
- The scope and content of the various mitigation packages have been reconsidered with a main package ('M1A') now identified comprising only friction reduction measures; a proposed junction improvement at Copse Lane / A3023 has been removed as being undeliverable to current standards, and other junctions previously part of mitigation packages 1, 2 and 3 are now separately considered both as standalone interventions and in combination with Mitigation Package M1A
- Modelling is now reported on the network extending beyond the A27 Langstone roundabout into and through Havant town centre to ensure that the effect on this location of traffic flow and distribution is understood.
- More detailed design work has been carried out on the various proposed interventions including Linsig[7] design of those junctions where traffic signal control is an option to be implemented. These changes are reflected in the updated report which is considered in section 4 and Appendix C below.

3.10 A section (4.88ff) has been added specifically considering the A27 Langstone roundabout and its interaction with the A3023.

[6] http://havant.moderngov.co.uk/mgAi.aspx?ID=14196 minute 51(n) retrieved 5 August 2019

[7] Linsig is a computer based junction design program for use with signalisation schemes. See http://www.jctconsultancy.co.uk/Software/LinSigV3/linsigv3.php retrieved 5 September 2019

3.11 This work is clearly in excess of what is usually required of a Transport Assessment. The design work has been carried out 'at risk' at the council's cost with technical input from Hampshire County Council, especially their Intelligent Technology Systems (ITS) team.

3.12 All option cost estimates have been updated to October 2019 prices and now include 44% optimism bias[8]. The estimates have been further refined by additional design work.

3.13 Further consideration has been given to encouraging modal shift because this represents the most efficient, environmentally friendly and future proofed way of moving people around. The results of this work with the local bus company, with walking and cycling groups, and with the emergency services is reported in Chapters 5 and 6.

3.14 Additional consideration has been given to non-transport benefits of the proposed mitigation packages. There is now included an assessment of the measures in terms not only of maintaining traffic flow but also of benefits to air quality; reduced severance; safety improvements; and environmental benefits. This is reported in Chapter 7.

3.15 The Addendum also addresses procedural and policy changes introduced since the publication of the original HITA. These include:

- Adoption of the borough council's Regeneration Strategy
- The Transforming Cities Fund bid which if successful would see works relating to the South East Hampshire Rapid Transit (SEHRT) project carried out at Langstone roundabout, in the upper section of Langstone Road, and along the Park Road South / Park Road North corridor in central Havant from 2020/21 onwards with the aim of improving the reliability and attractiveness of public transport, walking and cycling
- The borough and county councils working towards adoption of a Local Cycling and Walking Infrastructure Plan (LCWIP), adoption of which will enable funding to be committed to implement cycling and walking improvements with extensions to both networks
- Considering events in June 2019 relating to an emergency road closure of the A3023 which exposed issues in relation to diversion routes and network resilience
- More detailed consideration of the role of the Hayling Billy Trail within the overall transport provision for the Island.

What hasn't changed in this Addendum?

3.16 All major data inputs, surveys, trip rates and forecast data etc. are unchanged from the original HITA. This does mean that some of the expected mode shift alluded to in the Addendum cannot be accounted for in the modelling, which therefore represents a 'worst case' scenario.

3.17 The reporting routes (strategic routes 1 – 3 and journey time routes 1 – 6) tested remain unchanged from the HITA, although they are extended at their north end through Havant town centre.

3.18 All modelling continues to be reported in relation to a neutral weekday in school term in accordance with nationally adopted modelling standards.

3.19 Sources of funding for the measures are considered in Chapter 8.

[8] WebTAG Unit 1.2 'Scheme Costs'

4. Traffic Modelling Results

Summary: proposed interventions

Proposed interventions in priority and time order (NB: no fixed time specified). The solid line indicates the extent of 'early intervention' measures (potentially before 2026/7).

1. Highway Schemes	Description	Map Location ID (fig 4)	Cost Estimate
Northney Road unhooked left turn	Left turn lane for southbound Havant Road > eastbound Northney Road movement.	C	£370,000
Langstone Road two-lane extension	Extend two-lane southbound section by 170m from Woodbury Avenue to north of Southbrook Road (TCF scheme)	D	£1,067,000
Mitigation package M1A (north)	Package of 'friction reduction' schemes aimed at improving flow at specific junctions and bus stops north of Mill Rythe	5, 6, 7, 8, 9, 10, 16	£1,238,000
Mitigation package M1A (south)	Package of 'friction reduction' schemes aimed at improving flow at specific junctions and bus stops south of Mill Rythe	12, 13, 14, 15	£679,000
West Lane priority junction	Realignment of the north end of West Lane to create a new priority junction; addresses safety and severance issues	B	£1,840,000
Northney Road folded right turns	Junction realignment to create waiting space within the junction for right turning traffic	C	£780,000
West Lane signalised junction	Upgrade of priority junction with signals	B	£370,000
Mill Rythe (Manor Road / Church Road / Havant Road) junction signalisation	Signalised junction to replace roundabout to redistribute traffic delay	A	£930,000
Langstone Road / Woodbury Avenue / Technology Park	Right turn bans with signalisation	D	£1,020,000

Table 1: summary highway interventions in suggested priority order (taking account of safety, impact on traffic flow and improvement to air quality).

2. Non-highway Schemes	Description	Ref. paragraph	Cost Estimate
Cycling	East-west routes at Saltmarsh Lane, Higworth Lane – Church Road and in Hayling Park to implement phase 2 infrastructure study works (NB committed schemes expected to start spring 2020)	5.29ff	£195,000
Variable Message Signs	Three VMS signs at key access points to network (ready for summer 2020)	5.51ff	£25,000
Billy Trail phase 1	Creation of emergency access route (phase 1 upgrade – unbound surface assumed)	6.20ff	£500,000
'Red route' / parking and loading restrictions	Parking, waiting and loading restrictions on A3023 (legal, signs and lines)	5.48ff	£30,000
Bus stop infrastructure (in addition to facilities at stops upgraded in package M1A)	Upgrades of bus stops with more information, RTI if appropriate, new shelters etc.	5.8	£150,000
Bus fare subsidy	Long-term reduction in commuter fare	5.10ff	£250,000
Bus vehicles	Bring forward fleet replacement at current service frequency	5.5	£850,000
Bus vehicle electrification	Fleet replacement using electric vehicles with uplift in service frequency	5.5	£3,000,000
Ferry	Growing use and connectivity	5.12ff	£450,000
Walking	Upgrade of footpaths for inclusive mobility as described in LCWIP	5.34ff	£200,000
Cycling	Ongoing Island route development as described in LCWIP	5.26ff	£900,000
Billy Trail phase 2	Bound surface and route reinforcement (phase 2 upgrade)	6.26ff	£3,000,000

Table 2: summary non-highway schemes

Note

These non-highway schemes are ranked in terms of likely impact on the A3023 in terms of deliverability, probable modal switch and resulting benefit to reducing traffic flow on the A3023, reduction of friction and severance, accessibility and improvements to safety and air quality. No timescale is indicated although some of the interventions require the implementation of highway schemes in Table 1 to be effective (e.g. where walking routes cross the A3023).

4.1 Both the Hayling Island Transport Assessment (HITA) and this Addendum use a Paramics® Discovery model covering the major routes on the Island together with enough of the mainland network to allow traffic to be distributed onwards from the A27 Langstone roundabout. The extent of the model is shown in figure 2. Figure 3 shows the key routes that have been identified within the model to allow comparisons to be made when testing the various intervention scenarios.

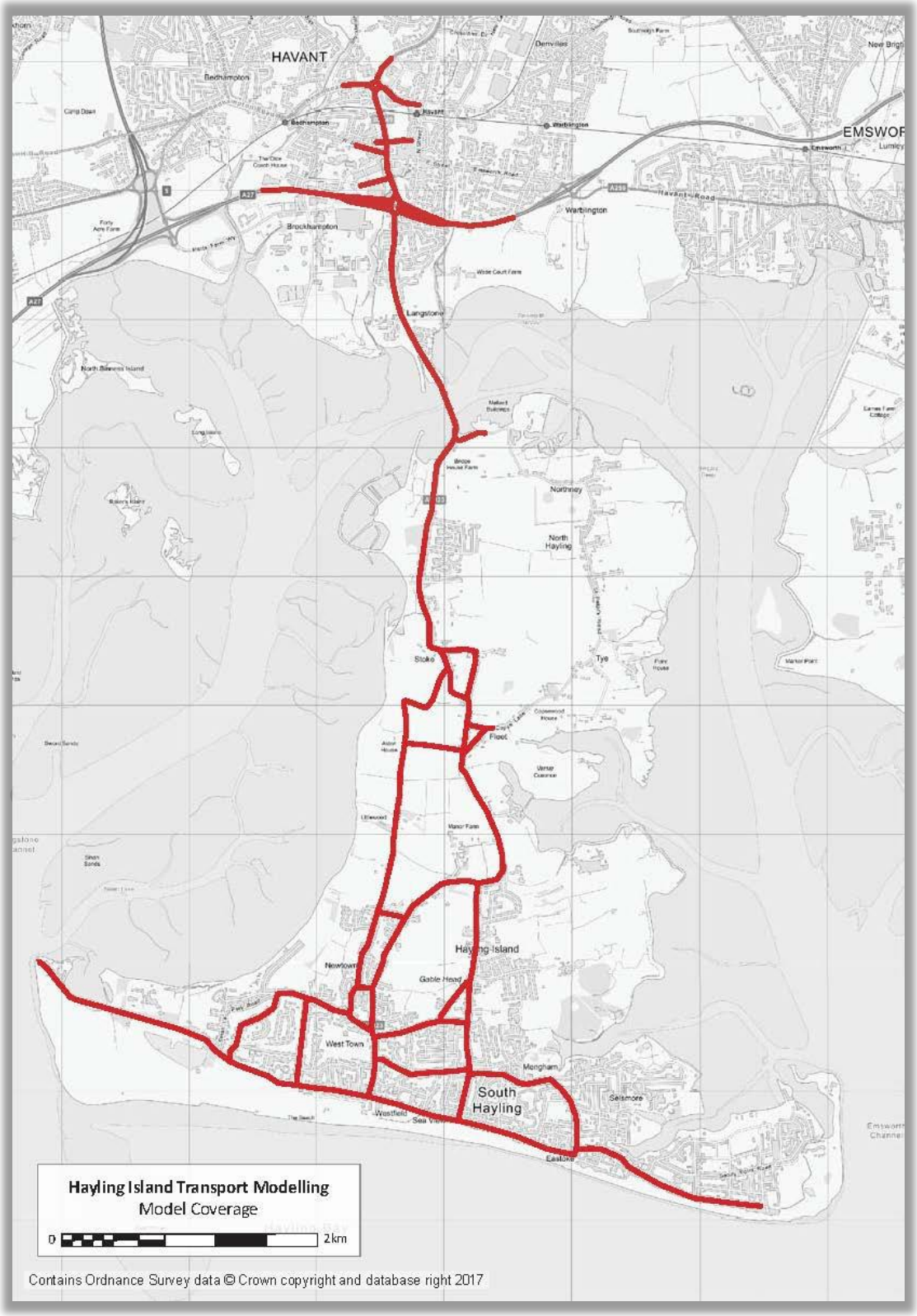


Figure 2: Hayling Island Transport Modelling: Model Coverage

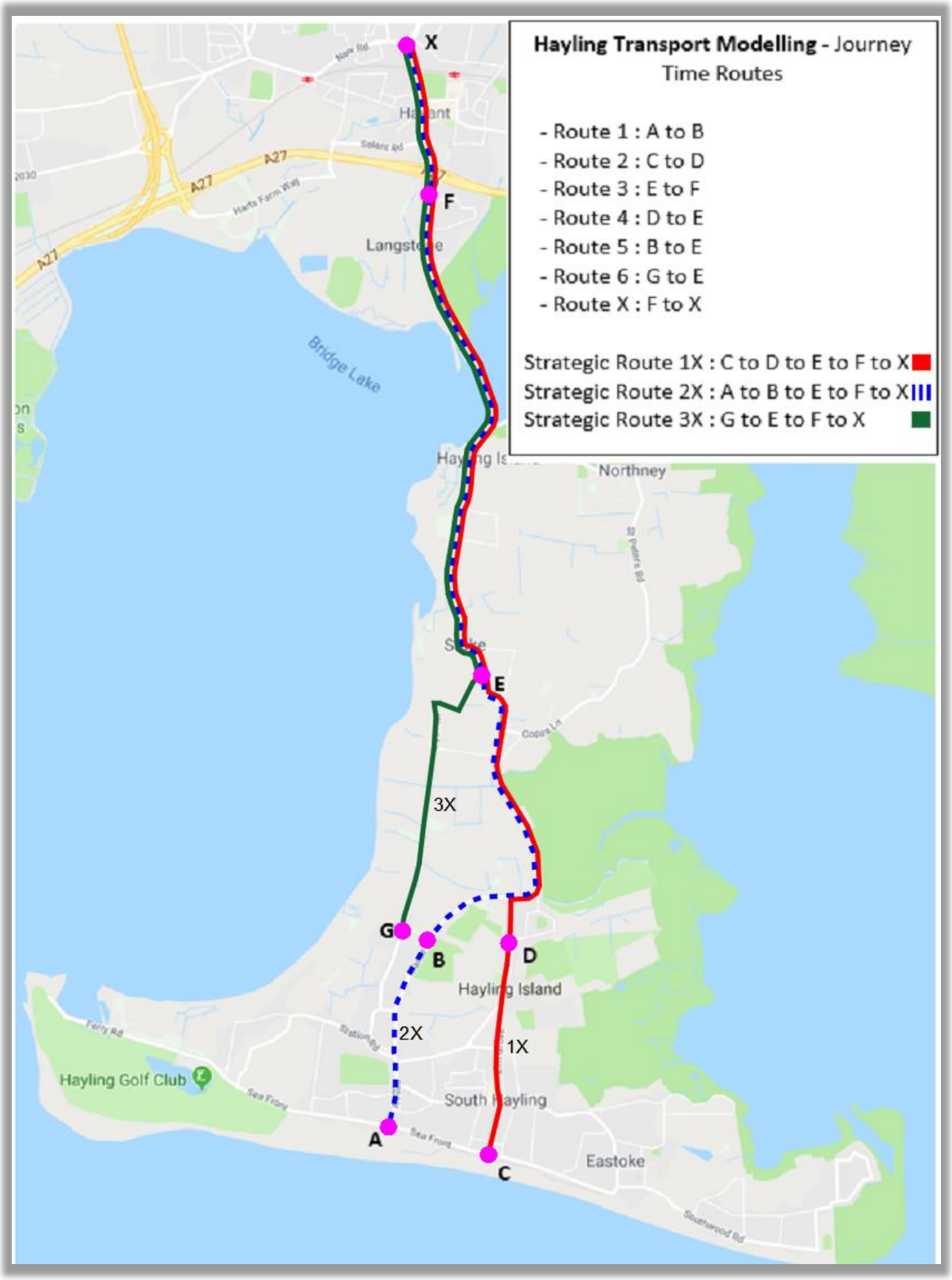


Figure 3: Journey Time Routes

‘Do Something’ Interventions and Mitigation

4.2 All vehicular traffic leaving Hayling Island must travel north on the A3023 to gain access to the wider strategic road network (i.e. A27, A3M and M27). Access to and from the A27 / M27 from the A3023 is hampered by capacity constraints, or ‘friction’ along the route, which we define as driver behavioural responses to physical road conditions – “things which interfere with traffic flow”. The characteristics of friction include vehicle composition (cars / lorries / caravans etc), vehicle turning movements, weather and the complex behaviour of undisciplined road users, which leads to shockwaves or ‘phantom traffic jams’[9]. Slow moving vehicles including cycles can and do have significant impact on the flow of traffic, as do delivery vehicles (parked or moving) and refuse collection. All these factors can impact on highway performance and traffic delay and are accentuated in the AM and PM peaks and during holiday periods.

4.3 The ‘Do Something’ scenarios in the original HITA proposed three packages of transport schemes on the Island, each cumulatively building on the other, that were intended to mitigate future congestion resulting from Local Plan development and improve facilities for all road users, including users of public transport, pedestrians and cyclists. This Addendum has reconsidered the scope and deliverability of these original packages and in accordance with the January report Amendment[10] has also broken down the original packages into their component parts to clarify which elements and combinations thereof are considered likely to provide mitigation for the increased traffic arising from the 2036 development.

4.4 As a result there is now in this addendum only one major package, comprising friction reduction measures (‘Mitigation Package M1A’). To this package is added a more limited number of individual junction improvements. The friction reduction schemes are not tested individually as part of this study but are assessed as an overall package of ‘friction reduction’ measures. The following Table 3 illustrates the differences between the HITA and Addendum modelled measures.

HITA Mitigation Measures	Addendum Mitigation Measures
Package 1: ‘Friction reduction’ measures at bus stops / provision of right turn lanes; signalisation of Mill Rythe junction; signalisation of Langstone Road / Woodbury Avenue; 2-lane extension in Langstone Road	Package M1A (‘friction reduction’ measures at bus stops and provision of right turn lanes); Mill Rythe and Langstone Road measures tested alone and in combination with package M1A
Package 2: as package 1 plus West Lane northern link, Northney Road junction and mini roundabout at Copse Lane / Havant Road	West Lane northern link tested alone and in combination with package M1A; Northney Road additional options tested in combination with package M1A; Copse Lane junction withdrawn
Package 3: as package 2 plus West Lane upgrade to replace A3023	No further testing

Table 3: Comparison between HITA and Addendum mitigation measures

[9] https://youtu.be/Rryu85BtALM retrieved 23 October 2019

[10] http://havant.moderngov.co.uk/mgAi.aspx?ID=14196 minute 51(n) retrieved 5 August 2019

4.5 The 'Do Something' forecast modelling for the Local Plan 2036 development demonstrates that the proposed mitigation measures have the potential to alleviate many of the effects of future development and to ensure that whilst there is some journey time increase (which is restricted to particular sections of the network where mitigation opportunities are limited), after implementation there is no severe impact on the highway network whilst significant societal benefits are offered. Options for improvements to increase capacity should be considered and the following mitigation interventions could assist in improving localised capacity and overall network performance.

4.6 This section of the Addendum reports on the results of further studies to provide road network improvements on the Island as a result of the January report Amendment. The results demonstrate that the Hayling Island road network operates within capacity in 2036 without severe cumulative harm being reached if the mitigation packages (or a variation of them) are implemented; improvements to specific locations on the A3023 will assist in improving journey time reliability, safety and air quality. If these are implemented at an early stage then a performance improvement over existing conditions will be achieved, albeit that later development would reduce and then remove this benefit. The principal objective is to improve conditions on the A3023 / B2149 corridor (including through the A27 roundabout) to maximise traffic throughput by improving journey time reliability and minimising queues at the junctions along the route.

4.7 Those options and high-level estimated costs of scheme interventions worth further investigation to alleviate friction, increase capacity and improve journey time reliability on Hayling Island, are shown in Figure 4 and, for 'friction reduction' measures, in Table 4. Updated cost estimates are provided as of October 2019 and include the following:

- Feasibility / options appraisal
- Cost of any diversions or changes to statutory undertaker plant (using initial estimates from undertakers)
- Ecology studies and works
- Legal processes (land, accommodation, licenses)
- Costs related to restricted working, in accordance with the seasonal requirements of the A3023 Traffic Management Plan
- Professional fees assumed at the Association of Consulting Engineers percentage rates
- Optimism bias of 44%.

4.8 Where relevant, measures such as traffic signal timings would be optimised to minimise delay to all road users and designed to ensure traffic flows are balanced at junctions, and to deter 'rat running'. To this end, Linsig modelling has also been carried out at the proposed junction interventions. Introduction of traffic signals carries a benefit in that pedestrian / cycle stages can be incorporated into the light sequence thereby improving safety and reducing severance (see Section 5 below).

4.9 The mitigation measures developed and tested in the model are shown in figure 4 and the results are discussed in the remainder of this Chapter.

Mitigation Package M1A

4.10 Schemes included in Mitigation Package M1A are listed in Table 4. Measures included are 'friction reduction' measures such as bus lay-bys / pull-ins and the provision of dedicated right turn lanes. All interventions are designed to only require land that is already public highway or in public ownership / control.

4.11 The balance between a clear traffic lane and a partially obstructed one is difficult to model, and account must be taken of the impact (and hence reliability and attractiveness) of bus services should other traffic not allow a bus to re-join the main carriageway. Ignorance of Highway Code rule 223 ("Please let buses pull out") is widespread and is not just confined to Hayling. Whilst a full depth (3m) layby allows the traffic lane to operate unobstructed, a partial layby (1.5m – 2m) allows light traffic to pass a stationary bus whilst allowing a greater ability for the bus to pull back into the traffic lane. This can be assisted if the exit flare for the layby is designed to be shallow such that the bus is not required to make an abrupt manoeuvre to regain the lane.

4.12 All laybys would be designed to current standards, including the provision of a hardstanding for waiting / disembarking passengers and possibly some linking footway, and this is reflected in the cost estimate at each site. The bus company considers that upgraded bus stop infrastructure would be a strong attractor to increase use of the Island bus service.

4.13 Likewise the provision of right turn lanes ('ghost islands') at junctions should ideally allow a minimum width of 2.6m to allow a vehicle to wait wholly outside of the A3023's live traffic lanes. Increasing this depth also allows right turning traffic out of the side road to wait in the middle of the carriageway, undertaking the right turn in two stages and reducing overall delay. Where 2.6m cannot be achieved, there continues to be value in providing a reduced width lane in those locations to allow light vehicles to pass waiting traffic (although larger vehicles would have to wait). There is a safety benefit if the ghost island can be supplemented by a physical pedestrian crossing refuge; at some locations the proximity to the junction will mean that swept paths of turning vehicles in and out of the side road will prevent this.

4.14 The modelling of proposed Mitigation Package M1A measures indicates that there is significant benefit to introducing these measures, with journey times generally being reduced over 'Do Minimum' and some approaching or surpassing baseline values. If funding is available, the implementation of these measures should be undertaken as soon as possible. The existing conditions on the A3023 would derive benefit from the measures identified because the issue of 'friction' on the A3023 is one which already exists (and has existed for many years) but becomes critical with the addition of Local Plan development.

4.15 The estimated cost of the 'friction reduction' mitigation package M1A is £2.217m. The whole package brings benefits in terms of journey time, safety, reduction in severance and air quality. If funding is limited or is only available in phases, then priority should be given to those measures north of the Mill Rythe (Manor Road / Church Road) junction (sites 5 – 10 inclusive, and 16), costed at £1.538m, since these benefit users from all areas of the Island. Sites 12 – 15 inclusive (estimated cost £679,000) are within the more urban south of the Island and journey 'noise' – the natural daily variation in journey time due to the effect of parked vehicles, collection / delivery, one-off events and interacting with traffic signal cycles – means that the time gained one day might be lost the next.

2036 Mitigation Package M1A Schemes

Highway Issues	Schemes	Map Location ID	Cost Estimate
A3023 NB and SB Queues; creation of 'shockwave' affecting town centre and A27	Right turn lane for The Ship Inn and new northbound bus layby	5	£595,000
A3023 NB and SB Queues	New right turn lane into New Cut and new SB bus stop pull-in south of New Cut	6	£225,000
A3023 NB Queues	New right turn lane in to Avenue Road	7	£180,000
A3023 NB Queues	New NB bus lay-by near Mill Close	8	£85,000
A3023 SB Queues	New right turn lanes into Esso garage, Victoria Road and North Hayling Halt, and additional pedestrian refuge	9	£295,000
A3023 NB Queues	A3023 Maypole NB bus stop pull-in	10	£83,000
A3023 SB Queues	New SB bus stop pull-in at Castlemans Lane.	16	£75,000
A3023 NB and SB Queues	New NB and SB bus stop pull-ins at the Oven Campsite	12	£165,000
A3023 NB and SB Queues	New pedestrian refuge and carriageway widening at Bright's Lane	13	£170,000
A3023 NB Queues	New northbound bus stop pull-in close to Gilbert Mead	14	£79,000
A3023 SB Queues	New right turn lane for Newtown Lane	15	£265,000
TOTAL COST PACKAGE			**£2,217,000**

Table 4: Mitigation Package M1A (friction reduction measures) – numbering as in original HITA

Figure 4: Mitigation Package M1A ('friction reduction' measures) 5-16 and specific junctions A-D: intervention locations. Location references 1-4 and 11 are not used in this Addendum.

Mill Rythe (Manor Road / Church Road / Havant Road) junction – site A

4.16 The roundabout was built in the 1970s to replace a priority junction. It is unbalanced, and the Paramics model indicates that, without interruption of flows from Church Road, queues on Manor Road will significantly increase with Local Plan development. This is particularly sensitive to the location of the access to the 'Rook Farm' development; in this Addendum this is assumed from Manor Road instead of, in the original HITA, from St Mary's Road / Church Road, in accordance with the stated preference in the Local Plan.

4.17 To avoid excessive delay and queues at this junction, signalisation has been tested as a replacement for the roundabout. Signalisation of the junction would redistribute delay, reducing queue length on the arms at different times of day, but importantly reducing queue length and delay from the 'Do Minimum' scenario on Manor Road whilst still providing a means for Church Road traffic to safely join the A3023. This is at the expense of journey time and queue length for traffic in Church Road which in the AM peak currently benefits from an almost uninterrupted access to the roundabout due to the lack of opposing traffic from Havant Road.

4.18 Within the past decade the eastbound / northbound carriageway in Havant Road has been narrowed from two lanes to one to allow for the creation of an improved uncontrolled crossing with pedestrians only needing to cross one northbound traffic lane. The disadvantage of this arrangement has been that the queue of right traffic waiting to turn into Kings Road has extended into the remaining single live lane, obstructing onward traffic flow and causing delay. Whilst limited in time of day and occurring only in school term time, this results in congestion at a very busy time of day for other commuting traffic.

4.19 The adoption of signalisation at the junction allows a safety improvement by incorporating pedestrian / cyclist crossings within the signal stages (replacing the current uncontrolled crossing), providing advance stop lines and allowing a second northbound / eastbound lane to be restored for traffic moving away from the junction. This second lane would be mainly intended for traffic turning right into Kings Road heading for Mill Rythe schools and the Holiday Village.

4.20 To accommodate the loss of the ability to 'u' turn at the roundabout for traffic from Kings Road, a new small roundabout is proposed at this more northerly point to allow the right turn into and out of Kings Road. Although the carriageway northbound away from the proposed roundabout is of sufficient width to allow two lanes, it quickly narrows and is currently hatched down to a single lane throughout. Lane merges elsewhere on the A3023 have demonstrated an unusually high level of aggressive driver behaviour in these layouts and the adoption of another merge at this location should be treated with caution.

4.21 A possible arrangement is shown in figure 5. Existing traffic movements are shown in Appendix D.

4.22 This mitigation was tested on its own (i.e. against the Do Minimum scenario with this change being the only network change made) as well as in combination with Mitigation Package M1A. As expected, it performed better in combination with Mitigation Package M1A, but whether in combination or without, the benefits are shown to be limited and at key times of day (especially the AM peak) the Paramics model indicates that signalisation adds delay for no network benefit. The Linsig modelling supports this but does show that the effect is dependent upon detailed layout and signal configuration. The added safety benefits the change to signals would bring, even with the restoration of the second lane to allow right turning traffic for Kings Road to be segregated, would need to be balanced against the impact on the highway network in terms of additional delay on the approaches, especially in Church Road. The estimated cost of the intervention is £930,000 inclusive of fees and contingency at October 2019 prices depending on the scope of the signalisation.

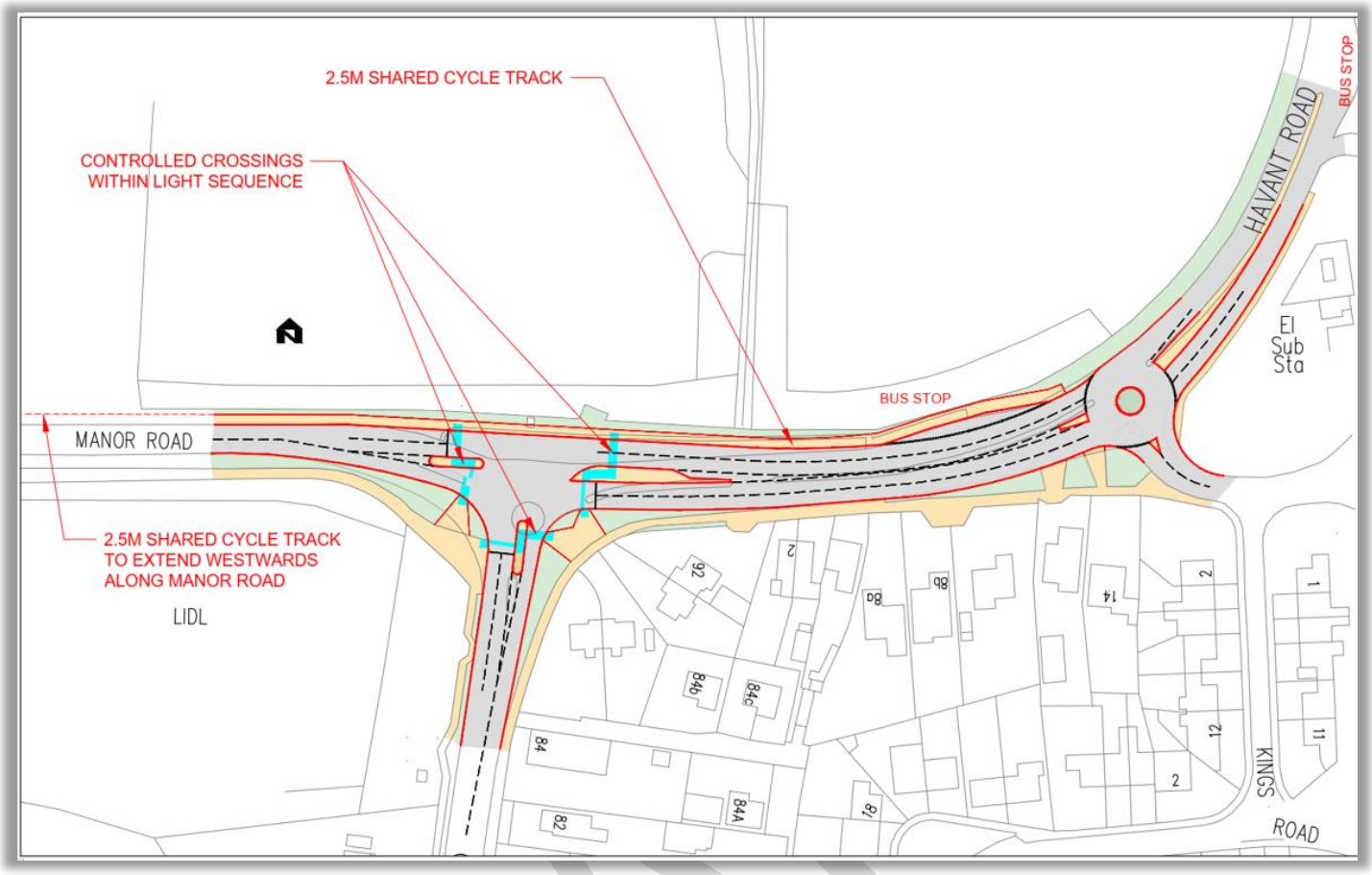


Figure 5: indicative layout for signalisation of Mill Rythe (Manor Road / Church Road / Havant Road) junction

West Lane (north end) – site B

4.23 This mitigation is proposed to overcome queues caused particularly in the PM peak to southbound traffic caused by right turning into West Lane. There is no central stacking area available within the 6.1m carriageway to separate right turning traffic from other traffic heading south on the A3023; this causes a southbound queue until such time as any right turning vehicle can clear the carriageway. Visibility for traffic turning out of West Lane is limited and the junction has a poor safety record. Existing junction flows are shown in Appendix D.

4.24 This proposal requires privately-owned third-party land. A new link is proposed from north of the 'bends' in West Lane, running north-east across the private land, to a new junction with the A3023 south of number 97 Havant Road. This has been modelled as a 2-stage signalised junction as this allows safe crossing of Havant Road by pedestrians and cyclists within the staging of the lights; however, it is possible that an unsignalised (priority) junction could be implemented albeit with reduced benefits for non-motorised users. The existing Havant Road / West Lane junction would be closed with residential and agricultural access taken from a priority junction at the south end of the new link, thus addressing the existing safety issue caused by limited visibility at the existing junction.

4.25 The right turn out of West Lane would be banned in order to minimise crossing turns in the uncontrolled layout and to create the two-stage signalised junction (addition of the third stage required for the right turn out of West Lane would undo the benefits of the intervention). The few vehicles needing to turn right at the north end of West Lane would be routed instead via Daw Lane.

