STUDY REPORT

Wyre Local Plan – A585(T) corridor evidence base

Prepared for

Highways England

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Introduction

1.1 Introduction

The strategic road network [SRN] is the road network for which Highways England has responsibility. The development aspirations in Wyre, as identified in Local Plan [the Plan] documents, will place additional demands on the SRN.

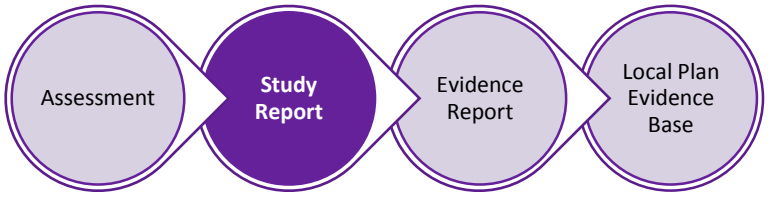
Highways England considers that it is critical to ensure that the implications of developments on infrastructure, and in particular the SRN, is fully understood, to enable any potential improvements to be appropriately planned for. It is therefore essential that forward planning of network operations take these additional pressures into account. On this basis it is considered that this study provides a key piece of evidence to inform the Plan.

1.2 Purpose of this report

This study report has been prepared by CH2M on behalf of Highways England with regard to the Plan. The report seeks to offer the detail of the analysis undertaken and has specifically sought to consider:

- The scale of development that could be brought forward without the need for significant additional infrastructure; and
- The nature and scale of further infrastructure measures required to support the Plan aspirations.

This study report informs the *evidence report* which seeks to provide a planning overview and to provide a direct link between the evidence base and the Plan and seeks to provide a level of evidence base that would inform the spatial strategy that Wyre Council [the Council] adopts as part of the Plan with a view to the impacts at the A585(T) corridor of the SRN.



Note that the focus of this evidence base is on the A585(T) element of the SRN. Highways England will need to consider evidence workstreams that are being undertaken in relation to other elements of the SRN when making recommendations in relation to the Local Plan.

1.3 Structure of this report

Following on from this introductory chapter, this report is structured as follows:

- **Chapter 2** provides a context to this report;
- **Chapter 3** details the study methodology;
- **Chapter 4** specifically defines the process of establishing flow scenarios to use in the study;
- **Chapter 5** provides a high-level consideration to link capacity;
- **Chapter 6** provides the junction assessments; and
- **Chapter 7** offers a summary and conclusions.

Study context

2.1 Local Plan context

With a view to the timescales involved in needing to have a spatial plan in place (there is a requirement to have the Plan progressed by early 2017), there is an immediate task for the Council to define the spatial pattern of development that the Plan will seek to deliver. The Council is rightly seeking to use evidence to assist in defining this spatial plan and in this particular regard is seeking to ensure that the transport infrastructure can support the aspirations.

Unfortunately, on this element of the SRN there exists some fluidity at this time in relation to the Road Investment Strategy [RIS] announcement of the Windy Harbour to Skippool Major Improvement Scheme [the RIS scheme] in that the exact form of that scheme remains unknown at this time. The assessment of options and associated modelling for the RIS scheme will not be being undertaken until mid/late 2016. This scheme is likely to influence the operation of that stretch of the A585(T) corridor directly, but on a wider scale as well.

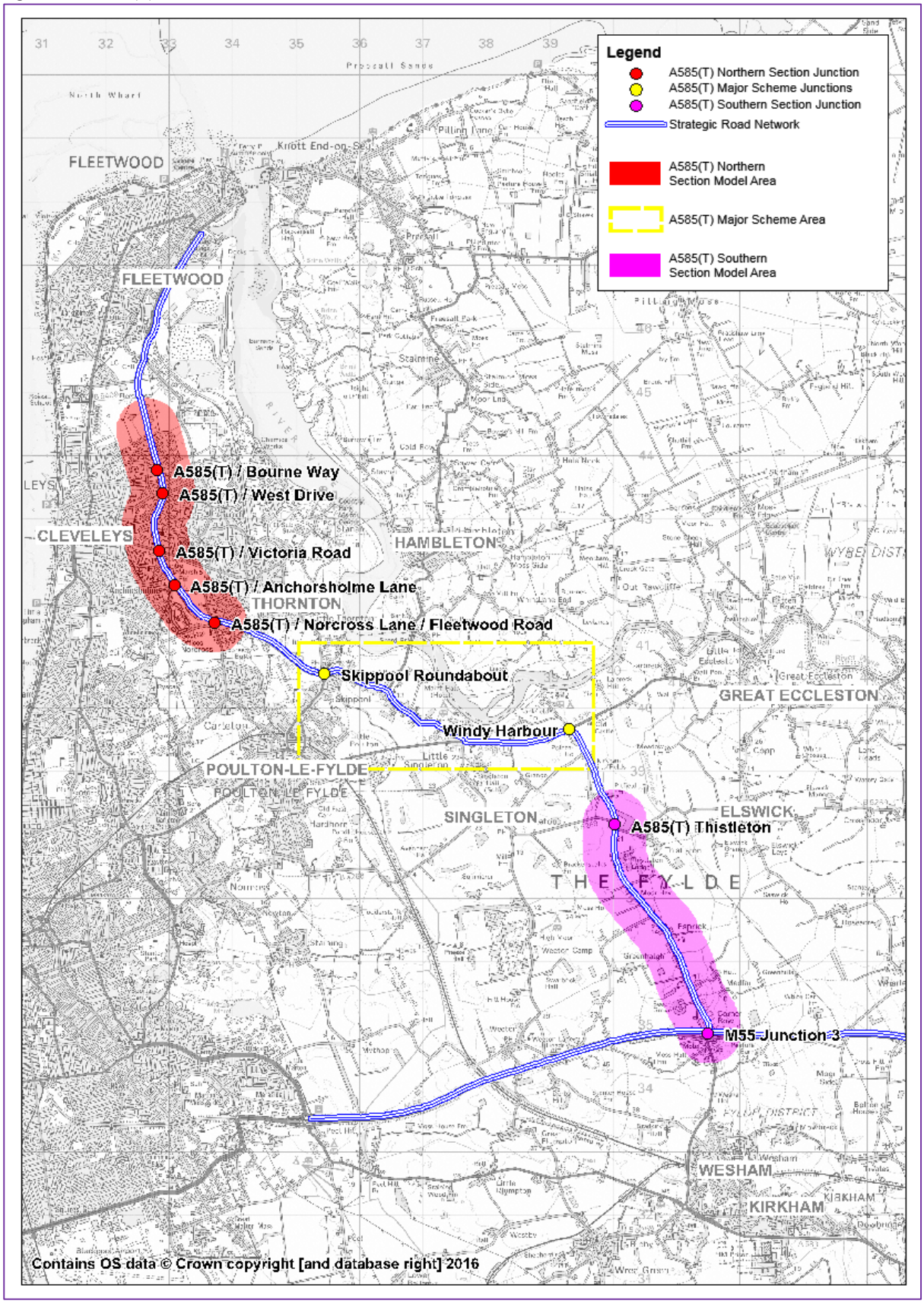
With a view to these “misaligned” timescales of the Plan development and the RIS scheme appraisal, the approach adopted within this evidence base is somewhat high-level and relatively pieced together, but it seeks to offer some early thoughts on the influence that the proposed scale and pattern of development could have on the A585(T) corridor. This will provide a level of evidence base that the Council can then rely on in informing the decisions that they make in relation to the scale and location of proposed development.

2.2 Study area and the SRN

The evidence base is focused on the A585(T) corridor from its junction with the M55 (at Junction 3) through to its northern extents at Fleetwood. The extent of network considered (and the junctions focused upon) in this evidence base is presented within Figure 2.1.

Note that due to the anticipated diversion of traffic from the existing A585(T) route through Singleton onto a possible potential Singleton bypass (as part of the A585(T) Windy Harbour to Skippool Improvement Scheme), the junctions within, at the beginning and at the end of this section have not been considered through detailed analysis at this time.

Figure 2.1: A585(T) Corridor from M55 to Fleetwood



Study methodology

3.1 Method overview

The general methodology adopted in undertaking this analysis is founded on the principle of:

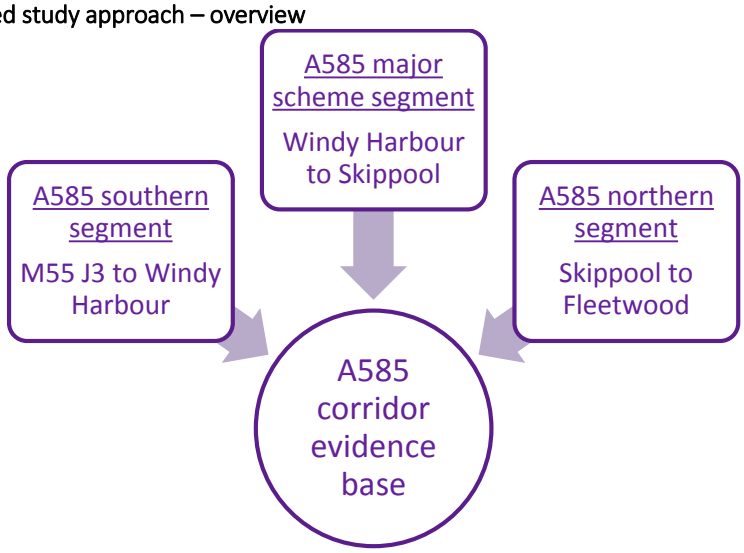
- Utilising existing highway models (where they are available);
- Utilising existing baseline traffic data as available through these existing models; and
- Using the GraHAM tool to determine trip levels associated with the development proposed through the Plan (see later section in relation to the specific GraHAM methodology).

Further information is afforded on the methodology below.

3.2 Segmented approach

On the basis of model and baseline traffic data availability across the A585(T) corridor (as set out below), and in the absence of a full corridor model that reflects the current network, a segmented approach to the study has been adopted as outlined in Figure 3.1.

Figure 3.1: Segmented study approach – overview



With a view to this segmented approach, Table 3.1 sets out the approach adopted for each segment of the A585(T) corridor.

Table 3.1: Segmented study approach - detail

Segment	Network element	Assessment platform / Information source		
		Model platforms	Base data	Development data / future growth
A585(T) southern segment	**M55 J3**	Junction 3 Paramics model (Mouchel)	As within the Junction 3 Paramics model (Mouchel)	GraHAM / NTM (TEMPro) growth. Jacobs SATURN model used to account for existing traffic flow changes following the construction of M55 J2.
	A585(T) Thistleton junction	A585(T) Paramics model (Mouchel)	As within the A585(T) Paramics model (Mouchel) – based to align with Junction 3 Paramics model (Mouchel)	GraHAM / NTM (TEMPro) growth

Segment	Network element	Assessment platform / Information source		
		Model platforms	Base data	Development data / future growth
A585(T) major scheme segment	**A585(T) RIS scheme (between, and including, Windy Harbour to Skippool)**	Operational analysis of this section of the A585(T) has not been undertaken at this time, but a consideration has been given to the level of growth attributed with the Plan and the consideration that will be given to this in the modelling (Arcadis) of the RIS scheme.		
A585(T) northern segment	**A585(T) Norcross junction**	A585(T) Paramics model (Mouchel)	As within the A585(T) Paramics model (Mouchel)	GraHAM / NTM (TEMPro) growth
	A585(T) Anchorsholme Way junction	A585(T) Paramics model (Mouchel)	As within the A585(T) Paramics model (Mouchel)	GraHAM / NTM (TEMPro) growth
	A585(T) Victoria Road junction	A585(T) Paramics model (Mouchel)	As within the A585(T) Paramics model (Mouchel)	GraHAM / NTM (TEMPro) growth
	A585(T) West Drive / Bourne Way junctions	A585(T) Paramics model (Mouchel)	As within the A585(T) Paramics model (Mouchel)	GraHAM / NTM (TEMPro) growth
	A585(T) Fleetwood junctions	Given the limited scale of development in the north Peninsula area, no operational analysis of this section of the corridor has been undertaken.		

3.3 Model platforms (and base data)

As identified in Table 3.1 above, a number of modelling platforms (and their associated base data) have been utilised in forming this evidence base. These are detailed further below:

- *M55 junction 3 Paramics model (Mouchel)*

A model of the M55 junction 3 network was received from Mouchel which had been developed to test the reintroduction of traffic signals on the junction circulatory and relining and widening of links to provide a clear two-lane path from the M55 east to the A585(T) north. A screenshot of the model is presented within ***Appendix A***.

The traffic flow demands have been adjusted to reflect the assessment scenarios considered within this report. Subsequent signal adjustments have been made within Paramics to reflect the difference in traffic demands from the Paramics model received by Mouchel and to ensure that they offer the optimised performance for these differing demand levels.

- *A585(T) Paramics model (Mouchel)*

In addition to the above, Mouchel also holds a Paramics model covering the wider A585(T) corridor from the M55 junction 3 to Fleetwood.

This Paramics model does not include the committed scheme at M55 junction 3 detailed above, however it does include an accurate representation of the network around the A585(T) Thistleton junction. A cordoned section of this wider model has been extracted therefore for use in modelling and assessing the A585(T) Thistleton junction. A screenshot of the model representation of the Thistleton junction is presented within ***Appendix A***.

- *A585(T) Paramics model (Arcadis)*

A Paramics model covering the A585(T) corridor from Norcross to M55 junction 3 to Fleetwood has been developed by Arcadis as part of the assessments of the proposed A585(T) Windy Harbour to Skippool improvement scheme. A screenshot of the model representation of the northern segment is presented within ***Appendix A***.

3.4 Development data

With regard to future traffic forecasts, the Council presented three Plan development scenarios to Highways England (aligned with the options presented during the *'Issues and Options'* consultation*)*. These three different scenarios, while containing the same overall quantum of development (for both residential and employment elements), contain different spatial patterns for the residential sites (employment remaining constant across all three scenarios). Information relating to these options is contained in ***Appendix B***, but in summary, it can be identified that:

- The employment development schedule is constant in total quantum (at 106.19 hectares) and spatial distribution across all three options.
- The residential development schedule is constant in total quantum (at 9,003 dwellings) with the distinct focus in spatial patterns of each of the options as follows:

– Housing scenario 1 – Fylde Coast Peninsula focus;

– Housing scenario 2 – A6 corridor focus; and

– Housing scenario 3 – Dispersed.

For the purpose of the analysis undertaken in this study, a focus has been placed on Scenario 1 given that this is focused on the Fylde Coast Peninsula and is therefore representative of having the greatest influence on the A585(T) corridor.

Flow derivation

4.1 2014 base flows

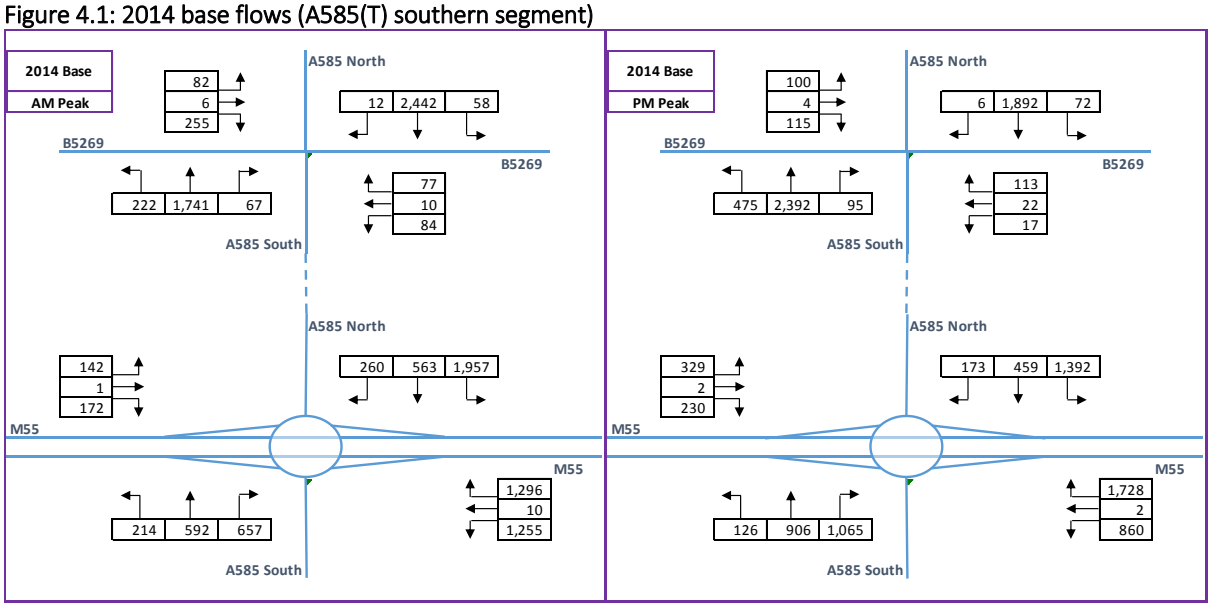
A585(T) southern segment

Traffic counts for M55 junction 3 have been extracted from the Mouchel Paramics model of the A585(T) corridor. This model's base year is 2014 and therefore the counts extracted are considered representative of traffic levels in 2014. *(Note that the numbers in this report depicting a movement directly between the M55 arms are not mainline flows - rather they are flows which have been captured to exit the mainline on the off-slip and then immediately re-enter the mainline via the on-slip).*

For the A585(T) Thistleton junction, the two-way flows on the A585(T) immediately to the north of M55 junction 3 have been extrapolated based on turning movement proportions extracted from the Mouchel Paramics model. The minor junctions between M55 junction 3 and the A585(T) Thistleton junction, including the junctions with Fleetwood Old Road, Medlar Lane, Greenhalgh Lane, Back Lane and Thistleton Road (south), have not been included, but are not considered to have any significant influence on the operation of either junction and are not the focus of any of Wyre's future development traffic accessing the A585(T) corridor.

The 2014 base flows for M55 junction 3 and the A585(T) Thistleton junctions are provided within Figure 4.1.

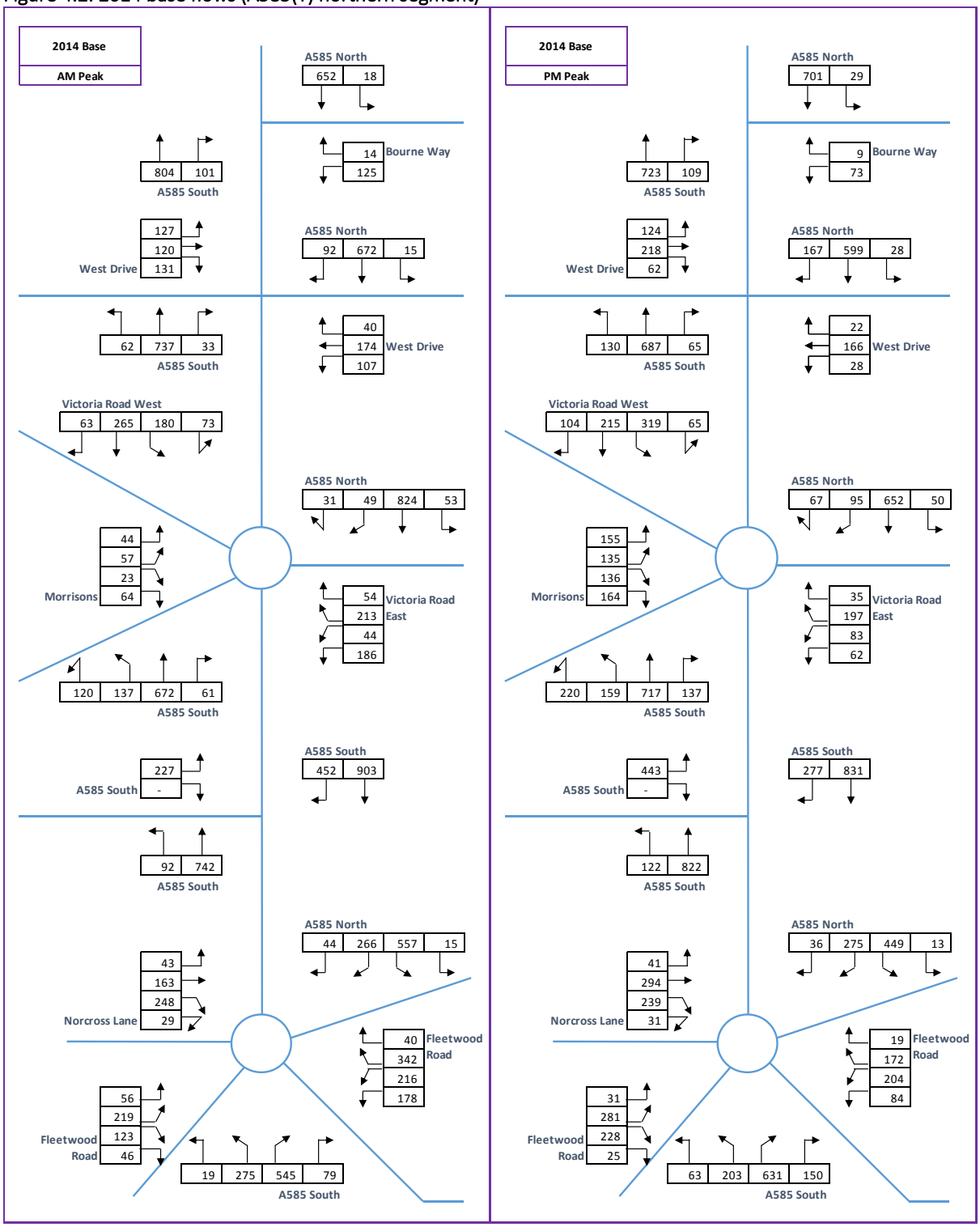
Figure 4.1: 2014 base flows (A585(T) southern segment)



A585(T) northern segment

Traffic counts were collected in 2014 for the 5 junctions contained within the A585(T) northern corridor and are therefore considered representative of junction turning movements in the 2014 base year. These turning movements are graphically shown within Figure 4.2.

Figure 4.2: 2014 base flows (A585(T) northern segment)



4.2 2031 future year flows

Influence of network changes

There are two specific schemes that have required consideration in terms of their potential influence on the operation of the network. These are detailed below:

- *Preston Western Distributor / M55 junction 2*

  As part of the Preston Western Bypass scheme, it is expected that by 2031, there will be a new junction (junction 2) on the M55 between junction 1 and junction 3. It has been agreed that as

part of this study, M55 junction 2 will be treated as a committed scheme. Therefore, its influence on traffic flows are accounted for within this study.

Following a review of a do-minimum and do-something assessments within a SATURN model developed by Jacobs for the Preston Western Bypass scheme, traffic flow forecasts suggest there will be a shift in traffic flows at and around M55 junction 3, as road users make use of new and alternative routes. Specifically this comparison suggests that there will be a decrease in traffic flows using the A585(T) south arm, as an alternative north/south route will be provided by the Preston Western Bypass connecting to M55 junction 2. This however corresponds with an increase in movements between the A585(T) north and M55 east arms (in both directions) and mainline M55 flows which now utilise M55 junction 2 as part of their route. There is also an overall slight increase in traffic at M55 junction 3 as a result of the M55 junction 2 scheme due to traffic congestion being unlocked from other, currently constrained areas of the network.

- *A585(T) Windy Harbour to Skippool major improvement scheme*

The Windy Harbour to Skippool major improvement scheme has the potential to change base traffic flows both in terms of volume (as traffic is released from congestion) and turning movements (as new more attractive routes are used).

Using the Skippool – Windy Harbour improvement scheme Paramics model provided by Arcadis, a review has been undertaken in order to understand the scale of base year traffic flow changes. The review indicates subtle changes to traffic flows on the rest of the corridor, though the review has suggested that the flow increases / changes in the northern and southern segments are marginal. When compared with the background traffic growth factors which are to be subsequently applied to 2014 base traffic flows (as detailed below), the scale of these changes is considered low and immaterial to the operation of the other segments. Therefore, no specific adjustments have been made.

Background traffic growth

Background traffic growth factors have been extracted from the DfT's TEMPro dataset. For this study, base traffic flows have been factored using TEMPro NTM (version 6.2, AF09 Wyre) local growth rates to provide representative do-minimum traffic flows for the assessment years.

The 'alternative planning' assumption facility within TEMPro has been utilised for this study, whereby the Wyre development aspirations contained within TEMPro have been removed from the TEMPro growth factor calculation. The factor extracted therefore provides the level of *background* traffic growth (due to fuel cost, income and developments outside of Wyre) within the Wyre TEMPro zone, but assuming no development in Wyre itself.

The normal TEMPro and *background* traffic growth factors extracted using the alternative assumption facility are presented within Table 4.1 for the period between the base year for which flow data is available (2014) and the end of Plan period (2031).

Table 4.1: TEMPro background traffic growth factors from 2014 to 2031 for the Wyre zone

Tempro development scenario	AM Peak	PM Peak
Standard NTM TEMPro Growth Factors	1.242 (24.2%)	1.256 (25.6%)
Background NTM TEMPro Growth Factors (i.e. no Wyre development growth)	1.144 (14.4%)	1.152 (15.2%)

The difference between the standard TEMPro growth factors and the background TEMPro growth factors is representative of the level of traffic growth directly attributable to developments within the Wyre Tempro zone. Figure 4.3 and Figure 4.4 present the temporal growth of Tempro traffic growth factors between 2014 and 2031 for the AM and PM peak periods respectively. These graphs display both the standard and background TEMPro growth factors as well as the growth directly associated with development in Wyre.

As this study accounts for traffic growth generated by Wyre developments via an alternative methodology to TEMPro, the use of the background TEMPro traffic growth figure is required to ensure future development trips are not double counted.

Figure 4.3: AM TEMPro traffic growth from 2014 to 2031 for the Wyre zone

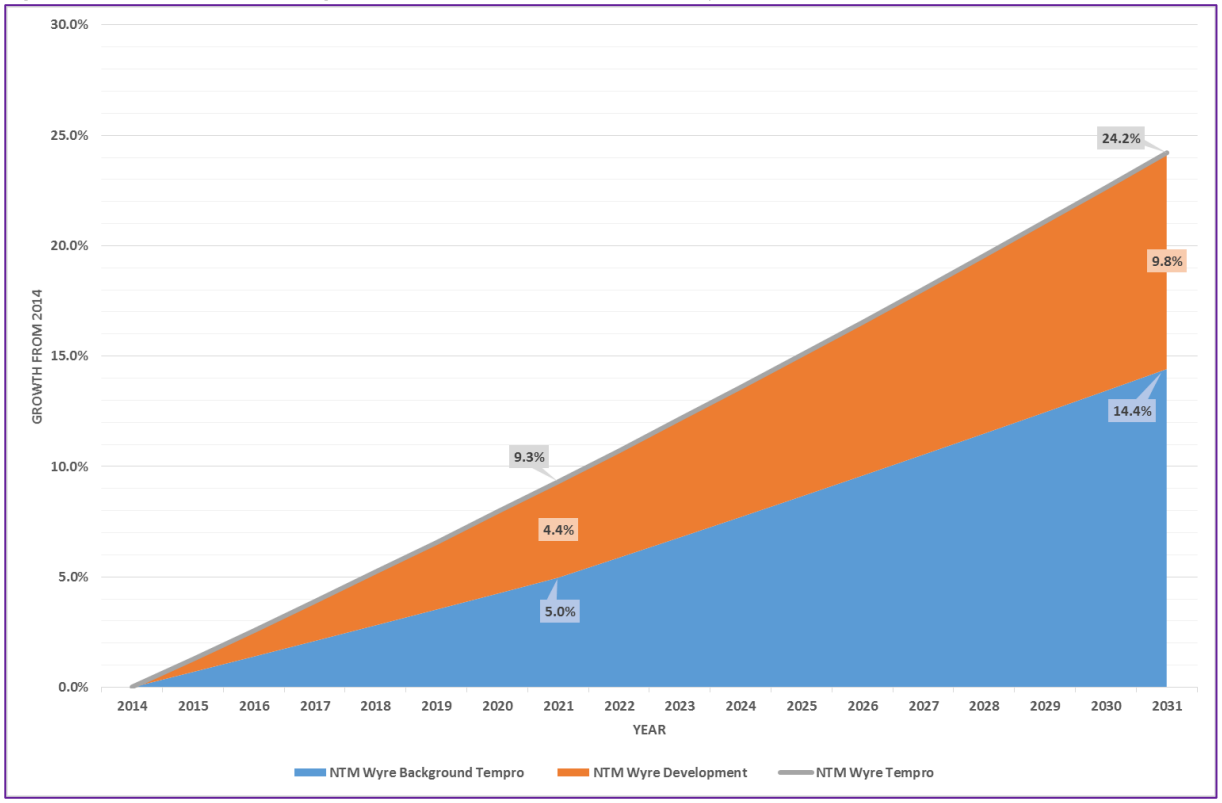
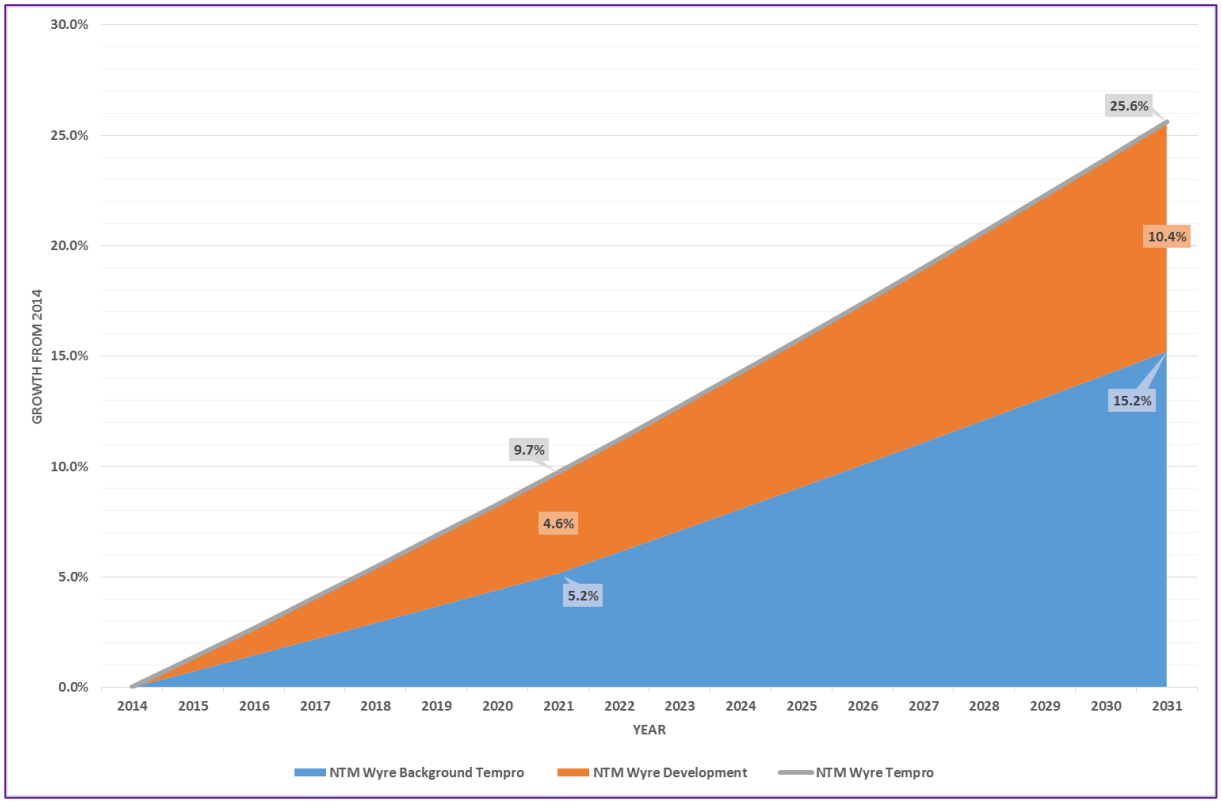


Figure 4.4: PM TEMPro traffic growth from 2014 to 2031 for the Wyre zone



The product of the background Wyre traffic growth factors being applied to the 2014 base flows provides the absolute growth in traffic volumes between 2014 and 2031, assuming no development within Wyre (but the M55 junction 2 and the Preston Western Bypass is constructed). This background

traffic growth is presented diagrammatically within Figure 4.5 and Figure 4.6 for the southern and northern segments respectively.

