Greater Exeter Mitigation Modelling

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SUBJECT:	Greater Exeter Mitigation Modelling		
PROJECT:	70105008 – Exeter Strategic Model Update	**AUTHOR:**	Edward Dawn
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INTRODUCTION

The Greater Exeter strategic modelling work was carried out to understand the cumulative and individual impacts of the emerging Local Plans from Teignbridge District Council (TDC), Exeter City Council (ECC), Mid Devon District Council (MDDC) and East Devon District Council (EDDC) upon the highway network within the Greater Exeter area. Details of the strategic modelling work are reported in the '*Greater Exeter Model Update'* report (final version dated October 2023) and '*Greater Exeter Further Modelling*' report (November 2024), both prepared by WSP. The *'Greater Exeter Local Plan Developments: Strategic Modelling Report'* (dated September 2023) was prepared by Devon County Council (DCC). This reported on the initial findings from the strategic modelling work and proposes a series of mitigations which are intended to reduce vehicular traffic and the impact of Local Plan developments on the highway network. Consequently, additional strategic modelling work was undertaken to examine the impact of the proposed mitigation proposals. This technical note details the methodology and results from the mitigation modelling exercise.

METHODOLOGY

The *'Greater Exeter Local Plan Developments: Strategic Modelling Report'* specified a list of proposed mitigation measures that would aim to reduce the impact of the proposed local plan developments on the highway network. The following mitigation proposals have been modelled:

- Local Cycling and Walking Infrastructure Plans (LCWIPs)
- Recently constructed and proposed rail stations
- Bus Service Improvement Plan (BSIP)
- Park and change sites

Other mitigation proposals that were mentioned in the report but have not been modelled are as follows:

- Markham's Farm - the operational modelling for Ide roundabout used an assumption that other mitigations for the Markham's Farm development (other than the nearby park and change) would reduce peak hour trips between Ide Lane and Alphington Road by 10%. In the strategic model the number of trips making this movement was very low (<50 vehicles), so it was decided not to model this mitigation.
- Car park closures - several car parks within Exeter are planned to be closed, including Mary Arches multi-storey (394 spaces), Magdalen Street (100 spaces) and Harlequins (91 spaces). It is expected that a proportion of these car park users will stop travelling into the centre of Exeter by car instead

of switching to another car park, but there is limited evidence available regarding what this proportion might be. Therefore, it was decided not to model this impact.

Separate to the report, microsimulation modelling was carried out on Ide Roundabout to investigate the traffic impact from the nearby proposed Markham Village development (*Ide Roundabout Traffic Impact Assessment*, September 2023) and to test various physical intervention options to mitigate the traffic impact (*Ide Roundabout Traffic Impact Assessment*, March 2024). Based on the microsimulation modelling results, TDC and DCC agreed to take forward the three interventions from the best performing option, of which two have been modelled for this strategic mitigation modelling:

- Signalisation of the A30 NB offslip entry arm onto Ide Roundabout
- Two lanes on the NB carriageway of the A377 between Ide Roundabout and the Church Road junction
- Pedestrian crossing across the SB A30 on-slip – this has not been modelled as it is unlikely to have a significant impact on highway traffic

The methodologies for assessing the impact of each of the proposed measures using the Greater Exeter model are detailed below. These adjustments have been applied to the '2040 Core' forecast scenario to create a new '2040 Core plus mitigation' forecast scenario for the AM and PM peak hours to examine the cumulative impact of all mitigation measures that have been proposed.

LCWIP schemes

The *'Greater Exeter Local Plan Developments: Strategic Modelling Report'* included schemes identified in two LCWIPs. The Exeter LCWIP identifies 22 cycling routes across the city of Exeter and recommends schemes for 20 of them, and the draft East Devon LCWIP identifies 4 key groups of routes in East Devon and recommends schemes across each group. Maps displaying the Exeter and East Devon cycle routes are shown in Figure 1 and Figure 2 respectively. These schemes are expected to lead to some modal shift from car to cycle. The Killerton & Broadclyst East Devon LCWIP route was excluded from the mitigation calculations. This was because the Killerton & Broadclyst cycle route is more focused on leisure and unlikely to have a large impact on peak traffic flows.

Figure 1 - Overview of Exeter cycle route recommendations (Exeter LCWIP, September 2023)

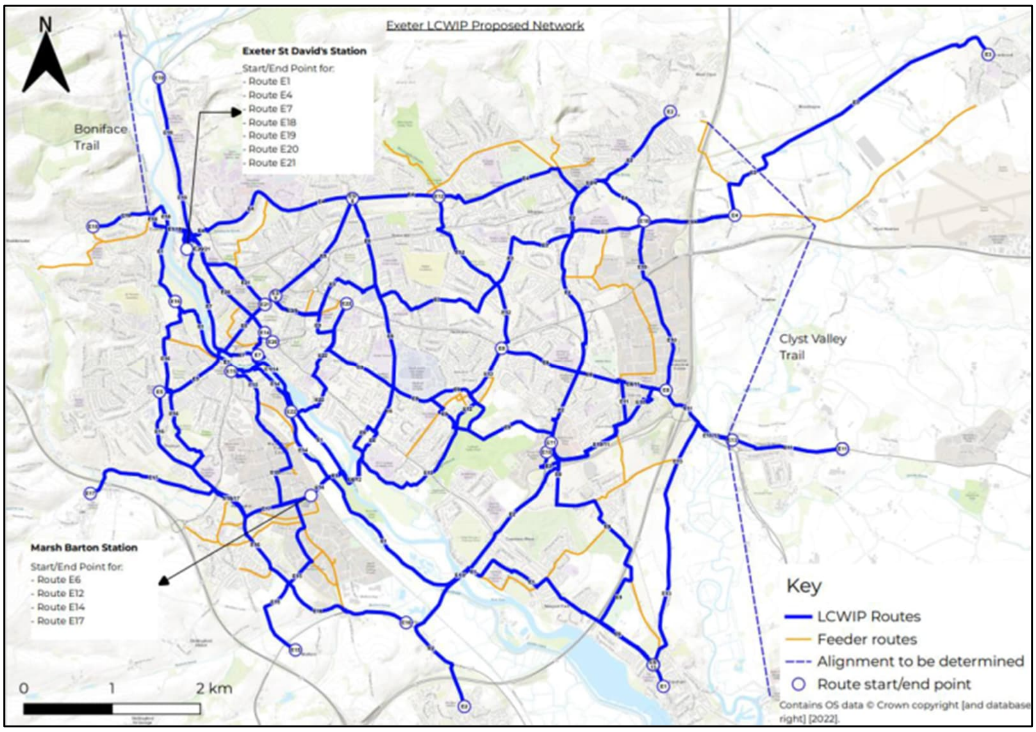
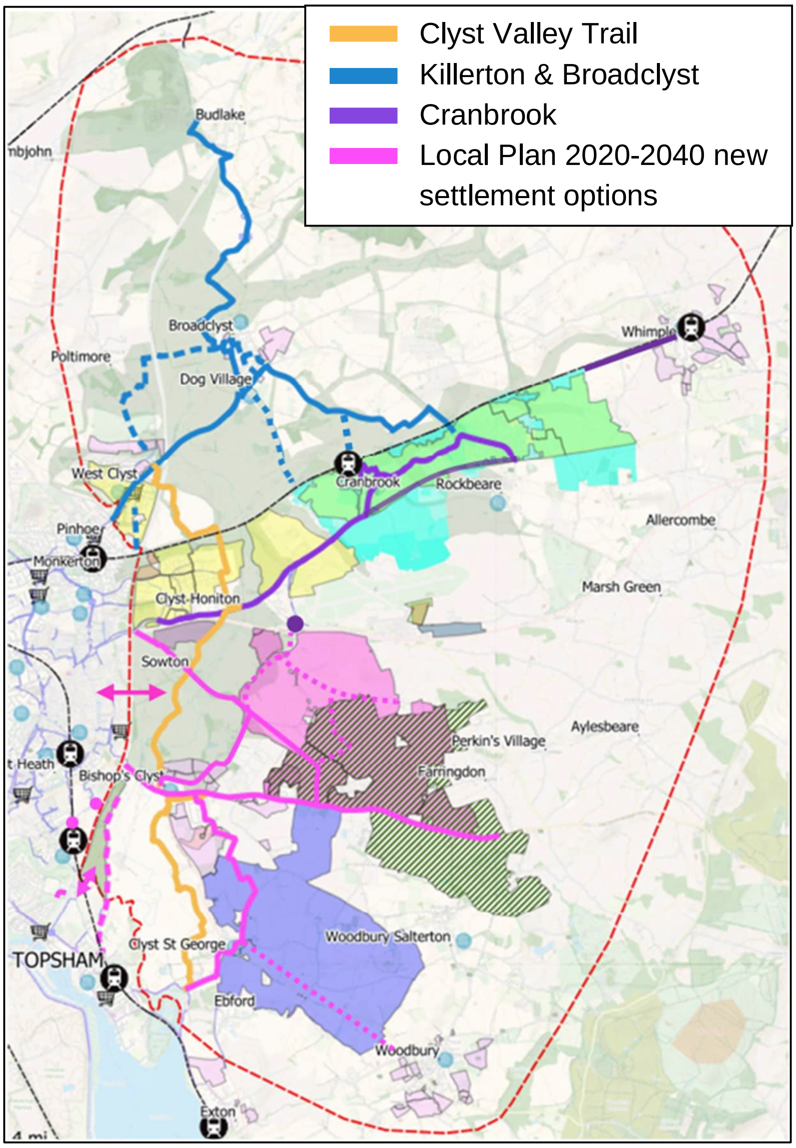


Figure 2 - Overview of East Devon cycle route recommendations (Draft East Devon LCWIP, October 2023)



An estimate of the increase in daily cycling trips due to the schemes in each LCWIP was estimated using the Active Travel Fund 4 (AT4) Uplifts Tool developed by Active Travel England. The inputs required for this tool are the type of infrastructure, scheme cost (in 2023 prices), the local authority, and the difference between the scheme cost and a cost benchmark provided by the tool (in terms of £ per km of scheme).

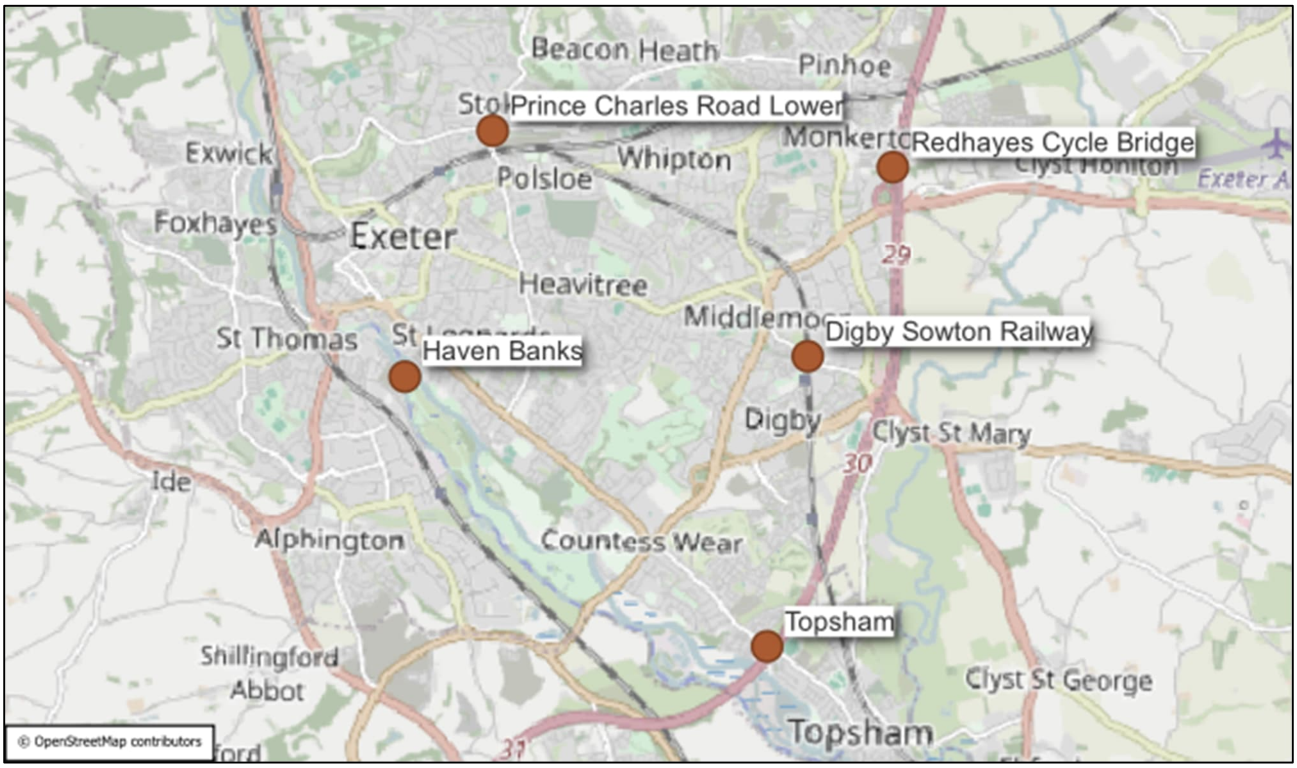
The Exeter LCWIP provides cost estimates for all 20 route schemes that sum to a total of £51,625,000 in 2022 prices. The 2022-2023 GDP deflator values from the TAG Data Book November 2023[1] were used to uplift the costs to 2023 prices, which summed to £55,255,819. The total length of the schemes was 57.0km, and the tool suggested a -19% difference between the scheme cost and benchmark costs. The infrastructure type was set to 'Area-wide cycling network. With these inputs, the tool estimated a daily increase of 10,320 cycling trips, where the intrinsic cycling potential for Exeter was given as 'High'.

The East Devon LCWIP provides a range of 2023 cost estimates for the Cranbrook and Local Plan 2020-2040 New Settlement Options, and the mid-points of these costs was used as an input for the AT4 Uplifts Tool. The total cost was £29,450,000. The total length of the schemes was 35.6km, and the tool suggested a -31% difference between the scheme costs and benchmark costs. The default intrinsic cycling potential for East Devon was given as 'Low', but given that the majority of the routes were located between Exeter and EDNC a 'Middle' potential was considered to be more representative since Exeter has a 'High' potential. With these inputs, the tool estimated a daily increase of 1,625 cycling trips.

[1] This was the most recent data book at the time the calculations were carried out.

