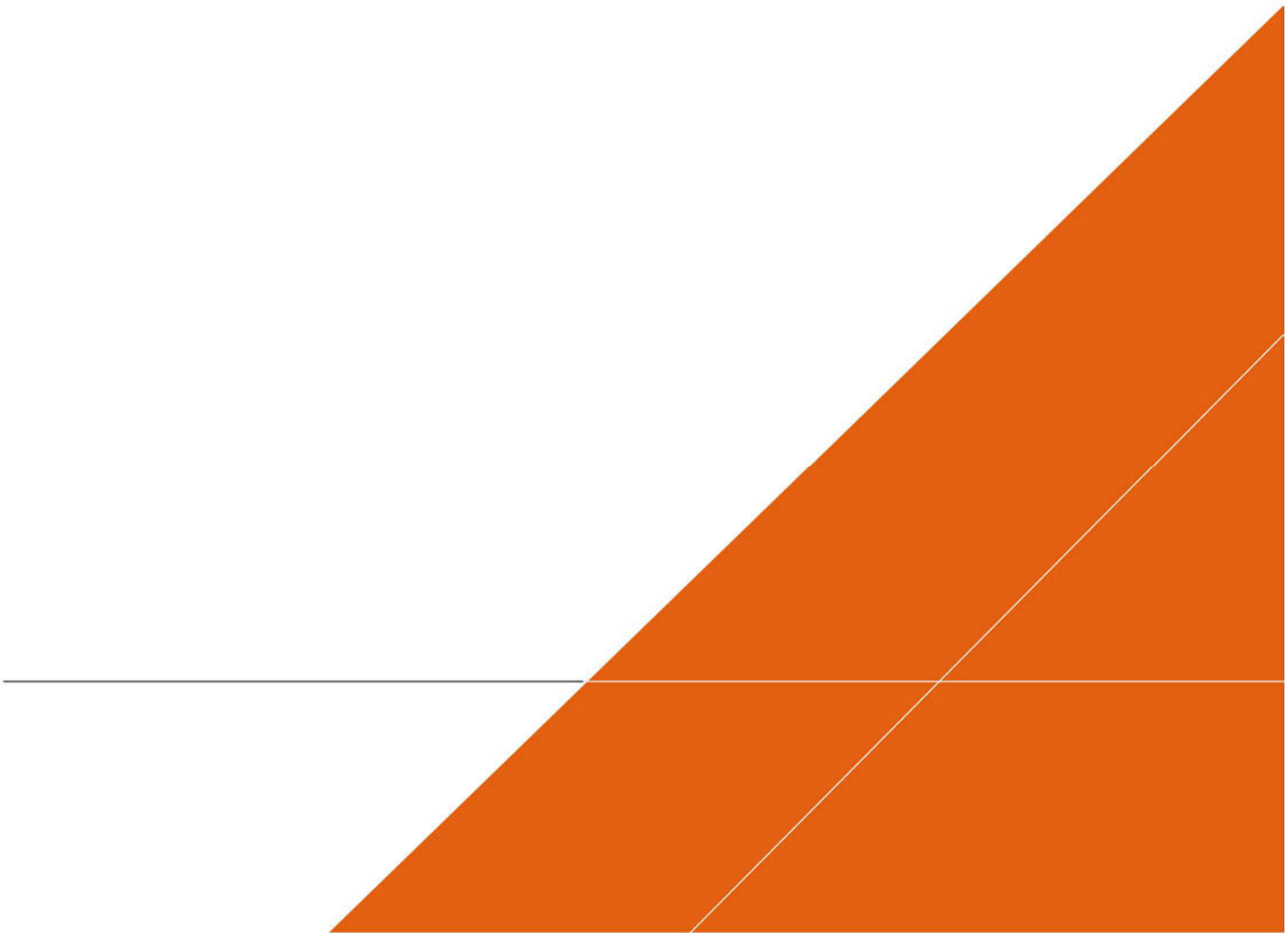
FHDC EX107
Appendix 9 from FHDC EX083/EX084

ARCADIS Design & Consultancy for natural and built assets

FOLKESTONE & HYTHE DISTRICT COUNCIL

Local Plan Traffic Analysis
Highways England Road Network

DECEMBER 2020



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1 VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
1.0	03/10/2020	JG	DC	DC	Initial Draft
2.0	30/11/2020	JG	DC	DC	Second Draft
2.1	03/12/2020	JG	DC	DC	Final Draft
3.0	17/12/2020	JG	DC	DC	Final Draft (internal review)
3.1	21/12/2020	JG	DC	DC	Final Draft

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1 Introduction

1.1 Background

At the request of Folkestone and Hythe District Council, Arcadis Consulting (UK) Ltd (Arcadis) is providing support to the District Council for their Core Strategy Review. The support being provided as described in this note relates to the Statement of Common Ground between Folkestone and Hythe District Council and Highways England and, specifically, the submission made to the examination by Highways England in a letter dated 3rd July 2020.

Arcadis held a meeting with Folkestone and Hythe District Council and Highways England on Monday the 14th of September to discuss the scope of work required to work towards a Statement of Common Ground between Folkestone and Hythe District Council and Highways England. Highways England expressed the view that they require further information to be able to support the local plan at the initial hearing in mid-November 2020, which is now postponed until December 2020.

A second meeting took place on Friday 25th of September, between Arcadis, Folkestone and Hythe District Council and Highways England. This meeting clarified the requirement for traffic investigations to support Highways England to determine the impact of the Folkestone and Hythe Local Plan on its road network. Since then, further meetings have been held between all three parties on Thursday 1st, Wednesday 7th, Monday 12th and Friday 30th of October to discuss progress towards the agreement of the scope, data sources and assumptions required for the study.

1.2 Purpose

The purpose of the study is to enable Folkestone and Hythe District Council to agree on a Statement of Common Ground regarding requirements for highway schemes to mitigate impact related to the Folkestone and Hythe Local Plan on the Highways England road network, or the further work required to identify those requirements.

It is acknowledged that further supporting information will be provided after this study, including the scheme costing.

1.3 Report Structure

This document is composed of:

- Section 2, presenting a review of previous data;
- Section 3, detailing the process for the selection of the study area;
- Section 4, presenting the traffic demand preparation;
- Section 5, summarising the analysis for M20 Junction 11;
- Section 6, summarising the analysis for M20 Junction 11a;
- Section 7, summarising the analysis for M20 Junction 12;
- Section 8, summarising the analysis for M20 Junction 13;
- Section 9, summarising the analysis for A20 / Spitfire Way / Alkham Valley Road; and
- Section 10, presenting the Otterpool Park Transport Assessment; and
- Section 11, presenting the overall conclusion.

2 Previous Data Review

2.1 Available Data

The data sources readily available as input to this study are available in Appendix A and consist of:

- AECOM, *Briefing Note: Shepway Transport Model Update – Review & Findings*, December 2017;
- AECOM, *Shepway Transport Model – Merge and Diverge Appraisal (with spreadsheet model)*, September 2018;
- AECOM, *Shepway Transport Model, Local Junction Modelling and outputs*; November 2017;
- Taylor Wimpey, *Cheriton High Street Junction, committed scheme drawing*, May 2018;
- Email correspondence from Highways England to Folkestone & Hythe District Council dated October 2018 to confirm that no mitigation would be required for the 2031 Do Something scenario for the Places and Policies Local Plan (additional modelling scenarios);
- Arcadis, *Otterpool Park – Transport Assessment*, February 2019 (with supporting information and traffic models);
- Folkestone & Hythe District Council and Highways England, *Statement of Common Ground*, January 2020;
- Highways England, *Folkestone and Hythe District Core Strategy Review Examination Submission to the Examination by Highways England*, July 2020; and
- Folkestone & Hythe District Council, *Core Strategy Review – Inspector's Matters*, July 2020.

Further information can be found as required on the Folkestone and Hythe District Council Local Plan website (https://folkestone-hythe.gov.uk/planning/planning-policy/local-map/examination-news-and-updates).

2.2 Traffic Demand Consistency with the Previous Stage

Two previous traffic models were available at the inception of this study. These were:

- The AECOM Shepway transport model, and
- The VISUM cordon model prepared as part of the Otterpool Park transport assessment.

For consistency with the existing Statement of Common Ground between Folkestone & Hythe District Council and Highways England (2020), it was decided to update the key assumptions of the 2017 AECOM Shepway transport model, rather than using the information available in the Otterpool Park transport assessment.

The Otterpool Park transport assessment information was, however, used for the traffic assessment within Ashford, as it is outside the Shepway model.

Following a detailed review of the AECOM Shepway transport model, the following information was identified as requiring an update:

- The Local Plan development housing and employment projections;
- The TEMPro factors, to account for the latest version of the database;
- The M20 motorway growth factor, to be superseded by an independent factor, accounting for through traffic values;
- The merge/diverge calculation methods to account for the 2020 DMRB; and
- The introduction of the junction upgrades immediately South of M20 Junction 12 (U-turning movement removal in the interchange).

No updates were undertaken of the Shepway transport model traffic assignment on the road network or individual development description and trip generation ratios.

3 Study Area Selection

3.1 Identifying Highways England Road Network

Folkestone and Hythe District Council Location

As shown in Image 1, Folkestone and Hythe District Council is located on the coast of the English Channel and includes the port town of Folkestone and the coastal market town of Hythe. Both towns are located within the northern half of the district. To the West is the town of Ashford, and to the East is the port of Dover.

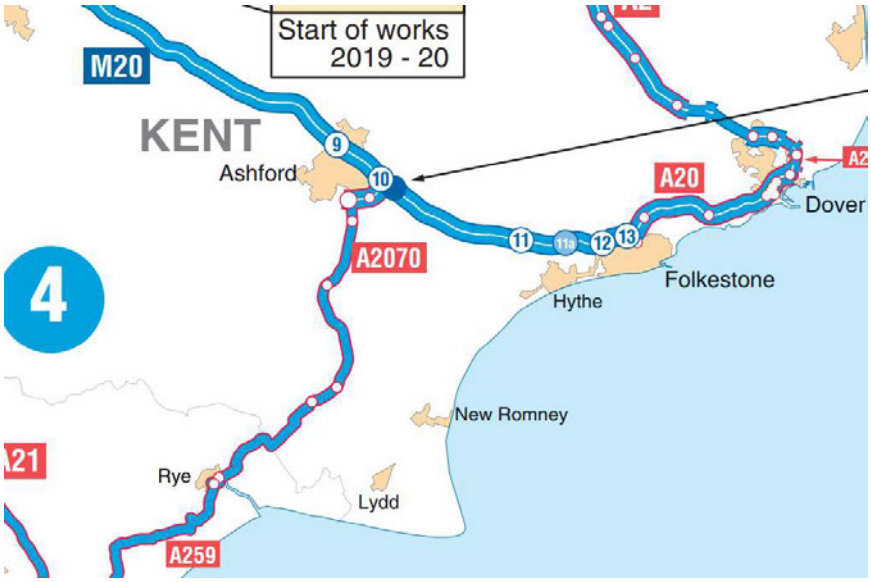
Image 1 – Folkestone and Hythe District Council Location

Highways England Road Network within the Area

Image 2 shows the Highways England road network in the area. It consists of:

- The M20, passing through Ashford, linking it to Folkestone;
- The A20, prolonging the M20 from Folkestone to Dover; and
- The A2070, linking Ashford to Rye.

Image 2 – Highways England Road Network



3.2 Channel Crossing

The M20 and A20 correspond to a key road transport corridor giving access to both:

- Dover port ferry terminal; and
- The Eurotunnel terminal.

Both facilities generate a significant volume of HGVs on the Highways England road network. Beyond the large volume of HGVs, traffic disruptions are anticipated concerning new customs rules expected to be implemented in late 2020.

3.3 Local Plan Description

2037 Local Plan in Numbers

Table 1 shows the Local Plan proposed development description for 2037 per housing and employment, based on the latest information available. This table also presents the projection used by AECOM in 2017. The comparison of the two datasets shows an increase in overall housing. Employment projections, on the other hand, remain stable.

Table 1 – 2037 Local Plan Housing and Employment Projections

From	To	2017 Data		2020 Data	
		Housing	Jobs	Housing	Jobs
2016	2016	49843	51458	51164	48200
2016	2017	50423	51760	52311	48530
2016	2018	51002	52062	52800	48860
2016	2019	51582	52363	53232	49190
2016	2020	52161	52665	53832	49520
2016	2021	52741	52967	54433	49850
2016	2022	53127	53125	55078	50180
2016	2023	53513	53283	55779	50510
2016	2024	53898	53441	56584	50840
2016	2025	54284	53599	57615	51170
2016	2026	54670	53757	58577	51500
2016	2027	55170	53889	59496	51830
2016	2028	55670	54021	60405	52160
2016	2029	56170	54153	61162	52490
2016	2030	56670	54285	61929	52820
2016	2031	57170	54417	62652	53150
2016	2032	57614	54583	63404	53480
2016	2033	58058	54749	64097	53810
2016	2034	58502	54914	64787	54140
2016	2035	58946	55080	65515	54470
2016	2036	59390	55246	66271	54800
2016	2037	59812	55412	66949	55130

Key Development Locations

Image 3 identifies the location of all the key developments considered explicitly in the AECOM Shepway transport model. With the updated Local Plan projections, these developments represent 72% of the growth in housing and 83% of the employment growth. They are located in the vicinity of existing urban areas of Folkestone and Hythe, North of the district.

Image 3 also shows, in dark blue, the junctions considered impacted by the Local Plan in the January 2020 statement of common ground between Folkestone and Hythe and Highways England. Visible in light blue are other junctions considered for inclusion within the study area of this updated assessment.

Table 2, on the next page, lists the names of the 13 developments explicitly included in the local plan.

Image 3 – Key 2037 Local Plan Developments

2031 Do Something Scenario - Places and Policies Local Plan (PPLP)

The 2031 Do Something scenario of the Places and Policies Local Plan includes developments 1 to 12 in Table 3. Highways England confirmed the absence of impact requiring mitigation of these developments (see Appendix A.5).

Site 13 is the only major development in the Local Plan not included in the PPLP.

2037 Growth Complement

The housing and employment growth in the Local Plan for 2037 not accounted for by the 13 developments is calculated using a TEMPro factor adjustment and applied to the base traffic volumes of the local road network.

The traffic growth from these developments is therefore distributed equally across the road network, except for the motorway mainline that has its own TEMPro growth factor taken directly from the TEMPro database.

Table 2 – Key Development Descriptions

Site Number	Scenario Inclusion	Site Name
1	2031 PPLP & 2037 Local Plan	Former Rotunda Amusement Park, Marine Parade, Folkestone, Kent
2	2031 PPLP & 2037 Local Plan	Shorncliffe Garrison, Folkestone
3	2031 PPLP & 2037 Local Plan	Street Record, Hurricane Way, Hawkinge, Kent, CT18 7SU
4	2031 PPLP & 2037 Local Plan	Philbeach House, Tanners Hill, Hythe, Kent CT21 5UQ
5	2031 PPLP & 2037 Local Plan	Land Adjoining Enterprise Way Enterprise Way Link Park Lympne Kent
6	2031 PPLP & 2037 Local Plan	Land Adjoining The Link Park Lympne Industrial Estate Lympne Kent
7	2031 PPLP & 2037 Local Plan	Land Read Rhodes House Main Road Sellindge Kent
8	2031 PPLP & 2037 Local Plan	Remainder of land at Aerodrome, Hawkinge
9	2031 PPLP & 2037 Local Plan	Nickolls Quarry Dymchurch Road Hythe Kent CT21 4NF
10	2031 PPLP & 2037 Local Plan	Land Adjacent The Surgery, Main Road, Sellindge, Kent
11	2031 PPLP & 2037 Local Plan	Land at Hurricane Way, Hawkinge, Kent CT18 7SU
12	2031 PPLP & 2037 Local Plan	Plot 1, Hurricane Way, Hawkinge, Kent CT18 7SU
13	2037 Local Plan	Otterpool Park

3.4 Ashford M20 Junctions

Key Interchanges

West of Folkestone and Hythe District Council is the town of Ashford. Three M20 interchanges are present:

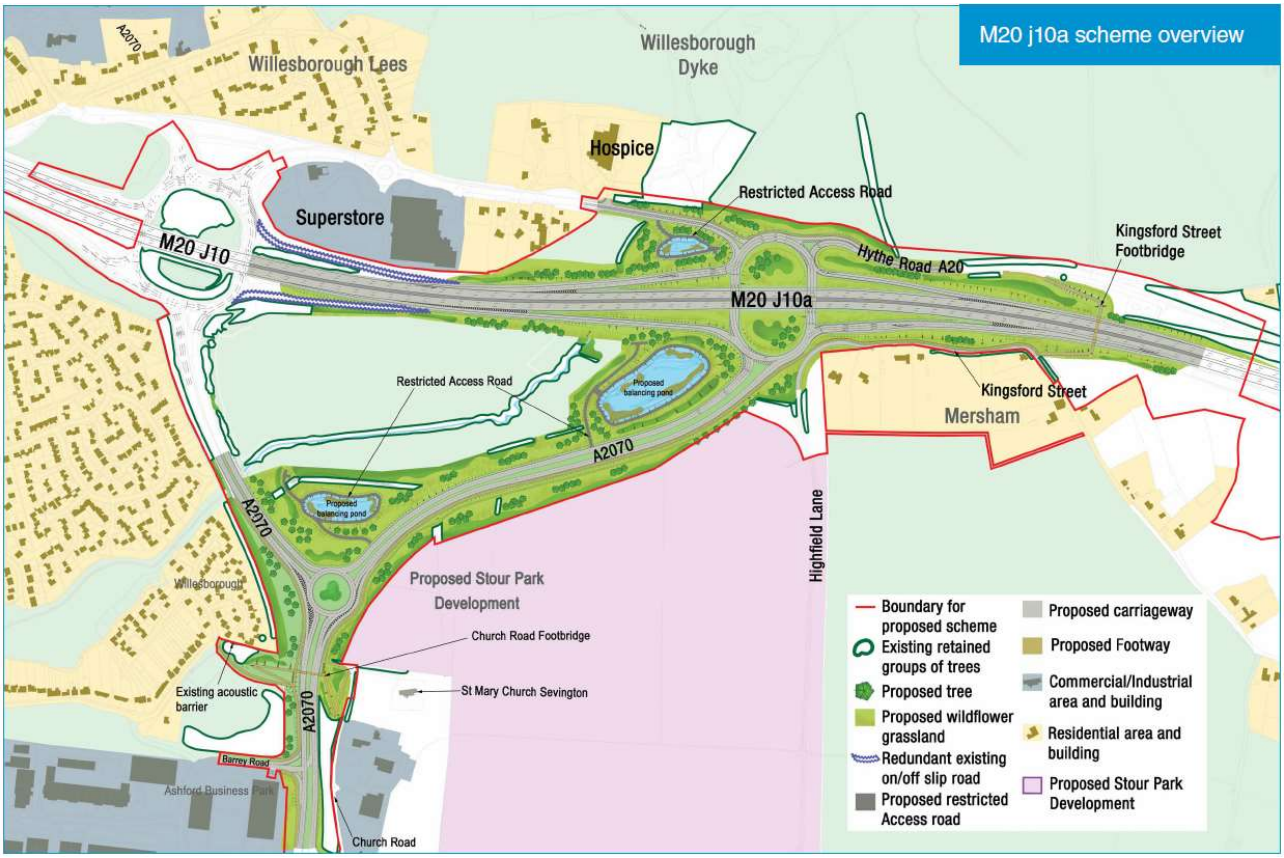
- M20 Junction 9;
- M20 Junction 10; and
- M20 Junction 10a.

M20 Junction 10a improvement scheme is recent. According to Highways England scheme presentation leaflet, works started in January 2018 and were completed in the summer of 2020. Image 4 presents a scheme that includes:

- The construction of a new interchange junction (Junction 10a);
- The closure of East facing ramps at Junction 10.

The fact that Junction 10a has recently been constructed as well as the COVID19 situation does not permit the reliable collection of traffic counts to assess the split of traffic for West facing splits.

