



Cyngor Castell-nedd Port Talbot
Neath Port Talbot Council

Replacement Local Development Plan

2023-2038

Strategic Highway Assessment - Stage 1

December 2024





0. Executive Summary

0.1. This report outlines the findings of the Stage 1 Strategic Highway Assessment, conducted to support the development of the Neath Port Talbot (NPT) Replacement Local Development Plan (RLDP). The assessment, commissioned by the Council and executed by WSP, evaluates the impact of proposed housing and employment developments on the region's transport network using the South West and Mid Wales Transport Model (SWMWTM).

Key Findings

0.2. Development Contributions:

0.3. Proposed development sites account for increased levels traffic, with modeling highlighting potential bottlenecks and flow redistribution across the network.

0.4. Network-Wide Impacts:

- Vehicle kilometers and hours increased by 1.0–1.2% and 1.25–1.49% respectively across AM, inter-peak, and PM periods for 2024 projections compared to the 2019 baseline.
- Average vehicle speeds reduced marginally by up to 0.37%.

0.5. Localised Impacts:

- M4 Junction 43: increases in vehicle queues and a shift in network performance categories, particularly during peak hours.
- A4320 Tesco Roundabout: Changes in performance categories at critical junctions, with up to 141 additional vehicles observed during peak hours.
- B4434/Cadoxton Road: Increased vehicle volumes, particularly in PM peaks, affecting traffic flow.



Recommendations

- 0.6. Enhanced Local Modelling: Conduct detailed modeling at key junctions to refine impact assessments and validate network performance metrics.

Conclusion

- 0.7. While the overall network impacts are modest, localised performance changes may necessitate focused interventions to maintain acceptable levels of service. The results provide insights to inform the NPT RLDP and guide sustainable transport and development strategies.



1. Introduction

- 1.1. To inform the preparation of the Neath Port Talbot (NPT) Replacement Local Development Plan (RLDP), the Council working with Transport for Wales (TfW) commissioned WSP to undertake a Stage 1 Strategic Highway Assessment to inform the Preferred Strategy.
- 1.2. The Strategic Highway Assessment has been undertaken using the model that TfW working with Welsh Government (WG) have developed to cover the whole of Wales. The Models are owned by WG and managed, maintained and updated by TfW. The relevant model for NPT is the South West and Mid Wales Transport Model (SWMWTM).
- 1.3. NPTC provided detailed assumptions about aspirations for housing numbers and locations within the county over the Replacement Local Development Plan (RLDP) period. These assumptions were input into the SWMWTM to determine their impact on the transport network across the County.
- 1.4. This technical note summarises the strategic traffic modelling undertaken to assess the impact of proposed housing and employment developments in the NPT RLDP Preferred Strategy.



2. Background

- 2.1. The Strategic Highway Assessment has been undertaken using the model that TfW working with Welsh Government (WG) have developed to cover the whole of Wales. The Models (North West Transport Model, South West and Mid Wales Transport Model, and South East Transport Model) are owned by WG and managed, maintained and updated by TfW.
- 2.2. The Models have been developed in line with UK transport analysis guidance. The Models represent car, bus and rail as well as walking and cycling for access to rail stations and bus stops. The Models contain information on the trips that people make by each form of transport. The Models are digitized, mathematical representations of all or part of a transport system and the movements made by people on that system. They are used to evaluate existing conditions and to project future effects and needs. They can represent different modes of transport and show the user the conditions for a defined base year or for forecast conditions in future years and at different time periods, such as peak periods.
- 2.3. The Models have been developed to be used by WG, TfW and local authorities for:
 - Testing scenarios for potential future behaviour changes on transport (such as increased working from home or reductions in the number of business trips in a post Covid-19 work);
 - Assessing development cumulative impact and supporting plan-making such as the development of LDPs;
 - Quantified evidence for WelTAG (The Welsh Transport Appraisal Guidance) Stages 1-3;
 - Database of detailed trip-making information;
 - Supporting scheme specific appraisals such as economic

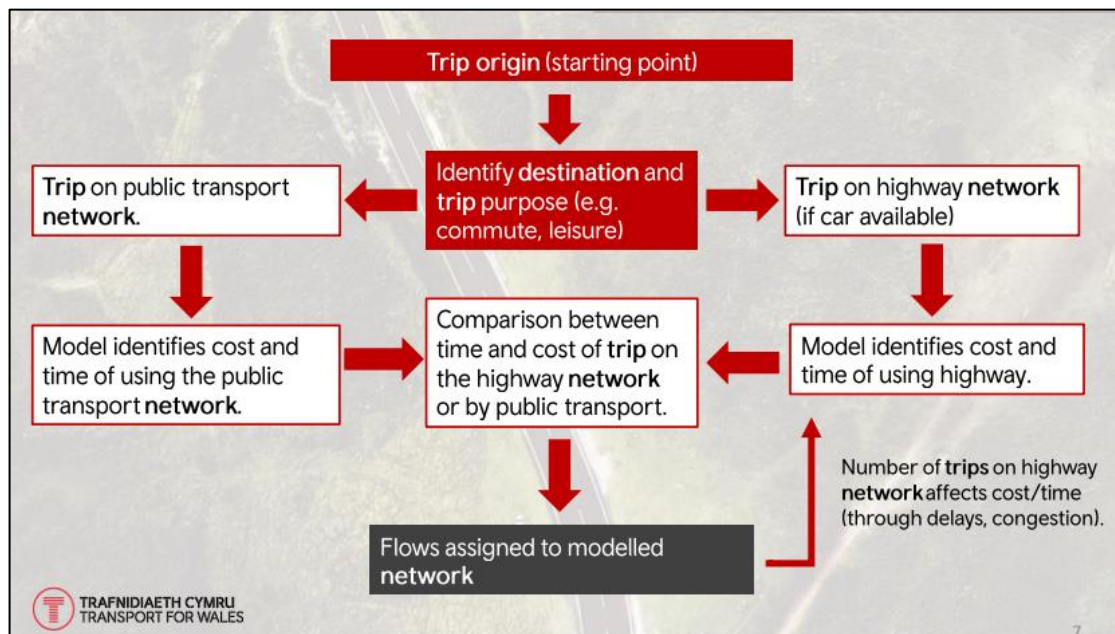
appraisals;