Data for 2023 from five cycle counts in Exeter (Topsham, Redhayes Cycle Bridge, Prince Charles Road Lower, Haven Banks, Digby Sowton Railway) was used to calculate the proportion of daily weekday trips taken in the AM peak (8am to 9am) and the PM peak (5pm to 6pm). These counts are shown in Figure 3.

Figure 3 - Exeter cycle counts



The stages and data sources which were used to convert daily cycle trip increases to peak hour car trip reductions are shown in Table 1.

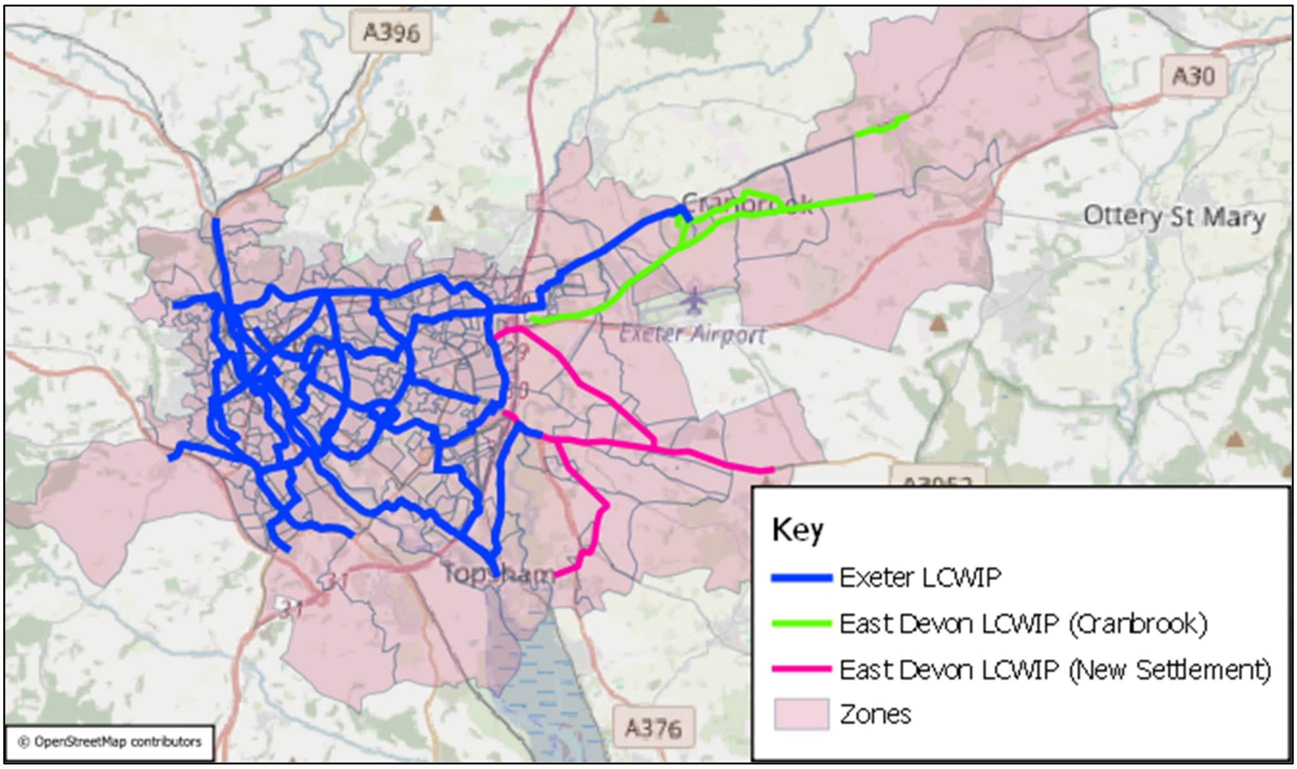
Table 1 - LCWIP Car Trip Reduction

LCWIP	**Exeter**		**East Devon**		**Source**
	AM	PM	AM	PM	
Daily cycle trip increase	10,320		1,625		ATF4 Uplifts Tool
Proportion of daily trips in peak hour	12.6%	10.7%	12.6%	10.7%	Exeter cycle count data
Peak hour cycle trip increase	1,299	1,103	75	64	
Car diversion factor	30%				TAG Data Book A5.4.7 (excluding rail)
Car person trip decrease	385	327	61	51	
Average car occupancy	1.39				(Occupancy by purpose) TAG Data Book A1.3.3, average weekday

					(Cycling purpose split) TEMPro 8.1, Core 2040 Exeter AM+PM
Car trip decrease	276	234	43	37	

The trip reductions from Table 1 were applied the SATURN zones which were identified as being intersected by an LCWIP route or feeder route (as identified in the Exeter LCWIP). The selected zones are shown in Figure 4. The car trip reductions were then applied to the model matrices by applying a factor to reduce car trips between the selected zones by the correct amount.

Figure 4 - LCWIP Zone Selection



Rail Stations

The *'Greater Exeter Local Plan Developments: Strategic Modelling Report'* identified the following recently opened or proposed railway stations which are expected to result in a mode shift from car to rail:

- Okehampton (opened 2021)
- Marsh Barton (opened 2023)
- Okehampton East (proposed opening 2025)
- Cullompton (proposed opening 2025)

For each rail station, an expected reduction in car trips has been derived from the passenger demand forecasts and other data, and the impacted zones have been identified based on walking and driving isochrones for the origin and destination stations. Even through the Okehampton station services started in 2021, this is after the base model year of 2017 and this was not included in the 2030 or 2040 forecast models.

OKEHAMPTON AND OKEHAMPTON EAST STATIONS

The effects of the Okehampton and Okehampton East stations have been calculated as a combined impact. The passenger demand forecast from the West Devon Transport Hub business case[2] was used in conjunction with other data to estimate the reduction in car trips, as summarised in Table 2. To determine what proportion of rail travel was in the AM and PM peak hours, Honiton station was used as a proxy for the Okehampton stations using data from MOIRA December 2019.

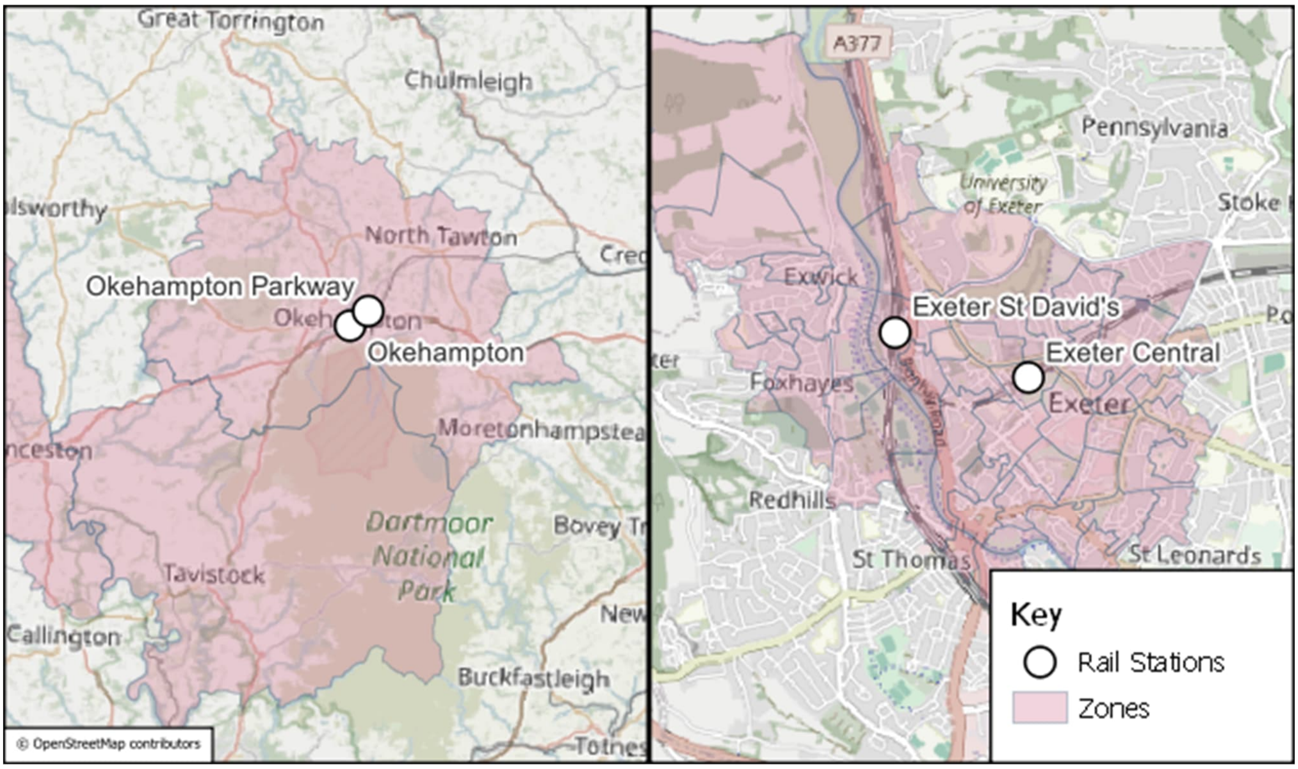
Table 2 - Okehampton Stations Car Trip Reduction

	Value		Source
2040 annual new-to-rail demand	451,021		West Devon Transport Hub demand forecast
Proportion of car users	84%		2011 Census journey-to-work car mode proportion of trips between Okehampton and Exeter
Annual car user decrease	379,748		
Average car occupancy	1.26		(Occupancy by purpose) TAG Data Book A1.3.3, average weekday (Rail purpose split) TEMPro 8.1, Core 2040 Exeter AM+PM
Annual car decrease	300,575		
Annualisation factor	300		West Devon Transport Hub demand forecast[2]
Daily car decrease	1,002		
	AM	**PM**	
Oke-to-Exe proportion of daily trips	11%	6%	MOIRA Dec 2019 Honiton station boardings (AM 7-8 and PM 17-18)
Exe-to-Oke proportion of daily trips	5%	7%	MOIRA Dec 2019 Honiton station drop-offs (AM 7-8 and PM 17-18)
Oke-to-Exe car decrease	107	56	
Exe-to-Oke car decrease	50	69	

The zones to apply the trip reductions to were selected by generating a car isochrone for Okehampton East station and walking isochrones for Exeter St David's and Exeter Central, which are where the Okehampton services stop. Zones within a 30 minute drive of Okehampton East were selected (excluding zones that were closer to Exeter than Okehampton), plus zones within a 15 minute walk of the Exeter stations. This is because the zone system is quite coarse in the Okehampton area and the east station is designed to also take traffic off the A30 from trips starting further west. Figure 5 shows the locations of these zones. The car trip reductions were then applied to the model matrices by applying a factor to reduce car trips between the Okehampton and Exeter zones by the correct amount.

[2] West Devon Transport Hub Strategic Outline Case, July 2022

Figure 5 - Okehampton Stations Zone Selection



CULLOMPTON STATION[3]

The car trip reduction for Cullompton station was calculated similarly to the Okehampton stations, as summarised in Table 3.

Table 3 - Cullompton Station Car Trip Reduction

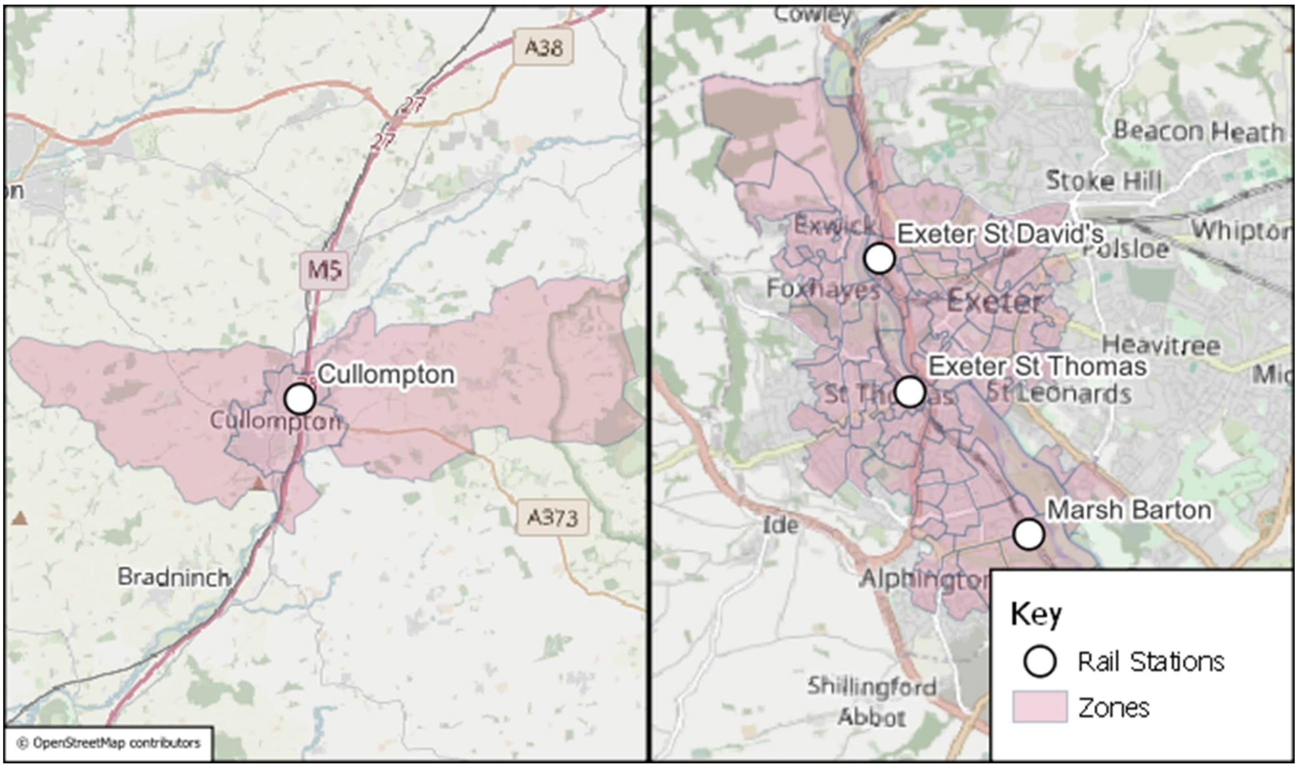
	Value	Source
2026 peak hour new-to-rail demand	262	Cullompton Railway Station Transport Assessment (Jan 2024)
2026-2040 rail passenger growth factor	1.13	Cullompton station appraisal – DfT background rail journey growth
2040 peak hour new-to-rail demand	296	
Proportion travelling south of Cullompton	91%	Cullompton Railway Station Transport Assessment (Jan 2024)
Proportion of car users	83%	Cullompton Railway Station Transport Assessment (Jan 2024)
Car user decrease	224	
Average car occupancy	1.26	(Occupancy by purpose) TAG Data Book A1.3.3, average weekday

[3] Cullompton station has since had its funding pulled. It is remaining in the mitigation modelling as there is still an aspiration to deliver it.