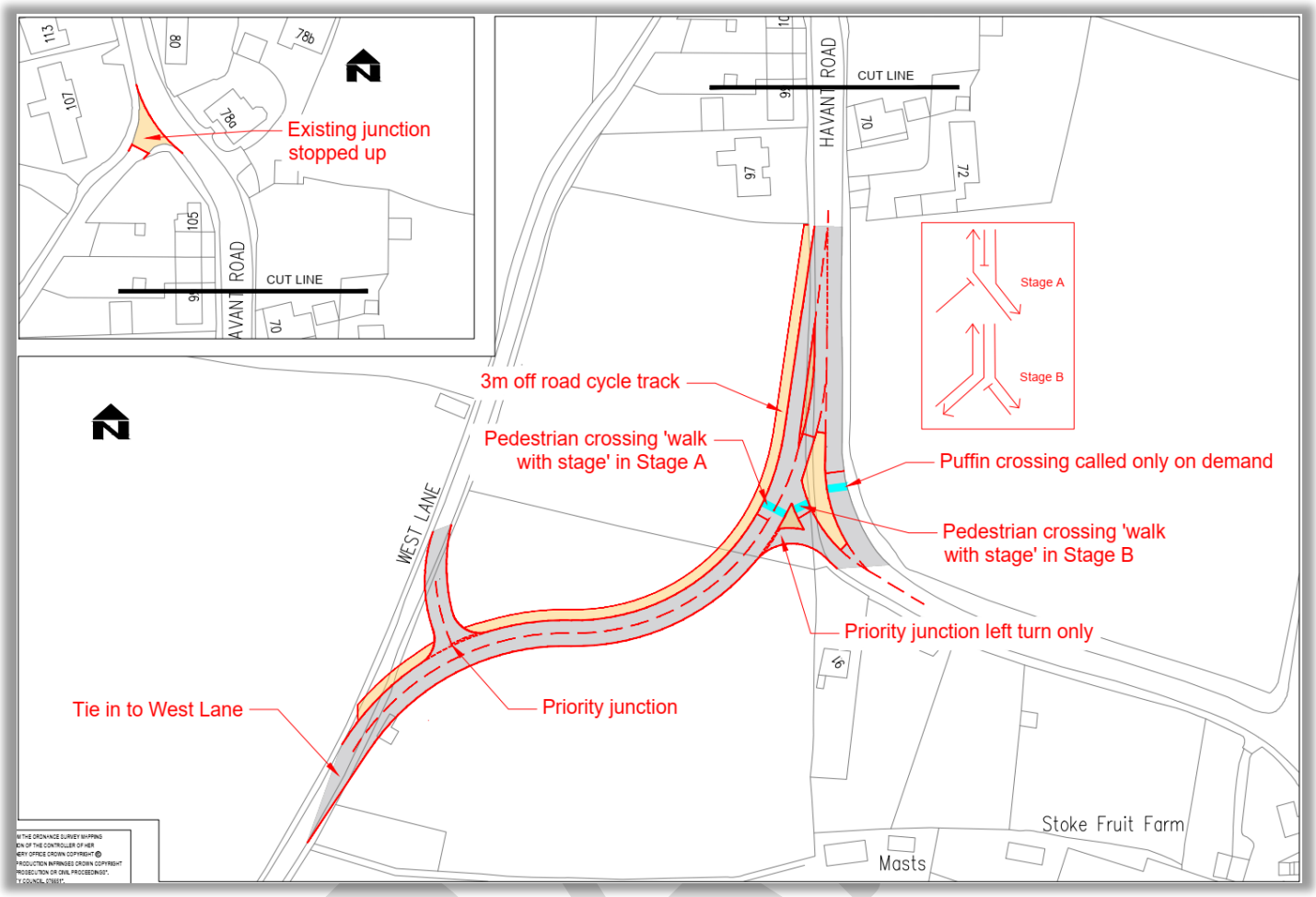


Figure 6: West Lane realigned and signalised junction – early provision would only require a priority junction

4.26 Modelling demonstrates that the new signalised junction provides a benefit in the PM peak on the A3023 but does cause delay in West Lane. The benefit is due to the ability of right turning traffic (into West Lane) to queue without causing a delay to following southbound traffic on the A3023, but the length of right turn stack available means that the reservoir quickly fills; the cycle time of the signalised junction needs to be relatively short in order to clear the reservoir. This results in regular stopping of the A3023 northbound traffic, balanced by safer conditions for traffic joining from West Lane. The safety and severance improvements the signalised junction brings result in this being a worthwhile intervention. Linsig modelling supports the findings of the Paramics model and shows the signalised junction operates with an acceptable degree of saturation.

4.27 This mitigation was tested on its own (i.e. against the Do Minimum scenario with this change being the only network change made) as well as in combination with Mitigation Package M1A. As expected, it performed better in combination with Mitigation Package M1A. The estimated cost of the fully signalised intervention is £2,210,000 inclusive of fees and contingency but EXCLUDING third party land required, at October 2019 prices. The initial priority (unsignalised) junction option is estimated to cost £1,840,000, again inclusive of fees and contingency but EXCLUDING third party land required, at October 2019 prices.

Northney Road – site C

4.28 This junction is a major cause of delay in both the side road (Northney Road) and on the A3023. There is a specific road safety issue at this location caused by turning traffic and gap acceptance

due to the interaction and proximity of the access to the Applegreen shop / petrol filling station. This manifests itself as side-on collisions involving traffic turning right out of Northney Road. Southbound traffic on the A3023 intending a left turn into the filling station will sometimes signal early (i.e. before reaching Northney Road) and traffic In Northney Road may then pull out, mistakenly expecting the southbound vehicle to be turning into Northney Road. Other delays (mainly in the AM peak) are caused by northbound traffic on the A3023 stopping to let traffic which has partly turned out of Northney Road into the ghost island join the northbound flow. The shockwave of this behaviour can result in stationary traffic for hundreds of metres either side of the junction, an effect out of proportion with the actual numbers of vehicles turning at the junction (see Appendix D).

4.29 The original layout of the highway in this area means that there are extensive areas adjacent to today's road which are still public highway, and this offers opportunities to improve layout, safety and performance using land already available for highway use. Four iterative versions of a redesign for this junction have been prepared.

4.30 **UNHOOKED:** The first version is to 'unhook' the left turn into Northney Road using a short section of new road so that traffic for Northney heading south on the A3023 turns off the main carriageway well before the main junction and thereby removes any confusion for traffic waiting to turn right out of Northney Road. This type of intervention is not directly modellable, but engineering judgement suggests a positive impact particularly with regard to road safety. The estimated cost of this provision, inclusive of fees, legal costs, optimism bias etc. is £370,000 at October 2019 prices, assuming that there are no significant statutory undertaker plant costs. The new road section does require making up of ground levels and is adjacent to an environmentally sensitive area. It is recommended that this option is investigated further for early implementation on safety grounds.

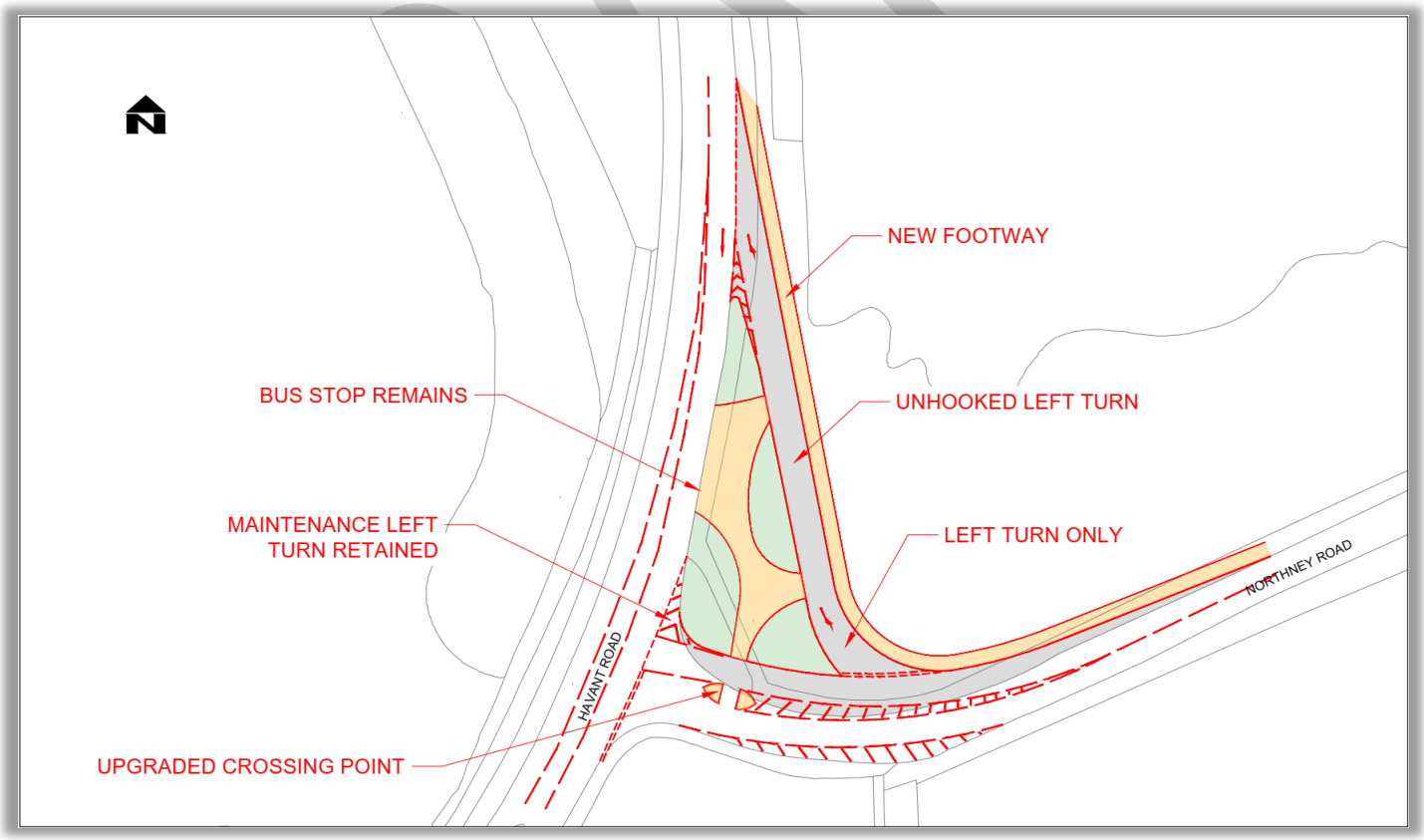


Figure 7: unhooked left turn at Northney Road

4.31 **FOLDED:** The second version is to provide a 'folded' right turn along with the 'unhooked' left turn. A folded junction allows the right turn to be made in two separate manoeuvres with right turning traffic into Northney Road crossing in front of traffic turning right out of Northney Road. This layout requires a large central stacking area (8m minimum) and to achieve this layout the speed limit on this section of road would need to be reduced to 30mph [the issue of speed limit on the A3023 generally is discussed below]. An additional uncontrolled crossing point could be provided north of the junction within the extensive area of 'surplus' carriageway this layout type generates. Modelling indicates a strong benefit in terms of queue length and journey time reductions on all arms at all times over Do Minimum. The estimated cost of this provision, inclusive of fees, legal costs, optimism bias etc. is £780,000 at October 2019 prices assuming that there are no significant statutory undertaker plant costs. This assumes that detailed design is able to minimise or remove the impact of the horizontal alignment on the filling station site, and that the unhooked left turn (4.30 above) has already been implemented; otherwise the combined cost of the unhooked and folded layouts is £1.15m.

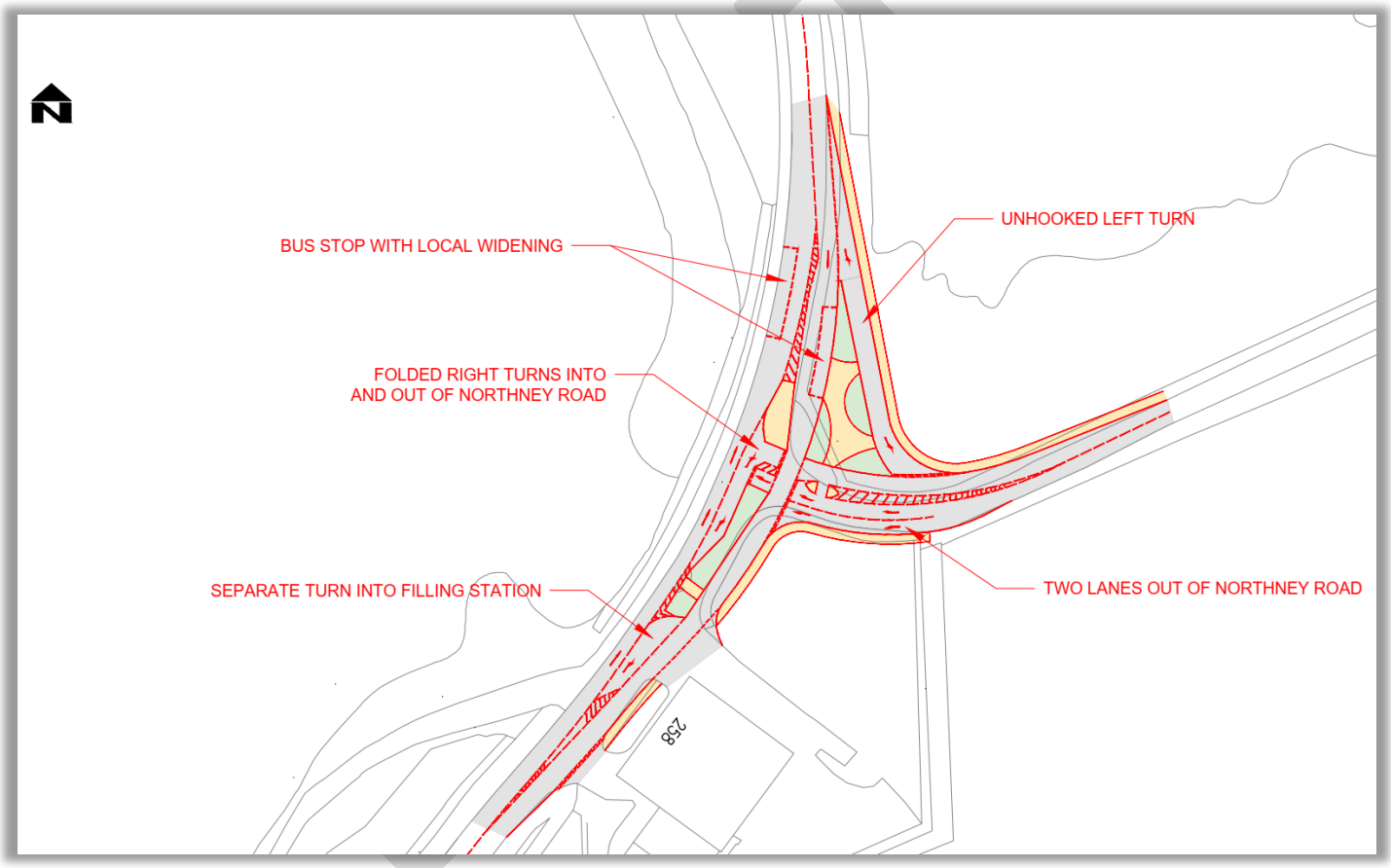


Figure 8: unhooked and folded turns at Northney Road

4.32 **SIGNALISED:** The third version provides a conventional signalised 3-stage junction with a segregated right turn lane for northbound A3023 traffic to stack and turn into Northney Road. Pedestrian / cycle crossings would be accommodated within the junction design to improve safety and reduce severance. Again, due to land constraints this junction layout would operate most efficiently at a 30mph speed limit. Both Paramics and Linsig modelling indicates this option does not benefit queue length or journey times as the shockwaves caused by the signals creates additional delay on all approaches, especially for southbound A3023 traffic which is stopped for two of the three stages. There is a strong benefit for safety as all moves within the junction are made in a controlled manner under the protection of the signal sequence. The estimated cost of this provision,

inclusive of fees, legal costs, optimism bias etc. is £960,000 at October 2019 prices assuming that there are no significant statutory undertaker plant costs. This assumes that detailed design is able to minimise or remove the impact of the horizontal alignment on the filling station site. **Due to the queueing caused by this layout, with Linsig modelling indicating queues of up to 1km at peak times (see Appendix C) and the resulting potential impact on the A27 Langstone roundabout, it is not recommended that this version be progressed.**

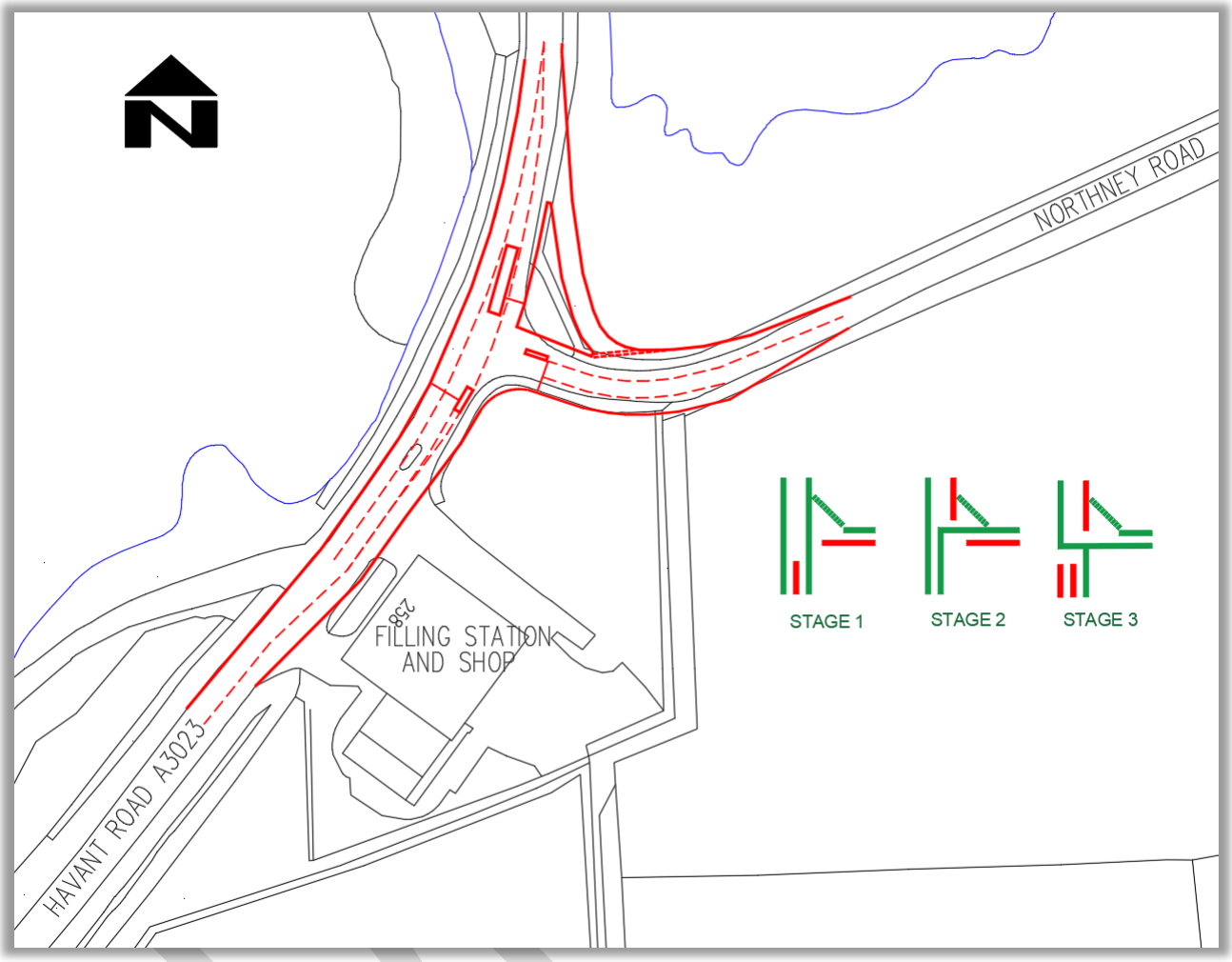


Figure 9: unhooked and signalised junction at Northney Road

4.33 **GYRATORY:** The final, fourth version is a significant investment which creates a gyratory system with a new 2-lane southbound highway link passing to the rear of the filling station thereby effectively creating a large roundabout with the filling station on the central island. Priority would apply to the A3023, so traffic heading out of Northney Road would first give way to traffic from the A3023 (southbound), turn left and proceed south past the rear of the filling station; if heading for Havant it would then turn right and give way again to traffic heading north on the A3023. Modelling for this option indicates that it performs well at all times of the day with particular benefits realised for northbound AM peak traffic resulting from the additional northbound capacity created for right turning traffic into Northney Road or the filling station. This option requires third party land for the new link as well as substantial accommodation works for the filling station. The estimated cost of this provision, inclusive of fees, legal costs, optimism bias etc. but excluding land is £2,850,000 at October 2019 prices, and assumes that there are no significant statutory undertaker plant costs. **It is not recommended that this option is progressed at this time.**

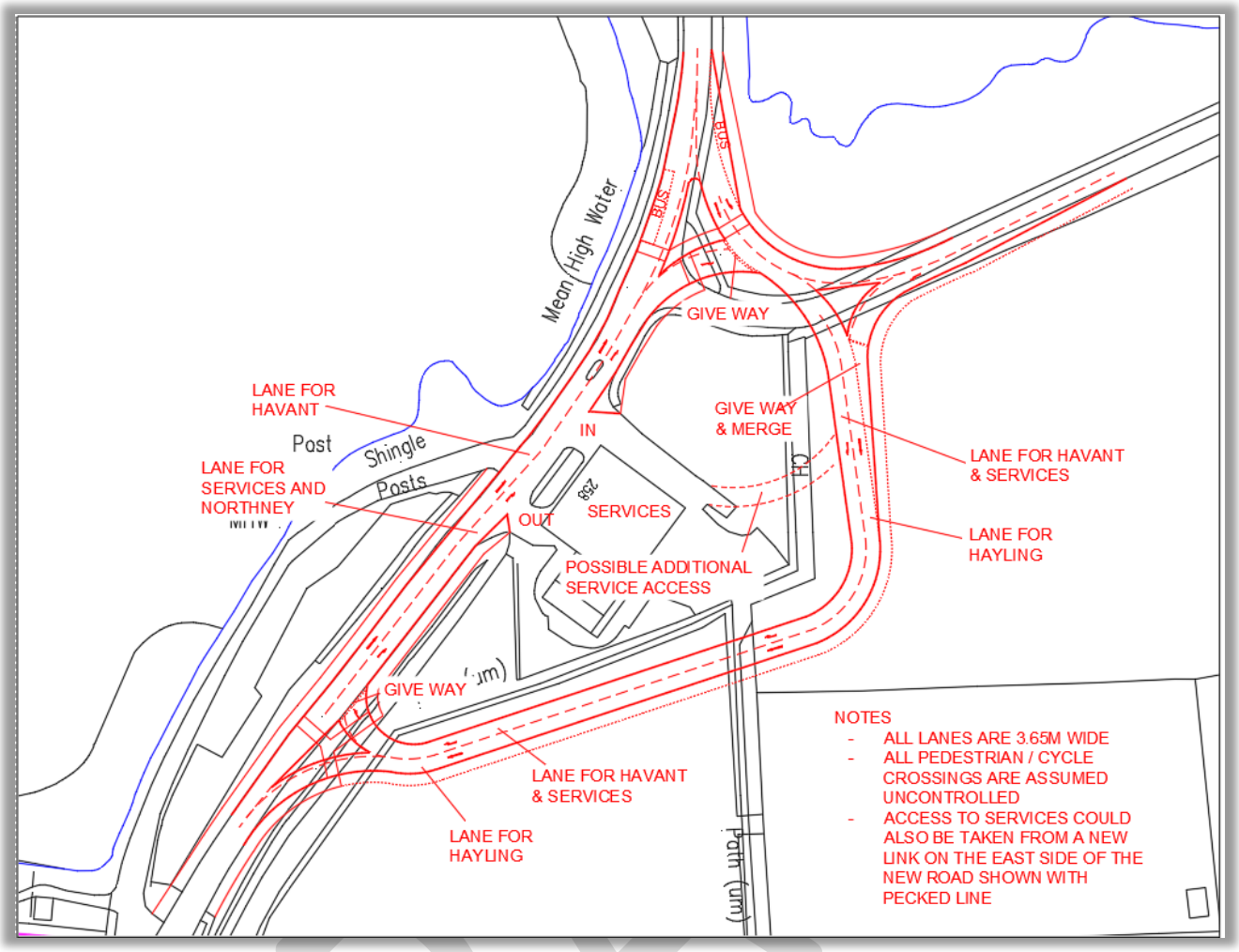


Figure 10: gyratory junction at Northney Road

Woodbury Avenue / Langstone Technology Park – site D

4.34 The complex interaction of traffic at this location combined with the road layout has the potential to cause issues at all times of the day. Two southbound lanes for Hayling merge into one lane at the junction with Woodbury Avenue, whilst a third lane at this point acts as a right turn lane into the Technology Park (this movement accounts for approximately 10% of the total southbound flow); in the opposite direction the single northbound lane widens to 3 lanes at the junction with Langstone Technology Park. All junctions are 'all moves' (left in / out, right in / out).

4.35 In the AM peak, the queue of southbound traffic waiting to turn right into the Technology Park queues can extend onto the circulatory carriageway of the adjacent roundabout due to the lack of turning opportunities against the flow of northbound traffic on the A3023. In such instances, traffic joining from A27 (east) tends to pass the queue in lanes 1 and 2 and then undertake a 'u' turn manoeuvre in Langbrook Close. At the same time, traffic turning right out of Woodbury Avenue obstructs the visibility of the traffic waiting to turn right into the Technology Park. Some of these right turning vehicles overhang and physically obstruct lane 2 southbound, reducing the effectiveness of the merge.

4.36 Although the perception is that the southbound delays (particularly in the PM peak) are caused by the merge, video evidence suggests that the delay is caused more by a shockwave emanating from the narrow section of Langstone Road between the Ship Inn and Langstone High Street where frontage accesses generate right turning traffic. Once the shockwave reaches the merge, the merge

locks and it then takes a few minutes for the merge to clear. This is exacerbated by poor driver behaviour with an unusually high degree of obstructive behaviour shown to southbound drivers trying to merge from lane 2 into lane 1, and conflicts with the right turning traffic at this location into and out of Woodbury Avenue and the Technology Park. When the merge locks, the effect quickly extends onto the signalised roundabout and into Park Road South.

4.37 In the summer of 2019 additional temporary signs were erected to encourage drivers to observe the merge more appropriately and has been considered successful with visibly better driver behaviour.

4.38 A two-stage intervention to this area is proposed in order to improve traffic flow, simplify manoeuvres, increase safety and reduce severance. The first stage is to increase the length of the two-lane section and move the merge point about 170m south of its present location into an area away from the influence of the side road junctions. It is expected that this will enable improved driver compliance with the merge. This element of the solution has been included in the Portsmouth area Transforming Cities Fund bid which is being submitted to the Department for Transport in November 2019, at an estimated cost of £1.067m (June 2019 estimate). Should the bid be successful, implementation of this work would be expected to progress in autumn 2021.

4.39 The second element of the intervention at this location is to ban all but southbound left turns into Woodbury Avenue, the right turn into the Technology Park and the left turn out of the Technology Park. The right turn into the Technology Park from A3023 southbound would be signalised in a two-stage junction linked to the staging of the lights on the adjacent roundabout to ensure effective use of the reservoir between the two junctions. Combined with a toucan crossing over the southbound carriageway and a ‘walk with stage’ layout for northbound carriageway, this would provide an opportunity for improved safety for pedestrians and cyclists crossing this busy road, improving east – west connectivity for pedestrians and cyclists by making access to the Hayling Billy Trail to the east easier, safer and hence more attractive. This full solution has been modelled using Paramics.

4.40 The prohibited right turns currently made at Woodbury Avenue would instead be made at Southbrook Road. Paramics modelling suggests that a priority junction would be acceptable although a signalised junction was tested in the original HITA modelling. The queues modelled at the priority junction can be accommodated with an extended right turn stack for northbound traffic but operation does rely on gap acceptance for both right turn moves. It is possible that delay could be experienced especially for traffic pulling out of Southbrook Road in some situations. A ‘folded’ right turn similar to that proposed at Northney Road (see 4.31) may be the most appropriate solution to minimise the possibility of delay at this location and there is highway land available to achieve this; further traffic modelling and detailed design work will be undertaken to determine which layout is the most appropriate for this location. This second phase would be required later in the Plan period and the detailed design would reflect evolving traffic conditions as Local Plan development continued, mitigation measures were built out and further traffic data was being generated; this full implementation has been the subject of testing but only in the Paramics model. The estimated cost of this second phase is £1.02m at October 2019 prices.

4.41 Performance of these measures will be further improved by provision of a right turn facility at The Ship Inn as part of the ‘friction reduction’ measures proposed in mitigation package M1A (see table 4 above) to reduce the instances of the ‘shockwave’ effect being created in the first place.