- Supporting scheme development and statutory processes; and
- Supporting decision-making and major policy interventions.

2.4. The Models cover large areas such as regions, local authorities, cities and towns. They include all the main transport routes such as motorways, main roads, bus and rail routes. They've been designed to be generally used to test large transport schemes or area-wide policies. In contrast, local transport models cover specific areas, usually including detailed road junction layouts. They are typically used for operational assessments such as testing new junction layouts, or new traffic signals and timings. They are used by WG and local authorities to test different ways of allocating road space and to test options for reducing delays at junctions.

2.5. The following diagram from TfW shows how highway models work:

Figure 1: Highway Models



2.6. The Models have been developed using a significant amount of primary and secondary data.

Table 1: Data Collection

Primary	Secondary
<p>Link counts: data collected on roads and on rail and bus routes to identify the number of vehicles or passengers using each section of the transport system.</p> <p>These include:</p> <ul style="list-style-type: none"> • Automatic traffic count (ATC): undertaken using rubber tubes across the road that count the number of vehicles (and vehicle axis) that pass over them. These are normally for 24 hours a day over a two-week period. • Manual Classified Count (MCC): typically collected from camera footage, recording the vehicles passing and later counted by a person or specialized software. This data is often collected for a 12-hour period and provides a detailed breakdown of the number of each vehicle type such as car, bus, heavy goods vehicle (HGV) etc. 	<p>Mobile phone data: Anonymised information on the start and end points of journeys made, collected by mobile phone operators based on communications between individual phones and cell towers.</p>

Primary	Secondary
<p>Face to face interviews: used to obtain a sample of individual journey information, detailing start and end locations, purpose of the journey, how the journey is made, ticket types used and frequency of journey.</p>	<p>In-vehicle journey time data: This is generally gathered from on-board GPS devices and is used to determine the average speeds of vehicles at different times of the day on each road within the modelled region.</p>
<p>Boarding and alighting counts: Counts of the number of people using public transport such as rail or bus. They are collected at stations or bus stops and represent the number of people using the services.</p>	<p>MOIRA data: Rail station and route usage statistics based on ticket sales.</p>
	<p>Traffic Wales data: Traffic data covering the main routes at all times of the day.</p>
	<p>Local authority data: Includes traffic counts, traffic signal timings, car park occupancy counts.</p>
	<p>Go Safe Data/ Locally sourced traffic and public transport data: Speed and count data provided for a variety of routes.</p>

Primary	Secondary
	<p>Census: Provides supplementary information for the whole of Wales, including the mode of transport used for journeys to work.</p>