	Value		Source
			(Rail purpose split) TEMPro 8.1, Core 2040 Exeter AM+PM
Peak hour car decrease	177		
	AM	**PM**	
Cul-to-Exe proportion	95%	5%	Cullompton Railway Station Transport Assessment (Jan 2024)
Exe-to-Cul proportion	5%	95%	Cullompton Railway Station Transport Assessment (Jan 2024)
Cul-to-Exe car decrease	168	9	
Exe-to-Cul car decrease	9	168	

The zones to apply the trip reductions to were selected by generating walking isochrones for Exeter St David's, Exeter St Thomas and Marsh Barton, which would be stops for the proposed services to/from Cullompton station. Zones within a 15 minute walk of the Exeter stations were selected. The Cullompton zone and adjacent zone were selected, as the proximity of Tiverton Parkway makes it less likely that people would drive to the station from further afield. Figure 6 shows the zone selection. The car trip reductions were then applied to the model matrices by applying a factor to reduce car trips between the Cullompton and Exeter zones by the correct amount.

Figure 6 - Cullompton Station Zone Selection



MARSH BARTON STATION

The car trip reduction for Marsh Barton station has been based on existing estimates of the car trip reduction and the distribution of trips from the Marsh Barton Rail Station Transport and Economics Report[4]. Table 3 of the report contains rail passenger forecasts up to 2042 and Table 7 contains estimates of the highway trip decrease up to 2031. The 2040 rail passenger forecasts were combined with the highway trip decrease proportions from 2031 to get an estimate of the highway trip decrease in 2040. Table 5 of the report contains the rail trip distribution by purpose for the top 15 stations. An all-purpose distribution was calculated by weighting the distribution for each purpose by the rail purpose split from the TAG Data Book Table A5.3.2. To simplify applying this distribution to the car trip reduction, the distribution was aggregated into 3 sectors: Exeter, East Devon, and Teignbridge/Torbay.

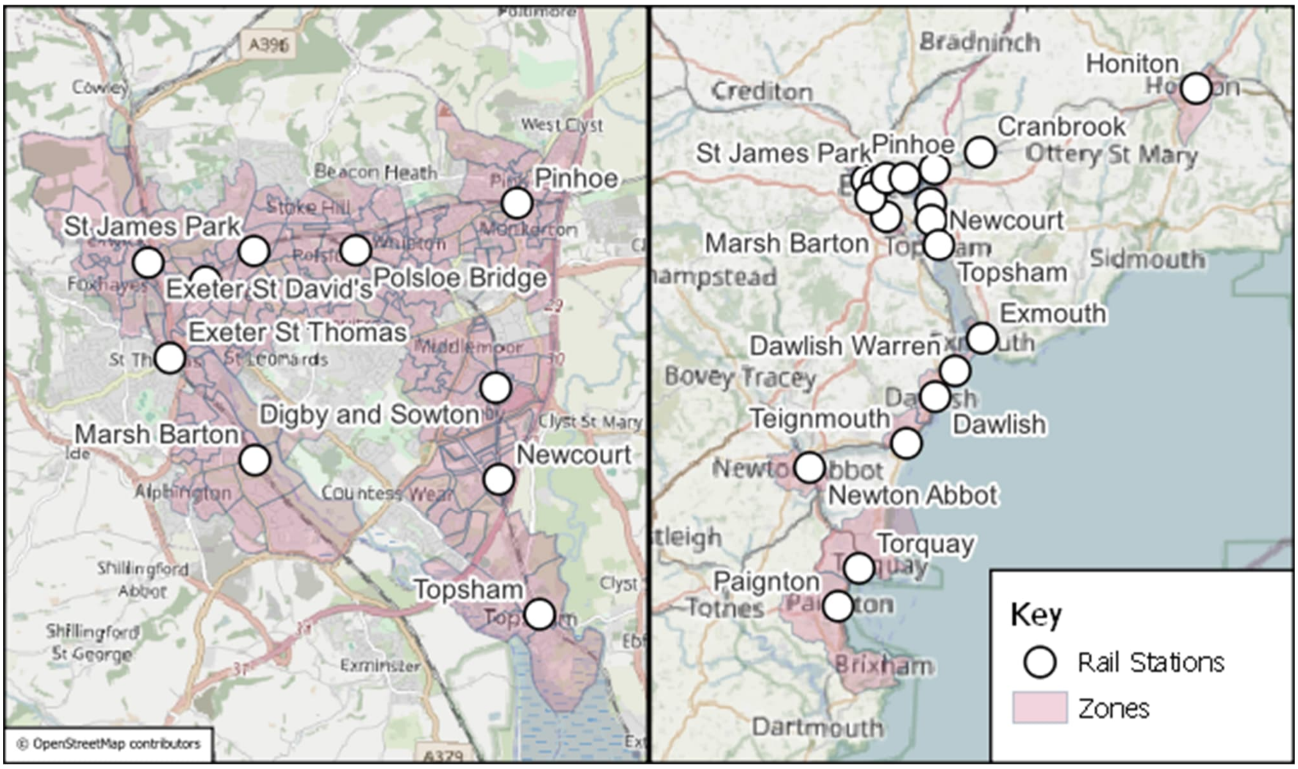
Table 4 - Marsh Barton Station Car Trip Reduction

	AM	PM	Source
2040 highway trip decrease	193	141	Marsh Barton Rail Station Transport and Economics Report
Trip distribution			
To/From Exeter	65.7%		
To/From East Devon	13.1%		
To/From Teignbridge/Torbay	21.1%		
Car trip reduction			
To/From Exeter	127	92	
To/From East Devon	25	18	
To/From Teignbridge/Torbay	41	30	

The zones to apply the trip reduction to were selected by generating walking isochrones for all stations included in the rail trip distribution. Zones within a 15-minute walk of these stations were selected. The car trip reductions were then applied to the model matrices by applying a factor to reduce car trips between the Marsh Barton and Exeter/East Devon/Teignbridge/Torquay sectors by the correct amount. The trips were split into arrivals / departures based on the existing model zone splits.

[4] Marsh Barton Rail Station Transport and Economics Report, Devon County Council, June 2020

Figure 7 – Marsh Barton Station Zone Selection



Bus Service Improvement Plan (BSIP)

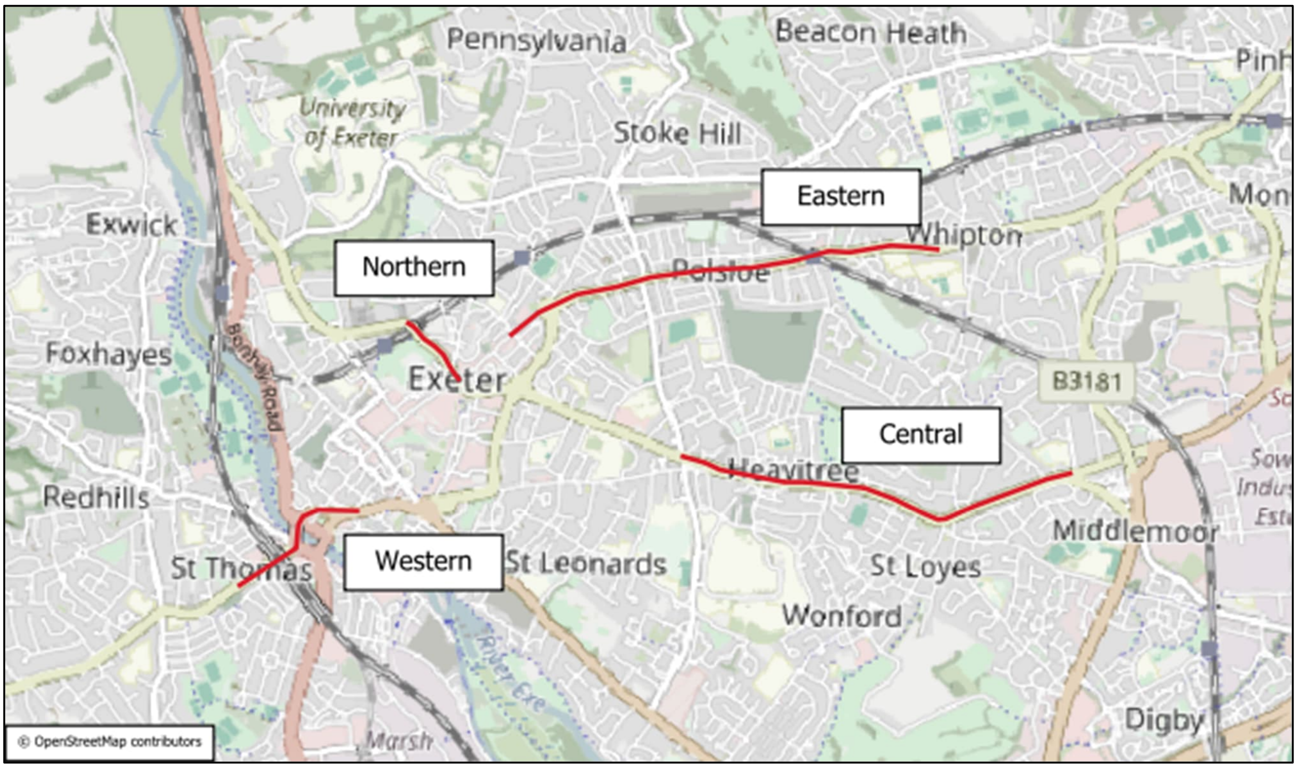
The *'Greater Exeter Local Plan Developments: Strategic Modelling Report'* included schemes from the DCC BSIP[5]. The DCC BSIP identifies schemes on the four main radial routes into Exeter, called the Central, Eastern, Northern and Western corridors. These schemes are expected to improve bus journey times, which is expected to encourage modal shift from car to bus. The location of these schemes is shown in Figure 8. The BSIP section 4.2.1 also provides estimates of the journey time savings provided by each scheme, as shown in Table 5.

Table 5 – BSIP Exeter schemes

Corridor	Scheme summary	Journey time saving
Central	New bus lanes and signalised junction upgrades	20%
Eastern	Conversion of peak hour bus lane to 24hrs with bus priority signals	27%
Northern	Bus gate	17%
Western	Conversion of peak hour bus lane to 24hrs and technology improvements at the signals	33%

[5] National Bus Strategy Bus Services Improvement Plan, Devon County Council, November 2022

Figure 8 – Location of BSIP Exeter schemes



The journey time saving percentages can be related to a percentage increase in bus passengers by using a bus in-vehicle-time (IVT) elasticity. A study carried out by RAND Europe and Systra on behalf of the Department for Transport[6] states that DfT guidance recommends a bus IVT value of -0.58.

The baseline number of daily bus passengers crossing each corridor was estimated by mapping the bus routes using each corridor and looking at 2011 Census journey-to-work bus passengers movements along each route. The Census movements were factored up to account for non-commute purposes, based on the bus purpose splits in TAG Data Book Table A1.3.16. The proportion of passengers travelling in the peak hours was estimated using NTS Table 0502b (2022, all purposes).

A summary of the car trip reduction calculations for each corridor is shown in Table 6.

Table 6 – BSIP Car Trip Reduction

	Central	Eastern	Northern	Western	Source
Baseline daily bus passengers	9,041	6,756	3,438	10,113	2011 Census journey to work NTS 0502b
Journey time saving	20%	27%	17%	33%	DCC BSIP
Bus IVT elasticity	-0.58				DfT study[6]
Bus passenger increase	1,049 (12%)	1,058 (16%)	339 (10%)	1,936 (19%)	
Diversion factor	33%				TAG Data Book A5.4.6 (Urban conurbation, no rail)

[6] Dunkerly et al (2018) 'Bus fare and journey time elasticities and diversion factors for all modes', chapter 6.6

	Central	Eastern	Northern	Western	Source
Car user decrease	342	345	110	631	
Average car occupancy	1.49				TAG Data Book A1.3.3, average weekday TEMPro 8.1, Core 2040 Exeter AM+PM
Daily car reduction	229	231	74	423	
AM proportion of daily trips	14%				NTS 0502b, 2022 all purposes
PM proportion of daily trips	8%				
AM peak car reduction	31	32	10	58	
PM peak car reduction	18	18	6	33	

The zones to apply the car trip reductions to were selected by mapping the bus routes using each corridor and selecting zones within 400m (i.e. a 5-minute walk) of the bus routes. This selection was manually adjusted to remove zones that only had a small overlap with the 400m buffer. Figure 9 to Figure 12 show the zone selection for each BSIP corridor.