Figure 4.5: 2014 – 2031 background traffic growth (A585(T) southern segment)

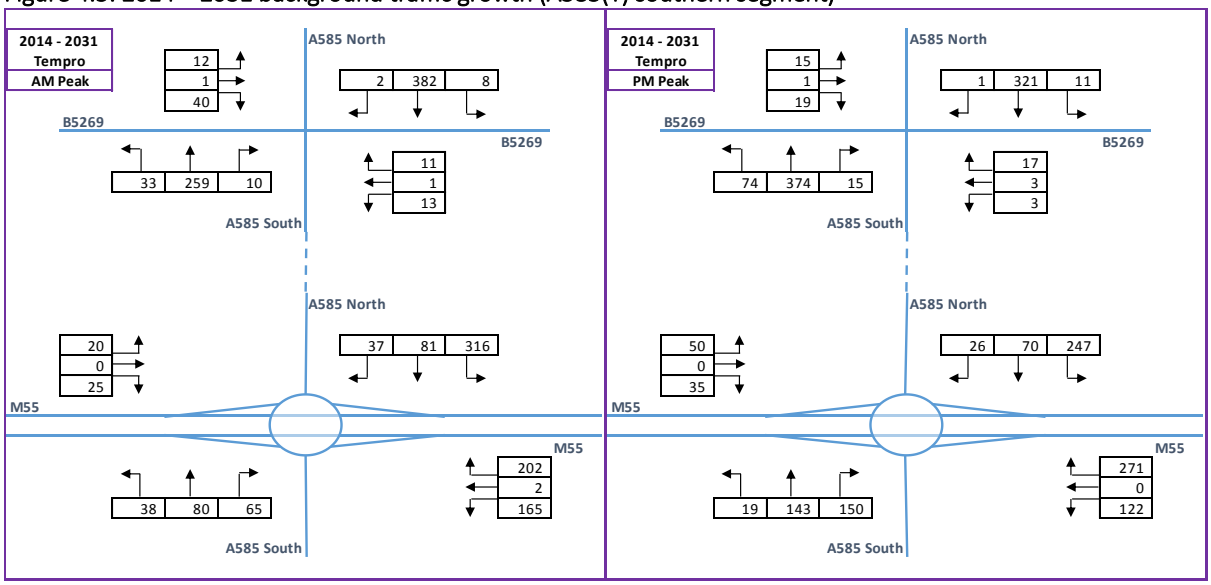
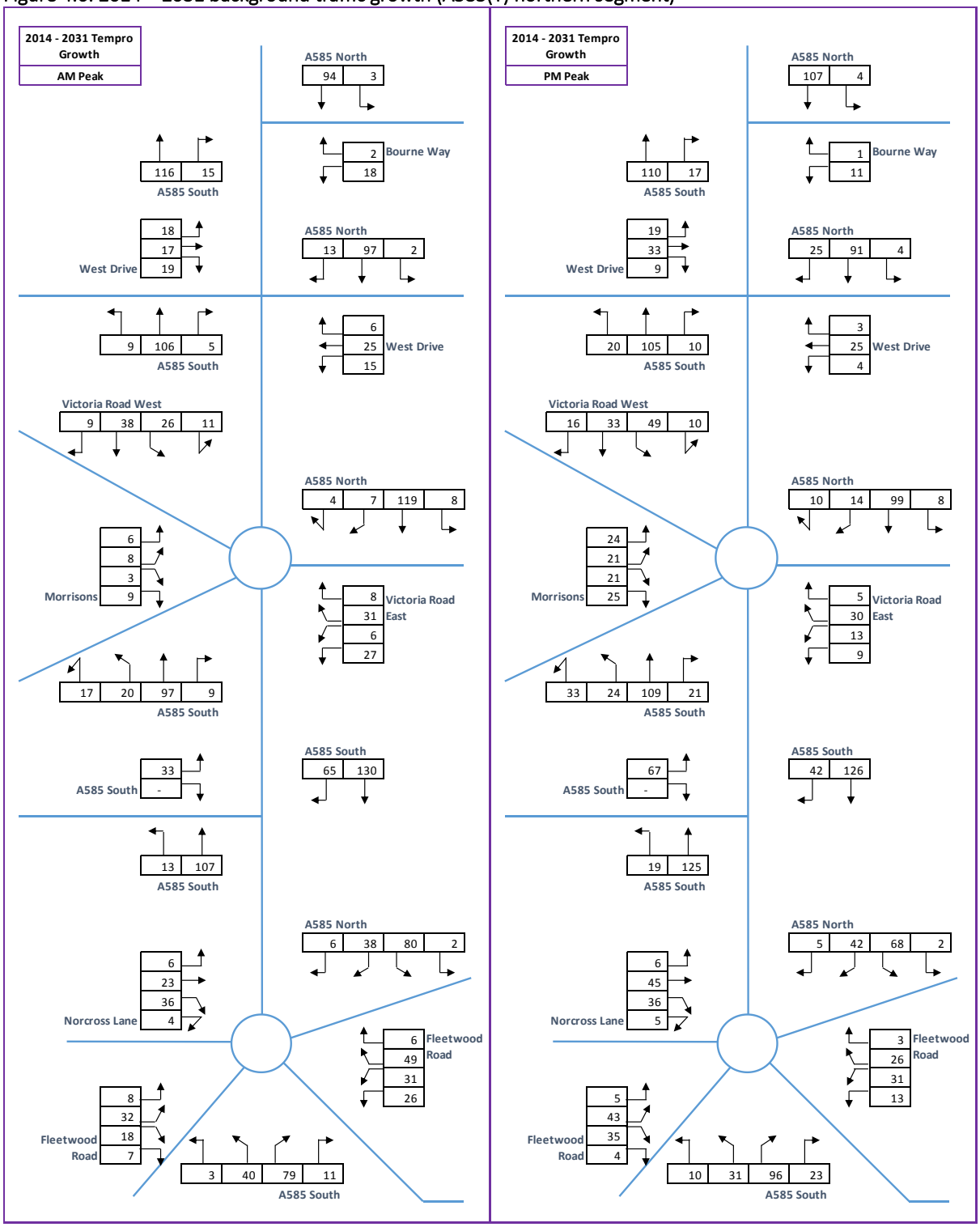


Figure 4.6: 2014 – 2031 background traffic growth (A585(T) northern segment)



Plan development trips

The trips that have been forecast to be directly associated with the Plan development aspirations have been derived through use of the Highways England GraHAm tool. It is this same tool that has formed the starting point for the other evidence base workstreams that are being undertaken in relation to the Plan.

GraHAm is a GIS-based program for estimating the origin and destinations of trips associated with proposed land-use developments. Using Census 2011 Origin-Destination data, GraHAM distributes residential and employment trips using a GIS routing algorithm, which finds the quickest path through a detailed road network. The road network is based OS Meridien2 (Open Data) and a free hand drawn

Strategic Road Network (using OS StreetView (10,000 raster images) to define the network). Routing on the SRN is based upon a single direction, whilst on the local highway road links are two way.

The outcomes of this process in relation to the trips that can be attributed to the Plan developments are presented within Figure 4.7 and Figure 4.8 for the southern and northern segments respectively. It should be noted that the GraHAm network does include M55 J2 and the Preston Western Bypass.

Figure 4.7: Plan development trips (A585(T) southern segment)

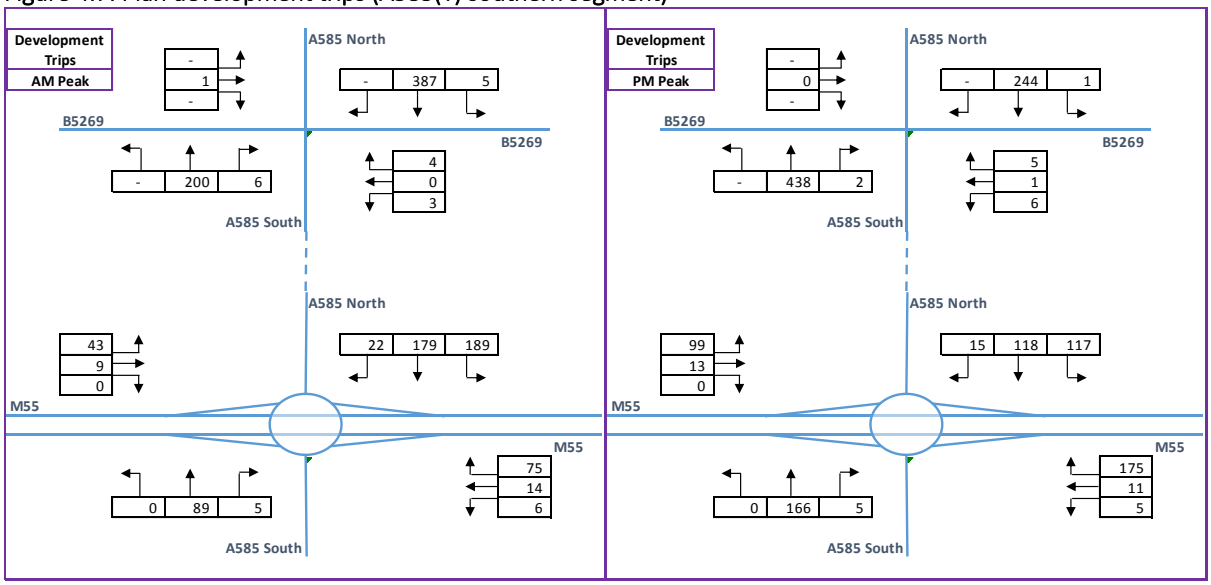
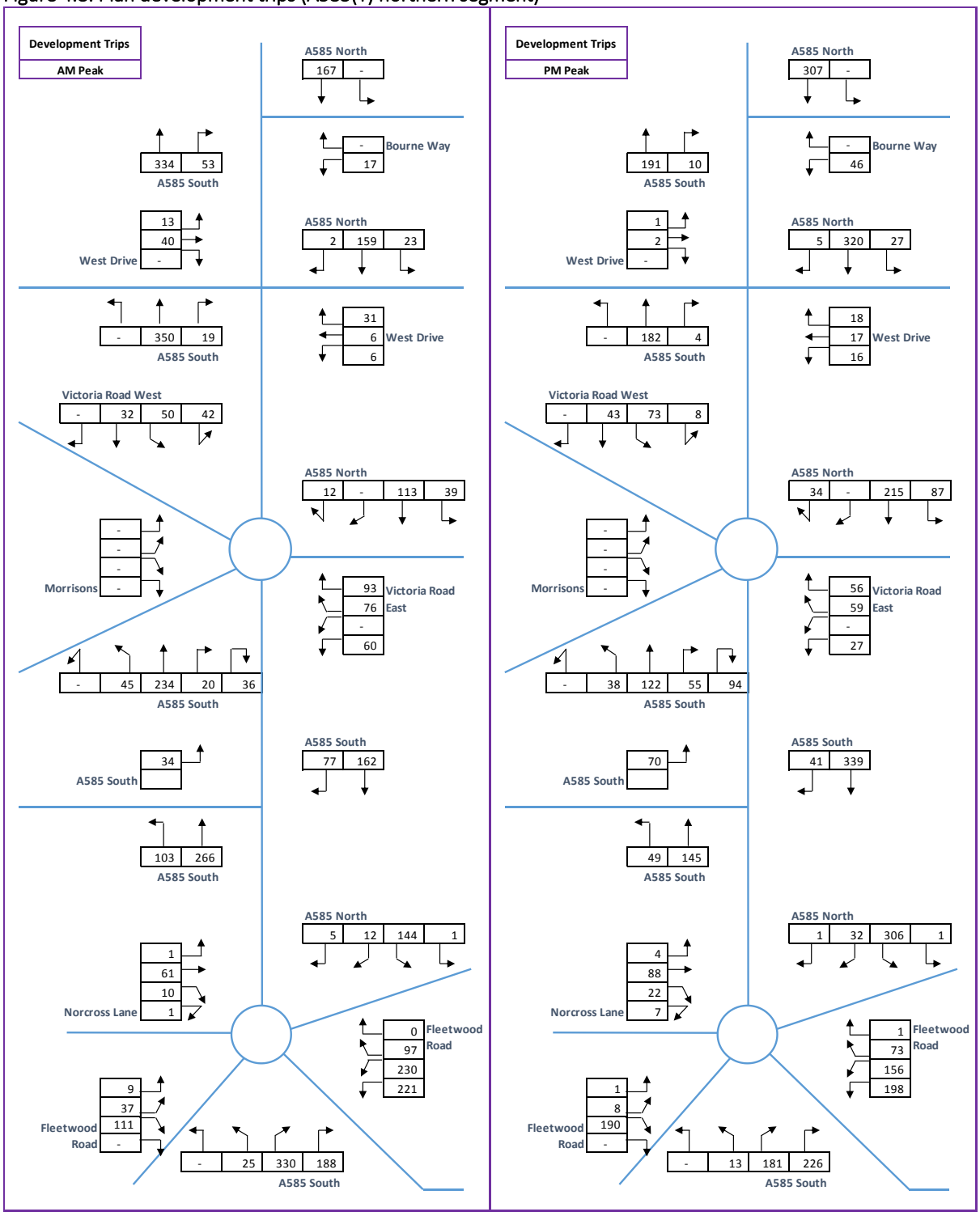


Figure 4.8: Plan development trips (A585(T) northern segment)



2031 total trips

The combination of the Plan trips, the Tempro background traffic and 2014 base flows provides a representation of forecast traffic levels and traffic movements within the 2031 assessment year if all the Plan developments were to be completed. The 2031 assessment year flows are presented within Figure 4.9 and Figure 4.10 for the southern and northern segments respectively.

Figure 4.9: 2031 future assessment year trips (southern segment)

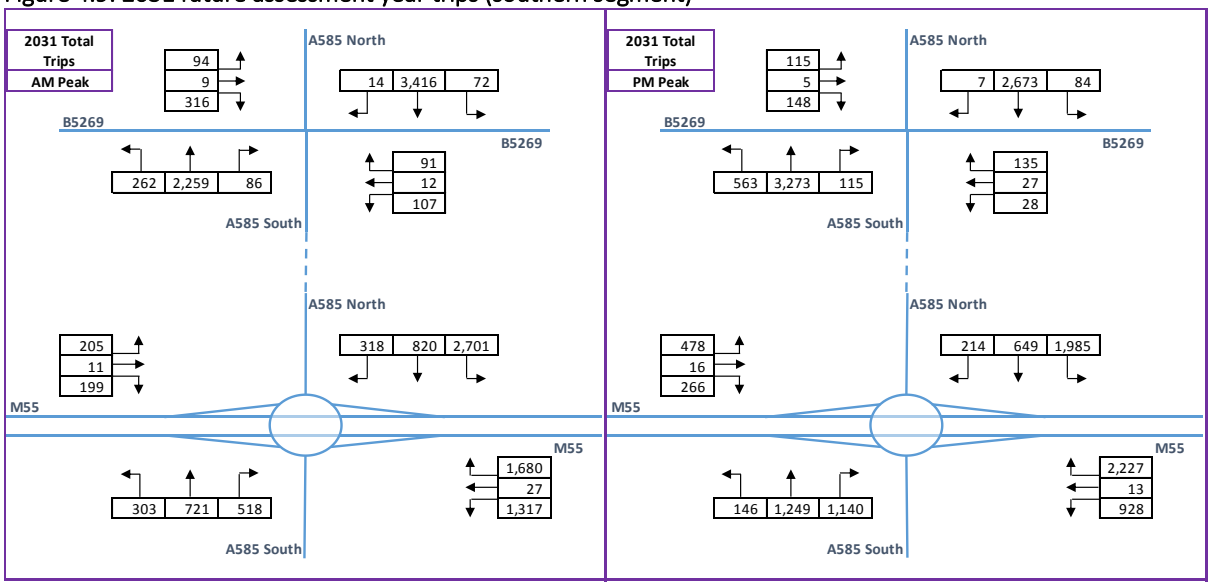
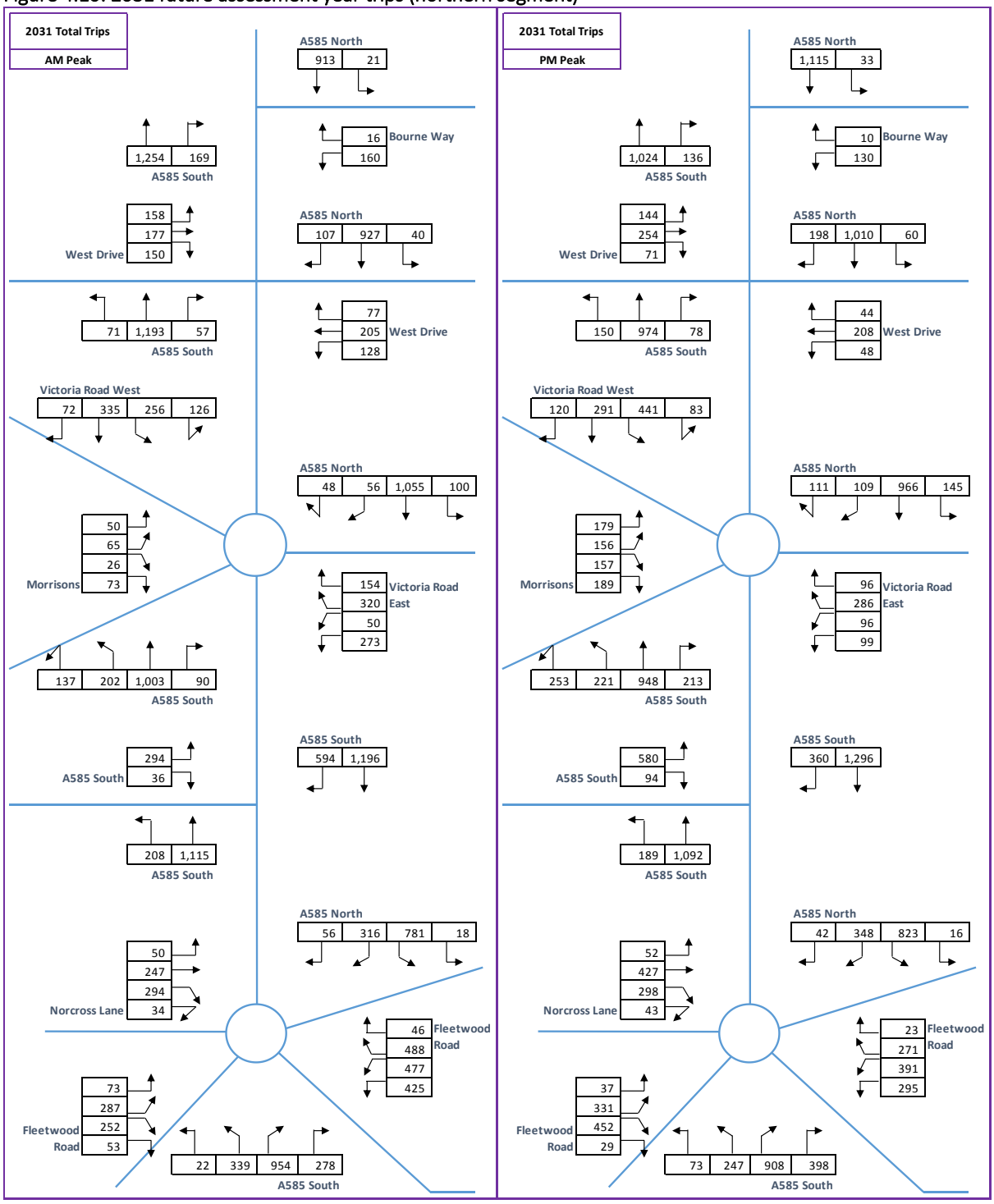


Figure 4.10: 2031 future assessment year trips (northern segment)



A585(T) link assessment

5.1 Overview

The A585(T) corridor is influenced to a large degree by the various at-grade junctions along its length and therefore it is these that have been the focus of the assessment presented in this study. However it is pertinent to give consideration to the link capacity of the A585(T) corridor with regard to the demands that are currently placed upon it and are forecast to be placed upon it in the 'with Plan' scenario.

5.2 Link assessment

With reference to the theoretical capacity of the links (1600 per lane for all-purpose trunk roads such as this) an RFC (reference of flow to capacity) value can be established – a value of 1 equating to a link at its theoretical capacity. Table 5.1 presents this information.

Table 5.1: Link RFC analysis

Location	Theoretical Link Capacity		2014 Base RFC				2031 'do-minimum (with plan)' RFC			
			AM		PM		AM		PM	
	North bound	South bound	North bound	South bound	North bound	South bound	North bound	South bound	North bound	South bound
A585(T) / Bourne Way	1600	1600	0.51	0.42	0.46	0.46	0.79	0.58	0.65	0.72
A585(T) / West Drive	3200	3200	0.28	0.24	0.26	0.25	0.45	0.34	0.36	0.40
A585(T) / Vicoria Road	1600	1600	0.54	0.60	0.60	0.54	0.84	0.79	0.80	0.83
A585(T) / Anchorsholme Lane	1600	1600	0.61	0.85	0.79	0.69	0.88	1.10	1.05	0.98
A585(T) / Norcross Lane / Fleetwood Road	1600	1600	0.53	0.55	0.61	0.48	0.84	0.73	0.82	0.77
Skippool Roundabout Singleton Roundabout	1600	1600	0.57	0.64	0.65	0.50	1.00	0.97	1.02	0.90
Windy Harbour	1600	1600	0.73	0.98	0.88	0.96	1.07	1.43	1.36	1.35
Thistleton	1600	1600	1.19	1.57	1.63	1.23	1.49	2.04	2.15	1.57
M55 J3	1600	1600	1.27	1.74	1.85	1.27	1.58	2.23	2.41	1.61
	1600	1600	0.91	1.24	1.31	0.97	1.10	1.54	1.62	1.19

While a useful indicator of where the pressures on the corridor would be, it is clear that the network currently operates with demands (in places) far exceeding the theoretical capacity. In using the modelling approach within this study, a fully-rounded view (links and junctions) will be established.

Junction assessments

6.1 Overview

Four scenarios have been modelled. Table 6.1 outlines the assessment scenarios and their components in terms of the network and traffic demands. Note, the do-something scenario has only been modelled when a specific issue in do-minimum assessment needs an infrastructure response.

Table 6.1: Assessment Scenarios

Assessment scenario	Network			Demands		
	Current	+ committed	+ supporting measures	Current	+ background growth	+ Plan
2014 'base'	✓			✓		
2031 'do-minimum (no Plan)'	✓	✓		✓	✓	
2031 'do-minimum (with Plan)'	✓	✓		✓	✓	✓
2031 'do-something'	✓	✓	✓	✓	✓	✓

The graphs subsequently presented in this section display maximum queue lengths in metres. It should be noted that as maximum queue lengths are displayed, this does not represent a constant state as queues will build up and dissipate with changes traffic flows. This is particularly relevant at signalised junctions. Further, some of the queue lengths on non-A585 junction arms may seem excessive and unrealistic. This is a consequence of the Paramics model being a corridor model, with no alternative routes being available other than that of the A585 corridor. It is highly likely that, as congestion builds within this area of the network a degree of re-routing will occur and the level of congestion will not be as high as that modelled.

A number of additional caveats also need to be taken into account when considering the junction assessment results:

- The models being used have been developed by third parties and the model used to consider both the M55 junction 3 and A585(T) Thistleton junctions have been run 'as is' and have not been audited by CH2M.
- There is no current modelling capability for the A585(T) corridor to reflect the re-assignment patterns of trips (i.e. trips re-routing to differing routes in the event of congestion on the A585(T) corridor).
- Signal timing adjustments were required within 2031 'do-minimum' and 'do-something' scenarios in order to optimise signalised junction operation given forecast traffic levels and turning movements. The signal adjustments have been made directly within the Paramics model and not within a bespoke specialised traffic signal software package such as LinSig.

The figures presented within this section show both the maximum and average queue length on each junction arm within the AM and PM peak periods. Maximum queues are represented by the graph columns, with the average queue length annotated accordingly within it (and against the same scale). Supporting these graphs, the Appendices contain queue lengths for junction each arm across the AM and PM peak periods, so to demonstrate the build-up and breakdown of queues across the peak period.

6.2 M55 junction 3

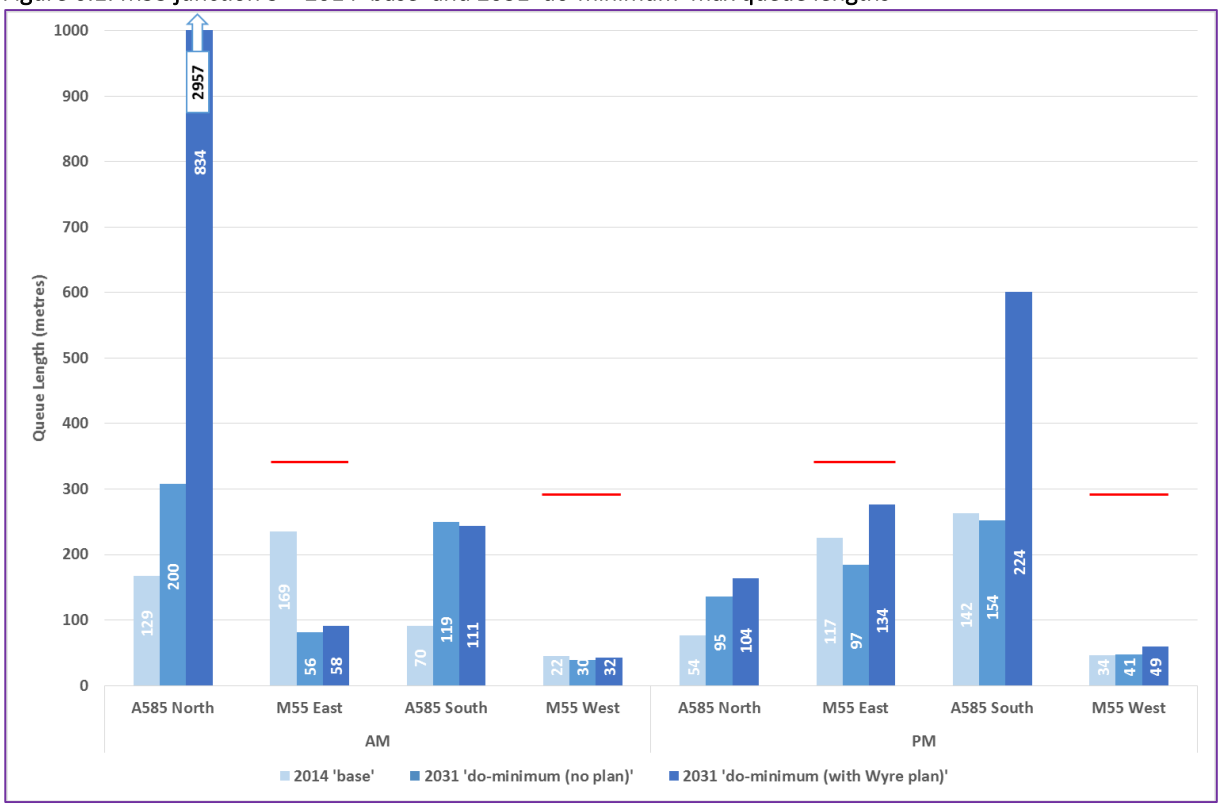
6.2.1 2014 'base' and 'do-minimum' assessments

The assessment of M55 junction 3 has been completed in Paramics for both the AM and PM peaks within the 2014 'base' and 2031 'do-minimum' scenarios.

At this location, the 2014 'base' network contains an unsignalled junction, with only a single lane on the circulatory arc between the westbound off-slip and westbound on-slip. The 2031 assessment year network contains a 'most likely' highway scheme which will see the introduction of traffic signals on the junction circulatory and relining and widening of links to provide a two-lane path from the M55 westbound off-slip to the A585(T) north.

The outputs of the Paramics modelling in terms of maximum queue lengths are presented in Figure 6.1. Maximum queues are represented by the graph columns, with the average queue length annotated accordingly within it (and against the same scale). ***Appendix C*** contains queue length by each 5 minute interval modelled for the M55 East and West off-slips.

Figure 6.1: M55 junction 3 – 2014 'base' and 2031 'do-minimum' max queue lengths



Compared to the 2014 'base', within the 2031 'do-minimum (no Plan)' scenario, lower queues are modelled on the M55 slip road in both the morning and evening peaks and the queues remain within the length of the slip roads (as indicated by the red horizontal lines). This reflects the operational benefits to the SRN provided by the 'most likely' highway scheme highlighted above, but also indicates the operational disbenefit to the A585 North and South arms.

With the addition of Plan development trips, queue lengths increase substantially on the A585 North arm in the morning peak and A585 South arm in the evening peak from the 'no plan' to 'with Plan' scenarios. Upon review of the congestion within the Paramics model, this extended queue is a series of smaller 'shockwaves' of congested traffic which backs-up on this single carriageway link. An acceptable level (below the lengths of the slips) of congestion is however maintained on the M55 slip roads in both peak hours. It is important to acknowledge that signal timing adjustments between the 'without' and 'with' Plan scenarios designed to optimise the performance of the junction will be influencing the differences in queue lengths modelled.

By considering the 2031 'do-minimum (no Plan)' and 'do-minimum (with Plan)' average queue lengths compared to the 2014 'base' scenario, a better understanding as to the impact of the Plan development aspirations can be ascertained. Table 6.2 below presents the average queue lengths in the AM and PM peaks within the assessment scenarios.

Table 6.2: Average queue lengths (metres)

Scenario	Peak Period	M55 EB Off-Slip (345m)	A585(T) north	M55 WB Off-Slip (295m)	A585(T) south
2014 'base'	**AM**	169	129	22	70
	PM	117	54	34	142
2031 'do-minimum (no Plan)'	**AM**	56 *(-113)*	200 *(+71)*	30 *(+7)*	119 *(+49)*
	PM	97 *(-20)*	95 *(+42)*	41 *(+7)*	154 *(+12)*
2031 'do-minimum (with Plan)'	**AM**	58 *(-111)*	834 *(+705)*	32 *(+10)*	111 *(+41)*
	PM	134 *(+17)*	104 *(+51)*	49 *(+15)*	224 *(+82)*

In terms of impact upon mainline flows, the lengths of the eastbound and westbound off-slips are 345m and 295m respectively from the junction circulatory to the end of the slip nose. Therefore, given the results in Table 3, the 2031 'do-minimum (with Plan)' queues within the morning and evening peaks on the M55 J3 slip roads can be accommodated by the existing off-slips at the junction.

6.2.2 2031 'do-something' assessments

Although the congestion modelled above is maintained within the capacity of the M55 slip roads, this output is influenced through the adjustment of signal timings at the junction circulatory (which is a reflection of the signal adjustments which will be required in the future in order to manage changing traffic flows). Whilst these traffic signals are optimised to maintain the operation of the roundabout circulatory primarily and for the benefit of the M55 exit slips, this is at the expense of the A585 arms, particularly the northern arm in the morning peak due to the substantial level of traffic demand during this time period.

There are a number of influences which need to be considered when interpreting the junction assessments at M55 junction 3:

- The signal timings at the junction have been modelled as fixed time and have been configured to reflect the traffic flows in each modelled scenario.
- The signal timings are focused on maintaining congestion levels on the M55 exit slips to within their capacities, yet fluctuations in the traffic demand throughout the modelled time period are not reflected by adjusted signal green times.
- It is likely that 'peak spreading' would occur as part of the growth in traffic flows from the present day to the assessment year. As a result, the peak level of traffic demand at the junction may not be as high as forecast, but the total level of demand may be spread over a longer time period.
- Given the level of congestion on the A585(T) north arm, it is also likely that alternative routes would be sought. To that end, the actual forecast level of congestion on this link may not be as high as forecast, although the proportion of traffic which would reroute or the corresponding impact on alternative routes is not known.

Notwithstanding the above, there are a number of potential mitigation measures which could be implemented at M55 junction 3 with reference to the forecast traffic demand at the junction:

- The variability in queue length (and demand) indicates that benefit could be achieved by ensuring that the junction operates optimally with MOVA in place. This would enable increased priority to be given to the A585 arms when demand at the M55 arms is lower.

- The implementation of a segregated left turn lane between the A585 North arm and the M55 eastbound on-slip (M55 East).
- The implementation of a segregated left turn lane between the M55 East (westbound off-slip) and the A585 South.

At this time these potential mitigation measures have not been assessed in detail, but are worthy of further discussion and assessment with Highways England with a view of detailed assessments being undertaken in the future. It is assumed at this stage that the above would facilitate the support of the Plan in its entirety.