2.7. The diagrams below show the development of the models:

Figure 2: Model Development – Base Year

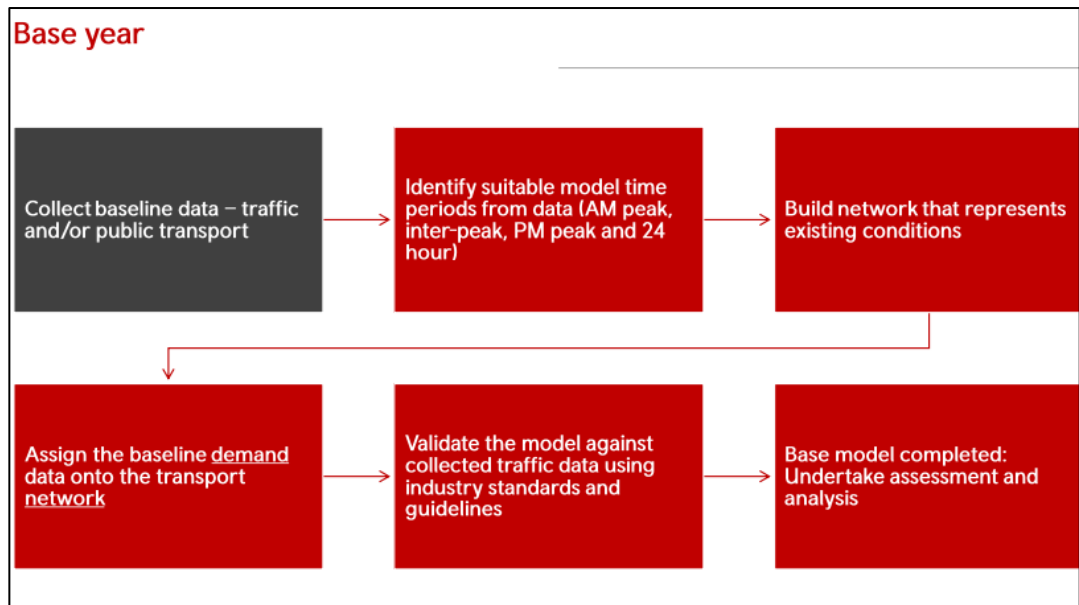
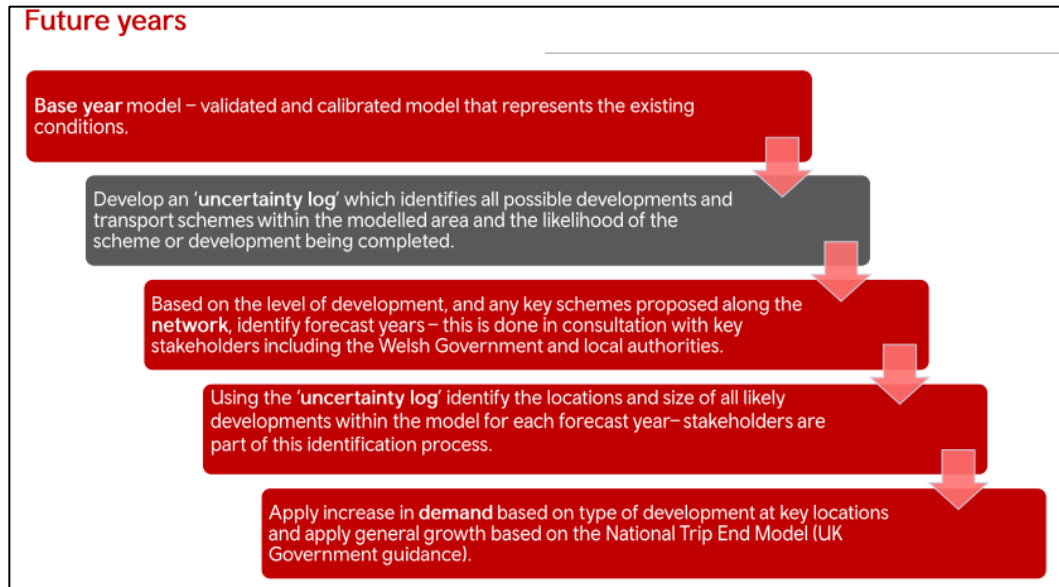


Figure 3: Model Development – Future Year



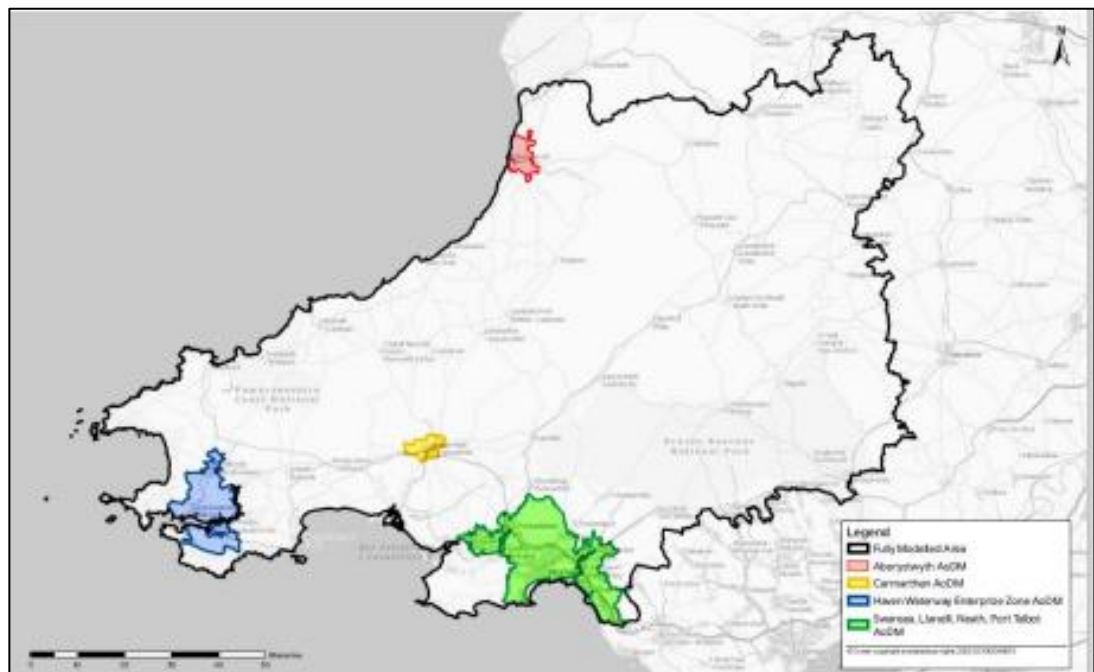
2.8. The model outputs:

- Traffic flows;
- Traffic speeds;
- Highway delays;
- Bus and rail passenger numbers;
- Mode to/from rail station or bus stop (e.g. walk, cycle, car);
- Mode shares;
- Trip lengths;
- Traffic and passenger flow comparisons (between scenarios);
- Speed and delay comparisons;
- Network pinch point identification; and
- Journey time analyses

2.9. The SWMWTM includes four areas of detailed modelling:

- Swansea, Llanelli, Neath, Port Talbot;
- Carmarthen;
- Aberystwyth; and
- Haven Waterways Enterprise Zone (Haverfordwest, Pembroke, Pembroke Dock and Milford Haven).