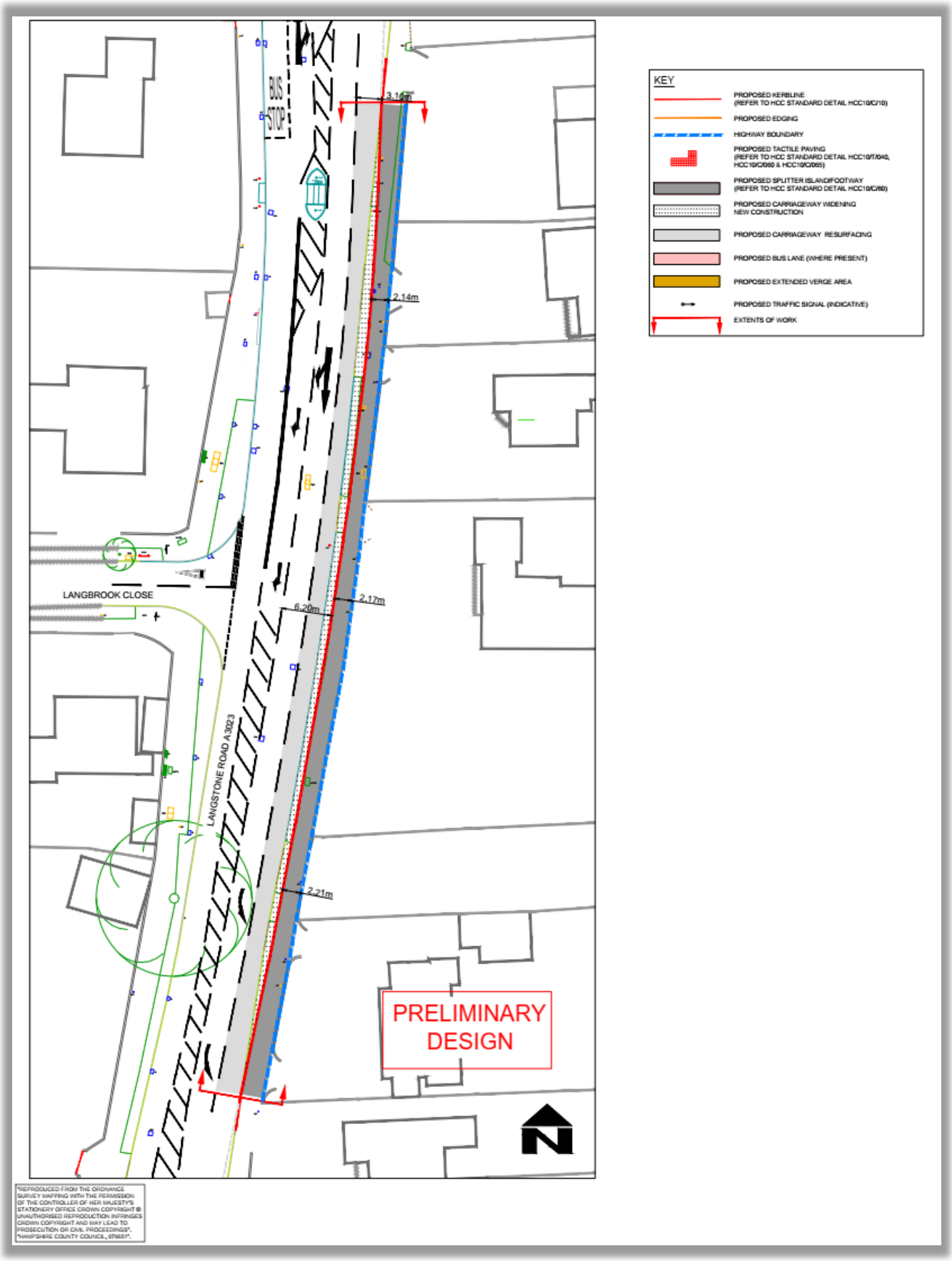


Figure 11: Transforming Cities Fund bid project for Langstone Road (phase 1 of possible improvements)

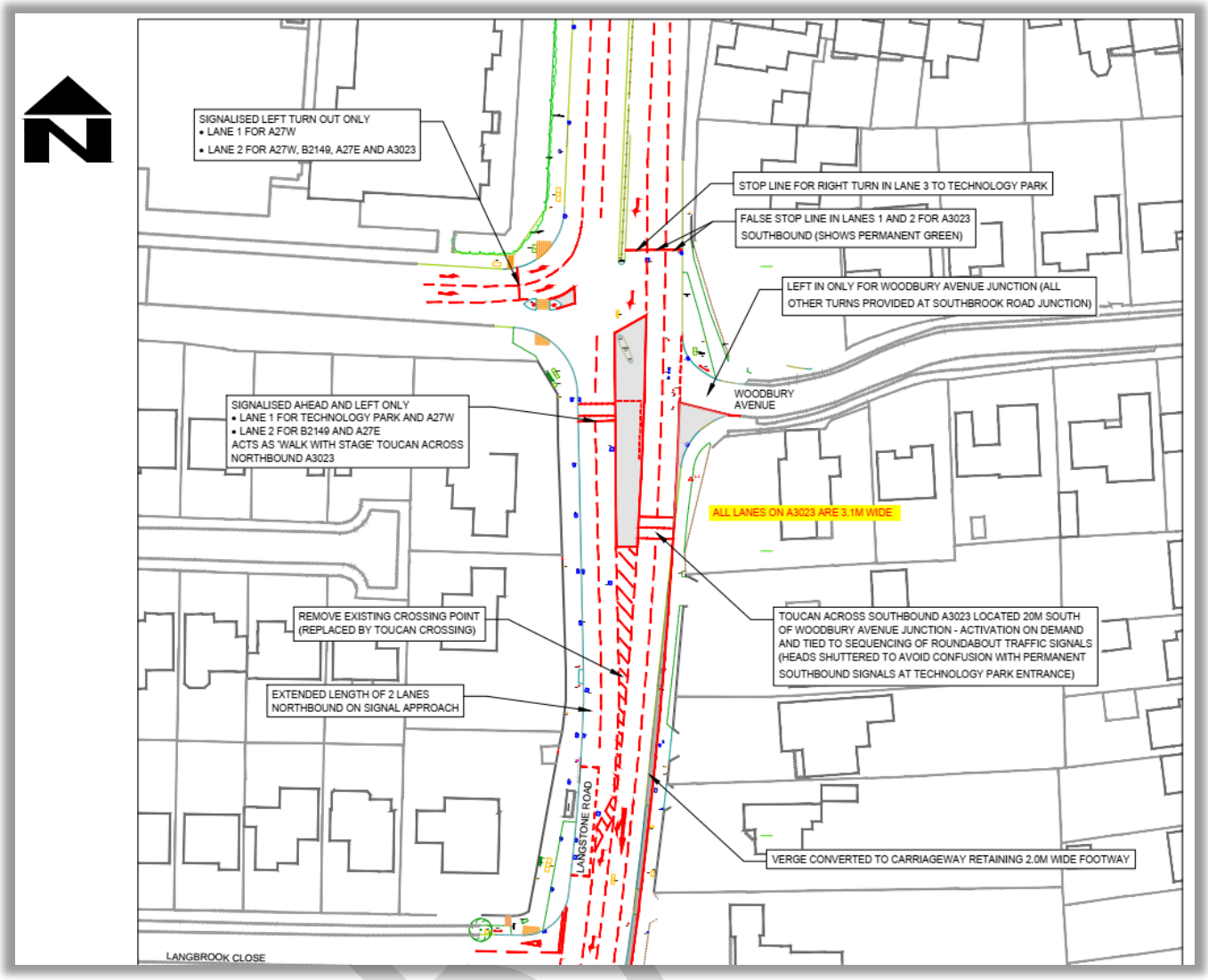


Figure 12: phase 2 Langstone Road with banned right turns, junction signalisation and pedestrian / cycle crossing facilities (only required late in Plan period and will be subject to further detailed testing and design)

Other Options formerly tested

4.42 Two other options for highway improvements from the original HITA have not been tested as part of this Addendum work. The first of these, the upgrade of West Lane from the 'bends' to a point north of Brights Lane with a further new link across open land to Manor Road, was found to offer significant improvements to journey time on some routes. Reference should be made to the original HITA for further discussion of this option. With an estimated cost well in excess of £20m excluding land (now estimated at October 2019 prices and with reference to similar schemes at Newgate Lane and Whitehill-Bordon to be closer to £30m), this proposal does not represent good value for money as a highway scheme alone. Its benefits are primarily in terms of the opportunity to significantly improve the current Havant Road through Stoke village with consequent reduction in severance, improvement in connectivity and air quality, the opportunity to strengthen east - west routes for access to the Billy Trail, and the provision of a viable alternative route in times of traffic disruption.

4.43 The proposal for a mini / small roundabout at the junction of Copse Lane with the A3023 has not been progressed because a layout compliant with the Design Manual for Roads and Bridges (DMRB) cannot be achieved due to visibility, land availability and highway geometry.

Speed Limit on the A3023

4.44 The speed limits on the A3023 vary on the journey towards the Island. From the Langstone Interchange on the A27, the national speed limit on the roundabout circulatory area becomes 40mph in Langstone Road and over Langstone bridge until New Cut. The rest of the Island is 30mph apart from the rural part of West Lane, part of Manor Road, the west end of Ferry Road, and Daw Lane.

4.45 The effect of speed on traffic flow is well understood. At lower speeds, traffic tends to travel closer together but conversely gap acceptance is greater; smaller gaps are needed for traffic to enter or cross the main stream. The most positive impact on traffic flow is that at lower speeds the impact of driver behaviour – for example if a driver slows to let another driver into or out of a side turning – is reduced as the 'shockwave' created in the traffic flow is lessened and its effect clears more quickly. All other factors remaining unchanged, the traffic volume capable of being accommodated by a road increases with a lower speed limit. Using Highways England figures, on a road such as the northern part of the A3023 the difference in flow between 40mph and 30mph could be as high as 400 vehicles per hour although the table used here is for new build carriageways to modern standards.

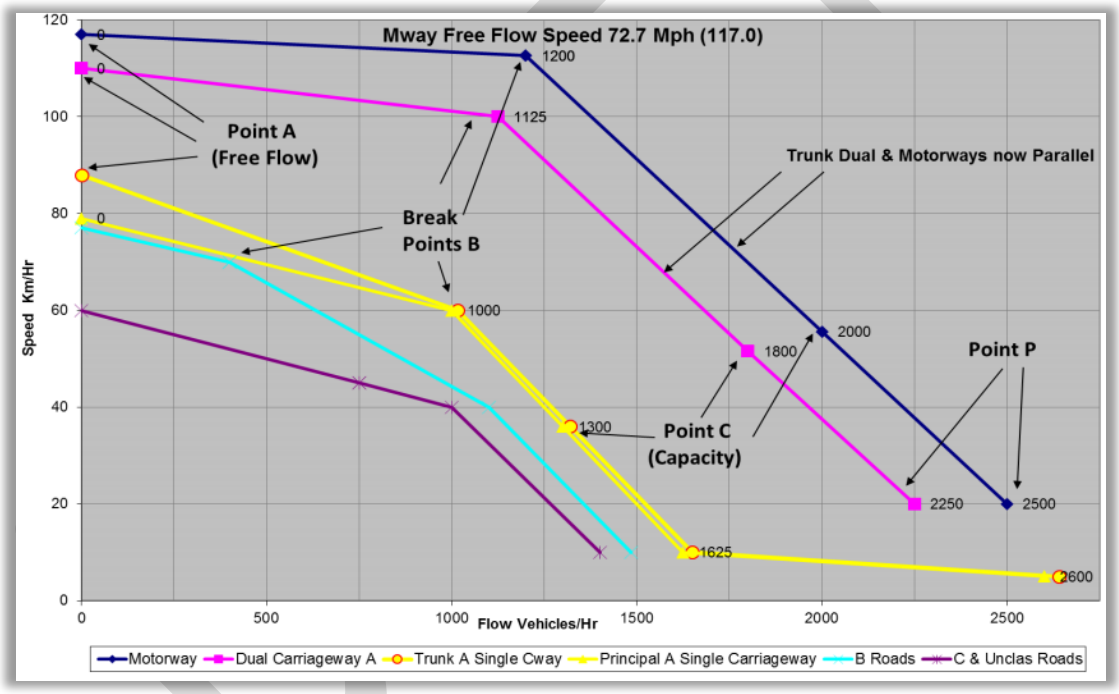


Figure 13: flow speed curve (diagram 47 - Highways England Traffic Forecast 2018)[11] – 30mph is 48kmh and 40mph is 64kmh

4.46 Some of the mitigation measures proposed, particularly those at the Northney Road folded junction and the 'TCF' widening south of Woodbury Avenue, will only be achievable if a lower speed limit is adopted. This is due to horizontal and vertical inter-visibility (stopping sight distances) for traffic and to allow for reduced lane width to limit land take. It is therefore proposed that as part of the mitigation strategy for the Island that the following changes to speed limits are adopted. These changes will be subject to the approval of the highway authority and Police, but each is justified on the basis of the overall mitigation strategy and its requirement on that particular link or node.

[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740399/road-traffic-forecasts-2018.pdf retrieved 27 August 2019

- Langstone roundabout: from national to 40mph (this better reflects actual speed on the junction)
- Langstone Road, Langstone bridge and Havant Road (north): from 40mph to 30mph
- Manor Road: 40mph to 30mph
- Daw Lane: 40mph to 30mph
- West Lane northwards of Daw Lane: 40mph to 30mph

4.47 The cumulative effect of a reduction in speed limit from 40mph to 30mph along Langstone Road will increase theoretical transit time in free traffic conditions (1.5 miles / 2.4km) by approximately 45 seconds. In terms of journey time 'noise' (i.e. the natural variation between two journeys at the same time on consecutive days caused by different daily conditions) is minor. The safety improvement that the lower speed limit will bring justifies the implementation of the measure despite the slightly longer journey time that the model indicates will result.

Modelling Results: Do Something 2036

Methodology

4.48 As with the original HITA, multiple model runs for each time period of the models were undertaken and the results averaged. The results compare link flows, journey times and queue lengths for the Addendum scenarios. Reference should be made to the original HITA and its extensive Appendices for a full explanation of the modelling process including validation of the 'as is' case.

4.49 As explained earlier in Chapter 3, the runs were based on a number of updated inputs to the basic model, with a different approach taken to the mitigation scenarios. Mitigation package M1A was first tested alone, then individual junctions (Mill Rythe, West Lane, Northney Road and Langstone Road) were tested alone, and finally mitigation package M1A was combined with each of the junctions in turn. In this way the modelling identified which of the junction measures were the most productive in terms of adding value to mitigation package M1A in terms of further reduced queue length and / or journey time.

4.50 The results of this modelling are described in detail in Appendices A and B to this Addendum, so here only the high-level outputs are reported.

4.51 The Paramics modelling by Systra was supplemented by Linsig designs undertaken by Hampshire County Council's Intelligent Transport Services (ITS) team so that it can be verified that the junction layout does indeed provide the changes expected within the wider context of the Island-wide model. Linsig takes the flow results from the Paramics model and designs a more detailed signal sequence than can be achieved in Paramics; by this means, the junction can be fine-tuned to provide the assurance that should the measure be implemented then it represents value for money and will indeed achieve the results expected.

Results: Link Flows

4.52 Details of the link flow changes can be seen in the tables in Appendix A. Further information about this process is contained in Appendix B 'Mitigation Testing Report'.

4.53 As expected and in line with the findings of the original HITA, these tables continue to show a general increase in traffic in the Do-Minimum[12] model compared to the Baseline Model[13], due to the additional volume of traffic associated with the addition of Local Plan 2036 development.

4.54 Comparing link counts for the Do Minimum and the various mitigation runs, flows are generally consistent with the Do Minimum scenario which is to be expected as forecasts continue to assume little change in modal shift. This is a known and recognised issue at a national level and is being questioned by the modelling industry as the standard forecasts make little allowance for the significant mode shifts that could be expected from specific local conditions and also from improvements such as those discussed in chapters 5 and 6 of this Addendum.

4.55 As previously stated the only notable change in link flow is observed relating to the signalisation of the Mill Rythe (Manor Road / Church Road / Havant Road) junction which makes Manor Road slightly more attractive as a route over Church Road due to the redistribution of delay. Across the various model runs, results are generally the same across the AM, Inter Peak and PM time periods.

Results: Journey Time Routes

4.56 In the original HITA, six 'journey time' routes were used to compare journey times in the various modelled scenarios. These routes represent the main sections of routes which road users follow when travelling on, around and off the Island. For this Addendum this was extended by adding a seventh route, 'X', through Havant town centre. Further information about this process is contained in Appendix B 'Mitigation Testing Report'. A summary of the results can also be viewed in Appendix A. The seven routes are as follows:

- Route 1: Beachlands roundabout to Manor Road / Brights Lane junction via A3023 Beach Road and Manor Road, northbound and southbound
- Route 2: Sea Front / Sea Grove Avenue junction to St Marys Road / Church Road junction via Elm Grove, northbound and southbound
- Route 3: A3023 Langstone Road / Woodbury Avenue / Langstone Technology Park to West Lane / Havant Road A3023 junction direct via A3023, northbound and southbound
- Route 4: St Mary's Road / Church Road to A3023 Havant Road / West Lane junction via A3023
- Route 5: Manor Road / Brights Lane to A3023 Havant Road / West Lane junction via A3023
- Route 6: West Lane/ Brights Lane to A3023 Havant Road / West Lane junction via West Lane
- Route X: A3023 Langstone Road / Woodbury Avenue / Langstone Technology Park to B2149 New Road roundabout via Park Road South.

4.57 As before, the journey times were collected and averaged over intervals of an hour for individual routes. From the tables in Appendix A, it can be seen that journey times increase over Baseline in all scenarios and time periods due to additional traffic whether this is from background growth, committed development or Local Plan sites.

[12] 'Do minimum' is a model running today's committed development, background traffic growth (in accordance with TEMPRO) and Local Plan 2036 development with no change to today's highway network.

[13] 'Baseline' is a model running today's committed development and background traffic growth (in accordance with TEMPRO) without Local Plan 2036 development, with no change to today's highway network

4.58 Comparing the various mitigation scenarios with the Do Minimum condition, journey times for routes 1 and 2 remain approximately the same. As the majority of the proposed mitigation measures are further north than these route sections (and do not feature at all on route 2), this would be expected.

4.59 Routes 3, 4, 5 and 6 generally benefit from journey time reductions compared with Do Minimum due to the implementation of mitigation package M1A ('friction reduction') measures along the northern sections of the A3023 and especially in some of the options for measures at the Havant Road / Northney Road junction as more fully discussed in 4.28ff above.

4.60 Route 3 shows increased journey times compared to the Do Minimum scenario in all conditions. The source of these increases is the changes to the Langstone Road A3023 / Langstone Technology Park / Woodbury Avenue junction and at the Langstone Road A3023 / Southbrook Road junction. The proposed measures at these junctions are required to assist traffic to exit the side road business and residential areas, to reduce severance and to address safety issues. However, this introduces delay for the main A3023 traffic flows.

4.61 For route 4, the scenarios demonstrate increased journey times compared to the Do Minimum scenario when signalisation at the Mill Rythe (Manor Road / Church Road / Havant Road) roundabout is added. Traffic flow in Church Road northbound is currently relatively unimpeded due to the unbalanced nature of the junction. Introducing traffic signals redistributes delay between Church Road and Manor Road A3023. This is more fully discussed in 4.23ff above.

4.62 Conversely route 5 demonstrates improved northbound journey times due to the introduction of the signalisation at the Mill Rythe (Manor Road / Church Road / Havant Road) roundabout. Without the signalisation, queue lengths for the forecast model (Do Minimum) demonstrate significant queues will develop on the Manor Road A3023 eastbound arm of the roundabout, particularly in the AM peak. This is mostly due to the assumption that Rook Farm development will take access onto Manor Road south of Brights Lane, together with the added traffic from the Sinah Lane development not all of which will use West Lane. Introducing traffic signals redistributes delay between Church Road and Manor Road A3023. This is more fully discussed in 4.23ff above.

4.63 Journey times for route 6 are similar to those in the Do Minimum scenario as only those mitigation package M1A measures north of West Lane / Havant Road have an effect. Journey times increase slightly when signals are introduced at the north end of the route (West Lane/ A3023). The model demonstrates that most vehicles would wait the length of one cycle before passing through the junction. This is to avoid adverse effect on the main Havant Road A3023.

4.64 Journey times through Havant town centre on route X are generally consistent between all runs which is to be expected as this route is outside of the primary area of influence of the Hayling interventions. The inclusion of route X is necessary to ensure that any boundary effects on Hayling traffic of traffic on the Langstone roundabout and through the town centre is accurately reflected. In the original HITA this route section was not reported which gave the impression that traffic on the A3023 arriving at or starting from point 'F' (Langstone Road / Langstone Technology Park / Woodbury Avenue) always had a free outlet / inlet whereas in some instances and times of day this is not the case. The exception is in the AM peak when mitigation package M1A is applied; southbound journey times decrease beyond Baseline. Systra considers:

The M1a measures improve the northbound flow in the AM south of the A27, by reducing the amount of "platooning" heading northbound, resulting from right turners holding traffic up, buses stopping etc. The result of this is that at the Technology Park junction, there are overall more gaps for southbound right turners entering the Technology Park. This reduces the queuing from right turners back onto the A27 roundabout and helps with throughput on the northern [Park Road South] arm, hence the reduced journey times.

4.65 Queue length Tables can be viewed in Appendix B. Comparisons between queue lengths for the mitigation measures are similar to those in the 2036 Do Minimum model. Mitigation package M1A does reduce journey times in all time periods. However at some of the specific junction interventions queueing increases mostly due to the redistribution of delay arising from signalisation. This is particularly evident at Mill Rythe (Church Road / Manor Road) (site A). Traffic signals at the Havant Road A3023 / Northney Road junction (site C) reduces long queues shown on Northney Road in the Do Minimum scenario, but queues are increased on the A3023 at this location northbound in the AM peak due to the currently unimpeded traffic flows on the A3023 being stopped to allow Northney Road traffic to join the A3023. There is benefit arising from the measures proposed at West Lane (site B) and at Langstone Road (site D) where queues are reduced from the Do Minimum condition.

Strategic Journey Time Routes

4.66 The seven journey time routes have been aggregated into three of the more strategic journey routes, and are referenced as 1X, 2X and 3X to distinguish them from routes 1, 2 and 3 used in the original HITA. These routes are a shorthand to represent the main routes used by the majority of drivers between Hayling Island and the mainland, and so provide a clear means of assessing the impacts of each mitigation measure or scenario on the route as a whole rather than in sub-divided components. As with the seven journey time routes, these strategic routes differ only from those in the original HITA by their extension through Havant town centre so that the impact of the A27 Langstone roundabout can be assessed.

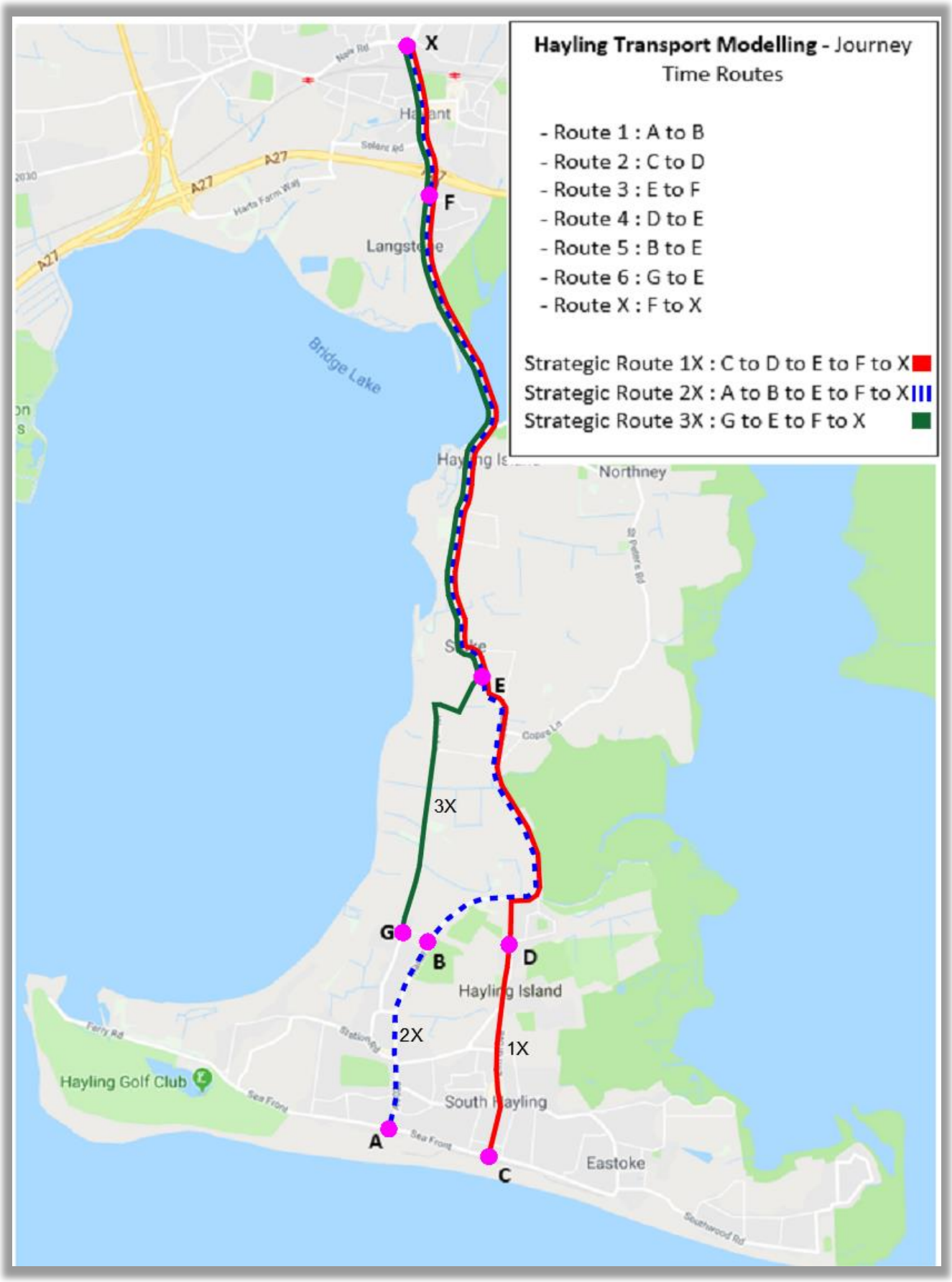


Figure 14: Journey time routes 1-6 and X, and strategic journey time routes 1X, 2X and 3X

Discussion: Impact of Mitigation Packages – Do Minimum vs Mitigation Packages

4.67 The Do Minimum models (where background growth, committed development and the 2036 development quantum is applied to today's road network) indicate that there will be additional journey time and extended queueing on the A3023. The effect is not as noticeable through Havant town centre. These journey time increases add up to seven minutes to a northbound journey in the AM peak and three minutes to a southbound journey in the PM peak on the modelled neutral days. Increases in the interpeak are not significant.

4.68 Applying the mitigation package M1A measures ('friction reduction'), the journey times reduce from Do Minimum towards the conditions applying in the Baseline in the peak direction, and mostly surpass Baseline in the contra-peak direction and in the inter-peak. The detailed figures are available in Appendix A. Mitigation for Local Plan development is therefore required.

4.69 On the three strategic routes 1X, 2X and 3X the effect of adding package M1A as the only intervention is that in the AM peak journey times increase by between two and four minutes against Baseline in the northbound direction, but reduce beyond Baseline in the southbound direction. This is an improvement of over 1½ minutes against the Do Minimum condition in the peak direction. In the interpeak there is minimal change with reduced journey time in the northbound direction and slightly increased journey time in the southbound direction (less than seven seconds in the worst case) which will in reality be unobservable amongst the journey 'noise' of day-to-day variation. In the evening peak, the reverse to the morning peak applies with southbound journey times increasing by in general up to three minutes over Baseline with northbound journey times generally decreasing beyond Baseline; again, the detailed figures are in Appendix A.

4.70 The more detailed journey times for routes 1-6 demonstrates that the main increases in these AM northbound and PM southbound journey times are limited to specific sections of the network. In the AM peak the increased journey time is on routes 1, 3 and 5, namely the A3023 between Beachlands and the A27. Due to overlap in route 3, these increased times affect the other strategic routes but to a lesser extent (i.e. only on those sections where they use the A3023 north of West Lane).

4.71 Whilst the 'friction reduction' measures in package M1A remove some of the general 'transit' delay, there are specific locations where 'point' delay is experienced. Therefore in addition to M1A, a further series of junction – specific measures are proposed. These locations have been considered in paragraphs 4.16ff above as sites A - D and comprise measures at Mill Rythe (Church Road / Manor Road / Havant Road) roundabout, West Lane / Havant Road junction, Northney Road / Havant Road junction, and at the north end of the A3023 in Langstone Road.

4.72 Some of these sites – Mill Rythe, West Lane and Langstone Road - were initially tested as stand-alone interventions without M1A but none were shown to have an individual benefit. In particular the introduction of signals at Mill Rythe junction was shown to have a negative effect due to the redistribution of delay between Manor Road and Church Road in the AM peak. Once it was recognised that M1A was required to provide the initial benefit to which the junction proposals then added, no further modelling of these junction proposals in isolation was undertaken.

4.73 The remaining modelling (specifically the four variations at Northney) was therefore carried out to test the individual junction interventions in combination with the friction reduction measures in package M1A. Apart from the signalisation of the Northney Road junction which introduces a new source of delay, and the signalisation at Mill Rythe which redistributes delay and affects journey time at all times of the day, all of these generally showed 'in combination' improvements to journey

times over the 'Do Minimum' condition on all routes at all times of the day and offer improvements over the package M1A alone, although many were minor. These are shown in Appendix A.

4.74 Finally the best performing junction upgrades were tested in combination - West Lane (signalisation), Northney Road (folded option) and at Langstone Road. These were tested with and without mitigation package M1A. The results indicated that the major benefits to be gained initially were delivered by mitigation package M1A alone; the junction upgrades then provided further journey time savings but not to a statistically significant level. The distribution of journey time improvements indicates that of all the proposed changes, the most valuable in terms of journey time savings is achieved by those at Langstone Road. The other benefits by implementing the changes in combination are generated by the societal gains as discussed in Chapters 5 and 7.

4.75 As a strategy it is therefore proposed that mitigation package M1A be implemented at the earliest opportunity. With today's traffic conditions, this will result in improvements to journey times in current conditions and will create a 'bank' of reduced journey times which phased development up to 2036 will then refill and then slightly exceed.

4.76 This will create an environment where, as future development is brought on stream, further modelling in light of the conditions pertaining at the time can be undertaken, and more detailed junction designs can be promoted which will be able to take advantage of other measures proposed in this Addendum.

Road Safety and Resilience

4.77 A consideration when assessing the impact of any development and associated mitigation is in understanding how the results could impact road safety, for all users. This is more comprehensively discussed in Chapters 5,6 and 7 but the following points act as a summary.

4.78 The A3023 between Langstone and Mill Rythe has a poor accident record[14], many of these caused by accessing frontage properties and the limited ability to turn right across oncoming traffic. Whilst their primary role of the measures in the mitigation package M1A is to secure reductions in journey time, or queue length, over Do Minimum, an additional benefit is to improve highway safety and resilience for all users.

4.79 Resilience in this context is the ability of the A3023 to withstand the impacts of accidents, unplanned road works and other regular local incidents. How the network recovers from the effects of these events, to allow residents, businesses and emergency services to get back to normal as quickly as possible, is as important as the 'business as usual' operation of the route.

4.80 The A3023 on Hayling Island is subject to increasing traffic levels due to car ownership and usage by residents, the necessity to access services off the island, together with cumulative development pressures which all add to daily traffic demand. Hayling Island has only one road route on and off the island with 24 hour daily average traffic flows at Langstone bridge of 26,508 vehicles. As opposed to a 'network' situation the 'one road only' situation for Hayling Island means that any incident and disruption on the A3023 is felt very quickly and can cause a problem that rapidly escalates with no immediate remedy available such as a diversion route. These incidents whilst often minor in themselves (e.g. a broken-down car or a parked delivery vehicle) have a disproportionately large impact on the efficient functioning of the A3023 corridor resulting in long

[14] See HITA for records of accidents up to 2018

delays, tailbacks into Havant town centre and beyond, and unreliable journey times. Hayling Island is therefore more vulnerable especially in the case of accidents and emergency roadworks which then have a big impact on the corridor and adjoining highway network. Clearly unmitigated additional development has the potential to worsen the situation significantly.

4.81 Assuming that the mitigation measures described in the HITA and in this Addendum are implemented, the impact of the proposed Local Plan development on the current level of resilience on the A3023 corridor will be balanced by additional capacity, additional opportunities for access (especially for emergency vehicles along the Hayling Billy Trail) and an overall improvement in highway safety by removing or improving those locations which give rise to the greatest numbers of road traffic incidents.

4.82 A factor in relation to highway safety and resilience is the impact of potential queueing and whether this has the potential to adversely impact the operation of additional junctions. The introduction of traffic signals at a junction removes any opposing traffic, driver decision and possible errors in judgement, therefore providing a safer junction. Traffic signals also allow for the accommodating pedestrian and cyclist crossing facilities.

4.83 However to balance this benefit, consideration needs to be given as to whether traffic queues generated at one junction queue back past other junctions. If this occurs, safety could be at risk. From the Paramics and Linsig modelling outputs, locations where queueing past other junctions is likely is from the proposed Mill Rythe signalised junction, back to the proposed Kings Road mini roundabout, with approximately 170m queue in the PM period. However, this could be offset by including ‘Keep Clear’ markings on the mini roundabout.

4.84 Likewise the relocation and signalisation of the West Lane junction reduces delay and queueing at that location, improving safety and providing additional crossing opportunities, and reducing the likelihood of road traffic incidents at this location.

4.85 At the A3023 Havant Road / Northney Road junction, the introduction of signalisation as modelled by Linsig could result in northbound and southbound traffic queues of approximately 930m, in the AM and PM periods respectively, which could result in northbound traffic queueing past the petrol station forecourt and garage, and southbound almost from the A27. For this reason, signalisation is not supported at this location, but the preferred ‘folded’ junction is a safer layout and will lead to an improved safety record with fewer road traffic incidents.

4.86 It will not be possible to completely alleviate the issues created by one-off incidents on the Island network or on the mainland due to the single access; however the justification for carrying out the mitigation work is as much to improve safety and therefore reduce the incidence of road closures or restrictions due to road traffic incidents which currently result in such closures.

4.87 The overall resilience of the network is also affected by the location within the highway boundary of statutory undertaker plant. Whilst the A3023 Management Plan does place restrictions on planned works on the highway, unplanned works will continue to have an impact on highway operation, especially if resulting in road closure. The mitigation measures will ensure that the impact of unplanned works is reduced should the work allow the road to remain open; in the case of full closure emergency planning arrangements will need to be activated, as is the case today, but the mitigation measures (especially those in relation to use of the Billy Trail as a ‘blue light’ access route, chapter 6) will allow better control and recovery of traffic in such conditions.

Langstone Roundabout

4.88 In the HITA, although modelling was carried out for the whole corridor (i.e. from locations in the south of Hayling, northwards through the A27 Langstone roundabout and Havant town centre, terminating at the New Road / Petersfield Road roundabout), the TA reports only on the section south of the A27. In this Addendum, this section has been included in the modelled runs so that the impact of traffic flow on and off the A27, and through Havant town centre, on traffic entering and leaving the A3023 is more clearly shown and understood. These additional sections have been identified by the addition of point 'X' at New Road roundabout on the routes and check points. The validation stage of the model reported in the original HITA showed that the model accurately represents joining, merging and leaving traffic at Langstone roundabout.

4.89 The county and borough councils are working with Highways England to ensure that the traffic lights on the Langstone roundabout are operating efficiently and effectively. It is known that issues of reliability cause some of the regularly reported congestion. This work with Highways England will strengthen relationships between the three principal parties and ensure that reports of signal failures are dealt with quickly to ensure that there is co-ordinated management of the junction to minimise negative effects on the town centre and A3023 traffic when the signal failures occur. The county council is discussing with Highways England the addition of an additional detector on the Langstone Road exit arm to allow more accurate operation of the junction.