Image 4 – M20 Junction 10a Scheme



Total Traffic from Folkestone and Hythe Local Plan

Using the updated transport model, the assessment of the 2037 traffic volumes from the Local Plan travelling to and from district council towards the West (the number within parenthesis as volumes from Otterpool Park), using the M20 are:

- AM Peak: Westbound 929(450) veh, - Eastbound 550(252) veh;
- PM Peak: Westbound 671(316) veh, - Eastbound 950(468) veh

Merge / Diverge Assessment

A merge and diverge assessment using the latest DMRB guidelines has been undertaken using the most recent WebTRIS counts available. Traffic demand on the West facing ramps of Junction 10 and 10a have been split equally as road users now have two ramps to choose from.

The key findings from this assessment are:

- The mainline through traffic volumes are low;
- Junction 9 traffic volumes on the ramp already exceed the design limit with DMRB, but there are no signs of congestion, likely as a result of very low mainline traffic; and
- The traffic volume from the Folkestone and Hythe Local Plan is not expected to be sufficient to require an upgrade of the merge / diverge segments.

Due to the very low mainline traffic volume, any upgrade of the merge / diverge segment would likely correspond to a lane gain, lane drop solution, with the hatching of lane 1 within the interchange.

Interchange Roundabout Assessment

Table 3 shows the 2037 junction traffic analysis within the 2019 Otterpool Park transport assessment, in which the Do-Minimum scenario is equal to Local Plan growth without Otterpool Park and the Do-Something scenario is Local Plan growth including Otterpool Park. This assessment shows the limited impact of the Folkestone and Hythe Local Plan, and the fact that it would not trigger the need for mitigation measures.

Table 3 – Junction 10, 10A and 9 2037 Degree of Saturation

Junction ID / Name		Maximum Degree of Saturation / Ratio of Flow to Capacity					
		2018		2037			
		Baseline		Do-Minimum		Do-Something	
		AM	PM	AM	PM	AM	PM
J1	M20 J10	84.5%	83.2%	70.7%	78.4%	75.0%	77.6%
J42	M20 J10A			41.0%	45.0%	68.3%	75.0%
J23	M20 J9	75.3%	92%	83.9%	95.1%	83.9%	93.3%

Conclusion

In conclusion, it is not anticipated that the Folkestone and Hythe Local Plan would lead to required mitigation measures within the Highways England network in Ashford. M20 Junctions 9, 10 and 10a have therefore been excluded from the assessment.

3.5 Selected Study Area

For this study, the road network of interest was defined as:

- Highways England road network (SRN) directly impacted by the increase in traffic from Folkestone and Hythe District Council Local Plan, to the extent that it would trigger the need for network upgrades; and
- The local junctions at risk of blocking back into the SRN as a result of traffic increase generated by the Local Plan.

The proposed study area is presented in Image 5. It corresponds, West to East, to interchanges:

- M20 Junction 11;
- M20 Junction 11a;
- M20 Junction 12;
- M20 Junction 13; and
- A20, A20 / Spitfire Way / Alkham Valley Road.

Image 5 – Proposed Study Area

4 Traffic Demand

4.1 2018 Baseline

The 2017 baseline data used in the AECOM Shepway Transport Model and the Arcadis Otterpool transport assessment were compared. The data is available in Appendix C.1 and is presented in Table 4. The key findings are:

- Except for Junction 12 in the AECOM model, all data sources are from 2016/2017 and consistent;
- AECOM applied a seasonality factor to the October traffic. The peak traffic is in August, likely related to the Dover port activities;
- AECOM traffic volumes are always higher than the non-factored counts.

The AECOM traffic volumes being a worst-case scenario, the original baseline traffic in the AECOM Shepway Transport Model has been retained. The increase in baseline traffic for M20 Junction 11 and the A20 junction, however, is significant.

Table 4 – 2017 Data Review

Junction	Date of survey		AM (8-9)			PM (17-18)		
	Arcadis model	AECOM model	Arcadis model	AECOM model	Difference	Arcadis model	AECOM model	Difference
M20 J11	13 October 2016	13 October 2016	2,361	2,672	+13%	2,356	2,690	+14%
M20 J11a	13 October 2016	13 October 2016	508	539	+6%	548	582	+6%
M20 J12	29 June 2017	22 October 2013*	2,931	3,074	+5%	3,045	3,070	+1%
M20 J13 Southern rdb	29 June 2017	13 October 2016	3,306	3,768	+14%	3,301	3,659	+11%
A20 Spitfire rdb	13 October 2016	13 October 2016	2,452	2,721	+11%	2,803	3,115	+11%
A20 Alkham rdb	13 October 2016	13 October 2016	1,903	2,112	+11%	1,523	1,693	+11%

Factored up to 2016 baseline

4.2 2037 Traffic Demand Model

The travel demand models are contained in Appendix C.2.

Local Plan Horizon

The local plan horizon is 2037 and this is the core assessment year.

Local Plan Scenario Description

Within the Shepway Transport Model, the core scenarios selected are:

- 2037 DS, corresponding to the Local Plan projection, also labelled Core Strategy Review (CSR 6,500); and
- 2037 DM, corresponding to the Places and Policies Local Plan (PPLP).

The description of individual development has evolved, but by consistency with the previous stage, developments descriptions have been retained as per the AECOM model version.

Local Plan Housing and Employment Projections

The housing and employment project are:

- As per the Local Plan in the 2037 DS;
- Discounted by Otterpool Park development in the 2037 DM.

The reason for the application of the discount is to ensure the transport model does not re-allocate the Otterpool Park traffic via the TEMPro Factor.

Motorway Growth Rate

For the motorway mainline traffic, an independent TEMPro factor has been included in the model. This change enables the assessment to reflect the increase of through traffic, which was not included in the original model developed in 2017 by AECOM.

Junction 12 U-Turning Traffic Removal

The Taylor Wimpey Cheriton High Street Junction, committed scheme drawing, clearly shows the ability to perform the right turning movement from the side road. Thus, the traffic from the South using Junction 12 to U-turn in the AECOM model has been removed.

TEMPro 7b

All TEMPro rates in the model have been superseded using the latest available version of the rates. The version is indicated as 7b.

5 M20 Junction 11

5.1 Assessment Overview

General Description

M20 Junction 11 is a major motorway interchange with the following characteristics:

- The M20 at this location is composed of 3 lanes in each direction (no lane drop/lane gain);
- To the West of the interchange, an overbridge is located that will constrain future road widening at this location;
- Ramps are wide, but are marked as one lane;
- The at-grade junction is a two-lane, non-signalised, roundabout, widened to three lanes at some locations;
- The at-grade junction has 5 arms (including 2 motorway arms). To the South, a further left-in left-out junction gives access to a depot; and
- Another roundabout further South enable U-turning movements.

Initial Mitigation Requirements Identification

The traffic analysis mitigation requirements at M20 Junction 11 based on the 2037 DS CSR 6,500 has been summarised in Image 6 on the next page. The key requirements are:

- Merge and diverge type upgrade at three locations;
- The widening to two lanes of three ramps;
- The upgrade of the main roundabout.

5.2 Merge / Diverge Assessment

The merge and diverge assessment are presented in Table 5 and 6. The key findings are:

- The motorway mainline never requires more than two lanes; and
- Three ramps require widening to two lanes.

Image 6 – M20 Junction 11 High-Level Mitigation Requirements

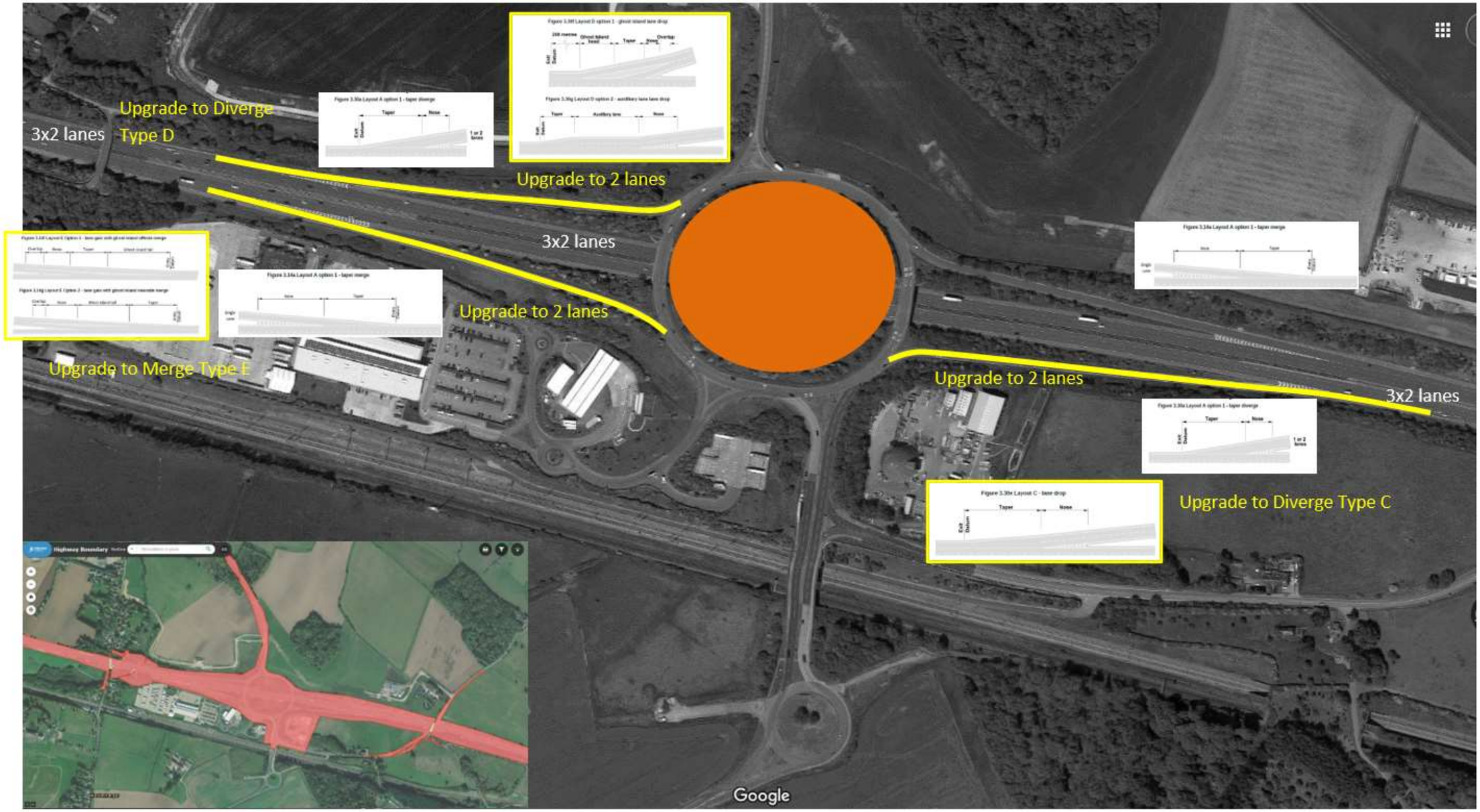
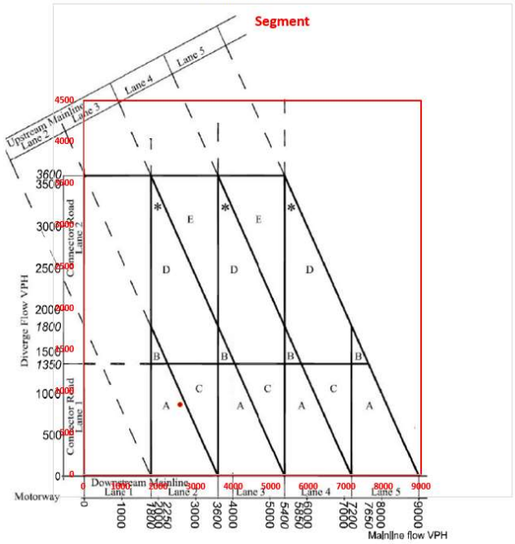


Table 5 – M20 Junction 11 – 2037 AM Merge/Diverge Assessment

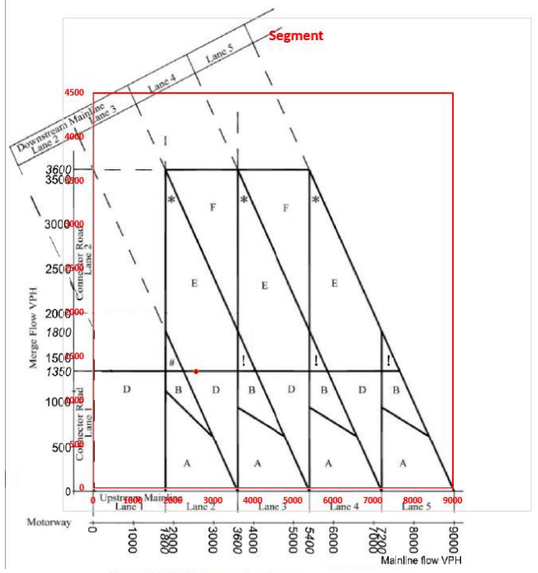
Figure 3.26b Motorway diverging diagram



M20 J11 EB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2580	844

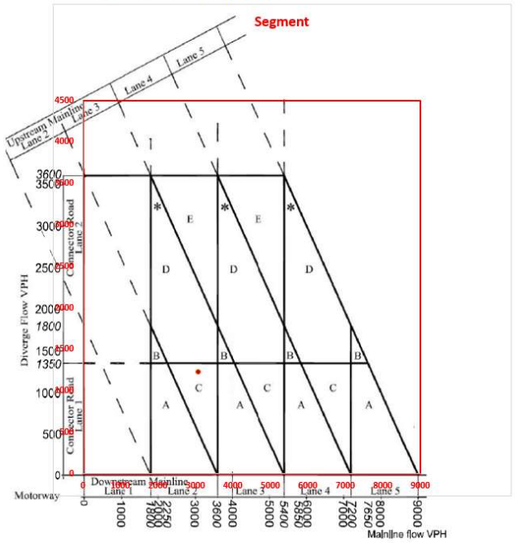
Figure 3.12b Motorway merging diagram



M20 J11 EB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2580	1335

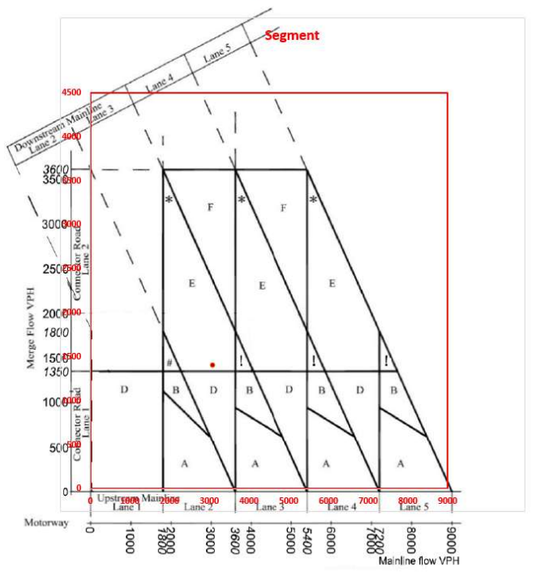
Figure 3.26b Motorway diverging diagram



M20 J11 WB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
3073	1232

Figure 3.12b Motorway merging diagram



M20 J11 WB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
3073	1405

Table 6 – M20 Junction 11 – 2037 PM Merge/Diverge Assessment

Figure 3.26b Motorway diverging diagram

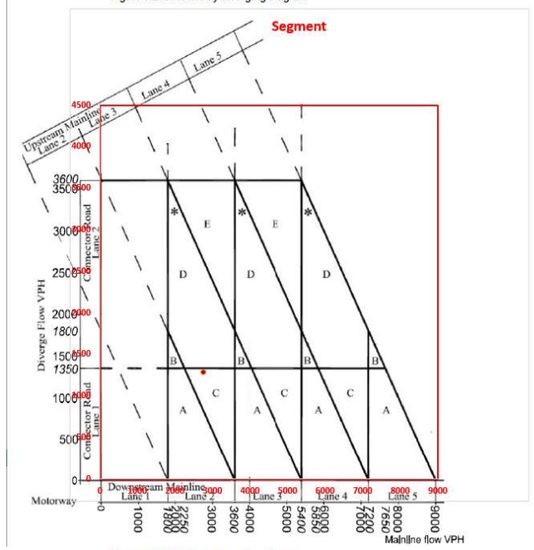
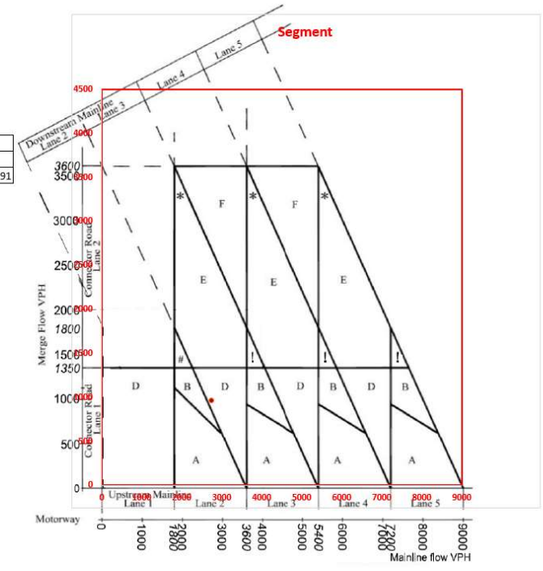


Figure 3.12b Motorway merging diagram

Figure 3.12b Motorway merging diagram



M20 J11 WB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2747	1291

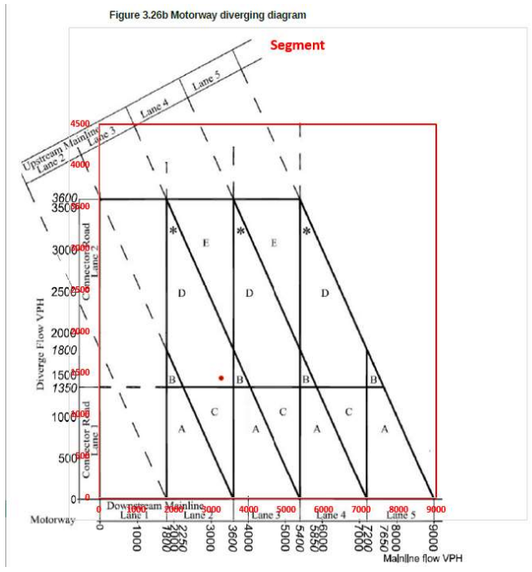
M20 J11 WB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2747	962

M20 J11 EB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
3263	1305

Figure 3.26b Motorway diverging diagram



M20 J11 EB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
3263	1441

5.3 Traffic Demand Impact

Overall Changes in Traffic Volumes (in Veh.)

For M20 Junction 11, the comparison of total traffic at an at-grade junction in 2037 between the DM scenario (DS PPLP) and the DS scenario (DS CSR 6,500) is as follows:

- AM Peak – DM (3708) / DS (5327), or an increase of 1619 (30%)
- PM Peak – DM (3807) / DS (5573), or an increase of 1766 (32%)

Based on the figures described above, the increase in traffic at the junction is very important between the 2037 DM and DS scenarios. Such a traffic increase is expected and is related mostly to Otterpool Park development.

5.4 Existing Layout at Grade Traffic Assessment

Table 7 presents the traffic analysis of the existing junction layout in both 2037 DM and DS scenarios.