Figure 4: SWMWTM – Areas of detailed modelling



- 2.10. There are two different representations of the Model: one which includes the transport network today including public transport and active travel and one which considers the Welsh Transport Strategy (WTS) and national targets for mode share within Wales over the next 10-16 years. The WTS has a national target of reducing car travel by 40% by 2040.
- 2.11. The model replicates a 2019 base year and forecasting to 2027 and 2042.
- 2.12. Key time periods include:
- AM 8am-9am (peak hour);



- Inter-peak 10am-3pm (averaged); and
- PM 5pm-6pm (peak hour).



3. Approach

- 3.1. To inform the Strategic Highways Assessment, WSP used PTV Visum 2022 SP1-3 which is a leading transportation planning software for macroscopic simulations and macroscopic modelling of transportation networks and transportation demand, public transportation planning, and for the development of transportation strategies and solutions.
- 3.2. NPT Council (NPTC) provided spreadsheets of proposed housing and employment sites for development in the Preferred Strategy RLDP. This included potential Key Sites and a range of submitted candidate sites to assess the proposed level of need. In addition, NPTC provided shapefiles and spreadsheets of housing and commercial developments completed since 2019 in order to bring the Model up to a 2024 baseline.
- 3.3. The following steps were then undertaken:
- Housing and employment site information was mapped to model zones.
 - Development trip ends were calculated to add to base model matrices on a zonal basis,
 - Trip distribution pattern for zones were selected.
 - Base matrices updated to produce forecast matrices which yielded the calculated trip ends and retained the patterns of the existing matrix and new development trips as far as possible.

3.4. The following steps provide more detail:

Step 1: Site Mapping

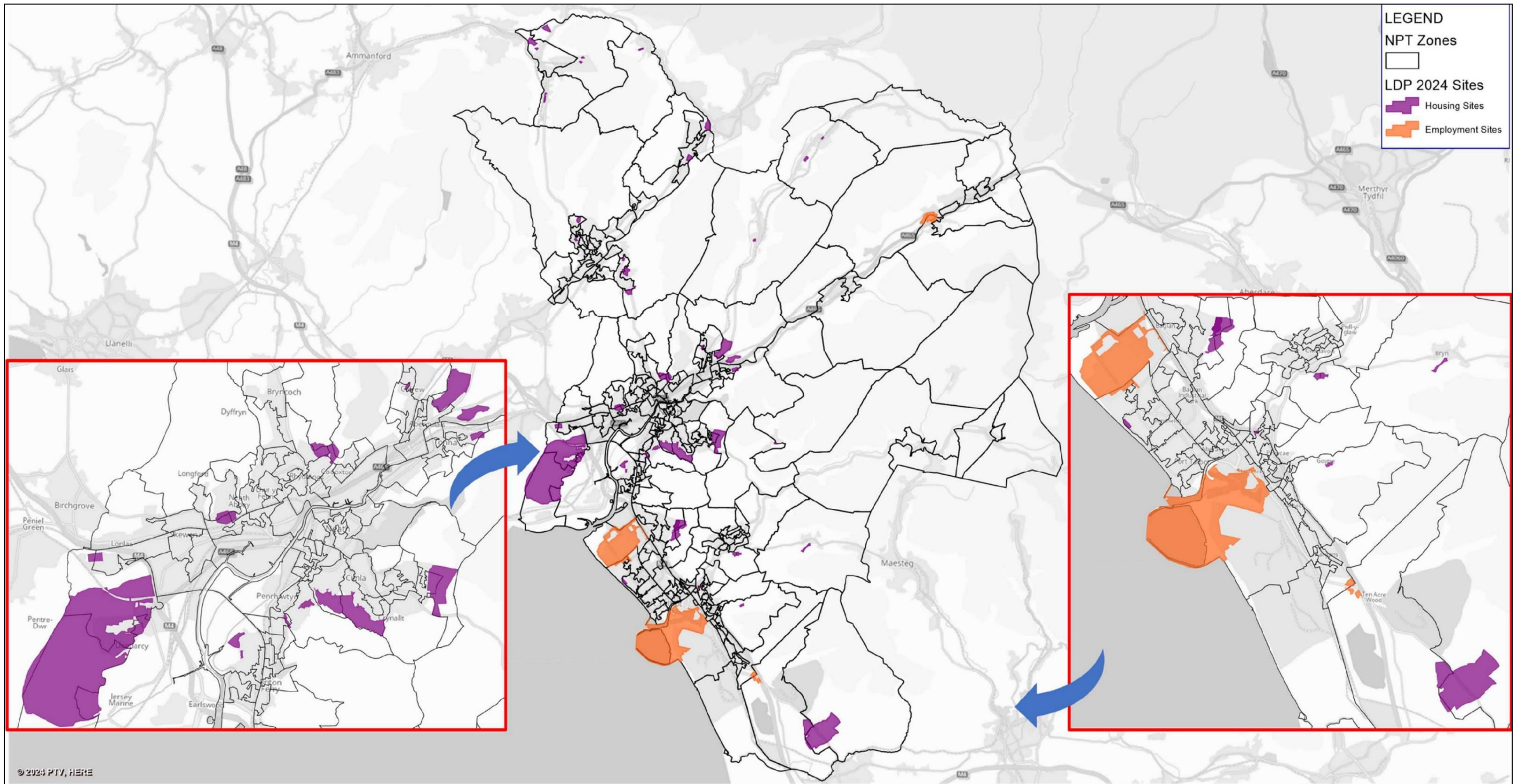
3.5. WSP imported the shapefiles with site polygons into Visum as territories. NPT county zones from the SWMWTM, MSOA boundaries and ward boundaries were also imported as zone entities. Accordingly, the requisite sites considered were mapped to one or more zones. Where a