4.90 As stated in 4.34ff. Hampshire County Council is progressing with a bid to the Transforming Cities Fund which if successful would see a number of projects implemented at the north end of Langstone Road, on the roundabout, and through the town centre. In parallel with this bid, funding from the borough's Community Infrastructure Levy (CIL) has been sought to undertake a study (with Highways England and county council input) on the roundabout to maximise the efficiency of its operation and to test 'late phase' and additional interventions beyond those contained in this formal Transport Assessment. These could include (inter alia) a segregated left turn lane allowing traffic from the northbound A3023 to join the A27 westbound on-slip directly; localised carriageway widening; and / or a direct access into the Langstone Technology Park from the A27 westbound on-slip, replacing the existing entrance on Langstone Road. Assuming the funding bid is successful, it is expected that the study will report in the autumn of 2020.

4.91 Because the Hayling modelling has demonstrated there is no cumulative severe impact on the A3023 by Local Plan development traffic, the outcome of this later study will only serve to further reduce the modelled queue lengths and journey times, reinforcing the fact that the present modelling very much represents a 'worst case' scenario unlikely to be realised.

4.92 The Paramics modelling indicates that the 'friction reduction' mitigation measures on the Island and at the Ship Inn access have a positive effect on vehicle flow, especially in the AM and PM southbound peaks where currently there are occasions when southbound traffic on the A3023 queues back onto the roundabout circulatory area. Application of the mitigation measures, especially the extension of the two-lane section of Langstone Road southwards by 170m to move the merge away from junctions and the implementation of measure son the Island which break up 'platoons' of traffic, seems to reduce the instances of these queues being generated. That these queues are not a regular occurrence and mainly confined to summer and weekend peaks is reflected in the modelling which is based upon a 'neutral' mid-week term time scenario, in accordance with WebTAG modelling conventions; in the model, the queues from the A3023 affecting the roundabout are limited both in time and extent which reflects well the conditions (queue lengths, journey times) on those neutral days.

4.93 The M1A measures particularly improve the northbound flow in the AM peak on Langstone Road south of the A27, by reducing the amount of “platooning” heading northbound, resulting from right turners holding traffic up, buses stopping etc. A result of this is that at the Technology Park junction, there are, overall, more gaps for southbound right turners entering the Park. This reduces the queuing from right turners back onto the A27 roundabout circulatory area and helps with throughput on the northern arm, which leads to the reduced AM southbound peak journey times indicated in the model results which then mirror interpeak times.

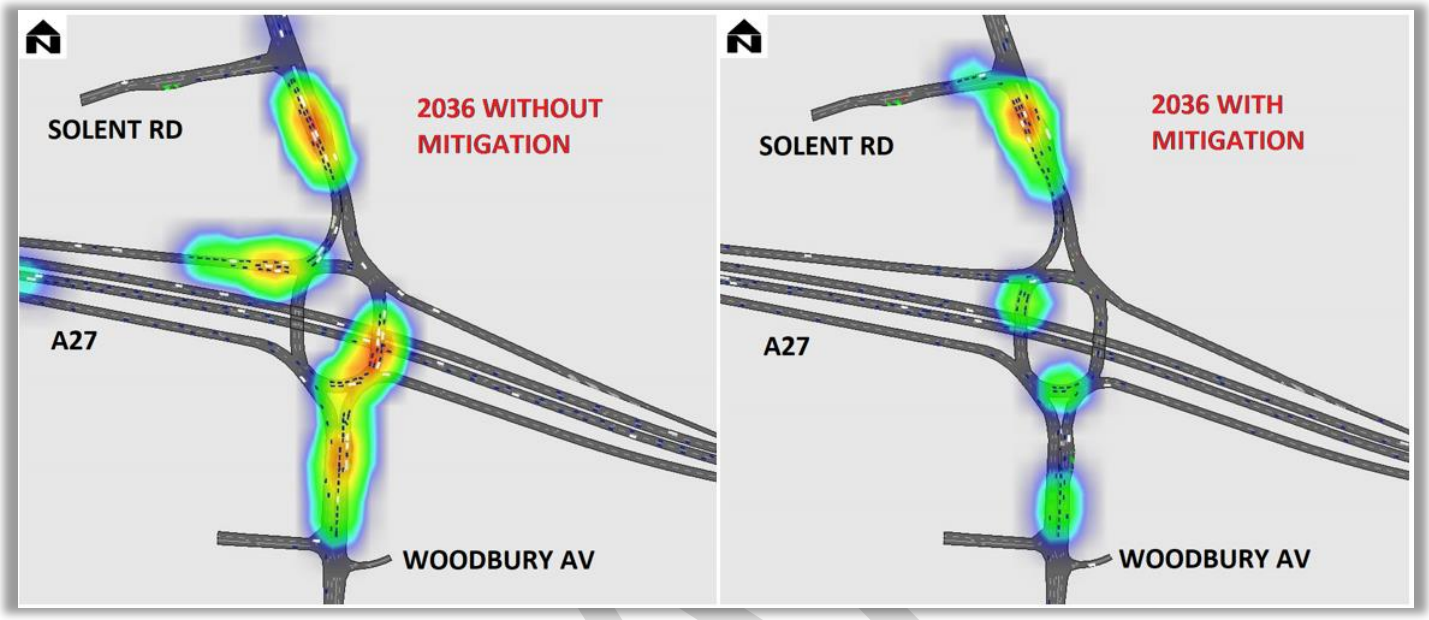


Figure 15: AM peak conditions at Langstone roundabout in 2036. The M1A mitigation measures on the Island reduce platooning of northbound traffic, allowing more right turning traffic to enter Langstone Technology Park, in turn reducing southbound congestion and improving journey times and flow through the town centre on Park Road North and Park Road South.

4.94 With regard to the modelling of the southbound shock waving on Langstone Road in the PM peak, the 2018 video surveys established what was causing this issue, and the extents of the congestion, namely that the southbound problems were shown to be a cumulative impact of all the “friction” to the south on Langstone Road and Havant Road. The HITA base model was calibrated to match this behaviour and matches the PM southbound journey times within the required model validation criteria, as outlined in the HITA model development report. Moving forwards to the ‘Do Minimum’ model, the increase in traffic volumes does see the conditions on Langstone Road southbound worsen as a result of increased effects of the “friction”, with increased blocking back towards the roundabout noted, and reflected in the journey times. These are then reduced by implementing the ‘Do Something’ mitigation measures and approach baseline.

4.95 Overall, implementation of mitigation measures on the A3023 south of the A27, even on the Island, has the effect of reducing shock waves and platooning of traffic. This results in improved flow onto and around the A27 Langstone roundabout in the AM and PM peaks.

Model Run Results Summary

4.96 The results from the Hayling Island Paramics and Linsig modelling have demonstrated that the proposed Local Plan development will have a severe impact on the highway network in terms of queue length and safety. The mitigation measures proposed would provide improvements at various

locations to offset the impact of increased traffic resulting from Local Plan development, in all cases reducing delays when compared to the situation without mitigation (Do Minimum scenario) and improving safety. In many cases the journey times approach Baseline (i.e. development without Local Plan) levels. By adopting these mitigation measures, the 2036 quantum of development will not cause severe cumulative harm on the highway network.

4.97 While no intervention provides a panacea for all the issues on the network, early implementation of the 'friction reduction' measures in particular would bring safer overall operation of the network whilst providing facilities for pedestrians and cyclists and road safety improvements to all users, to create the time required to build modal change away from the private car.

Further Work

4.98 Further work and modelling iterations to address the increased delays on the A3023 and side roads and to make further journey time savings and reduce queue lengths could be investigated. Supplementary mitigation measures, with different permutations of proposed interventions and combination of schemes, could provide an optimum package. This is especially true of the upper end of the A3023, in particular at Southbrook Road where the option of a folded right turn will need to be confirmed later in the Plan period when the second stage of the Langstone Road intervention (banned turns at Woodbury Avenue and Langstone Technology Park) is implemented.

4.99 CIL funding has been applied for 2020/21 for a further detailed study into the operation of the A27 Langstone roundabout. This would provide a more accurate understanding of the 'phase 2' Langstone Road intervention (4.39ff) which is proposed for late in the Plan period, as well as investigating the provision of a segregated left turn ('jet') lane to allow northbound traffic on the A3023 to directly access the A27 westbound on-slip without stopping for the traffic signals on the roundabout circulatory area.

4.100 This proposed further study could also investigate an alternative option of providing a direct entrance into the Langstone Technology Park from the A27 westbound on-slip would remove the southbound right turning movement from the A3023 into the Technology Park and thus remove the need for northbound traffic signals at this location (as discussed in 4.39ff). This would not be able to operate in combination with the 'jet' lane suggested above due to the merging of traffic on the slip road. Such a new 'inbound access' to the Technology Park has been suggested to Highways England, operators of the A27, who have raised no objection in principle to the option.

4.101 As with the original HITA 'package 3', a long-term view will need to be taken of the comprehensive upgrading of West Lane to provide an alternative route for the A3023. Third-party land would be required for this upgrade but it would provide relief and resilience especially for traffic from the south-east of the Island which would have much clearer access at Mill Rythe onto the former A3023 through Stoke. The West Lane / Havant Road link (site B, discussed at 4.23ff) is designed to allow for the future implementation of the more substantial project.

4.102 The current work pre-supposes an access to the Rook Farm development site from Manor Road in accordance with the Local Plan site allocation. The original HITA assumed that access would be taken from St Marys Road. Should the access be confirmed from St Marys Road, some additional modelling would have to be undertaken to determine the quantum of change to traffic flow especially the respect to the balance at Church Road / Manor Road / Havant Road (Mill Rythe) and on West Lane. With acceptance of the Paramics model as the basis of traffic modelling on the Island, developers will be given access to the model for their own TA work ensuring a consistent approach going forward through the Local Plan period.

5. Other Transport Network Improvements and Interventions

5.1 This section highlights other transport network enhancements and interventions not involving direct physical works on the highway which could be considered to improve journey time reliability, but which are not included within the microsimulation modelling as they are outside of modelling parameters. Any of the following measures could therefore offer additional benefit to any proposed mitigation. Further studies would be required to understand the impact of the options below, as few can be modelled with any degree of accuracy.

5.2 By encouraging modal switch primarily away from the private car, additional road space capacity would result thereby improving journey times and reliability for the remaining traffic. This mode switch can be assisted by making bus travel more attractive and reliable; by improving conditions and facilities for walking and cycling; and offering incentives to avoid private car use. Some of the mode shift can be addressed through Local Plan policies such as additional facilities for the community being provided locally (a recent example being the 'Lidl' store at Mill Rythe), removing or reducing the need for 'off-Island' travel.

Bus Network

5.3 The bus service network is stable and frequent, with routes not having changed for the past ten years apart from minor changes to timetables have been introduced to reflect changing demand and traffic conditions. In broad terms the service is formed of two routes (routes 30 and 31, commercially operated by Stagecoach) which are common between Havant bus station and the Church Road / Manor Road roundabout at Mill Rythe; service 30 then operates in an anticlockwise loop around the urban south of the Island via West Town, Beachlands, Eastoke and Mengham whilst service 31 operates the opposite way around the same loop. Both loops divert into the Eastoke peninsula. Broadly, each service operates half hourly from before 0600 in the daytime on Mondays to Saturdays, and hourly after 1900 in the evening and on Sundays. Last bus leaves Havant at 2200 on Mondays to Saturdays and 1935 on Sundays and bank holidays. End to end journey time is 55 minutes and so the service requires four vehicles which are usually from a small fleet branded for Hayling Island. A fifth vehicle is held in reserve in the summer in case of service perturbation.

5.4 As a result of the route via Beachlands being longer than the route via Mengham, the headways between buses to Havant on opposite sides of the loop are unbalanced. For example, the service at Eastoke has departures to Havant at 19/28/49/58 minutes past the hour. At Beachlands this is even more acute with departures for Havant at 06/12/36/42 minutes past the hour. The result of this lack of balance is that although it could be argued that there are four buses an hour to Havant from anywhere on Hayling, in reality in the urban south it is realistically two per hour except on the Eastoke peninsula.

5.5 Discussions with the operator (Stagecoach) have been undertaken as part of this Addendum and the following key points are of note:

- Route branding could be strengthened on-street and on the vehicles
- There are currently no plans for significant commercially-driven frequency or route changes
- Any increase in frequency would need to be undertaken in balanced steps with two vehicles required for each step (i.e. 30-minute headway to 20-minute headway would require two additional vehicles)
- Extension to operating hours (morning, evening, weekends) would require financial support
- Severance caused by difficulty crossing the road to use bus stops reduces the attractiveness of the service
- Vehicle fleet is currently five years old to Euro5 emissions standard and with onboard WiFi. The next step would be to upgrade to Euro6[15] with USB and WiFi; to bring forward replacement of the fleet would require investment of £850,000 for Euro6 vehicles (which would offer extra 28 seats / hour) or £2m for an all-electric fleet[16] (which would offer 4 seats / hour fewer than the current fleet)
- Customer service improvements have been demonstrated to increase patronage
- New innovations in ticket payment technology are likely to prove attractive to gaining new users
- Pricing appears to be an area where additional patronage could be driven, however any innovations need to be sustainable.

5.6 The Island's demographic profile results in a higher than average proportion of bus users doing so under concessionary travel arrangements. Because the bus company is reimbursed based on the average price of a single fare, and because relatively fewer patrons pay in this way, the fare rate is higher on the Island than on other similar routes on the mainland. This disincentivises bus use for the fare paying public.

5.7 Highway friction reduction measures in package M1A propose that certain bus stops are relocated into full depth or half depth lay-bys. The design of these measures needs to ensure that bus services are not disadvantaged when pulling out of the layby; this can be achieved by the geometry of the layby exit. Upgraded stops should include shelters and timetable information. Opportunities for driver education (especially around Highway Code Rule 223, "Please let buses pull out") will be investigated should the service suffer from unreliability due to implementation of this mitigation measure.

5.8 Real time passenger information (RTPI) is not required at all stops due to the growth of mobile device applications, but several stops at key locations (Beachlands, West Town, Eastoke Corner, Creek Road, Mengham) would benefit from provision of RTPI on the basis both of usage and visibility by non-bus users.

5.9 The operator is willing to investigate any measure that drives increased patronage[17]. One proven means of creating bus use from new development is to offer a weekly free pass and this can be written into Section 106 agreements with the relevant developer; however this is a short term measure, and a mode shift to achieve the degree of change required to mitigate traffic growth will

[15] https://www.youtube.com/watch?v=coDvwMWVgX0 retrieved 20 August 2019

[16] Costs from a personal email communication between HBC and Stagecoach, August 2019

[17] In a December 2017 survey reported in the HITA, out of 1717 respondents, 663 stated that they would use the bus service more frequently, instead of a car, if the services were "improved". It was not defined what such an "improvement" might be.

require a proportion of existing journeys to transfer to the bus and be retained into the long term, starting as soon as possible.

5.10 With frequencies and routes effectively fixed for the foreseeable future, the only measure available to make bus travel more attractive is at the farebox. The council will therefore continue to engage with the operator to identify and if possible, implement innovative fare solutions which may include subsidy, a specific pass, zone changes, through fares etc. as well as subsidy of individual service enhancements if a business case can be demonstrated. The Council accepts that should any such interventions be identified, then in order to provide confidence for the mode switch any support required needs to be provided with a long-term commitment.[18]

5.11 In September 2019 the government announced through its Autumn Spending Review that £200M would be made available for a range of bus service enhancements and trials, including the creation of an 'electric town'. It is understood that Stagecoach is engaging with the Department for Transport to investigate a suitable candidate, and the council has asked that Hayling's network be included in this discussion. With the cost of fleet replacement covered by a separate source, it is possible that fares could be reduced as they would not have to include an element for such fleet renewal.

Ferry

5.12 The Hayling Ferry provides a link between Portsea Island and Hayling and currently runs summer (half hourly finishing at 2100) and winter (hourly finishing at 1900) timetables. It extends its timetable as required, for example to support special events in Portsmouth and Hayling Island. Cycles are carried free of charge.

5.13 The ferry route forms a dual role both in providing both a shorter, more direct route into Portsmouth from the Island for pedestrians and cyclists, and as a link in longer distance transport networks (National Cycle Network route 2 and the Shipwrights Way Long-Distance Path both use the ferry as part of their route). However, it has suffered from a troubled financial past with operations suspended for 18 months in 2015/16; local authority support is required to maintain the service.

5.14 Increasing sailing frequency, hours of service and improving access to the ferry on both sides, especially by public transport, would provide an opportunity to make the ferry more attractive and convenient for those travelling between the two islands and beyond, therefore, potentially releasing highway network capacity especially in the morning peak. The bus connections to the ferry continue to be limited; in the winter of 2018/19 a trial bus service aimed at scholars and commuters was operated to the ferry but failed to generate revenue and was withdrawn after four months and £20,000 of support. Likewise, the extension of a supported bus service (First number 15) meeting the Portsmouth side of the ferry on Mondays to Fridays, whilst still operating at the time of writing this report[19], has thus far failed to generate more passengers.

5.15 A key attribute should be clarity of fare structure with the aim of a single fare from anywhere on the Island to Portsmouth using the ferry as one stage in a multi-stage journey. 'All-in-One' combined tickets have been trialled in the past but have failed due to administrative difficulties over fare attribution and reimbursement. The lack of a direct bus service to the Hayling ferry terminal has

[18] It is also possible that the additional £200m national funding announced by the Chancellor in the September 2019 Spending Review for buses may be available to 'fast track' some of the proposals listed in this section

[19] Late August 2019

previously required the use of a taxi which has added to the cost of any scheme. The lack of a 'through' ticket adds to the cost to the prospective customer. With updated technology it may now be possible to re-introduce the All-in-One scheme in some form whilst minimising the potential economic effect on the operator.

5.16 At present the ferry is not part of the 'Solent Go' multi-operator south Hampshire travel card[20] and therefore one opportunity to reduce the 'fare severance' which some passengers might find off-putting is not being addressed. The council is encouraging the operator of the ferry, Baker Trayte Marine, to investigate the benefits of joining the scheme.

5.17 The original HITA suggested that consideration could be given to the provision of one or more purpose-built amphibious passenger vehicles (APV or DUKW ('DUCK')[21]). This would negate the requirement for connecting transport and supporting infrastructure either side of the ferry, thereby assisting with issues associated with mooring fees at the Harbour pontoons, cross modal connectivity and the factors determining modal choice. Such vehicles would also attract leisure / tourist use, especially if running on a longer route between Beachlands and Southsea. However with cost of a suitable purpose-built vehicle in the order of £450,000 this represents an investment which is currently beyond the ability of the various partners to meet without external support. Their limitation to a 10kn current would mean the operation across the Harbour mouth would be at the upper end of their ability.

5.18 The Council will continue to work with the ferry operator to support and develop the ferry as a useful element of the transport infrastructure of the Island. However, it is recognised that without significant investment the role of the ferry is likely to be relatively limited and no account has been made in this Addendum for any significant mode switch.

Walking and Cycling Network

5.19 Hayling Island is flat and no journey on the Island, or even off it into the hinterland, is more than 5 miles in length. It should therefore be an ideal walking and cycling environment[22]. However, there is a well-founded perception that both modes suffer from proximity (or use of) the A3023. Locally the national statistic[23] that 20% or so of journeys under 1 mile, and some 70% of journeys of between 1 and 5 miles, are made by car would suggest that a significant mode shift could be achieved if the appropriate infrastructure for walking and cycling was in place. On Hayling due to the unbalanced nature of residential : employment locations journeys will tend to be longer with travel from the Island to places of work or tertiary education tending to weight the mode towards car / bus and away from cycling and walking. The 2011 Census journey to work data for Hayling Island residents and people who travel from elsewhere and work on Hayling Island shows that Hayling Island has 7,677 working residents; of these, 22% commuted within Hayling, 15% to elsewhere within the Borough, 15% working from home and 15% to Portsmouth[24]. Certainly the 22% 'intra-Island' commute is an attractive target for modal shift as currently only 8.5% of journeys are by walking and cycling.

[20] http://solentgo.co.uk/ retrieved 8 August 2019

[21] https://www.windsorducktours.co.uk/ as an example of a viable operation, retrieved 8 August 2019

[22] http://www.cyclehayling.org.uk/ retrieved 9 August 2019

[23] https://www.gov.uk/government/statistics/national-travel-survey-2018 National Travel Survey 2018 retrieved 9 August 2019

[24] https://www.ons.gov.uk/census/2011census retrieved 21 October 2019

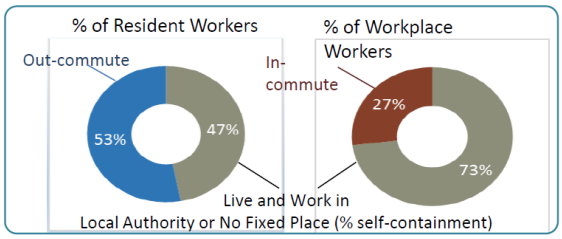
Hayling Island 2011 Commuter Flows

2011 Resident Workers[1]: 7,677
Live & work in Hayling Island[2]: 2,763
No Fixed Place [of work]: 820
Out-commute[3]: 4,094

2011 Workplace Workers[1]: 4,940
Live & work in Hayling Island[2]: 2,763
No Fixed Place [of work]: 820
In-commute[4]: 1,357

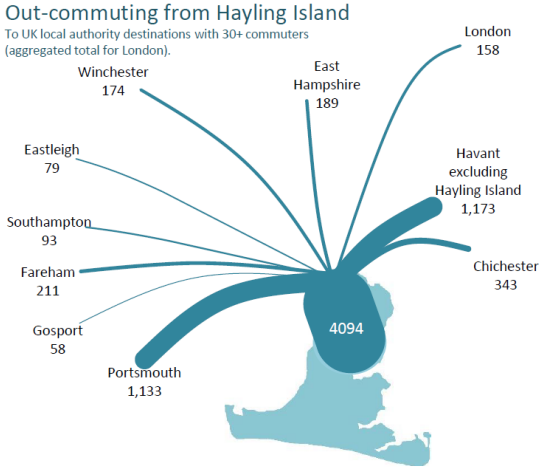
2011 Net Commuter Out flow[5]: 2,737

[1]Aged 16yrs plus in employment the week before the 2011 Census. [2]Commute within area or Home workers (work mainly at or from home), [3]Includes Scotland, Northern Ireland, Offshore and outside UK, [4]In-commuting from England and Wales only (other data not available), [5]The difference between Out and In commuting.



Out-commuting from Hayling Island

To UK local authority destinations with 30+ commuters (aggregated total for London).

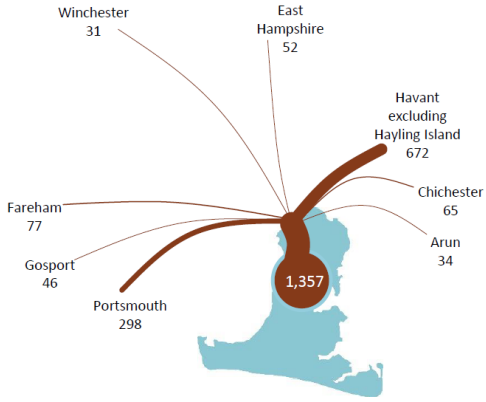


Commuting to other UK destinations = 483 resident workers.
Commuting to offshore installations & outside UK = 29 resident workers.

2011 England & Wales Census data – people aged 16+ in employment the week before the census. ONS swap some counts, particularly in small areas, to preserve anonymity

In-commuting to Hayling Island

From English and Welsh local authorities with 30+ commuters to Hayling



Commuting from other local authorities in England and Wales = 82 workers.
London is included and has fewer than 30 commuters to Hayling.
Data not available for origins outside England and Wales.

2011 England & Wales Census data – people aged 16+ in employment the week before the census. ONS swap some counts, particularly in small areas, to preserve anonymity.

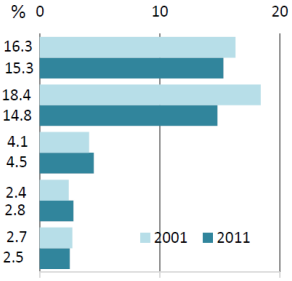
Hayling Island Commuter Flows and Main Method of Travel to Work

The Census 2011 commuter data measures workers aged 16yrs+, while Census 2001 data measures workers aged 16-74yrs. Comparisons between the census numbers should be used with caution due to the difference in age bands, natural population growth over time and economic conditions at the time of census collection which affect worker numbers. The percentage values provide a better relative comparison, although not strictly measuring like-for-like.

Top Five Destinations of Hayling Out-commuters

Number and percentage of total employed Resident Workers
Table ranked by Census 2011 figures with the figure for the same area given for 2001

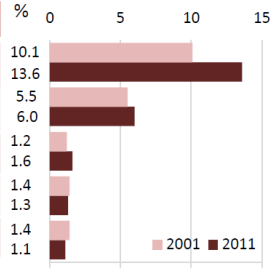
Destination	2001	2011	% 2001	% 2011
Havant excluding Hayling Island	1,357	1,173	16.3	15.3
Portsmouth	1,202	1,133	18.4	14.8
Chichester	301	343	4.1	4.5
Fareham	174	211	2.4	2.8
East Hampshire	202	189	2.7	2.5



Top Five Origins (England/Wales) of Hayling In-commuters

Number and percentage of total employed Workplace Workers
Table ranked by Census 2011 figures with the figure for the same area given for 2001

Origin	2001	2011	% 2001	% 2011
Havant excluding Hayling Island	420	672	10.1	13.6
Portsmouth	229	298	5.5	6.0
Fareham	51	77	1.2	1.6
Chichester	59	65	1.4	1.3
East Hampshire	57	52	1.4	1.1



Main Method of Travel to Work	2001	2011	% 2001	% 2011
Car/Van	4744	5037	64.3	65.6
Homeworker	840	1155	11.4	15.0
On Foot	564	433	7.6	5.6
Car/Van Passenger	408	307	5.5	4.0
Bicycle	308	223	4.2	2.9
Bus	244	186	3.3	2.4
Train	111	182	1.5	2.4
Other	154	154	2.1	2.0

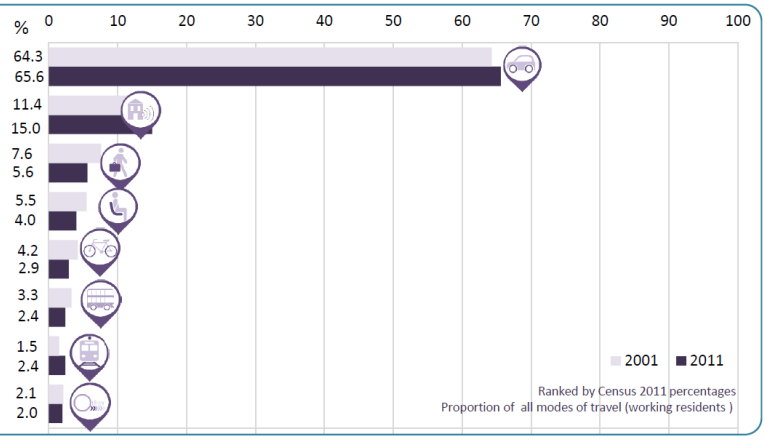


Figure 16 Source: Census 2011

5.20 The borough and county councils have recognised that significant investment is required to produce a cycle and walking network that best serves the needs of the community. The approach over many years has been to seek funding for such improvements from developer contributions (through Section 106 agreements) or through limited programme such as Safe Routes to School (SRtS). However, the fundamental issue with cycling and walking on the Island remains; the disincentive of the A3023 as a busy and polluting road, resulting in community severance and loss of opportunity for more sustainable modes of travel.

5.21 Addressing this issue and achieving the necessary modal shift in favour of walking and cycling will require specific funding to be identified even if this means diverting funding away from purely highway improvements or interventions. Ensuring cycle and walking friendly routes on the island, with access to existing and new footpaths and cycle tracks being clear and coherent, consistent and continuous, will assist in the general perception that routes are safe for walking and cycle use.

5.22 Crossing the A3023 on foot is challenging due to the absence of central refuge islands for long sections of the route. Between Langstone High Street and Mill Rythe School there are only two crossing points where it is possible to cross either separate traffic directions or under the protection of lights. Langstone High Street to Northney Road (refuge island) is a distance of 0.93km; Northney Road to Victoria Road puffin crossing is a distance of 1.17km; and Victoria Road puffin crossing to Mill Rythe School is 2.45km. People wishing to cross the road between Northney and Mill Rythe other than at these two intermediate points have to wait for the alignment of a gap in the traffic in both directions, with anecdotal reports that this can take ‘up to 10 minutes’. This results in severance, especially in locations such as Stoke village. It even leads to anecdotal reports of residents not using the bus service as whilst it may be easy to get on the bus, getting off on the other side of the road results in a long wait to cross (5.5 above).

5.23 Some of the measures proposed within mitigation package M1A and other junction improvements will result in additional locations where pedestrians and cyclists will be able to cross in two stages, one traffic direction at a time, or at new signal-controlled crossings (e.g. at West Lane within the possible signalised layout). This will improve safe access to bus stops, shops and other community facilities and will reduce east / west severance along the A3023.

5.24 The borough and county councils are progressing with their Local Cycling and Walking Infrastructure Plans (LCWIPs) with the high-level county plan expected to be ready shortly after the publication date of this Addendum. The borough plan is likely to be published in spring 2020. Recommendations to be included in the final plans are to develop new routes and methods which make best use of the existing cycle tracks, and to introduce, where appropriate, ‘cycle friendly infrastructure’ such as cycle ramps and advanced stop lines at key locations.

5.25 The HITA recognised that improving the Hayling Island cycle network and links would achieve the overarching aim of improving cycling connectivity and promoting cycling as a realistic method of travel to, and between locations on the island, but also to other residential, commercial and employment centres within the Borough. This Addendum extends this aspiration to cover the walking network. Improved networks would connect existing and future residents to key destinations and encourage an uptake in walking and cycling for short trips, including those to work and for shopping and leisure. By improving walking and cycling infrastructure and connectivity, the route will help to tackle congestion by supporting a mode change from car to foot or cycle for local journeys. An improved network would also act as a feeder into other strategic and local routes, improving localised connectivity and accessibility, reducing severance and linking with other projects in the Borough.

Cycling

5.26 In terms of cycling, the objectives of providing an improved network are as follows:

- To contribute to mitigation by building modal shift to cycles, and by moving cycles away from roads;
- To provide a coherent east-west cycle link across the island;
- To provide a coherent north-south commuter link, from the south of the island to the mainland;
- To support commuters by linking residential developments (existing and proposed) to key employment areas and town centres, such as Havant;
- To encourage a modal shift towards cycling and reduce car dependency for journeys on the corridor.

5.27 At present, the principal route for cyclists and walkers is the Hayling Billy Trail, which is part of the National Cycle Network (NCN 2). The Billy Trail links the island to the mainland following the line of a disused railway track on the island's western side, from Havant railway station on the mainland, to Station Road in the southern part of the island. Due to its strategic importance to the Island's cycling and walking network, as well as for other factors, the Billy Trail is considered in a chapter of its own in this addendum (chapter 6 below).

5.28 Elsewhere on the Island, providing a comprehensive network and enhancing the existing facilities could assist in minimising the impact of normal traffic growth and additional traffic, resulting from any new development, upon the local area. Improving cycling infrastructure to make it coherent, more direct and perceivably safer will assist in encouraging more sustainable transport choices, not only for the existing local residents, but also for those who are new to the area.