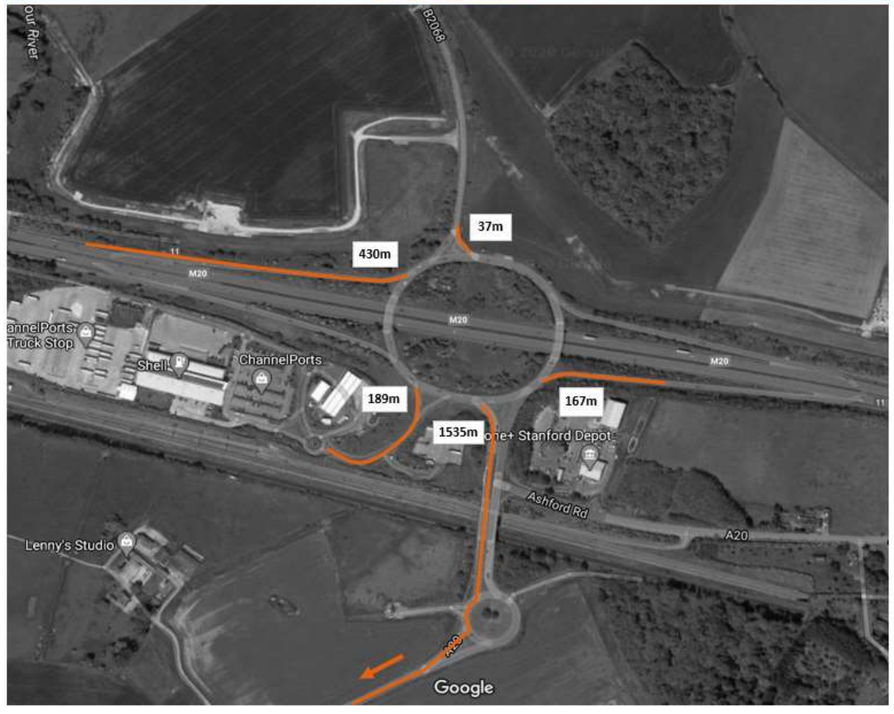
The key findings are:

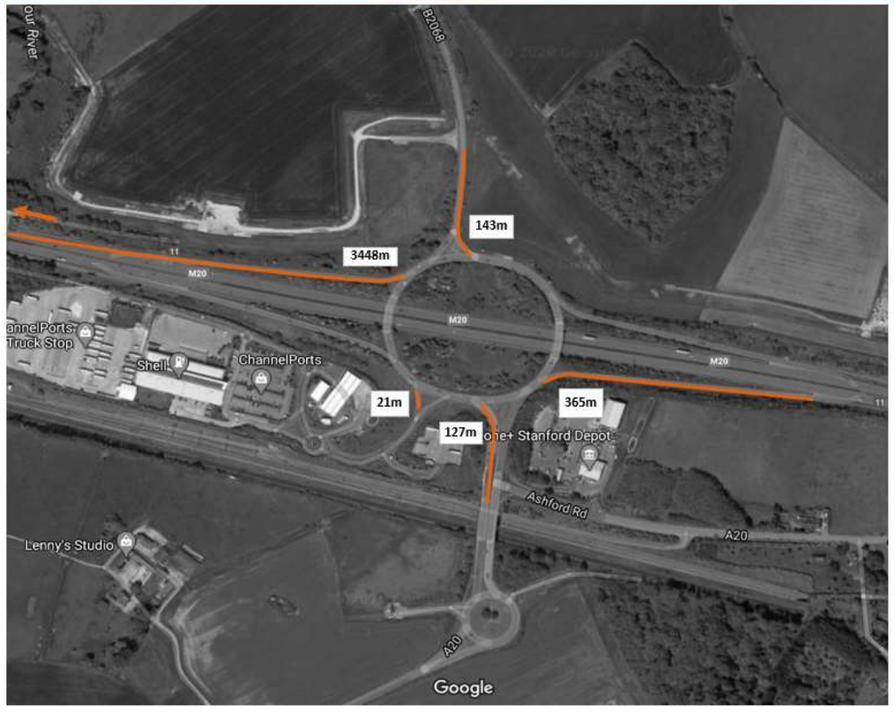
- In the DM PM peak scenario, one approach reaches capacity, but the impact is minor, with no risk of blocking back queue onto the M20;
- In the DS AM and PM peak scenarios, most approaches have reached oversaturation, indicating the need for a widening of the junction layout.

Table 7 – M20 Junction 11 – 2037 Existing Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	DM 2037							
M20 OffSlip Westbound	1.9	6.7	0.66	A	2.5	11.7	0.72	B
A20 Ashford Road	2.3	5.11	0.7	A	1.9	4.47	0.66	A
Services	0.4	8.29	0.31	A	0.3	6.31	0.25	A
M20 OffSlip Eastbound	1.3	6.82	0.56	A	16.3	55.15	0.97	F
B2068	0.8	5.76	0.45	A	4	27.89	0.82	D
Arm	DS 2037							
M20 OffSlip Westbound	29	74.95	1.01	F	63.5	202.61	1.07	F
A20 Ashford Road	267	383.77	1.21	F	22	34.23	0.97	D
Services	32.8	1004.84	1.35	F	3.6	74.68	0.83	F
M20 OffSlip Eastbound	74.8	331.4	1.17	F	599.7	2036.32	2.22	F
B2068	6.5	50.38	0.89	F	24.8	167.51	1.05	F

Image 7 – M20 Junction 11 – 2037 Queue Length Comparison





5.5 Proposed Mitigations

Proposed Mitigation Constraints

The proposed concept development was focussed on respecting the following constraints:

- Ensuring free-flowing and safe traffic conditions;
- Avoiding any impact on existing structures as much as possible, for cost reasons; and
- Maintaining the same level of accessibility as in the present situation.

When developing proposed mitigations, the introduction at the junction to the South of a signalised South to East right turning movement was necessary to avoid the need to widen the bridge structures across the M20.

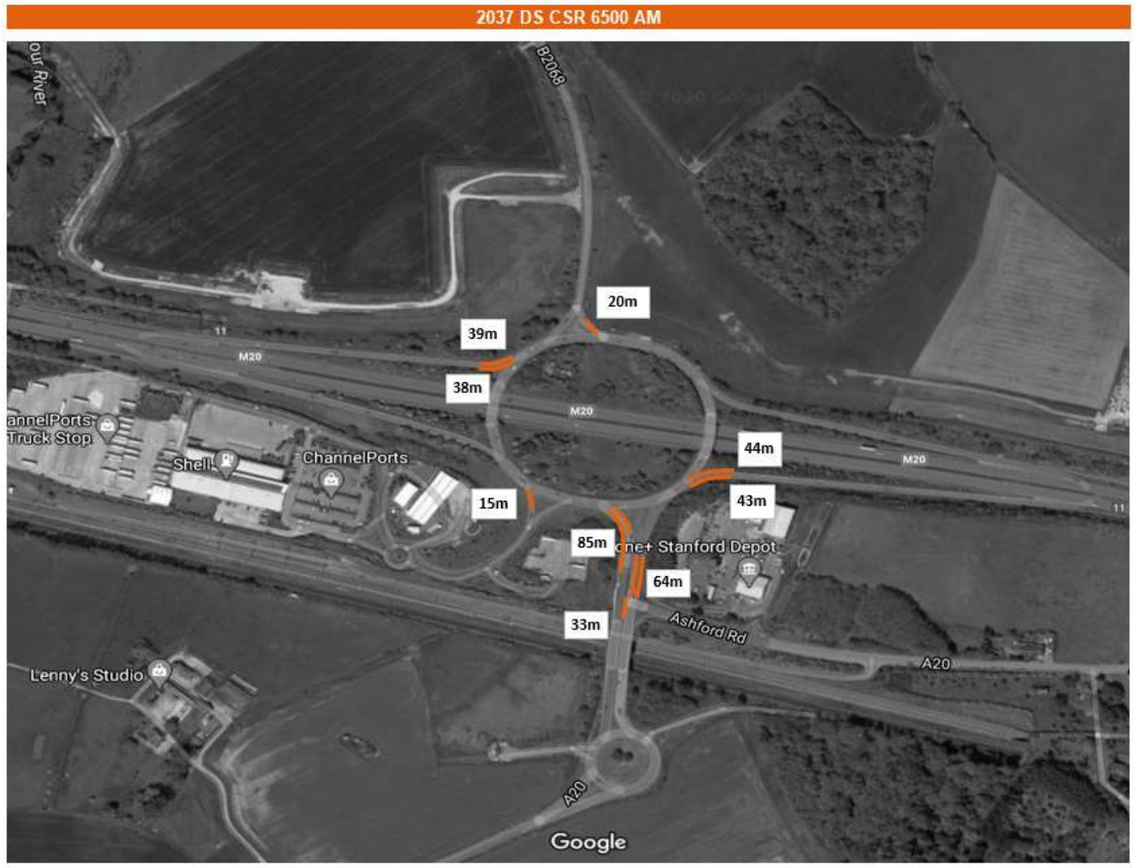
Table 8 presents the traffic analysis of the proposed junction layout for 2037 DS scenario. Image 8 presents the queue length with mitigations. The key findings are:

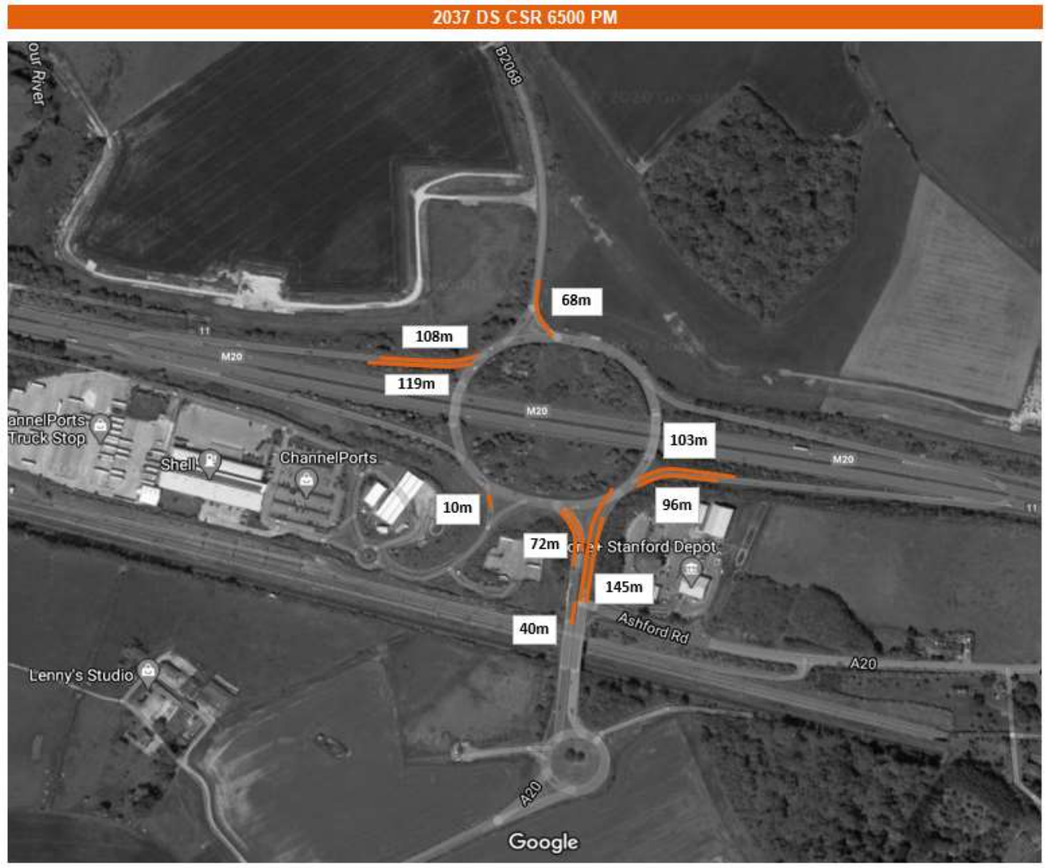
- The two junctions at the interchange can be upgraded to free-flowing traffic conditions, without impacting the key structures; and
- Further significant increase in right-turning traffic at the junction to the South, giving access to the depot would potentially require further upgrading.

Table 8 – M20 Junction 11 – 2037 Proposed Layout Assessment

2037 DS with Mitigation M20 Junction 11 Roundabout							
Approach	Lane	AM			PM		
		Queue (PCU)	Delay	DoS	Queue (PCU)	Delay	DoS
M20 OffSlip Westbound	1	7.5	19.1	71.8%	16.7	41.6	71.8%
	2 & 3	7.6	18.7	65.50%	17.9	42.4	65.50%
A20 Ashford Road	1	14.8	12.2	79.9%	12.6	11.4	79.9%
	2 & 3	6.8	7.4	73.40%	9.3	10	73.40%
Services	1	2.6	12	34.6%	1.8	5.9	34.6%
M20 OffSlip Eastbound	1 & 2	6.8	28.8	75.2%	18.7	34.2	75.2%
		6.6	29.3	71.30%	20.7	38.9	71.30%
B2068	1	1.5	7.4	58.3%	9.4	28.0	58.3%
	2	1.9	13.9	47.0%	2.4	29.3	47.0%
2037 DS with Mitigation M20 Junction 11 T-Junction							
Approach	Lane	AM			PM		
		Queue (PCU)	Delay	DoS	Queue (PCU)	Delay	DoS
A20 Ashford Road Southbound	1 & 2	10.5	9.6	71.9%	21.9	12.6	87.7%
	3	11.2	9.9	70.20%	25.3	13.7	87.70%
A20 Ashford Road Northbound Right Turn	1	5.7	31.7	81.3%	6.9	45.2	79.5%

Image 8 – M20 Junction 11 Initial Mitigation 2037 Queue Length





5.6 Eurotunnel Incident Operations

Typical Incident Description

The Eurotunnel facility has been developed at a location constrained physically, and the processing gates have a limited ability to:

- Accommodate queuing traffic beyond normal operations; and
- Generate spare capacity during processing time.

As a consequence operational incidents at the Eurotunnel terminal result in blocking back queue on the M20. As seen on Image 8 lorries are using the hard shoulder as a temporary parking facility. Such an incident can typically last ½ day or longer.

The change in custom regime towards the end of 2020 will likely require additional custom checks compared to the requirements from previous years. As part of this project, details of the future terminal operations is not known, but additional facilities in the vicinity of the M20 motorway are being developed.

Image 9 – November 2020 Eurotunnel Traffic Queues

M20 Junction 11 Design Usage

A number of alternative proposed arrangements from the Option A have been developed to account for the following:

- Retaining the ability for lorries to use the hard shoulder as an emergency car park; and
- Retaining the ability for lorries to use land 1 (nearside lane) as an emergency car park.

The proposed alternatives have for purpose to explore alternative designs that retain the existing three lane cross-section. Intelligent transport systems have been excluded from this assessment as the objective was to retain existing operations.

Alternatives are only required for the eastbound direction, leading to the Eurotunnel terminal.

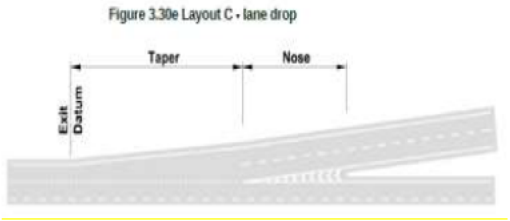
Design Options

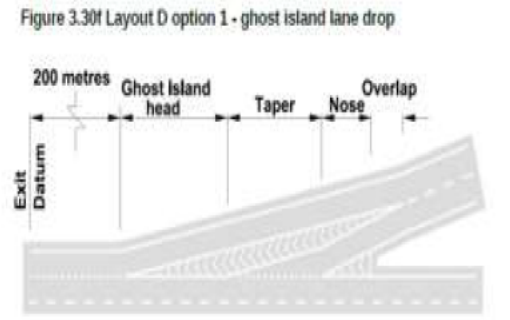
Option A corresponds to a type D option 1 (Ghost Island with lane drop). Based on the merge diverge assessment, the DMRB requirements are:

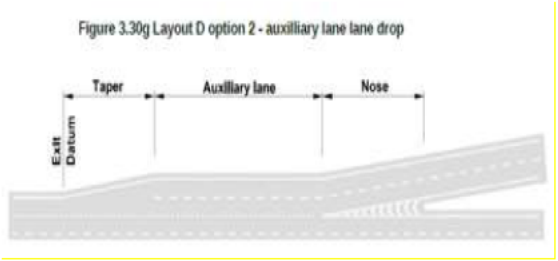
- In the AM peak, the assessment is bordering a type A and a type C, and
- In the PM peak, the assessment is bordering a type C and a type D.

For reference, diverge types C and D are presented on Image 9 below. Both diverge types correspond to a lane drop arrangement.

Image 10 – DMRB Diverge Types C and D







Three proposed alternatives have been considered. Drawings for all options (A to D) are saved in Appendix E. The option descriptions are:

- **Option B: Maintain 3 lanes cross-section & diverge within available space**
  - The three lanes cross-section has been maintained continuously;
  - The largest diverge segment that can be developed between the bridge to the West and the interchange to the East is a type A.
- **Option C: Lane drop with a mainline taper from 2 to 3 lanes**
  - The lane drop leads to a widening back to three lanes following the diverge segment.
- **Option D: Maintain 3 lanes cross-section & larger diverge**
  - The three lanes cross-section has been maintained continuously;
  - The largest diverge segment that can be developed without the lane drop is a type B (Option 2); and
  - This option requires the demolition of the bridge

Currently Planned Traffic Operation Schemes

A meeting was held between Kent County Council, Folkestone and Hythe District Council and Arcadis on Wednesday the 9th of December to discuss traffic management operations in relation to blocking back queues at the Eurotunnel facility. The summary of the key points are:

- **Current Traffic Management Measures**
  - Operation Fennel (https://www.bbc.co.uk/news/uk-england-kent-55278947) is "a series of escalating traffic systems designed to cope with up to 7,000 HGVs in Kent. The overall plan includes:
    - TAP 20 which can hold 500 HGVs on the A20
    - Operation Brock under which 2,000 trucks can queue on the M20
    - Brock Manston which would see 4,000 lorries park in Thanet
    - TAP 256 which can hold up to 450 HGVs on the A256
    - The Sevington inland border facility near Ashford which holds 1,200 lorries
    - Further car parks at Ebbsfleet and Waterbrook
    - Operation Stack, which would bring M20 closures, can be used but would be implemented as a last resort" (https://www.eurotunnel.com/uk/travelling-with-us/latest/operation-stack/).
  - From the description of the various traffic management schemes, and from our discussions with Kent County Council, the new traffic management system should no longer see blocking back queue from the Eurotunnel across the M20 Junction 11 interchange.
- **Road Safety Measures**
  - The queueing of traffic in lane 1 (nearside motorway lane) was recognised as a road safety hazard and is no longer permitted. It is understood from our discussion with Kent County Council that the police would intervene to prevent such a situation to remain on the M20; and
  - M20 Junction 11 is closed to traffic when blocking back occurs from the Eurotunnel into Junction 11.

Conclusion and Recommendation

Overall, the DMRB calculation recommends a lane drop. A widening to four lanes of the road segment between Junction 10a and Junction 11 has not been considered as it is seen as a significant overdesign.

From a design point of view:

- Not implementing the lane drop would require a departure from standards, which might be difficult to secure based an occasional incident;
- Access for lorries to use the hard shoulders for queueing is always possible; and
- The demolition of the bridge does not provide the opportunity of an adequate diverge type, unless the segment between Junction 10a and Junction 11 is widened to 4 lanes (which is not considered suitable).

From a road safety point of view, there should no longer be a risk of collision between queuing HGV and general traffic on the M20 Junction 11 because:

- Vehicles are no longer permitted to queue in lane 1;
- The new traffic management measures should prevent blocking back queues into M20 Junction 11; and
- If a blocking back occurs, the interchange is expected to be closed.

In conclusion, the layout with the lane drop, either Option A or Option C is recommended. Image 10 to 12 below show the various options.

5.7 Timeline Analysis – Junction Upgrade Requirements

To remain free-flowing, the M20 Junction 11 will require upgrades as Otterpool Park develops. Key stages in the junction development have been identified based on traffic volumes at the junction.