site was within more than one zone, the respective area / floorspace in each zone was used to estimate trip ends for each zone.

- 3.6. The following map shows the proposed housing and employment sites mapped to NPT zones.

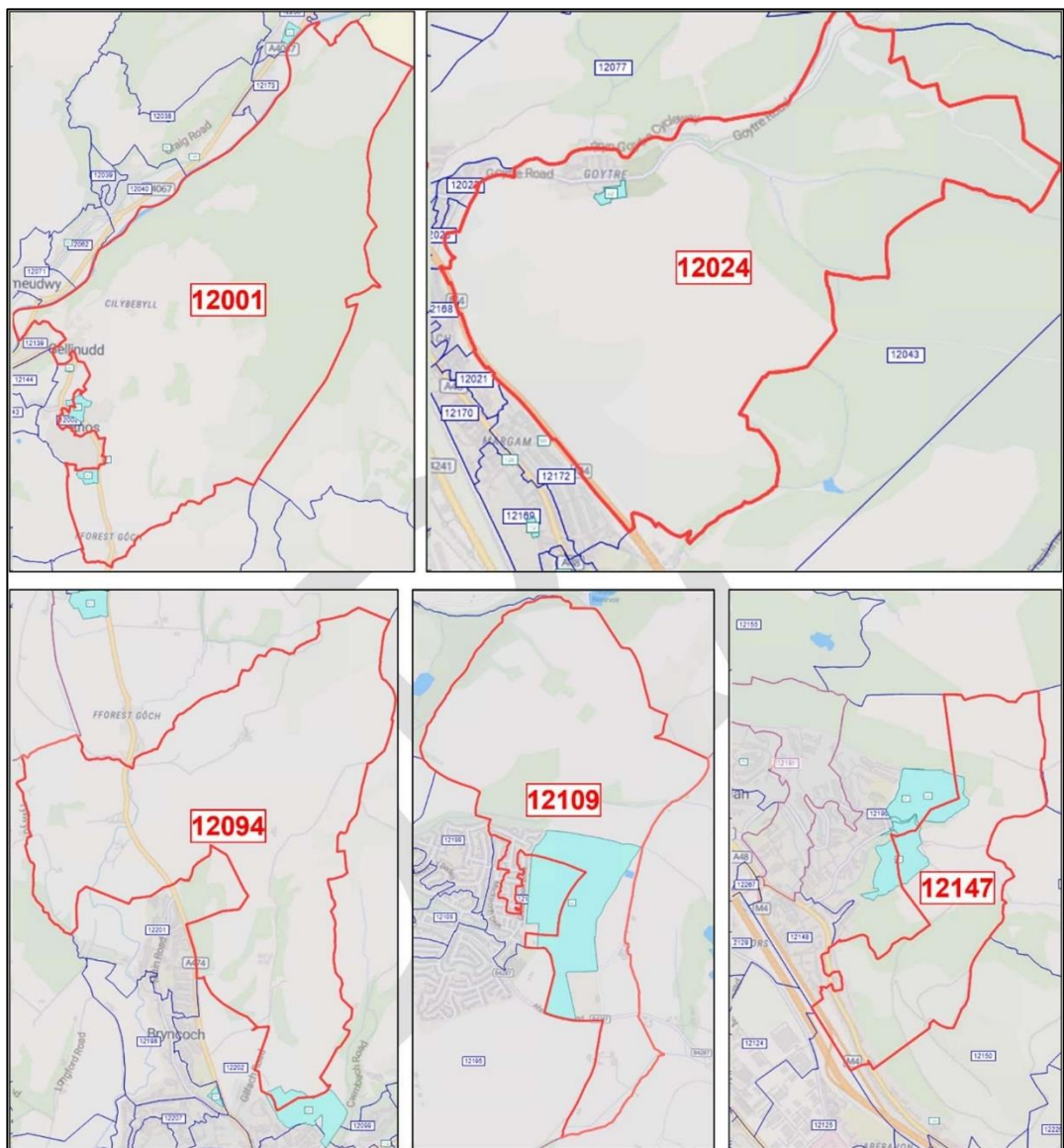
Figure 5: Potential Housing and Employment Sites mapped into NPT Zones



Step 2: Proxy Zone Checks

- 3.7. The zones to which the sites were mapped were checked to determine if they were sparsely populated, by considering the type of area covered by the zone in comparison to the location of the site(s) within the zone. For example, if the zone is large with development concentrated in a small region and the development site is not in the vicinity of the same region; or if a site is getting split across zones. Examples are shown in the Figure below:

Figure 6: Exemplary instances of Sparsely Populated Zones





- 3.8. From a total of 49 zones containing the development sites, 9 zones were deemed to be sparsely populated, and neighbouring zones were considered for using trip distribution patterns, as per the Table below.