5.29 Section 106 funding has been secured from development on the Island as contributions towards improvements to walking and cycling infrastructure. The Hayling Island Cycling and Pedestrian Improvements report was completed in February 2017 and investigated and assessed the feasibility of improvements to cycle and pedestrian infrastructure across south Hayling. This identified the following schemes were feasible, funding dependent, and subsequent to the HITA some of these schemes have now moved towards implementation:

- Junction improvements at Tournerbury Lane to improve safety for pedestrians and cyclists (*implemented August 2019*);
- Elm Grove crossing south – replace existing zebra crossing with a new 'Puffin' crossing north of Hollow Lane (*implemented September 2019*);
- Elm Grove - upgrade Webb Lane westbound bus stop with associated changes to the road layout (*now to be possibly delivered through this Addendum*);
- Upgrade of footpath 102 / Rails Lane (cycle route to Eastoke) with some sections for shared use by cyclists *(part of England Coast Path)*;
- Implement improvements to the northern access to Mengham Junior School (footpath 101) to a design agreed with the School, and minor improvements to footpath 88. Encourage take-up of 'park and stride' etc. arrangements in association with input from the Safe Routes to School team. No works proposed to the other schools;
- A new east-west cycle route from Church Road to the Hayling Billy, via Manor Road, Higworth Lane and Brights Lane by upgrading footpaths 89 and 521 and to be delivered in phases. Any work on footpath 521 to join the Hayling Billy would have a high potential ecological impact and further assessment of a detailed design would be needed. Alternative routes using footpaths 92, 93 and 94 to be considered as part of wider development proposals at the appropriate time (*footpath 89 work*

to be progressed in spring 2020; footpath 521 [Saltmarsh Lane] work to be implemented by Cycle Hayling in 2020[25]);

- Improve by widening to shared use the east-west (to Richmond Close) and north-south routes through Hayling Park. In the longer term, upgrade and widen footways on the east and west sides of Beach Road between St Mary's Road and the zebra crossing if and when a route through St Mary's Road has been implemented (*implementation spring 2020*);
- Resurface an un-adopted section of St Margaret's Road and construct a footway on the north side (*subsequently not progressed but subject of a community-led CIL bid in 2020 for the footway only*);
- Maintain a watching brief for the possibility of providing a new England Coast Path (ECP) link from Mill Rythe School along A3023 to Mill Rythe Lane, onto Yew Tree Road and Copse Lane, including improvements towards cycle / pedestrian route as part of access to schools in the area (*includes parts of footpaths 102 and 88*).

5.30 The potential role of cycling as a means of mode shift away from the private car has gained further impetus during 2019 due to the efforts of community led groups such as Cycle Hayling. This group was awarded £16,000 of CIL funding in 2017 to construct the upgrade to footpath 521 identified in the Hayling Island Cycling and Pedestrian Improvements report, and implementation is expected in 2020. This challenging section has involved negotiations with Southern Water and the landowner as well as agreeing a new surfacing specification with Hampshire County Council's Countryside Service which if more widely adopted will make cycle tracks more attractive for all grades and standards of users.

5.31 New cycle track developments will be reflected in and promoted through the LCWIP. As part of the initial work towards the LCWIP, an 'Aspirational 2036 Cycle Map'[26] was produced which indicated the major components of the cycle network as they could be expected to be in 2036. This would be combined with a clear and concise system of route numbering to assist waymarking of the major routes[27]. The key elements of this Aspirational Map are:

- Hayling Billy Trail (see chapter 6 below) is the primary north-south route to Havant;
- A second north-south route on the east / centre of the Island connecting to the Billy Trail taking advantage of the improved ability to cross the A3023 as a result of mitigation package M1A measures in the Stoke village area);
- Two or three major east-west routes connecting to the north – south / Billy Trail route:
  - Either (1) Hayling ferry to Eastoke via Sea Front; (2) Sinah Lane - Hayling Park – Mengham – Rails Lane; (3) Saltmarsh Lane– Brights Lane - Church Road
  - Or (1) Hayling ferry to Eastoke via Sea Front; (2) Saltmarsh Lane - Brights Lane – St Marys Road - Mengham – Rails Lane (current LCWIP preference)
- Other infill routes to connect local communities to these main routes.

5.32 The aim of the LCWIP will be to ensure that the majority of Hayling residents in the urban south of the Island are within 400m of a quality hard surfaced cycle route. Funding for the provision of these routes (which in many locations reflect upgrades of existing routes or those already planned) will be sourced from Section 106 agreements, where very local to a particular development site, or through CIL funds. Linking to these would be a system of quieter roads using existing residential streets,

[25] http://www.cyclehayling.org.uk/saltmarsh-lane-cycle-path-update/ retrieved 12 August 2019

[26] https://www.havant.gov.uk/sites/default/files/documents/2036%20Cycle%20map%20Document_0.pdf retrieved 12 August 2019

[27] https://www.havant.gov.uk/sites/default/files/documents/2036%20Cycle%20map%20Document_Rev2.pdf retrieved 12 August 2019

such that in the urban south of the Island everyone would be within 100m of a quiet route. Some of these routes may require traffic calming.

5.33 For those residents in the north of the Island, there are relatively few routes which could be adapted to include legal cycling use. The approach in these areas will be to provide easy access to the Billy Trail as the main north-south route, and for localised improvements at junctions and crossing points. Many of the roads in this area, especially those around Northney, should be self-limiting in terms of speed due to the road layout; the current speed limit of 30mph was introduced in December 2016 to reinforce the context of a lower speed zone through this rural part of the Island. The focus in cycle provision will be geared towards improved access to the new A3023 crossing points introduced in mitigation package M1A, together with improved surfaces on those sections of route which are able to be converted to traffic-free cycle track, with the aim of building use and attractiveness of the Billy Trail (see chapter 6).

Walking

5.34 The Public Rights of Way (PRoW) network on the Island is mature and provides many links not directly possible using other means of transport. This is particularly the case in the north of the Island where a network of footpaths connects Northney and Stoke with the hinterland. Most of the footpaths are unsurfaced and at the field margins are prone to being squeezed by planting; stiles and gates provide obstacles to mobility impaired users and the surface (or lack of) makes many of the paths usable only in the summer months.

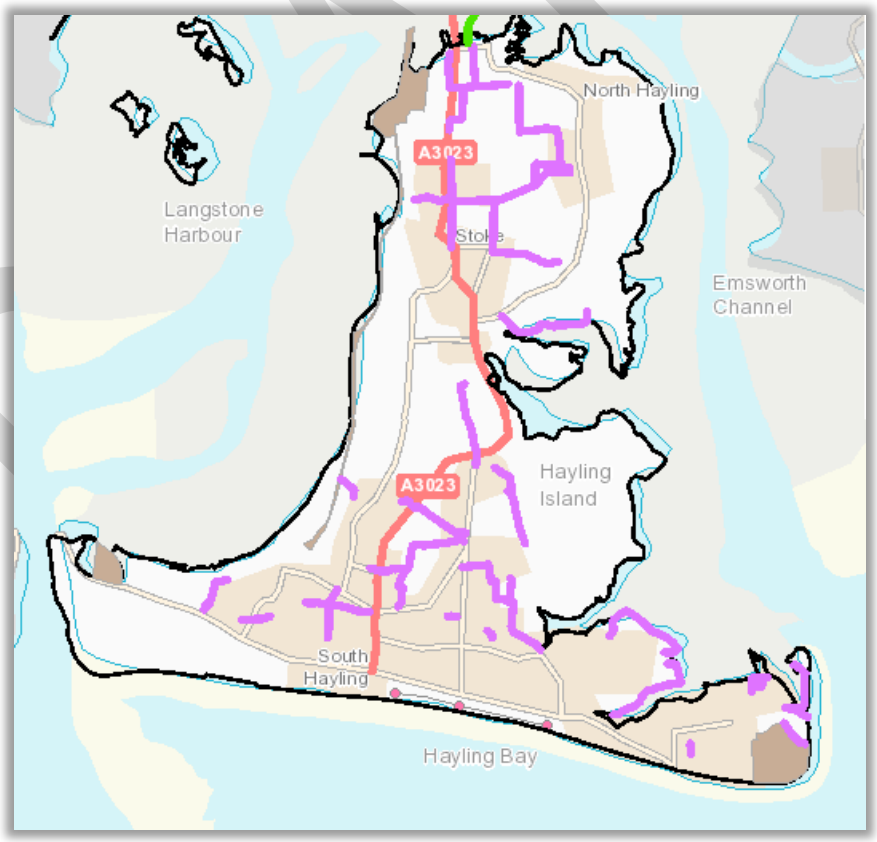


Figure 17: public rights of way network

5.35 In some respects the walking network mirrors the cycle network (both as existing and in year 2036 aspiration). The principal route is the Hayling Billy Trail which forms part of the Shipwrights Way long-distance footpath (Portsmouth – Alice Holt Forest). This links the island to the mainland via the road bridge and follows the line of a disused railway track on the island's western side. Connections

onto the Billy Trail on foot are available at its north end (Northney Road), at the site of North Hayling Halt, adjacent to West Lane 'bends', at Saltmarsh Lane / Denhill Close, and at Station Road which is the site of the former terminus station. The Trail is a permissive bridleway, owned by Hampshire County Council and Havant Borough Council, and maintained with an unmade surface. It is not a public right of way. At North Hayling Halt the walking route is subsumed into a small coastal car park.

5.36 Other significant paths on the Island are footpaths 88 and 102 running up the east side of the urban area from Rails Lane to Mill Rythe; footpaths 89, 92, 93 and 94 which run east-west between Church road and Manor Road; and footpaths 96 and 97 crossing Hayling Park. In the north of the Island, footpaths 80, 81, 84 and 85 link Stoke village with the Northney area whilst footpaths 105 and 106 link Northney to the bridge. Footpath 87 provides a traffic-free link between Mill Rythe towards Stoke village. These main routes provide opportunity for a 'commuter walking' network serving local destinations, beyond walking purely for leisure purposes.

5.37 Much work has been undertaken by bodies such as Cycle Hayling and local landowners to provide access to equestrian routes through the Registered Riders Scheme to provide sections of route suitable for walking and cycling[28]. The opportunity to engage with landowners, possibly through interested third parties, will be crucial in meeting the Council's aspiration for the PRoW network by 2036 of having all the network accessible to those with limited mobility. This will involve a programme of work involving:

- Reviewing need for gates and stiles and replacing where necessary with accessible equipment;
- Upgrading surfaces to all weather (not necessarily bound) which may include drainage improvements;
- Minimum width to allow mobility vehicles to pass;
- Additional wayfinding where necessary.

5.38 The Local Cycling and Walking Infrastructure Plan (LCWIP) will be the means through which the council will generate a funding stream for these improvements. Through the LCWIP the council would intend to create an annual funding stream of at least £30,000 to work towards this aspiration. The first sections to be implemented would be those with the heaviest footfall and forming the key connecting paths in the network – namely those listed in 5.36 above.

5.39 Natural England is progressing plans through section 296 of the Marine and Coastal Access Act 2009 to create the England Coast Path (ECP). This is a new National Trail which will by 2021 allow circumnavigate the English coast on foot; on Hayling it will create a circular coastal walk linking together existing sections of rights of way. Whilst there have been some legal challenges to this project the route down the west and south coast of the Island has been agreed, whilst recommendations for the eastern route were published in October 2019[29]. Once the ECP is in place and its use established, sections could be considered for upgrading to shared use to supplement the main cycle network.

[28] http://www.cyclehayling.org.uk/new-section-of-cycle-path-on-hayling/ retrieved 12 August 2019

[29] https://www.gov.uk/government/publications/england-coast-path-in-the-south-of-england retrieved 12th August 2019

5.40 The Hayling Billy Trail has been identified as an element of the ECP and the implication of this decision is considered in Chapter 6. Other footpaths identified as forming part of the ECP are footpaths 102 (Rails Lane – Beech Grove) and 88 (Tournerbury Lane to Mill Rythe).

Smarter Choices 'Soft Measures'

5.41 Smarter Choices are defined as 'soft measures' centred on changing behaviour by seeking to encourage modal shift. These measures provide improved information, assist in better travel choices to reduce car use, and enhance the attractiveness of alternatives. These measures were considered in the HITA January 2019.

5.42 As demonstrated by the Hayling Island Travel Survey, undertaken as part of this review, 84% of those who responded use the private car as their main form of transport, with around 50% stating they would use public transport if services were improved. This would suggest potential scope for achieving modal shift, although it has to be recognised that due to the geography and facilities available on the Island a larger than average number of trips are longer than national statistics suggest.

5.43 Limitations on the existing and future highway network (even taking account of potential measures earlier in this report) mean that few of the conventional 'smarter choice' measures are likely to have attraction:

- The introduction of new forms of alternative transport – this will reflect national trends towards the possible introduction of connected automated vehicles (CAVs) and other forms of 'self-driving' vehicles other than on specific routes (see Chapter 6) over which the council has no control
- Car Sharing – arrangements can be formal (i.e. through the workplace) or informal (colleagues / friends) and is already well established
- High Occupancy Vehicles (HOV) – require dedicated HOV lanes which are unlikely to be possible
- Car Clubs – unlikely to be successful as even in large cities the success rate has been low and many schemes have been closed
- Smart Ticketing – as regards bus travel, contactless payment is already available and wider initiatives are likely to be rolled out within 12 months of the date of publication of this report. The true value would be inter-availability between bus and train modes, which is restricted by current franchise arrangements with train service operators
- Use of Social Media and Applications – these already exist (e.g. traffic data on Google Maps[30]) but require preparation for use in that the user must download the app, an available data connection or have a social media account before the journey commences to take advantage of the facility
- Intelligent Transport Systems – this will be enabled by default on any new or upgraded traffic light system. Different forms of ITS system can identify (for example) late running buses and prioritise them at junctions *(this is likely to be introduced through the TCF work in central Havant)*
- Schemes to encourage behaviour change and awareness – these have been shown to produce real results in mode change and will be progressed throughout the life of the Local Plan, but the key is to identify, provide and maintain the appropriate level of resource to enable long term mode change

[30] https://www.google.co.uk/maps/@50.8084053,-0.9478876,13.75z/data=!5m1!1e1 as an example, retrieved 12 August 2019

- School and Workplace Travel Plans – these are a planning requirement, but the perception is that more monitoring and enforcement is required. There may be opportunities to improve the viability of these plans and encourage greater resources to enforce / encourage their targets
- Teleworking, teleconferencing and home working, and shopping – societal changes are increasing use of remote technologies. Unfortunately, increased volumes of 'last mile' deliveries have the potential to balance or negate any mode share / overall usage savings brought about in other traffic by adopting these technologies.

5.44 Taking all these soft measures in total and from experience elsewhere in similar locations, it is estimated that 1%-3% of the traffic on the A3023 could be removed by widespread adoption of these types of measures. It will therefore be a major strand in the council's communications and publicity programme that regular campaigns based on one or more of these strands will be held.

Demand Management 'Hard Measures'

5.45 As stated in the HITA, demand management measures could be employed to reduce the demand for travel (in particular the use of private vehicles) in order to improve network efficiency and to reduce congestion and pollution. Government policy objectives have become increasingly focused on reducing escalating road congestion, in an attempt to minimise the generated external costs associated with road transport and the resulting air quality and health concerns surrounding vehicle use. Congestion is nothing new, especially on the A3023 where in the 1950s and 1960s queues of traffic on the then B2149 were longer than experienced today[31], but numerous methods available today may offer the potential to reduce the phenomena.

5.46 These so-called 'hard measures' would include the following. The disadvantage with these interventions is that many only address the issue at the point of arrival on the Island, by which time it will be too late to have a discernible impact on any congestion on the Island itself. Others are contrary to the council's various strategies (such as the Regeneration Strategy) which seek to support economic development on the Island:

- Increasing destination parking charges and restrictions
- Zone access control and permit systems
- Road user charging
- Congestion charging
- Increasing generalised cost of car use through taxes (this would be a national intervention)
- Physical restraints and road space reallocation
- Rationing road space and allowing congestion itself to control demand.

5.47 In reality there are few 'hard' measures which would realistically be successful on Hayling given the constraint of the physical layout of the highway system with its single access road and bridge, and the resulting captive nature of many of the journeys leading to travel mode choice being based on distance and directness between home and off-Island employment locations. Those few 'hard' measures which may have a deliverable benefit are considered below. It should be noted that as the measures concern human behaviour and reaction to information and prevailing conditions, the impact of these interventions cannot be accurately modelled.

[31] See figure 18 in Chapter 6

Parking and Loading Restrictions

5.48 As the A3023 is Hayling's main vehicular access route, a priority is to keep traffic flowing to reduce delays. Any vehicle stopping on the A3023 has the potential to generate queues, and this is the basis of the proposed 'friction reduction' measures in mitigation package M1A in Chapter 4 in terms of buses and right turning vehicles. The creation on the A3023 of a 'red route' or equivalent has the potential to further reduce friction and therefore delays. Were such a measure to be introduced it could prohibit all parking, boarding or alighting, or loading and unloading on the A3023 at certain times of the day (peak hours only, or 7am – 7pm are typical time ranges used elsewhere in the UK). This would not address delays caused by turning traffic either into side roads or frontage access but would restrict service vehicles stopping on the carriageway and obstructing free flow.

5.49 A scheme could be implemented via a Traffic Regulation Order (TRO) with signs and road markings placed on the A3023 advising on restrictions in accordance with the Traffic Signs Regulations and General Directions 2016. Support of the Police and highway authority would be required, and the council's Civil Enforcement Officers would be needed to ensure compliance. They would issue Penalty Charge Notices (PCNs) if the restrictions were contravened. The creation of these restrictions could be likely to raise unrealistic expectations of levels of enforcement (the vast majority of deliveries for example are made lasting a few minutes, with minor traffic impact). For this reason, the highway authority does not currently support the creation of such a system-wide restriction, although there are more localised lengths of the route which may benefit. More investigation is needed to determine the most effective intervention (if any) and the council's Traffic Team has been engaged to deliver initial proposals.

5.50 Measures have already been put in place by the council to reduce the impact of refuse collection by moving the time when frontages along the A3023 are served out of the peak, which have generated positive results on traffic flow without impacting on the quality of the service. Temporary southbound signage at the north end of Langstone Road was introduced in summer 2019 and anecdotal evidence suggests traffic at the merge flowed better because of its presence. These types of intervention demonstrates the council's commitment to work with and for the community to the benefit of all users.

VMS (Vehicle Message Signs)

5.51 VMS signs at key locations could provide live information about conditions on the road and transport network that may affect expected journey times, such as incidents, congestion or accidents. Their use is becoming widespread especially at road works sites giving real time information about traffic conditions and delays, as well as providing information about upcoming events. Providing road users with live traffic and road network information could assist in redistributing traffic efficiently when congestion occurs on certain links. Use of VMS could particularly assist on busy summer days or when a road traffic accident has occurred on the network; people would be encouraged to stay on the Island until the delay eases. VMS messages on the wider trunk road network already exist and could serve to warn of delays onto the Island; operation of these systems is the responsibility of Highways England.

5.52 This intervention interacts well with the wider regeneration aspirations of the borough council, especially with respect to the sea front. With a wider range of activities to attract inbound visitors, those same attractions would provide justification for those visitors to remain longer and / or naturally stagger their time of departure.

5.53 The benefit of VMS technology is that users do not have to prepare for their use in the same way that they have to for social media or travel apps. The information is clearly available at the roadside and an informed decision can be encouraged by use of the message (e.g. “60 minutes to Havant from this point”). The signs could initially be hired to test the concept and the messages set from the county council’s ROMANSE centre in Winchester. Initial consideration suggests locations for a first ‘trial’ wave of VMS provision might be in sea front car parks between Beachlands and Eastoke.

Park and Ride

5.54 Park and Ride can be a useful instrument to assist in alleviating the problem of traffic congestion and as an effective complimentary measure to other forms of road user control. Park and Ride combines the use of the private car to travel from origin points with the efficiency of public transport, moving large numbers of people into a destination area. Some Park and Ride schemes use a dedicated fleet of vehicles operating a set route (e.g. Portsmouth), others use existing bus services to provide the bus link (e.g. Oxford, Weymouth).

5.55 A range of Park and Ride scheme types are available including those that are permanent (on some or all days of the week) or only operational for specific seasons or events. The following charging regimes can be implemented:

- Free parking and a charge for public transport;
- Charge for car park and free public transport;
- Charge for both.

5.56 Park and Ride can be attractive to motorists as the dedicated bus services are routed to popular destinations and operate at high frequencies. The charge is usually comparable with parking charges at the destination and effective in overcoming objections to long journey times, high cost and the frequent stopping of normal public transport. Concessionary travel is sometimes (but not generally) available for use on Park and Ride bus services. The most successful Park and Ride schemes have the following attributes in common, and unfortunately all have limited application in the case of Hayling Island:

- On-street priority in the form of bus lanes and priority detection at traffic signals;
- A discrete destination point or contained area;
- A car park location which is easily accessible to incoming traffic and which does not involve a diversion away from the route to the destination.

5.57 A Park and Ride service would struggle to compete with other traffic on the limited and restricted highway network on the Island. ‘The Beach’ is a three mile long destination and difficult to serve effectively. Although every private vehicle transferred to the Park and Ride service would reduce overall congestion, it is probable that congestion would not be eliminated, and in this case the buses would be caught in the congestion the system is seeking to reduce. The location of the incoming car park is also a matter of concern; local experience in Portsmouth with their Park and Ride service showed that in its first location (with the car park being at Lakeside off the A27 / M27) the long diversion to get to the car park, followed by a long journey on the bus just to get back to where the user initially turned off, acted as a disincentive. The more successful Tipner scheme benefits not only from direct access from the M275 motorway but also that users can see the congestion ahead and can make the decision to access direct into the car park.

5.58 In Hayling’s case the location of the car park would have to be on or close to the A3023 for maximum effect. Were a summer holiday weekend peak period service to be operated (thus

addressing the periods of observed peak stress on the Island's road network), this suggests use of the Langstone Technology Park or the Bulbeck Road multi-storey sites as most suitable.

5.59 The Park and Ride could support visitor growth by providing additional public transport capacity onto Hayling Island particularly during summer holiday periods. It is considered that this intervention is one to be considered in the longer term once the effect of any highway mitigation measures in Package M1A have been assessed, as otherwise the service would not be able to demonstrate advantage over general traffic.

Integration Opportunities

5.60 It is unlikely that any single demand management tool, in isolation, will be effective in resolving the issues arising from future background traffic growth and development and any measures should be integrated as a part of a package of policies to curb traffic growth. Highway modelling (Chapter 4) indicates that mitigation measures alone will not bring future (with 2036 Local Plan development) traffic conditions back to 2019 conditions although severe cumulative harm is not then caused; that is before addressing views that the 2019 conditions are not acceptable.

5.61 The purpose of integration is to achieve higher performance against the objectives than individual measures could attain alone. The synergy between measures is reinforced by the cumulative benefit of the separate improvements. Integration has the capacity to provide benefits greater than individual measures by increasing the scope of complementary interventions. For example:

- The provision of an improved public transport system and / or a reduction in fares to strengthen the impact of bus services;
- Introducing 'Park and Ride' to increase bus patronage and reduce traffic volume;
- Highway mitigation measures to give buses priority.

5.62 A further method of integration is to employ financial measures such as parking charges or road user charging to generate a stream of revenue to be spent on other aspects of an overall mitigation strategy. It is considered unlikely that enough traffic would be diverted from the A3023 to make such measures acceptable whilst the borough's Regeneration Strategy recognises that the Island suffers economically from its geography: hence measures to deliberately make it unattractive would not find support in the community and would undermine the Strategy.

5.63 Therefore the approach to be taken in addressing the Local Plan development related traffic will be to adopt a broad ranging suite of interventions, on- and off-highway, with the aims of reducing delay where possible, improving safety, reducing severance / improving connectivity and improving air quality and the environment. This 'matrix approach' does not rely solely on highway-based interventions to effect mode choice and increase the use of sustainable travel; rather it realistically weighs the benefits of the various options to arrive at a suite of integrated interventions which development will bring. This is further discussed in Chapter 7.

6. The Hayling Billy Trail

History

6.1 The Hayling Billy Trail owes its origin to the closure of the Hayling branch of the former London Brighton and South Coast Railway (LBSCR) in 1963. Rising operating costs and the seasonal nature of the traffic, together with concerns over the condition of the railway bridge over Langstone Harbour and the effect of delays on traffic caused by the level crossing at Langstone meant that it was already an obvious and early target for closure[32]; the last train ran in November 1963 and within a month most of the rails had been lifted.

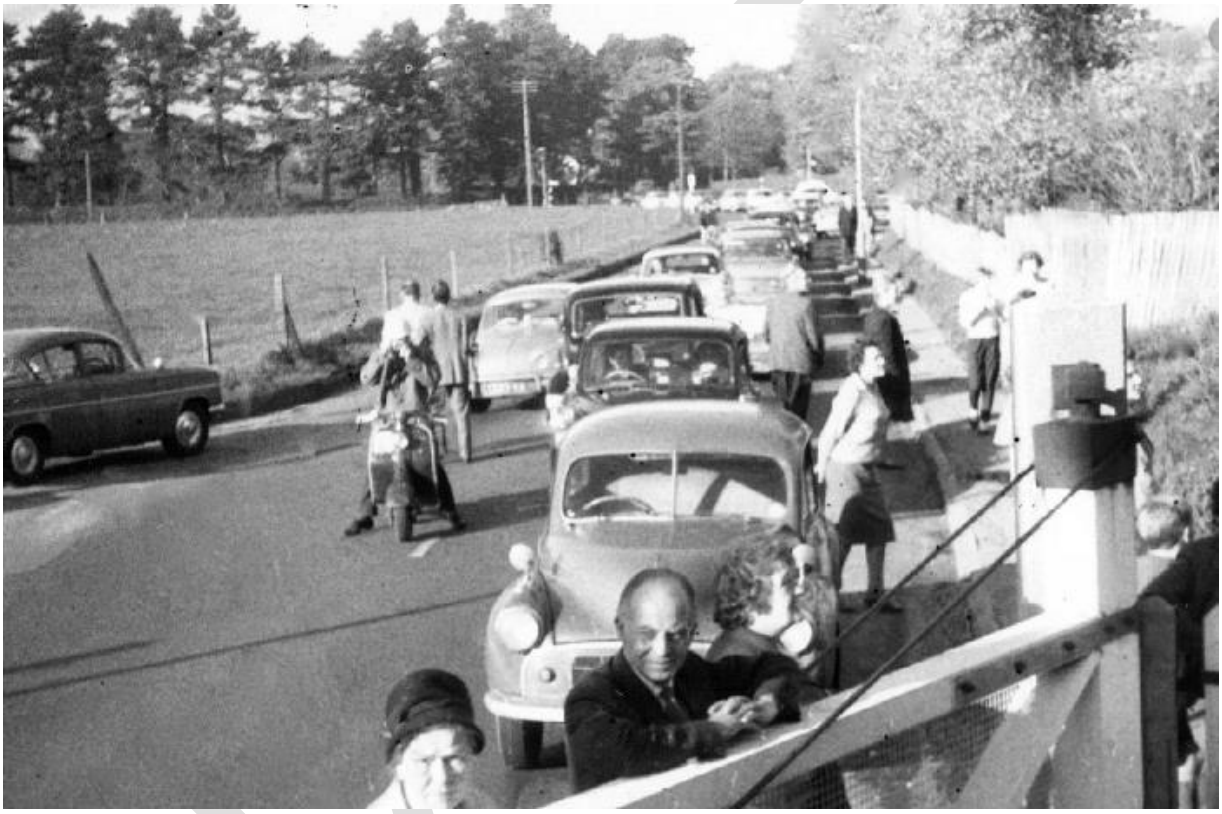


Figure 18: traffic delays are nothing new: traffic at the Langstone level crossing in the early 1960s (courtesy Portsmouth Evening News / Barry Cox Collection

6.2 Although attempts were made to use the line for other purposes, including a service using a redundant Blackpool tram, these plans fell foul of the same issues that led to the closure of the railway line. The route's footprint was transferred to Hampshire County Council who have since maintained the section on the Island as a permissive bridleway. There is no right of way over the route. Coastal erosion is affecting the route at two locations.

[32] http://www.britishrailways.info/BEECHING%20CLOSURES.htm retrieved 13 August 2019

Status

6.3 Because the Trail on the Island is currently not a public right of way, it can be closed at any time by notice of the landowner (Hampshire County Council). The landowner also determines the level of service of the route; currently it is being maintained with an unbound surface, although some work has been carried out in recent years to start an improvement programme by upgrading the surface using a higher standard of unbound material. The Trail is managed by the county council's Countryside Service (HCS). The unbound surface reflects the history of the route as a former railway line and the rural nature of the route.

6.4 A short length to the south of the Trail, 150m northwards from the Station Theatre, is owned and managed by Havant Borough Council to the same standard as the Hampshire owned section. On the mainland, the Trail is public highway and has been resurfaced using a tarmac finish; such a surface is not supported by HCS.

6.5 North of this section, the Trail is laid out as two separate routes, one for walking and cycling and the other for horse riding; this extends as far as the footpath link to West Lane bends where the Trail becomes a single track shared by all users. Apart from a short length of tarmac surfacing south of the North Hayling Halt car park the remainder of the route has an unbound surface to a variety of standards reflecting the reactive maintenance carried out until recently.

6.6 The northernmost section of the Trail was resurfaced in 2014 to an experimental specification using a self-binding sponge gravel. This has weathered well and still provides a resilient surface after five years; however, the cost of installation was equivalent to a bound (tarmac) surface.

6.7 The environmental designations of the land adjoining the route (Langstone Harbour is a Site of Special Scientific Interest and a Special Protection area) and its coastal location make the Billy Trail a much valued local and regional resource. Although today it forms part of the Shipwright's Way long-distance path, it previously existed as a separately-marketed Trail for many years. It is also used as part of the National Cycle Network's route 2 (Kent – Cornwall).

6.8 The internationally important environmental and wildlife designations of the Harbour attract a significant number of 'green tourists' who visit the area specifically for the wildlife. The Trail links together many of these designated areas as well as the West Hayling Local Nature Reserve and The Kench Nature Reserve.

6.9 The England Coast Path, when adopted in 2020, will use the Trail as part of its perambulation of the coast. At this point the Trail will gain the status of a National Trail (under the National Parks and Access to the Countryside Act 1949) which will bring further benefits, possible access to additional maintenance funding, and exposure to a wider audience both for the Trail itself but also for the Island and its 'green' economy. As a National Trail the permissive designation is likely to change although it is not clear at present what its future status under coastal access rights will be; a formal decision is awaited from the County Council and Natural England.[33]

[33] https://www.gov.uk/government/collections/england-coast-path-portsmouth-to-south-hayling retrieved 19 August 2019

6.10 Sections of the verge along the Trail are managed under the Higher Level Stewardship (HLS) scheme for which Hampshire County Council receives grant funding from Natural England. Any development of the route will need to address the impact of the proposal on the HLS areas.

Transport Role

6.11 The Billy Trail has grown in relative importance as the growth of traffic on the Island's roads has led to a perception that walking and cycling in particular is dangerous and unpleasant. Starting in the mid 1980s[34] the route has been upgraded and restored by the landowners and today offers a viable alternative route for pedestrians and cyclists into Havant and beyond. However it is generally accepted that the potential of the Billy Trail is unrealised.

6.12 The key issues relating to the attractiveness and usefulness of the Trail are:

- Quality of the surface generally in all weathers
- Puddles and mud in wet weather
- Shared use including by equestrians
- Lighting and security
- Waymarking and connectivity
- Erosion.

6.13 Apart from a short section south of the North Hayling halt car park, the Trail's surface is unbound. This ranges in material from limestone 'scalpings' some of which dates from the closure of the railway to more loose gravel / hoggin and the aforementioned northernmost section with self-binding sponge gravel. These different materials, from different sources and of varying ages and quality[35], lead to a 'patchwork' of surfaces some of which positively militate against the use of the Trail by all but the most determined cyclist[36]. The choice of surface is a reflection of the status of the Trail as a permissive bridleway; falling under the remit of Hampshire County Council's Countryside Service (HCS) rather than the highway authority, this leans towards a 'rural' surface management approach. This is a disincentive for commuter cyclists as it is considerably slower, and often damages road bikes, and for less confident cyclists who may be concerned about injury, as well as damage to their bicycle.

6.14 Linked to the quality of the surface is the inability of the Trail to operate effectively in wet conditions. Whilst in dry weather the uneven stone surface is not (in places) unlike other rural paths, in wet weather the surface holds water and conditions rapidly deteriorate. The standing water then takes a long time to dissipate, allowing the formation of mud which further reduces the usefulness of the Trail to all but the most determined user. The drainage of the Trail has seen minimal maintenance since the days of the formation of the railway drainage system (the 'cess') and to retain the Trail as a useful link in Hayling's transport network urgent work needs to be carried out to resolve this situation. Unfortunately funding for this will be substantial and is currently unavailable, so in some

[34] https://www.portsmouthctc.org.uk/the-story-of-the-hayling-billy-trail-1984-2014/ retrieved 16 August 2019

[35] http://www.cyclehayling.org.uk/caution-billy-trail-resurfacing/ retrieved 16 August 2019

[36] http://www.cyclehayling.org.uk/home/home-page-hayling-billy-trail-restoration/ retrieved 16 August 2019

respects most parts of the Trail are in a spiral of continuing deterioration. This further disincentivises commuter cycling.

6.15 As a permissive bridleway the Trail is used by local stables for riding horses. Whilst shared cycle routes are an accepted methodology, they are not as attractive to cyclists as segregated routes due to the uncertain interaction with pedestrians. Add equestrians into the groups combining on the shared use Trail and this possibly explains why most commuter cyclists choose to use the A3023 with the resulting impact on vehicular traffic. The Trail's designation as a 'permissive bridleway' is primarily to enshrine its higher rights for cycling as a means of transport, more than its leisure rights for horses, and its use overwhelmingly reflects that.