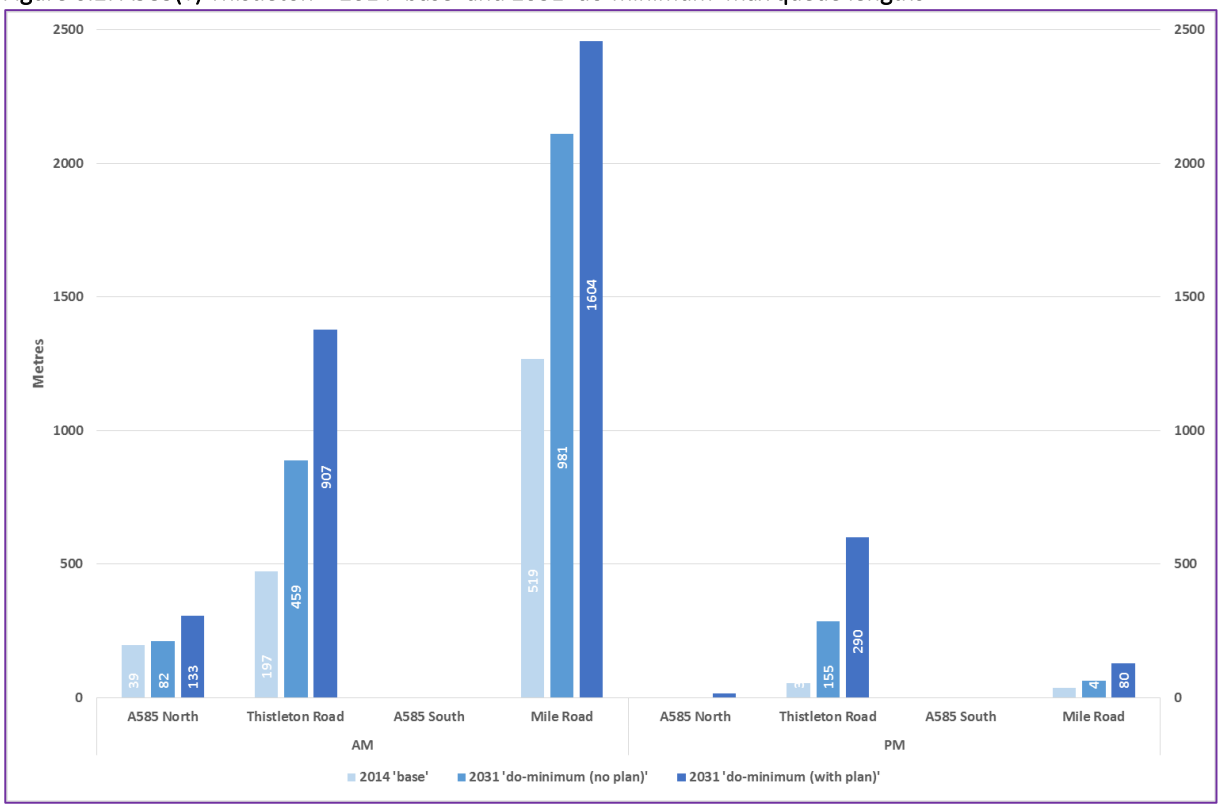
6.3 A585(T) Thistleton

6.3.1 2014 'base' and 2031 'do-minimum' assessments

The assessment of the four arm staggered priority A585(T) Thistleton junction has been completed in Paramics for both the morning and evening peaks within the 2014 'base' and 2031 'do-minimum' scenarios.

The outputs of the Paramics model for the A585(T) Thistleton junction within the 2014 'base', 'without Plan' and 'with Plan' development scenarios are presented within ***Appendix D*** for the AM and PM peaks. As a summary, Figure 6.2 below presents the maximum queue lengths modelled at this junction for each of the scenarios modelled.

Figure 6.2: A585(T) Thistleton – 2014 'base' and 2031 'do-minimum' max queue lengths



The figures above demonstrate that congestion and queue lengths are much more severe within the morning peak than the evening peak (noting the scale of the figures).

There is also a consistent growth in queue lengths through the scenarios as traffic flows increase; with the shortest queues being in the 2014 'base', followed by the 2031 'do-minimum (no Plan)' scenario and then the 2031 'do-minimum (with Plan)' scenario.

In all scenarios, the majority of congestion modelled is forecast to be located on the Mile Road and Thistleton Road arms which form part of the local road network. This is unsurprising given that it is these arms that give way to the A585(T) traffic and is specifically caused as a result of right hand

movements out of these arms being restricted due to conflicting higher priority movements between the major A585(T) arms.

Congestion on the A585(T) links are only modelled within the morning peak and only on the A585 North (southbound) arm. This congestion is a result of right hand turning movement vehicles exceeding the filter lane capacity and blocking southbound A585(T) movements through the junction. This is an intermittent issue within all scenarios and does not cause prolonged periods of delay (as identified in ***Appendix D***).

The above outcomes need to be considered in two respects:

- ***Capacity –*** the main problem relates to the local road network arms of the junction where queues are forecast to extend to significant lengths (Mile Road in the morning peak and Thistleton Road in the evening peak). The un-modelled likelihood is that such demand would seek other routes where this issue is not so prevalent. Resolving this issue however would need a measure that would allow these movements to be made with a reduced level of delay, but such would likely result in an increase in delay to the strategic north-south A585(T) movement.
- ***Safety*** - at priority junctions such as this, an increased demand for the use of the side arms, both in terms of those turning from the minor arm but also those turning right from the mainline into the minor arms, coupled with an increasing mainline flow, can lead to fewer safe opportunities to make the movements. Clearly such could lead to driver frustration and it is noted from previous consideration of the A585(T) corridor, stretching back to the Route Management Strategy process, that this element of the network had issues associated with right turning movements at junctions.

6.4 A585(T) Windy Harbour – Skippool

6.4.1 Major improvement scheme

The government announced proposals to substantially improve the A585(T) at Little Singleton in their Road Investment Strategy [RIS]. Highways England is currently developing the proposals and reviewing options prior to public consultation in the second half of 2016.

The location of the scheme was chosen as road users currently experience heavy congestion at peak times on the main road to Fleetwood, with the Little Singleton and Shard Road junctions forming a major bottleneck. The works will remove a major bottleneck, reduce congestion and lessen the impact of traffic on the local community.

6.4.2 Study consideration

On the basis of the scheme proposal, the assessment of operational performance of this stretch of network has not been undertaken in the same manner as has been undertaken for the rest of the A585(T) corridor for the following junctions:

- Skippool junction (A585(T) / A588 Breck Road / B5412 Skippool Road);
- Shard junction (A585(T) / A588 Shard Road);
- Singleton junction (A585(T) / A586 Garstang Road / Lodge Lane); and
- Windy Harbour junction (A585(T) / A586 Garstang Road / Windy Harbour Road).

During the development of the scheme and determining the scheme options, Highways England will undertake detailed operational analysis and appraisal of this scheme. This operational analysis will give consideration to future likely traffic growth including that which could be expected to arise from future development-related aspirations. This, or the level of growth that the appraisal will be based upon, is not available at the time of undertaking this study.

On this basis, the provisional outcome of this study is that this element of the network could accommodate the trips associated with the development proposed in the Plan in their entirety. However, this conclusion is caveated heavily here and throughout the response to the Plan in that:

(i) **There is no current certainty that the operational analysis and appraisal of the scheme will specifically consider the level of development being proposed in the Plan. The scheme appraisal will be undertaken in accordance with DfT Transport Analysis Guidance [TAG] and with a view to TAG unit 3.15.5 (The Treatment of Uncertainty in Forecasting), developments which are "one of a number of possible inputs in an initial consultation process, Or, a policy aspiration" are considered to be "Hypothetical: There is considerable uncertainty whether the outcome will ever happen." On this basis, TAG identifies that such hypothetical development would not form part of the 'Core Scenario' but that they could form part of a 'Sensitivity test'.**

(ii) **There is no current certainty that the scheme budget will deliver a scheme that provides the level of capacity that could accommodate all future growth forecasts and specifically growth associated with the development proposed in the Plan.**

(iii) **On this basis, there is no certainty that other measures, beyond those that the scheme will deliver, will not be required to support the level of development aspired through the Plan.**

This important caveat should be recognised and considered in terms of how the Plan progresses and the potential provisions it needs to make on the basis of this current level of unknown. Highways England will continue to work with the Council as the appraisal of the scheme advances.

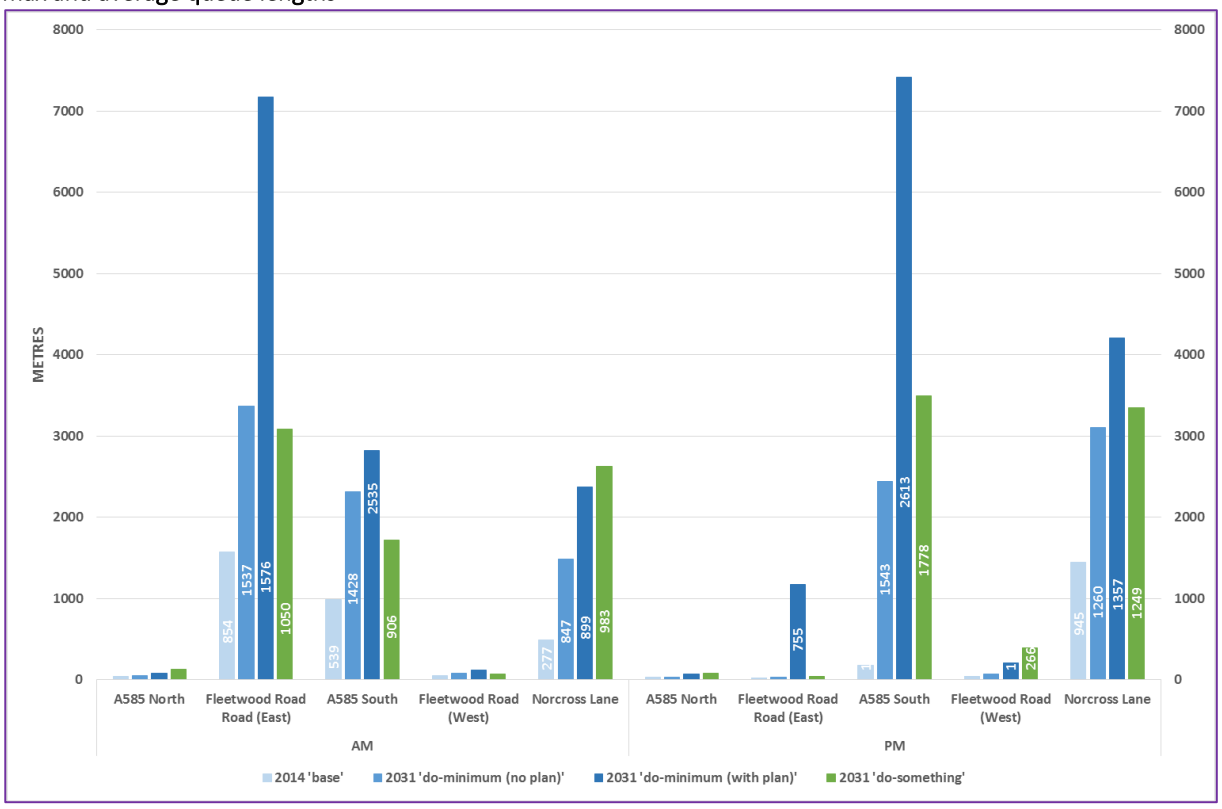
6.5 A585(T) / Norcross Lane / Fleetwood Road

6.5.1 2014 'base' and 2031 'do-minimum' assessments

This five arm unsignalised roundabout between the A585(T), Norcross Lane and Fleetwood Road has been assessed using the A585(T) Paramics model.

The outputs of the Paramics model for the A585(T) / Norcross Lane / Fleetwood Road junction in the assessment scenarios are presented in Figure 6.3. ***Appendix E*** contains the queue profiles across the AM and PM peaks for the 2014 'base' and 2031 'do minimum' and 2031 'do-something' scenarios.

Figure 6.3: A585(T) / Norcross Lane / Fleetwood Road – 2014 'base', 2031 'do-minimum' and 2031 'do-something' max and average queue lengths



Substantial queue lengths and congestion is modelled throughout the A585(T) / Norcross Lane / Fleetwood Road junction. On all arms, longer queues are modelled compared to the 2014 'base' within both 2031 assessment scenarios due to higher network travel demands. Logically also, queue lengths are higher within the 2031 'do-minimum (with Plan)' scenario compared to the 2031 'do-minimum (no Plan)'.

In the AM peak, queue lengths increase substantially on the Fleetwood Road East and A585(T) south arms, which is likely to be a result of conflicting higher priority movements from the A585(T) north. In the PM peak, the A585(T) south arm is again severely impacted upon by traffic demand increases in the 2031 assessment scenarios compared to the 2014 'base' scenario.

The congestion modelled at this junction in the 2031 'do-minimum (with Plan)' scenario, as indicated by the excessive queue lengths, requires mitigation in order to maintain an acceptable level of performance at the junction.

6.5.2 2031 'do-something' assessments

The Fleetwood-Thornton Area Action Plan [AAP] proposed a scheme at this junction as part of its Sustainable Transport Strategy. This scheme comprised the widening and realignment of all arms at the junction to provide more entry capacity and a wider circulatory. Since the production of this strategy however, a Transport Assessment detailing proposals for a mixed-use development in Norcross identified that the proposed scheme would not be sufficient to cope with the (by the time of writing) refined development aspirations in the area.

In order to maintain an acceptable level of operation at the A585(T) / Norcross Lane / Fleetwood Road junction, additional junction enhancements to the AAP were proposed including the signalisation of A585(T) arms. Full details are as follows:

- **A585(T) north –** lane markings and signalisation;
- **Fleetwood Road north –** additional lane on both the entry and exit links;
- **A585(T) South –** additional lane on the entry link and signalisation. Extended merge section on the exit link;

- **Fleetwood Road South –** additional lane and road markings on the entry link; and
- **Norcross Lane –** additional lane on the entry link and extended merge section on the exit link.

The transport consultants which produced the Transport Assessment, Curtins, produced a full scheme drawing detailing the above proposals. This drawing has been extracted from the Transport Assessment for reference and can be found within ***Appendix J*** (90323_TA_008). It is this scheme which has been modelled within the 2031 'do-something' assessment scenario.

As shown within Figure 6.3 the effects of this mitigation scheme are seen throughout the junction. In the AM peak, there is a reduction in congestion on the Fleetwood Road (East) and A585 South arms to a level below that of the 2031 'do-minimum (no plan) scenario. This will be a consequence of the traffic signals changing the previously constant flow of movements from the A585(T) north to a 'pulsed' flow, hence providing gaps in circulatory traffic movements and allowing vehicles from the Fleetwood Road (East) arm to access the circulatory. While there is a small increase in congestion on Norcross Lane as a result of the mitigation scheme, this additional congestion is considered to be offset by the wider operational benefits at the junction. It is also considered that if congestion on Norcross Lane is severe, rerouting will occur, a travel behaviour which is not captured or considered within the A585 corridor Paramics model.

In the PM peak, congestion is substantially reduced on the A585 South and Norcross Lane arms, to a level comparable with that in the 2031 'do-minimum (no plan) scenario. Congestion is removed entirely from the Fleetwood Road (East) arm and there is a negligible increase on the Fleetwood Road (West) arm.

The impacts of this mitigation scheme also extend beyond this junction, as it was necessary as part of the mitigation modelling stage to complete a number of signal timing refinements in order to balance the residual congestion, such is the sensitivity of traffic flows at the junction in the 2031 assessment year. The sensitivity of the signal timings at this junction also indicate the requirement for further junction assessments to be undertaken using a specialised traffic signal modelling package in order to precisely derive the most effective signal timing pattern.

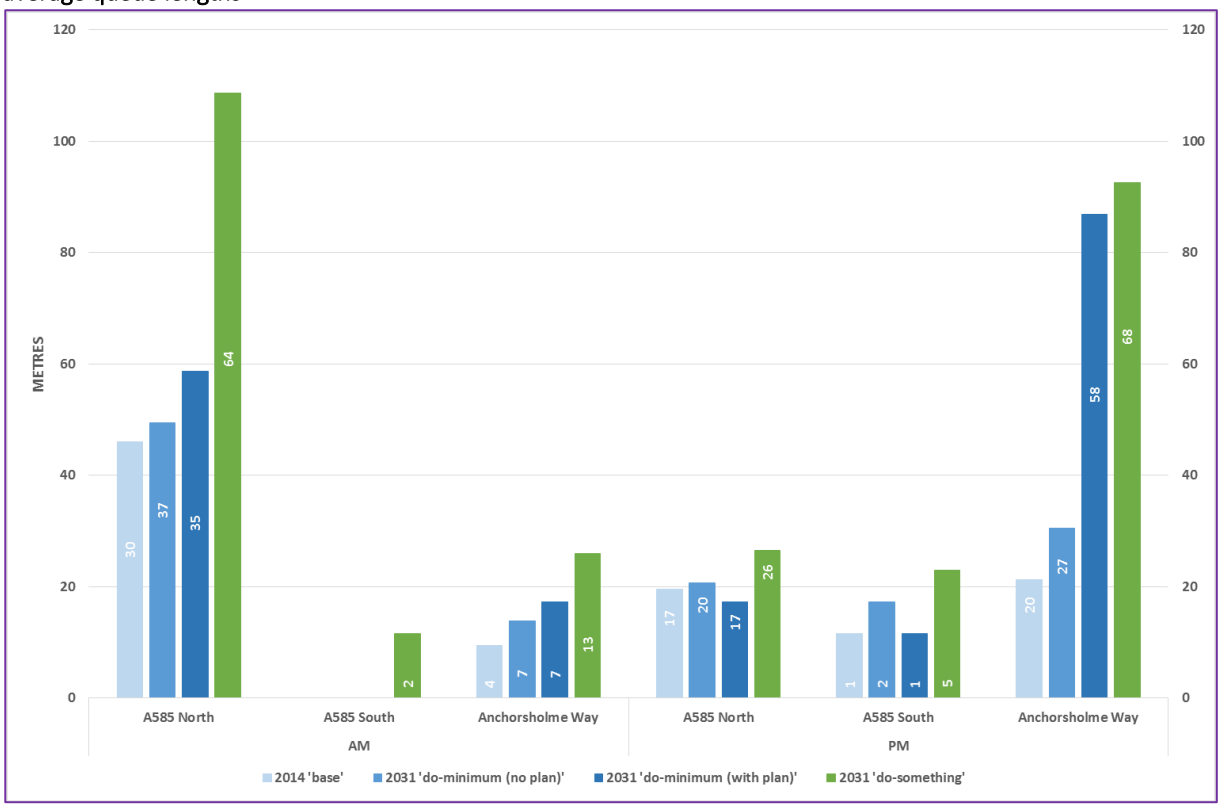
6.6 A585(T) / Anchorsholme Lane

6.6.1 2014 'base' and 2031 'do-minimum' assessments

This three arm priority junction includes left and right turn filter lanes on the A585(T) approaches, while right turning movements from Anchorsholme Lane are banned. Therefore, any movement from Anchorsholme Lane to the A585(T) South must travel north initially before performing a U-turn at the A585(T) / Victoria Road roundabout.

The outputs of the Paramics model for the A585(T) / Anchorsholme Lane junction in the three assessment scenarios are presented in Figure 6.4 for the AM and PM peak. ***Appendix F*** contains the queue profiles across the AM and PM peaks for the 2014 'base' and 2031 'do minimum' and 2031 'do-something' scenarios.

Figure 6.4: A585(T) / Anchorsholme Lane – 2014 'base', 2031 'do-minimum' and 2031 'do-something' max and average queue lengths



With reference to the queue profiles in ***Appendix F***, queue lengths on arms at the A585(T) / Anchorsholme Lane junction fluctuate through the AM and PM peak periods. A key consideration at this junction are the lengths of the filter lanes on the A585(T) which are provided to cater for vehicles turning into Anchorsholme Lane from the A585(T) north or A585(T) south. If these are exceeded then A585(T) traffic travelling through the junction will be impeded.

The length of the A585(T) north filter lane (for right hand turning movements into Anchorsholme Lane) is approximately 70m with the A585(T) South filter lane being approximately 120m. The figures above suggest that the filter lane queue lengths will not impact upon A585(T) mainline traffic movements in either the AM or PM peak.

Although there appears to be an increase in congestion on the A585 North arm in the AM peak as a result of the mitigation scheme at the A585(T) / Norcross Lane / Fleetwood Road, it is important to note that Figure 6.4 presents the maximum queue length within the peak period. Across the peak period, congestion will build up and dissipate as traffic flows fluctuate. With further reference to the figures presented within ***Appendix F***, the congestion highlighted here is not considered significant.

6.6.2 2031 'do-something' assessments

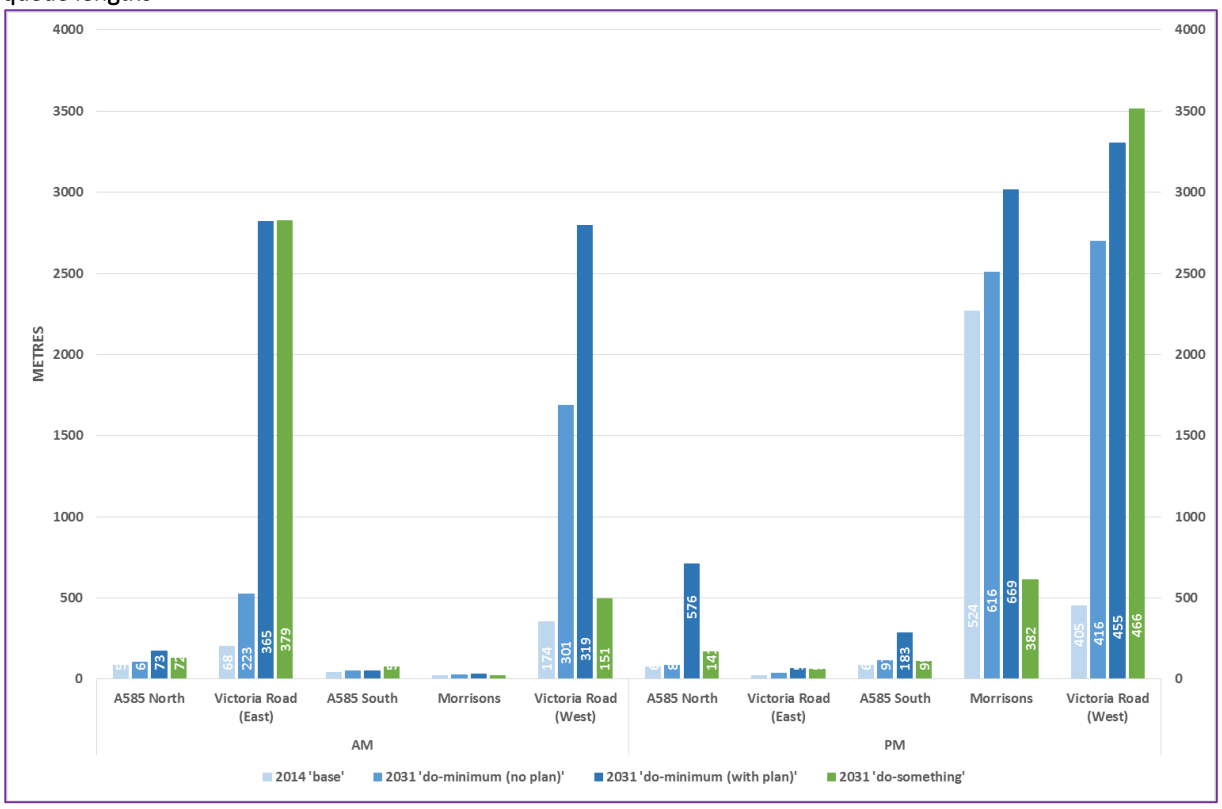
The knock on effects at this junction resulting from mitigation schemes proposed at other junction on this A585 corridor, are not considered to have a detrimental impact to the performance and operation of the A585(T) / Anchorsholme Lane junction.

6.7 A585(T) / Victoria Road

6.7.1 2014 'base' and 2031 'do-minimum' assessments

This five arm unsignalised roundabout between the A585(T) and Victoria Road (and the Morrisons superstore) has been assessed using the A585(T) Paramics model. The outputs of the Paramics model for the A585(T) / Victoria Road junction in the three assessment scenarios are presented in Figure 6.5 for the AM and PM peaks. ***Appendix G*** contains the queue profiles for the AM and PM peaks for the 2014 'base' and 2031 'do-minimum' assessment scenarios.

Figure 6.5: A585(T) / Victoria Road – 2014 'base', 2031 'do-minimum' and 2031 'do-something' max and average queue lengths



Different arms of the A585(T) / Victoria Road junction incur congestion within the AM and PM peak periods. In the AM peak, congestion is highest on the Victoria Road east and west arms and there is a clear step change in queue lengths between the scenarios with the 2031 'do-minimum (with Plan)' trip demands resulting in higher congestion (as would be expected) than the 2031 'do-minimum (with Plan)' and 2014 'base' scenarios. There is also an increase in congestion on the A585(T) north arm, albeit at a much lower level. This queuing does not extend back and impact upon other junctions to the north.

Congestion is also modelled within the PM peak, but the distribution of congestion through the junction is quite different. Congestion is modelled on the Morrison's arm within all three scenarios, however the greatest proportional increase in congestion is on the A585(T) north arm. Maximum queue lengths on this arm increase from approximately 13-15 vehicles in the 2014 'base' and 2031 'do-minimum (no Plan)' scenarios to 123 vehicles in the 2031 'do-minimum (with Plan)' scenario. Upon review of the distribution of development trip movements through the junction, the above congestion on the A585(T) north arm is likely to be caused due to the increase in movements from the Victoria Road West arm to the Victoria Road West or A585(T) south arms, as these movements will impede access from the A585(T) north arm (which itself also incurs a significant number of new development trips). As will be discussed in the following sections, this congestion on the A585 North arm is modelled to affect the operation of the A585(T) / West Drive and A585(T) / Bourne Way junctions.

The substantial congestion modelled at this junction, as indicated by the excessive queue lengths, leads to the recommendation that mitigation schemes need to be identified and assessed at this junction.

6.7.2 2031 'do-something' assessments

The Fleetwood-Thornton Area Action Plan [AAP] proposed a scheme at this junction as part of its Sustainable Transport Strategy. This scheme comprised the widening and realignment of all arms at the junction to provide more entry capacity, and a wider circulatory as detailed below:

- **A585(T) north** – extra lane on both the entry and exit slips. Provision of two lane path from A585(T) north to south through the junction;

- **Victoria Road East** – additional lane on both the approach and stop line;
- **A585(T) South** – additional lane on both the approach and stop line. Extended two lane merging section on the exit link;
- **Morrisons** – additional lane at the stop line; and
- **Victoria Road West** – additional lane on approach to the stop line and extended two lane merging section on the exit link.

Upon modelling the above scheme, it was found that this scheme does not offer sufficient mitigation for the level of traffic forecast in the 2031 assessment year. Specifically, the additional capacity on the A585(T) North and South arms resulted in an increased level of flow onto and through the junction circulatory. This restricted the opportunities for waiting traffic on the Morrisons and Victoria Road arms to enter the circulatory and therefore, congestion actually became more severe on these arms. Further mitigation measures were therefore implemented in the form of traffic signals on the A585 North and South arms so to better regulate traffic flow through the junction. A full scheme drawing detailing the widening, lining and traffic signal mitigation proposals can be found within ***Appendix J***.

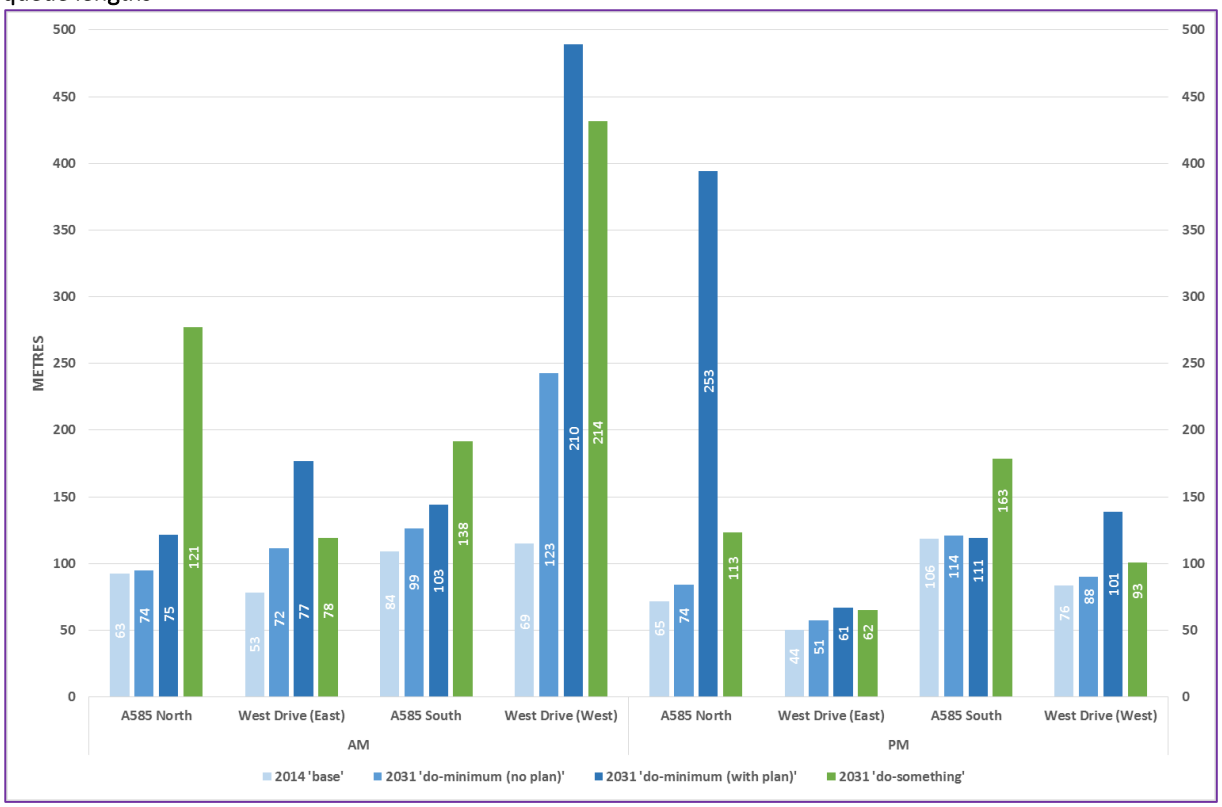
Like the A585(T) / Norcross Lane / Fleetwood Road junction, the effects of the mitigation scheme are seen throughout the junction (with reference to Figure 6.5). In the AM peak, a substantial reduction in congestion is modelled on the Victoria Road (West) arm while there are negligible changes in congestion on all other arms. In the PM peak, lower congestion is modelled on all arms except the Victoria Road (West) arm. Within both peak periods, it is considered that there is a net benefit to the junction operation as a whole as a result of the proposed mitigation measures. It is also considered that if congestion on Victoria Road arms is severe, rerouting will occur, a travel behaviour which is not captured or considered within the A585 corridor Paramics model.

6.8 A585(T) / West Drive

6.8.1 2014 'base' and 2031 'do-minimum' assessments

This four arm signalised junction between the A585(T) and West Drive has been assessed using the A585(T) Paramics model. The outputs of the Paramics model for the A585(T) / West Drive junction in the three assessment scenarios are presented in Figure 6.6 for the AM and PM peaks. ***Appendix H*** contains the queue profiles for the AM and PM peaks for the 2014 'base' and 2031 'do-minimum' assessment scenarios.

Figure 6.6: A585(T) / West Drive – 2014 'base', 2031 'do-minimum' and 2031 'do-something' max and average queue lengths



In the AM peak, congestion increases on the West Drive east and west arms between each of the three scenarios, most notably on the West Drive (west) arm. Queue lengths on the A585(T) north and south arms slightly increase between the three scenarios, but are not to a level which is deemed detrimental to the operation of the junction or other junctions nearby.

Queue lengths on the A585(T) north arm increase substantially in the PM peak within the 2031 'do-minimum (with Plan)' scenario. As noted above, this congestion is caused as a result of queue traffic caused by capacity constraints at the A585(T) / Victoria Road junction located to the south. Queue lengths on other arms remain broadly constant.

6.8.2 2031 'do-something' assessments

The effects of proposed mitigation schemes at the A585(T) / Victoria Road can be seen to benefit the operation of the A585(T) / West Drive junction in the PM peak through a substantial reduction in congestion on the A585 North arm. This is a result of traffic no longer backing up from the A585(T) / Victoria Road junction. While there is a small increase in congestion on the A585 South arm, this will not impact upon the A585(T) / Victoria Road junction to the south.

A similar situation occurs in the AM peak, where congestion is reduced on the West Drive arms, but slight increases are modelled on the A585 North and South arms. The largest increase is on the A585 North arm, but this will not back up and impact upon the A585(T) / Bourne Way junction to the north. This increase has been generated as a result of signal timing adjustments being required in order to facilitate the increase in traffic demand on the A585 South arm which has been 'released' from congestion as a result of the A585(T) / Victoria Road signalisation scheme.