Figure 9 – BSIP Central Zone Selection

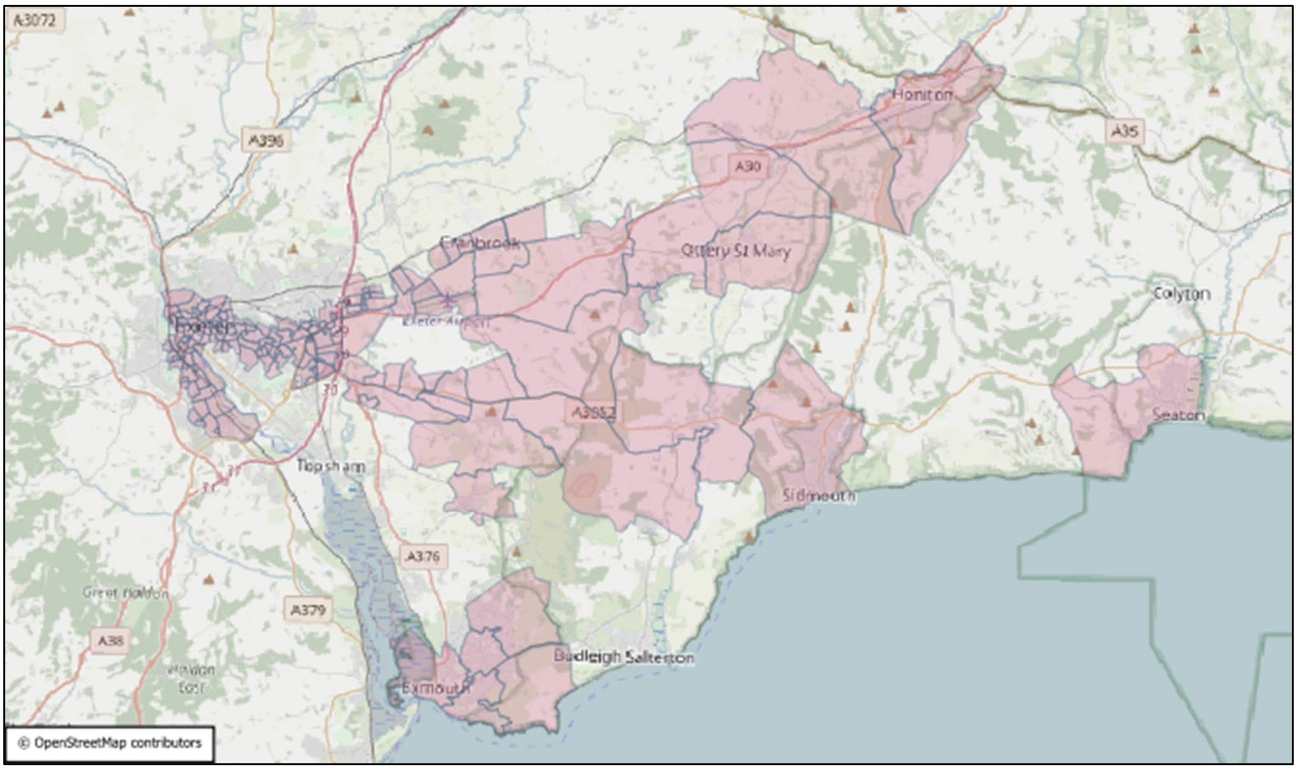


Figure 10 – BSIP Eastern Zone Selection

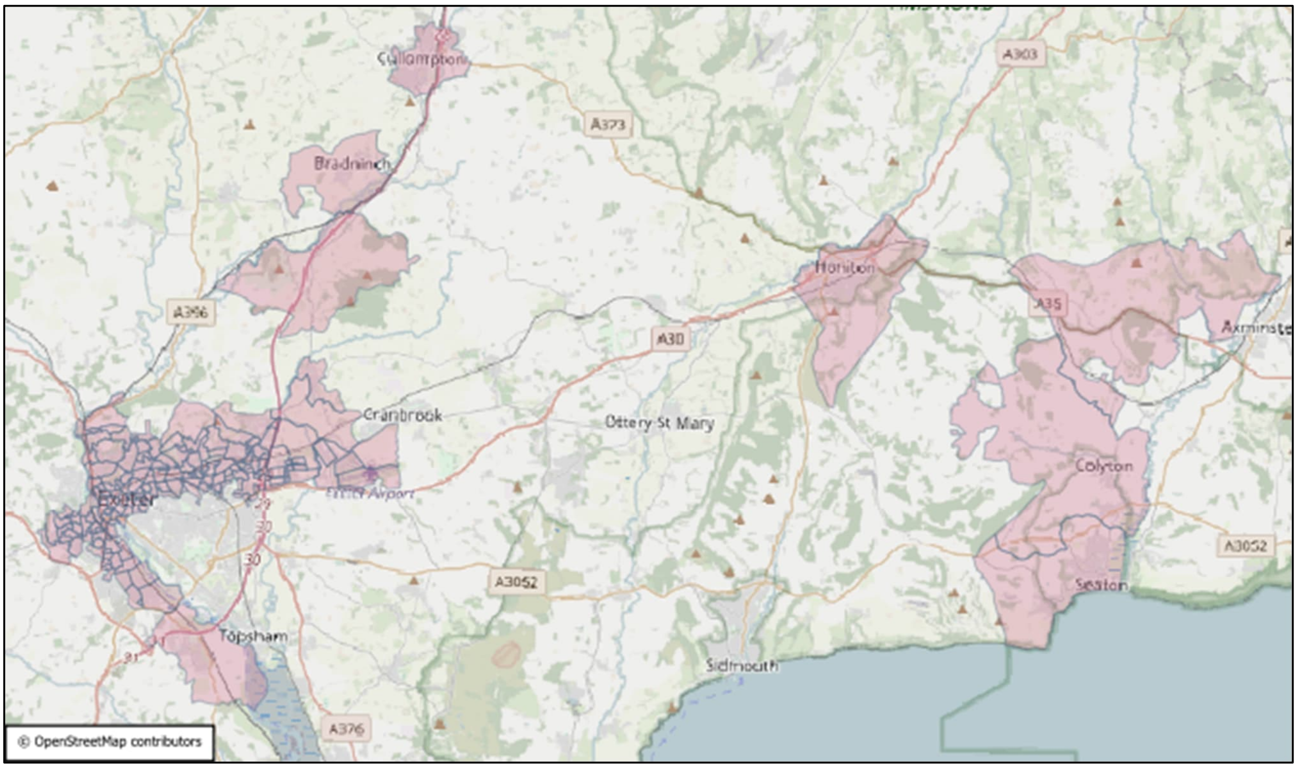


Figure 11 – BSIP Northern Zone Selection

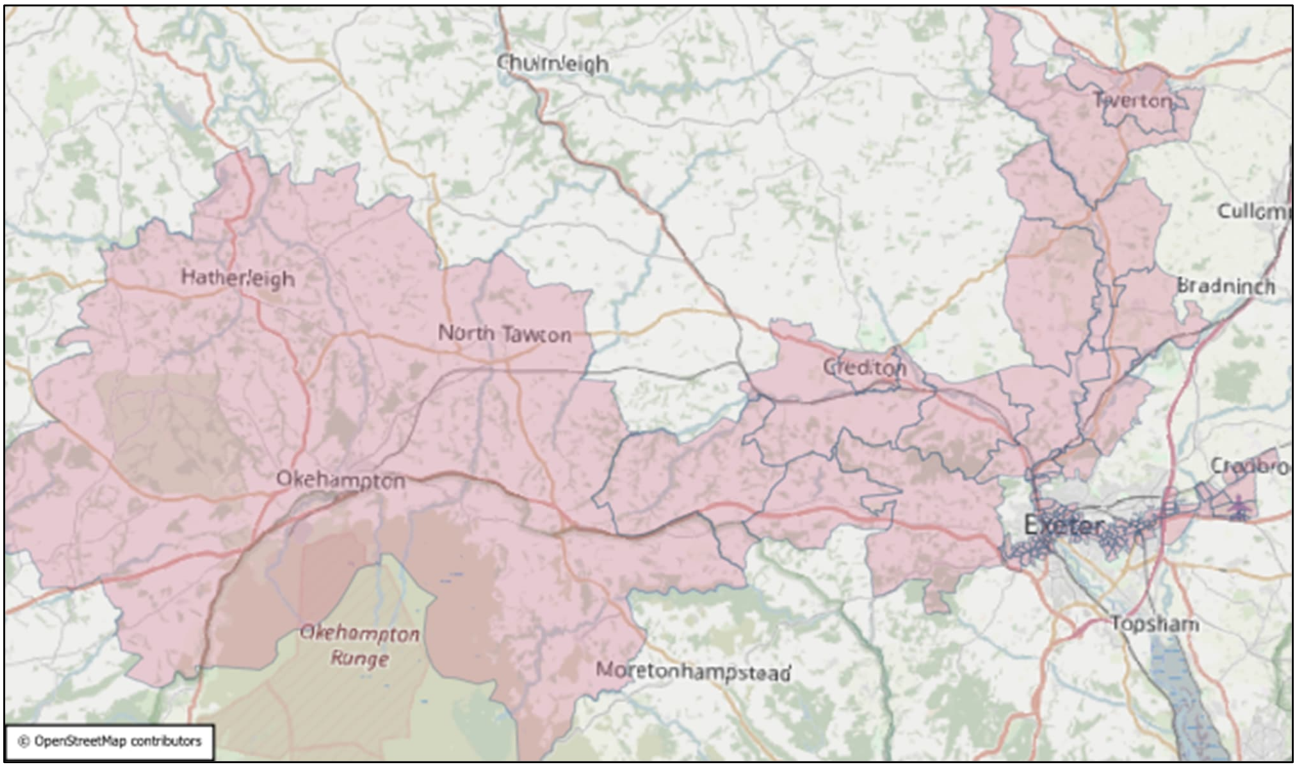
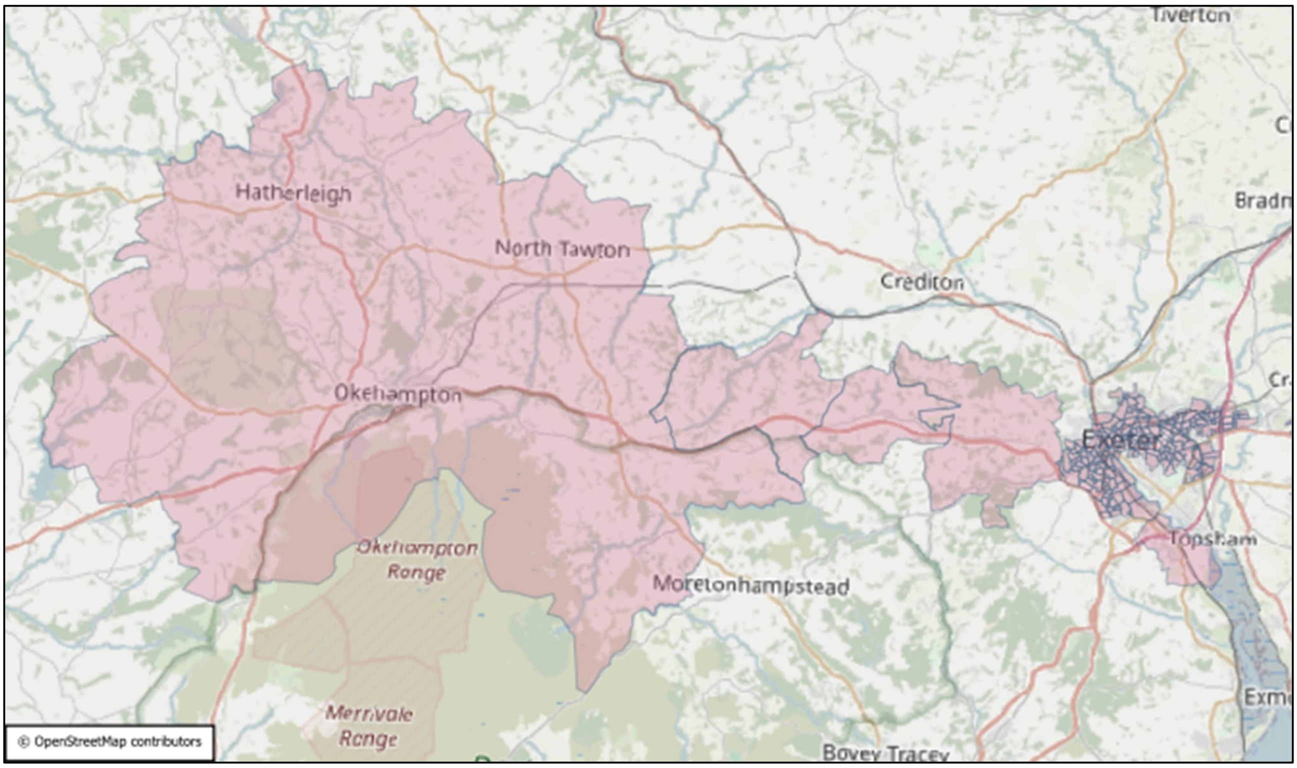


Figure 12 – BSIP Western Zone Selection



The car trip reduction was applied only to trips travelling between zones on opposite sides of each corridor, since these trips would benefit from the corridor schemes.

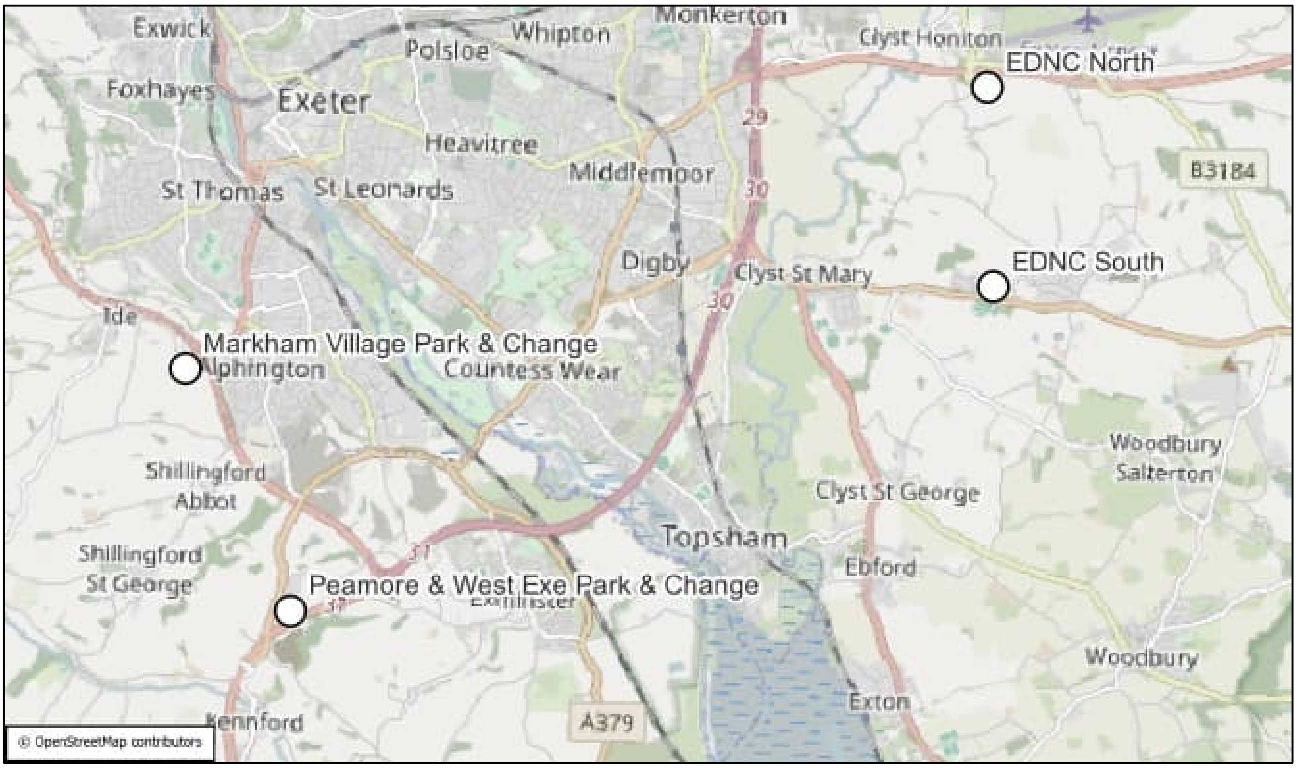
Park & Change

Four Park & Change (P&C) sites were identified in the mitigation measures, and are shown in Table 7 and Figure 13. It is expected that traffic will reroute to these sites as opposed to driving into the centre of Exeter.