- **No Intervention - Existing (2018) situation up until no intervention required**
  - From the existing situation
    - AM Peak Junction Total: 2600 (veh./hr)
    - PM Peak Junction Total: 2600 (veh./hr)
  - Until the following traffic volumes are reached
    - AM Peak Junction Total: 3600 (veh./hr)
    - PM Peak Junction Total: 3650 (veh./hr)
- **Intervention 1 – M20 Eastbound Off-slip requires upgrade**
  - M20 Eastbound Off-slip requires upgrade (2037 with 0% Otterpool Park 6,500 or earlier time with Otterpool Park)
    - AM Peak Junction Total: 3600 (veh./hr)
    - PM Peak Junction Total: 3650 (veh./hr)
- **Intervention 2 – M20 Westbound Off-slip requires upgrade**
  - M20 Westbound Off-slip reaching capacity (2037 and approximately 45% of Otterpool Park 6,500)
    - AM Peak Junction Total: 4550 (veh./hr)
    - PM Peak Junction Total: 4715 (veh./hr)

    The widening of the ramp approaches is the first element of junction upgrade required, the roundabout upgrade would be recommended to take place in one construction stage.
- **Intervention 3 – South Circulatory and A20 South approach requires upgrade**
  - South circulating carriageway reaching capacity (2037 and approximately 70% of Otterpool Park 6,500)
    - AM Peak Junction Total: 4850 (veh./hr)
    - PM Peak Junction Total: 5100 (veh./hr)
- **Intervention 4 – Main roundabout at capacity to south junction upgrade (A20 Ashford Road Junction)**
  - Junction to the south of M20 Junction 11 required to remove U-turn movements (2037 and approximately 92% of Otterpool Park 6,500)
    - AM Peak Junction Total: 5200 (veh./hr)
    - PM Peak Junction Total: 5450 (veh./hr)

The percentage of development is considered the worst-case because of the seasonality factor applied to the background traffic, as well as the lack of intra-zonal trips being considered at the development.

5.8 Conclusion

In conclusion, M20 Junction 11 is significantly impacted by the Local Plan. A proposed mitigation has been developed and requires further highway design investigation.

It is recommended the junction upgrade is not considered as one development stage, as the South junction might not be required as part of DS CSR 6,500.

It is recommended that any mitigation scheme is subject to a monitor and manage approach to implementation. Traffic volumes should be monitored throughout the Local Plan period to inform when or if the mitigation is required.

Image 11 – M20 Junction 11 – Option A

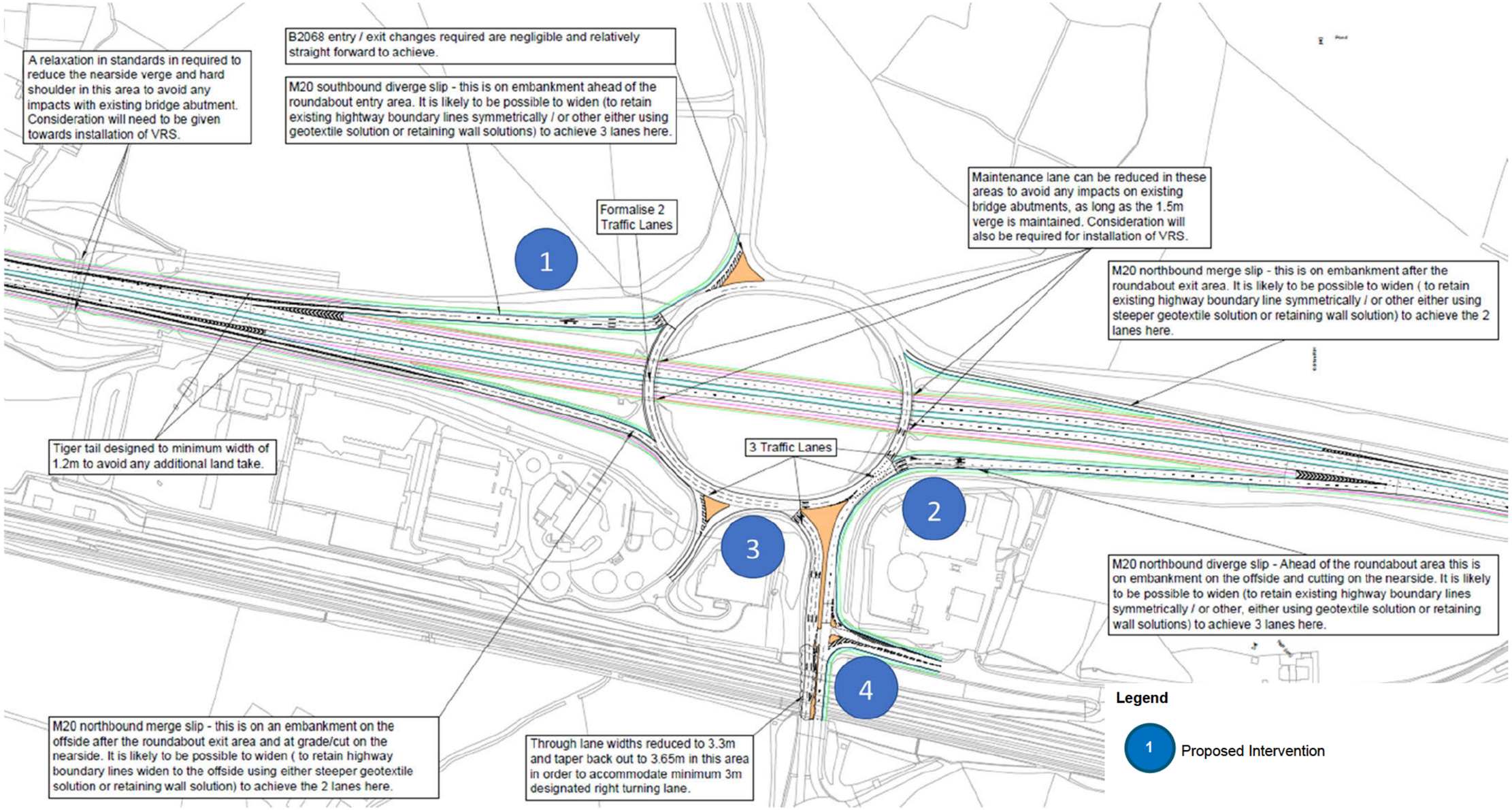


Image 12 – M20 Junction 11 – Option B

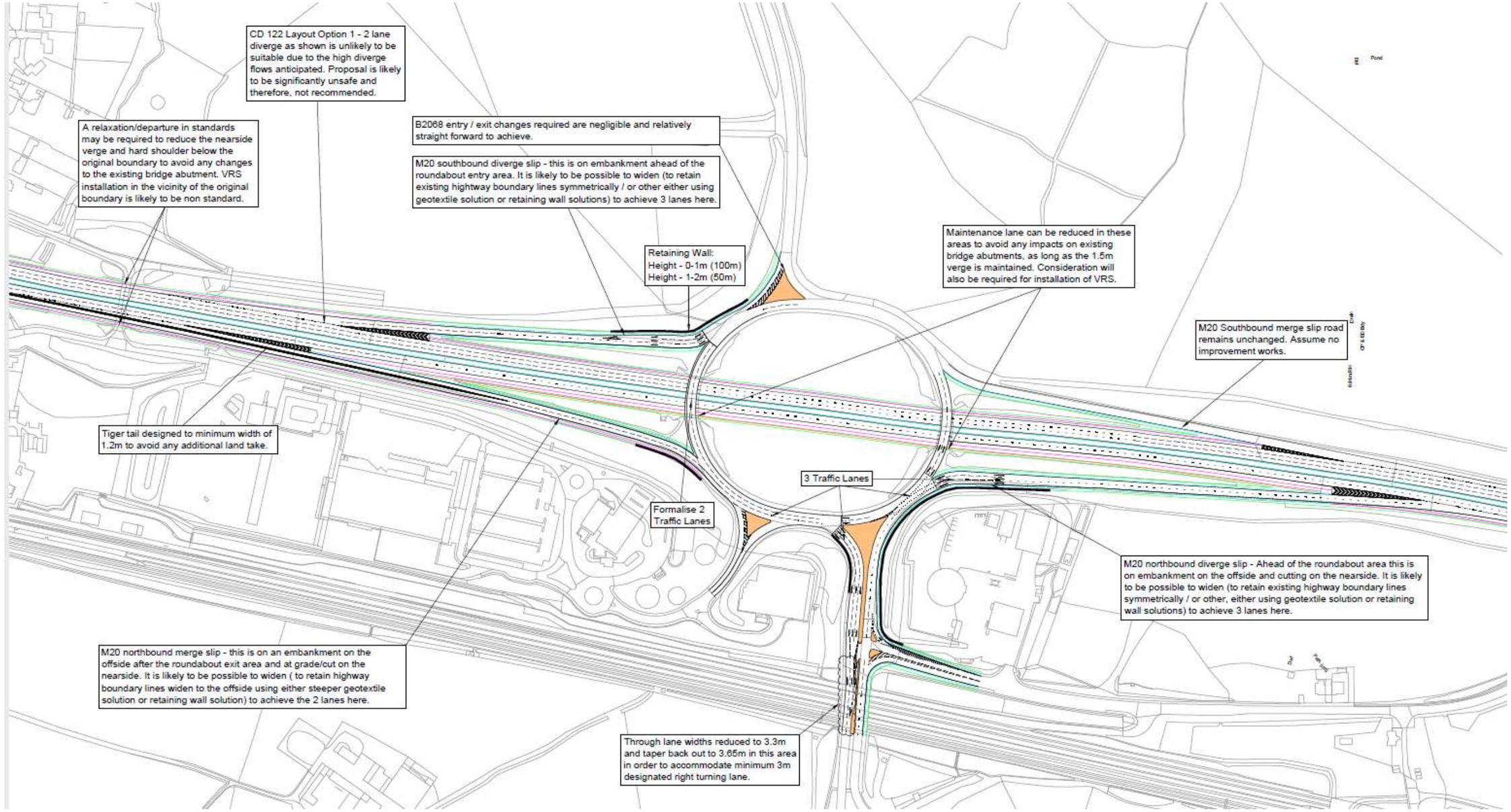


Image 13 – M20 Junction 11 – Option C

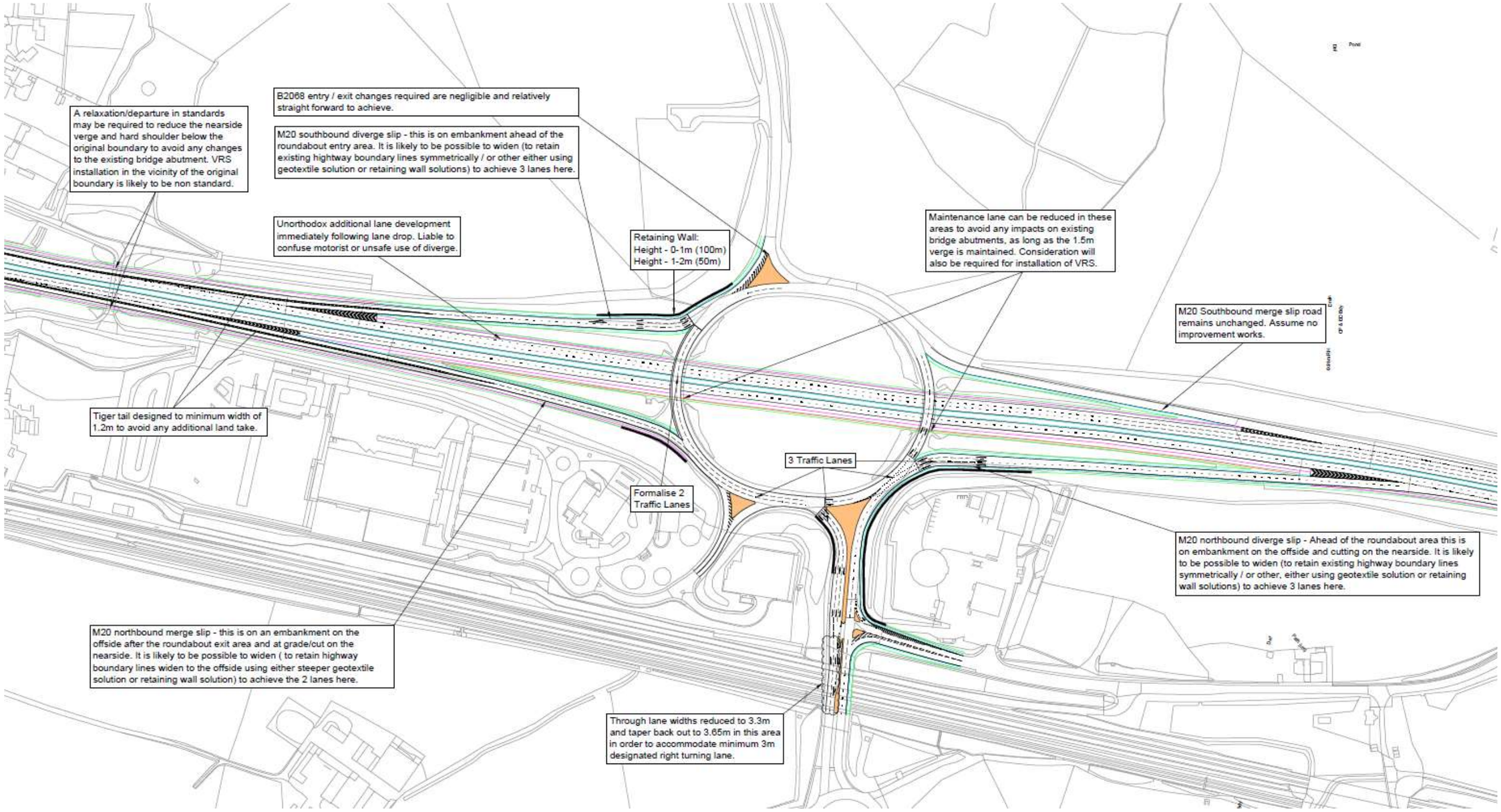
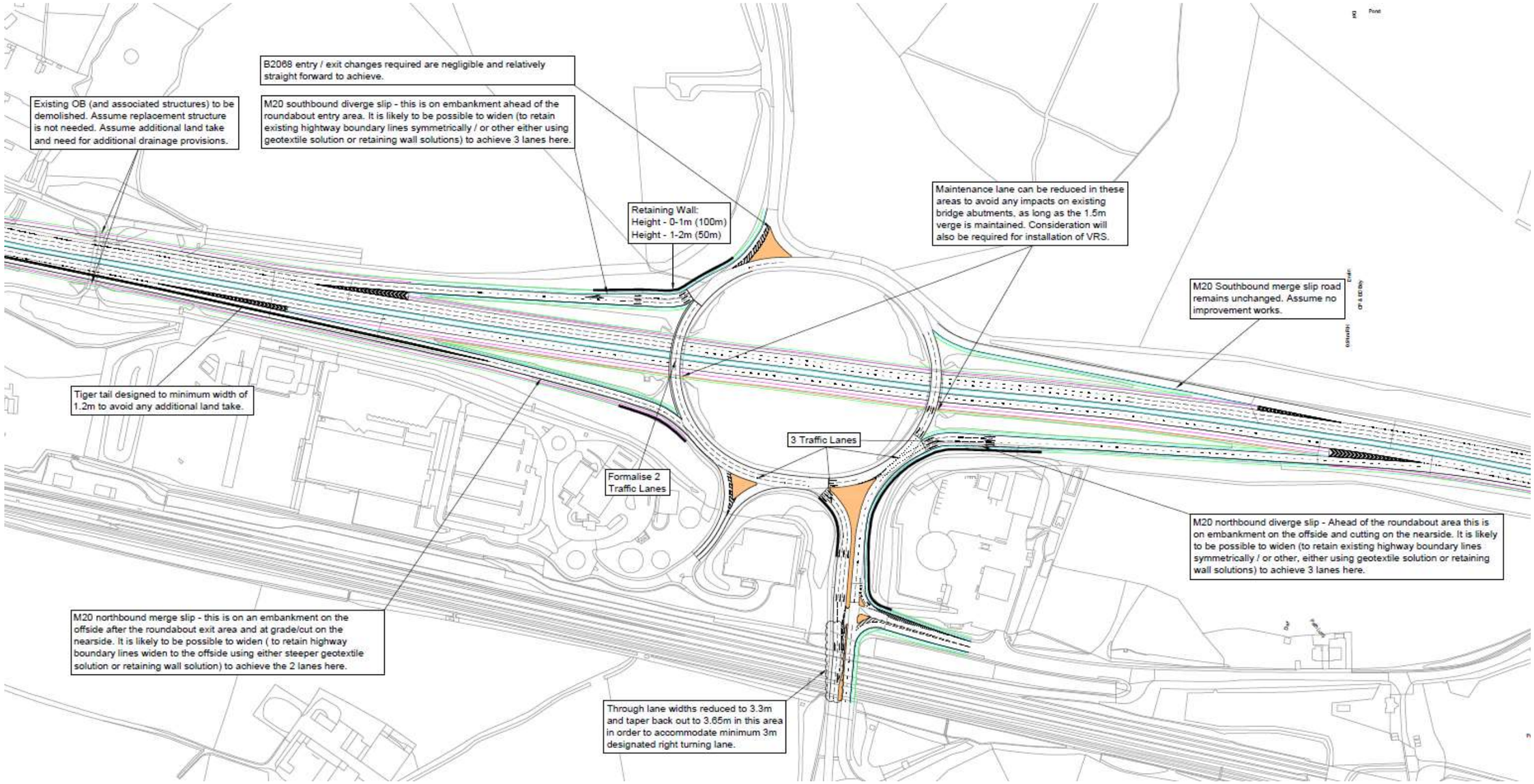


Image 14 – M20 Junction 11 – Option D



6 M20 Junction 11a

6.1 Assessment Overview

General Description

M20 Junction 11a corresponds to the access and egress to the Eurotunnel terminal. The interchange is composed of:

- West facing ramps only;
- No nearby at-grade junctions on the local network; and
- The tunnel control gate when entering the facility.

It is our understanding that the entrance control gate has only been designed to process vehicles for custom controls in an EU environment. It is possible that more extensive custom control will result in the control gate creating blocking back queues on the M20.

Mitigation Requirements Identification

There are no mitigation requirements identified at Junction 11a, related to the impact of the Folkestone and Hythe Local Plan.

The merge and diverge calculations, however, highlight the fact that the traffic volume to and from the Eurotunnel terminal is low. A three-lane cross-section East of the interchange should be maintained in the 2037 scenario.

6.2 Merge / Diverge Assessment

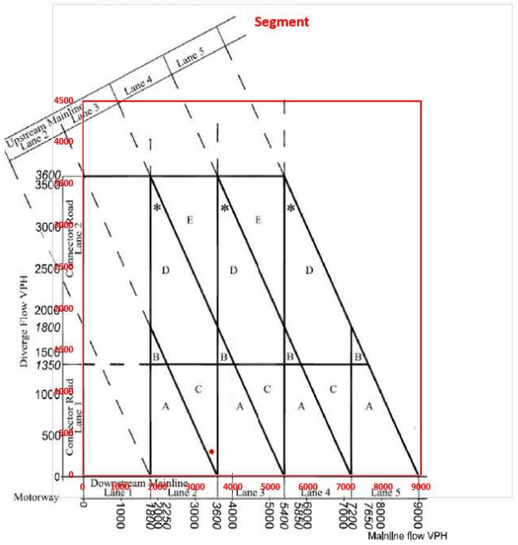
The merge and diverge analysis of M20 Junction 11a is presented in Table 9 on the next page.

6.3 Conclusion

In conclusion, M20 Junction 11a does not require mitigation from Folkestone and Hythe Local Plan DS CSR 6,500 scenario.

Table 9 – M20 Junction 11a – 2037 AM & PM Merge/Diverge Assessment

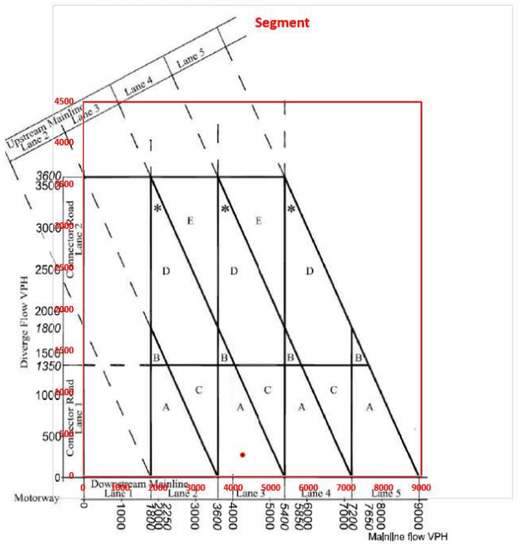
Figure 3.26b Motorway diverging diagram



M20 J11A EB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
3445	283

Figure 3.26b Motorway diverging diagram



M20 J11A EB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
4248	258

Figure 3.12b Motorway merging diagram

M20 J11A WB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
3711	246

Figure 3.12b Motorway merging diagram

M20 J11A WB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
3125	352

7 M20 Junction 12

7.1 Assessment Overview

General Description

M20 Junction 12 is a major motorway interchange with the following characteristics:

- West of Junction 12 the M20 is composed of 3 lanes in each direction, a lane drop/lane gain arrangement results in the motorway being two lanes in each direction to the east of the junction;
- The at-grade junction is a two-lane, non-signalised, roundabout;
- The junction immediately to the South of the roundabout interchange is being upgraded to include a right-turning movement from the Cheriton High Street (the Westside road); and
- Highways England road network only extends to the motorway ramps.