Table 2: NPT Zones with Developments and Proxy Zones for Trip Distribution

NPT Zone	Proxy Zone	Remark
12001	12002	Housing sites are at edge of large zone, and actually adjacent to Zone 12002
12024	12022	Housing site is at edge of large zone, and nearest similar populated area in Goytre region is in adjacent Zone 12002
12058	12251	Site is split evenly with adjacent Zone 12251
12094	12202	Site is split with adjacent Zone 12202
12104	12099	Site is split with adjacent Zone 12099
12109	12194	Site is split with adjacent Zone 12194
12133	12132	Sites near adjacent Zone 12132
12147	12190	Sites split with adjacent Zone 12190
12236	12239	Site is near adjacent Zone 12239

Step 3: Development Trip Ends

- 3.9. Using the number of residential units and floorspace of employment sites as the variables, the development trip ends were calculated by multiplying the variables with trip rates from the Trip Rate Information Computer Database (TRICS) database.
- 3.10. TRICS is the national standard database system of trip generation and analysis used in the planning application process. The database holds thousands of trip rate surveys generated by different land uses and location type.



3.11. The trip rates for the various categories under residential and employment land uses were extracted from TRICS 7.11.1 by considering the region for primary filtering of survey sites as England (excluding London) and Wales. The 12 hour (0700-1900) two-way rates were used for calculating the development trip ends, as shown in the Table below.

Table 3: Trip Rates from TRICS 7.11.1 for Private Housing and Employment (B1, B2, B8)

Use	Type	TRICS 7.11.1 class	12 hr (0700- 1900) Two-way rate (All veh)	per Variable
Res	Private	03A	4.197	1 dwelling unit
Emp-B1	Office	02A	6.136	100 sqm GFA
Emp-B2	Industrial Estate	02D	5.391	100 sqm GFA
Emp-B8	Warehousing (Self-Storage)	02E	3.013	100 sqm GFA
Emp-B8	Warehousing (Commercial)	02F	0.993	100 sqm GFA
Emp-B8	Parcel Distribution Centres	02G	3.610	100 sqm GFA
Emp-B8	Average	-	2.539	100 sqm GFA

3.12. The residential and employment trips calculated per site are as per



Appendix 1 and Appendix 2.

3.13. The zone-wise total trip ends and developments are as per Appendix 3.

Step 4: NPT RLDP Demand Matrices

3.14. 12-hour, two-way development trips from numbers were split into relevant time periods, user classes and from/to home.

3.15. Origin and destination factors were also applied to base matrices to obtain the proposed NPT RLDP assignment matrices.

3.16. Whilst the same process has been followed, development trip ends and distributions have been updated to align with the provided development information from NPT.

3.17. In summary, the following steps were followed to create the NPT RLDP 2024 matrices:

- Development trip ends split into time periods (AM, IP and PM) and user classes (Car Business, Car Commute and Car Other) using factors derived from model development report, base matrix totals, and Dynamic Integrated Assignment and Demand Modelling Manual.
- The NPT LDP trip ends row and column factors calculated as the ratio of split development trips and base model trips. These factors were added to Zone User Defined Attributes in Visum.
- Factor matrices calculated by multiplying a Unit Matrix with the row and column factor User Defined Attributes
- NPT LDP matrices calculated as base matrix plus the product of the factor matrix and the modified base matrix.
- Matrices assigned to networks.

3.18. The total demands for the 2019 model (model base year) and LDP 2024



scenarios by peaks and user classes are as shown in the table below. Private vehicle trips only have been considered during this assessment, i.e. no change in the Goods Vehicle Demand has been considered.



Table 4: Total Demand by Peak and User Classes for 2019 and RLDP 2024 scenarios

Peak	User Class	2019	LDP 2024	Difference (RLDP 2024 - Base 2019)
AM	UC1 - Car Business	12805	13021	216
AM	UC1 - Car Commute	55189	56121	932
AM	UC3 - Car Other	70076	71257	1181
IP	UC1 - Car Business	8938	9088	151
IP	UC1 - Car Commute	14037	14274	237
IP	UC3 - Car Other	85500	86942	1442
PM	UC1 - Car Business	7749	7880	131
PM	UC1 - Car Commute	52901	53793	892
PM	UC3 - Car Other	75336	76606	1270

4. Analysis

- 4.1. This Chapter reports on the findings of the Strategic Highways Assessment. It should be noted that the version of the Model used for this assessment does not take into consideration the WTS. No model shift assumptions have therefore been taken into consideration.
- 4.2. The assigned models for base 2019 and LDP 2024 were compared using link flow differences, junction delays at junctions, and network statistics. This is summarised below as Level of Service which is a term used qualitatively to describe the operating conditions of a section of road or turning movement at a junction based on factors such as speed, travel time and delay. The level of service is designated with a letter A to F, with A representing the best operating conditions and F the worst. The Table below describes the performance rating of each letter A to F.