Table 7 - Park & Change sites

Park & Change site	Parking spaces
Markham Village	125
Peamore & West Exe	625
EDNC North	450
EDNC South	450

Figure 13 – Park & Change site locations



The number of car trips to reroute to Markham Village has been based on the same assumption as used for recent operational modelling of Ide Roundabout, which is 100 trips (80% occupancy) in the AM and PM peaks.

The Matford Park & Ride site (451 spaces) has been used as a proxy for the other sites to determine the number of car trips to reroute. Count data from September 2023 showed that the 27% of the parking spaces at Matford were occupied between 8am and 9am. It has been assumed that the utilisation of Peamore and EDNC North and South would change by the same percentage in the AM peak, which corresponds to 311, 122 and 122 arrivals respectively. The PM peak departures have been assumed to be the same as the AM peak arrivals.

The zones to apply the Markham Village car trip rerouting to were selected by identifying zones to the west of the site likely to be able to make use of the site and selecting zones within 400m of a bus route between the site and Exeter bus station (excluding zones on the south side of the River Exe).The zones to apply the Peamore car trip rerouting to were selected by identifying zones to the south of the site likely to be able to make use of the site and selecting zones within 400m of a bus route between the site and Exeter bus station via Countess Wear (excluding zones on the south side of the River Exe). The zones to apply the EDNC North and South car trip rerouting to were selected by identifying zones to the east of the sites likely to be able to make use of the site and selecting zones within 400m of bus routes between the sites and Exeter bus station. The selected zones for Markham Village, Peamore and EDNC North and South are shown in Figure 14, Figure 15 and Figure 16 respectively.

Figure 14 – Markham Village P&C Zone Selection

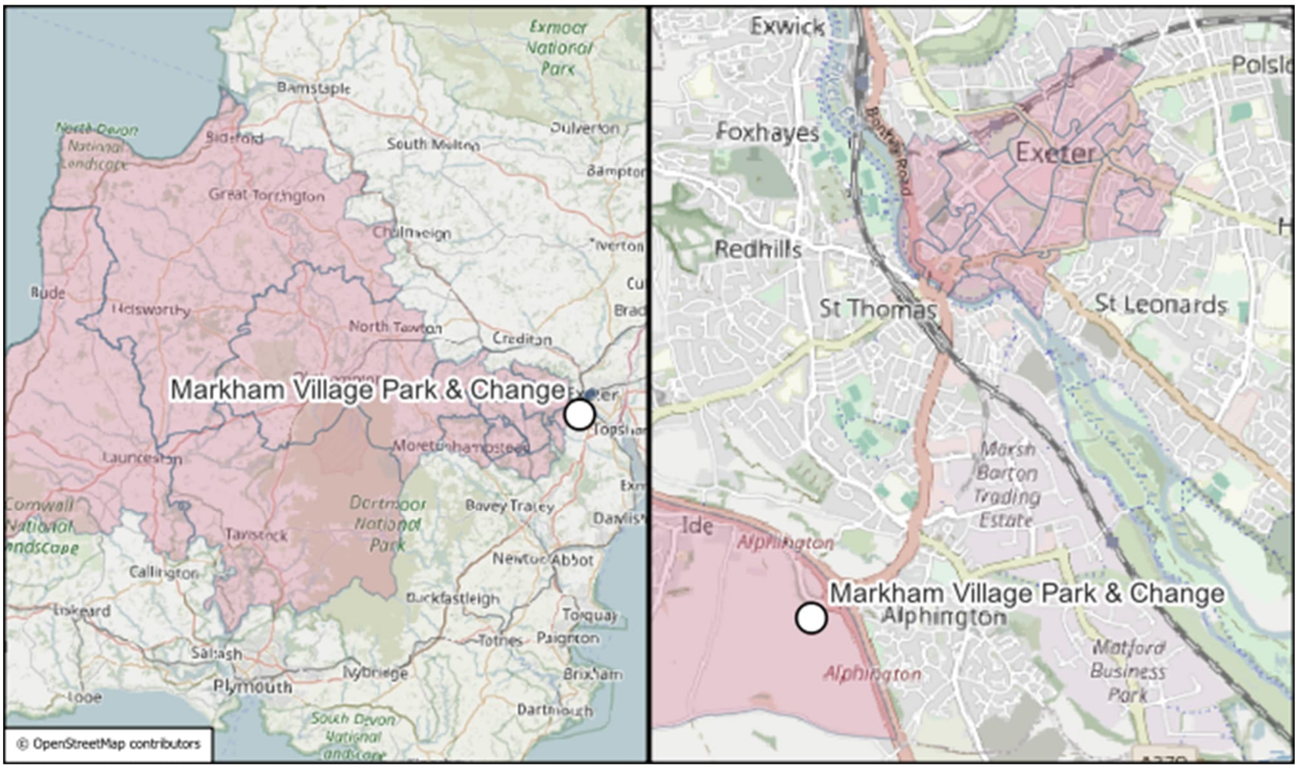


Figure 15 – Peamore & West Exe P&C Zone Selection

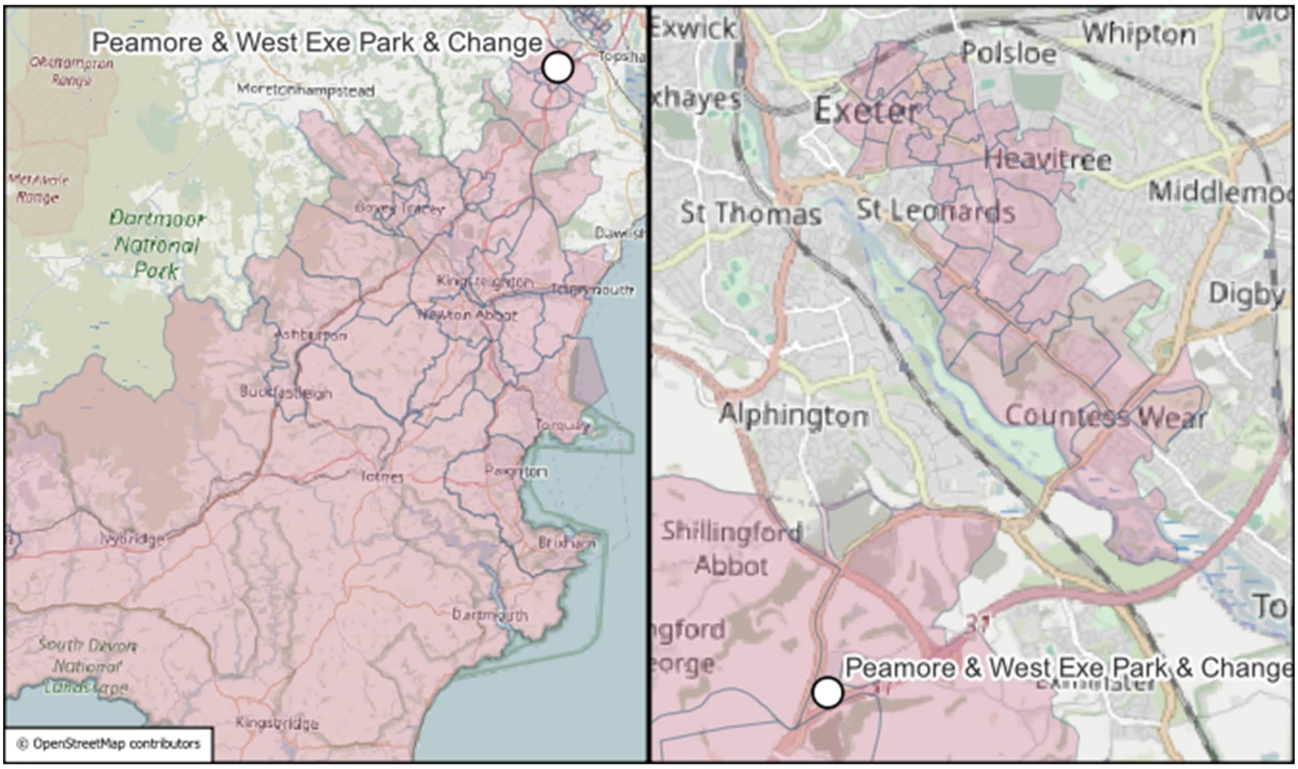
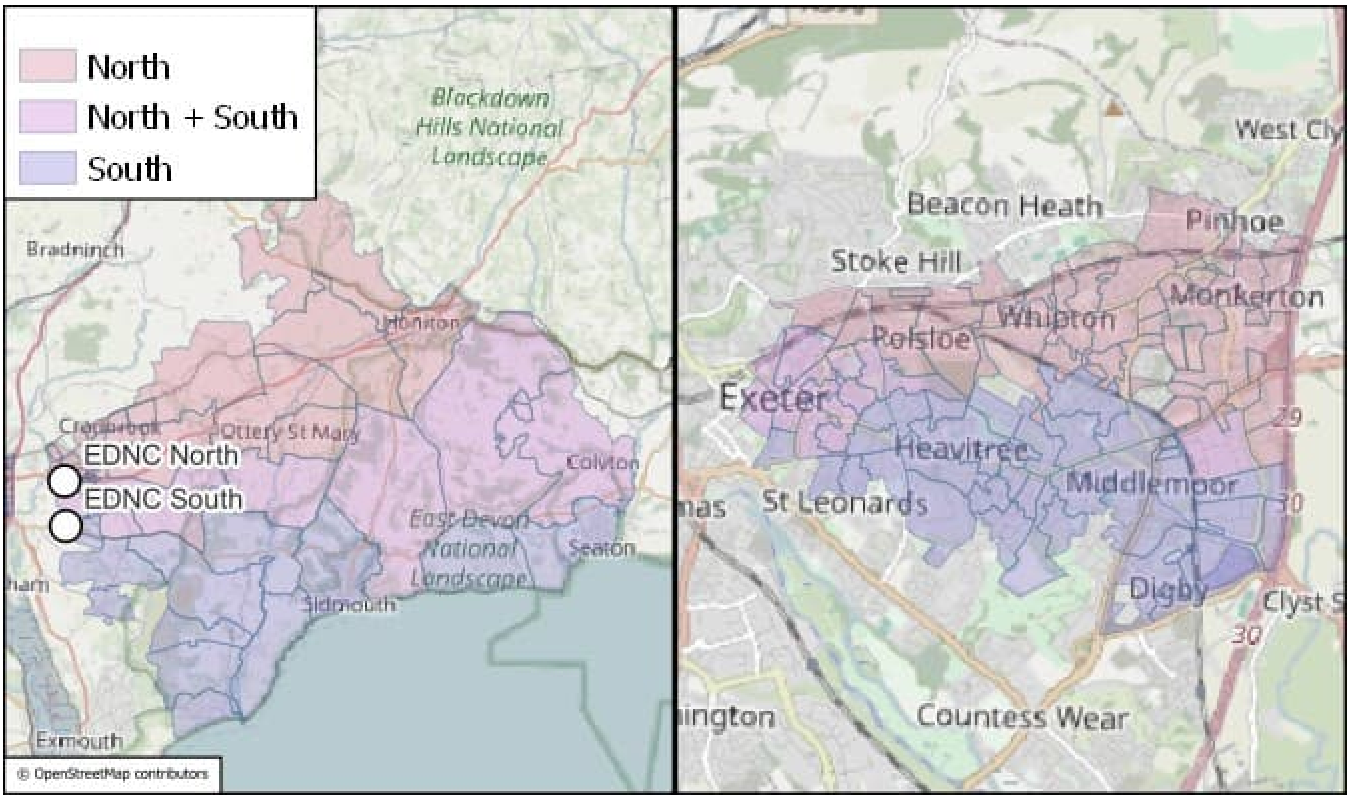


Figure 16 - EDNC North & South P&C Zone Selection



The rerouting was applied to the AM model matrices by selecting the required number of car trips with an origin in the ‘park and change’ zones and a destination in the Exeter zones and moving the destination of the trips to a proxy park and change zone near to the actual site. The process was similar for the PM model matrices, selecting the required number of car trips with a destination in the ‘park and change’ zones and an origin in the Exeter zones and moving the origin of the trips to the proxy park and change zones.

Combining Mitigation Impacts

The mitigations were applied in sequence to the model matrices. The first mitigation to be applied was the Exeter LCWIP, and the output matrix was then used as the input matrix for applying the East Devon LCWIP. The other mitigations were applied in the same fashion. Table 8 shows the order in which mitigations were applied and how many cars were removed in each time period.

Table 8 – Mitigation application order

Mitigation	AM peak car reduction	PM peak car reduction
1 – Exeter LCWIP	276	234
2 – East Devon LCWIP	43	37
3 – Okehampton stations	126*	125
4 – Cullompton station	147*	104*
5 – Marsh Barton station	193	141
6 – BSIP Central	31	18
7 – BSIP Eastern	32	18
8 – BSIP Northern	10	6
9 – BSIP Western	58	33
10 – Markham Village P&C	0 (100 rerouted)	0 (100 rerouted)
11 – Peamore & West Exe P&C	0 (311 rerouted)	0 (311 rerouted)
12 – EDNC North P&C	0 (122 rerouted)	0 (122 rerouted)
13 – EDNC South P&C	0 (122 rerouted)	0 (122 rerouted)
Total	977	788

** The calculated reduction for AM Exeter-to-Okehampton trips (50) was larger than the actual number of car trips in the model (19). The calculated reduction for both AM and PM Cullompton station trips (177) was larger than the actual number of car trips in the model.*

The mitigation networks were created by adding the Ide Roundabout mitigations to the 2040 Core Scenario networks. The final output mitigation matrices were then assigned to the mitigation networks to create 2040 Core with mitigation assignments.

MODEL RESULTS

Flows

Figure 17 to Figure 20 show the demand and actual flow changes between 2040 Core and 2040 Core with mitigation for both AM and PM peaks. Larger versions of these figures with annotated flows are included at the end of this technical note. The demand flow shows all assigned flow (where traffic intends to travel) while the actual flow shows the flow after accounting for flow metering (where capacity issues prevent the full demand flow from passing a particular link or turn). As there are several over-capacity junctions in the 2040 Core scenario, the demand flow may be reduced by the mitigations without changing the actual flow.