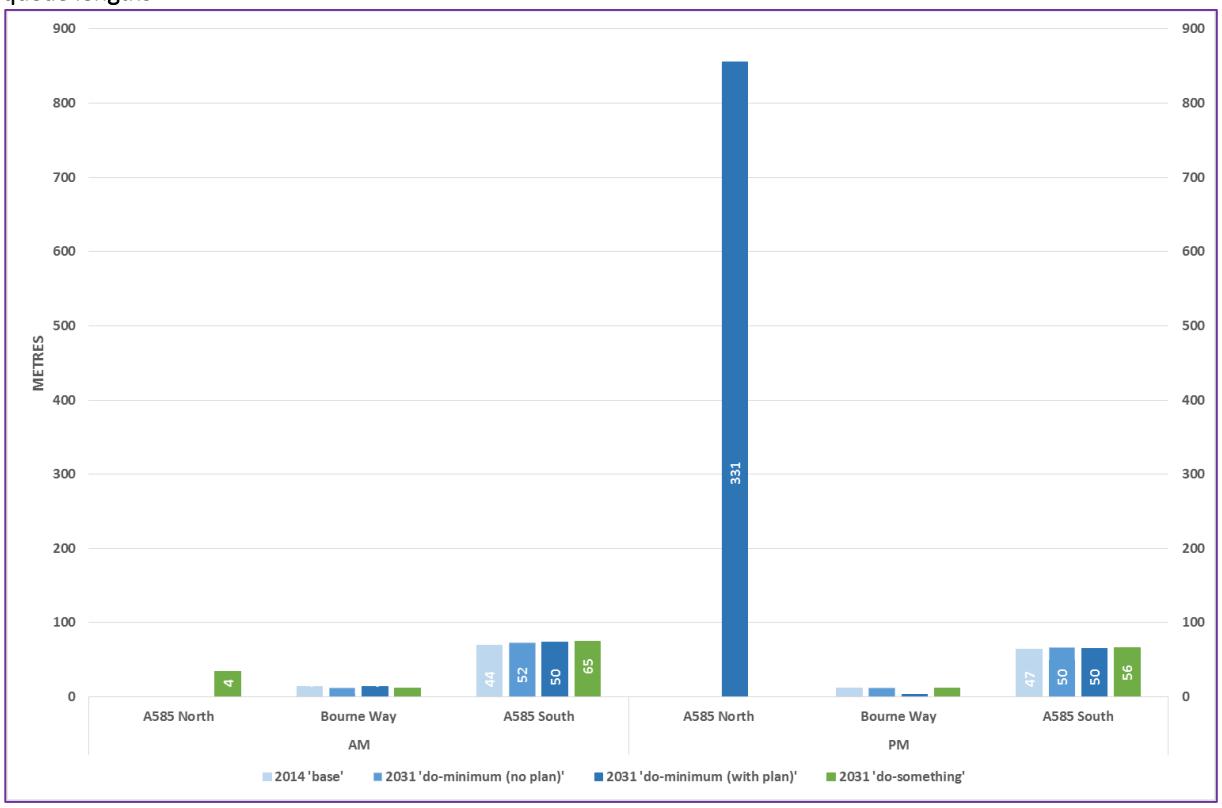
6.9 A585(T) / Bourne Way

6.9.1 2014 'base' and 2031 'do-minimum' assessments

The three arm signalised junction between the A585(T) and Bourne Way has been assessed using the A585(T) Paramics model. The outputs of the Paramics model for the A585(T) / Bourne Way junction in the three assessment scenarios are presented in Figure 6.7 for the AM and PM peaks. ***Appendix I***

contains the queue profiles for the AM and PM peaks for the 2014 'base' and 2031 'do-minimum' assessment scenarios.

Figure 6.7: A585(T) / Bourne Way – 2014 'base', 2031 'do-minimum' and 2031 'do-something' max and average queue lengths



The level of queuing in the AM peak at the A585(T) / Bourne Way junction is low and not considered significant. While queue lengths on the A585(T) south arm are longer than other arms, this queuing does not extend back to and impact upon the operation of the A585(T) West Drive junction to the south. It is also worth noting that the queue lengths remain broadly the same between the three scenarios.

In the PM peak, there is a substantial increase of queuing traffic on the A585(T) north arm. Despite this congestion, the next junction to the north is over 1,500m away and therefore the congestion is fully contained within the A585(T) southbound link to the north of the junction. The cause of this congestion is as a result of capacity constraints at the A585(T) / Victoria Road junction located to the south (which also affects the operation of the A585(T) / West Drive junction).

6.9.2 2031 'do-something' assessments

The mitigation measures applied at the A585(T) / Victoria Road junction offer benefits which extend through the A585(T) / West Drive junction and the A585(T) / Bourne Way junction, as can be seen by the elimination of congestion on the A585 North in the PM peak. No other mitigations at the A585(T) / Bourne Way junction have been applied.

6.10 Junction assessments summary

In order to draw together the junction assessment outputs detailed above, the following presents a summary of each junction assessment by scenario.

- **M55 Junction 3** – The 2031 'do-minimum' assessments included a previously identified scheme which is anticipated to be implemented before 2031. This signalisation and lining scheme offered benefits to junction operation even with the addition of future year traffic growth and development trips. Average queue lengths on the M55 exit slip roads were found to be within the capacity of the slip roads in the 2031 'do-minimum (with Plan)' assessments,

although the A585 arms show signs of significant detrimenttherefore no further mitigation schemes have been identified at this stage, although our conclusions offer potential conisderations.

- **A585(T) Thistleton** – There is consistent growth in queue lengths through the scenarios as traffic flows increase; with the shortest queues being in the 2014 'base', followed by the 2031 'do-minimum (no Plan)' scenario and then the 2031 'do-minimum (with Plan)' scenario. Congestion at this junction are centred on the minor Thistleton and Mile Road arms. No specific mitigation schemes have been identified at this stage, although our conclusions offer potential conisderations.
- **A585(T) / Norcross Lane / Fleetwood Road** - On all arms, longer queues are modelled compared to the 2014 'base' within both 2031 assessment scenarios due to higher network travel demands. The queue lengths within the 2031 'do-minimum (with Plan)' assessment are considered substantial. A mitigation scheme comprising entry/exit link widening and signalisation of the A585(T) arms provided a level of mitigation which would maintain the forecast performance and operation of the junction in the 2031 'do-minimum (no Plan)' scenario.
- **A585(T) / Anchorsholme Lane** – The existing filter lanes are deemed to have sufficient capacity to cater for 2031 'do-minimum (with Plan)' traffic demand. No mitigation at this junction specifically is considered necessary. The junction is also found to operate at no detriment with the implementation of mitigation schemes at the A585(T) / Norcross Lane / Fleetwood Road and A585(T) / Victoria Road.
- **A585(T) / Victoria Road** - On all arms, longer queues are modelled compared to the 2014 'base' within both 2031 assessment scenarios due to higher network travel demands. The queue lengths within the 2031 'do-minimum (with Plan)' assessment are considered substantial and will impact upon the performance of operation of the A585(T) / West Drive and A585(T) / Bourne Way junctions to the north. A mitigation scheme comprising entry/exit link widening and traffic signals on the A585(T) provided a level of mitigation which would maintain the forecast performance and operation of the junction in the 2031 'do-minimum (no Plan)' scenario, although congestion is still forecast on the Victoria Road (East) arm in the AM peak and on the Victoria Road (West) arm in the PM peak.
- **A585(T) / West Drive** – congestion increases with the addition of traffic between the 2014 'base' and 2031 assessment scenarios. The operation of the junction is impact upon excessive congestion at the A585(T) / Victoria Road junction in the 2031 'do-minimum (with Plan)' assessment. With the introduction of the mitigation scheme at the A585 / Victoria Road junction, the operation of the A585(T) / West Drive junction is greatly improved. No specific hard mitigation measures are considered necessary at the junction, although it is anticipated that adjustments to the signal timings will be required to more accurately adapt to future year traffic demands.
- **A585(T) / Bourne Way** – queue lengths are consistently low throughout the assessment scenarios. Although there is a substantial proportional increase in queuing on the A585(T) north arm in the 2031 'do-minimum (with Plan)' scenario, this is a consequence of congestion generated by capacity constraints at the A585(T) / Victoria Road junction to the south. Following the introduction of the mitigation scheme at the A585 / Victoria Road junction, the A585(T) / Victoria Road junction operates efficiently. No mitigation is considered necessary at the A585(T) / Bourne Way junction.

Fylde Local Plan Consideration

7.1 Background

Further assessments have been undertaken on the request of Highways England. Specifically, these additional assessments consider the combined impact of Wyre and Fylde Plan development trips in 2031 at M55 junction 3 only. These assessments seek to determine the impact at the junction arising from the combined Plan proposals and seeks to define the need for measures to support the Plans with regard these impacts.

7.2 Methodology

To consider the impact of Fylde Plan development trips, committed and full development aspirations featured within the Fylde Local Plan to 2032 (Emerging) Highways England Assessment Report (September 2015) [hereon referred to as the Fylde study] has been incorporated into the Wyre assessment methodology detailed within section 3.

The Fylde Plan development traffic forecasts are based on those contained within the Fylde Study. Given the Fylde assessment was undertaken in September 2015, the development patterns were slightly adjusted based on revised information received from the Council.

The trips that have been forecast to be directly associated with the Plan development aspirations have been derived through use of the Highways England GraHAm tool. It is this same tool that has formed the starting point for the other evidence base workstreams that are being undertaken in relation to the Plan. Figure 7.1 presents the committed and Figure 7.2 presents the full Fylde Plan development trips through M55 junction 3.

Figure 7.1: Committed Fylde Plan development trips at M55 junction 3

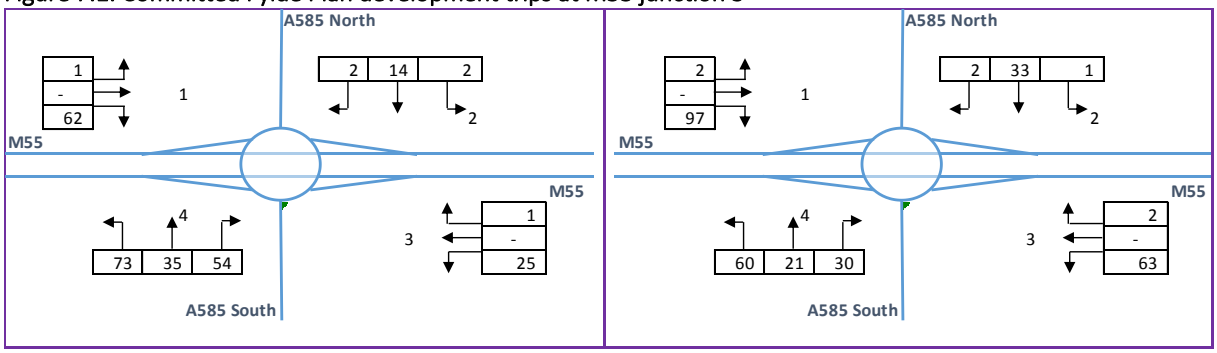
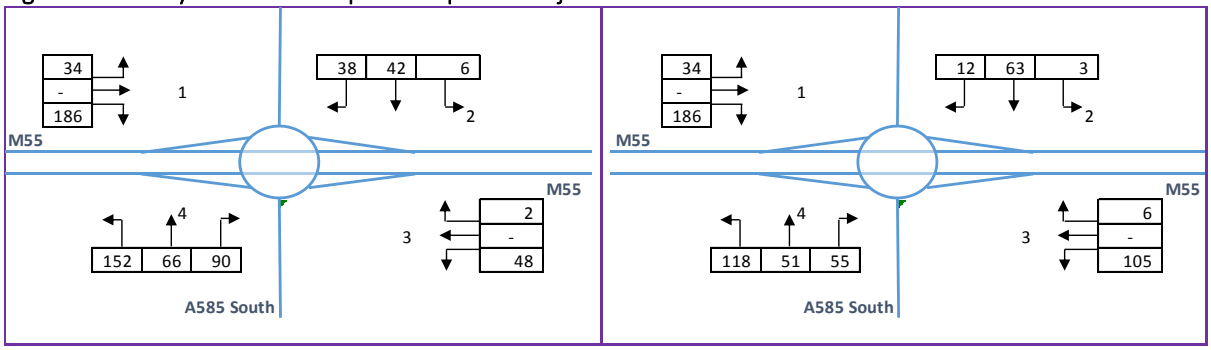


Figure 7.2: Full Fylde Plan development trips at M55 junction 3



These development trips are then applied as per the methodology detailed within section 4 and added to the traffic flow build up at the same stage as the Wyre Plan development trips. The combination of the Wyre and Fylde Plan trips, the Tempro background traffic and 2014 base flows provides a representation of forecast traffic levels and traffic movements within the 2031 assessment year. The 2031 assessment year flows for Wyre and committed Fylde Plan scenario and full Wyre and Fylde Plan scenarios at M55 junction 3 are presented within and Figure 7.4.

Figure 7.3: 2031 future assessment year trips (including Wyre and committed Fylde Plan trips)

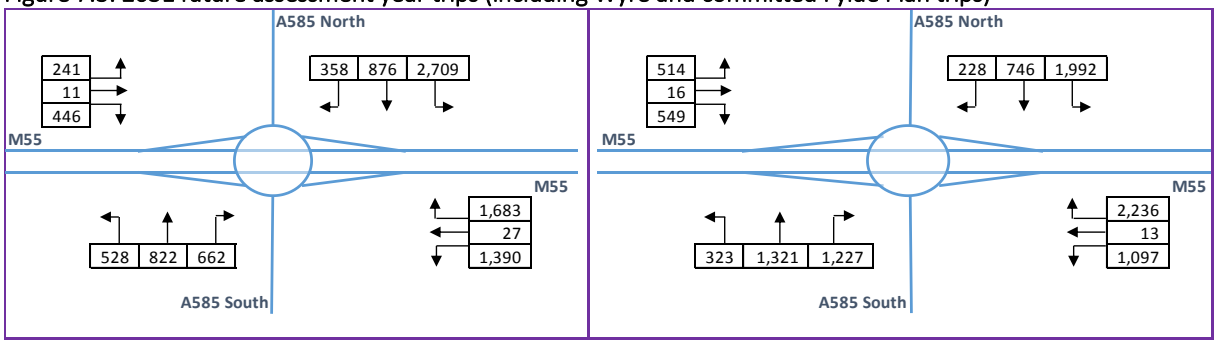
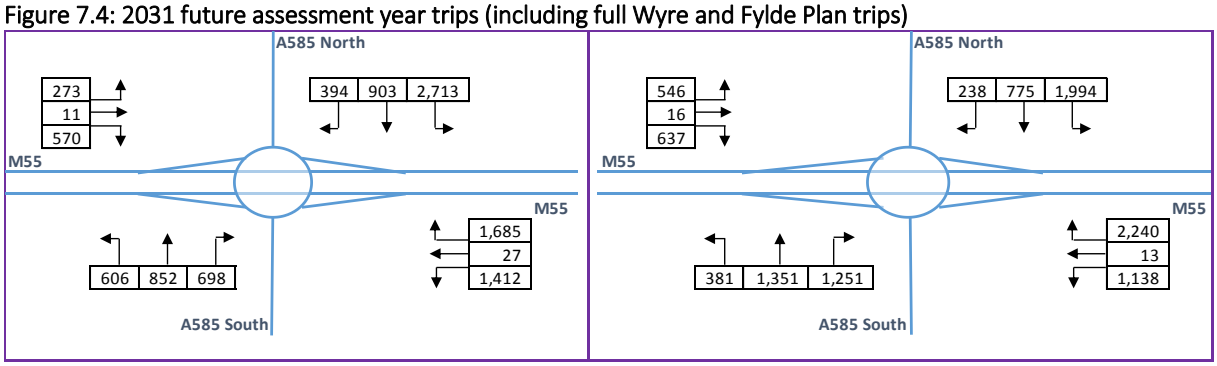


Figure 7.4: 2031 future assessment year trips (including full Wyre and Fylde Plan trips)



7.3 Outputs summary

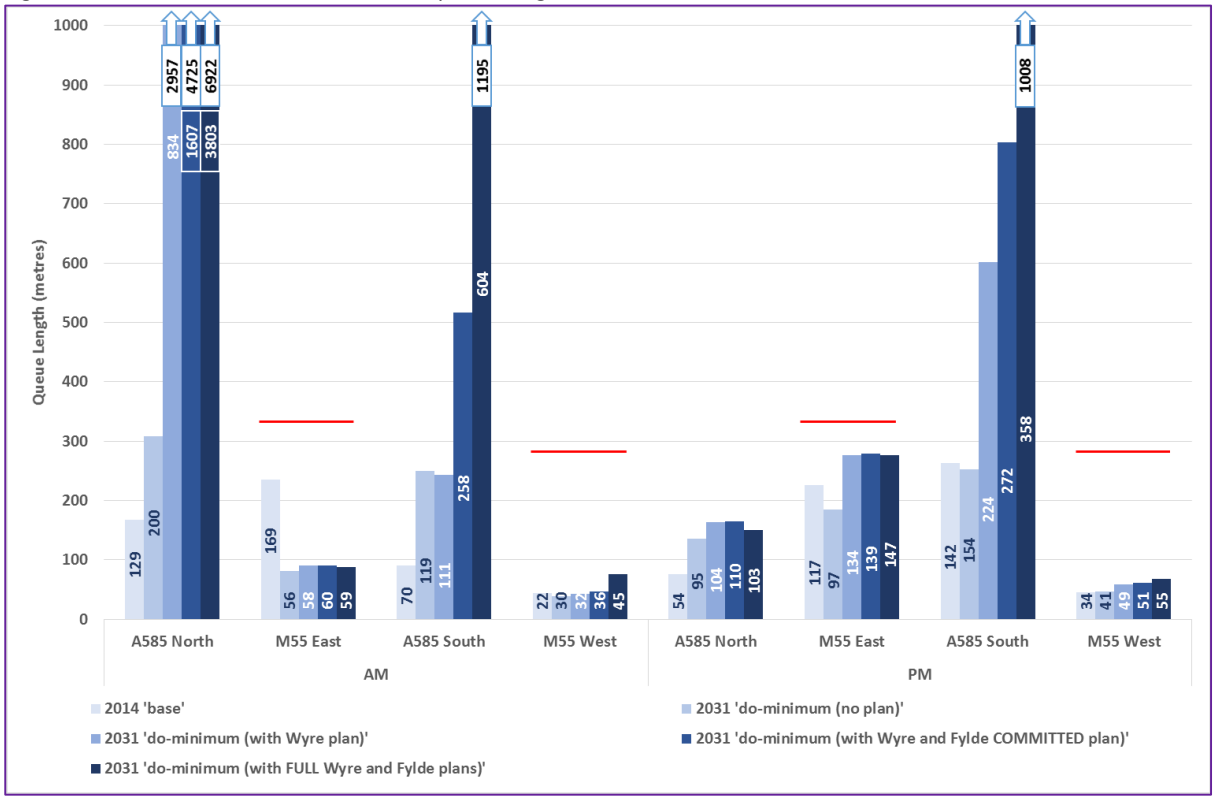
The assessment of M55 junction 3 has been completed in Paramics for both the morning and evening peaks within the 2014 'base' and 2031 'do-minimum' scenarios. Given the basis of the assessment is founded on the analysis undertaken as part of the Wyre study, the 'with Plan' outcomes are presented below for both:

- the Wyre Plan alone;
- The full Wyre and committed Fylde Plans; and,
- the combined impacts of the Full Wyre and Fylde plans.

At this location, the 2014 'base' network contains an unsignalled junction, with only a single lane on the circulatory arc between the westbound off-slip and westbound on-slip. The 2031 assessment year network contains a 'most likely' highway scheme which will see the introduction of traffic signals on the junction circulatory and relining and widening of links to provide a two-lane path from the M55 westbound off-slip to the A585(T) north.

The outputs of the Paramics modelling in terms of maximum and average queue lengths are presented in Figure 7.5. Note that the bar reflects the maximum length of the queue on that arm, while the numeric values shown present the average queue length for that time period. The red line shows the length of the M55 exit slip roads at junction 3.

Figure 7.5: M55 J3 Paramics assessment queue lengths



Compared to the 2014 'base', within the 2031 'do-minimum (no Plan)' scenario, lower queues are modelled on the M55 slip road in both the morning and evening peaks and the queues remain within the length of the slip roads (as indicated by the red horizontal lines). This reflects the operational benefits to the SRN provided by the 'most likely' highway scheme highlighted above, but also indicates the operational disbenefit to the A585 North and South arms.

With the addition of Plan development trips, queue lengths increase substantially on the A585 North arm in the AM peak and A585 South arm in the evening peak from the 'no plan' to 'with Wyre Plan' scenarios. An acceptable level of congestion is however maintained on the M55 slip roads in both peak hours. It is important to acknowledge that signal timing adjustments between the 'without' and 'with' Plan scenarios designed to optimise the performance of the junction will be influencing the differences in queue lengths modelled.

With the further addition of the committed Fylde and full Fylde Plan trips within the 2031 'do-minimum scenarios, congestion increases exponentially on those arms where congestion was already noted within the 'with Wyre Plan' scenarios. Excessive congestion is now modelled on the A585 North arm within the morning peak and A585 South arm within both peak hours. In terms of the M55 exit slip roads however, congestion remains within the capacity of the slip road in both peak hours.

Although the congestion modelled above is maintained within the capacity of the M55 slip roads, this output is influenced through the adjustment of signal timings at the junction circulatory (which is a reflection of the signal adjustments which will be required in the future in order to manage changing traffic flows). Whilst these traffic signals are optimised for the benefit of the circulatory primarily and of the M55 exit slips, this is at the expense of the A585 arms, particularly the northern arm in the morning peak due to the substantial level of traffic demand during this time period.

As discussed within section 6.2.2, there are a number of influences which need to be considered when interpreting the junction assessments at M55 J3 including fixed signal timings, the potential for peak spreading and alternative routes being used which may result in the level of traffic demand and congestion to be less than what has been modelled.

As also detailed within section 6.2.2, there are a number of potential mitigation measures which could be implemented at M55 junction 3 with reference to the forecast traffic demand at the junction:

- The variability in queue length (and demand) indicates that benefit could be achieved by ensuring that the junction operates optimally with MOVA in place. This would enable increased priority to be given to the A585 arms when demand at the M55 arms is lower.
- The implementation of a segregated left turn lane between the A585 North arm and the M55 eastbound on-slip (M55 East).
- The implementation of a segregated left turn lane between the M55 East (westbound off-slip) and the A585 South.

At this time these potential mitigation measures have not been assessed in detail, but are worthy of further discussion and assessment with Highways England with a view of detailed assessments being undertaken in the future. It is assumed at this stage that the above would facilitate the support of the Plan in its entirety.

Summary

8.1 Conclusions

Through analysis of the likely future demands on the A585(T) corridor, and with a view to the purpose of the study, it has been possible to define both:

- The scale of development that could be brought forward without the need for significant additional infrastructure; and
- The nature and scale of further infrastructure measures that may be required to support the Plan aspirations.

Table 8.1 overleaf seeks to offer a summary of the findings.

8.2 Study tool

To aid the Council with the understanding of what level of development (as defined within the local plan) can be progressed before, or with, suitable mitigation measures in place, a development impact assessment tool has been developed for use by the Council.

Based on a cap of development as specified by the Local Plan, the tool allows the user to adjust the scale of residential and employment development throughout the Wyre region, which will affect the scale and distribution of development trip impacts through the A585 corridor.

Based on this bespoke Local Plan development aspiration, the tool will also highlight where the operating capacity of each junction is exceeded (drawing on the outputs of the Paramics modelling presented within this report). A facility is then available to the user to adjust which mitigation schemes are implemented at which junction, in order to increase the operating capacity with the aim of being sufficient to cope with the traffic impacts forecast by the specified Local Plan development aspirations.

It is envisaged that the tool will enable the Council to determine a suitable mix of Wyre Local Plan aspirations which can be delivered within different network improvement scenarios.

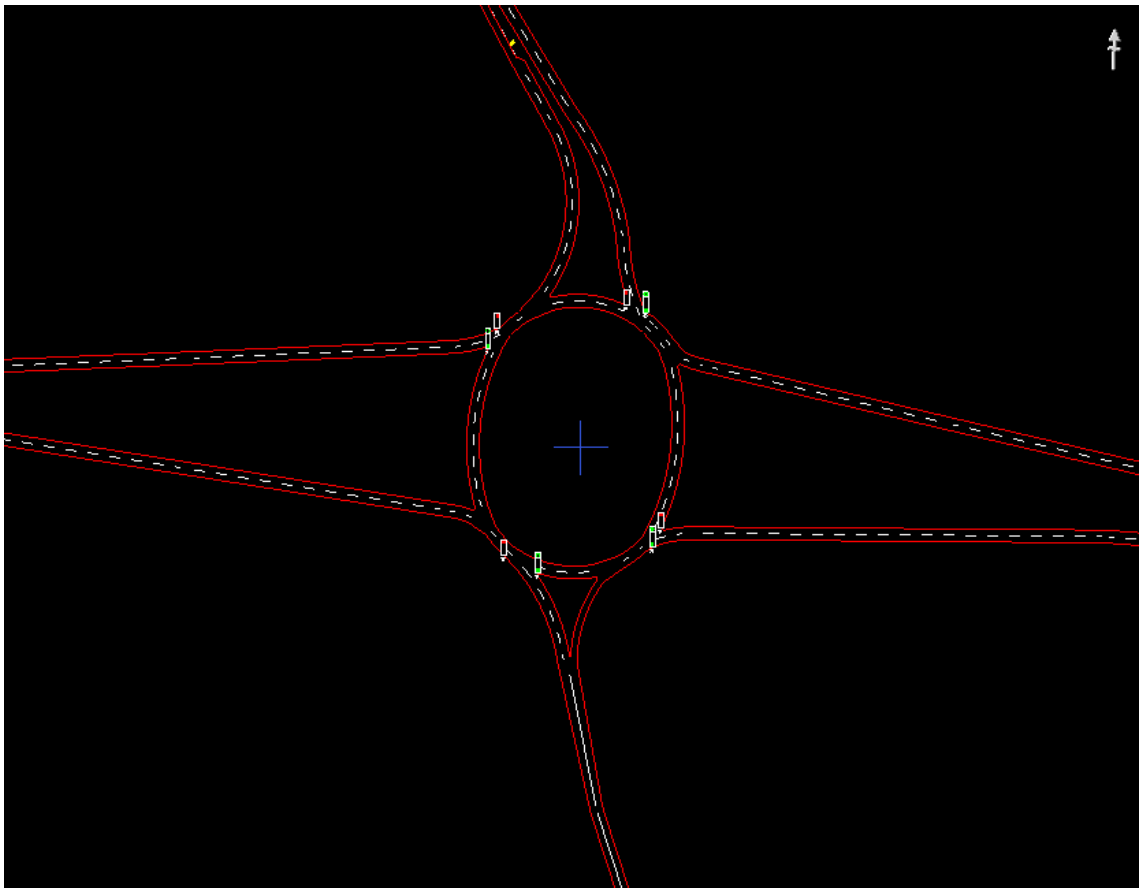
Table 8.1: Study analysis outcomes

Location	Deliverable development without need for significant additional infrastructure		Additional infrastructure measures required to support the Plan aspirations	
	Proportion of Plan trips acceptable	Comment	Additional infrastructure measure	Proportion of Plan trips acceptable (with measure in place)
A585(T) Fleetwood Junctions	100%	With a view to the limited level of development traffic impact at these junctions, they have not been assessed in full and are not considered to require any supporting measures. The full Plan development aspiration is therefore considered to be possible of being accommodated within the existing infrastructure provision.	None required	100%
A585(T) / Bourne Way junction	100%	The analysis undertaken has indicated little influence on levels of queuing with the Plan aspirations in place. It is therefore considered that the full Plan development aspiration is possible of being accommodated within the existing infrastructure provision.	None required	100%
A585(T) West Drive junction	100%	The analysis undertaken has indicated that the influence on queuing is not detrimental to the operation of the network. It is therefore considered that the full Plan development aspiration is possible of being accommodated within the existing infrastructure provision.	None required	100%
A585(T) Victoria Road junction	0%	The addition of the Plan trips is forecast to cause the operation of this junction to deteriorate significantly beyond the forecast position without the Plan. On the basis of considering the operation of the junction within the 'no Plan' scenario it is considered that the junction would require improvement to facilitate any Plan development.	A scheme based on the Fleetwood-Thornton AAP, which involved widening and realignment of all arms and the circulatory. Additionally includes signalisation of the two A585(T) arms. (estimated cost range = £0million - £5 million)	67%
			Significant further improvement (undefined) (estimated cost range = £significant)	100%
A585(T) Anchorsholme Way junction	100%	The analysis undertaken has indicated no detriment to the operation of this junction. It is therefore considered that the full Plan development aspiration is possible of being accommodated within the existing infrastructure provision.	None required	100%
A585(T) Norcross junction	0%	The addition of the Plan trips is forecast to cause the operation of this junction to deteriorate significantly beyond the forecast position without the Plan. On the basis of considering the operation of the junction within the 'no Plan' scenario it is considered that the junction would require improvement to facilitate any Plan development.	A scheme based on that recently submitted in support of a planning application, which involved widening and realignment of all arms and the circulatory, and includes signalisation of the two A585(T) arms. (estimated cost range = £0million - £5 million)	77%
			Significant further improvement (undefined) (estimated cost = £significant)	100%
A585(T) Windy Harbour to Skippool RIS scheme	0%	This element of the network has not been assessed in detail but it is considered that the current conditions on the network are prohibitive to significant (if any) level of future development coming forward.	Road Investment Strategy [RIS] scheme involving the possible potential bypass of the existing A585 at Little Singleton. (estimated cost = £TBC) <u>Scheme caveat</u> Highways England is currently developing the proposals and reviewing options, during which detailed operational analysis and appraisal of this scheme will be undertaken. This operational analysis will give consideration to future likely traffic growth including that which could be expected to arise from future development-related aspirations. This, or the level of growth that the appraisal will be based upon, is not available at the time of undertaking this study. In the absence of this analysis, the provisional outcome of this study is that this element of the network could accommodate the trips associated with the development proposed in the Plan in their entirety. However, this conclusion is caveated heavily here in that: (i) there is no current certainty that the operational analysis and appraisal of the scheme will specifically consider the level of development being proposed in the Plan; (ii) there is no current certainty that the scheme budget will deliver a scheme that provides the level of capacity that could accommodate all future growth forecasts; and (iii) on this basis, there is no certainty that other measures, beyond those that the scheme will deliver, will not be required to support the level of development aspired through the Plan.	100%