Table 5: Performance Ratings

Letter	Operating Condition	Description
A	Free flow	Traffic flows at or above the posted speed limit and motorists have complete mobility between lanes.
B	Reasonable free flow	Length of service A speeds are maintained, manoeuvrability within the traffic stream is slightly restricted. Motorists still have a high level of physical and psychological comfort.
C	Stable flow	Ability to manoeuvre through lanes is noticeably restricted and lane changes require more driver awareness. Most experienced drivers are comfortable, roads remain safely below but efficiently close to capacity, and posted speed is maintained. This is the target length of service for some urban and most rural roads.

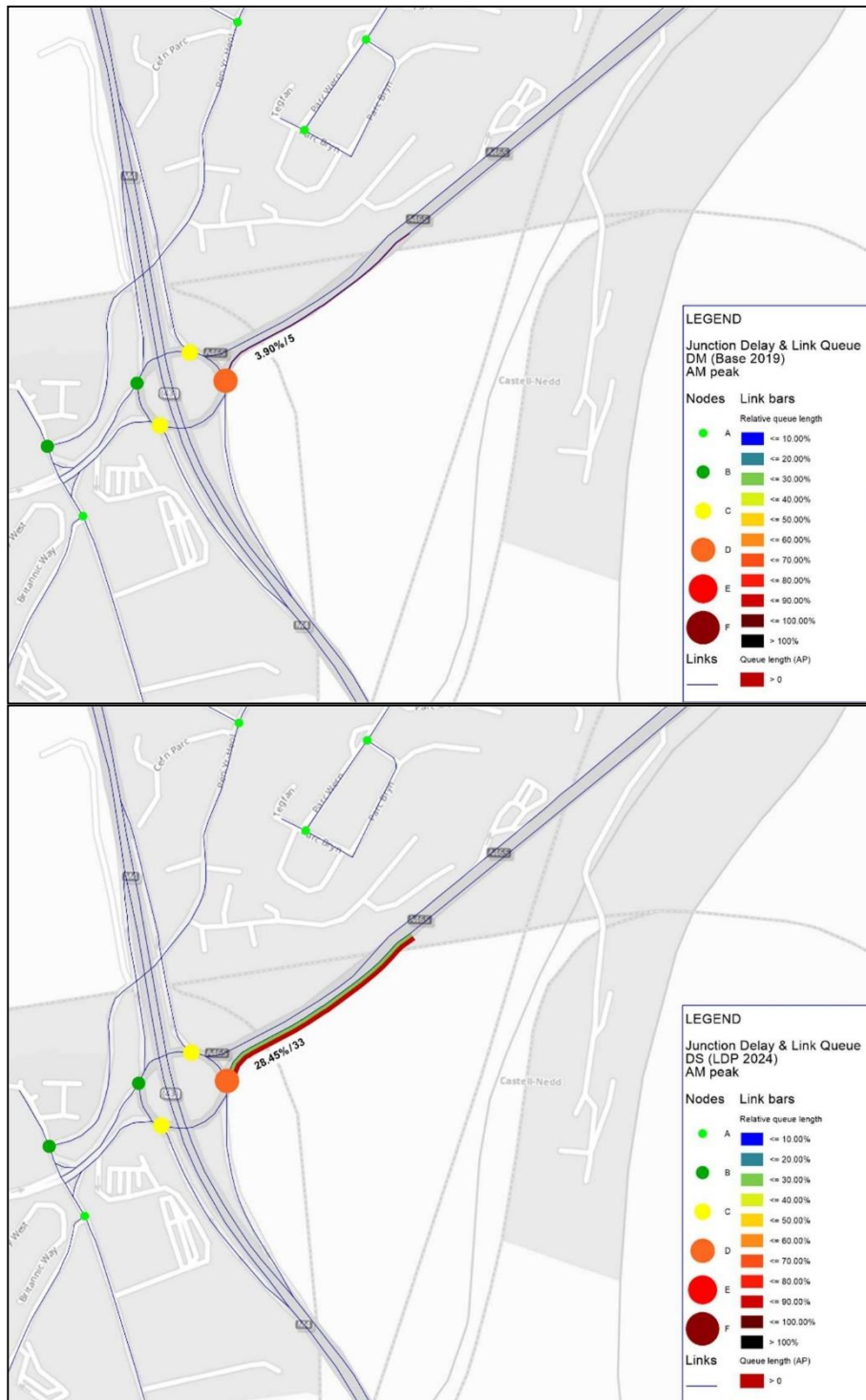
Letter	Operating Condition	Description
D	Approaching unstable flow	Speeds slightly decrease as traffic volume slightly increases. Freedom to manoeuvre within the traffic stream is much more limited and driver comfort levels decrease.
E	Unstable flow, operating at capacity	Flow becomes irregular and speed varies rapidly because there are virtually no usable gaps to manoeuvre in the traffic stream and speeds rarely reach the posted limit. Any disruption to traffic flow, such as merging or lane changes will create a shock wave affecting traffic upstream. Drivers' level of comfort becomes poor.
F	Forced or breakdown of flow	Every vehicle moves in lockstep with the vehicle in front of it, with frequent slowing required. Travel time cannot be predicted, with generally more demand than capacity.

- 4.3. The methodology for calculating the length of service is set out in the Highway Capacity Manual (2010) and has been applied to the analysis of both link flow and junction delay to aid the interpretation of the model results. The calculated length of service has been colour coded as below.