Figure 17 - Demand Flow Changes AM (Green = Increase, Blue = Decrease)

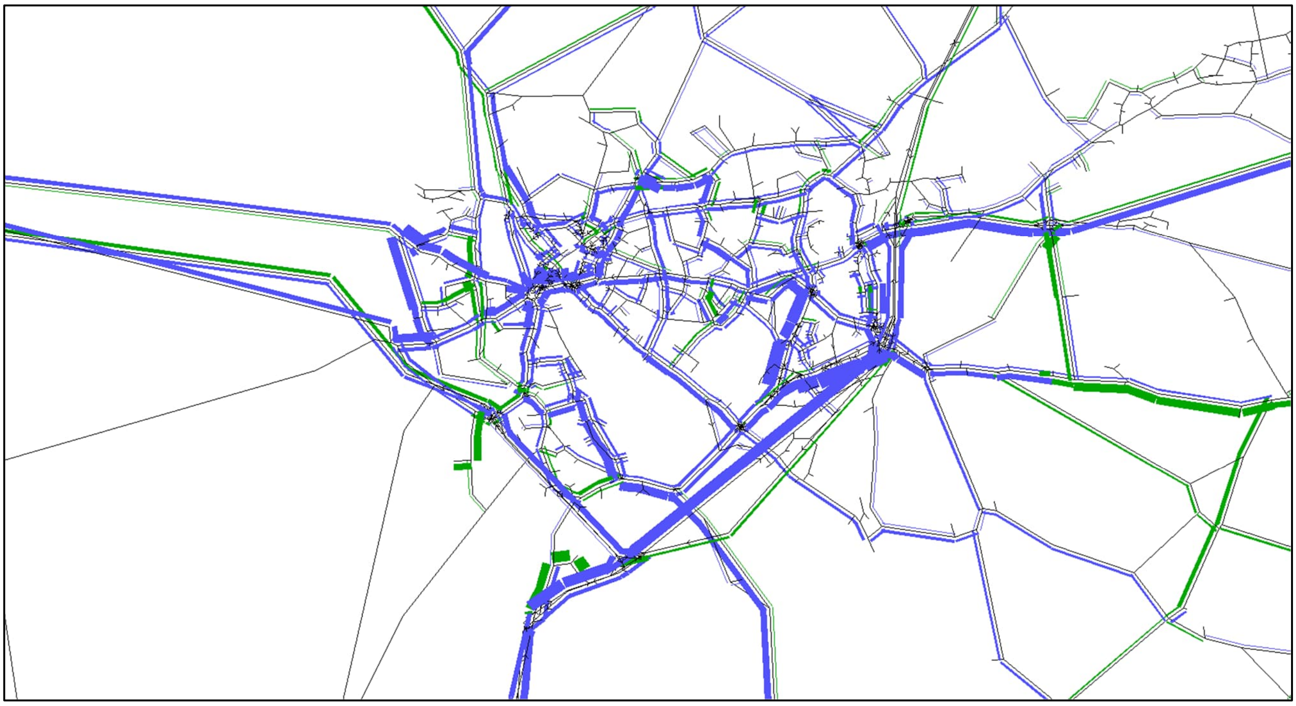


Figure 18 - Actual Flow Changes AM (Green = Increase, Blue = Decrease)

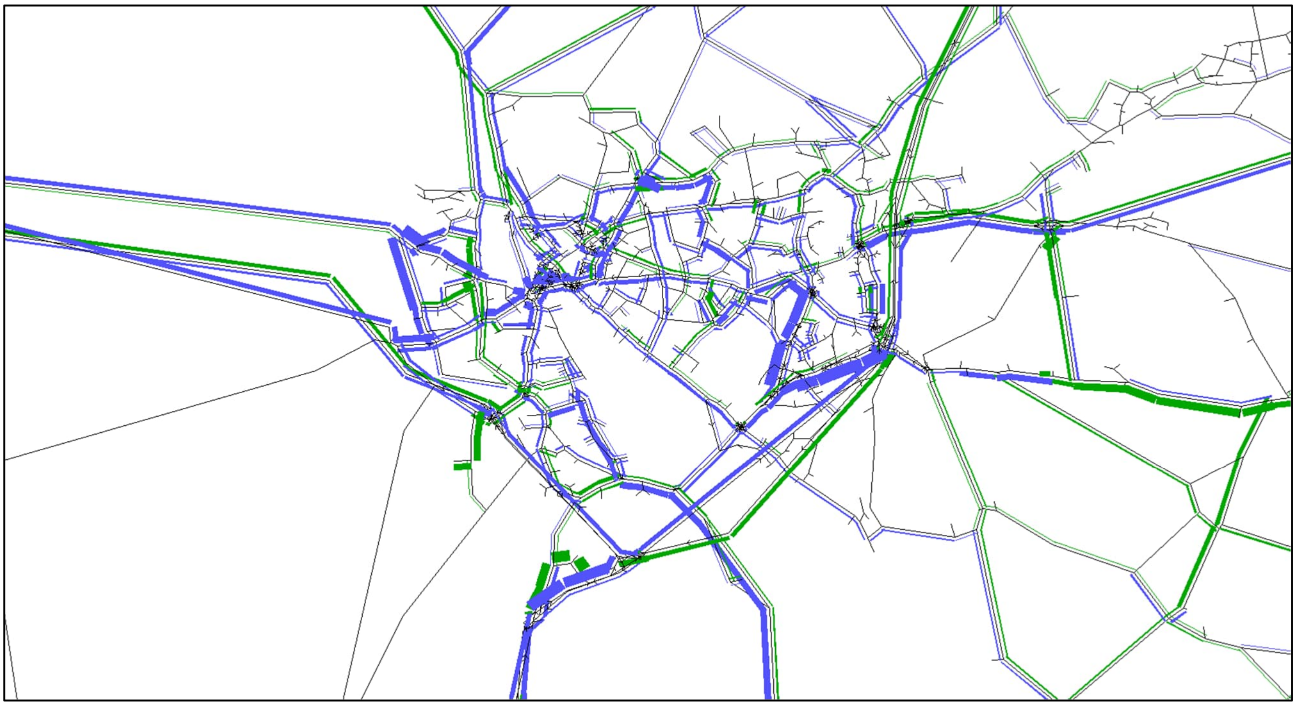


Figure 19 - Demand Flow Changes PM (Green = Increase, Blue = Decrease)

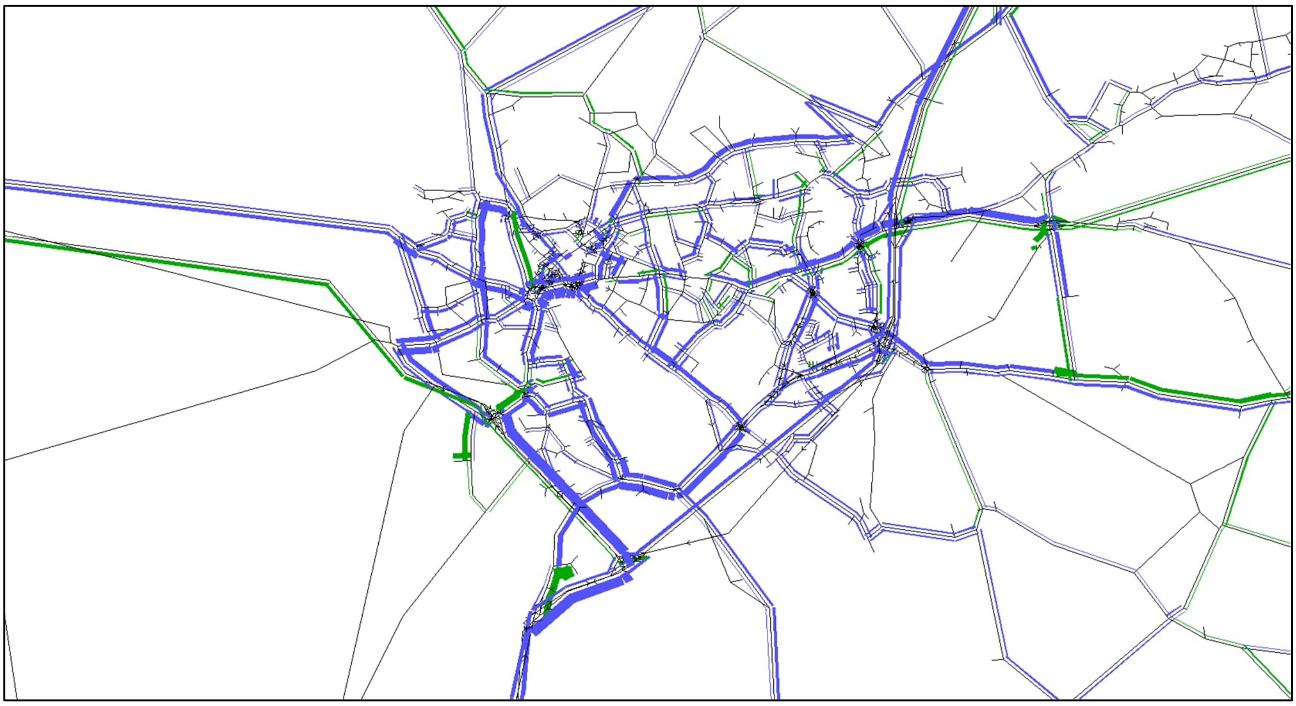
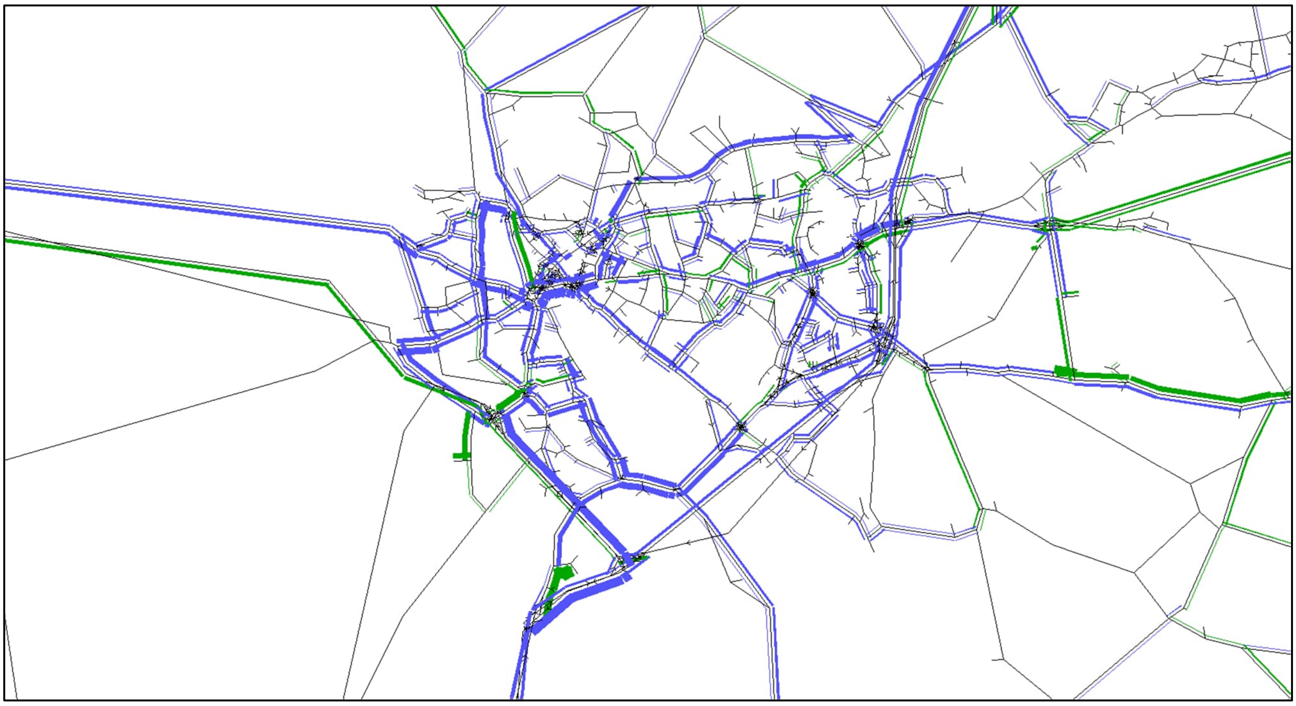


Figure 20 - Actual Flow Changes PM (Green = Increase, Blue = Decrease)



A30 & SOUTH WEST EXETER

This area is affected by multiple mitigations (Okehampton and Marsh Barton stations, Exeter LCWIP, BSIP Western corridor, West Exe P&C) and sees the largest flow reductions in both time periods as a result. The West Exe P&C reroutes some traffic that was previously using the B3212 or Nadderwater to access Exeter to use the A30 instead to access the P&C. In the AM peak there is an increase in northbound traffic between Ide Roundabout and Cowick Lane. This is due to delay reductions around the Alphington Road/Cowick Lane signals and the additional northbound A377 lane, which means it becomes quicker for some A30 traffic to travel to Crediton via Cowick Lane and the A377 as opposed to exiting the A30 around Tedburn St Mary and using one of the country roads.

M5 J31

This area is mainly affected by the Peamore P&C, which in the AM peak leads to more traffic exiting the A38 at Wobbly Wheel junction as opposed to continuing along to M5 J30. In the PM peak it primarily reduces traffic on the A379. In the AM peak there is an increase in northbound traffic on the A379 between Peamore and Matford roundabout. This is due to various delay reductions between Torquay and Matford roundabout which shifts traffic away from the A379 Sannerville Way route and onto the A380/A38 instead.

M5 J29 & M5 J30

This area is affected by the central and eastern BSIP corridor schemes, Exeter and East Devon LCWIPs, and the EDNC P&Cs, which have a modest impact on reducing traffic flows. In the AM peak the demand flow approaching M5 J30 from the south is reduced due to rerouting to Peamore P&C – however, because the A38 EB movement at J31 is over capacity, the actual flow on the M5 between J31 and J30 is not reduced as much. There is a reduction in traffic turning at M5 J30 from the M5 northbound onto the A379, which frees up some capacity for traffic continuing along the M5 northbound beyond J30. In both peaks there is a reduction in traffic on the A30 through M5 J29 and on the A376/A379 through M5 J30 as a result of the EDNC P&Cs.