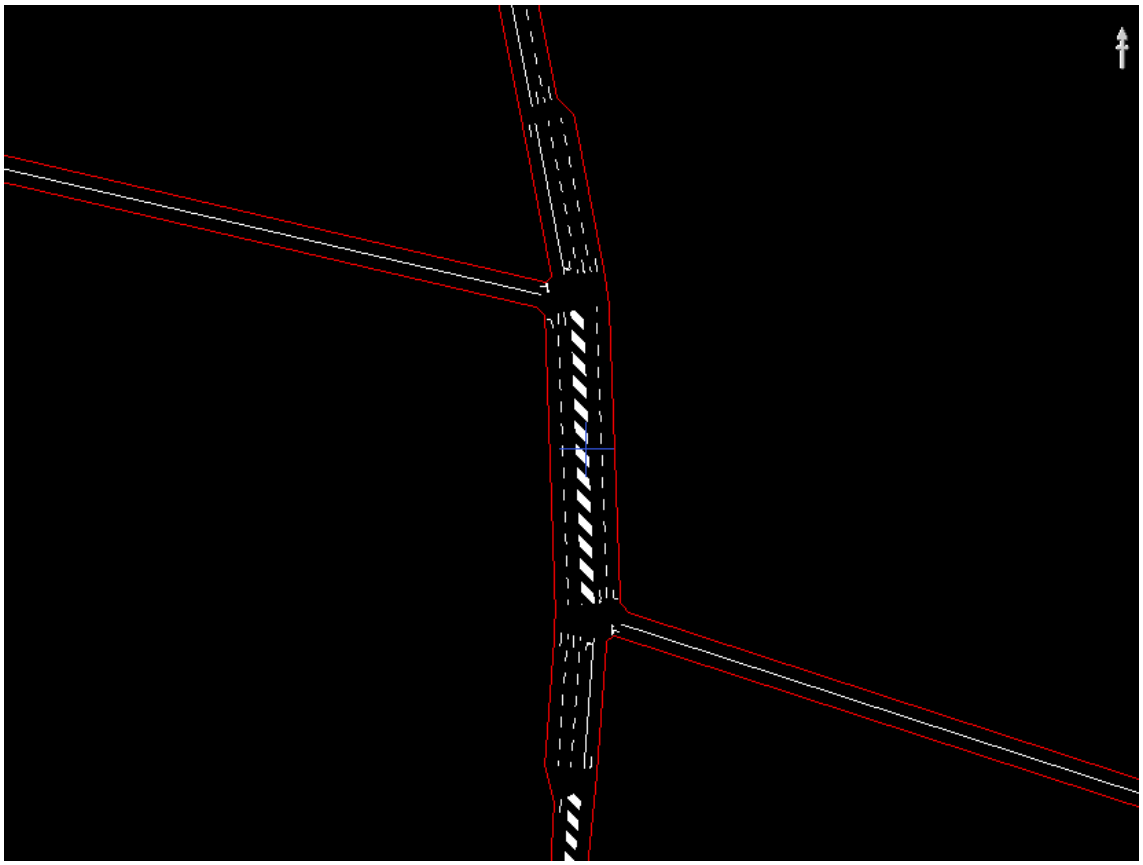
Location	Deliverable development without need for significant additional infrastructure		Additional infrastructure measures required to support the Plan aspirations	
	Proportion of Plan trips acceptable	Comment	Additional infrastructure measure	Proportion of Plan trips acceptable (with measure in place)
A585(T) Thistleton junction	0%	With the addition of Wyre Plan trips, the junction mainline flows are predominately unconstrained although the capacity of the right hand filter lanes are at their limit and cause periodic obstructions to mainline flows through the junction. There are however severe queues on the local minor links approaching the junction (Thistleton Road and Mile Road). Given the length of these queues and interaction with both the right hand filter lanes and high mainline flows, the forecast traffic levels pose a serious safety consideration.	Tested roundabout and traffic signal arrangements do not offer sufficient benefit to the local road network links without severe detriment to the A585 through flows. Potential solutions may involve the removal of right hand turn movements at the junction (which will result in local road network traffic to re-route) but this is a discussion which needs to be held with the Local Highway Authority. (estimated cost = £unknown)	100%
M55 J3	0%* *with 'most likely' highway scheme	The addition of the Plan trips is forecast to cause the operation of this junction to deteriorate, however following the implementation of a 'most likely' signalisation scheme at the junction, the level on congestion on the M55 off-slips can be contained within their existing length following signal adjustments. This though is at the expense of congestion on the A585(T) North arm. With the addition of Fylde development trips, a further detriment in the operation of the junction is modelled. While traffic signal adjustments can maintain the level of congestion to be within the M55 off-slips, there is excessive congestion on both the A585(T) North and A585 South arms.	Significant further improvement, yet to be defined but could comprise MOVA signal operation, the widening of the westbound off-slip to three lanes and the addition of two free flow left turn links (from the A585(T) North to M55 East and M55 East to A585 South). (estimated cost range = £0million - £5 million)	100%

Appendix A
Model network screenshots

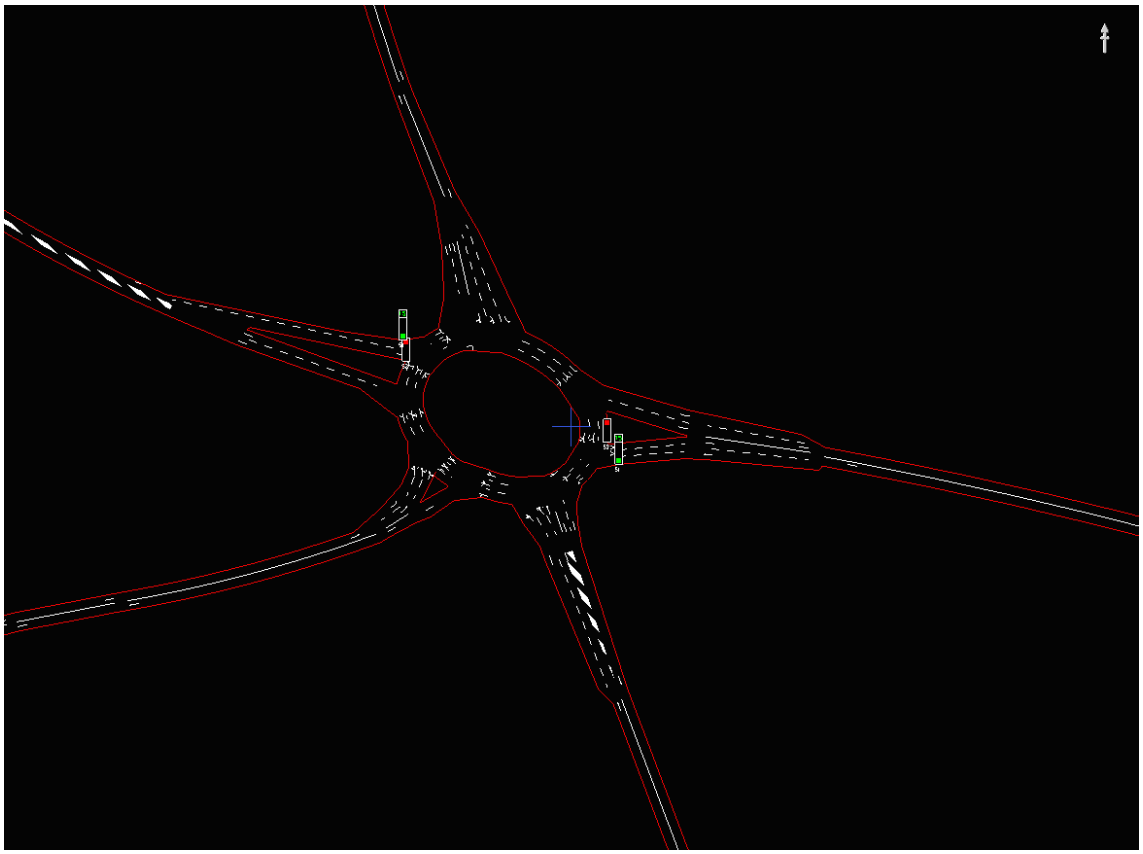
M55 J3 modelled network *(source: M55 J3 Paramics model (Mouchel))*



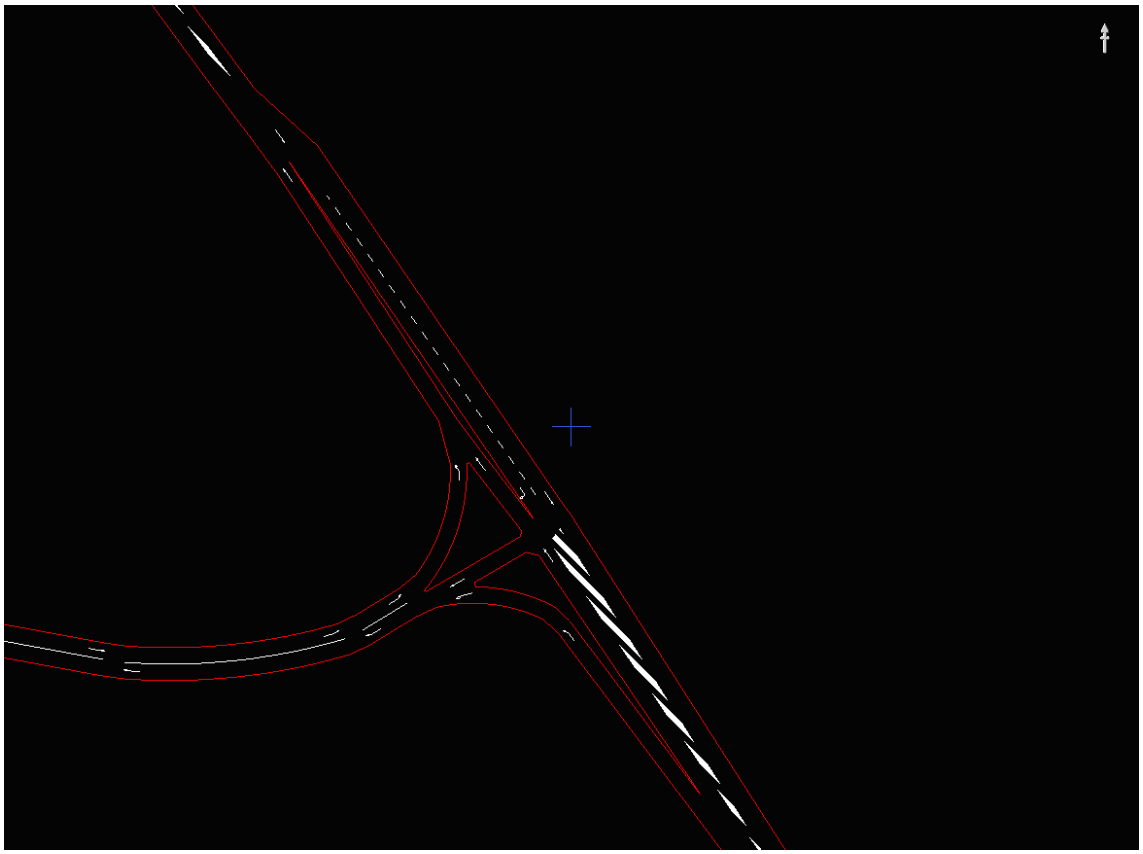
A585(T) Thistleton junction modelled network *(source: A585(T) Paramics model (Mouchel))*



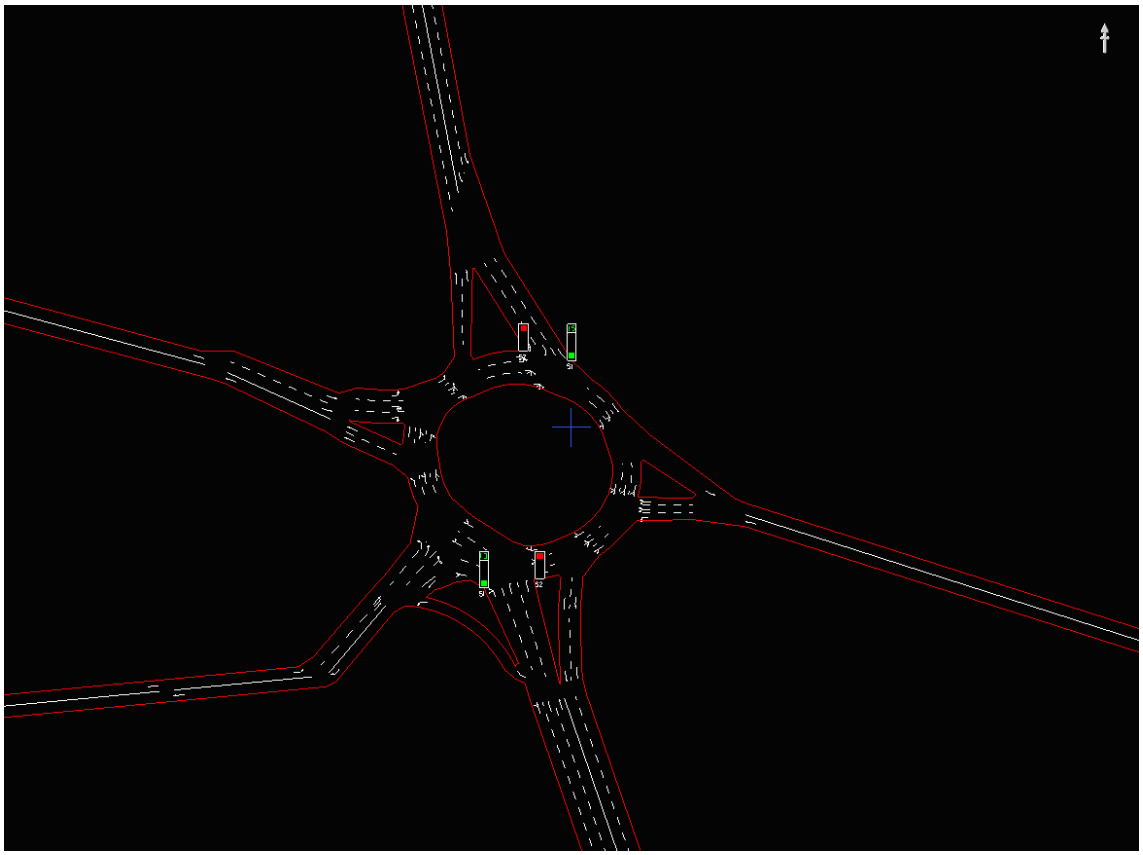
A585(T) / Norcross Lane / Fleetwood Road junction modelled network *(source: A585(T) Paramics model (Mouchel))*



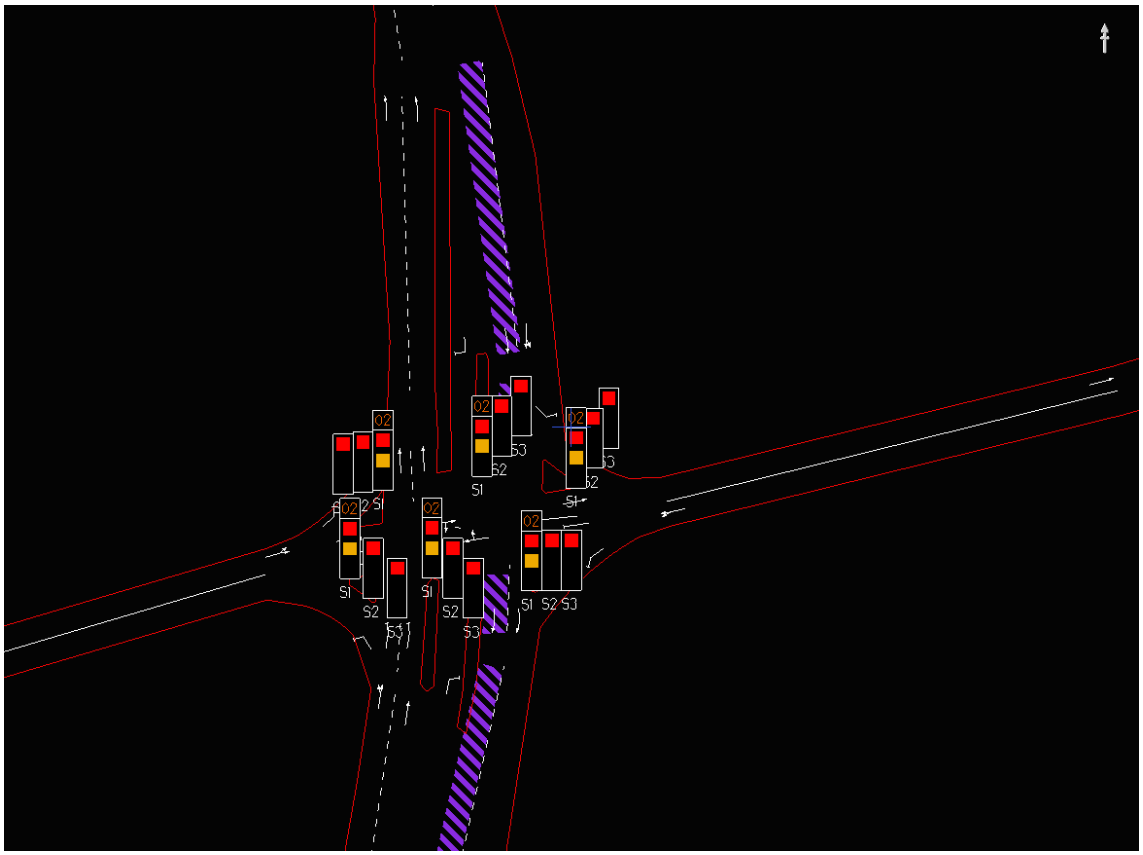
A585(T) / Anchorsholme Lane junction modelled network *(source: A585(T) Paramics model (Mouchel))*



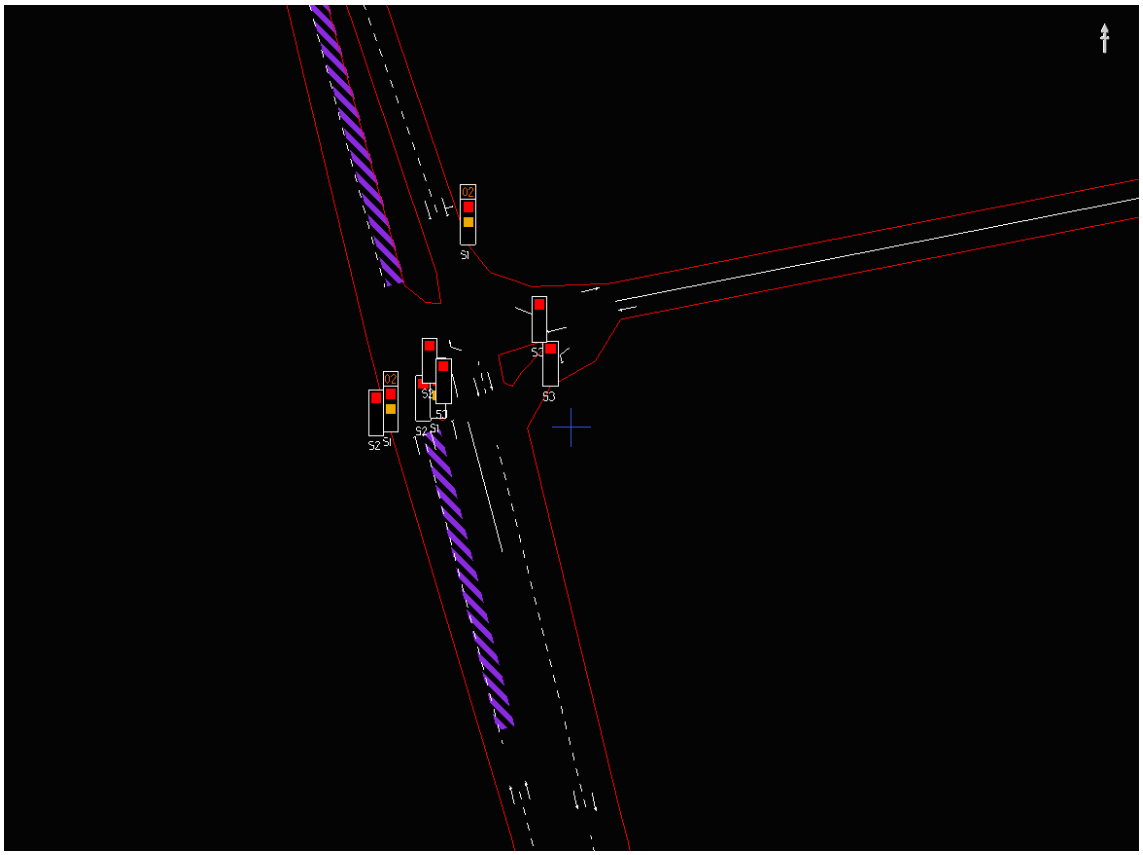
A585(T) / Victoria Road junction modelled network *(source: A585(T) Paramics model (Mouchel))*



A585(T) / West Drive junction modelled network *(source: A585(T) Paramics model (Mouchel))*

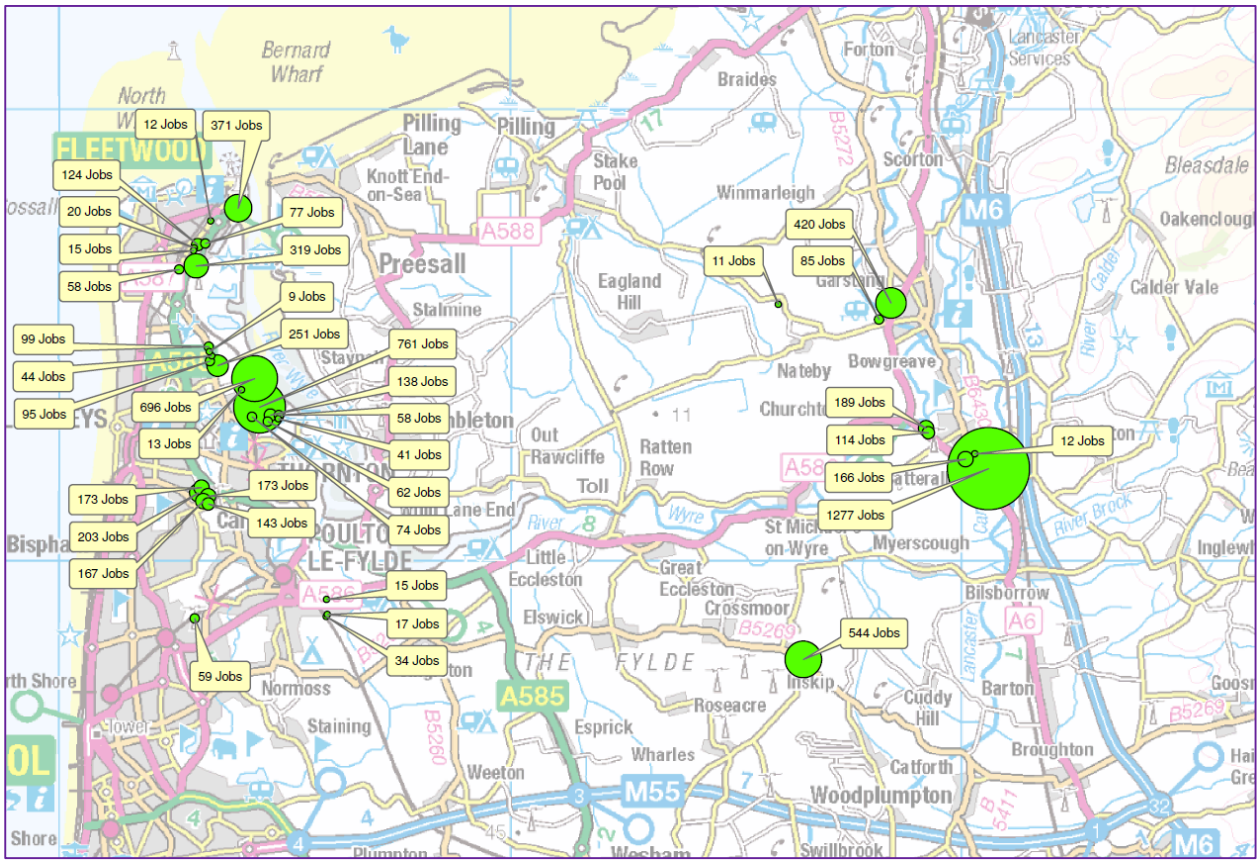


A585(T) / Bourne Way junction modelled network *(source: A585(T) Paramics model (Mouchel))*

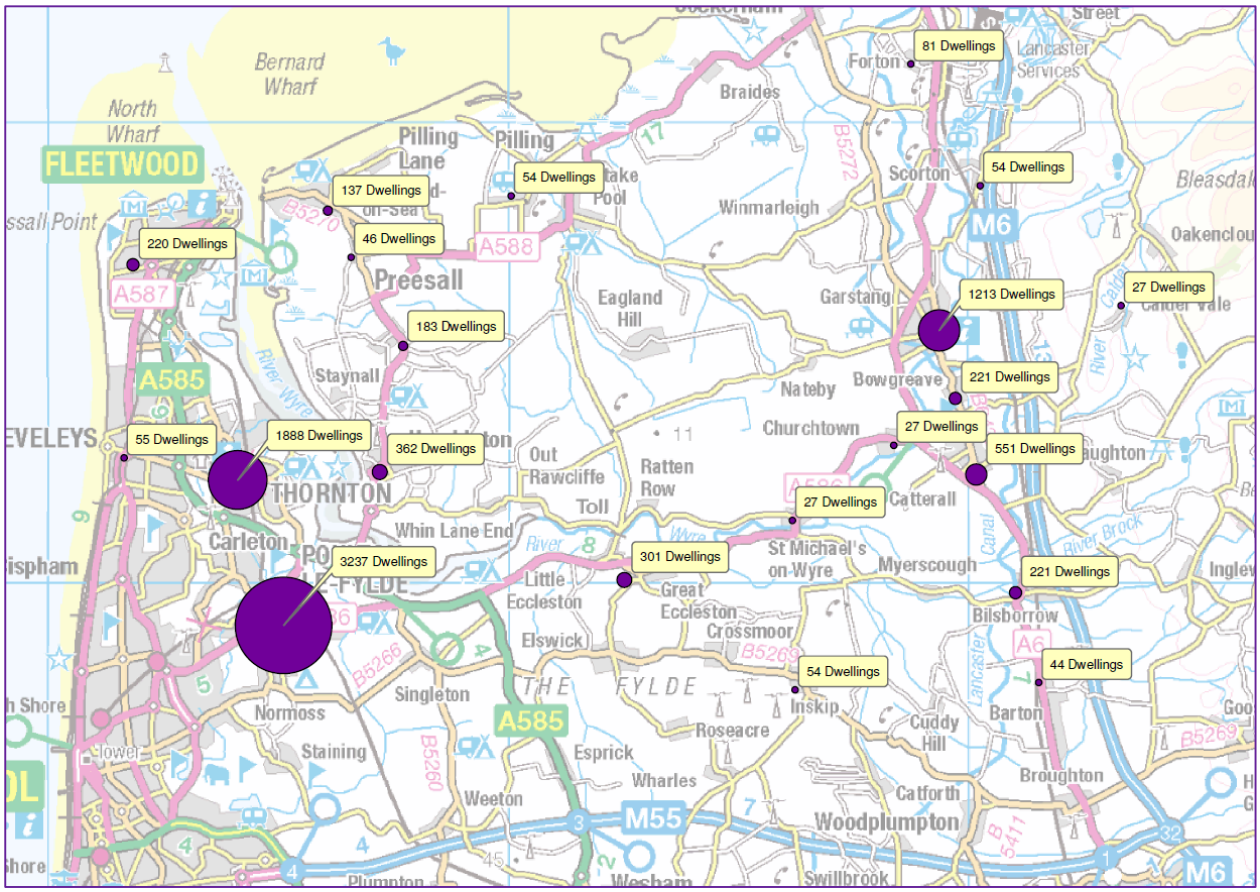


Appendix B
Local Plan spatial options

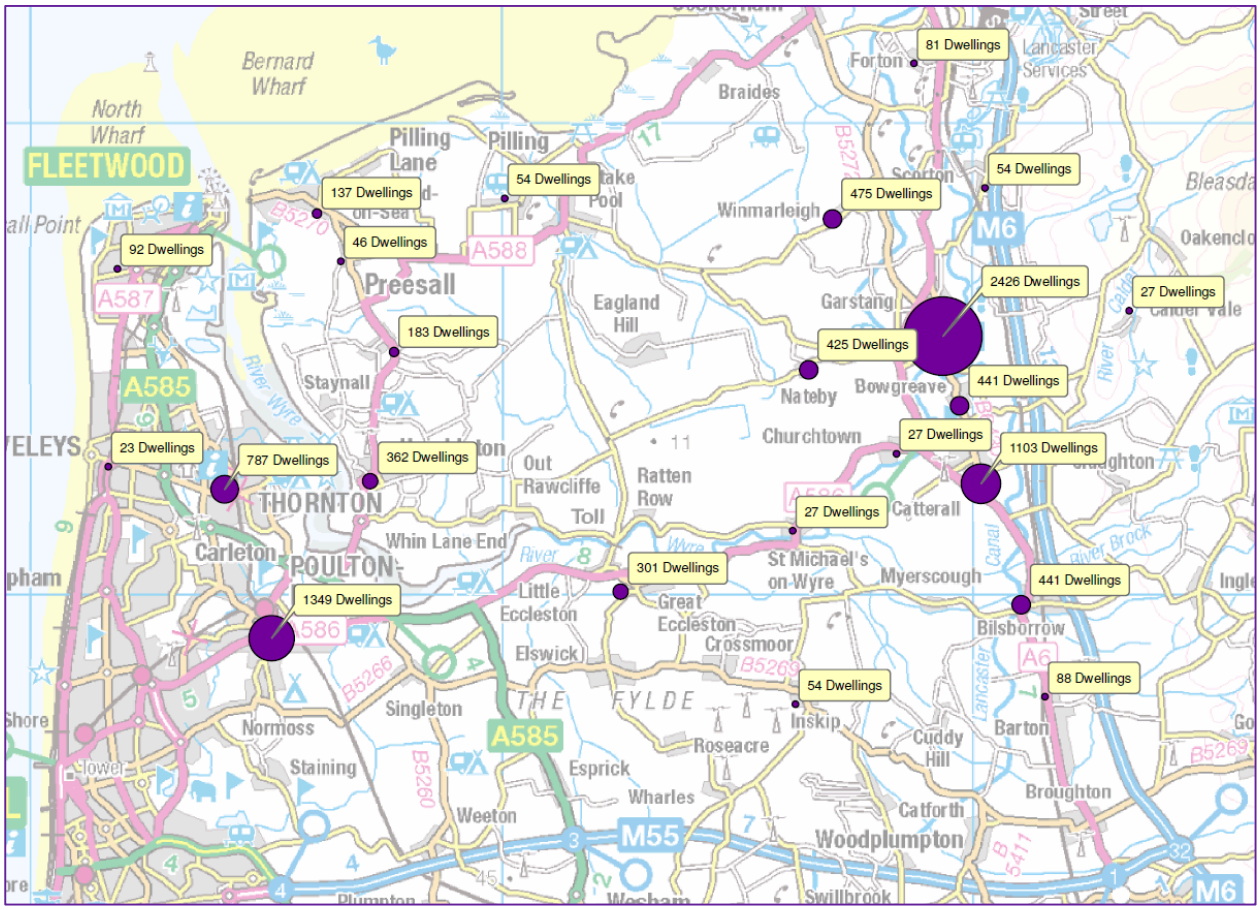
Employment site plan



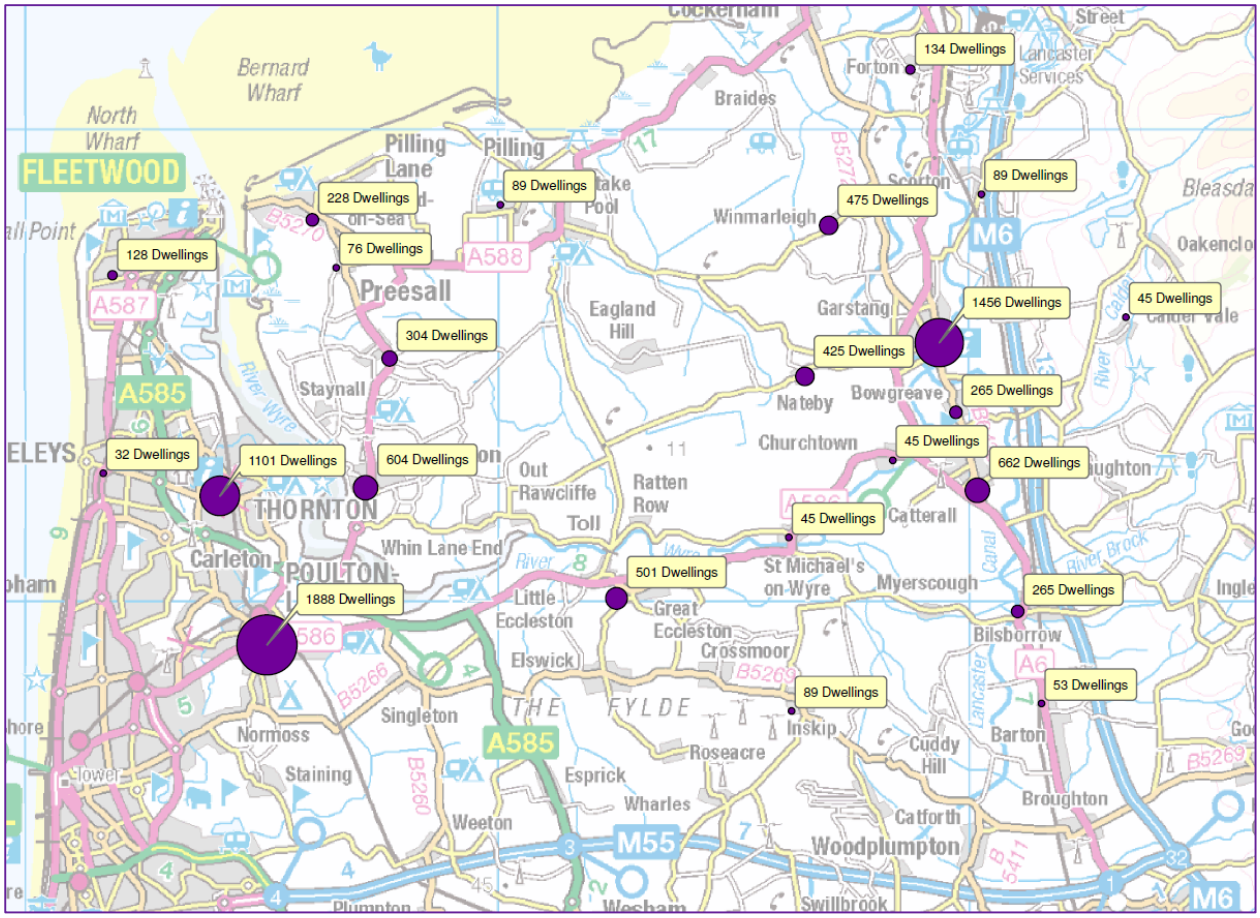
Housing Scenario 1 site plan



Housing Scenario 2 site plan



Housing Scenario 3 site plan



Employment site list

Site Reference	Site description	Estate	B1 Dev Quantum (hectares)	B2 Dev Quantum (hectares)	B8 Dev Quantum (hectares)
WY 06 04	North of Estate Road	East of Fleetwood Road	0.153	1.224	0.153
WY 06 05	South of Estate Road	East of Fleetwood Road	0.407	3.256	0.407
WY 07 01	Butts Road	Red Marsh Industrial Estate	0.021	0.168	0.021
WY 08 06	Off Denham Way	Copse Road Industrial Area	0.025	0.2	0.025
WY 10 03	West of Dock Avenue (Fylde Ice)	Port of Fleetwood	0.125	1	0.125
WY 11 02	West of Aldon Road	Poulton Industrial Estate	0.055	0.44	0.055
WY 11 03	East of Aldon Road	Poulton Industrial Estate	0.027	0.216	0.027
WY 11 04	North of Furness Drive	Poulton Industrial Estate	0.025	0.2	0.025
WY 24 01	Brockholes Way	Brockholes Way, Catterall	0.02	0.16	0.02
WY 04 03	East Road	Hillhouse Secure Site	0.223	1.784	0.223
WY 04 04	South Road fronting Vinollit	Hillhouse Secure Site	0.094	0.752	0.094
WY 04 05	South Road adjoining new substation	Hillhouse Secure Site	0.067	0.536	0.067
WY 04 06	Riverside Business Park	Hillhouse Secure Site	1.127	9.016	1.127
WY 04 07	South Road / Central Road	Hillhouse Secure Site	0.101	0.808	0.101
WY 06 01	Venture Road	Burn Hall Industrial Estate	0.161	1.288	0.161
WY 06 02	Enterprise Way	Burn Hall Industrial Estate	0.014	0.112	0.014
WY 06 03	South East corner	Burn Hall Industrial Estate	0.071	0.568	0.071
WY 08 02	South of Council Depot	Copse Road Industrial Area	0.2	1.6	0.2
WY 08 03	East of Copse Road Builders Yard	Copse Road Industrial Area	0.032	0.256	0.032
WY 08 04	Copse Road (South of Fishermans Friends)	Copse Road Industrial Area	0.094	0.752	0.094
WY 12 01	North west corner	Robson Way	0	0	0
WY 19 01	North of entrance	Nateby Technology Park	0.095	0.76	0.095
WY 08 01	North end of Siding Road	Copse Road Industrial Area	0.017	0.136	0.017
WY 10 06	South of new road	Port of Fleetwood	0.02	0.16	0.02
WY 00 03	Land West of A6	Garstang	0.517	4.136	0.517
WY 00 06b	Catterall Gates Lane South Extn	Catterall	0.68	5.44	0.68
WY 03 01	Block 1 & Robinson House	Norcross	0.184	1.472	0.184
WY 03 02	Block 2 & parking	Norcross	0.92	0	0