Mitigation Requirements Identification

There are no mitigation requirements identified at Junction 12, traffic volumes are not changing significantly between the DM and the DS scenario. Traffic conditions remain free-flowing, except for the M20 westbound off-ramp approach at the roundabout that has reached capacity. Image 15 presents the location of the approach reaching capacity, and Image 16 the queue length diagrams.

7.2 Merge / Diverge Assessment

The merge and diverge assessment is presented in Table 10 and 11. The key finding is:

- The motorway mainline East of Junction 12 should be 3 lanes and not 2 as in the existing situation.

Image 15 – M20 Junction 12 High-Level Mitigation Requirements

Table 10 – M20 Junction 12 – 2037 AM Merge/Diverge Assessment

Figure 3.26b Motorway diverging diagram

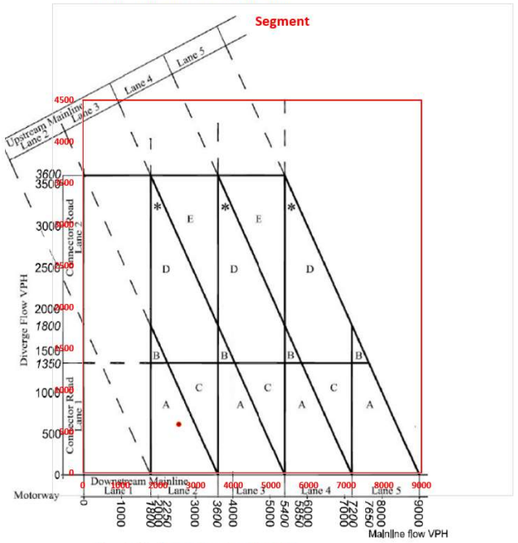
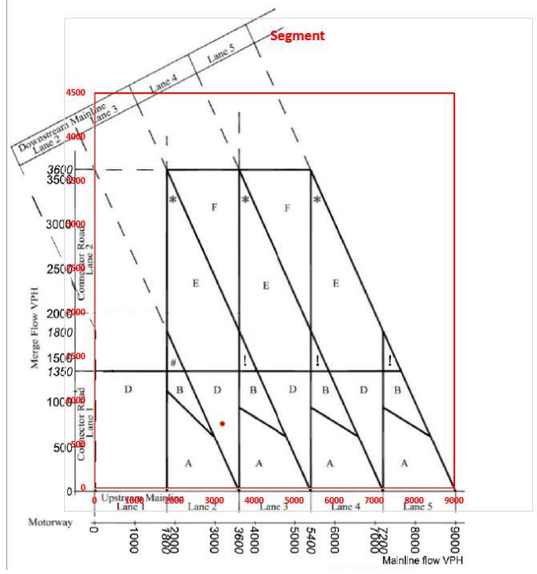


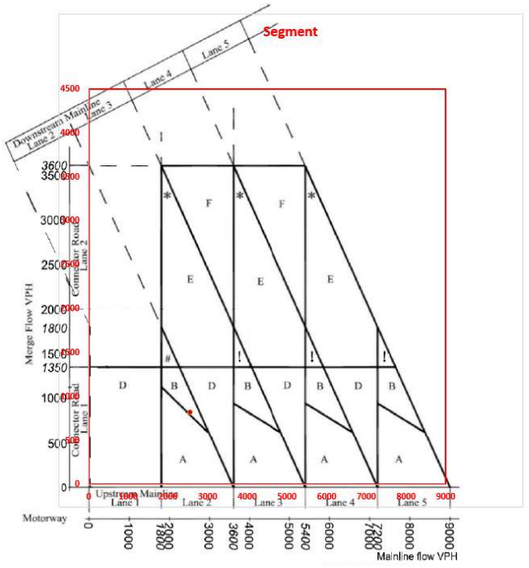
Figure 3.12b Motorway merging diagram



M20 J12 EB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2562	587

Figure 3.12b Motorway merging diagram



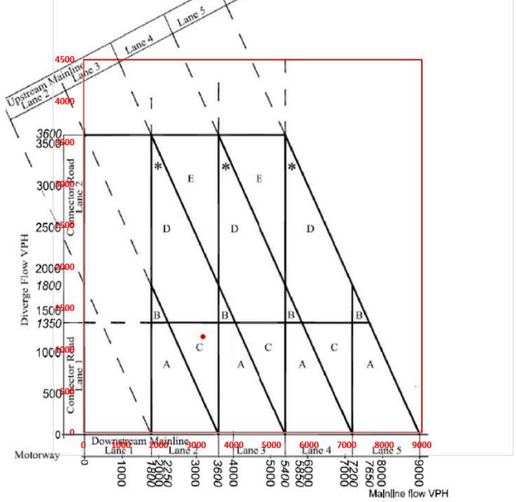
M20 J12 EB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2562	812

M20 J12 WB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
3194	741

Figure 3.26b Motorway diverging diagram



M20 J12 WB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
3194	1153

Table 11 – M20 Junction 12 – 2037 PM Merge/Diverge Assessment

Figure 3.26b Motorway diverging diagram

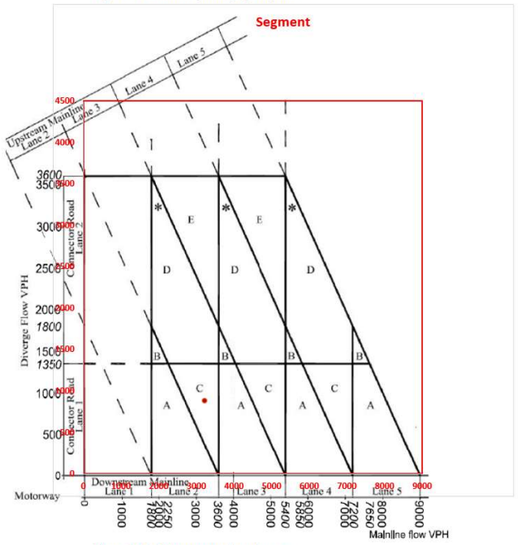
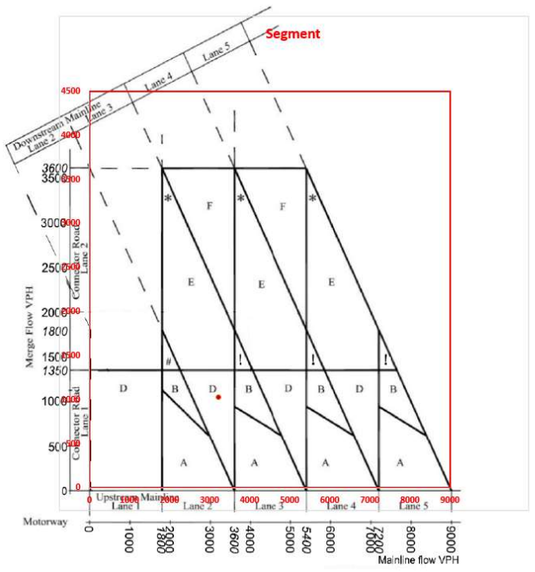


Figure 3.12b Motorway merging diagram

M20 J12 EB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
3228	882

Figure 3.12b Motorway merging diagram



M20 J12 EB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
3228	1031

M20 J12 WB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2838	607

Figure 3.26b Motorway diverging diagram

M20 J12 WB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2838	850

7.3 Traffic Demand Impact

Overall Changes in Traffic Volumes

The M20 Junction 20 comparison of total traffic at an at-grade junction in 2037 between the DM scenario (DS PPLP) and the DS scenario (DS CSR 6,500) is as follows (traffic flows in vehicles):

- AM Peak – DM (3869) / DS (3825), or a decrease of -44 (-1%)
- PM Peak – DM (3898) / DS (3858), or a decrease of -40 (-1%)

The overall change in traffic is negligible.

7.4 Existing Layout at Grade Traffic Assessment

Table 12 presents the traffic analysis of the existing junction layout in both 2037 DM and DS scenarios.

The key findings are:

- Traffic conditions remain similar between the two scenarios; and
- The junction is free-flowing, except for the M20 westbound approach that has reached capacity.

Table 12 – M20 Junction 12 – 2037 Existing Layout Assessment

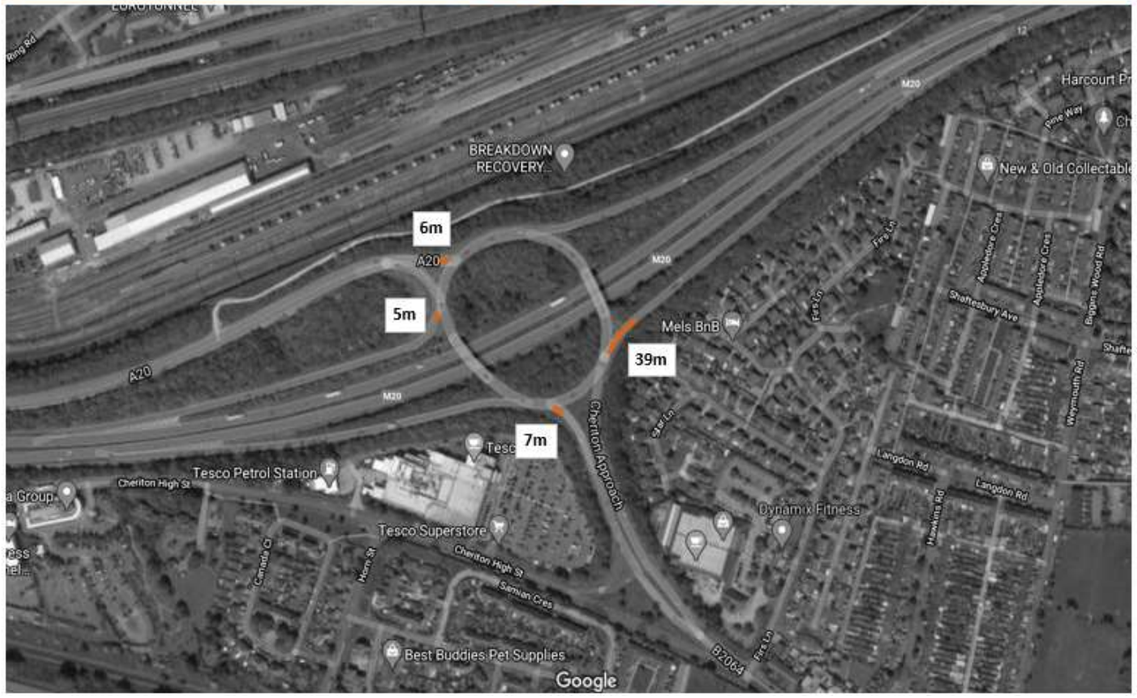
Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	DM 2037							
M20 Westbound	7.7	22.15	0.9	C	4.7	18.06	0.83	C
B2064 Cheriton	1.3	3.14	0.56	A	1.2	2.9	0.54	A
M20 Eastbound	0.9	5.11	0.46	A	3.3	12.57	0.77	B
A20 Ashford Road	1.1	4.55	0.53	A	3	12.56	0.76	B
Arm	DS 2037							
M20 Westbound	6.7	20.07	0.88	C	3.9	15.59	0.8	C
B2064 Cheriton	1.2	3.05	0.55	A	1.2	2.88	0.54	A
M20 Eastbound	0.9	5.12	0.48	A	3	11.28	0.75	B
A20 Ashford Road	1.1	4.54	0.52	A	2.6	11.02	0.73	B

7.5 Conclusion

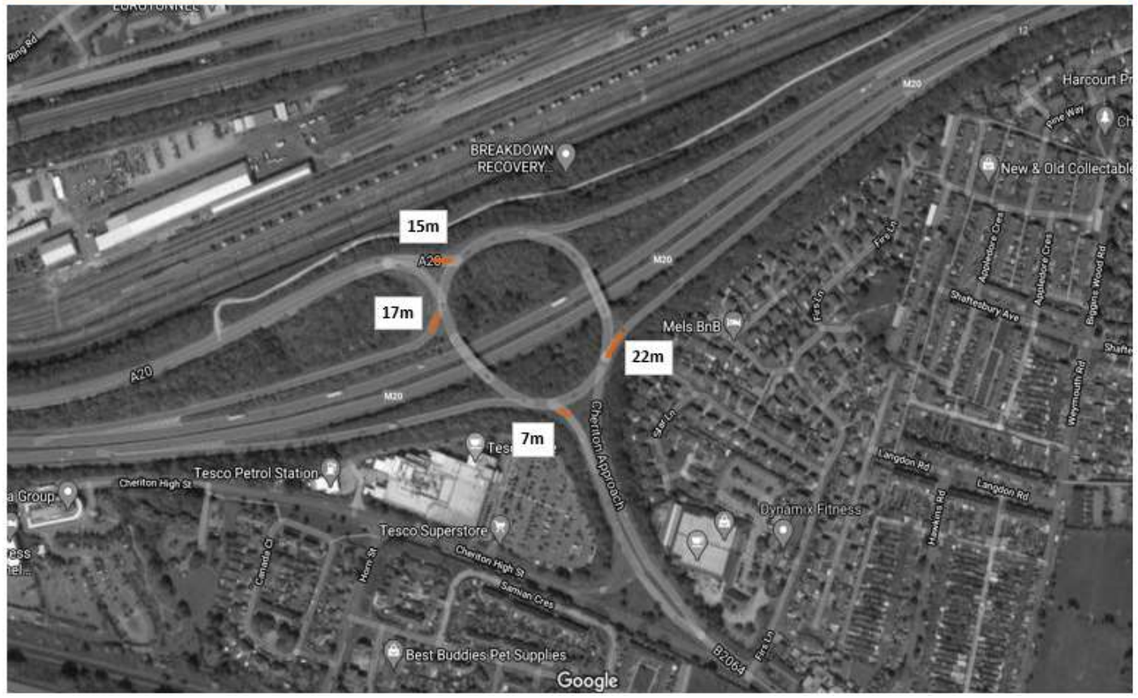
In conclusion, M20 Junction 12 does not require mitigation from Folkestone and Hythe Local Plan DS CSR 6,500 scenario.

Image 16 – M20 Junction 12 – 2037 Queue Length Comparison

2037 DS CSR 6500 AM



2037 DS CSR 6500 PM



8 M20 Junction 12 to 13 Weaving Segment

8.1 Assessment Overview

General Description

The weaving segment between M20 Junction 12 to 13 is short and is predicted to be saturated in the future.

Mitigation Requirements Identification

The drop of speed from 70mph to 60mph should be adequate to mitigate the impact of high traffic volumes in the weaving segment. The conservative assumptions regarding the traffic forecast have sufficient uncertainty that a highway improvement scheme should not be necessary.

8.2 Weaving Segment Description

The location of the motorway segment between M20 Junction 12 and Junction 13 in the north of Folkestone is indicated in Image 17.

Image 17 – M20 Jct12-Jct13 Weaving Segment Location

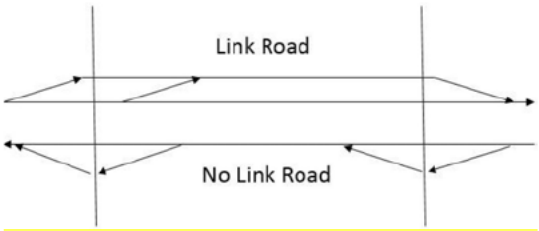
The weaving segment between M20 Junction 12 and Junction 13 is characterised by:

- A Motorway Standard;
- Two lanes in each direction;
- A 70mph speed limit;
- A weaving distance of:
  - 430m eastbound; and
  - 670m westbound.

According to DMRB CD122 Revision 1:

- This section of the M20 should be classified as a "Rural road" because the speed limit is 70mph. To be classified an urban road, the motorway would have to have a speed limit of 60mph or less;
- The minimum length of a weaving section "shall be 2km for motorways; and 1km for all-purpose roads"; and
- If the minimum weaving distance is not possible, a link road should be introduced. As shown on Image 18, a link road is a parallel road enabling traffic to bypass the weaving segment.

Image 18 – DMRB Link Road diagram



8.3 Traffic Volumes

The traffic volume per lane of a motorway section can be characterised as follow:

- Design Year maximum traffic requirement – 1,800 vehicles per lane (free-flowing, respect of safety distances); and
- Saturation Flow – 2,000 vehicles per lane per hour (assuming 10% HGV).

Traffic volumes of the weaving segment in the existing situation are detailed below. The traffic volumes come from the factoring up of independent Webtris data and therefore do not perfectly match. The key inputs are:

- The traffic volume consistency is +/- 150 vehicles;
- The seasonality factor is 1.0765; and
- The motorway TEMPro factor is 1.3502.

The TEMPro factor includes an element of double counting as it has been applied to all mainline traffic, including traffic volumes exiting and entering the network locally, representing approximately 200 vehicles per merging segment, or 5% of total traffic volumes. Moreover, the TEMPro factor corresponds to the worst case scenario as it accounts some local growth. The following sensitivity test have been extracted from TEMPro:

- With Folkestone and Hythe Local plan
  - Motorway 1.3427 AM, 1.3502 PM; and
  - Trunk Road 1.3140 AM, 1.3213 PM.
- Without Folkestone and Hythe Local Plan
  - Motorway 1.1019 AM, 1.0984 PM; and
  - Trunk Road 1.0783AM, 1.0749 PM.

Due to the location of M20 Junction 12 to Junction 13 weaving segments, the likely future traffic growth factor would be expected to be closer to the trunk road value than to the motorway value and could be up to 25% lower than the factor used in this analysis.

Eastbound AM Peak (Veh.)

- Jct 12 Ramp In – 812 Jct 13 Ramp Out – 1525
  - Weaving 3374 to 3444
- Jct 12 Mainline – 2562 Jct 13 Mainline – 1919

Eastbound PM Peak (Veh.)

- Jct 12 Ramp – 1031 Jct 13 Ramp – 1484
  - Weaving 4259 to 4127
- Jct 12 Mainline – 3228 Jct 13 Mainline - 2643

Westbound AM Peak (Veh.)

- Jct 12 Mainline – 3194 Jct 13 Mainline – 2432
  - Weaving 4347 to 4477
- Jct 12 Ramp Out – 1153 Jct 13 Ramp In – 2045

Westbound PM Peak (Veh.)

- Jct 12 Mainline – 2838 Jct 13 Mainline – 2039
  - Weaving 3688 to 4076*
- Jct 12 Ramp Out – 850 Jct 13 Ramp In – 2037

**the flow discrepancy results for the fact that traffic counts at this location have been extracted from two different years. Junction 12 WebTris data is originally from Sept 2017 whereas J13 is from Sept 2016. This may help explain the difference of almost 400 veh.*

The above analysis shows that:

- The counts' accuracy is +/- 150 vehicles;
- The day to day variation of the counts (excluding seasonality) is approximately 10%;
- The local seasonality factor is 7.65%;
- Approximately 5% of the total traffic corresponds to double counting; and
- Up to 25% motorway mainline excess growth factor.

Excluding the weaving movement, the volume to capacity ratio (V/C) could be below 1 in all cases if the seasonality factor is discounted. However, the motorway segment would remain saturated and subject to a congestion event, depending on daily traffic variations.

8.4 60mph DMRB Urban Road Weaving Analysis

The M20 at the location of the weaving segment is a 70mph road segment. However, the weaving segment is not to standard and therefore the DMRB calculation cannot be performed. If the speed limit at the weaving segment is 60mph, the road can be classified as “URBAN” and the weaving length requirement can be much shorter. Thus, the weaving analysis has been undertaken assuming an Urban road classification.