Volume over Capacity (V/C)

Figure 21 and Figure 23 show the max junction V/C percentages for 2040 Core with mitigation for both AM and PM peaks. Only V/Cs that are near to or over capacity are displayed. Figure 22 and Figure 24 show the change in max junction V/C percentages between 2040 Core and 2040 Core with mitigation.

Figure 21 - Worst Turn V/C AM

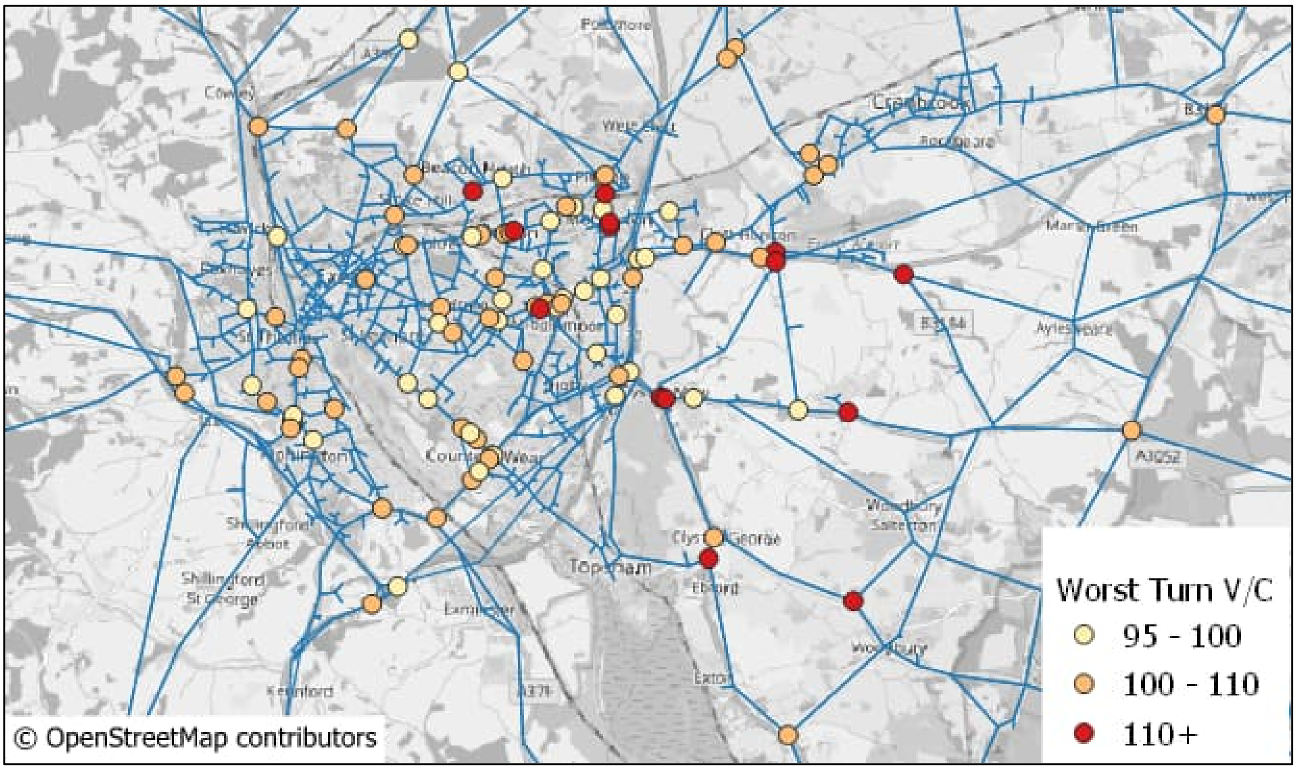


Figure 22 - Worst Turn V/C Change AM

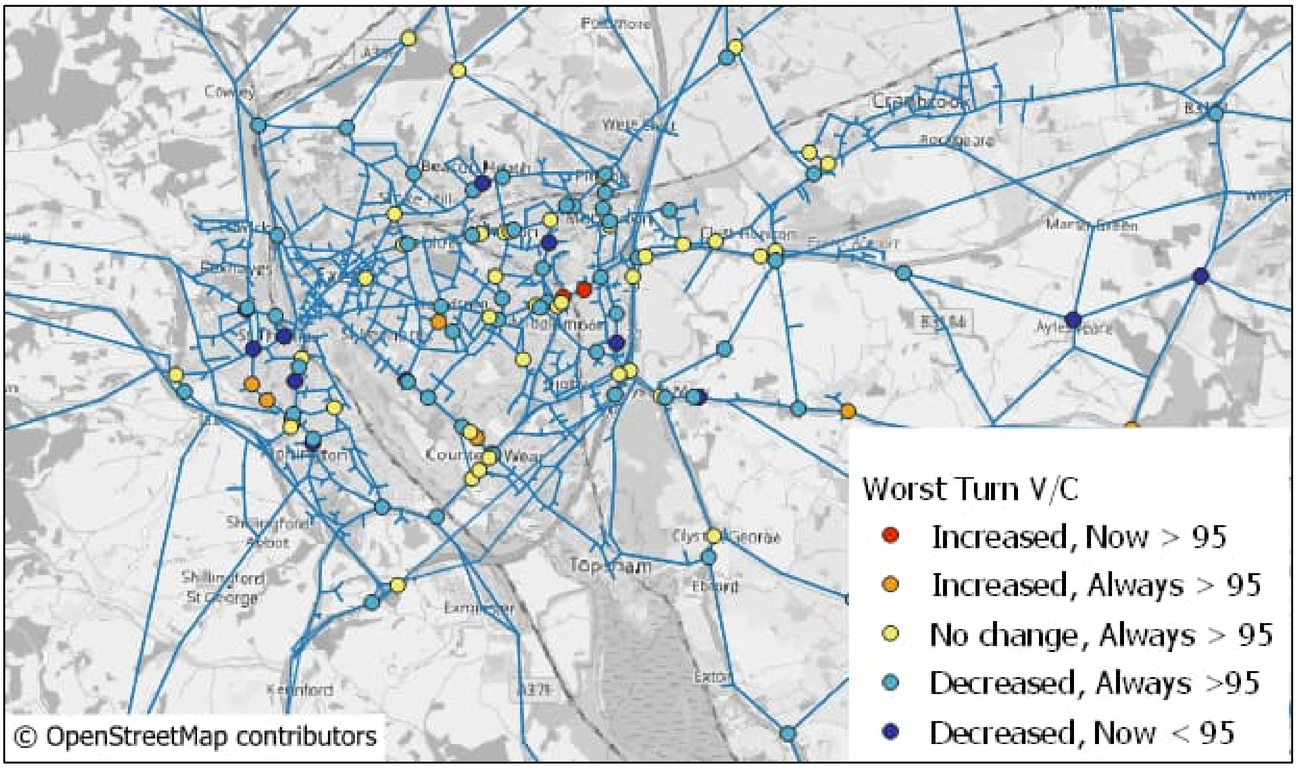


Figure 23 - Worst Turn V/C PM

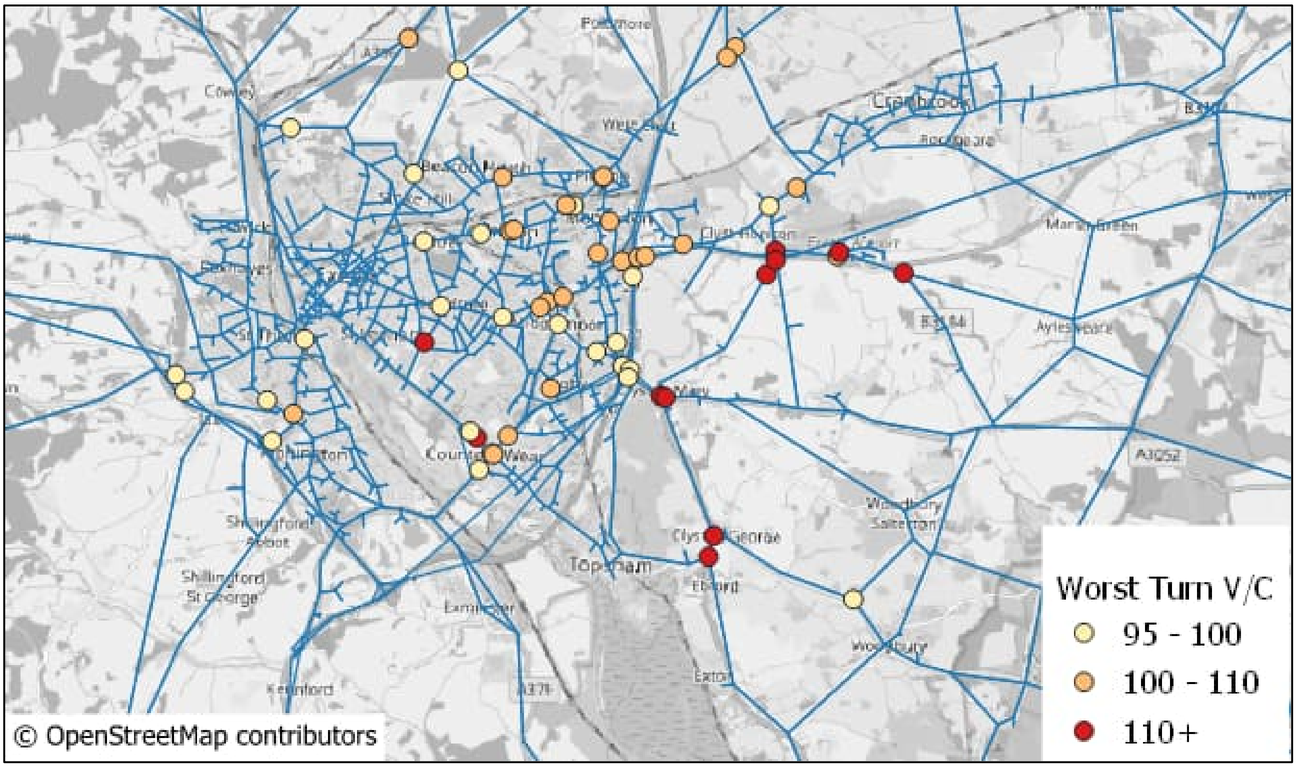
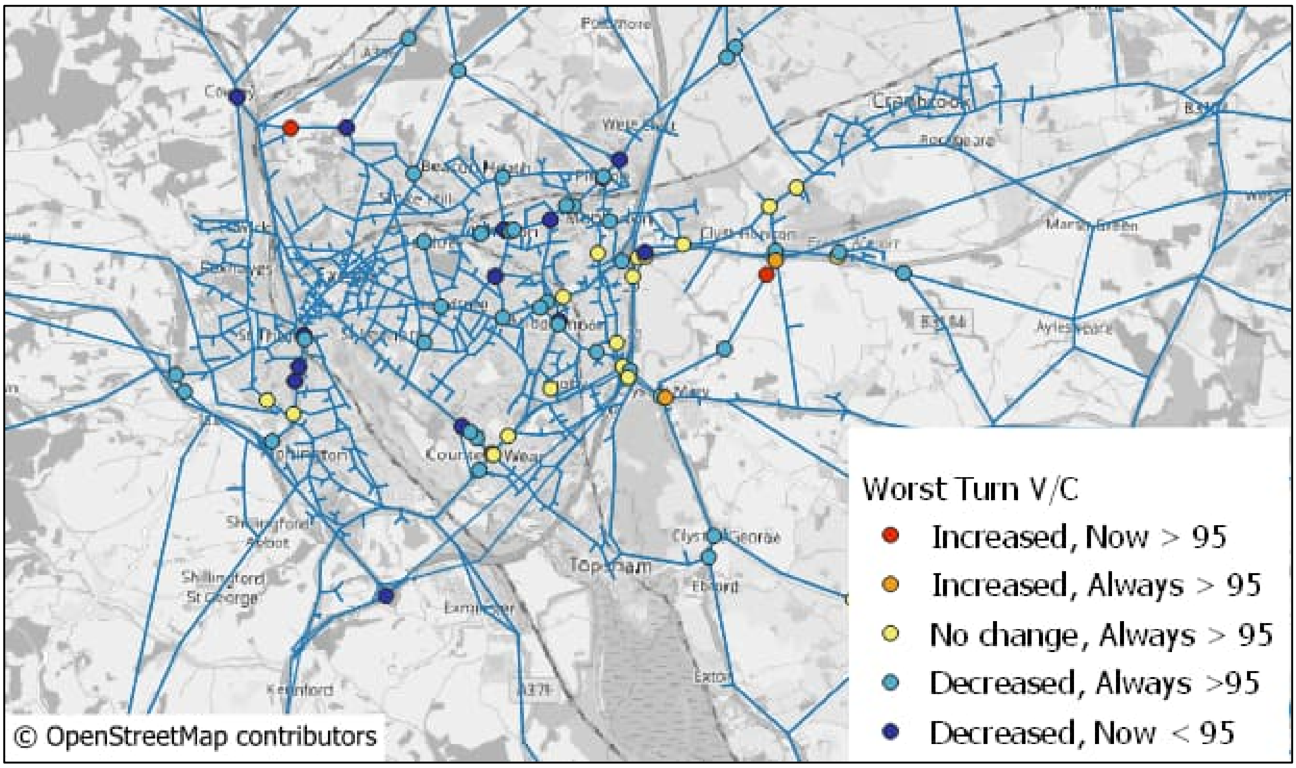


Figure 24 - Worst Turn V/C Change PM



A30 & SOUTH WEST EXETER

In the AM peak with mitigations, the forecasts indicate there will be a general improvement in V/Cs around south west Exeter, with V/Cs at a number of junctions reducing to below 95%, including along Alphington Road. The operation of Ide roundabout has been investigated in a separate piece of microsimulation modelling work *(Ide Roundabout Traffic Impact Assessment*, March 2024).

M5 J31

In the AM peak with mitigations the A38 mainline eastbound at J31 is forecast to remain over 100%. This is at the location where the mainline drops from three to two lanes. In the PM peak the M5 westbound mainline at J31 is at 94% where the mainline drops from four to two lanes, and so is just within capacity.

M5 J29, M5 J30, A30 AIRPORT JUNCTION & CLYST ST MARY ROUNDABOUT

There are fewer mitigations impacting the east of Exeter, and so there are mostly small (~1%) changes in V/C around M5 J29 and M5 J30. The J30 roundabout is forecast to remain near capacity at several signals in both AM and PM peaks. At J29 the northbound diverge lane is forecast to be over capacity in the AM peak. The A30 signalised junctions just west and east of the M5 J29 overbridge are forecast to be over capacity in both AM and PM peaks.