Site Reference	Site description	Estate	B1 Dev Quantum (hectares)	B2 Dev Quantum (hectares)	B8 Dev Quantum (hectares)
WY 03 03	Block 3	Norcross	0.92	0	0
WY 03 04	Blocks 4 & 7	Norcross	0.76	0	0
WY 03 05	Block 5 & Canteen	Norcross	0.89	0	0
WY 04 01	Between West and East Road	Hillhouse Secure Site	1.08	0	0
WY 04 02	West Road	Hillhouse Secure Site	1.231	9.848	1.231
WY 10 01	East of Dock Street	Port of Fleetwood	0.119	0.952	0.119
WY 00 04	Longmoor Lane	Nateby	0.6	4.8	0.6
WY 00 06a	Catterall Gates Lane South West	Catterall Gates Lane South	0.137	1.096	0.137
WY 00 08	-	South of Brockholes Ind Est	0.306	2.448	0.306
WY 01	-	Dorset Avenue, Cleveleys	2.066	16.528	2.066
WY 14	-	Bank View Ind Est, Hambleton	0	0	0
WY 15	-	Sunny Bank Farm Ind Est, Hambleton	0	0	0
WY 16	-	Old Coal Yard, Preesall	0	0	0
WY 17	-	Preesall Mill Ind Est, Preesall	0	0	0
WY 20	-	Taylors Lane Ind Est, Pilling	0	0	0
WY 22	-	Green Lane West, Garstang	0	0	0
WY 23	-	Riverside Ind Est, Catterall	0	0	0
WY 25	-	Creamery Ind Est, Barnacre	0	0	0
WY 26	-	Calder Vale Mill, Calder Vale	0	0	0
WY 27	-	Oakenclough Mill, Oakenclough	0	0	0
WY 00 07	-	Beech House Fields	0	0	0
Great Eccleston	-	-	0.268	2.144	0.268
Inskip	-	-	0	0	0
Bilsborrow	-	-	0.88	7.04	0.88
Myerscough	-	-	0	0	0
Barton	-	-	0	0	0
St Michaels	-	-	0	0	0
Forton	-	-	0	0	0

Site Reference	Site description	Estate	B1 Dev Quantum (hectares)	B2 Dev Quantum (hectares)	B8 Dev Quantum (hectares)
Fleetwood Quay (off Dock Street)	-	-	0	0	0
Scorton	-	-	0	0	0
Knott-End-On-Sea	-	-	0	0	0

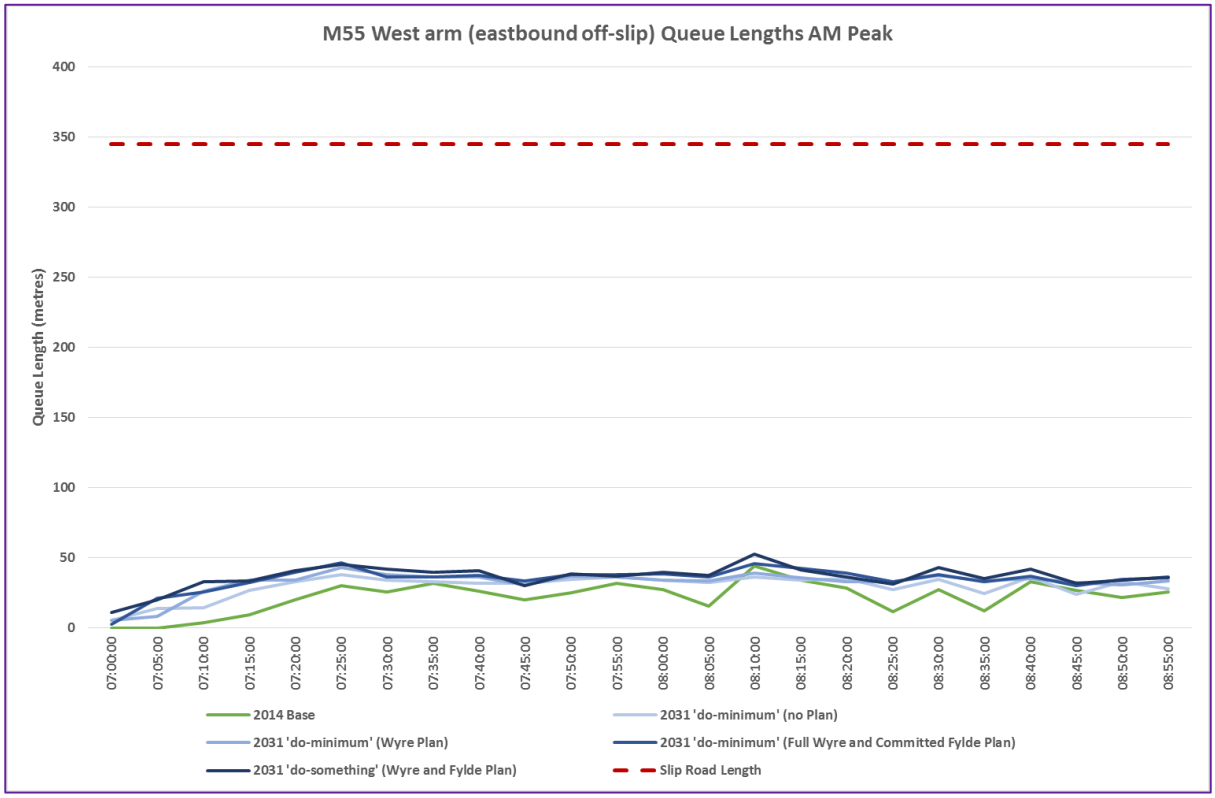
Housing site list

Settlement	Quantum of Residential Dwellings Tested		
	Scenario 1	Scenario 2	Scenario 3
Barton	44	88	53
Bilsborrow	221	441	265
Bowgreave	221	441	265
Burn Naze	0	0	0
Cabus	0	0	0
Calder Vale	27	27	45
Carleton	0	0	0
Catterall	551	1103	662
Churchtown and Kirkland	27	27	45
Cleveleys	55	23	32
Crossmoor	0	0	0
Fisher's Row	0	0	0
Fleetwood	220	92	128
Forton and Hollins Lane	81	81	134
Garstang	1213	2426	1456
Great Eccleston	301	301	501
Hambleton	362	362	604
Inskip	54	54	89
Knott End-on-Sea	137	137	228
Myerscough	0	0	0
Nateby	0	425	425
Newsham	0	0	0
Pilling (inc. Smallwood Hey and Stakepool)	54	54	89
Pilling Lane	0	0	0
Poulton-le-Fylde	3237	1349	1888
Preesall	46	46	76

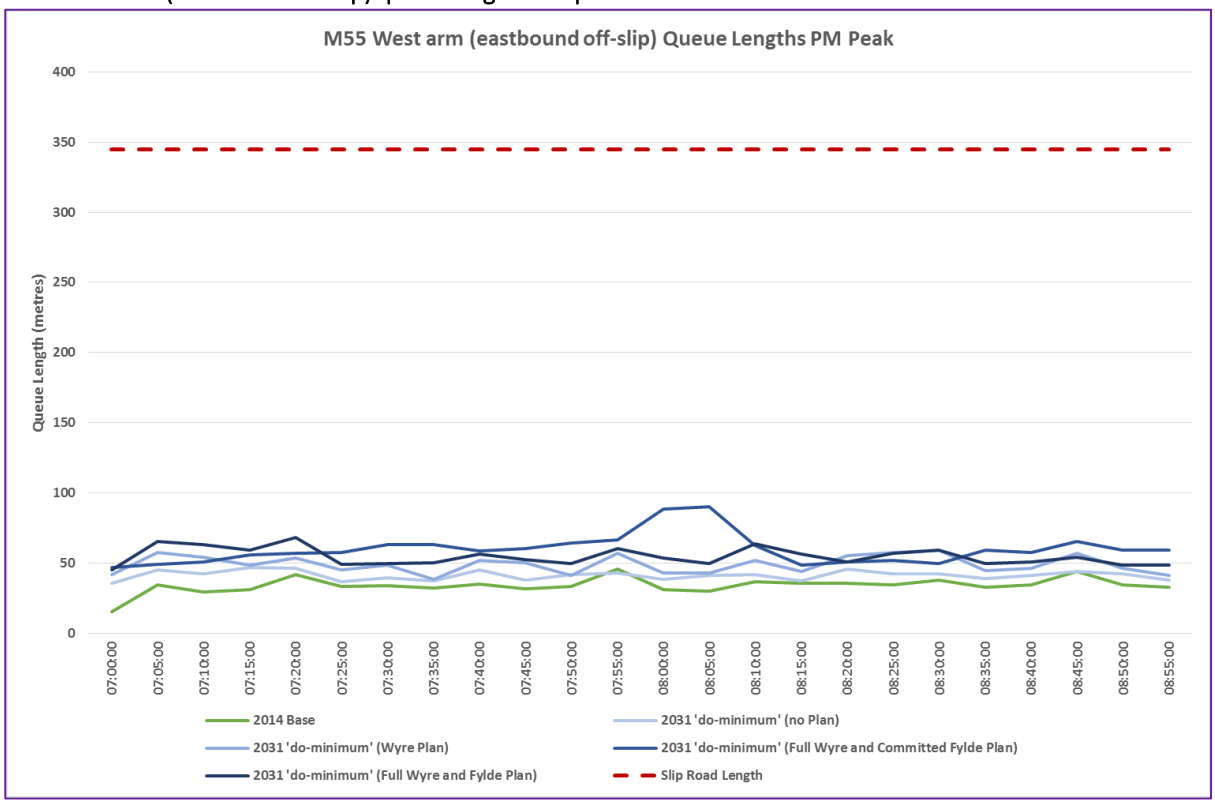
Settlement	Quantum of Residential Dwellings Tested		
	Scenario 1	Scenario 2	Scenario 3
Ratten Row	0	0	0
Scorton	54	54	89
St Michael's on Wyre	27	27	45
Stake Pool	0	0	0
Stalmine	183	183	304
Thornton	1888	787	1101
Trunnah	0	0	0
Winmarleigh	0	475	475

Appendix C
Queue result graphs – M55 junction 3

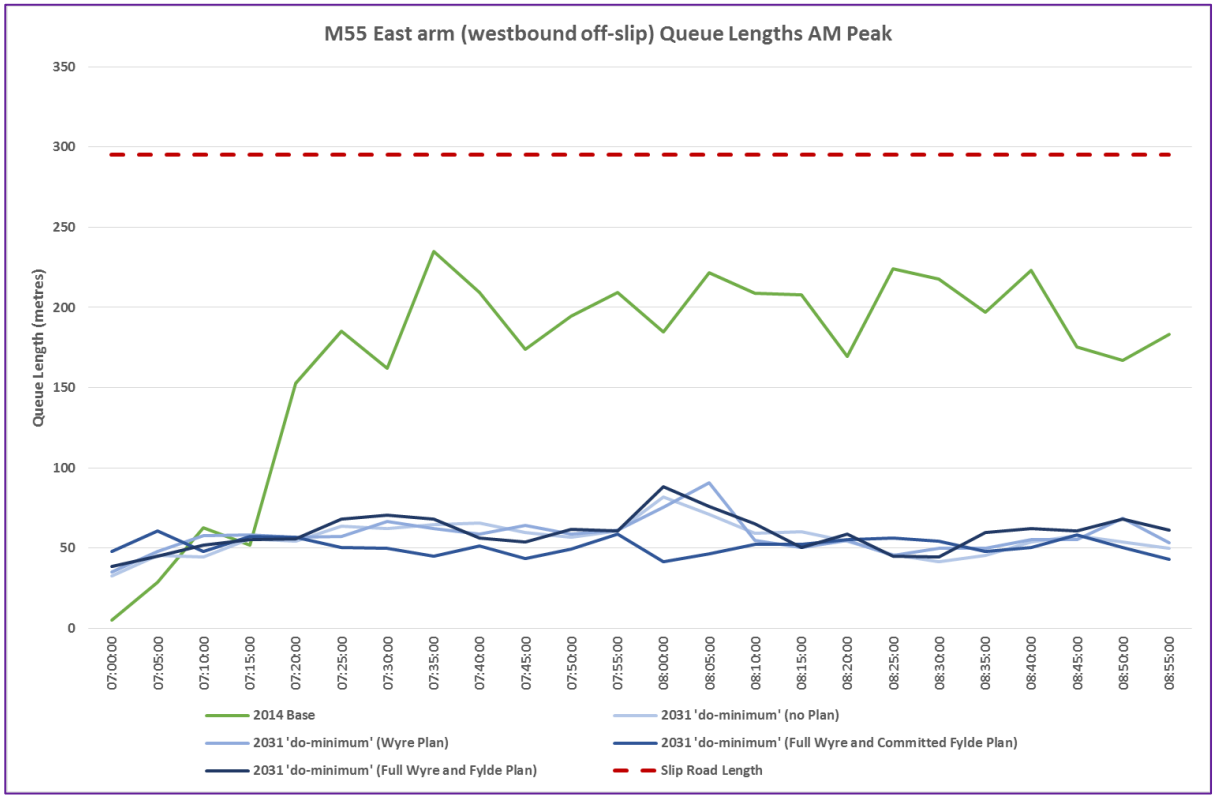
M55 West arm (eastbound off-slip) queue lengths AM peak



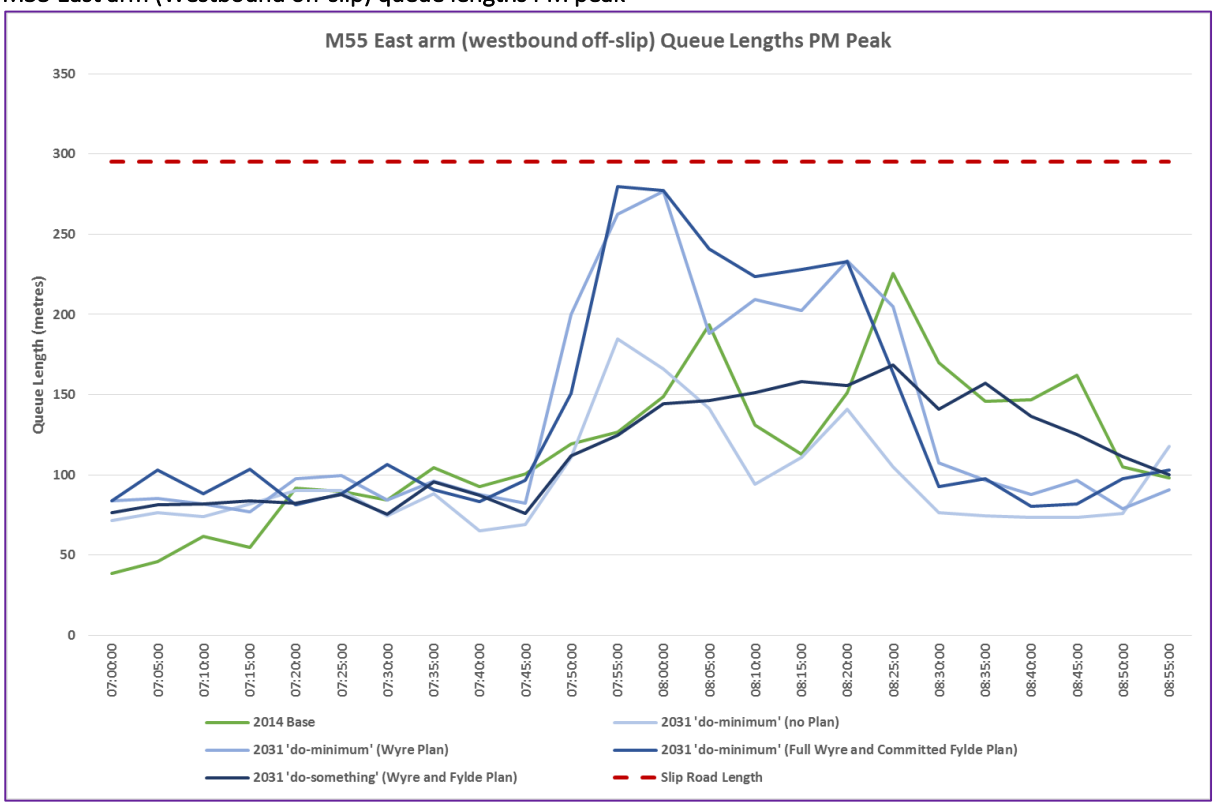
M55 West arm (eastbound off-slip) queue lengths PM peak



M55 East arm (Westbound off-slip) queue lengths AM peak

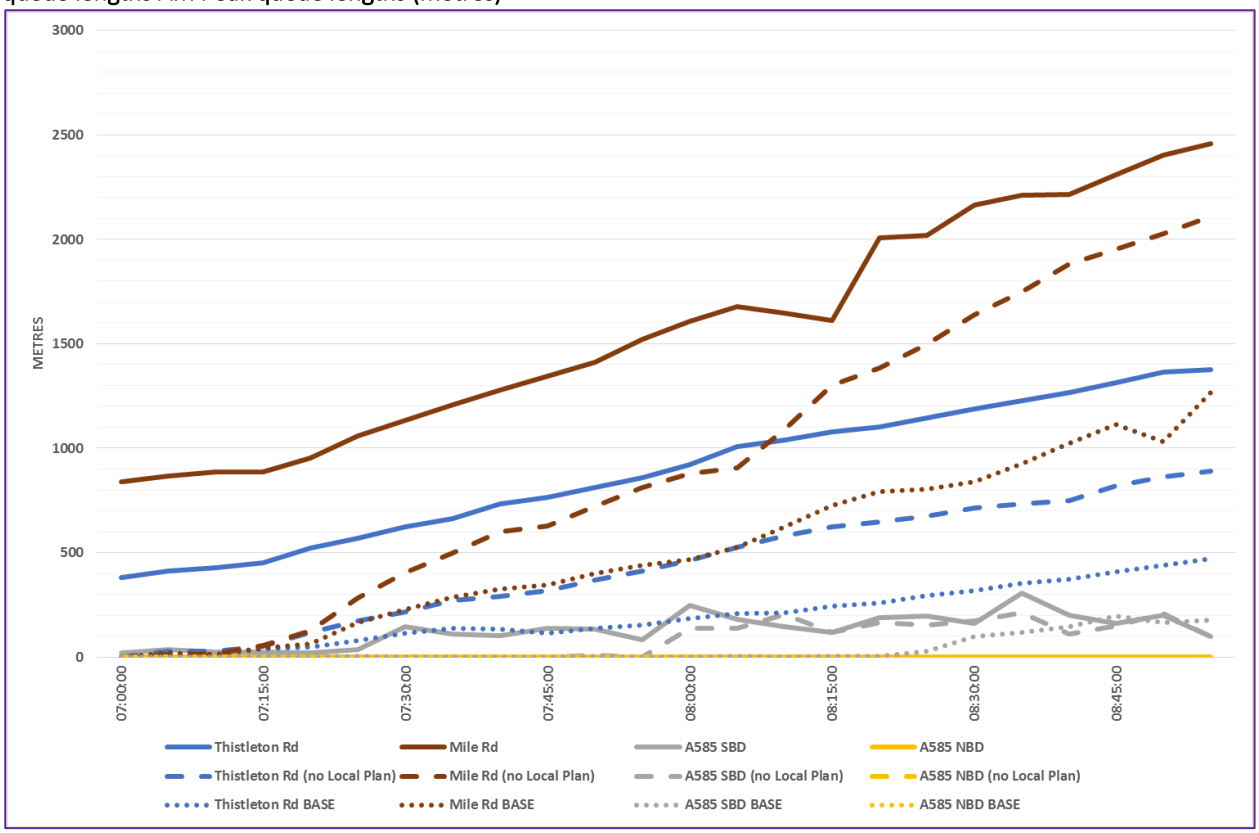


M55 East arm (Westbound off-slip) queue lengths PM peak

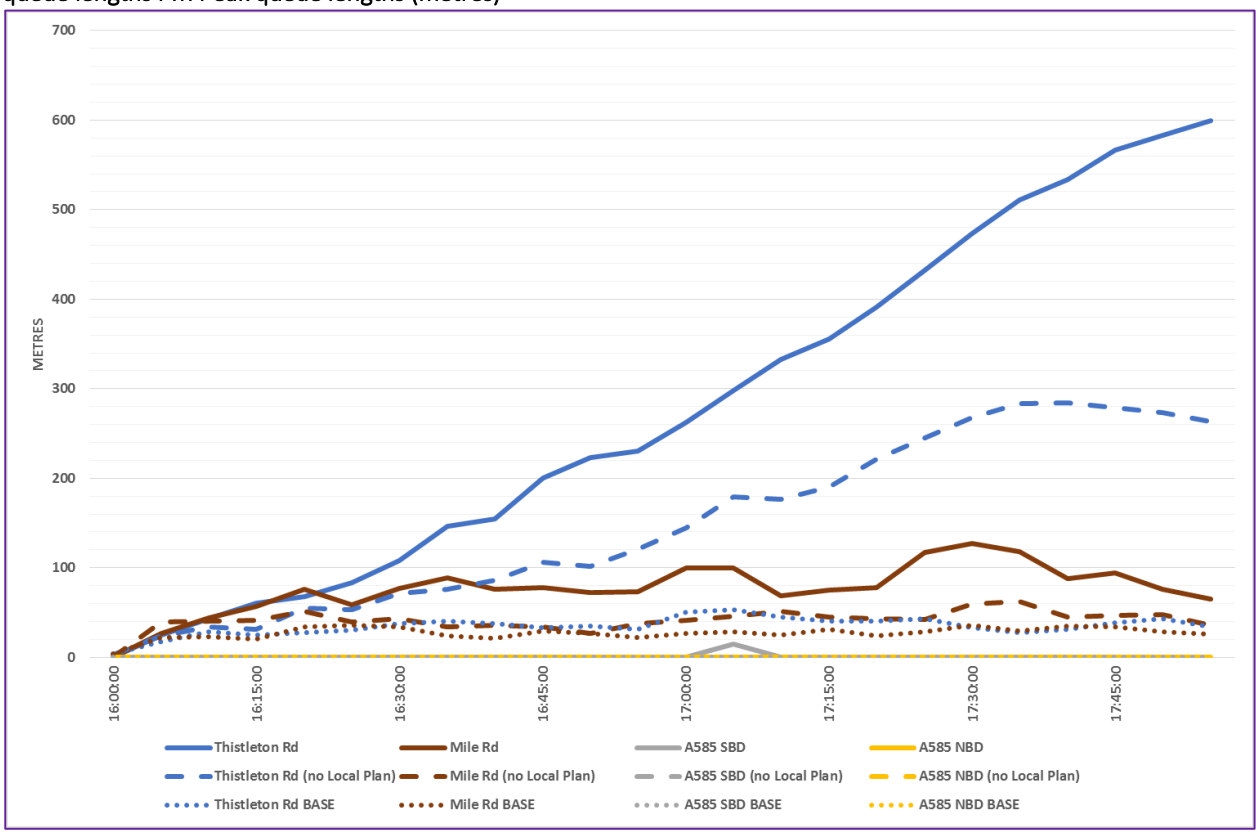


Appendix D
Queue result graphs – A585(T) / Thistleton

A585(T) Thistleton - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths AM Peak queue lengths (metres)

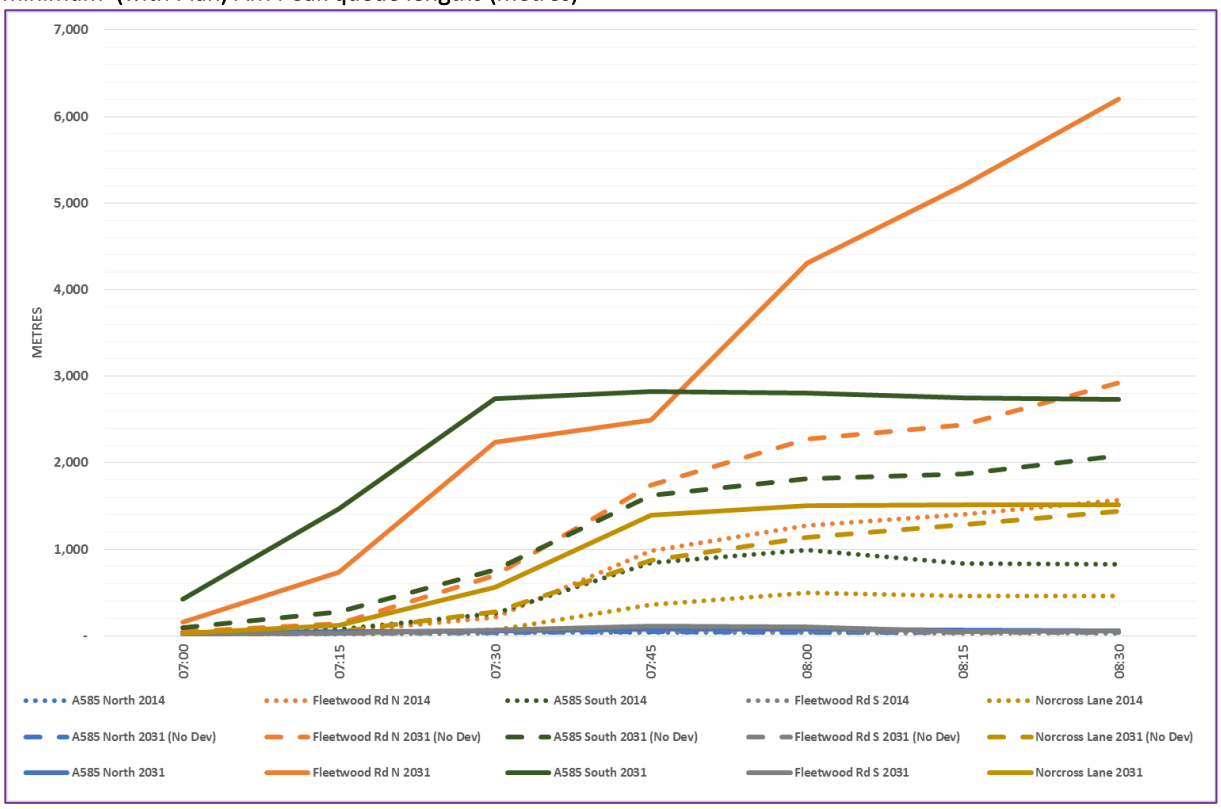


A585(T) Thistleton - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths PM Peak queue lengths (metres)

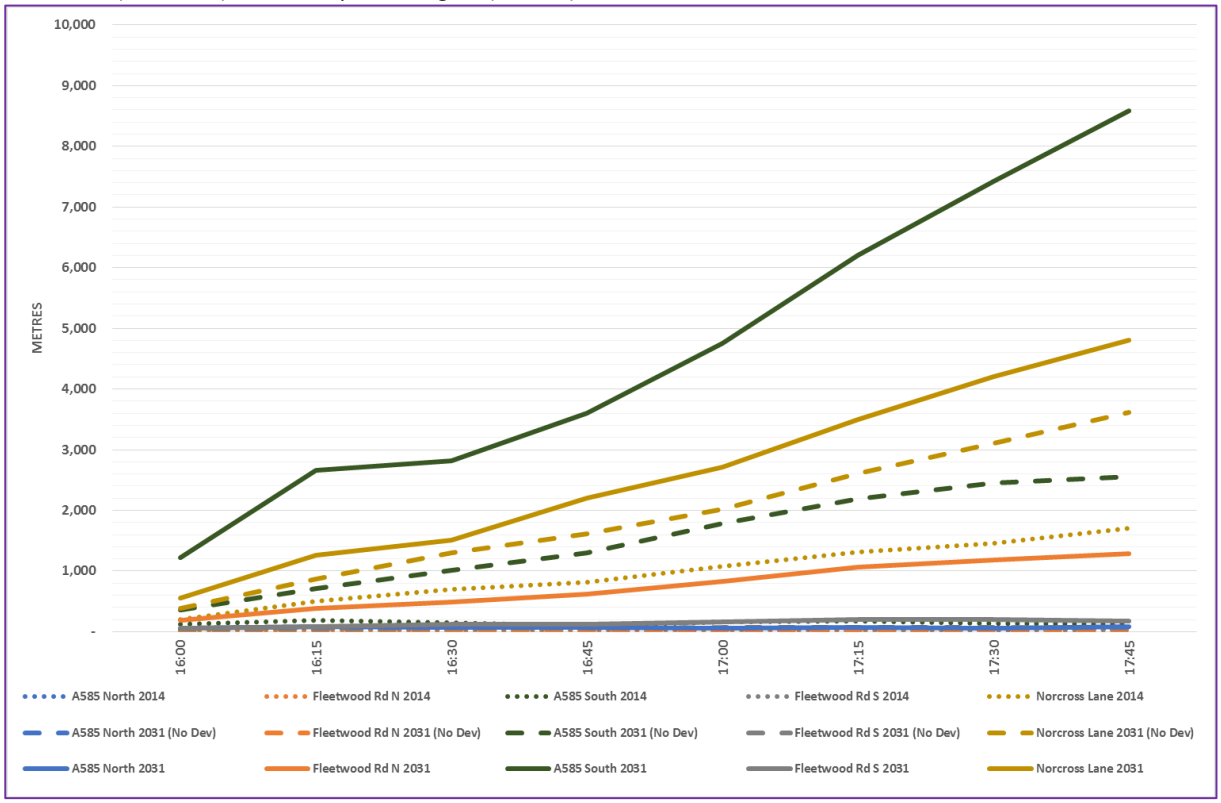


Appendix E
Queue result graphs – A585(T) / Norcross Lane / Fleetwood Road

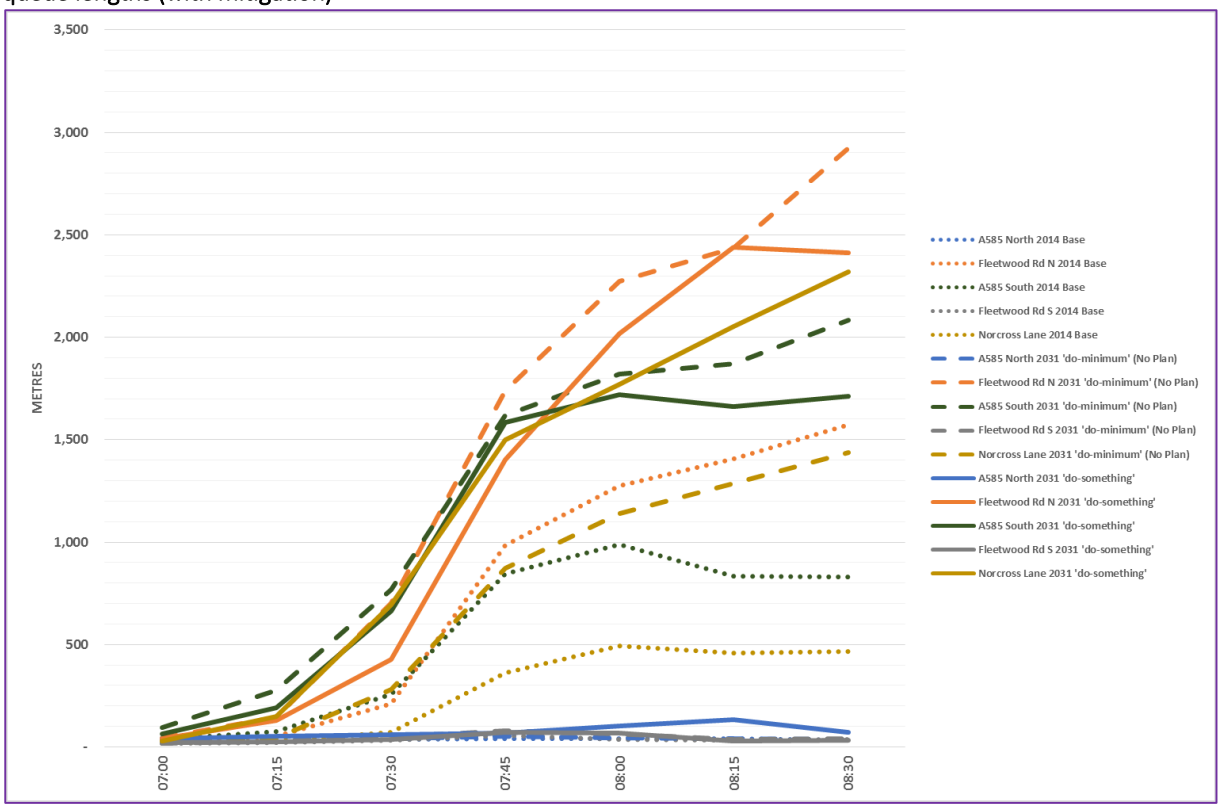
A585(T) / Norcross Lane / Fleetwood Road - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths (metres)