Image 19 plots the two weaving lengths of the existing layout for a motorway standard. The analysis shows that, in slow urban conditions, the weaving traffic can be greater than 2,000 vehicles an hour, which is the saturation flow of a lane.

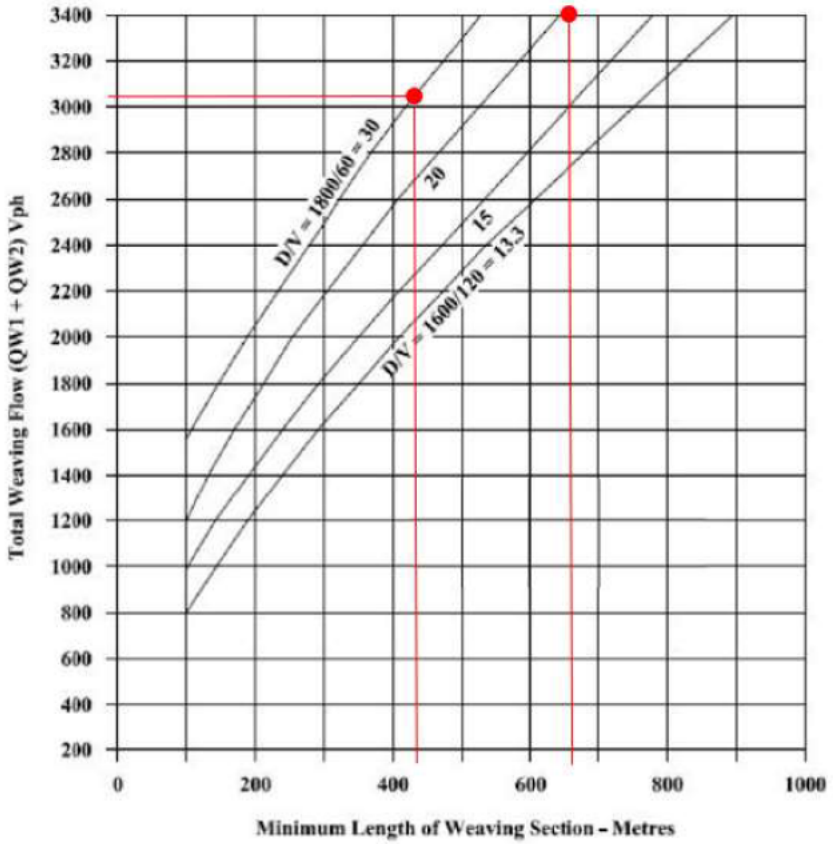
Image 20 shows the traffic flow terms to identify each stream of traffic. The origin-destination traffic pattern at the location of the study is not known. In Image 21, a test has been performed assuming zero traffic in flow 1, and a further test undertaken with 20% of the traffic from the entrance and exit ramps.

Further percentage of traffic allocation for flow 1 were tested, with no impact on the resulting number of lanes required.

The last table of Image 21 shows that a reduction of 8.5% in overall traffic would be sufficient to accommodate the two-lane weaving section. This result would, however, correspond to saturated traffic conditions, and not to free flowing traffic conditions expected at the design year.

Image 19 – DMRB Weaving Traffic Assessment

Figure 4.6b Minimum weaving section length for urban roads based on design flows

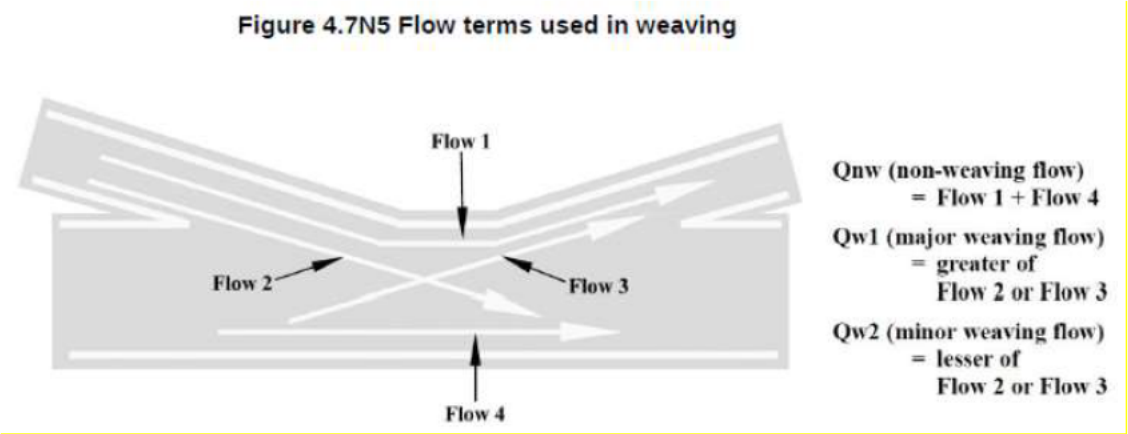


NOTE 1 *In Figure 4.6b, D is the hourly flow and V is the design speed of the mainline upstream of the weaving section.*

NOTE 2 *For urban roads, the design flows are adjusted for uphill gradients and the presence of HGVs by using Table 3.9a.*

NOTE 3 *When determining the appropriate spacing between successive merges and diverges, it is necessary to consider whether the spacing is sufficient to accommodate the necessary advance directional signage.*

Image 20 – DMRB Weaving Flow Terms



8.5 Conclusion

Not to Standard

In conclusion, the weaving segments between M20 Junction 12 and Junction 13 is not to standard. In its current configuration, a link road is recommended instead of the weaving segment.

In order for the weaving segment to be DMRB compliant, the free flow speed would need to be dropped to 60mph, which would result in the corridor classification to change from RURAL to URBAN.

8.5% Traffic Reduction Required from the 2037 Worst Case Scenario

Only by assuming this reclassification of road type can the weaving calculation be undertaken. The analysis of the traffic volumes for each weaving segment shows that:

- 3 lanes would be required for 2037, which is consistent with the merge/diverge analysis, however;
- a traffic reduction of 8.5 per cent would be sufficient for all weaving segments to operate at capacity or under saturated conditions.

Traffic volumes for this section are worst case and account for:

- The counts' accuracy is +/- 150 vehicles;
- The day to day variation of the counts (excluding seasonality) is approximately 10%;
- The local seasonality factor is 7.65%;
- Approximately 5% of the total traffic corresponds to double counting;
- Up to 25% motorway mainline excess growth factor; and
- No internal traffic considered as part of Otterpool Park.

Overall, even if future traffic conditions might be at capacity or saturated, 2037 is not the road geometry design year, but the ultimate assessment year as part of the local plan. The change in speed limit of this section or road to bring it to an URBAN standard is recommended.

Merge Diverge Consistency

A review of the merge and diverge segments in the M20 Junction 12 and M20 Junction 13 shows that the traffic reduction required to retain a two lane cross-section would also lead to not require lane gain or lane drop arrangements.

Image 21 – Weaving Calculations (see Appendix D.6)

Number of Lanes Calculation - URBAN

									Figure 4.6a	*Figure 4.6b*		In Vehicles per hour									
Road	**From (junction)**	**To (junction)**	**Direction**	**Built environment**	**Road Type**	**Period**	**Name**	**D**	**L (Design Speed) (m)**	**L (Design Flow) (m)**	**Lmin (km)**	**L - Measured Length (km)**	**Flow 1**	**Flow 2**	**Flow 3**	**Flow 4**	**Qnw**	**Qw1**	**Qw2**	**N**	**N (Number of Lanes)**
M20	Jct12	Jct13	Eastbound	URBAN	Motorway	AM	Weaving_M20_Jct12-Jct13_AM	1800	380.00	250.00	0.38	0.43	0	812	1525	1107	1107	1525	812	2.260	2
M20	Jct12	Jct13	Eastbound	URBAN	Motorway	PM	Weaving_M20_Jct12-Jct13_PM	1800	380.00	300.00	0.38	0.43	0	1051	1484	1744	1744	1484	1051	2.806	3
M20	Jct13	Jct12	Westbound	URBAN	Motorway	AM	Weaving_M20_Jct13-Jct12_AM	1800	380.00	470.00	0.47	0.57	0	2045	1155	1279	1279	2045	1155	2.746	3
M20	Jct13	Jct12	Westbound	URBAN	Motorway	PM	Weaving_M20_Jct13-Jct12_PM	1800	380.00	400.00	0.40	0.57	0	2037	850	1189	1189	2037	850	2.357	2

Number of Lanes Calculation - URBAN

									Figure 4.6a	*Figure 4.6b*		In Vehicles per hour									
Road	**From (junction)**	**To (junction)**	**Direction**	**Built environment**	**Road Type**	**Period**	**Name**	**D**	**L (Design Speed) (m)**	**L (Design Flow) (m)**	**Lmin (km)**	**L - Measured Length (km)**	**Flow 1**	**Flow 2**	**Flow 3**	**Flow 4**	**Qnw**	**Qw1**	**Qw2**	**N**	**N (Number of Lanes)**
M20	Jct12	Jct13	Eastbound	URBAN	Motorway	AM	Weaving_M20_Jct12-Jct13_AM	1800	380.00	250.00	0.38	0.43	467	650	1220	1107	1574	1220	650	2.191	2
M20	Jct12	Jct13	Eastbound	URBAN	Motorway	PM	Weaving_M20_Jct12-Jct13_PM	1800	380.00	300.00	0.38	0.43	503	825	1187	1744	2247	1187	825	2.718	3
M20	Jct13	Jct12	Westbound	URBAN	Motorway	AM	Weaving_M20_Jct13-Jct12_AM	1800	380.00	470.00	0.47	0.57	640	1636	922	1279	1919	1636	922	2.694	3
M20	Jct13	Jct12	Westbound	URBAN	Motorway	PM	Weaving_M20_Jct13-Jct12_PM	1800	380.00	400.00	0.40	0.57	577	1630	680	1189	1766	1630	680	2.338	2

0.2 Share of local trips

Number of Lanes Calculation - URBAN

									Figure 4.6a	*Figure 4.6b*		In Vehicles per hour									
Road	**From (junction)**	**To (junction)**	**Direction**	**Built environment**	**Road Type**	**Period**	**Name**	**D**	**L (Design Speed) (m)**	**L (Design Flow) (m)**	**Lmin (km)**	**L - Measured Length (km)**	**Flow 1**	**Flow 2**	**Flow 3**	**Flow 4**	**Qnw**	**Qw1**	**Qw2**	**N**	**N (Number of Lanes)**
M20	Jct12	Jct13	Eastbound	URBAN	Motorway	AM	Weaving_M20_Jct12-Jct13_AM	1800	380.00	250.00	0.38	0.43	428	594	1116	1013	1441	1116	594	2.005	2
M20	Jct12	Jct13	Eastbound	URBAN	Motorway	PM	Weaving_M20_Jct12-Jct13_PM	1800	380.00	300.00	0.38	0.43	460	755	1086	1596	2056	1086	755	2.487	2
M20	Jct13	Jct12	Westbound	URBAN	Motorway	AM	Weaving_M20_Jct13-Jct12_AM	1800	380.00	470.00	0.47	0.57	585	1497	844	1170	1756	1497	844	2.465	2
M20	Jct13	Jct12	Westbound	URBAN	Motorway	PM	Weaving_M20_Jct13-Jct12_PM	1800	380.00	400.00	0.40	0.57	528	1491	622	1088	1616	1491	622	2.140	2

0.085 Drop in traffic

9 M20 Junction 13

9.1 Assessment Overview

General Description

M20 Junction 13 is a major motorway interchange with the following characteristics:

- The M20 at this location is composed of 2 lanes in each direction;
- The at-grade junction is a dumbbell with two non-signalised roundabouts;
- The South roundabout includes several free-flow bypasses as part of the existing road layout; and
- Highways England road network includes the full interchange.

Mitigation Requirements Identification

To accommodate 2037 traffic requirement at M20 Junction 13 would include:

- The widening of the M20 to 3 lanes in each direction, West of M20 Junction 13;
- The widening of West facing ramps to 2 lanes, with an upgrade of the corresponding merge / diverge segments; and
- The upgrade of the South roundabout in the dumbbell interchange.

The above upgrades, however, are not required because of the Local Plan CSR 6,500 development, but because of background growth. Although the CSR 6,500 growth increases traffic demand at the roundabout to the South the actual traffic increase is marginal, but as this junction is already saturated, traffic congestion worsens disproportionately.

A traffic increase of 1% to 2% can be mitigated using minor operational improvements. It would typically require geometric improvements.

9.2 M20 Mainline Segment Between Junction 12 and 13

The M20 mainline segment between Junction 12 and Junction 13 has high traffic projections in 2037. The volumes of traffic for each scenario are:

- Eastbound
  - DM 2037 (PPLP): AM 2914 Veh / PM 3939 Veh
  - DS 2037 (CSR): AM 3374 Veh / PM 4259 Veh
- Westbound
  - DM 2037 (PPLP): 4136 Veh / PM 3516 Veh
  - DS 2037 (CSR): 4477 Veh / PM 4076 Veh

The DMRB design standard requires 1,800 vehicles per lane for a motorway to ensure drivers can respect the inter-vehicular safety distance as per the highway code. Depending on the percentage of HGVs, the traffic capacity in section would be comprised between 2,000 and 2,300 vehicles per hour.

The distance between M20 Junction 12 and Junction 13, however, is a weaving segment approximately 850 meters long. The link capacity is therefore further impacted by vehicle lane change behaviour.

The DM2037 (PPLP) analysis, therefore, shows that a three-lane cross-section would be required to achieve free-flowing conditions at peak hour. The DS 2037 (CSR) does increase traffic volumes but does not generate a change to the 2037 required motorway mainline cross-section.

9.3 Merge / Diverge Assessment

The merge and diverge assessment is presented in Tables 13 and 14. The key finding is:

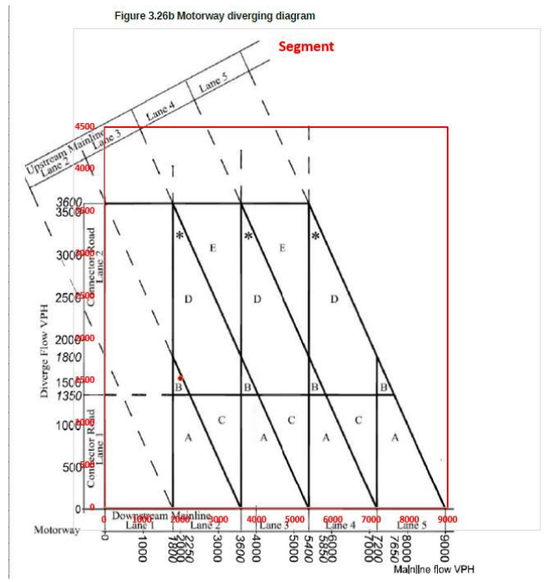
- The PM peak is the busiest;
- The DMRB maximum motorway design value is 1,800 vehicles per lane, but the capacity could, in some circumstances allow up to 2,000 vehicles per lanes depending on the percentage of HGVs. The traffic forecast on the M20 presents values higher than 2,000 vehicles per lane, suggesting an overestimation of the traffic forecast. The widening of the M20 to 3 lanes in each direction, West of M20 Junction 13 is the outcome suggested by the DMRB calculation as well as the road capacity; and
- The widening of West facing ramps to 2 lanes, with an upgrade of the corresponding merge / diverge segments.

Image 22 presents high-level mitigation requirements.

Image 22– M20 Junction 13 High-Level Mitigation Requirements

Table 13 – M20 Junction 13 – 2037 AM Merge/Diverge Assessment

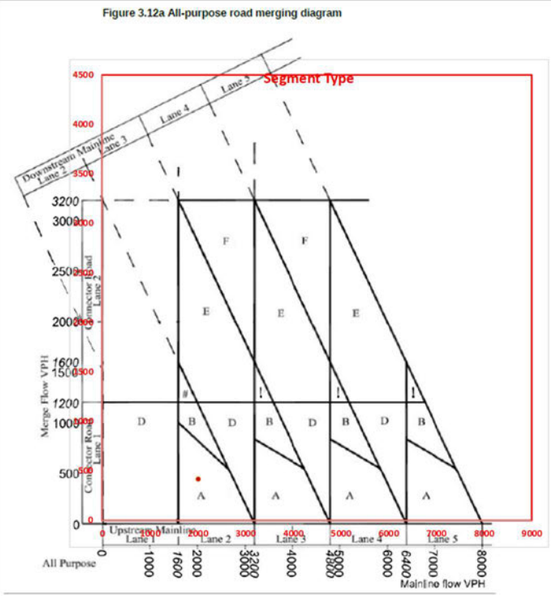
Figure 3.26b Motorway diverging diagram



M20 J13 EB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2015	1525

Figure 3.12a All-purpose road merging diagram



M20 J13 EB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2015	413

Figure 3.12b Motorway merging diagram

M20 J13 WB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2432	2045

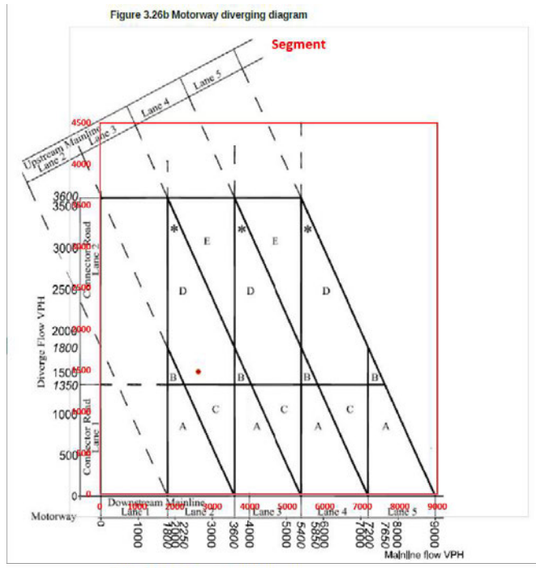
Figure 3.26a All-purpose road diverging diagram

M20 J13 WB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2432	739

Table 14 – M20 Junction 13 – 2037 PM Merge/Diverge Assessment

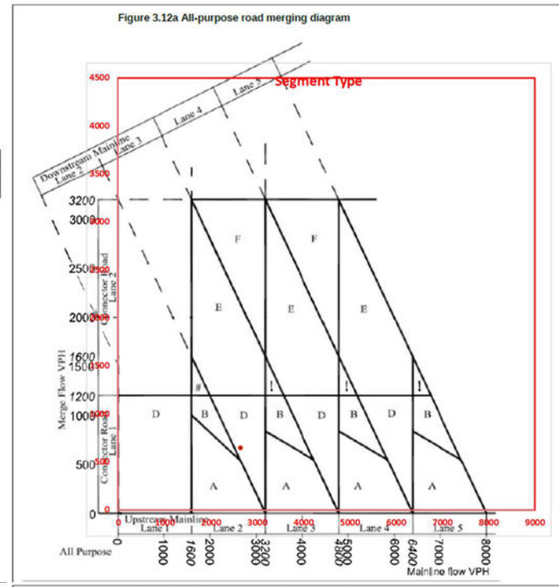
Figure 3.26b Motorway diverging diagram



M20 J13 EB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2643	1484

Figure 3.12a All-purpose road merging diagram



M20 J13 EB On-Slip___PM

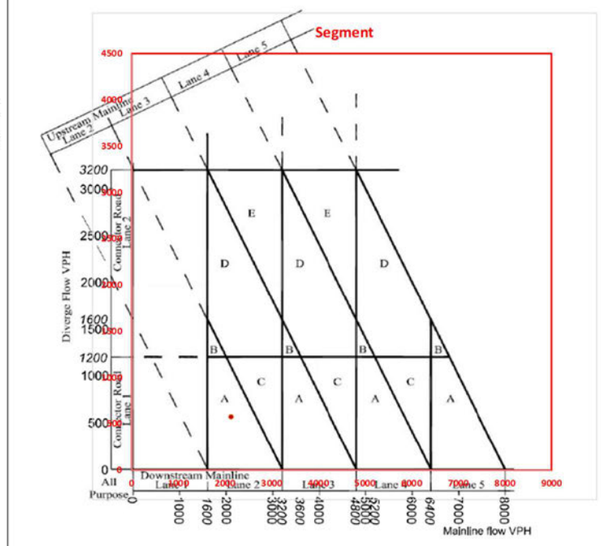
Mainline flow	Merge flow
Veh/hr	Veh/hr
2643	637

Figure 3.12b Motorway merging diagram

M20 J13 WB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
2141	2037

Figure 3.26a All-purpose road diverging diagram



M20 J13 WB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
2141	567

9.4 Traffic Demand Impact

Overall Changes in Traffic Volumes

M20 Junction 13 South roundabout comparison of total traffic at an at-grade junction in 2037 between the DM scenario (DS PPLP) and the DS scenario (DS CSR 6,500) is as follows (traffic flows in vehicles):

- AM Peak – DM (5504) / DS (5581), or an increase of 77 (1%)
- PM Peak – DM (5531) / DS (5636), or an increase of 105 (2%)

The above analysis demonstrates that a very small level of traffic volume from the DS CSR 6,500 is being routed via Junction 13 interchange.