At the Clyst St Mary roundabout near J30, both east and west approaches to the roundabout are forecast to be over capacity in both AM and PM peaks. At the A30 Airport junction to the east of M5 J29, both roundabouts are forecast to be over capacity in both AM and PM peaks. In the AM peak the A30 eastbound diverge at the Airport junction is forecast to be over capacity.

There is an existing National Highways VISSIM model that covers J29, J30, the A30 Airport junction and the Clyst St Mary roundabout. Discussions are currently underway regarding the use of this model for operational modelling of these junctions in the 2040 Core and 2040 Core with mitigation scenarios.

OTHER JUNCTIONS

In the 2040 Core with mitigations scenario, the Bridge Road approach to Countess Wear roundabout is forecast to be over capacity in the AM peak. In the PM peak the Rydon Lane approach arm is forecast to be over capacity. To the southwest of Countess Wear, the Bridge Road approach arm of the Bridge Road/A379 roundabout is forecast to be over capacity in the AM peak. Both the Countess Wear and Bridge Road/A379 roundabouts form part of an alternative route to cross the River Exe other than the M5, and delays on these junctions may cause more traffic to reroute onto the M5.

Although other junctions are forecast to be over capacity in the 2040 Core with mitigation scenario, in some cases these are access junctions for development sites, in which case the requirements for the access junctions would be investigated in Transport Assessments for the relevant sites. In other cases the high V/Cs can be due to limitations of the SATURN model (e.g. locations where not all roads are represented, or locations which were not validated in the base model).

CONCLUSION

A modelling exercise was undertaken to assess the impact of proposed mitigation measures in the Greater Exeter area. The measures included LCWIPs, BSIP, new rail stations, park and change sites, and network changes at Ide Roundabout/Alphington Road. For each mitigation, a car trip reduction was calculated and the zones impacted were identified. The 2040 Core forecast scenario matrices were factored to account for each mitigation and then reassigned to produce a 2040 Core with mitigation forecast scenario.

The 2040 Core with mitigation forecast showed flow reductions across Exeter, with the largest reductions being around southwest Exeter. On the eastern side of Exeter around J29 and J30, a number of junctions remain over 100% capacity in the 2040 Core with mitigation scenario. These include movements on J29 and J30 themselves, as well as at Clyst St Mary roundabout and the A30 airport roundabout.

While the strategic forecast modelling provides an indication of which junctions may have capacity issues, operational modelling would be required to confirm how well the junctions perform with forecast traffic flows. National Highways have an existing VISSIM model that covers J29, J30, the A30 Airport junction and the Clyst St Mary roundabout – discussions are currently underway regarding the use of this model to test these junctions in the 2040 Core and 2040 Core with mitigation scenarios. This will take flow changes from this strategic model and be able to provide a better indication of the impacts the additional traffic from the emerging Local Plans will have on the network.

Figure 17 - Demand Flow Changes AM

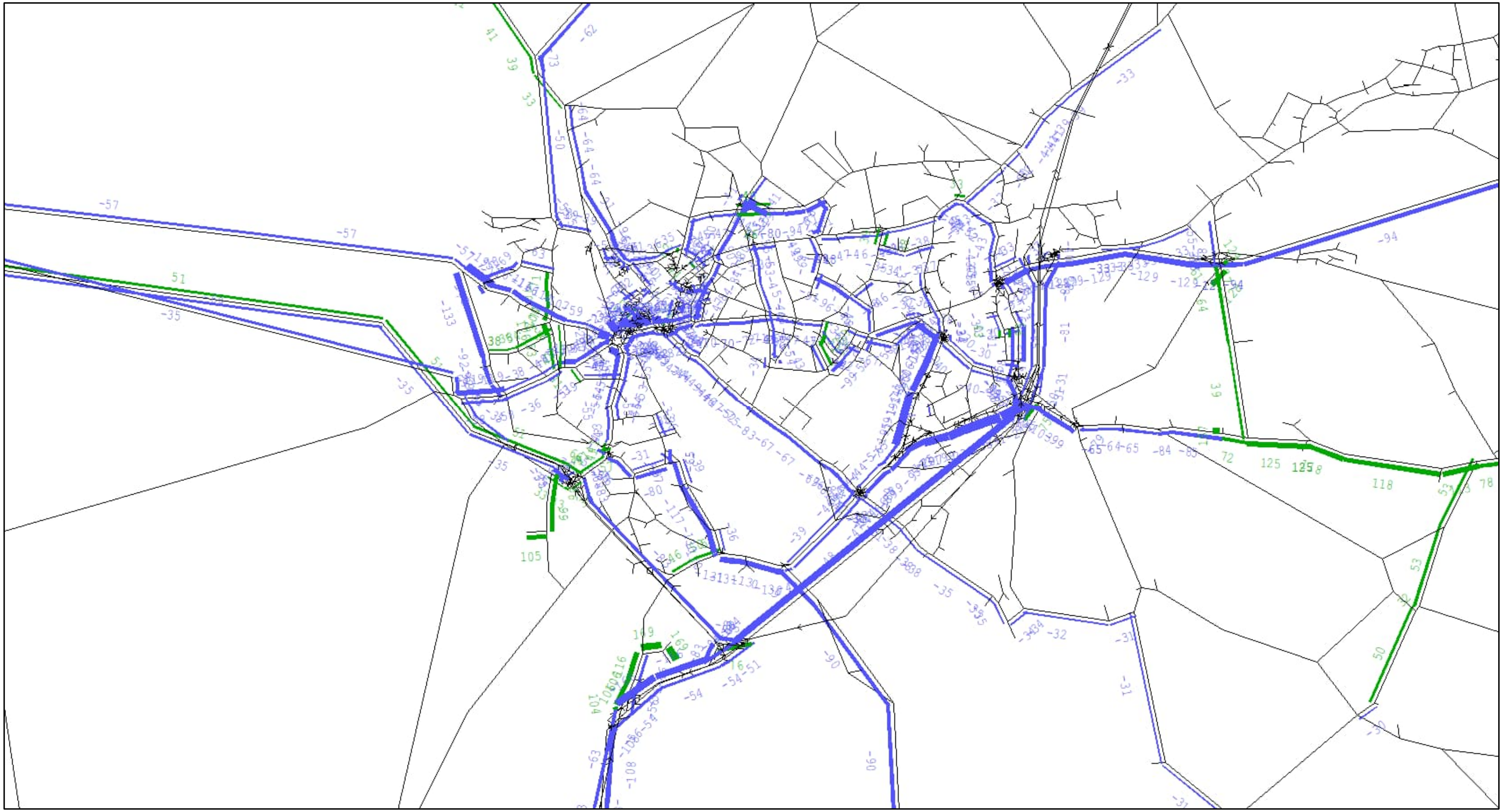


Figure 18 – Actual Flow Changes AM

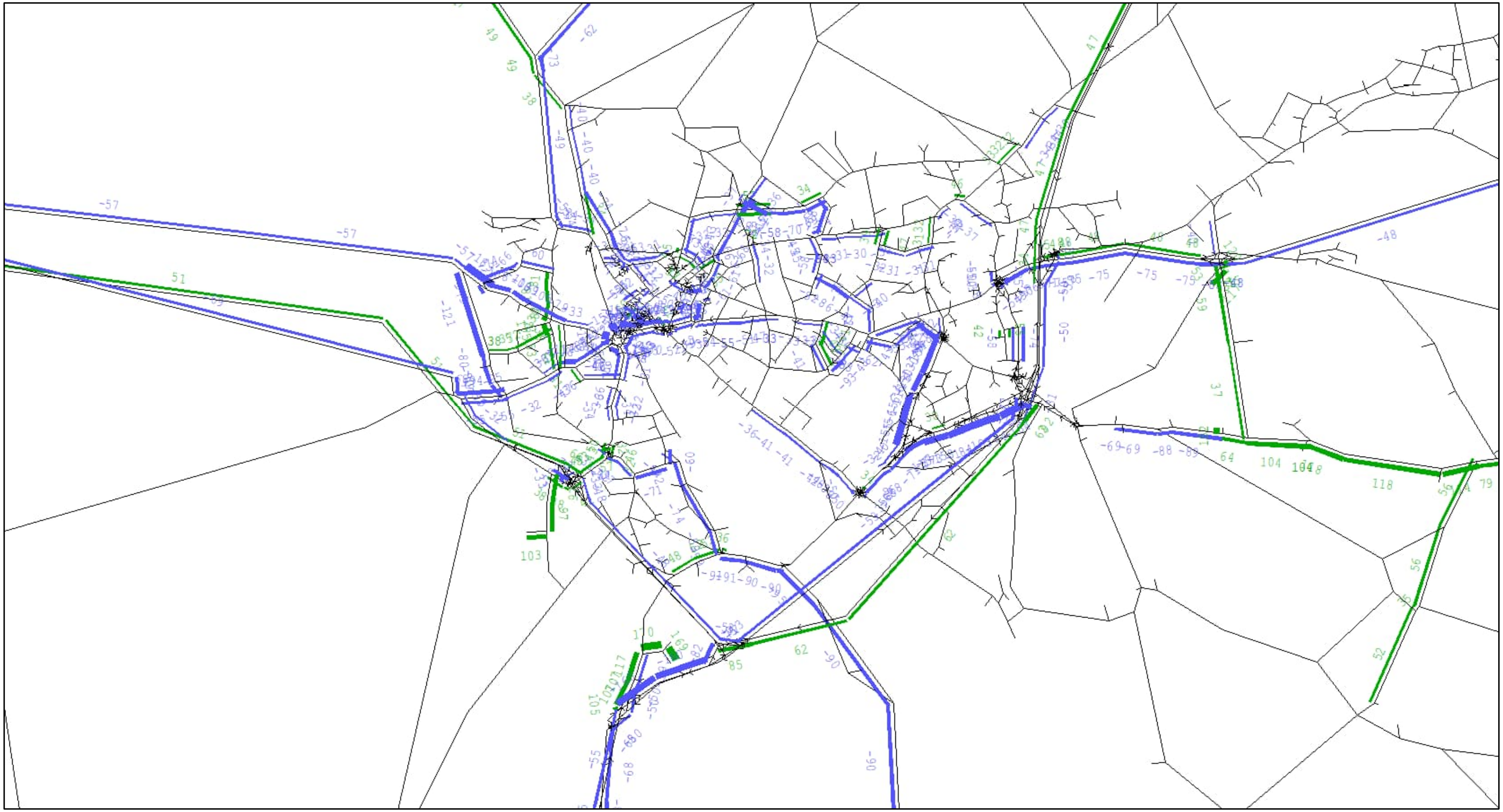


Figure 19 – Demand Flow Changes PM

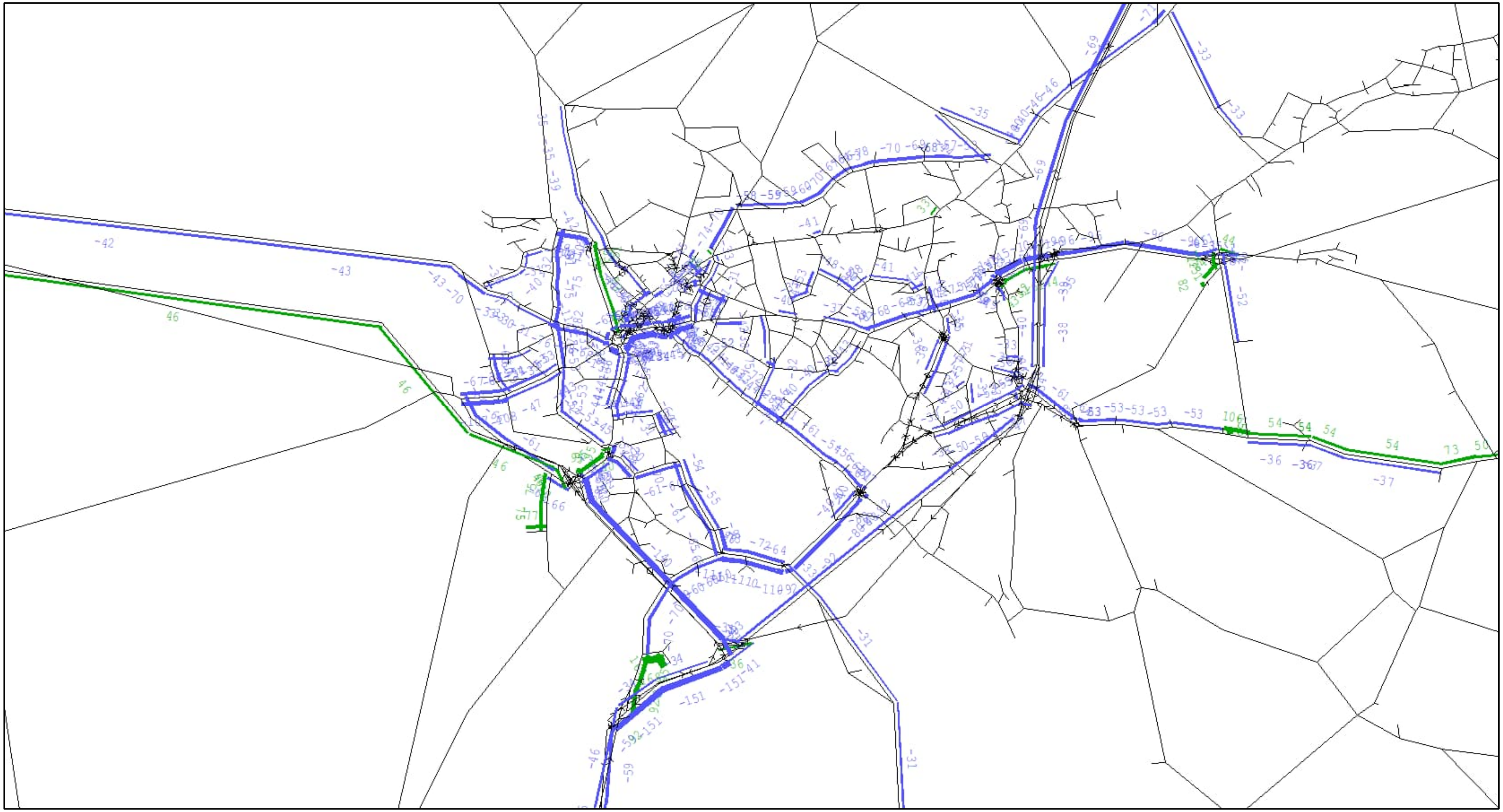


Figure 20 – Actual Flow Changes PM