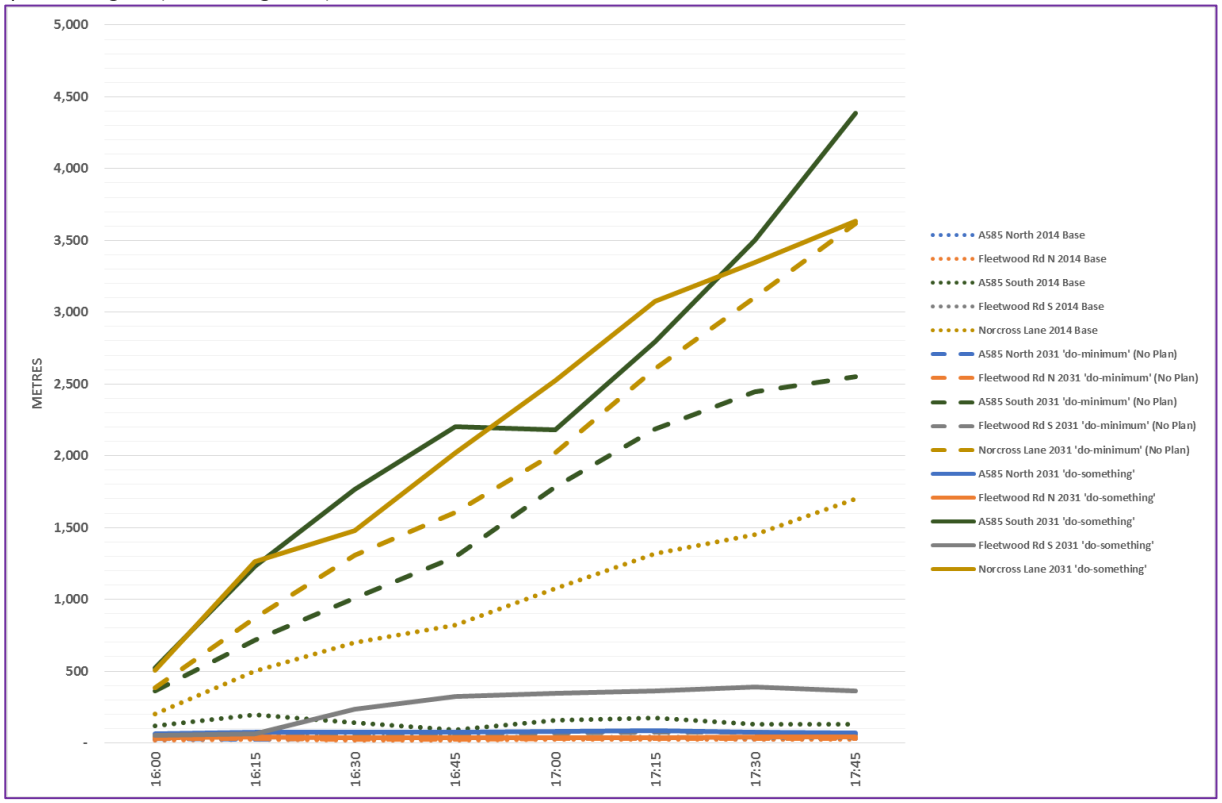
A585(T) / Norcross Lane / Fleetwood Road - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) PM Peak queue lengths (metres)



A585(T) / Norcross Lane / Fleetwood Road - 2014 'base', 2031 'do-minimum' and 2031 'do-something' AM Peak queue lengths (with mitigation)

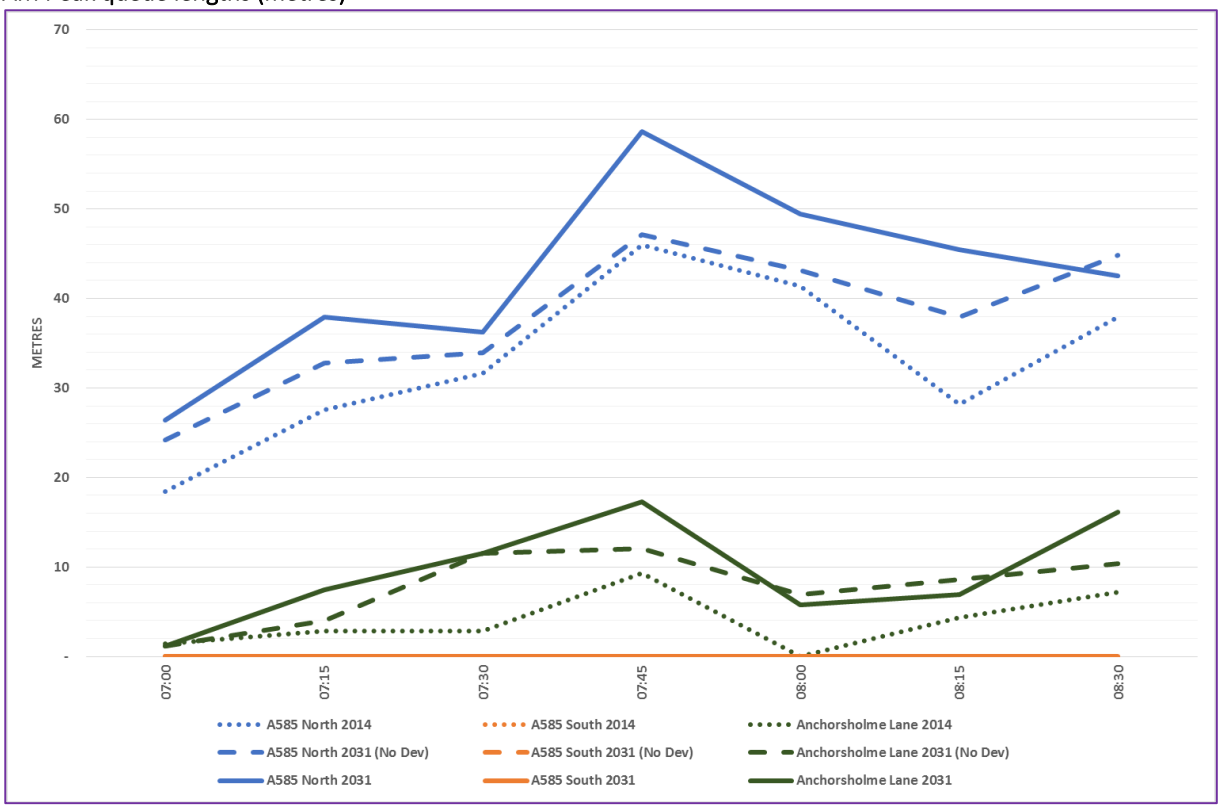


A585(T) / Norcross Lane / Fleetwood Road - 2014 'base', 2031 'do-minimum' and 2031 'do-something' PM Peak queue lengths (with mitigation)

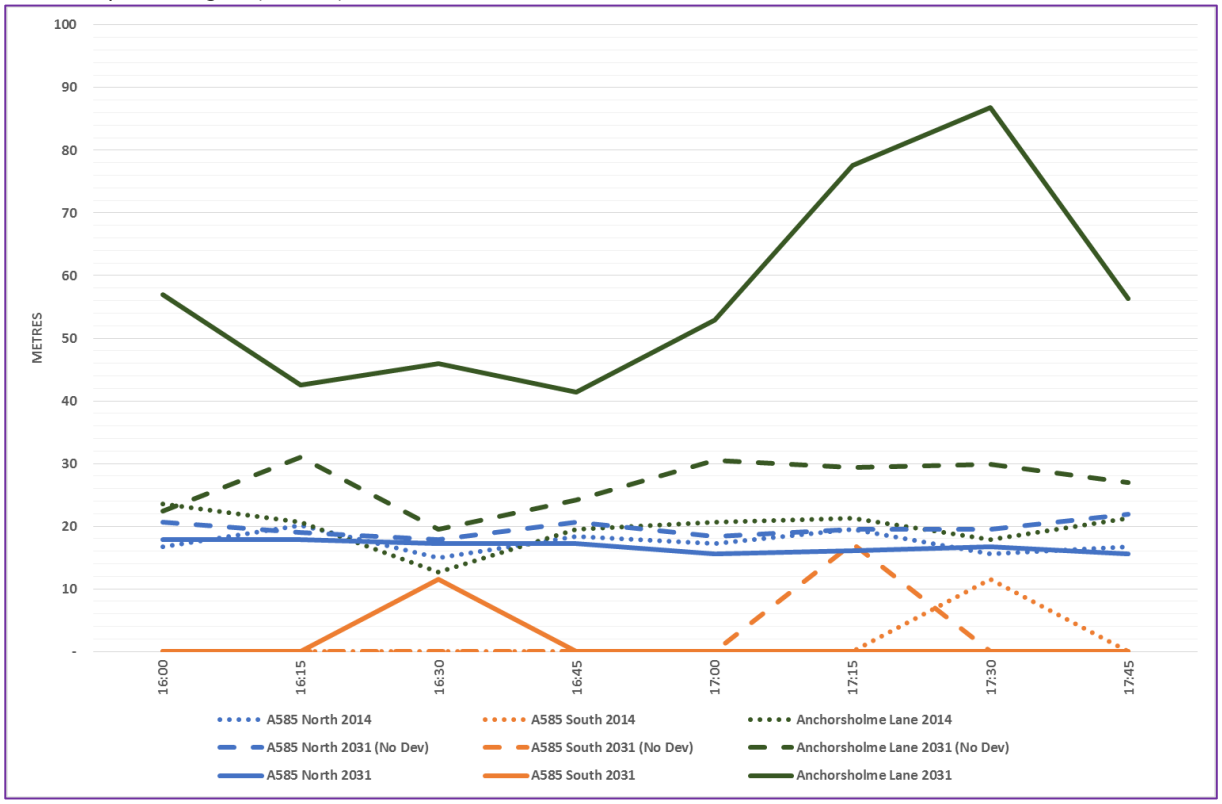


Appendix F
Queue result graphs – A585(T) / Anchorsholme Lane

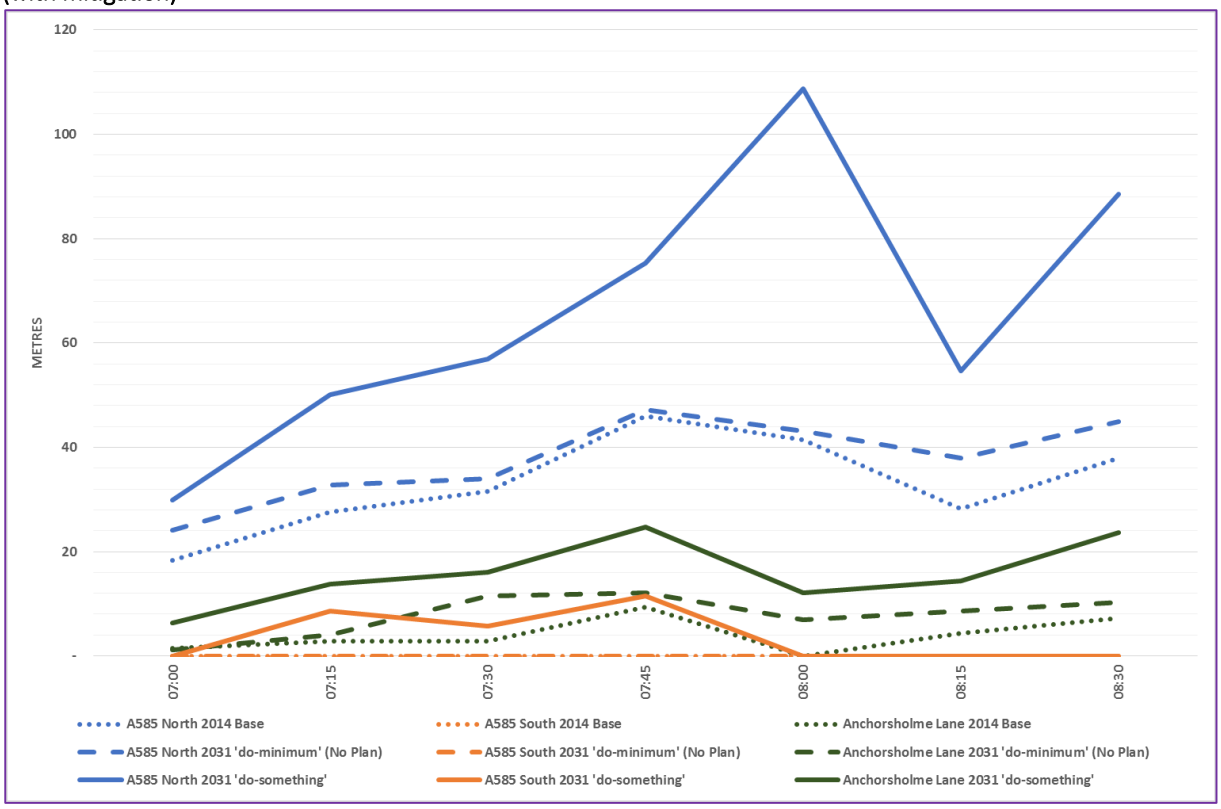
A585(T) / Anchorsholme Lane - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths (metres)



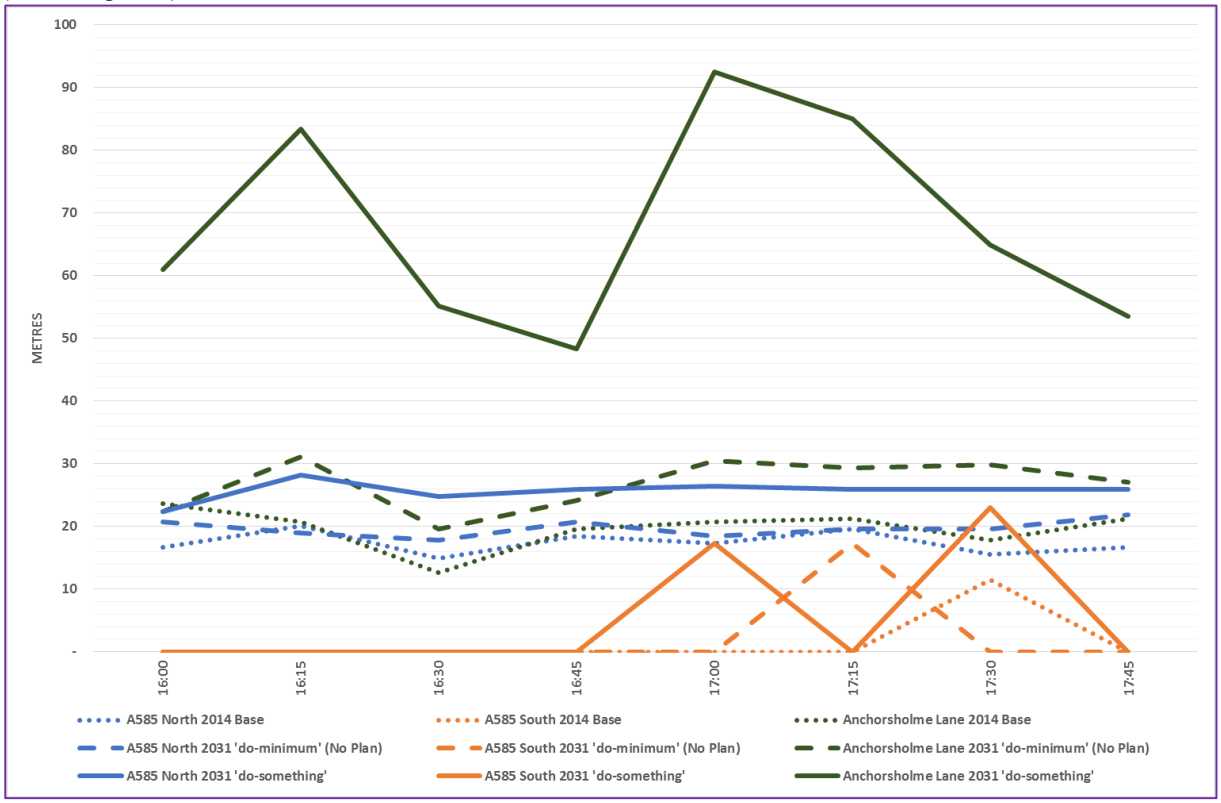
A585(T) / Anchorsholme Lane - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) PM Peak queue lengths (metres)



A585(T) / Anchorsholme Lane - 2014 'base', 2031 'do-minimum' and 2031 'do-something' AM Peak queue lengths (with mitigation)

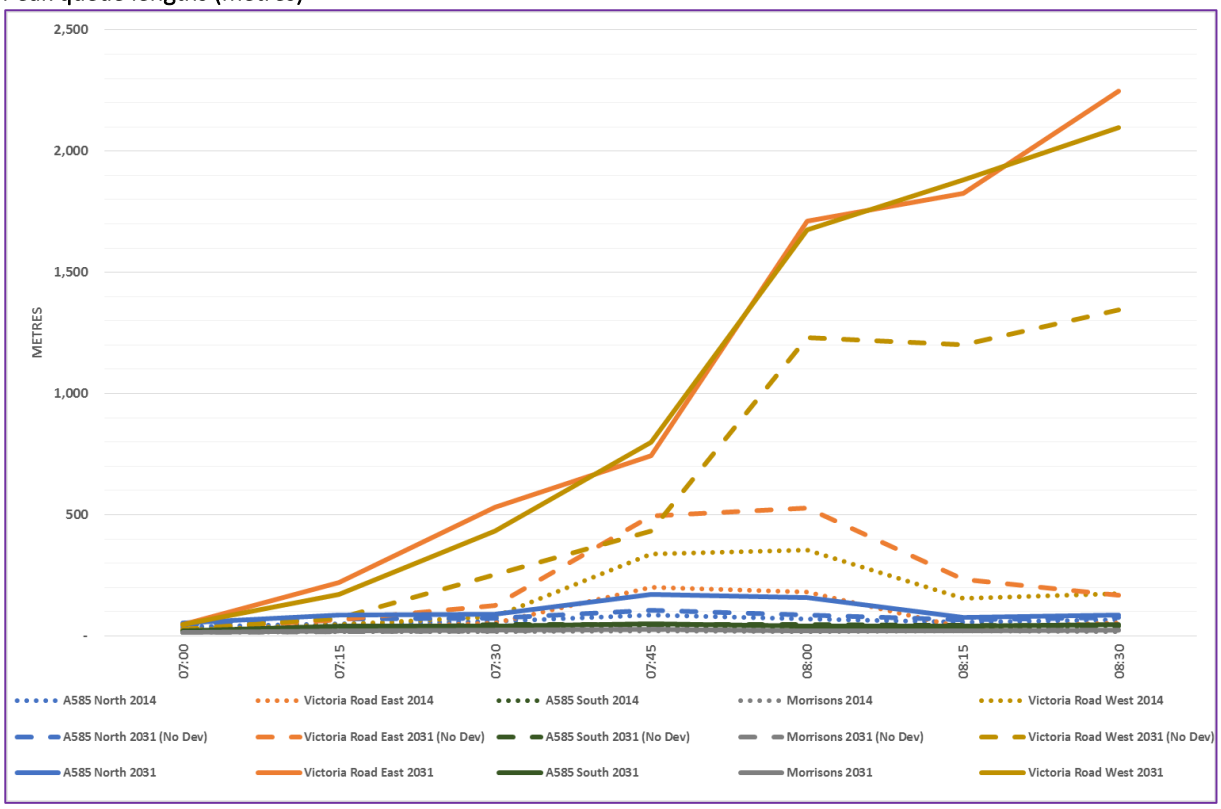


A585(T) / Anchorsholme Lane - 2014 'base', 2031 'do-minimum' and 2031 'do-something' PM Peak queue lengths (with mitigation)

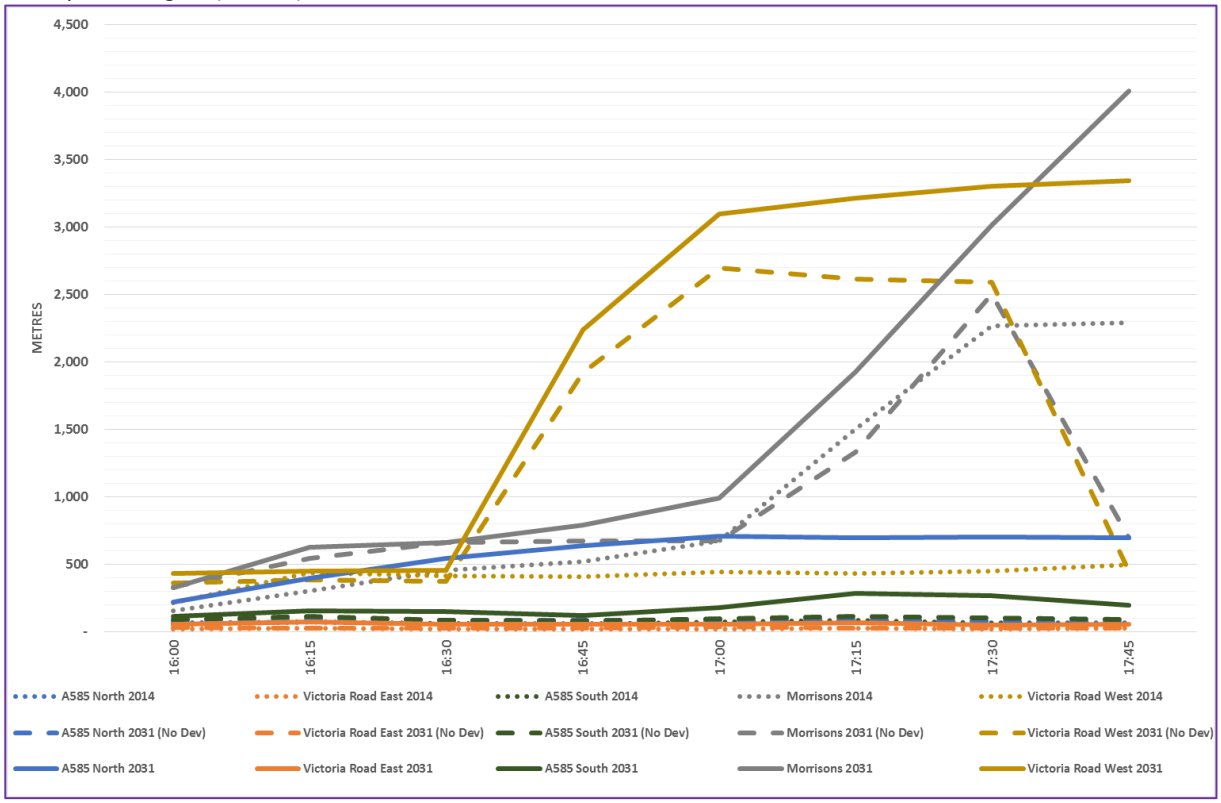


Appendix G
Queue result graphs – A585(T) / Victoria Road

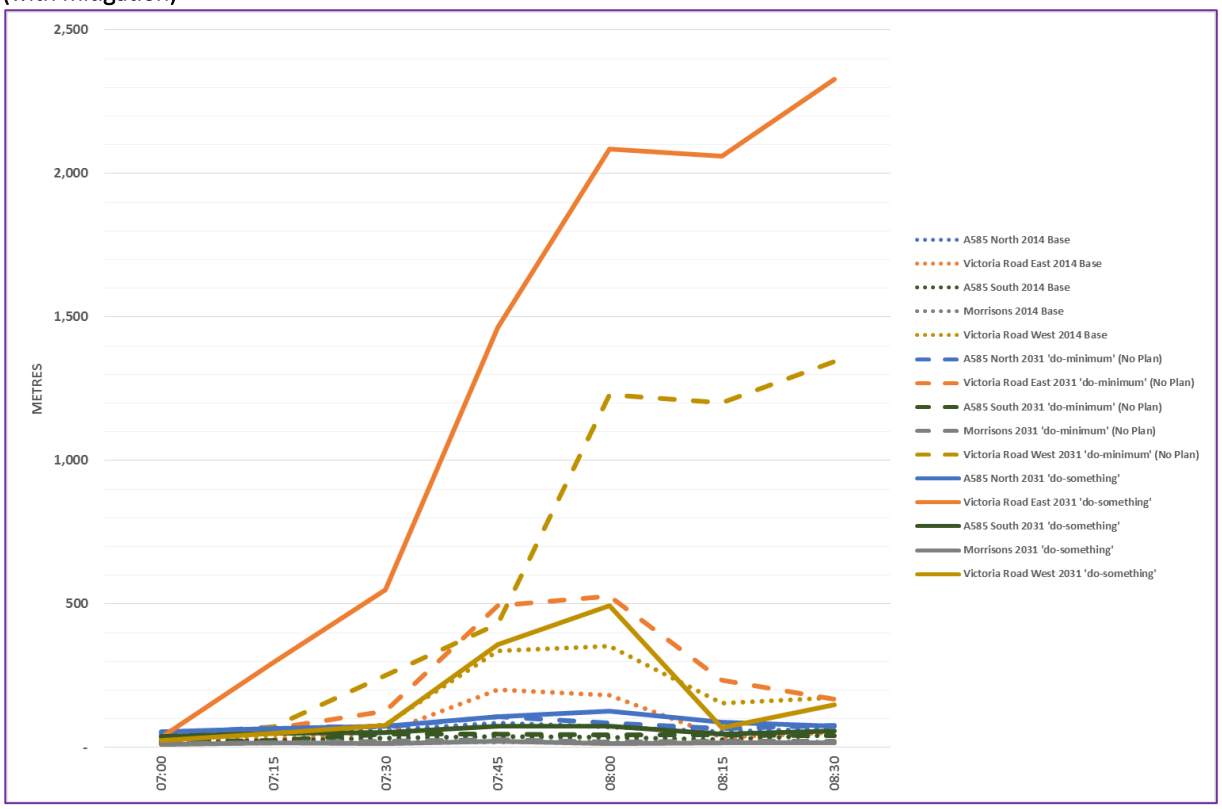
A585(T) / Victoria Road - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths (metres)



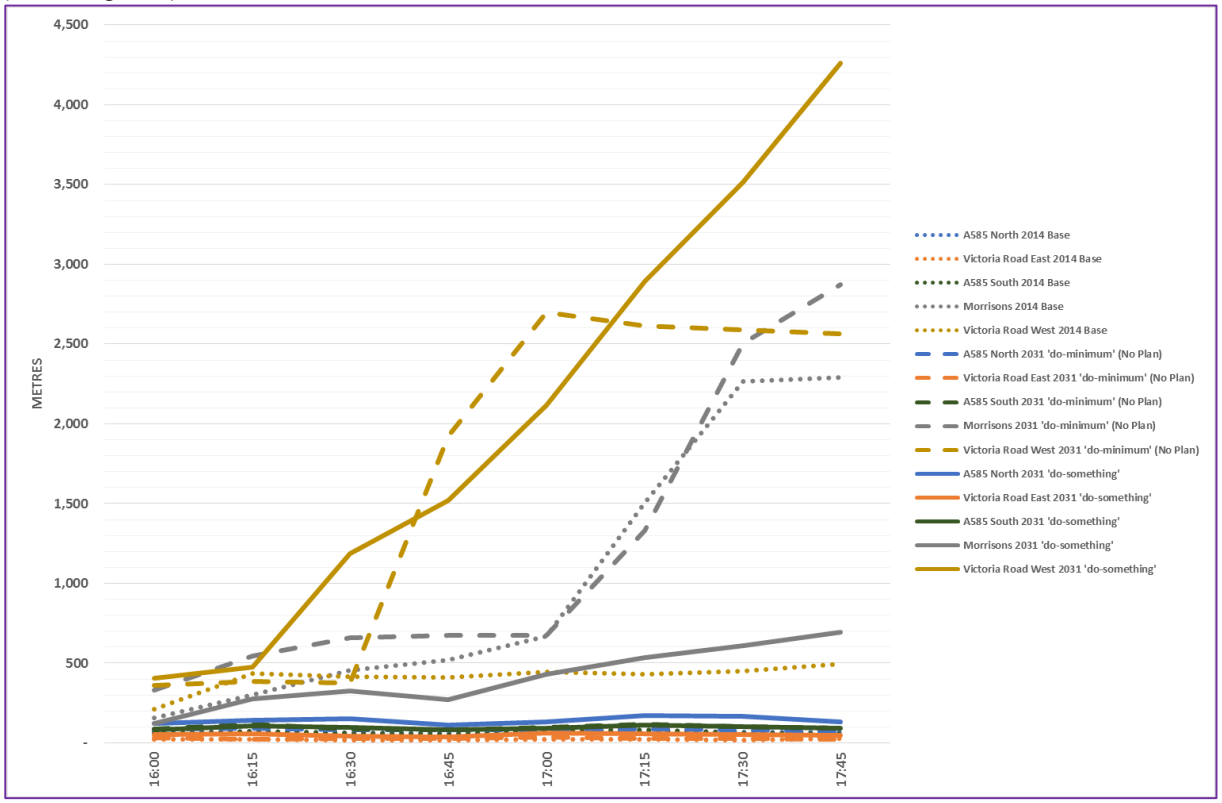
A585(T) / Victoria Road - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) PM Peak queue lengths (metres)



A585(T) / Victoria Road - 2014 'base' and 2031 'do-minimum' and 2031 'do-something' AM Peak queue lengths (with mitigation)