9.5 Existing Layout at Grade Traffic Assessment

Table 15 shows the traffic delay at the non-signalised South roundabout. Three out of four approaches are saturated in both the AM and PM peak. Such a degree of saturation is not surprising considering the very high volume of traffic at the junction.

A physical junction improvement will be required at the junction to accommodate 2037 traffic demand. Moreover, traffic delays are very imbalanced. A signalised option at the junction should be considered to help to balance delays at the junction, but it is not a substitute for physical junction improvements.

Table 15 – M20 Junction 13 Castle Hill Interchange South – 2037 Existing Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	DM 2037							
M20 Westbound Entry On	2.5	10.88	0.72	B	1.2	6.86	0.55	A
Churchill Avenue	97.6	195.66	1.13	F	12.9	32.16	0.94	D
Cherry Garden Avenue	2.3	8.63	0.7	A	4.8	15.53	0.84	C
A20 Castle Hill Bridge	45.4	98.59	1.04	F	48.6	103.76	1.04	F
Arm	DS 2037							
M20 Westbound Entry On	2.2	10.02	0.69	B	1.1	6.57	0.53	A
Churchill Avenue	115	249.97	1.16	F	20.7	49.66	0.98	E
Cherry Garden Avenue	2.3	9	0.7	A	5.1	17.07	0.85	C
A20 Castle Hill Bridge	100.9	193.64	1.12	F	77.5	152.47	1.09	F

9.6 Proposed Mitigations

Proposed Mitigation Considerations

The proposed concept development was focussed on respecting the following constraints:

- Mitigating the impact of the DS 2037 CSR scenario back to DM 2037 conditions only;
- Avoiding any impact on existing structures as much as possible, for cost reasons; and
- Maintaining the same level of accessibility as in the present situation.

Image 23 presents the proposed mitigation measures. Table 16 presents the traffic analysis of the proposed junction layout for 2037 DS scenario. The key improvements are as follows:

- Widen the entry width on the Churchill Avenue approach to 11m and extend the flare length by 10m; and
- Localised widening on the A20 Castle Hill Bridge approach to provide minimum lane widths of 3.6m for the final approach to the junction.

Image 23 – M20 Junction 13 South – 2037 Proposed Layout

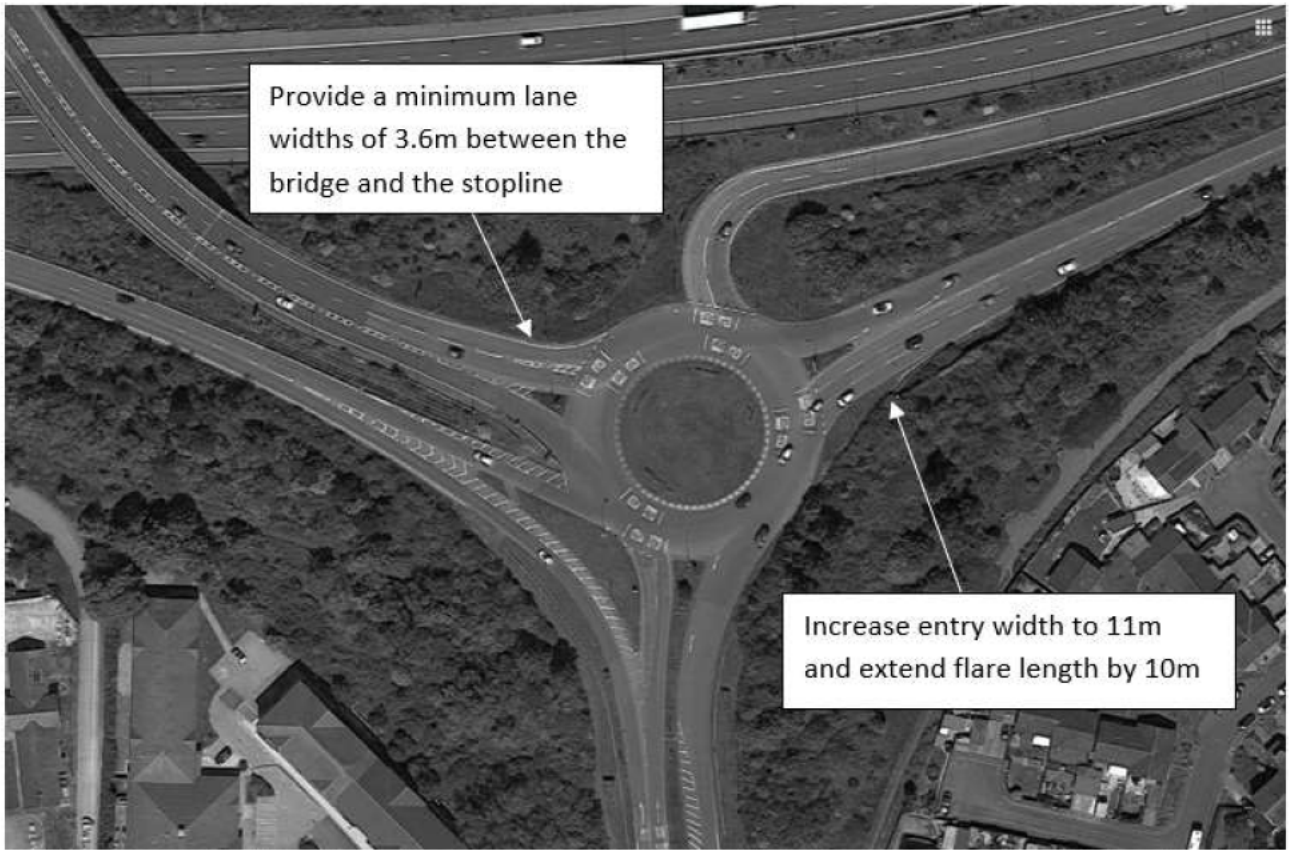


Table 16 – M20 Junction 13 South – 2037 Proposed Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
Arm	DS 2037							
M20 Westbound Entry Only	3.2	14.56	0.77	B	1.3	7.86	0.58	A
Churchill Avenue	45.9	95.45	1.04	F	6.5	15.95	0.88	C
Cherry Garden Avenue	2.7	10.72	0.74	B	5.5	18.31	0.85	C
A20 Castle Hill Bridge	23.3	51.19	0.99	F	15.4	35.95	0.96	E

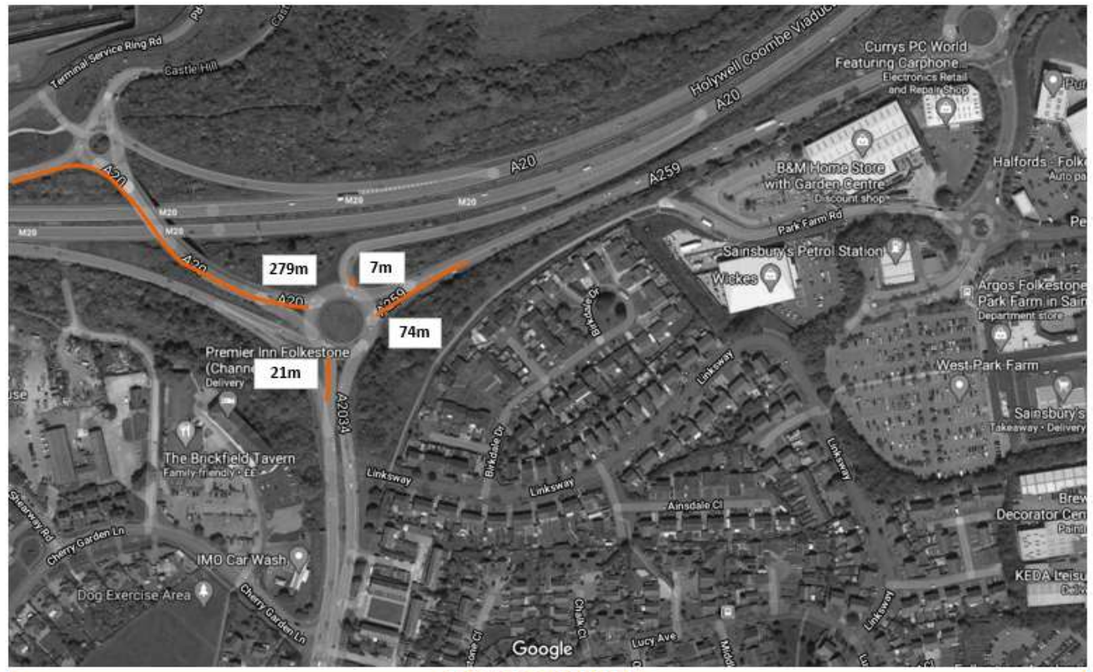
9.7 Conclusion

Significant highway improvements will be required at M20 Junction 13. These improvements, however, should be attributed to background traffic growth and not to the DS CSR 6500 scenario. The Local Plan additional 1% to 2% traffic increase can be mitigated using minor operational improvements shown in Section 9.6.

Image 24 – M20 Junction 13 – 2037 Queue Length Comparison

2037 DS PPLP 6500 AM

2037 DS PPLP 6500 PM



2037 DS CSR 6500 AM

2037 DS CSR 6500 PM

10 A20 / Spitfire Way / Alkham Valley Road

General Description

A20 / Spitfire Way / Alkham Valley Road junction is a major motorway interchange with the following characteristics:

- The M20 at this location is composed of 2 lanes in each direction;
- A number of physical constraints severely restrict geometric alterations at this interchange, including:
  - The presence of a tunnel West of the interchange, impacting the ability to extend merge / diverge segments;
  - The presence of a substation, requiring access to the South of the carriageway;
  - The presence of bridge structures;
  - The topography of the site, with significant elevations on the ramps; and
  - The overbridge width can only accommodate one lane in each direction.
- Highways England road network includes most of the interchange, except for Canterbury Road/Alkham Valley.

Mitigation Requirements Identification

To accommodate 2037 traffic requirement at A20 / Spitfire Way / Alkham Valley Road junction would include:

- A set of geometric upgrades at the junctions, in particular for the A-Road ramp approaches; and
- Probably an improved signage and road safety scheme to limit the risk of blocking back queues and incidents on the A20, that would potentially result from lane change manoeuvres on the A20 mainline.

Image 25 presents the mitigation requirements.

Further upgrades could be considered, however, the presence of only two lanes on the A20, local site constraints as well as the balanced traffic volume on the corridor might suggest them to be not necessary, despite DMRB standard requirements.

Moreover, the DS CSR 6,500 would only account for up to 6% to 7% traffic increase at local junctions. Such traffic increase could typically be mitigated using limited geometric improvements and operational measures.

10.1 Merge / Diverge Assessment

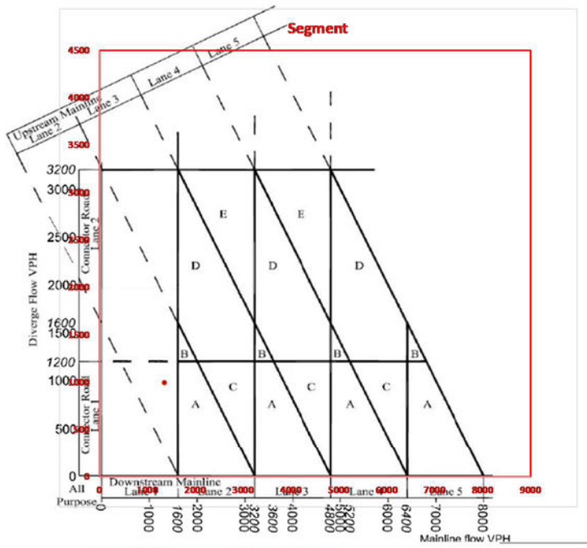
The merge and diverge assessment is presented in Tables 17 and 18. The key finding is:

- The dominant traffic seems tidal, from the local area towards the West in the morning, and back in the afternoon;
- The traffic staying on the motorway mainline never requires more than one lane, and overall, the traffic density on the A20 at this location is low;
- There are no lane restrictions for HGVs in the tunnel;
- The projected traffic volume on the ramps can be high and would require two lanes, however, a single lane would have sufficient capacity, and a two-lane ramp on a 2 lane mainline would require extended merge diverge segments.

Image 25 – A20 / Spitfire Way / Alkham Valley Road High-Level Mitigation Requirements

Table 17 – A20 / Spitfire Way / Alkham Valley Road– 2037 AM Merge/Diverge Assessment

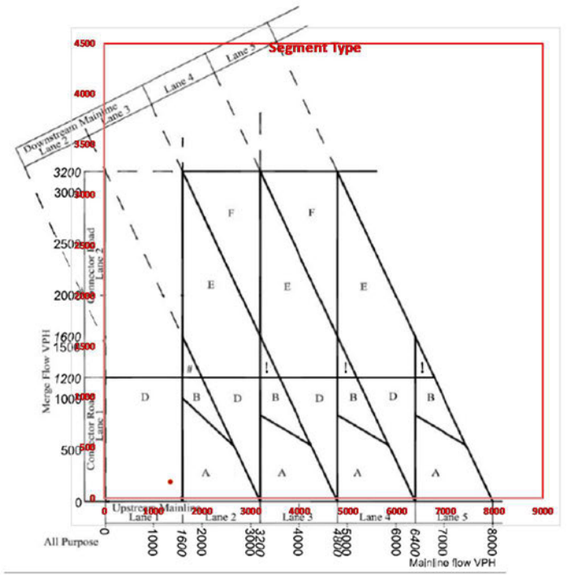
Figure 3.26a All-purpose road diverging diagram



A20 Spitfire EB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
1356	990

Figure 3.12a All-purpose road merging diagram



A20 Spitfire EB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
1356	154

Figure 3.12a All-purpose road merging diagram

A20 Alkham WB On-Slip___AM

Mainline flow	Merge flow
Veh/hr	Veh/hr
1392	1785

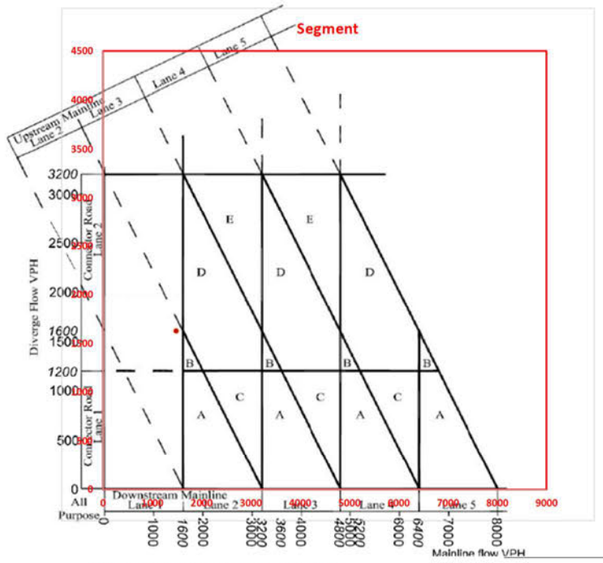
Figure 3.26a All-purpose road diverging diagram

A20 Alkham WB Off-Slip___AM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
1392	89

Table 18 – A20 / Spitfire Way / Alkham Valley Road– 2037 PM Merge/Diverge Assessment

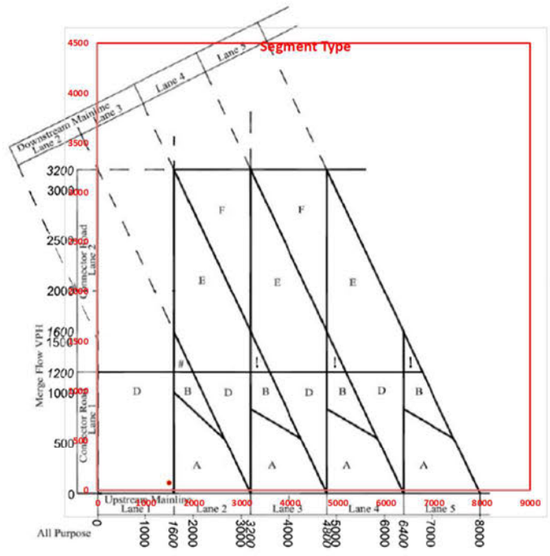
Figure 3.26a All-purpose road diverging diagram



A20 Spitfire EB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
1497	1619

Figure 3.12a All-purpose road merging diagram



A20 Spitfire EB On-Slip___PM

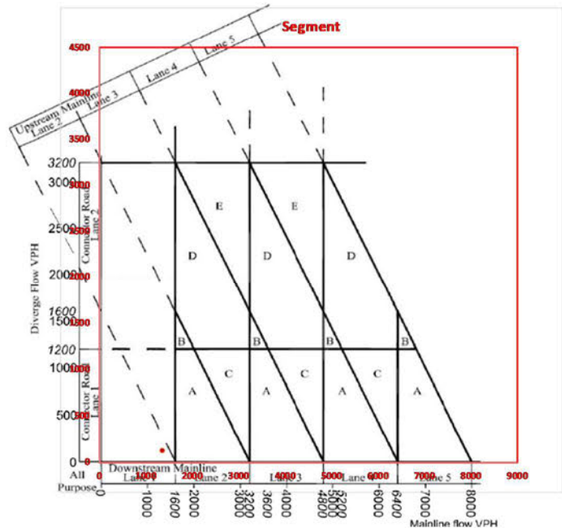
Mainline flow	Merge flow
Veh/hr	Veh/hr
1497	67

Figure 3.12a All-purpose road merging diagram

A20 Alkham WB On-Slip___PM

Mainline flow	Merge flow
Veh/hr	Veh/hr
1361	1177

Figure 3.26a All-purpose road diverging diagram



A20 Alkham WB Off-Slip___PM

Mainline flow	Diverge flow
Veh/hr	Veh/hr
1361	122

10.2 Traffic Demand Impact

The A20 / Spitfire Way / Alkham Valley Road interchange is composed of three junctions. As indicated below, the Spitfire Way junction to the North is more impacted than others. This is logical as most of the development is taking place North of the A20.

Overall Changes in Traffic Volumes (in Veh.) – Spitfire Way

The comparison of total traffic at an at-grade junction in 2037 between the DM scenario (DS PPLP) and the DS scenario (DS CSR 6,500) is as follows:

- AM Peak – DM (3363) / DS (3585), or an increase of 222 (6%)
- PM Peak – DM (3829) / DS (4069), or an increase of 240 (6%)

Overall Changes in Traffic Volumes (in Veh.) – Alkham Valley

The comparison of total traffic at an at-grade junction in 2037 between the DM scenario (DS PPLP) and the DS scenario (DS CSR 6,500) is as follows:

- AM Peak – DM (2491) / DS (2523), or an increase of 32 (1%)
- PM Peak – DM (2032) / DS (2184), or an increase of 152 (7%)

Overall Changes in Traffic Volumes (in Veh.) – Canterbury Road/Alkham Valley

The comparison of total traffic at an at-grade junction in 2037 between the DM scenario (DS PPLP) and the DS scenario (DS CSR 6,500) is as follows:

- AM Peak – DM (3231) / DS (3238), or an increase of 7 (0%)
- PM Peak – DM (3279) / DS (3385), or an increase of 106 (3%)

10.3 Existing Layout at Grade Traffic Assessment

Table 19 shows the traffic delay at the non-signalised North roundabout. The four approaches are unevenly saturated, however, typically two or more approaches have reached capacity at the junction at each peak hour. Image 26 presents the queue lengths for the same scenarios.