6.16 The Trail follows the rural west coast of the Island and for much of its length is open to Langstone Harbour. This makes it a particularly attractive route with significant wildlife interest. The reverse of this situation however is that the provision of lighting has been avoided because of its distracting effect on that wildlife, especially roosting birds. The lack of lighting means that use of the Trail drops considerably in the winter probably reflecting the darker evenings and mornings as well as the poor drainage. There are two main reasons lighting would help cycling:

- To see surface hazards and obstacles. Although modern bike rechargeable lights are getting cheaper and better, they are still a deterrent to many.
- For personal security. In such a remote location, some people would not feel safe, however much lighting there was.

6.17 Because the Trail follows the west coast of the Island, access to it from the eastern side of the Island is longer and indirect and requires the crossing of several major roads to reach it. As a result, cyclists and other users from these areas tend to use other more direct routes including the A3023 with resulting impact on other traffic. The Trail does form the best route away from these roads, but it is not waymarked from these more remote areas. Some users who could use the Trail could be unaware of its benefit to them and improved waymarking could provide assurance and information.

6.18 At two locations south of North Hayling Halt, the Trail is subject to coastal erosion. The northern of the two sites is historically a low-lying section of the route and is affected by extreme high tide / tidal surges covering the Trail. This flooding fills fields to the east of the Trail with water which stands for a long period of time as the tidal outlet that serves the fields is then blocked by beach shingle. The shingle also covers the Trail surface making it difficult to use until it has been removed. The southern erosion site is part of an active area of coastal loss with cliffing occurring up to the edge of the Trail surface. Repairs early in 2016 were carried out to extend the life of this section of the Trial by a planned five years to allow Hampshire County Council as the owner to determine a future course of action.

6.19 Without significant investment it is unlikely that use of the Trail as a viable alternative for travel off the Island will be increased. Without this increase however, addressing development related traffic will require highway interventions which are comparatively more expensive. A good case can therefore be made for interventions on the Billy Trail, before considering the value that such interventions could add.

6.20 Psychology is key to behaviour change. Even keen cyclists will refuse detours of a few metres from their desire line, and commuters even more so. Unless the journey originates from the south-west of the Island, use of the Billy Trail is a large detour. The council's LCWIP will investigate possible routes that are shorter than the A3023, that are flat, sheltered from prevailing winds, but yet close enough to the A3023 that people see cyclists getting to the bridge first. Along with the rise of e-bikes, this is perhaps the most likely means of driving mode switching.

Figure 19: the Hayling Billy Trail in context of access points, parking and erosion hot-spots

Future Opportunities

Emergency Access – 'blue light' calls

6.21 On 14th June 2019 a burst water main on Havant Road A3023 near to the 'Esso' garage caused the carriageway to be closed for over 4 hours. Traffic was diverted via Northney but due to the rural nature of the roads used on the diversion this was rapidly blocked by larger vehicles at the tight bends. Traffic congestion in the wider area extended along the A27 to Chichester in the east; beyond Horndean on the A3M to the north; and beyond Fareham on the M27 to the west. As a result of this incident a review of the Emergency Plan is being carried out as there were clearly elements which did not work according to expectations.

6.22 The use of part of the Billy Trail between Northney Road and the footpath to West Lane 'bends' has been suggested as an emergency access to supplement with A3023 in times of severe traffic perturbation. This access would be intended for 'blue light' traffic and as such would not require significant surfacing works to be carried out; the Trail is already accessible for maintenance vehicles. All sections of the Trail are already accessible by pick-up truck sized vehicles.

6.23 At the time of writing this section of the report (August 2019), survey work was being undertaken to determine whether the use of the Trail in the suggested way was possible and if so, what works would need to be carried out and what the likely cost of such works would be. It is expected that this work will be reporting initial findings in November 2019, and if available the results will be submitted as an Annex to this document.

Emergency Access – public transport

6.24 As part of the emergency access work related above, consideration will also be given to allowing buses to also use the Billy Trail during these times of severe perturbation. During the 14th June incident, Stagecoach was asked to stop sending buses onto the Hayling. In response, the frequency was cut to send circa one bus an hour. This decision was based upon the fact that there were many people wanting to get back onto the Island and the bus company did not want to 'abandon' them in Havant. Their consideration was that there were many other heavy vehicles being allowed to use the A3023 and that reported incidents involving buses at bottlenecks were actually caused by tour coaches.

6.25 In terms of patronage, most of the bus use is derived from points south of Mill Rythe, so if the Billy Trail was available for emergency use Stagecoach would most definitely take advantage of this. In times of chronic traffic disruption, if buses were seen as the solution rather than part of the problem then many people might well leave their cars at home and not just add further vehicles to the chaos. The bus company considers that it would be extremely comforting and a "great selling point" if they could reassure people that even "if something really bad happens, the buses will keep running"[37].

6.26 The survey work referred to in 6.23 will therefore also report on this possibility. However due to the nature of the vehicles used by the bus company, it may not be possible to achieve the necessary

[37] Email personal communication HBC / Stagecoach, 15 August 2019

horizontal and vertical alignment required. There would also be management issues were the general public able to see buses let onto the Trail whilst other non blue-light vehicles were not.

Surfacing

6.27 The most significant improvement possible to the Billy Trail would be to upgrade the route to an all-weather surface. In order to reduce the future maintenance burden, a bound surface using either a tarmac or concrete based solution would be preferable. The use of the self-binding sponge gravel during the 2014 upgrade works was intended to serve as a demonstration of what could be achieved whilst retaining an unbound surface. Whilst it is generally accepted that the sponge gravel is superior in many ways to the 'scalpings' used elsewhere, it is prohibitively expensive and requires the same level of site preparation in terms of drainage and formation strengthening as would a bound surface and requires more regular and ongoing maintenance.

6.28 It is therefore proposed that, in stages, the Billy Trail is provided with a bound surface. There are three options to provide this surface:

- Tarmac
- Concrete
- Recycled material

6.29 A tarmac derived surface would require the construction of a binder and / or surface layer similar to that which has been provided on the mainland section of the Hayling Billy Trail. As a minimum, this work would require the regulating of the existing surface to even out any major depressions and to ensure that any water entering the profile is not trapped within the construction layers. The binder course is laid by machine and would then be topped either by a surface course, or surface dressed with a 'tar spray and chip' finish to match the mainland section.

6.30 An alternative to this approach to regulating the existing surface would be to use soil stabilisation techniques to rotovate the existing surface, adding cement to it as it is worked to result in a smooth formation with the strength of lean mix concrete onto which a tarmac surface can be laid.

6.31 A concrete derived surface would be more straightforward to construct as after reprofiling this needs only a single concrete slab to be constructed. Given the location it is unlikely to require reinforcement but crack inducers would need to be included in its construction to avoid crazing of the surface. The final surface could be left as concrete or treated using 'tar spray and chip' similar to the tarmac option above.

6.32 A third option would be to surface the path using a recycled material. The council has gained experience of using a product called 'Flexistone'®[38] although equivalent alternative products are available. This has the benefit of being able to be laid directly onto any surface which would not need as much preparation as with the concrete or tarmac alternatives as it is designed to be fully permeable.

6.33 All of the above options are broadly the same cost due to the differing amounts of preparation required; an estimated cost of £3.5m should be assumed for the 4.5km length of route between

[38] http://www.kbiuk.co.uk/products/kbi-flexi-stone/ retrieved 16 August 2019

Havant Road in the north and Station Road in the south, which includes an estimate for drainage and associated improvements. This could be provided as several staged builds as follows:

- Havant Road to North Hayling Halt (including upgrading of track linking North Hayling Halt to Havant Road and reconfiguration of the shoreline car park)
- North Hayling Halt to West Lane bends (including upgrade of footpath linking Billy Trail to West Lane)
- West Lane bends to Saltmarsh Lane (including further upgrading of footpath 521 linking Billy Trail to Denhill Close)
- Saltmarsh Lane to Station Road

6.34 Combined with the surfacing would be a programme of wayfinding to supplement the signage that already exists along the Trail itself. This wayfinding would extend across the southern urban part of the Island with the intention of highlighting the access points to the Trail both at Station Road and at Saltmarsh Lane / Denhill Close. Of course, this does not overcome the indirect nature of routing that some users will experience due to geography, but the wayfinding would raise the profile and enhance the accessibility of the Billy Trail from other areas of the Island.

6.35 If a bound surface of any type is applied to the Trail, it may be necessary to provide (along the whole length or along part) an alternative route for equestrian use. This could be in the form of an unbound margin to the bound section.

Lighting

6.36 It is unlikely that the Trail will be able to be conventionally lit due to the environmental designation of the adjoining Harbour. This does not rule out either low level solar / electric lighting or even the use of a product such as Traxeye®[39] installed into the surface and able to provide a limited level of ambient lighting.

Restricted Vehicle Route

6.37 The Borough Council is embarking on an ambitious regeneration programme[40] which over the Plan period is likely to see major redevelopment being promoted at various sites along the seaward frontage of the Island. As part of this wider agenda the council is eager to progress discussions over the potential for the use of the Trail as a route for connected autonomous vehicles (CAVs) possibly in partnership with the Solent Local Enterprise Partnership (LEP).

6.38 The use of the Trail as a route for CAVs would fundamentally change its character but would also provide an opportunity to realise some of the options listed above. CAVs would best operate on a bound surface especially if some of the infrastructure to support them (in terms of guidance, charging supply, parking points etc.) were required on the route. It is envisaged that ambitions for such a CAV route would include a designated second bridge which could be designed to accommodate cyclists and pedestrians; this would connect to the mainland section of the Trail (which already has a bound surface to which users on the Island aspire) and thus provide a continuous high-quality surfaced route.

[39] https://pressreleases.responsesource.com/newsroom/Gibs2000/ retrieved 19 August 2019

[40] https://www.havant.gov.uk/sites/default/files/documents/Have%20opportunity%20with%20Havant%20update%20March%202019.pdf retrieved 19 August 2019

6.39 Further work will be ongoing into the use by the Trail by CAVs beyond the timescale of this report. There are high levels of uncertainty as to the timescale and technical viability of the use of the Trail by CAVs and as such no modelling allowance has been made in this Addendum for any mode switch to CAVs. Community Infrastructure Levy (CIL) funding has been requested for 2020/21 to investigate the feasibility of such use.

Environmental Resources

6.40 Development on the Island and elsewhere (typically within 5.6km and covering a potential 1750 homes) requires mitigation for the loss or impact on Brent Goose feeding / roosting sites where these sites are lost to development. The Council is working with the Partnership for Urban South Hampshire (PUSH) to identify suitable mitigation sites and the fields to the east of the Billy Trail, north of the urban area have been identified as a possible 'Brent Goose refuge'[41]. Should these plans come to fruition, then the land required for the Refuge could serve a dual purpose in providing a recessionary route for the Billy Trail as coastal erosion (particularly at the southern site) continues. The diverted Trail could be provided from day 1 of the refuge as a 'proof of concept', or allowance could be made for it at a future point in time as the erosion continued. Such plans for the refuge and the allowance for local diversion of the Trail relate well to the considerations of surfacing the Trail listed above.

National Trail

6.41 The adoption of the Billy Trail as part of the England Coast Path National Trail is expected during 2020 or 2021. This brings with it the expectation by Natural England that "because the trail on this length of coast will form part of the National Trail being created around the whole coast of England called the England Coast Path, we envisage that it will be maintained to the same high quality standards as other National Trails in England".[42] As the majority landowner, HCC will have an input to this process as it is expected that the local access authority would maintain the National Trail.

Summary

6.42 The Billy Trail is a largely unrealised asset in the overall transport provision of the Island and could play a major role in supporting mode switch to more sustainable forms of travel. With (nationally) up to 50% of journeys being less than 5 miles in length (although locally this figure is lower due to the lack of local facilities), growing the mode for cycling and walking even from the existing low base of 8.5% of all journeys could have a potentially significant positive impact on traffic flows on the A3023. A tripling of cycling mode resulting from an upgraded, all-weather Trail would have an equivalent effect of removing nearly all the additional development traffic to 2036 expected to use the A3023 by the end of the Local Plan period.

6.43 Such a mode switch cannot however be incorporated into the Paramics model because it relies on behavioural change beyond that capable of being modelled. Thus whilst the council will be working with all interested parties to bring forward realistic and achievable costed plans (through its LCWIP) to maximise the use of the Trail by pedestrians and cyclists, and whilst it could be reasonably expected that such measures will reduce the impact of development related traffic on the A3023, in

[41] https://www.push.gov.uk/wp-content/uploads/2019/08/South-Hampshire-Green-Infrastructure-Implementation-Plan-June-2019-.pdf page 50, retrieved 23 August 2019

[42] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/834795/south-hayling-east-head-report-1.PDF retrieved 4 October 2019

practice the model has followed national standardised traffic growth and journey parameters. Its validation phase recorded in the original HITA reflects the real time journey 'friction' in part caused by cyclists and other slow-moving traffic using the A3023; it follows that with the aspirations and commitments made in this Chapter, the 2036 scenario modelling represents very much a 'worst case' scenario as the A3023 will become less attractive to (in particular) cyclists as the quality of the Billy Trail, ease of crossing the A3023 and other routes connecting to it are all improved. It is considered that this 'worst case' scenario can be largely avoided by adopting the measures included in Chapters 5 and 6.

6.44 This requires that a more holistic view needs to be taken of the transport (and other related) interventions proposed on the Island through the Plan period needs to be taken. This is the subject of Chapter 7.

7. Societal Benefits of Mitigation

7.1 The modelling work has demonstrated that it is not possible to accommodate any of the development scenarios (Baseline, Do Minimum and Do Something) without an impact on the A3023 corridor in terms of queue length or journey time at certain times. It is important to note that, with mitigation, none of these impacts results in severe cumulative harm to the highway.

7.2 In many of the 'Do Something' scenarios (Modified mitigation package M1A and / or the proposed junction changes) queue lengths and journey times are reduced over the Do Minimum condition to approach Baseline conditions, and in some cases surpass them. This is dependent on time of day and direction of travel; and in some cases, the redistribution of delay may be considered to lead to a poorer journey experience for some modes of travel.

7.3 The implications of implementing measures in response to development on the Island are wider than can be measured purely in highway capacity terms. This section of the Addendum therefore considers the impact of each of the various measures described and considered in Chapters 4, 5 and 6 above in the wider societal benefits – improvements in safety, environment, air quality, connectivity and severance which will otherwise be compromised in the face of additional unmitigated traffic. These issues have been reported during the development of the TA and this Addendum as key considerations for residents and visitors alike to the Island, and will become of increasing importance both in terms of Local Plan development but also under the council's Regeneration Strategy.

7.4 The council has therefore developed a matrix which considers the scale of benefits arising from these interventions in a balanced and nuanced way. For example, the provision of a signalised junction may redistribute delay and on one arm of the junction may make an existing journey longer or may extend a queue; but to the resulting benefits of shorter or more consistent delays on the other legs of the junction will be added others such as the improved pedestrian / cyclist crossing point that such a junction would include; the ability to cross the lanes of traffic separately leading to reduced severance and improved connectivity; and the air quality gain of, on balance, the overall volume of traffic being able to move through the junction more smoothly. The resulting matrix is shown in Appendix E.

7.5 The matrix is scored on the benefit or disbenefit of the individual mitigations or interventions. A very strong positive benefit is scored as '✓✓' whereas a very strong negative impact is scored as '××'; slight positive and slight negative are scored as '✓' and '×' respectively, and a neutral impact is scored as '⓿'. The scores, whilst in some ways subjective, reflect the overall advantage or disadvantage of an intervention.

7.6 Some of the scoring, as would be expected, is taken from the model outputs. Other, 'softer' measures (for example relating to supporting increased walking or cycling) are scored from professional judgement and through peer review.

7.7 From the matrix (Appendix E) it can be seen that within the context of highway interventions that may not significantly improve journey times for motorised users, there are wider societal benefits in terms of reduced severance, safety, air quality and journey consistency. In the context of national policy which prioritises sustainable travel (walking and cycling) above use of the private car, there is a theme which is clear from the matrix that concentrating efforts on maintaining or even improving traffic flow will only be possible at the expense of these wider societal benefits. This is a national debate which will be ongoing, and is not something that this Transport Assessment Addendum can address.

7.8 The societal benefits the matrix considers are as follows:

- Safety
  - safer for motorists (primarily when making turning and crossing manoeuvres, and controlled locations for queueing)
  - safer for cyclists (primarily the ability to use routes segregated from other traffic, or by improved ability to cross the main road)
  - safer for pedestrians (primarily the improved ability to cross at controlled locations, and the availability of alternative routes away from traffic)
- Air Quality and Noise
  - fewer car journeys (lower exhaust emissions, reduced instances of particulates from tyre wear / braking)
  - less idling and stop-start traffic (more controlled, concentrated at junctions, smoother flow)
  - even driving (road conditions allow steady progress even at lower speed)
  - more bus use (one full bus can replace over 40 single occupant cars)
  - more cycling (mode transfer, reduced traffic, improved routes)
  - more walking (mode transfer, reduced traffic, improved routes)
- Journey consistency
  - reduced vehicle friction (traffic flows more steadily along the route)
  - fewer parked vehicles (reduced instances of delay to other traffic caused by obstructions)
  - cyclists choose off road route (fewer slow-moving vehicles on main road as well as less delay for cyclists using dedicated / defined routes)
- Better connectivity
  - better connection across A3023 (less community severance and improved ability to cross)
  - better north-south connection (improved quality, journey time consistency and resilience along the corridor)

8. Funding and Delivery

8.1 Highways infrastructure is generally planned for and delivered in two ways: strategically or directly linked to development.

8.2 At the strategic level, the local authority (Havant Borough Council) and highways authorities (Hampshire County Council or Highways England) and other partner bodies work together to identify, plan and directly deliver improvements to the network. Examples of this in the Havant area include the current work on public transport improvements through the Transforming Cities Fund bid, and in the slightly wider area the delivery of upgrades to Newgate Lane in Fareham and the Whitehill-Bordon relief road in East Hampshire. Major interventions can involve coordination across a range of partners, and contributions or grant funding from a variety of sources due to the scale and cost. The council will work therefore continue to work with its partners at Hampshire County Council, Highways England, neighbouring authorities, the Solent Local Enterprise Partnership, transport providers, developers and other stakeholders to access funding opportunities from Government, and to attract external sources of funding to support infrastructure delivery.

8.3 Other transport interventions, in particular those that are designed to mitigate the impact of development are mostly funded by developers through legal agreements with the council (known as S106 agreements), or through Community Infrastructure Levy (CIL) payments. Recent examples of this includes access and infrastructure work to Dunsbury Business Park and works associated with the build-out of the Berewood major development area.

8.4 For clarity, CIL is intended to provide funding for more strategic projects, whilst S106 funding is more closely tied to interventions to address harm directly caused by the specific development.

8.5 Havant Borough Council is responsible for making the final decision on the allocation of CIL income. This is through an annual bidding process that aligns with the council's annual capital spending programme. The aim is to identify and agree priorities for the use of CIL (and S106 planning obligations funds) over a three-year programme, and to agree the release of funds on an annual basis. The Council has published a Developer Contributions Guide and a CIL Funding Decision Protocol which further explain S106 and CIL and how the funds are collected, allocated and spent. Agreed funding and actual spend information is also published annually[43].

8.6 There can of course be overlap between the more strategic measures and those designed directly to mitigate the impacts of development. The measures set out in this report are likely to be funded through a mixture of direct funding from the authorities (supported by the authorities bidding for different 'pots' of money from government and other sources), CIL and S106 moneys. Some may be forward funded by the council, with money reclaimed through the development process over time.

8.7 The council is unable to predetermine funding sources for individual interventions; this because such sources are likely to change over time (for example, specific government funding 'pots').

8.8 The thorough modelling and consideration of possible mitigation solutions for development on Hayling Island presented in this Addendum report will provide an excellent basis from which to

[43] https://www.havant.gov.uk/community-infrastructure-levy retrieved 22 October 2019

attract direct funding or seek developer contributions, as it has provided a much more detailed evidence base of possible solutions than a standard Local Plan Transport Assessment. The council will work with developers and infrastructure providers to coordinate the delivery of infrastructure improvements.

8.9 However, there remains an expectation that landowners and developers will undertake the necessary site-specific technical analysis and modelling work, collaborating with the borough and county councils at an early stage, before a planning application is made. Applicants for planning permission will be required to submit detailed site-specific transport assessments, preferably using the modelling base developed for this TA, which will further test and refine the schemes presented at a high level in the Local Plan Transport Assessment and this Addendum. These will help to determine which elements individual developers are responsible for. The opportunity for landowners and developers to purchase runs of the model will be available, the results of which will be fed back into the model to ensure it is retained as an up to date resource going forward.

9. Summary and Conclusion

9.1 The information presented in this Addendum report provides the results of further Paramics® microsimulation modelling undertaken following the submission of the original HITA in January 2019. It identifies the impact of each of the modelled scenarios on the network. It tests and reports on potential interventions and measures to improve the highway, traffic and wider transport networks on Hayling Island.

9.2 Results for the Do Minimum scenario demonstrate queue lengths and journey times will increase due to the Local Plan Development, resulting in severe harm and necessitating mitigation. The mitigation measures considered reduce journey times and queue lengths in comparison to the non-mitigated condition and in places bring conditions with Local Plan development in place to closely match conditions seen today. It is concluded that the cumulative impact of the Local Plan development, in transport terms, can be mitigated to a level where it is does not have a severe cumulative impact.

9.3 The proposed measures include the introduction of traffic signals and whilst queue lengths and delays increase on some junction arms, the traffic signals redistribute delay more evenly across all of the arms at a junction. This reduces queues on side roads and provides improved journey time reliability. Traffic signals also facilitate the option to provide crossing facilities for pedestrians and cyclists, therefore improving road safety and reducing community severance.

9.4 Where the mitigated Local Plan development traffic results in longer journeys than in today's conditions, this is limited to certain times of day and is highly directional. The impact of the Local Plan development traffic results in an increase in journey times for northbound traffic during the AM Peak, and for southbound traffic in the PM peak, but this Addendum has shown that the mitigation measures can be provided to introduce wider benefits relating to:

- little or no detriment to contra-peak and interpeak journey times
- the introduction of safe pedestrian and cycle crossings through the signalisation of certain junctions
- reducing the existing friction that currently occurs along the A3023 and introducing an element of control to the local road network, which can aid journey predictability and reliability
- helping to reduce potential future impact on the Strategic Road Network
- allowing safe and controlled side road access for vehicles
- improving air quality
- reducing community severance

that would otherwise occur in the face of unmitigated traffic growth.

9.5 More detailed design has been undertaken ‘at risk’ on the mitigation measures, and this has included Linsig modelling of the signalised junctions. Further design work and model iterations will be required to provide a more refined and optimum solution once funding has been identified. Improving journey times and queue lengths further should be investigated, but this needs to be in balance with the operation of the overall network as a finite resource and recognise the reality of the present transport landscape.

9.6 The detailed designs for the interventions will offer greater detail in junction operation and identify whether the junction holds available capacity, or if it is over capacity.

9.7 The principal constraints to large scale infrastructure improvements on Hayling Island and Langstone are the requirements for third party land, the single bridge across to the mainland and ultimately the limitations of traffic throughput at the northern end of the A3023 where it interacts with the A27 Langstone Roundabout.

9.8 The information presented in this TA and Addendum can be used to inform considerations of potential highway mitigation associated with developments. The analysis is extensive but not exhaustive, and specific requirements will continue to be reviewed on a case-by-case basis as part of the normal planning process. That planning process can now be informed by detailed design of the proposed interventions (towards which contributions should be taken) and the existence of a robust model which can be offered to prospective developers to ensure that their own Transport Assessments reflect the same basic parameters as are used in this report.

Appendix A Modelling Results for Journey Time Routes and Strategic Routes

The following tables are derived from the Systra 'Mitigation Testing' Report (Appendix B).

Baseline is background traffic growth with committed development on the existing road network.

Do Minimum is background traffic growth with committed development and Local Plan 2036 sites on the existing road network.

Mitigation package M1A is 'Do Minimum' with measures to reduce friction as detailed in Table 4 of the Addendum report.

Other junction locations are as per map and are tested alone with Do Minimum (Tables A1, A3, A5 and A7) or in combination with M1A measures (Tables A2, A4, A6 and A8) with Tables A1 – A4 comparing interventions with Do Minimum and Tables A5 – A8 comparing with Baseline:

	Junctions alone	In combination with M1A
Comparing with Do Minimum	A1, A3	A2, A4
Comparing with Baseline	A5, A7	A6, A8

Table 6: Mitigation measures testing combinations

Accuracy of the model is as described in chapter 5 of the Systra 'Base Model Development Report' November 2018. The routes in that report do not exactly match the latterly extended routes 1X, 2X AND 3X but Table A9 shows the match between baseline 2018 and baseline 2036 for the sections up to Woodbury Avenue on Strategic routes 1, 2 and 3 in the HITA.

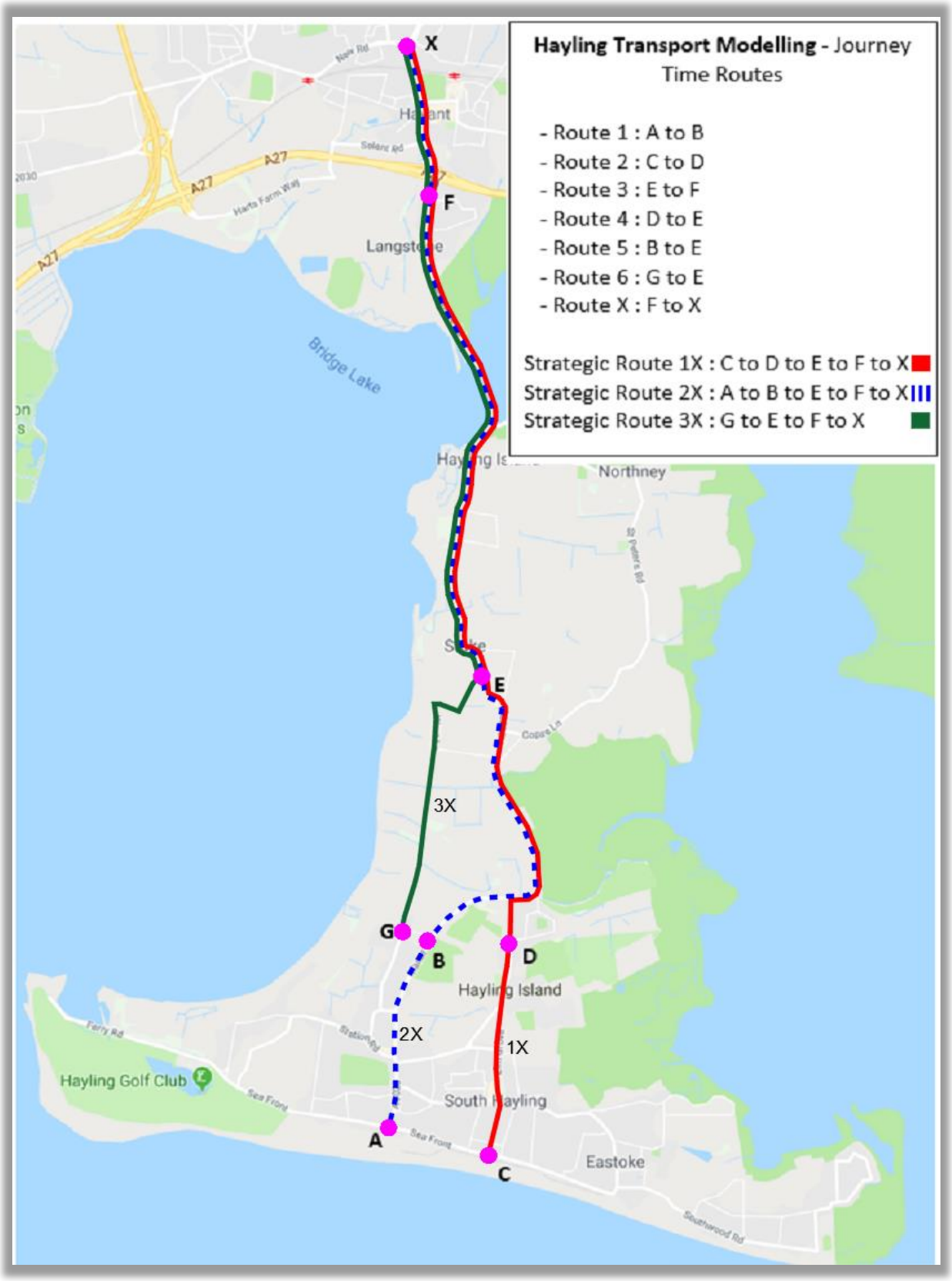


Figure A1: journey time routes 1-6 and X, and strategic journey time routes 1X, 2X and 3X.