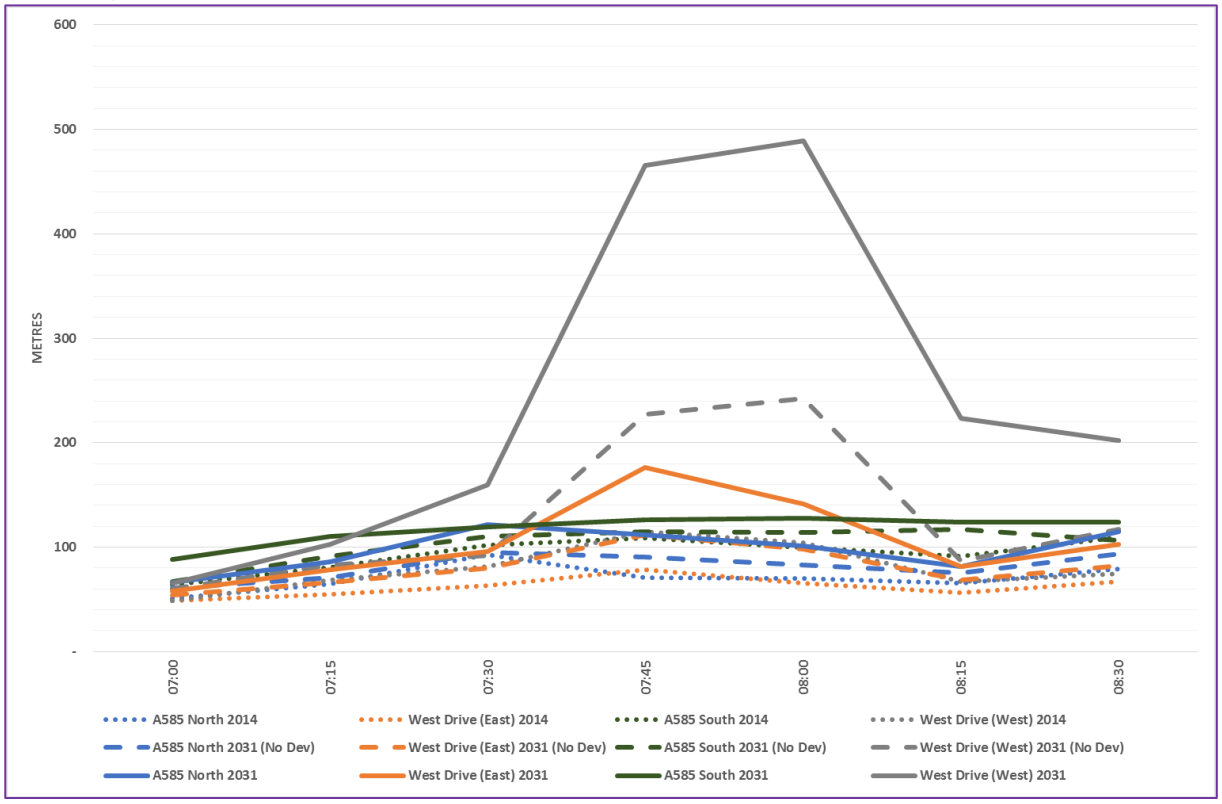


A585(T) / Victoria Road - 2014 'base' and 2031 'do-minimum' and 2031 'do-something' PM Peak queue lengths (with mitigation)

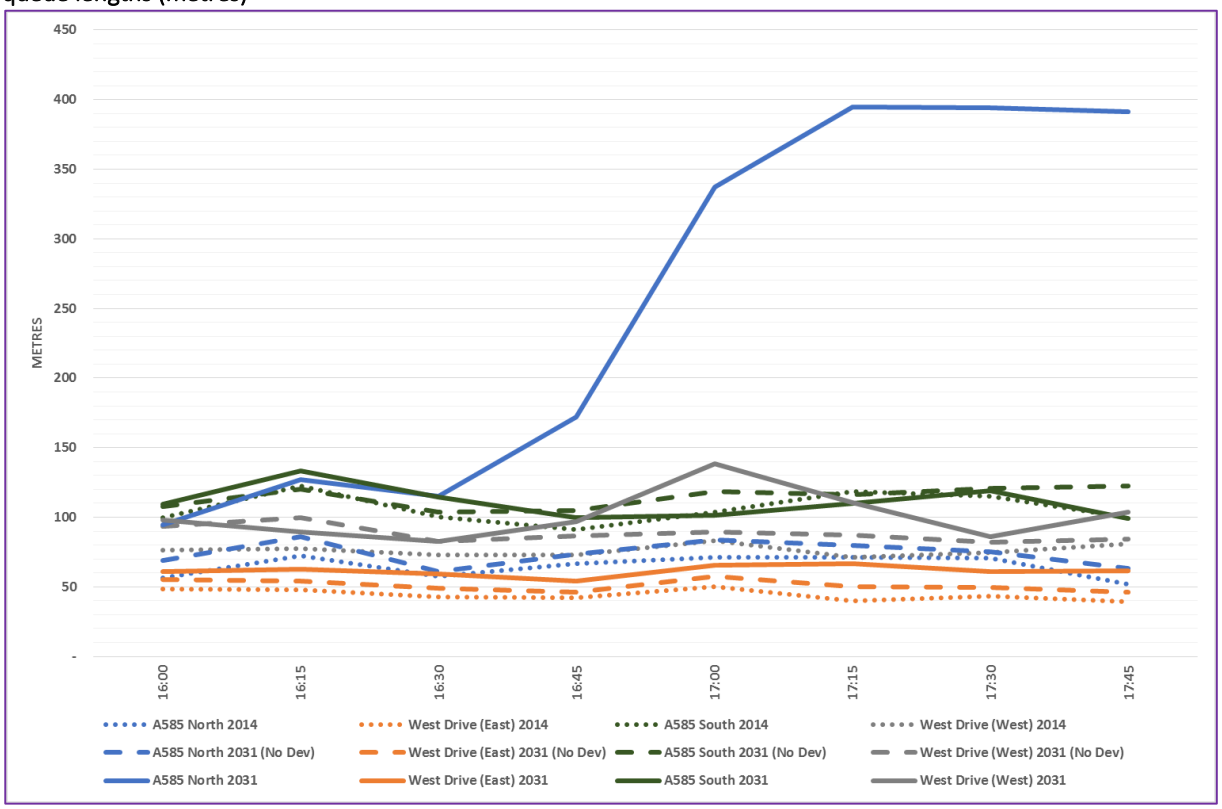


Appendix H
Queue result graphs – A585(T) / West Drive

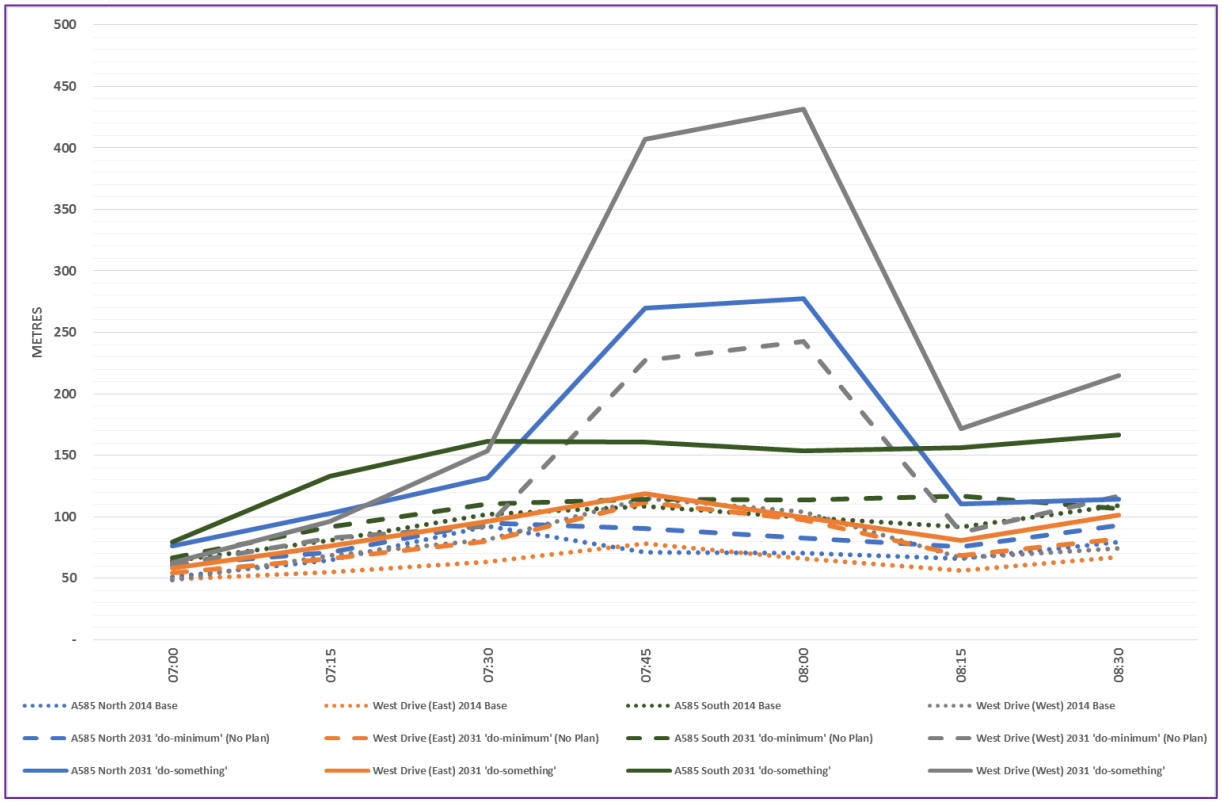
A585(T) / West Drive - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths (metres)



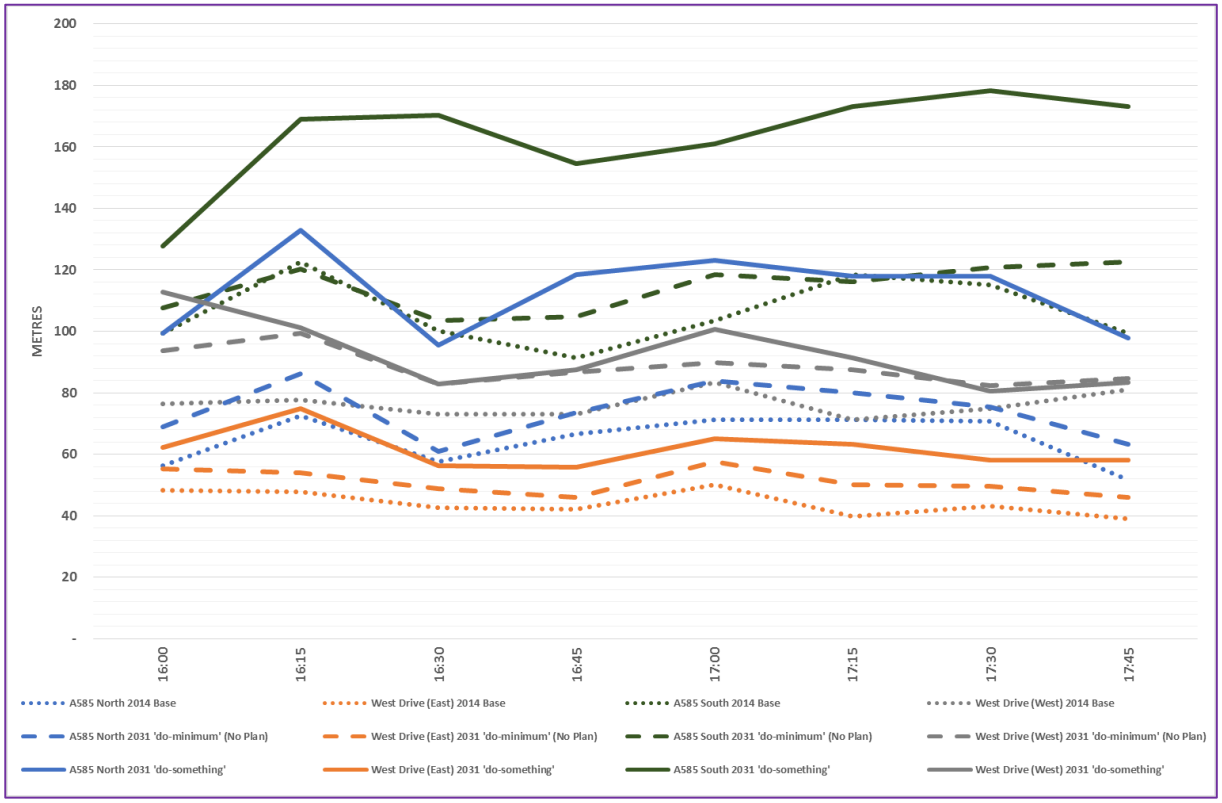
A585(T) / West Drive - 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) PM Peak queue lengths (metres)



A585(T) / West Drive - 2014 'base' and 2031 'do-minimum' and 2031 'do-something' AM Peak queue lengths (with mitigation)

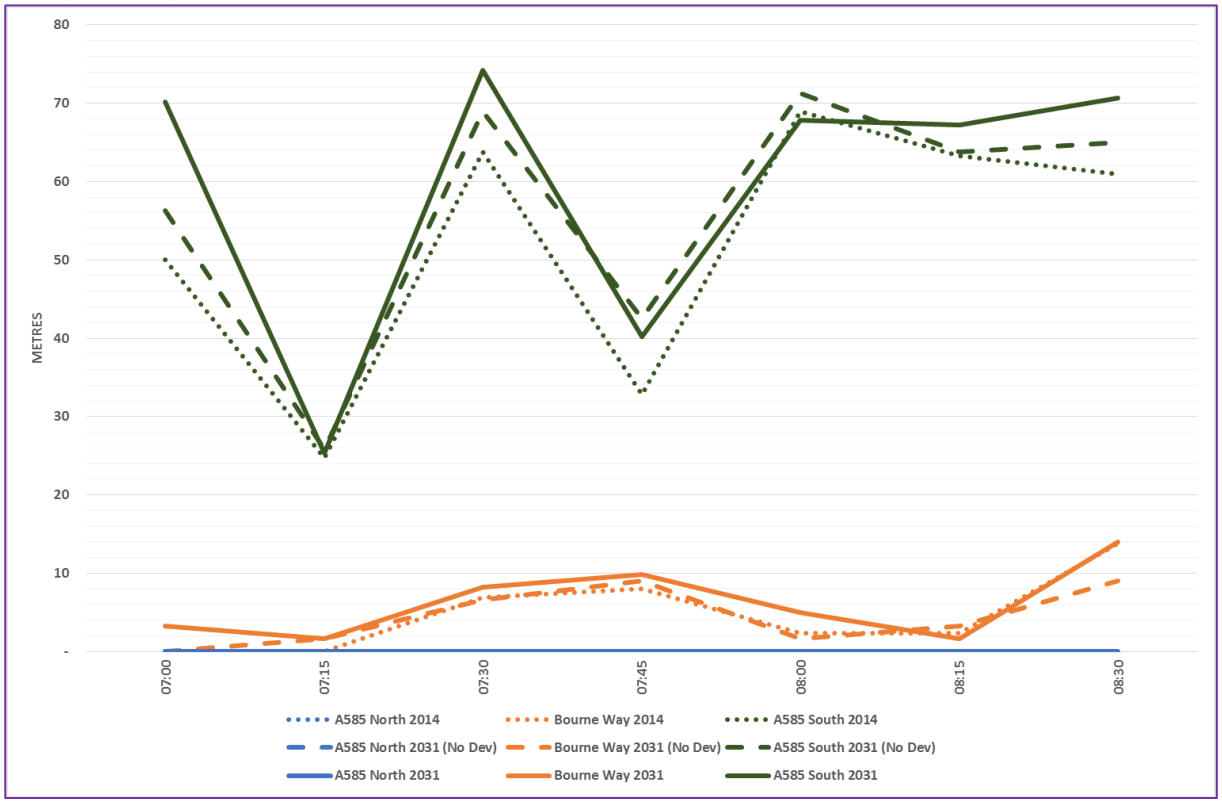


A585(T) / West Drive - 2014 'base' and 2031 'do-minimum' and 2031 'do-something' PM Peak queue lengths (with mitigation)

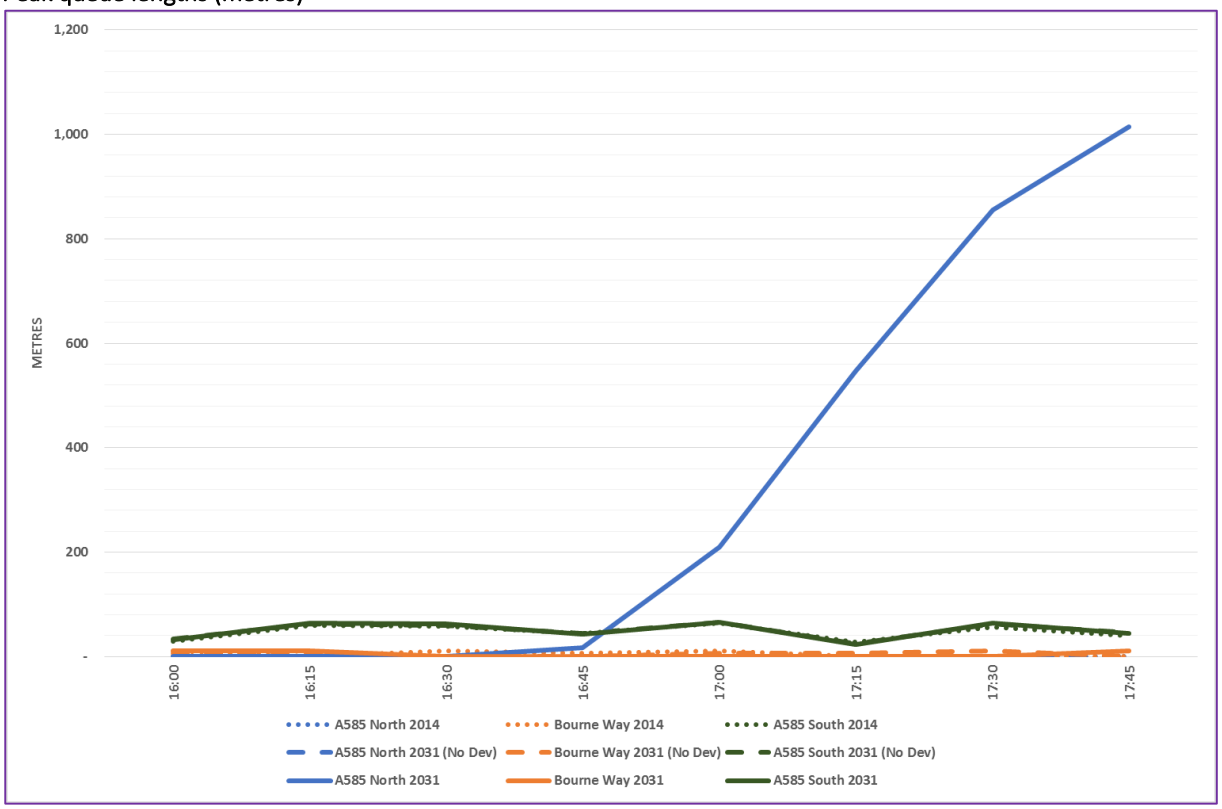


Appendix I
Queue result graphs – A585(T) / Bourne Way

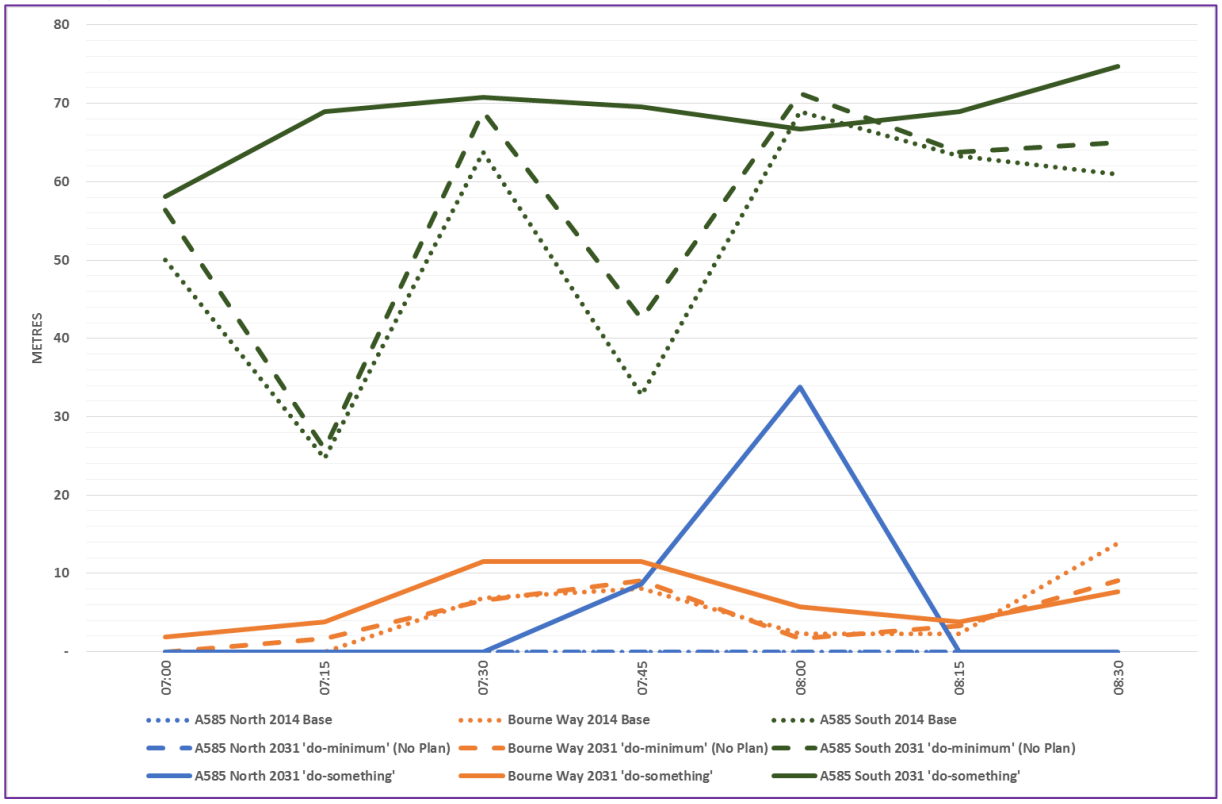
A585(T) / Bourne Way – 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) AM Peak queue lengths (metres)



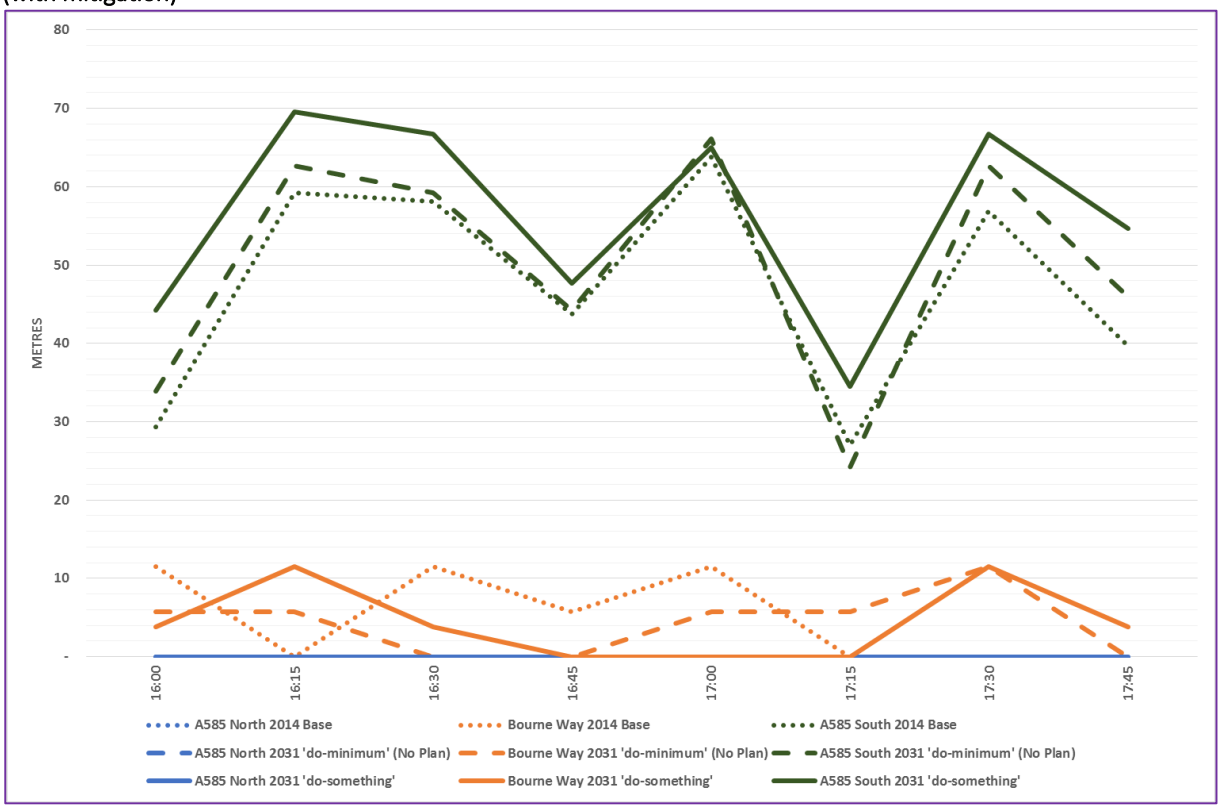
A585(T) / Bourne Way – 2014 'base' and 2031 'do-minimum' (no Plan) and 2031 'do-minimum' (with Plan) PM Peak queue lengths (metres)



A585(T) / Bourne Way - 2014 'base' and 2031 'do-minimum' and 2031 'do-something' AM Peak queue lengths (with mitigation)

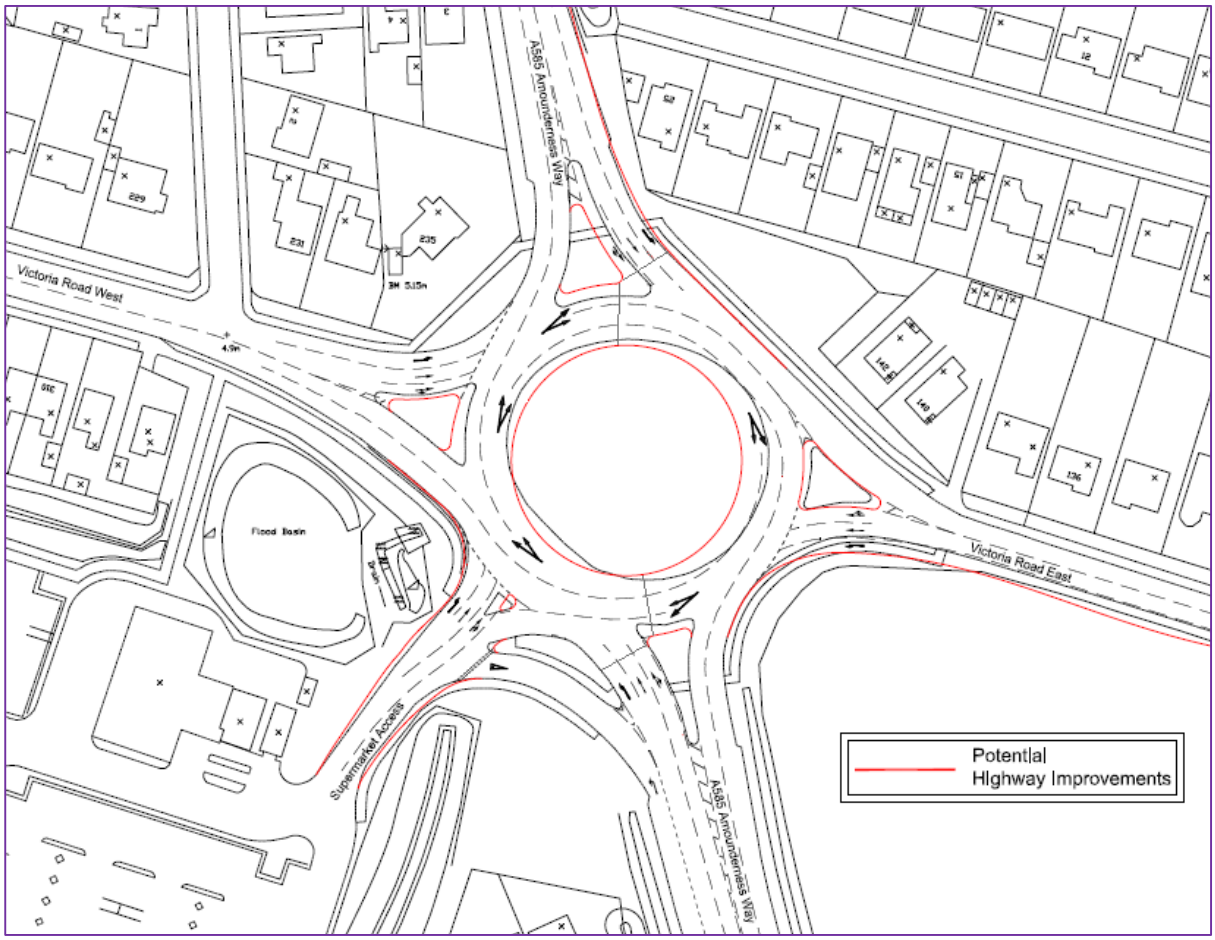


A585(T) / Bourne Way - 2014 'base' and 2031 'do-minimum' and 2031 'do-something' PM Peak queue lengths (with mitigation)

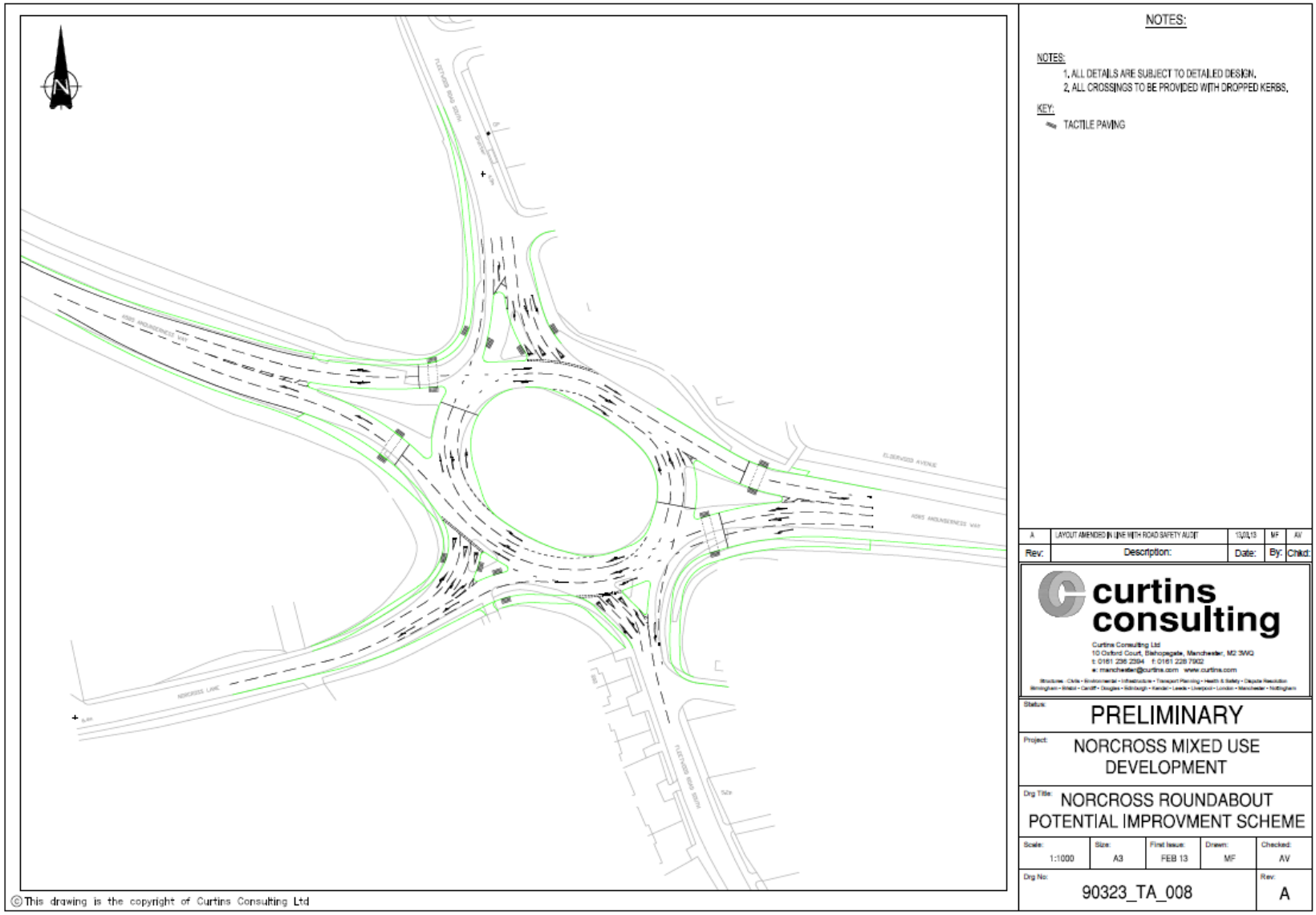


Appendix J
Mitigation scheme drawings

A585(T) / Victoria Road



A585(T) / Norcross Lane / Fleetwood Road



APPENDIX J
MITIGATION SCHEME DRAWINGS