Road geometric improvements will be required at the junction, which will have to be combined with a signalised (or part-signalised) solution to ensure the absence of blocking back queues on the A20.

Table 19 – Spitfire Way-White Horse Hill-A260 – 2037 Existing Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	DM 2037							
White House Hill	2.1	14.93	0.68	B	0.7	6.29	0.4	A
A20 Slip Roads	20.1	82.1	1	F	289.4	742.35	1.45	F
Canterbury Rd	1.2	5.57	0.54	A	3.6	12.69	0.79	B
Spitfire Way	91.5	191.54	1.12	F	3.8	12.97	0.8	B
Arm	DS 2037							
White House Hill	2.1	15.16	0.68	C	0.9	8.04	0.47	A
A20 Slip Roads	116.8	447.95	1.25	F	503.7	1350.49	1.75	F
Canterbury Rd	1.2	5.74	0.54	A	2.8	10.01	0.74	B
Spitfire Way	119.7	277.65	1.15	F	9.3	28	0.92	D

Image 26 – Spitfire Way-White Horse Hill-A260 – 2037 Queue Length Comparison

2037 DS PPLP 6500 AM

2037 DS PPLP 6500 PM

2037 DS CSR 6500 AM

2037 DS CSR 6500 PM

Table 20 shows the traffic delay at the non-signalised South roundabout. The three approaches are unevenly saturated, with an overall degree of saturation suggesting the queueing could be re-balanced using traffic signals. Internal storage capacity might prove challenging. Image 27 shows the queue lengths on the highway layout.

Due to the arm configuration at the junction, free-flowing junction bypasses can also be envisaged.

Table 20 – Alkham Valley Rd-A20 Slip – 2037 Existing Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	DM 2037							
A20 Offslip	0	1.95	0.05	A	0.1	2.26	0.08	A
AlkamValley Rd (East)	1.6	5.05	0.62	A	0.4	2.81	0.3	A
AlkamValley Rd (South)	152.7	390	1.23	F	37.8	83.81	1.02	F
Arm	DS 2037							
A20 Offslip	0	1.92	0.05	A	0.1	2.15	0.07	A
AlkamValley Rd (East)	1.4	4.75	0.59	A	0.4	2.76	0.29	A
AlkamValley Rd (South)	186	488.43	1.28	F	120.4	240.9	1.14	F

Image 27 – Alkham Valley Rd-A20 Slip – 2037 Queue Length Comparison

2037 DS PPLP 6500 AM

2037 DS PPLP 6500 PM

2037 DS CSR 6500 AM

2037 DS CSR 6500 PM

Table 21 shows a completely saturated three-arm junction on the A260. The development of a large signalised junction or a large roundabout is required at this location. The carriageway width restriction on the bridge North of the junction represents a major constraint limiting opportunities for junction improvements.

Signalising the existing junction only will not be sufficient to accommodate future traffic demand.

Table 21 – Canterbury Rd-A260 Alkham Valley Rd – 2037 Existing Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	DM 2037							
Alkham Valley Left Turn	215.7	2545.12	1E+10	F	163.8	2636.14	1E+10	F
Alkham Valley Right Turn	33.9	2622.47	1E+10	F	43.3	2718.02	1E+10	F
Canterbury Road Right Turn	49.6	1492.51	2	F	56.9	783.24	1.67	F
Arm	DS 2037							
Alkham Valley Left Turn	206.5	29190.2	1E+10	F	158.4	3416.15	1E+10	F
Alkham Valley Right Turn	32.2	33643.02	1E+10	F	41.7	3496.55	1E+10	F
Canterbury Road Right Turn	54	1965.07	2.33	F	78.8	2048.83	2.36	F

Image 28 – Canterbury Rd-A260 Alkham Valley Rd – 2037 Queue Length Comparison

2037 DS PPLP 6500 AM

2037 DS PPLP 6500 PM

2037 DS CSR 6500 AM

2037 DS CSR 6500 PM

10.4 Proposed Mitigations

Proposed Mitigation Considerations

The proposed concept development was focussed on respecting the following constraints:

- Mitigating the impact of the DS 2037 CSR scenario back to DM 2037 conditions only;
- Avoiding any impact on existing structures as much as possible, for cost and feasibility reasons; and
- Maintaining the same level of accessibility as in the present situation.

The followings section present the traffic analysis of the proposed junction layout for 2037 DS scenario with mitigation for the three A20 Alkham Valley junctions.

Spitfire Way-White Horse Hill-A260 (see image 24)

- Increasing the effective flare length on the A20 Slip approach by 7m;
- Increasing the entry width by 0.4m and the effective flare length by 11m on the Spitfireway approach; and
- Left turn free-flow slip from the A20 slip to the A260 South.

Image 29 – Spitfire Way-White Horse Hill-A260 – 2037 Proposed Layout

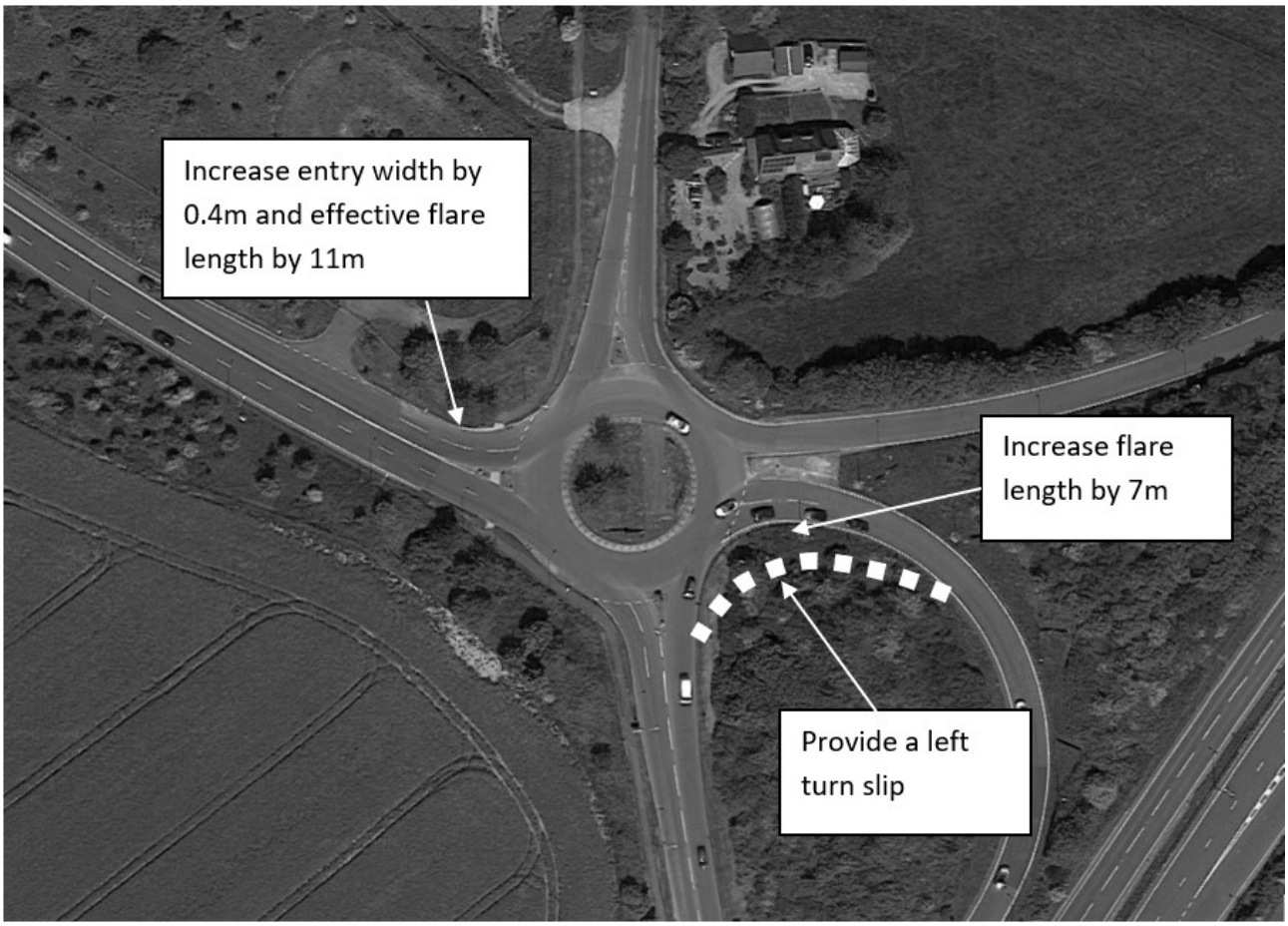


Table 22 – Spitfire Way-White Horse Hill-A260 – 2037 Proposed Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
Arm	DS 2037							
White House Hill	3.8	28.58	0.81	D	0.9	8.08	0.47	A
A20 Slip Roads	48.5	185.05	1.12	F	122.3	322.69	1.23	F
Canterbury Rd	1.1	5.23	0.52	A	3.7	13.32	0.79	B
Spitfire Way	26.4	59.36	1	F	4	11.69	0.81	B

Table 22 shows that most arms have improved performance in the proposed 2037 situation compared to the DM 2037 situation. Queues in the AM peak, however, have moved from Spitfire Way to the A20 Slip Road. This queue of 185 meters, however, does not block back onto the motorway.

In the AM peak, weighted average junction delay per vehicle are:

- DM 2037 – 50 seconds per vehicle
- DS 2037 with mitigations – 41 seconds per vehicle

In the PM peak, weighted average junction delay per vehicle are:

- DM 2037 – 117 seconds per vehicle
- DS 2037 with mitigations – 59 seconds per vehicle

Overall, the junction delays are mitigated and operational consequences for traffic queues remain the same,

Alkham Valley Rd-A20 Slip (see Image 30)

- Increasing the entry width by 0.54m and the effective flare length by 8.8m on the Alkham Valley South approach.

Image 30 – Alkham Valley Rd-A20 Slip – 2037 Proposed Layout

Table 23 shows the modelling results after the implementation of mitigation measures.

Table 23 – Alkham Valley Rd-A20 Slip – 2037 Proposed Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
Arm	DS 2037							
A20 Offslip	0	1.95	0.05	A	0.1	2.21	0.07	A
AlkamValley Rd (East)	1.4	4.75	0.59	A	0.4	2.76	0.29	A
AlkamValley Rd (South)	119.7	249.97	1.16	F	56.9	107.33	1.05	F

The proposed measures fully mitigate the traffic increase impact at Alkham Valley.

Canterbury Rd-A260 Alkham Valley Rd (See image 31)

- Increasing the mainline carriageway width at the junction to 7.8m

Image 31 – Canterbury Rd-A260 Alkham Valley Rd – 2037 Proposed Layout

Table 24 shows the modelling results with the mitigation measures implemented.

Table 24 – Canterbury Rd-A260 Alkham Valley Rd – 2037 Proposed Layout Assessment

Arm	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
Arm	DS 2037							
Alkham Valley Left Turn	93.5	2057.18	2.98	F	115.8	1776.78	1E+10	F
Alkham Valley Right Turn	15	2310.38	2.85	F	30.1	1982.94	1E+10	F
Canterbury Road Right Turn	30.4	562.93	1.44	F	54.4	770.98	1.66	F

The proposed measures fully mitigate the traffic increase impact at Canterbury Rd-A260 Alkham Valley Rd.

10.5 Conclusion

In conclusion, the merge / diverge arrangement would require upgrading using DMRB design standards, but from a congestion standpoint, it would not result in saturated traffic conditions. A safety assessment would, however, be required to ensure last-minute lane change manoeuvres are mitigated.

Regarding the three at-grade junctions of the A20 / Spitfire Way / Alkham Valley Road interchange, to re-instate free-flowing traffic conditions:

- Physical junction interventions will be required, combined with the signalisation of the junctions; and
- The Canterbury Road-A260 Alkham Valley Road junction is constrained by the bridge just North of it and might not be able to accommodate a sufficient junction upgrade.

The DS CSR 6,500 scenario, however, is having a very limited contribution to the above-described traffic conditions. Mitigating its own impact would be limited to the development of minor junction improvements. This section demonstrates that limited highways geometric interventions are sufficient to mitigate the increase in traffic volumes generated by the Local Plan.

11 Otterpool Park Transport Assessment

11.1 Submitted Transport Assessment

Initial Work and Submission

In February 2019, an outline planning application for the Otterpool Park development was submitted to Folkestone & Hythe District Council. A Transport Assessment was submitted with the application, the scope of which was discussed and agreed with Kent County Council, Folkestone & Hythe District Council and Highways England between April 2017 and March 2018. As part of the scoping exercise, technical reports were produced setting out the methods by which the assessment was to be undertaken and preliminary assessment work was carried out to inform discussions. A series of meetings were held and correspondence was exchanged with the key stakeholders throughout the year-long scoping period, which culminated in a set of technical notes and scoping documents that set out the agreed scope and method for the assessment. With regard to the scope of the highway impact assessment, the study area included all the junctions assessed in this Traffic Report.

Revised Submission in Preparation for 2021

Following comments received on the 2019 application, further scoping discussions have been held with all three parties in 2020. The discussions have led to variations in the scope and method of assessment, which will be reflected in the Transport Assessment to be produced for the revised application due for submission in 2021.

11.2 Garden Town with Sustainable Transport

High Provision of Local Services

The aim for the Otterpool Park settlement is to strike the right balance between ensuring the Garden Town is a great place to live and work with all the amenities its population needs, while also providing strong connections to and from neighbouring communities via sustainable transport modes. There will be a high proportion of local trips made within Otterpool Park as the development incorporates a range of schools, healthcare, community and sports facilities to meet as many of the needs of residents as possible and minimise travel to other locations. There will be local shopping and services and on-site employment locations together with the infrastructure for home working.

Comprehensive Network to Support Active Travel

The Otterpool Park development and associated access and travel strategy will provide residents, employees and visitors with an attractive and comprehensive network of sustainable travel opportunities to provide viable alternatives to travel by private car. This will be balanced with the need to ensure that the highway access arrangements are robust enough to sustain additional traffic movements, provide connectivity to existing routes and allow the existing network to function without causing significant issues for Otterpool Park and existing local residents.

The infrastructure of the Masterplan will be complemented by bespoke green travel measures, which will build on the opportunities offered by the existing and proposed walking, cycling, equestrian and public transport infrastructure, and promote and develop sustainable travel opportunities as well as support low emissions vehicles and innovative transport solutions.

Agreed Trip Generation Rates

All elements of the trip generation were agreed with Highways England, Kent County Council and Folkestone & Hythe District Council during the scoping process. The detail in which the trip generation of the Otterpool Park site has been considered for the Otterpool Park Transport Assessment is far greater than is the case for

the Shepway Transport Model on which this assessment of the Folkestone & Hythe Local Plan has been based. The Otterpool Park Transport Assessment considers the number of trips generated by and attracted to the site for 14 separate trip purposes and recognises the varying methods of travel people are likely to use for the different purposes. Most importantly, it considers the level of trip internalisation that can be expected due to the range of services offered on-site for residents and visitors. The agreed method of trip generation and distribution identifies that up to one-third of all trips generated by the site is likely to be internalised and therefore would not impact on the highway network outside of the development boundary. In addition, up to 20% of trips attracted to the site are expected to take the form of linked trips (i.e. a commuter working on-site may also drop their child at an on-site school or/and visit one fo the local shops).

Lower Traffic Level on Highways England Road Network

Based on the above efforts made by Otterpool Park, the anticipated external trip generation of the Otterpool Park development, and therefore the traffic that will impact on local roads and the Highways England network, is expected to be lower than the trip generation of the Otterpool Park site in the Shepway Transport Model, which uses trip rates from the TRICS database that are derived from stand-alone residential and commercial developments that do not take any account of trip internalisation.

11.3 Monitor and Manage Approach

Shepway Transport Model – Worst-Case Using Typical Ratios

The Otterpool Park trip generation in the Shepway Transport Model is therefore expected to represent an overestimation of the actual trip generation of a Garden Town. Since the Otterpool Park development trips represent the majority of the Local Plan trips assessed in this Traffic Report, it follows that the assessment presented here represents an overestimation of the likely impact on the Highways England network, particularly at the M20 Junction 11.

Monitor and Manage Approach

It should be acknowledged that forecasting travel behaviour 20+ years in the future is a very difficult task. In a relatively short period of time, new innovations can influence where, when and how people travel. For example, over the period in which Otterpool Park would be built, it is accepted that there are likely to be many new influences on travel behaviour that may increase or decrease people's propensity to travel by sustainable modes. For this reason, it is recommended that any highway mitigation measures identified within this Report should be subject to a 'monitor and manage' approach to implementation to prevent the unnecessary introduction of significant infrastructure changes if they are not required.

12 Overall Conclusion

In conclusion, the purpose of the study is to enable Folkestone and Hythe District Council to agree on a Statement of Common Ground regarding requirements for highway schemes to mitigate impact related to the Folkestone and Hythe Local Plan on the Highways England road network, or the further work required to identify those requirements.

The methodology in the AECOM Shepway Transport Model has been retained, and the model updated using the latest available information for the DS CSR 6,500 2037 scenario.

The study area has been confirmed to be limited to the Highways England road network within Folkestone and Hythe District Council following a review of traffic volumes and traffic conditions in the Ashford area.

The weaving segments on the M20 between Junction 12 and Junction 13 (both direction) would require upgrading according to the design standard, but such an situation would corresponds to a worst case scenario, unlikely to occur in practice.

Overall, the following junctions require physical upgrades by 2037:

- M20 Junction 11;
- M20 Junction 13; and
- A20 / Spitfire Way / Alkham Valley Road interchange.

M20 Junction 11 requires substantial junction upgrades, directly linked to background traffic growth and to Otterpool Park development. The traffic impact from DS CSR 6,500 on the other two junctions, however, is limited. The traffic impact is mostly the result of these junction being already saturated in the future.

Otterpool Park Transport Assessment modelling assumptions take into account the garden village and active travel measures of the site. In the view of the potential positive impact of such measures, a “monitor and manage” approach to infrastructure development is recommended.

APPENDIX A

1.1 Available Input Data

1. AECOM, Briefing Note: Shepway Transport Model Update – Review & Findings, December 2017;
2. AECOM, Shepway Transport Model – Merge and Diverge Appraisal (with spreadsheet model), September 2018;
3. AECOM, Shepway Transport Model, Local Junction Modelling and outputs; November 2017;
4. Taylor Wimpey, Cheriton High Street Junction, committed scheme drawing, May 2018;
5. Email correspondence from Highways England to Folkestone & Hythe District Council dated October 2018 to confirm that no mitigation would be required for the 2031 Do Something scenario for the Places and Policies Local Plan (additional modelling scenarios);
6. Arcadis, Otterpool Park – Transport Assessment, February 2019 (with supporting information and traffic models);
7. Folkestone & Hythe District Council and Highways England, Statement of Common Ground, January 2020;
8. Highways England, Folkestone and Hythe District Core Strategy Review Examination Submission to the Examination by Highways England, July 2020; and
9. Folkestone & Hythe District Council, Core Strategy Review – Inspector's Matters, July 2020.

APPENDIX B

1.2 Ashford Traffic Analysis

1. Junction 10a scheme description;
2. WebTRIS data; and
3. Ashford junctions DMRB merge diverge analysis.

APPENDIX C

1.3 Traffic Demand Model

1. Baseline demand analysis;
2. Traffic demand models.

APPENDIX D

1.4 Traffic Analysis

1. M20 Junction 11 traffic analysis;
2. M20 Junction 11a traffic analysis;
3. M20 Junction 12 traffic analysis;
4. M20 Junction 13 traffic analysis;
5. A20 / Spitfire Way / Alkham Valley Road traffic analysis; and
6. M20 Junction 12 to junction 14 Weaving.

APPENDIX E

1.5 M20 Junction 11 Design

1. Option A drawing;
2. Option B drawing;
3. Option C drawing; and
4. Option D drawing.

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