Table A1: Journey time routes 1 – 6 and X

Individual junction mitigation measures compared with Do-Minimum

08:00 - 09:00

Journey Times (mm:ss) Description	Route #	Do Minimum	Do Minimum + Langstone	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	05:07	04:28	03:21	03:58	04:14
Brights Lane - Beachlands Rbt	Route 1 SB	02:26	02:27	02:29	02:31	02:29
Sea Front - St Mary's Road	Route 2 NB	02:07	02:06	02:06	02:07	02:07
St Mary's Road - Sea Front	Route 2 SB	02:19	02:20	02:19	02:20	02:20
West Lane/A3023 - Tech Park	Route 3 NB	08:34	07:46	08:31	08:43	07:18
Tech Park - West Lane/A3023	Route 3 SB	05:09	04:54	05:18	04:33	04:26
Church Road - West Lane/A302	Route 4 NB	04:16	04:09	04:59	04:38	04:37
West Lane/A3023 Church Road	Route 4 SB	03:42	03:40	05:01	03:39	03:35
Manor Road - West Lane/A302	Route 5 NB	07:02	06:18	05:37	06:17	06:32
West Lane/A3023 - Manor Roa	Route 5 SB	03:56	03:55	04:58	03:54	03:51
West Lane Northbound	Route 6 NB	04:01	03:46	04:51	03:34	03:34
West Lane Southbound	Route 6 SB	03:01	02:54	03:12	02:54	02:54
Tech Park - New Rd RBT	Route X NB	03:39	03:38	05:22	03:39	03:33
New Rd RBT - Tech Park	Route X SB	06:56	05:45	06:58	08:06	05:30

Comparison with Do-Minimum:
> 30s decrease
> 30s increase

12:00 - 13:00

Journey Times (mm:ss) Description	Route #	Do Minimum	Do Minimum + Langstone	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:34	02:32	02:48	02:35	02:35
Brights Lane - Beachlands Rbt	Route 1 SB	02:36	02:36	02:35	02:39	02:35
Sea Front - St Mary's Road	Route 2 NB	02:02	02:02	02:02	02:03	02:03
St Mary's Road - Sea Front	Route 2 SB	02:15	02:16	02:16	02:16	02:15
West Lane/A3023 - Tech Park	Route 3 NB	04:58	04:51	04:56	05:02	04:48
Tech Park - West Lane/A3023	Route 3 SB	04:44	04:41	04:44	04:41	04:28
Church Road - West Lane/A302	Route 4 NB	03:44	03:41	04:04	03:50	03:48
West Lane/A3023 Church Road	Route 4 SB	03:41	03:40	04:26	03:43	03:39
Manor Road - West Lane/A302	Route 5 NB	04:00	03:58	04:18	04:07	04:07
West Lane/A3023 - Manor Roa	Route 5 SB	03:58	03:57	04:34	04:01	03:57
West Lane Northbound	Route 6 NB	02:37	02:39	02:39	03:18	03:13
West Lane Southbound	Route 6 SB	02:36	02:36	02:36	03:16	03:14
Tech Park - New Rd RBT	Route X NB	03:10	03:12	03:26	03:14	03:12
New Rd RBT - Tech Park	Route X SB	02:39	02:40	03:39	02:40	02:39

17:00 - 18:00

Journey Times (mm:ss) Description	Route #	Do Minimum	Do Minimum + Langstone	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:30	02:31	02:43	02:31	02:31
Brights Lane - Beachlands Rbt	Route 1 SB	02:35	02:34	02:33	02:35	02:35
Sea Front - St Mary's Road	Route 2 NB	02:04	02:03	02:03	02:03	02:04
St Mary's Road - Sea Front	Route 2 SB	02:13	02:14	02:16	02:14	02:14
West Lane/A3023 - Tech Park	Route 3 NB	05:23	05:07	05:54	05:16	04:54
Tech Park - West Lane/A3023	Route 3 SB	07:59	08:08	07:46	07:59	07:41
Church Road - West Lane/A302	Route 4 NB	03:47	03:47	04:24	03:55	03:55
West Lane/A3023 Church Road	Route 4 SB	03:40	03:39	04:31	03:42	03:43
Manor Road - West Lane/A302	Route 5 NB	04:01	04:01	04:13	04:08	04:08
West Lane/A3023 - Manor Roa	Route 5 SB	03:55	03:54	04:42	03:58	03:59
West Lane Northbound	Route 6 NB	02:36	02:36	02:36	03:10	03:09
West Lane Southbound	Route 6 SB	02:34	02:35	02:35	03:22	03:26
Tech Park - New Rd RBT	Route X NB	04:13	04:21	04:27	04:14	04:24
New Rd RBT - Tech Park	Route X SB	03:00	02:54	03:10	02:56	02:55

Table A2: Journey time routes 1 – 6 and X

Individual junction mitigation measures combination with mitigation package M1A compared with Do-Minimum

08:00 - 09:00

Journey Times (mm:ss) Description	Route	Do Mimimum	2036 M1a	M1a + Langstone	M1a + Mill Rythe	M1a + Northney Gyr	M1a + Northney Sigs	M1a + Tech Park	M1a + West Lane	M1a + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	03:58	04:11	04:15	02:56	04:13	04:12	04:06	04:21	04:08
Brights Lane - Beachlands Rbt	Route 1 SB	02:23	02:23	02:23	02:25	02:24	02:25	02:23	02:23	02:23
Sea Front - St Mary's Road	Route 2 NB	02:07	02:07	02:07	02:07	02:07	02:07	02:07	02:07	02:07
St Mary's Road - Sea Front	Route 2 SB	02:19	02:19	02:20	02:19	02:18	02:19	02:21	02:21	02:19
West Lane/A3023 - Tech Park	Route 3 NB	06:26	07:23	06:28	06:51	06:41	09:06	09:00	07:09	06:28
Tech Park - West Lane/A3023	Route 3 SB	04:34	04:40	04:38	04:44	04:50	05:05	04:53	04:29	04:23
Church Road - West Lane/A302	Route 4 NB	03:51	03:53	03:52	04:07	03:51	05:12	03:58	04:11	04:08
West Lane/A3023 Church Road	Route 4 SB	03:33	03:34	03:34	04:41	03:33	03:38	03:35	03:33	03:30
Manor Road - West Lane/A302	Route 5 NB	05:29	05:42	05:46	04:23	05:43	07:08	05:43	06:11	05:55
West Lane/A3023 - Manor Roa	Route 5 SB	03:47	03:48	03:48	04:35	03:47	03:52	03:48	03:47	03:44
West Lane Northbound	Route 6 NB	03:05	03:11	03:12	03:30	03:13	04:51	03:13	03:13	03:09
West Lane Southbound	Route 6 SB	02:47	02:48	02:47	02:48	02:47	03:00	02:49	03:00	03:00
Tech Park - New Rd RBT	Route X NB	03:38	03:39	03:37	03:39	03:39	03:36	03:37	03:42	03:40
New Rd RBT - Tech Park	Route X SB	02:44	02:49	02:47	02:58	03:02	02:42	02:41	02:45	02:50

Comparison with Do-Minimum:
- > 30s decrease
- > 30s increase

12:00 - 13:00

Journey Times (mm:ss) Description	Route #	Do Minimum	2036 M1a	M1a + Langstone	M1a + Mill Rythe	M1a + Northney Gyr	M1a + Northney Sigs	M1a + Tech Park	M1a + West Lane	M1a + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:32	02:30	02:31	02:44	02:32	02:31	02:31	02:31	02:32
Brights Lane - Beachlands Rbt	Route 1 SB	02:26	02:28	02:30	02:28	02:26	02:29	02:30	02:30	02:29
Sea Front - St Mary's Road	Route 2 NB	02:03	02:03	02:03	02:03	02:03	02:03	02:03	02:03	02:03
St Mary's Road - Sea Front	Route 2 SB	02:13	02:16	02:16	02:16	02:14	02:14	02:14	02:15	02:16
West Lane/A3023 - Tech Park	Route 3 NB	04:27	04:30	04:28	04:27	04:27	04:41	04:37	04:29	04:24
Tech Park - West Lane/A3023	Route 3 SB	04:32	04:41	04:35	04:41	04:46	04:49	04:42	04:38	04:28
Church Road - West Lane/A302	Route 4 NB	03:34	03:36	03:35	04:00	03:35	03:35	03:35	03:42	03:42
West Lane/A3023 Church Road	Route 4 SB	03:32	03:35	03:34	04:11	03:32	03:33	03:35	03:36	03:33
Manor Road - West Lane/A302	Route 5 NB	03:50	03:50	03:51	04:00	03:51	03:50	03:50	03:56	03:55
West Lane/A3023 - Manor Roa	Route 5 SB	03:46	03:49	03:49	04:17	03:47	03:48	03:50	03:52	03:48
West Lane Northbound	Route 6 NB	02:37	02:36	02:37	02:39	02:38	02:37	02:37	03:07	03:09
West Lane Southbound	Route 6 SB	02:34	02:36	02:35	02:34	02:36	02:35	02:35	03:16	03:24
Tech Park - New Rd RBT	Route X NB	03:11	03:09	03:09	03:09	03:11	03:10	03:19	03:09	03:08
New Rd RBT - Tech Park	Route X SB	02:39	02:40	02:41	02:39	02:40	02:41	02:40	02:40	02:40

17:00 - 18:00

Journey Times (mm:ss) Description	Route #	Do Minimum	2036 M1a	M1a + Langstone	M1a + Mill Rythe	M1a + Northney Gyr	M1a + Northney Sigs	M1a + Tech Park	M1a + West Lane	M1a + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:28	02:28	02:29	02:40	02:28	02:29	02:28	02:29	02:28
Brights Lane - Beachlands Rbt	Route 1 SB	02:29	02:28	02:30	02:27	02:29	02:29	02:30	02:31	02:30
Sea Front - St Mary's Road	Route 2 NB	02:03	02:04	02:03	02:04	02:03	02:03	02:04	02:04	02:04
St Mary's Road - Sea Front	Route 2 SB	02:14	02:14	02:14	02:17	02:15	02:15	02:14	02:14	02:15
West Lane/A3023 - Tech Park	Route 3 NB	04:39	04:28	04:24	04:28	04:27	05:14	04:37	04:25	04:24
Tech Park - West Lane/A3023	Route 3 SB	05:51	06:34	06:19	06:15	06:08	06:35	06:14	06:19	05:51
Church Road - West Lane/A302	Route 4 NB	03:39	03:39	03:40	04:21	03:38	03:43	03:40	03:47	03:44
West Lane/A3023 Church Road	Route 4 SB	03:37	03:35	03:36	04:17	03:36	03:36	03:36	03:39	03:39
Manor Road - West Lane/A302	Route 5 NB	03:51	03:50	03:51	03:59	03:50	03:55	03:52	03:57	03:55
West Lane/A3023 - Manor Roa	Route 5 SB	03:50	03:48	03:49	04:26	03:50	03:49	03:50	03:53	03:53
West Lane Northbound	Route 6 NB	02:36	02:35	02:36	02:36	02:35	02:36	02:36	03:03	03:06
West Lane Southbound	Route 6 SB	02:33	02:34	02:34	02:33	02:34	02:34	02:34	03:30	03:21
Tech Park - New Rd RBT	Route X NB	04:11	04:12	04:16	04:18	04:15	04:14	04:29	04:17	04:13
New Rd RBT - Tech Park	Route X SB	02:57	02:58	02:55	02:57	02:58	02:59	02:56	02:58	02:55

Table A3: Strategic journey time routes 1X, 2X and 3X

Individual junction mitigation measures compared with Do-Minimum

08:00 - 09:00

Journey Times (mm:ss) Description	2036 Do Minimum	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum Langstone	Do Minimum West Lane +Northney Folded +Langstone
Strategic Route 1X NB	18:36	20:58	18:53	17:39	17:35
Strategic Route 1X SB	18:06	19:36	17:25	16:39	15:51
Strategic Route 2X NB	20:54	21:08	20:06	19:20	19:01
Strategic Route 2X SB	17:44	18:58	17:06	16:17	15:32
Strategic Route 3X NB	16:14	18:44	15:43	15:10	14:25
Strategic Route 3X SB	15:06	15:28	14:21	13:33	12:50

Compared to do minimum:
>30s increase
>30s decrease

12:00 - 13:00

Journey Times (mm:ss) Description	2036 Do Minimum	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum Langstone	Do Minimum West Lane +Northney Folded +Langstone
Strategic Route 1X NB	13:54	14:28	14:09	13:46	13:51
Strategic Route 1X SB	13:19	15:05	13:20	13:17	13:01
Strategic Route 2X NB	13:49	14:20	14:04	13:41	13:47
Strategic Route 2X SB	13:11	14:47	13:15	13:08	12:54
Strategic Route 3X NB	10:45	11:01	11:34	10:42	11:13
Strategic Route 3X SB	09:59	10:59	10:37	09:57	10:21

17:00 - 18:00

Journey Times (mm:ss) Description	2036 Do Minimum	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum Langstone	Do Minimum West Lane +Northney Folded +Langstone
Strategic Route 1X NB	15:27	16:48	15:28	15:18	15:17
Strategic Route 1X SB	16:52	17:43	16:51	16:55	16:33
Strategic Route 2X NB	15:17	16:15	15:19	15:10	15:08
Strategic Route 2X SB	16:44	17:26	16:43	16:45	16:25
Strategic Route 3X NB	12:12	12:57	12:40	12:04	12:27
Strategic Route 3X SB	13:33	13:31	14:17	13:37	14:02

Table A4: Strategic journey time routes 1X, 2X and 3X

Individual junction mitigation measures in combination with mitigation package M1A, compared with Do-Minimum

08:00 - 09:00

Journey Times (mm:ss) Description	2036 Do Minimum	M1a	M1a + Mill Rythe	M1a + West Lane	M1a Langstone	M1a Northney Fold	M1a Northney Gyratory	M1a Northney Signals	M1a Technology Park	M1a West Lane +Northney Folded +Langstone
Strategic Route 1X NB	18:36	17:02	16:44	17:09	16:04	16:02	16:18	20:01	18:42	16:23
Strategic Route 1X SB	18:06	13:22	14:42	13:08	13:19	13:10	13:43	13:44	13:30	13:02
Strategic Route 2X NB	20:54	18:23	16:33	18:41	17:29	17:11	17:42	21:29	19:59	17:42
Strategic Route 2X SB	17:44	12:57	13:58	12:42	12:54	12:46	13:20	13:21	13:02	12:38
Strategic Route 3X NB	16:14	14:13	14:00	14:04	13:17	13:09	13:33	17:33	15:50	13:17
Strategic Route 3X SB	15:06	10:17	10:30	10:14	10:12	10:05	10:39	10:47	10:23	10:13

Compared to do minimum:
- >30s increase
- >30s decrease

12:00 - 13:00

Journey Times (mm:ss) Description	2036 Do Minimum	M1a	M1a + Mill Rythe	M1a + West Lane	M1a Langstone	M1a Northney Fold	M1a Northney Gyratory	M1a Northney Signals	M1a Technology Park	M1a West Lane +Northney Folded +Langstone
Strategic Route 1X NB	13:54	13:18	13:39	13:23	13:15	13:15	13:16	13:29	13:34	13:17
Strategic Route 1X SB	13:19	13:12	13:47	13:09	13:06	12:56	13:12	13:17	13:11	12:57
Strategic Route 2X NB	13:49	13:09	13:18	13:15	13:08	13:09	13:10	13:22	13:27	13:09
Strategic Route 2X SB	13:11	12:55	13:22	12:57	12:52	12:40	12:57	13:04	12:58	12:42
Strategic Route 3X NB	10:45	10:15	10:15	10:45	10:14	10:15	10:16	10:28	10:33	10:41
Strategic Route 3X SB	09:59	09:57	09:54	10:34	09:51	09:45	10:02	10:05	09:57	10:32

17:00 - 18:00

Journey Times (mm:ss) Description	2036 Do Minimum	M1a	M1a + Mill Rythe	M1a + West Lane	M1a Langstone	M1a Northney Fold	M1a Northney Gyratory	M1a Northney Signals	M1a Technology Park	M1a West Lane +Northney Folded +Langstone
Strategic Route 1X NB	15:27	14:23	15:11	14:33	14:23	14:32	14:23	15:14	14:50	14:25
Strategic Route 1X SB	16:52	15:21	15:46	15:10	15:04	14:39	14:57	15:25	15:00	14:40
Strategic Route 2X NB	15:17	14:11	14:26	14:20	14:12	14:22	14:13	15:05	14:39	14:13
Strategic Route 2X SB	16:44	15:06	15:21	14:58	14:50	14:24	14:42	15:09	14:47	14:26
Strategic Route 3X NB	12:12	11:15	11:22	11:45	11:16	11:26	11:17	12:04	11:42	11:43
Strategic Route 3X SB	13:33	12:06	11:45	12:47	11:48	11:21	11:40	12:08	11:44	12:07

Table A5: Journey time routes 1 – 6 and X

Individual junction mitigation compared with Baseline

08:00 - 09:00

Journey Times (mm:ss) Description	Route #	2036 Baseline	Do Minimum	Do Minimum + Langstone	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	03:07	05:07	04:28	03:21	03:58	04:14
Brights Lane - Beachlands Rbt	Route 1 SB	02:26	02:26	02:27	02:29	02:31	02:29
Sea Front - St Mary's Road	Route 2 NB	02:05	02:07	02:06	02:06	02:07	02:07
St Mary's Road - Sea Front	Route 2 SB	02:16	02:19	02:20	02:19	02:20	02:20
West Lane/A3023 - Tech Park	Route 3 NB	05:59	08:34	07:46	08:31	08:43	07:18
Tech Park - West Lane/A3023	Route 3 SB	04:38	05:09	04:54	05:18	04:33	04:26
Church Road - West Lane/A302	Route 4 NB	03:48	04:16	04:09	04:59	04:38	04:37
West Lane/A3023 Church Road	Route 4 SB	03:34	03:42	03:40	05:01	03:39	03:35
Manor Road - West Lane/A302	Route 5 NB	04:38	07:02	06:18	05:37	06:17	06:32
West Lane/A3023 - Manor Roa	Route 5 SB	03:49	03:56	03:55	04:58	03:54	03:51
West Lane Northbound	Route 6 NB	02:52	04:01	03:46	04:51	03:34	03:34
West Lane Southbound	Route 6 SB	02:45	03:01	02:54	03:12	02:54	02:54
Tech Park - New Rd RBT	Route X NB	03:30	03:39	03:38	05:22	03:39	03:33
New Rd RBT - Tech Park	Route X SB	03:35	06:56	05:45	06:58	08:06	05:30

Comparison with Baseline:
> 30s decrease
> 30s increase

12:00 - 13:00

Journey Times (mm:ss) Description	Route #	2036 Baseline	Do Minimum	Do Minimum + Langstone	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:31	02:34	02:32	02:48	02:35	02:35
Brights Lane - Beachlands Rbt	Route 1 SB	02:35	02:36	02:36	02:35	02:39	02:35
Sea Front - St Mary's Road	Route 2 NB	02:02	02:02	02:02	02:02	02:03	02:03
St Mary's Road - Sea Front	Route 2 SB	02:12	02:15	02:16	02:16	02:16	02:15
West Lane/A3023 - Tech Park	Route 3 NB	04:45	04:58	04:51	04:56	05:02	04:48
Tech Park - West Lane/A3023	Route 3 SB	04:38	04:44	04:41	04:44	04:41	04:28
Church Road - West Lane/A302	Route 4 NB	03:37	03:44	03:41	04:04	03:50	03:48
West Lane/A3023 Church Road	Route 4 SB	03:36	03:41	03:40	04:26	03:43	03:39
Manor Road - West Lane/A302	Route 5 NB	03:55	04:00	03:58	04:18	04:07	04:07
West Lane/A3023 - Manor Roa	Route 5 SB	03:53	03:58	03:57	04:34	04:01	03:57
West Lane Northbound	Route 6 NB	02:37	02:37	02:39	02:39	03:18	03:13
West Lane Southbound	Route 6 SB	02:35	02:36	02:36	02:36	03:16	03:14
Tech Park - New Rd RBT	Route X NB	03:09	03:10	03:12	03:26	03:14	03:12
New Rd RBT - Tech Park	Route X SB	02:39	02:39	02:40	03:39	02:40	02:39

17:00 - 18:00

Journey Times (mm:ss) Description	Route #	2036 Baseline	Do Minimum	Do Minimum + Langstone	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:29	02:30	02:31	02:43	02:31	02:31
Brights Lane - Beachlands Rbt	Route 1 SB	02:33	02:35	02:34	02:33	02:35	02:35
Sea Front - St Mary's Road	Route 2 NB	02:01	02:04	02:03	02:03	02:03	02:04
St Mary's Road - Sea Front	Route 2 SB	02:14	02:13	02:14	02:16	02:14	02:14
West Lane/A3023 - Tech Park	Route 3 NB	04:47	05:23	05:07	05:54	05:16	04:54
Tech Park - West Lane/A3023	Route 3 SB	05:15	07:59	08:08	07:46	07:59	07:41
Church Road - West Lane/A302	Route 4 NB	03:37	03:47	03:47	04:24	03:55	03:55
West Lane/A3023 Church Road	Route 4 SB	03:38	03:40	03:39	04:31	03:42	03:43
Manor Road - West Lane/A302	Route 5 NB	03:54	04:01	04:01	04:13	04:08	04:08
West Lane/A3023 - Manor Roa	Route 5 SB	03:52	03:55	03:54	04:42	03:58	03:59
West Lane Northbound	Route 6 NB	02:35	02:36	02:36	02:36	03:10	03:09
West Lane Southbound	Route 6 SB	02:33	02:34	02:35	02:35	03:22	03:26
Tech Park - New Rd RBT	Route X NB	04:16	04:13	04:21	04:27	04:14	04:24
New Rd RBT - Tech Park	Route X SB	02:50	03:00	02:54	03:10	02:56	02:55

Table A6: Journey time routes 1 – 6 and X

Individual junction mitigation measures in combination with mitigation package M1A, compared with Baseline

08:00 - 09:00

Journey Times (mm:ss) Description	Route	2036 Baseline	2036 M1a	M1a + Langstone	M1a + Mill Rythe	M1a + Northney Gyr	M1a + Northney Sigs	M1a + Tech Park	M1a + West Lane	M1a + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	03:07	04:11	04:15	02:56	04:13	04:12	04:06	04:21	04:08
Brights Lane - Beachlands Rbt	Route 1 SB	02:26	02:23	02:23	02:25	02:24	02:25	02:23	02:23	02:23
Sea Front - St Mary's Road	Route 2 NB	02:05	02:07	02:07	02:07	02:07	02:07	02:07	02:07	02:07
St Mary's Road - Sea Front	Route 2 SB	02:16	02:19	02:20	02:19	02:18	02:19	02:21	02:21	02:19
West Lane/A3023 - Tech Park	Route 3 NB	05:59	07:23	06:28	06:51	06:41	09:06	09:00	07:09	06:28
Tech Park - West Lane/A3023	Route 3 SB	04:38	04:40	04:38	04:44	04:50	05:05	04:53	04:29	04:23
Church Road - West Lane/A30	Route 4 NB	03:48	03:53	03:52	04:07	03:51	05:12	03:58	04:11	04:08
West Lane/A3023 Church Road	Route 4 SB	03:34	03:34	03:34	04:41	03:33	03:38	03:35	03:33	03:30
Manor Road - West Lane/A302	Route 5 NB	04:38	05:42	05:46	04:23	05:43	07:08	05:43	06:11	05:55
West Lane/A3023 - Manor Roa	Route 5 SB	03:49	03:48	03:48	04:35	03:47	03:52	03:48	03:47	03:44
West Lane Northbound	Route 6 NB	02:52	03:11	03:12	03:30	03:13	04:51	03:13	03:13	03:09
West Lane Southbound	Route 6 SB	02:45	02:48	02:47	02:48	02:47	03:00	02:49	03:00	03:00
Tech Park - New Rd RBT	Route X NB	03:30	03:39	03:37	03:39	03:39	03:36	03:37	03:42	03:40
New Rd RBT - Tech Park	Route X SB	03:35	02:49	02:47	02:58	03:02	02:42	02:41	02:45	02:50

Comparison with Baseline:
- > 30s decrease
- > 30s increase

12:00 - 13:00

Journey Times (mm:ss) Description	Route #	2036 Baseline	2036 M1a	M1a + Langstone	M1a + Mill Rythe	M1a + Northney Gyr	M1a + Northney Sigs	M1a + Tech Park	M1a + West Lane	M1a + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:31	02:30	02:31	02:44	02:32	02:31	02:31	02:31	02:32
Brights Lane - Beachlands Rbt	Route 1 SB	02:35	02:28	02:30	02:28	02:26	02:29	02:30	02:30	02:29
Sea Front - St Mary's Road	Route 2 NB	02:02	02:03	02:03	02:03	02:03	02:03	02:03	02:03	02:03
St Mary's Road - Sea Front	Route 2 SB	02:12	02:16	02:16	02:16	02:14	02:14	02:14	02:15	02:16
West Lane/A3023 - Tech Park	Route 3 NB	04:45	04:30	04:28	04:27	04:27	04:41	04:37	04:29	04:24
Tech Park - West Lane/A3023	Route 3 SB	04:38	04:41	04:35	04:41	04:46	04:49	04:42	04:38	04:28
Church Road - West Lane/A30	Route 4 NB	03:37	03:36	03:35	04:00	03:35	03:35	03:35	03:42	03:42
West Lane/A3023 Church Road	Route 4 SB	03:36	03:35	03:34	04:11	03:32	03:33	03:35	03:36	03:33
Manor Road - West Lane/A302	Route 5 NB	03:55	03:50	03:51	04:00	03:51	03:50	03:50	03:56	03:55
West Lane/A3023 - Manor Roa	Route 5 SB	03:53	03:49	03:49	04:17	03:47	03:48	03:50	03:52	03:48
West Lane Northbound	Route 6 NB	02:37	02:36	02:37	02:39	02:38	02:37	02:37	03:07	03:09
West Lane Southbound	Route 6 SB	02:35	02:36	02:35	02:34	02:36	02:35	02:35	03:16	03:24
Tech Park - New Rd RBT	Route X NB	03:09	03:09	03:09	03:09	03:11	03:10	03:19	03:09	03:08
New Rd RBT - Tech Park	Route X SB	02:39	02:40	02:41	02:39	02:40	02:41	02:40	02:40	02:40

17:00 - 18:00

Journey Times (mm:ss) Description	Route #	2036 Baseline	2036 M1a	M1a + Langstone	M1a + Mill Rythe	M1a + Northney Gyr	M1a + Northney Sigs	M1a + Tech Park	M1a + West Lane	M1a + West Lane + Folded + Langstone
Beachlands Rbt - Brights Lane	Route 1 NB	02:29	02:28	02:29	02:40	02:28	02:29	02:28	02:29	02:28
Brights Lane - Beachlands Rbt	Route 1 SB	02:33	02:28	02:30	02:27	02:29	02:29	02:30	02:31	02:30
Sea Front - St Mary's Road	Route 2 NB	02:01	02:04	02:03	02:04	02:03	02:03	02:04	02:04	02:04
St Mary's Road - Sea Front	Route 2 SB	02:14	02:14	02:14	02:17	02:15	02:15	02:14	02:14	02:15
West Lane/A3023 - Tech Park	Route 3 NB	04:47	04:28	04:24	04:28	04:27	05:14	04:37	04:25	04:24
Tech Park - West Lane/A3023	Route 3 SB	05:15	06:34	06:19	06:15	06:08	06:35	06:14	06:19	05:51
Church Road - West Lane/A30	Route 4 NB	03:37	03:39	03:40	04:21	03:38	03:43	03:40	03:47	03:44
West Lane/A3023 Church Road	Route 4 SB	03:38	03:35	03:36	04:17	03:36	03:36	03:36	03:39	03:39
Manor Road - West Lane/A302	Route 5 NB	03:54	03:50	03:51	03:59	03:50	03:55	03:52	03:57	03:55
West Lane/A3023 - Manor Roa	Route 5 SB	03:52	03:48	03:49	04:26	03:50	03:49	03:50	03:53	03:53
West Lane Northbound	Route 6 NB	02:35	02:35	02:36	02:36	02:35	02:36	02:36	03:03	03:06
West Lane Southbound	Route 6 SB	02:33	02:34	02:34	02:33	02:34	02:34	02:34	03:30	03:21
Tech Park - New Rd RBT	Route X NB	04:16	04:12	04:16	04:18	04:15	04:14	04:29	04:17	04:13
New Rd RBT - Tech Park	Route X SB	02:50	02:58	02:55	02:57	02:58	02:59	02:56	02:58	02:55

Table A7: Strategic journey time routes 1X, 2X and 3X

Individual junction mitigation measures compared with Baseline

08:00 - 09:00

Journey Times (mm:ss) Description	2036 Baseline	2036 Do Minimum	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum Langstone	Do Minimum West Lane +Northney Folded +Langstone
Strategic Route 1X NB	15:22	18:36	20:58	18:53	17:39	17:35
Strategic Route 1X SB	14:03	18:06	19:36	17:25	16:39	15:51
Strategic Route 2X NB	17:13	20:54	21:08	20:06	19:20	19:01
Strategic Route 2X SB	14:28	17:44	18:58	17:06	16:17	15:32
Strategic Route 3X NB	12:21	16:14	18:44	15:43	15:10	14:25
Strategic Route 3X SB	10:58	15:06	15:28	14:21	13:33	12:50

Compared to baseline:
- >30s increase
- >30s decrease

12:00 - 13:00

Journey Times (mm:ss) Description	2036 Baseline	2036 Do Minimum	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum Langstone	Do Minimum West Lane +Northney Folded +Langstone
Strategic Route 1X NB	13:33	13:54	14:28	14:09	13:46	13:51
Strategic Route 1X SB	13:05	13:19	15:05	13:20	13:17	13:01
Strategic Route 2X NB	14:20	13:49	14:20	14:04	13:41	13:47
Strategic Route 2X SB	13:45	13:11	14:47	13:15	13:08	12:54
Strategic Route 3X NB	10:31	10:45	11:01	11:34	10:42	11:13
Strategic Route 3X SB	09:52	09:59	10:59	10:37	09:57	10:21

17:00 - 18:00

Journey Times (mm:ss) Description	2036 Baseline	2036 Do Minimum	Do Minimum + Mill Rythe	Do Minimum + West Lane	Do Minimum Langstone	Do Minimum West Lane +Northney Folded +Langstone
Strategic Route 1X NB	14:41	15:27	16:48	15:28	15:18	15:17
Strategic Route 1X SB	13:57	16:52	17:43	16:51	16:55	16:33
Strategic Route 2X NB	15:26	15:17	16:15	15:19	15:10	15:08
Strategic Route 2X SB	14:30	16:44	17:26	16:43	16:45	16:25
Strategic Route 3X NB	11:38	12:12	12:57	12:40	12:04	12:27
Strategic Route 3X SB	10:38	13:33	13:31	14:17	13:37	14:02

Table A8: Strategic journey time routes 1X, 2X and 3X

Individual junction mitigation measures in combination with mitigation package M1A, compared with Baseline

08:00 - 09:00

Journey Times (mm:ss) Description	2036 Baseline	2036 Do Minimum	M1a	M1a + Mill Rythe	M1a + West Lane	M1a Langstone	M1a Northney Fold	M1a Northney Gyratory	M1a Northney Signals	M1a Technology Park	M1a West Lane +Northney Folded +Langstone
Strategic Route 1X NB	15:22	18:36	17:02	16:44	17:09	16:04	16:02	16:18	20:01	18:42	16:23
Strategic Route 1X SB	14:03	18:06	13:22	14:42	13:08	13:19	13:10	13:43	13:44	13:30	13:02
Strategic Route 2X NB	17:13	20:54	18:23	16:33	18:41	17:29	17:11	17:42	21:29	19:59	17:42
Strategic Route 2X SB	14:28	17:44	12:57	13:58	12:42	12:54	12:46	13:20	13:21	13:02	12:38
Strategic Route 3X NB	12:21	16:14	14:13	14:00	14:04	13:17	13:09	13:33	17:33	15:50	13:17
Strategic Route 3X SB	10:58	15:06	10:17	10:30	10:14	10:12	10:05	10:39	10:47	10:23	10:13

12:00 - 13:00

Journey Times (mm:ss) Description	2036 Baseline	2036 Do Minimum	M1a	M1a + Mill Rythe	M1a + West Lane	M1a Langstone	M1a Northney Fold	M1a Northney Gyratory	M1a Northney Signals	M1a Technology Park	M1a West Lane +Northney Folded +Langstone
Strategic Route 1X NB	13:33	13:54	13:18	13:39	13:23	13:15	13:15	13:16	13:29	13:34	13:17
Strategic Route 1X SB	13:05	13:19	13:12	13:47	13:09	13:06	12:56	13:12	13:17	13:11	12:57
Strategic Route 2X NB	14:20	13:49	13:09	13:18	13:15	13:08	13:09	13:10	13:22	13:27	13:09
Strategic Route 2X SB	13:45	13:11	12:55	13:22	12:57	12:52	12:40	12:57	13:04	12:58	12:42
Strategic Route 3X NB	10:31	10:45	10:15	10:15	10:45	10:14	10:15	10:16	10:28	10:33	10:41
Strategic Route 3X SB	09:52	09:59	09:57	09:54	10:34	09:51	09:45	10:02	10:05	09:57	10:32

17:00 - 18:00

Journey Times (mm:ss) Description	2036 Baseline	2036 Do Minimum	M1a	M1a + Mill Rythe	M1a + West Lane	M1a Langstone	M1a Northney Fold	M1a Northney Gyratory	M1a Northney Signals	M1a Technology Park	M1a West Lane +Northney Folded +Langstone
Strategic Route 1X NB	14:41	15:27	14:23	15:11	14:33	14:23	14:32	14:23	15:14	14:50	14:25
Strategic Route 1X SB	13:57	16:52	15:21	15:46	15:10	15:04	14:39	14:57	15:25	15:00	14:40
Strategic Route 2X NB	15:26	15:17	14:11	14:26	14:20	14:12	14:22	14:13	15:05	14:39	14:13
Strategic Route 2X SB	14:30	16:44	15:06	15:21	14:58	14:50	14:24	14:42	15:09	14:47	14:26
Strategic Route 3X NB	11:38	12:12	11:15	11:22	11:45	11:16	11:26	11:17	12:04	11:42	11:43
Strategic Route 3X SB	10:38	13:33	12:06	11:45	12:47	11:48	11:21	11:40	12:08	11:44	12:07

Compared to baseline:
- >30s increase
- >30s decrease

Table A9: Comparison of 2018 and 2036 journey times on strategic journey time routes 1, 2 and 3

These journey times relate to the section of the strategic routes south of Woodbury Avenue:

Route 1: Beachlands roundabout – Mill Rythe roundabout – A3023 – Woodbury Avenue / Tech Park

Route 2: Sea Front / Sea Grove Road - Mill Rythe roundabout – A3023 – Woodbury Avenue / Tech Park

Route 3: West Lane / Brights Lane – West Lane – A3023 - Woodbury Avenue / Tech Park

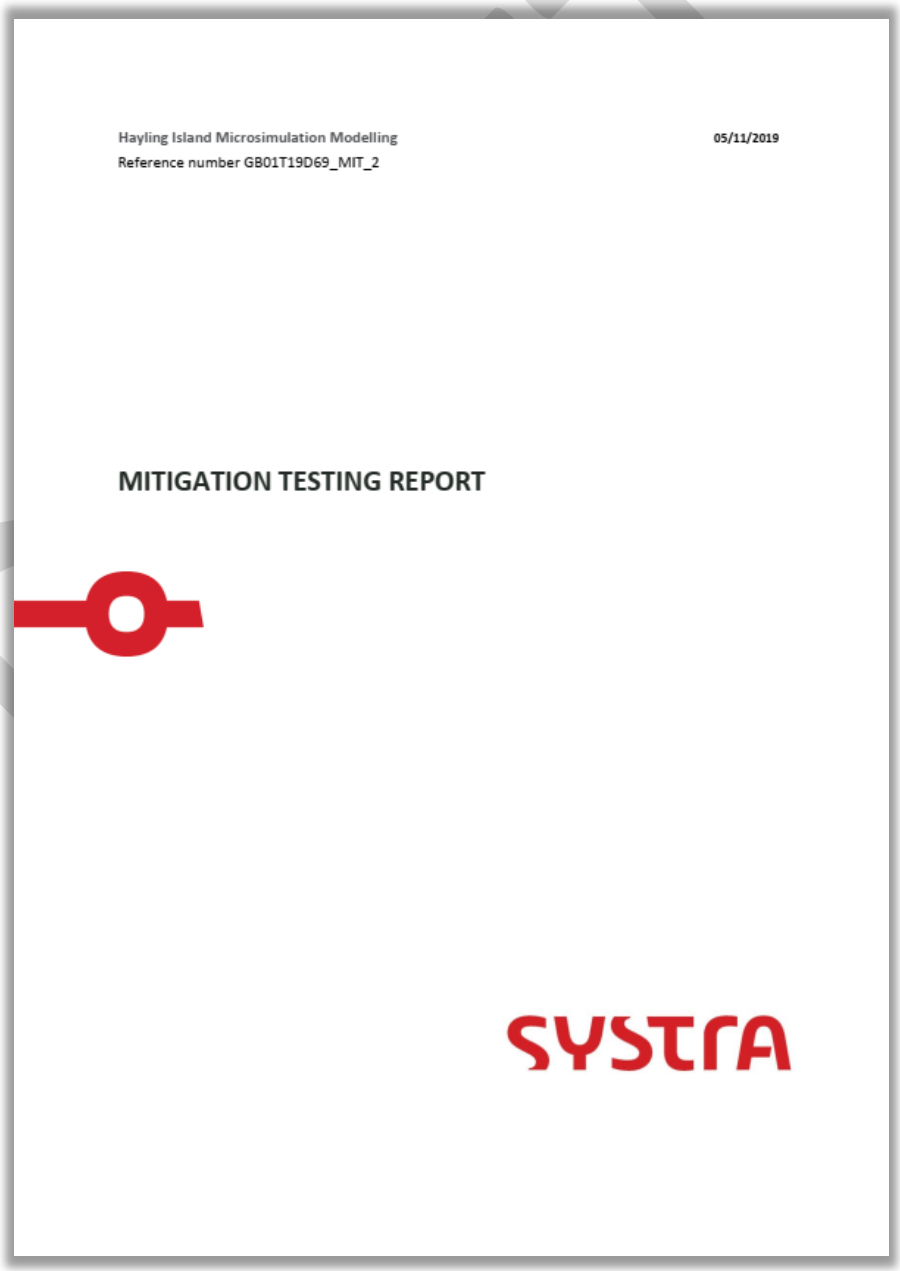
08:00 - 09:00	Base 2018	Base 2036
Route 1 NB	11:08	13:44
Route 1 SB	09:34	10:53
Route 2 NB	10:47	11:52
Route 2 SB	09:55	10:28
Route 3 NB	08:09	08:51
Route 3 SB	07:12	07:23

12:00 - 13:00	Base 2018	Base 2036
Route 1 NB	09:45	11:11
Route 1 SB	09:41	11:06
Route 2 NB	09:51	10:24
Route 2 SB	09:51	10:26
Route 3 NB	07:16	07:22
Route 3 SB	07:04	07:13

17:00 - 18:00	Base 2018	Base 2036
Route 1 NB	09:44	11:10
Route 1 SB	10:31	11:40
Route 2 NB	09:53	10:25
Route 2 SB	10:42	11:07
Route 3 NB	07:12	07:22
Route 3 SB	07:48	07:48

Appendix B (Systra - Hayling Island Mitigation Testing Report (November 2019)

See separate document.



Hayling Island Microsimulation Modelling 05/11/2019

Reference number GB01T19D69_MIT_2

MITIGATION TESTING REPORT

SYSTRA

Appendix C (Hampshire County Council Linsig Testing)

NOTE: this report has revised page numbering and formatting to reflect its inclusion in the Addendum. The content is unchanged from the original report.

ITS Group

ETE Department

Hampshire County Council

Hayling Island – traffic signal modelling report

Contents

Introduction

Hampshire County Council ITS Group has been approached by Havant Borough Council to look at the potential implications of a series of signal controlled junctions being introduced on Hayling Island in support of the Local Development Plan.

The junctions being considered in this report are:

- A3023 Havant Road and Northney Road;
- Havant Road, Manor Road and Church Road;
- A3023 Havant Road and West Lane.

The three junctions are on a direct link from the north to the south of the island.

The proposals consider the operation in terms of a basic Linsig analysis to determine the potential operation of the proposed junction layouts as provided by Havant Borough Council. The proposals are also considered in terms of outline buildability.

Background

The project has been derived from a desire by Havant Borough Council to provide long term capacity at the junctions to support the Local Development Plan housing allocation. Traffic signal options have been developed in order that the area can appropriately meet projected future traffic demands in a safe manner. To this end Havant Borough Council have produced a series of outline proposals for signal design options at the junctions. In order to progress the project, the designs need to be considered in terms of buildability and capacity.

It is intended that this report will allow for a preliminary determination of the potential capacity of the proposed sites along with an analysis of the typical queues and delays that can be anticipated. An over view is required of any potential issues that may arise from constructing junctions at these locations. Analysis will be completed by applying the proposed outline layouts for the junctions into the Linsig 3 design analysis software. A review will be made, taking reference from previous experience of the ITS Group, into high level issues that may impact on the buildability of the proposed designs.

Traffic flows have been supplied by Havant Borough Council. These flows have been derived from the Hayling Island Paramics model for the local plan design year of 2036. Each signal junction has been tested for the AM peak hour (0800-0900), inter peak (1100-1200) and PM peak hour (1700-1800). Havant Borough Council have produced outline design layouts that will be used to develop the initial traffic signal modelling within Linsig. No alterations to these layouts have been tested.

A3023 Havant Road / Northney Road

Havant Road/Northney Road is the first junction that is arrived at after crossing the bridge onto the island. As such the capacity and operation of this junction would be critical to traffic entering and leaving the island. The junction is being considered for signalisation to mitigate the potential queues associated with a priority intersection.

The junction is a three arm 'T' junction with footways to the western side and north eastern side. There is a busy petrol station located to the south eastern corner of the junction.

The junction has been assessed using Linsig traffic signal design software. It has been assumed that all approaches will operate with a Saturation Flow of 1800 PCU's/hr. Pedestrian crossings are included on the layout drawing and for the purposes of this modelling report it is assumed that they would be push button controlled. A stage arrangement, based on the supplied outline design, has been assumed of:

- Stage 1 – A3023 Havant Road north and south;
- Stage 2 - Northney Road;
- Stage 3 - All Red for pedestrians.

A 90 second cycle time has been adopted for all periods.

The modelling has been based on the preliminary design drawing 2017_15 A3023/NORTHNEY ROAD (see Appendix) supplied by Havant Borough Council.

The 2036 modelling results for this signal junction are outlined below.

	AM peak 2036			Inter Peak 2036			PM peak 2036		
	Mean max queue (PCUs)	Avg delay / pcu (mins: secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)
Havant Rd Nth	12.5 (72m)	0m 15s	65.3%	16.6 (95m)	0m 17s	75.4	**161.7 (930m)**	**5m 51s**	**120.3**
Northney Rd	1.5 (12m)	0m 52s	33.8%	2.6 (15m)	0m 56s	52.5	2.7 (15m)	0m 59s	54.4
Havant Rd Sth	**165.0 (949m)**	**5m 53s**	**120.5%**	15.0 (86m)	0m 16s	72.2	10.8 (62m)	0m 13s	60.2
Cycle time	90 secs			90 secs			90 secs		
PRC %	**-33.9**			19.3			**-33.7**		

Table 1

PCU – Passenger Car Units
PRC – Practical Reserve Capacity

The modelling results indicate that Havant Road south will be significantly over capacity in the AM period and Havant Road north far over capacity in the PM period. The mean maximum queues for these periods are shown to be approaching a kilometre (It should be noted that this measurement is mean figure and as such the queues are likely to be longer than this for at least half of the modelled period). This signal option would generate considerable levels of delay and congestion along the A3023 at peak times which would not provide a viable solution.

<u>Design comments</u>

In terms of the signal junction buildability a review of the drawings has shown that the widening of the footway/cycleway to the western side of the junction is likely to involve substantial works to the shore line

headwall and shore line beyond in order to accommodate the widening. This may not be a desirable solution from both an ecological and a financial point of view.
It is unclear as to how the bus stops will be accommodated within the signal junction; inappropriate placement could lead to exit blocking of the junction which may have a detrimental impact on the anticipated capacity results.

Havant Road / Church Road / Manor Road ('Mill Rythe')

Havant Road/Church Road/Manor Road is a roundabout towards the south of the island within an area that is predominantly residential in nature, all be it on a road that forms part of the main north/south link. The junction is being considered for signalisation as a means to accommodate Local Development Plan traffic in 2036.

The junction is a three-arm roundabout junction with footways to both sides on all three arms. There is a busy newly constructed supermarket located to the south western corner of the junction.

The junction has been assessed using Linsig traffic signal design software. It has been assumed that all approaches will operate with a Saturation Flow of 1800 PCU's/hr. Pedestrian crossings have been included on all arms of the layout and push button-controlled facilities have been included in the modelling. A stage arrangement, based on the supplied outline design, has been assumed of:

- Stage 1 - Havant Road left turn/Church Road;
- Stage 2 - Havant Road /Manor Road (gap seeking right turn)
- Stage 3 - All red pedestrians.

A 90 second cycle time has been adopted.

The modelling has been based on the preliminary design drawing 2017_15 A3023/MILL RYTHE ROUNDABOUT (see Appendix) supplied by Havant Borough Council. For the purposes of the modelling it has been assumed that the signal junction layout would be far more compact to minimise the amount of lost time and to maximise capacity.

<u>Staging option A</u>

The 2036 modelling results for this junction are shown below.

	AM peak 2036			Inter Peak 2036			PM peak 2036		
	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)
Havant Rd Nth	5.6 (32.2m)	0m 39s	54	6.3 (36m)	0m 35s	54.2	8.6 (49m)	0m 31s	61.1
Church Rd	21.1 (121m)	0m 35s		10.5 (60m)	0m 24s	24.5	9.4 (54m)	0m 28s	61.6
Manor Rd	12.1 (70m)	1m 5s		6.8 (39m)	0m 37s	37.6	4.7 (27m)	0m 31s	52.8
Cycle time	90 secs			90 secs			90 secs		
PRC %	2.1			43.9			46.2		

Table 2

PCU – Passenger Car Units
PRC – Practical Reserve Capacity

The modelling shows that the junction is almost at capacity in the 2036 AM peak but would operate comfortably within capacity in the inter and PM peaks. There would be limited queues in both the AM and PM peak periods on all approaches.

Design comments

This staging arrangement requires Manor Road right turning drivers to cross 2 lanes of opposing traffic from Havant Road. Historically this type of staging arrangement has resulted in collisions resulting from poor driver judgement.

A review of the drawing shows the junction to have large amounts of space available to tighten up the approaches to bring the stop lines further into the junction and thus reduce the intergreen times required. This would be essential to realise the junction performance indicated above.

It was also noted that a driveway along Havant Road immediately prior to the junction is accessed through a cut through in the current island arrangements. This movement is not preserved in the proposed arrangement. Access must be maintained in any new arrangement.

Staging option B

In order to consider the potential safety of the junction, and reduce the need for a right turning vehicle from Manor Road to give way to two lanes of opposed traffic, an alternative stage arrangement has been considered that allows for a fully signalled right turn on Manor Road.

A stage arrangement, based on the supplied outline design, has been assumed of:

- Stage 1 – Havant Road left turn/Church Road
- Stage 2 – Havant Road/Manor Road ahead
- Stage 3 – Manor Road ahead and right turn
- Stage 4 – All red pedestrians

The 2036 modelling results for this junction are shown below.

	AM peak 2036			Inter Peak 2036			PM peak 2036		
	Mean max queue (PCUs)	Avg delay / pcu (secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (secs)	Degree of saturation (%)
Havant Rd Nth	8.7 (50m)	1m 26s	88.1	7.2 (41m)	0m 45s	67.8	9.8 (56m)	0m 41s	72.9
Church Rd	**23.6 (136m)**	**0m 45s**	**92.2**	11.9 (68m)	0m 31s	71.3	10.6 (61m)	0m 36s	71.8
Manor Rd	10.6 (61m)	0m 50s	80.7	6.0 (35m)	0m 30s	51.5	4.2 (26m)	0m 25s	37.9
Cycle time	90 secs			90 secs			90 secs		
PRC %	**-2.5**			43.9			23.5		

Table 2

PCU – Passenger Car Units
PRC – Practical Reserve Capacity

The modelling shows that the junction will operate mainly within capacity during the 2036 scenario, with the AM peak slipping just outside in the modelling due to the proposed right turning movement being called every cycle in the model (this is unlikely to happen on street).

Similarly to staging option A, the above results have been produced on the basis that the junction layout would be far more compact to minimise the amount of lost time and to maximise capacity.

Havant Road / West Lane

Havant Road/West Lane is a 'T' junction towards the south of the island within area that is predominantly residential in nature, all be it on a road that forms part of the main north/south link. The junction is being considered for signalisation to address a current congestion issue and to accommodate Local Plan development traffic. However the current junction arrangement is of an extremely poor alignment with visibility from the side road being severely limited. For this reason a new junction is being considered to the south of the current position that will require the realignment of West Lane, land take and the closure of the current junction. This is being considered as a means to improve safety as well as capacity.

The junction is a three-arm 'T' junction with footways to both sides on all three arms. There are residential properties to all sides of the junction.

The junction has been assessed using Linsig traffic signal design software. It has been assumed that all approaches will operate with a Saturation Flow of 1800 PCU's/hr. The proposed layout physically bans the West Street right turn movement to Havant Road south. A stage arrangement, based on the supplied outline design, has been assumed of:

- Stage 1 - Havant Road north right turn and West Lane left turn only;
- Stage 2- Havant Road south;
- Havant Road north left turn to operate in a separate stream as it only conflicts with a pedestrian phase. It has been assumed that the pedestrian phase would appear every cycle which represents a worst case scenario in terms of traffic delay.

A 90 second cycle time has been adopted.

The modelling has been based on the preliminary design drawing supplied by Havant Borough Council (see Appendix), and traffic flow data for 2036 again supplied by Havant Borough Council.

The 2036 modelling results for this junction are shown below.

	AM peak 2036			Inter Peak 2036			PM peak 2036		
	Mean max queue (PCUs)	Avg delay / pcu (mins: secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)	Mean max queue (PCUs)	Avg delay / pcu (mins:secs)	Degree of saturation (%)
Havant Rd Nth LFT	4.9 (28m)	0m 4s	41.7	5.7 (33m)	0m 5s	47.0	13.3 (76m)	0m 8s	71.7
Havant Rd Nth RGT	2.3 (13m)	0m 49s	39.1	3.0 (17m)	0m 52s	49.1	4.2 (24m)	0m 44s	50.9
Havant Road Sth	24.4 (140m)	0m 18s	87.2	8.1 (47m)	0m 7s	53.1	7.1 (41m)	0m 9s	46.7
West Lane	6.9 (40m)	1m 24s	84.1	2.7 (16m)	0m 51s	45.9	1.8 (10m)	0m 39s	24.4
Cycle time	90 secs			90 secs			90 secs		
PRC %	3.3			69.4			25.6		

Table 2

PCU – Passenger Car Units
PRC – Practical Reserve Capacity

The modelling shows that junction is likely to operate within capacity in the 2036 scenario, resulting in limited queues in both the AM and PM peak periods on all approaches.

Design comments

A review of the drawing shows bus stops located within the alignment of the proposed junction. Careful consideration will need to be given to the position of these in any proposed design in order to prevent blocking visibility to the signal heads or the creation of exit blocking.

It is also noted that the anticipated queues will need to be carefully managed due to the very windy nature of the local road network that reduce visibility to a queue ahead.

Recommendations

It is recommended that the traffic signal options for the junctions of

- Havant Road with Church Road/Manor Road
- Havant Road with West Lane

appear suitable at this stage for signalisation and could accommodate the 2036 Local Plan development traffic within capacity. The Havant Road/Church Road/Manor Road signal layout should be refined to achieve the predicted capacity performance.

It is recommended that the traffic signal option for

- Northney Road with Havant Road

is not progressed due to the predicted severe over capacity and congestion. It is recommended that alternative proposals are investigated at this junction.

WRITTEN BY - MARK ANDREWS/Jonathan Mundy
DATE – 19/09/19

Appendix A

Mitigation Package 2a.pdf

Havant Road/Northney Road traffic signal option drawing (drg 2017_15 A3023/NORTHNEY ROAD)
[This is figure 9 in the main Addendum report]

Mitigation Package 1c.pdf

Havant Road/Manor Road/Church Road traffic signal option drawing (drg 2017_15 A3023/MILL RYTHE ROUNDABOUT)
[This is figure 5 in the main Addendum report]

west lane.pdf

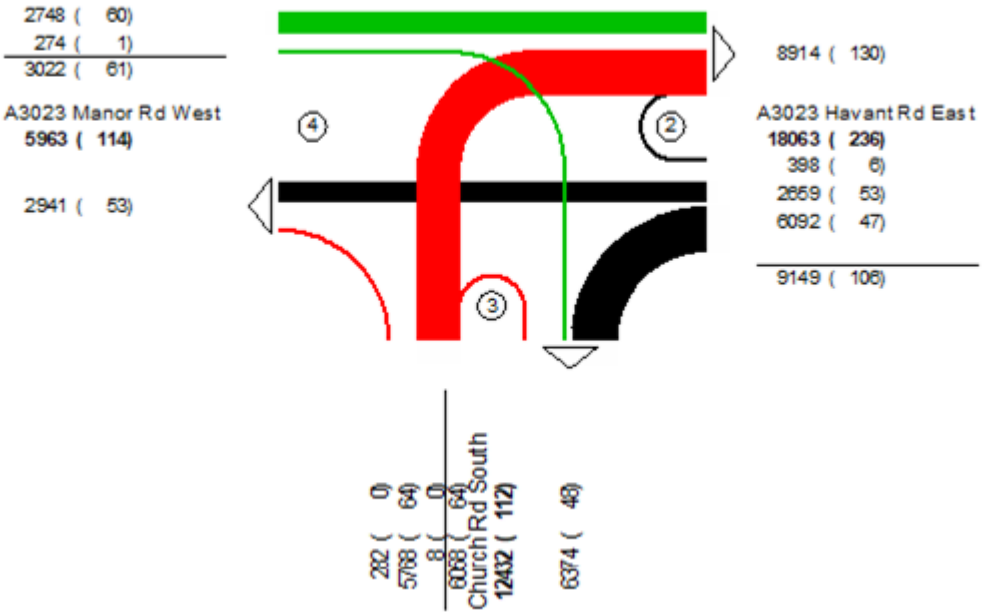
Havant Road/West Lane traffic signal option drawing
[This is figure 6 in the main Addendum report]

Appendix D (Reference traffic turning counts)

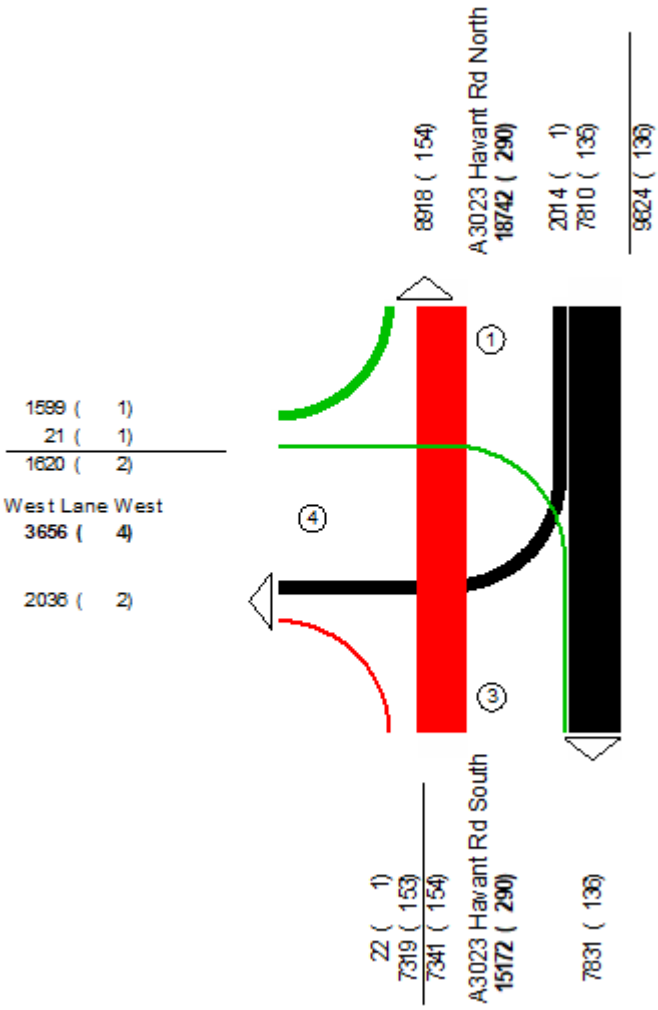
The following counts were undertaken in June 2017 and are reproduced here to illustrate the proportions of vehicle turning movements at the named junctions. These values were used in the development, calibration and validation of the Paramics model.

For each arm of the junction, the main figure is total number of vehicles and the figure in brackets represents the flow of HGVs. ‘Vehicles’ includes cars, buses, light and heavy goods, cycles and powered two wheelers.

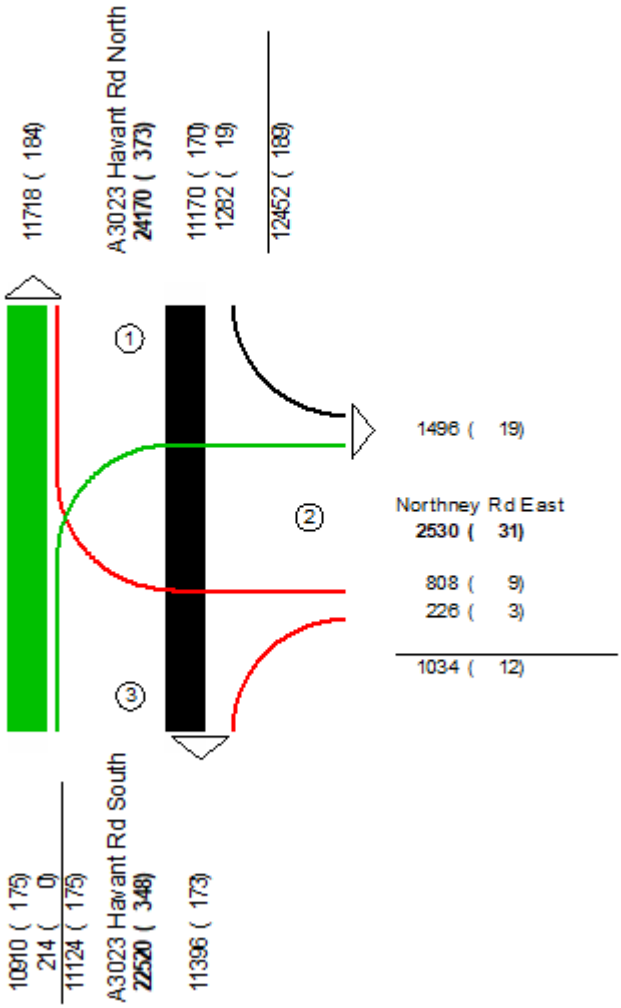
Mill Rythe (Havant Road / Manor Road / Church Road)



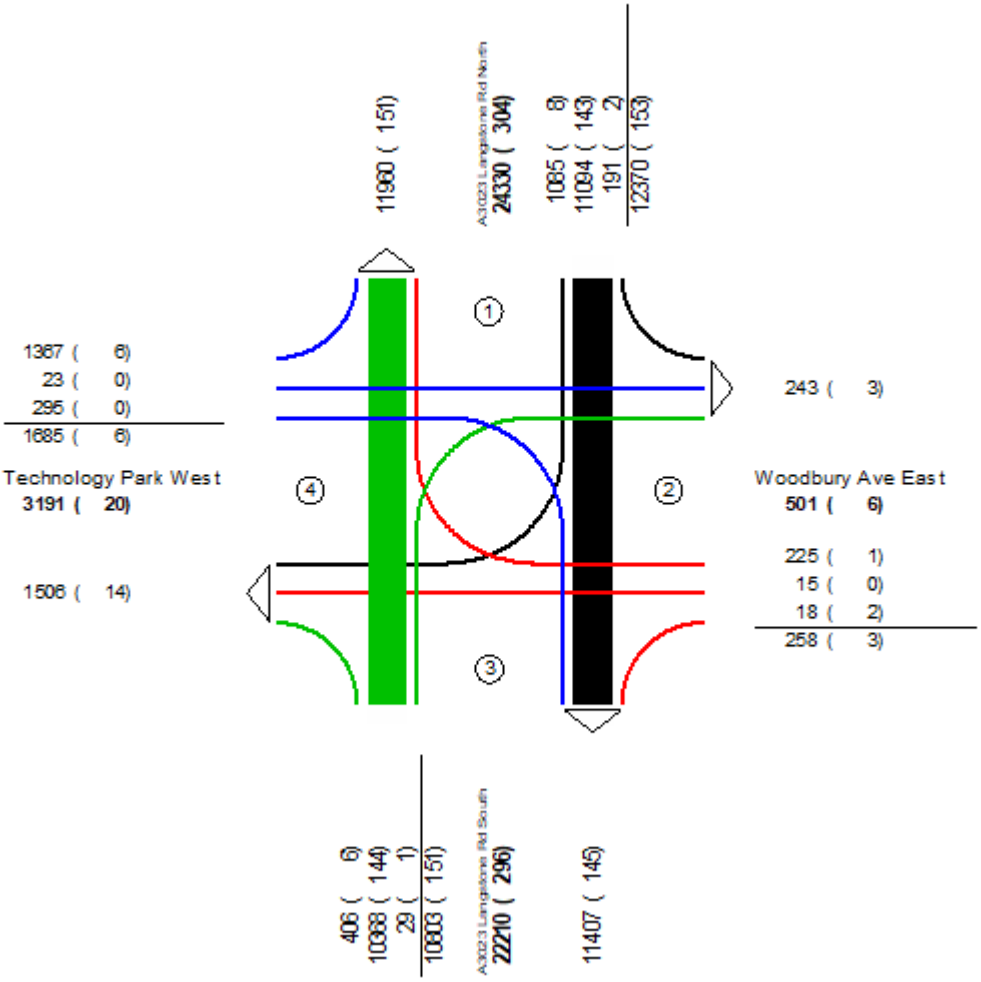
West Lane


1599 (1)
21 (1)
1620 (2)
West Lane West
3656 (4)
2036 (2)
4
1
3
22 (1)
7319 (153)
7341 (154)
A3023 Havant Rd South
15172 (290)
7831 (136)
8918 (154)
A3023 Havant Rd North
18742 (290)
2014 (1)
7810 (135)
9824 (136)

Northney Road



Woodbury Lane / Langstone Road / Langstone Technology Park



Appendix E (Societal Benefit Matrix)

Location		Scheme		Safety				Air Quality & Noise							Journey Consistency				Community Connectivity			All Categories
TA Map	Location	Brief Description	report reference	safer for motorists	safer for cyclists	safer for pedestrians	OVERALL SAFETY RATING	fewer car journeys	less idling and stop-start traffic	even driving	more bus use	more cycling	more walking	OVERALL AIR QUALITY & NOISE RATING	reduced vehicle friction	fewer parked vehicles	cyclists choose off road route	OVERALL CONSISTENCY RATING	better connection across A3023	better north-south connection	OVERALL CONNECTIVITY RATING	OVERALL RATING ACROSS ALL CATEGORIES
Various	Various	Bus stop lay-bys (Package M1A)	4.10 ff	✓	✓	✓		⊙	✓✓	✓	⊙	⊙	⊙		✓	⊙	⊙		⊙	✓✓		
Various	Various	Right turn lanes (Package M1A)	4.10 ff	✓✓	✓✓	✓		⊙	✓✓	✓	⊙	⊙	⊙		✓✓	⊙	⊙		✓	✓✓		
5	Ship Inn	bus layby, northbound right turn into Ship PH car park; pedestrian islands (Package M1A)	4.10 ff	⊙	⊙	✓✓		⊙	✓✓	✓	⊙	⊙	⊙		✓✓	⊙	⊙		✓✓	✓✓		
A	A3023 (Manor Rd, Havant Rd) / Church	Light controlled junction	4.16 ff	×	✓✓	✓✓		⊙	×	✓	⊙	⊙	⊙		⊙	⊙	⊙		✓✓	⊙		
B	West Lane north (Junction with A3023)	'Phase 1': Blocking of northern end of West Lane; new West Lane entrance	4.23 ff	✓✓	✓✓	⊙		⊙	⊙	✓	⊙	⊙	⊙		✓✓	⊙	⊙		✓	⊙		
B	West Lane	'Phase 2': Link to avoid sharp bends	4.23 ff	✓✓	✓✓	✓✓		⊙	⊙	✓	⊙	⊙	⊙		⊙	⊙	⊙		⊙	✓		
C	A3023 / Northney Rd junction	Option a: dedicated left turn southbound to Northney	4.30	✓✓	✓✓	⊙		⊙	✓✓	✓	⊙	⊙	⊙		✓✓	⊙	⊙		⊙	✓✓		
C	A3023 / Northney Rd junction	Option b: option a plus Folded Right turns to and from Northney	4.31	✓✓	✓✓	⊙		⊙	✓✓	✓	⊙	⊙	⊙		✓✓	⊙	⊙		⊙	✓✓		
C	A3023/ Northney Rd junction	Option c: option a plus Light controlled junction	4.32	✓✓	✓✓	✓✓		⊙	×	✓	⊙	⊙	⊙		✓✓	⊙	⊙		⊙	⊙		
C	A3023 / Northney Rd junction	Option d: Gyratory	4.33	⊙	⊙	⊙		⊙	✓✓	✓	⊙	⊙	⊙		✓✓	⊙	⊙		⊙	✓		
D	Woodbury Avenue/ Langstone Technology Park	Extend two lanes on A3023 southwards (TCF scheme)	4.34 ff	✓	⊙	⊙		⊙	✓	✓	✓	⊙	⊙		✓✓	⊙	⊙		⊙	✓		
D	Woodbury Avenue/ Langstone Technology Park	Extend two lanes on A3023 southwards; ban right turn onto A3023; signal control	4.34 ff	✓	✓	✓✓		⊙	⊙	✓	⊙	⊙	✓		✓✓	⊙	⊙		✓✓	⊙		
n/a	Length of A3023	Heavily Restricted Parking and Loading (Red Route)	5.48 ff	✓✓	✓✓	✓		⊙	✓✓	✓	⊙	✓	⊙		✓✓	✓✓	⊙		⊙	✓✓		
n/a	Length of A3023	Bus service improvements (frequency and cost)	5.3 ff	⊙	⊙	⊙		✓✓	✓	⊙	✓✓	⊙	⊙		⊙	⊙	⊙		⊙	✓✓		
n/a	Sea Front / Ferry Road	Shuttle from Beachlands to Ferry	5.12 ff	⊙	⊙	⊙		✓	⊙	⊙	✓	⊙	⊙		✓	✓	⊙		⊙	⊙		
n/a	Southbound from Langstone	Southbound Visitor Park & Ride with dedicated route	5.54 ff	⊙	⊙	⊙		✓✓	✓	⊙	✓	⊙	⊙		⊙	✓	⊙		⊙	⊙		
n/a	Length of A3023	Walking and cycling improvements	5.26 ff	✓	✓✓	✓✓		✓✓	✓	⊙	⊙	✓✓	✓✓		⊙	⊙	⊙		⊙	✓✓		
n/a	Length of A3023	A3023 consistent 30mph speed limit south of A27	4.44 ff	✓✓	✓✓	✓✓		⊙	✓	✓✓	⊙	✓	⊙		⊙	⊙	⊙		✓	✓		
n/a	Billy trail	Hard Surfacing	6.27 ff	⊙	✓✓	✓✓		✓✓	✓	⊙	✓	✓✓	✓✓		⊙	⊙	✓✓		✓	✓✓		

Overall Rating

Criteria Scoring	
✓✓	likely positive effect
✓	potential positive effect
⊙	unlikely to change / no direct link / neutral effect
×	potential negative effect
××	likely negative effect

RAG rating of Category	
	All negative, or mixture of negative and neutral scores - demonstrating an overall negative effect on this category
	Where a category includes any negative scores, even if the remainder are positive, amber is ascribed to flag the negative elements
	A majority of positive scores in a catergory must be achieved to achieve green. For example, if there are three criteria in a category, at least two positive scores must be achieved to be rated green. (NB the 'Connectivity' category has only two criteria. Here one positive score is considered sufficient for a green rating).
	If all criteria are scored neutral, or there are only a limited number of possitive effects (ie insufficient to qualify for a green score), the grey colour will denote the neutral or limited effect of the measures