AM Peak Results

- 4.4. Interrogation of junction delay and link queue shows that the level of service materially changes (i.e. moves from one performance category to another) for the A4230 towards Tesco roundabout: change of performance category from B to C at the Longford Road / A4320 mini roundabout and a change of performance category from A to B at the Monastery Road /A4320 mini roundabout.

Figure 7: Junction delay and link queues: AM M4 Junction 43 (Base 2019 top, LDP 2024 bottom)



- 4.5. For M4 Junction 43, whilst there is no change in delay categories for each node there is an extended queue on the A465 approach from 5 vehicles to 33 vehicles.

Figure 8: - Junction delay and link queues: AM A4320 towards Tesco roundabout (Base 2019 top, LDP 2024 bottom)





4.6. The overall link flow differences due to the impact of development for the AM peak are shown in Figure 9 and Figure 10. There is an overall 1.07% flow increase across the network in AM. These flow differences should be viewed in context with the junction delay and link queues shown above – a large flow difference may be considered acceptable if the performance category is either A, B or C, whereas a much smaller flow difference might be considered unacceptable if the performance category is D, E or F. Note that as the SWMWTM is a strategic model covering a large area and has not been validated in detail within NPT, these results should be considered to be indicative. Further modelling, including detailed junction modelling would be required to confirm these impacts.



Figure 9 - Link flow difference LDP 2024 – base 2019 (AM wide)

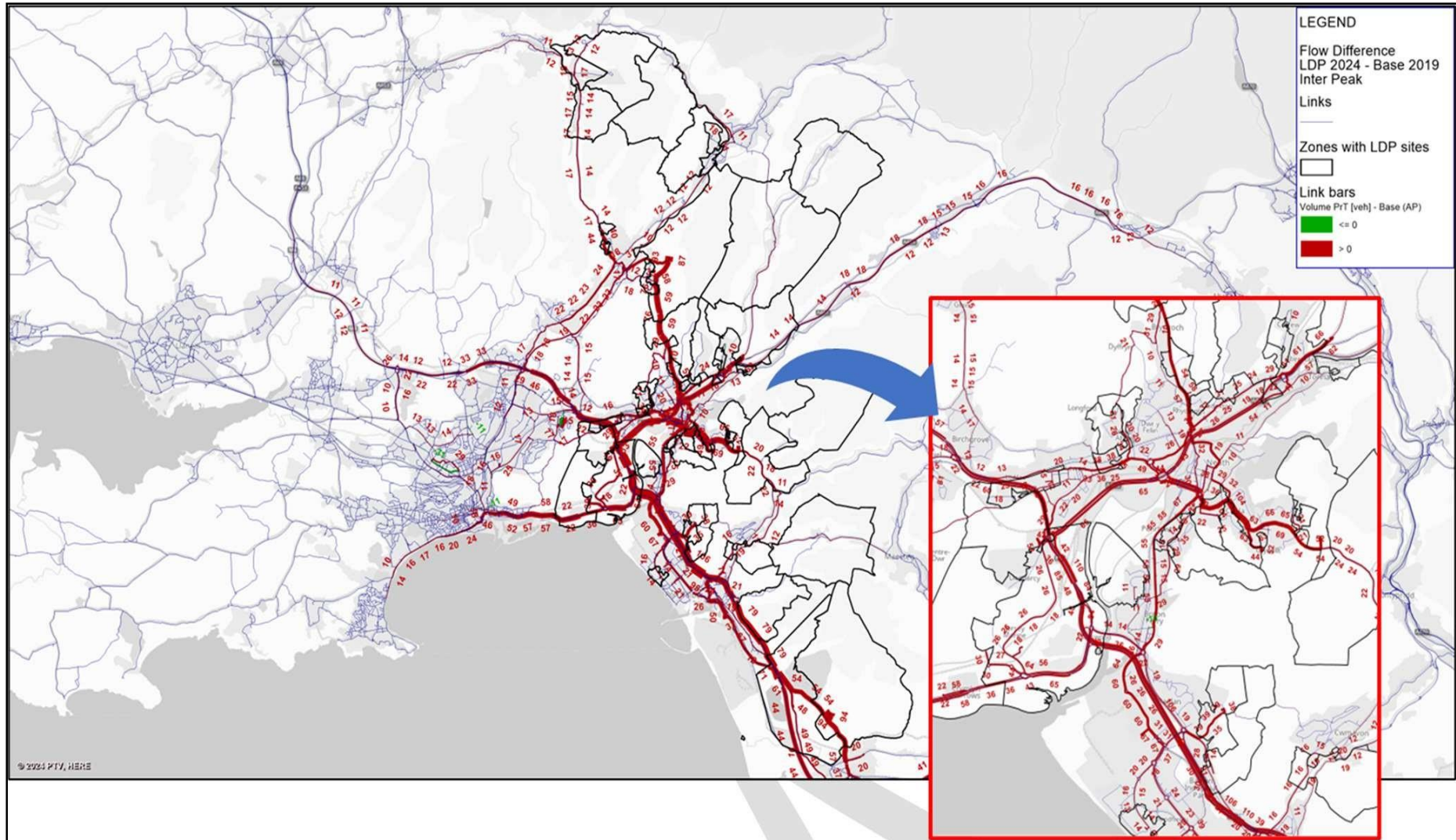
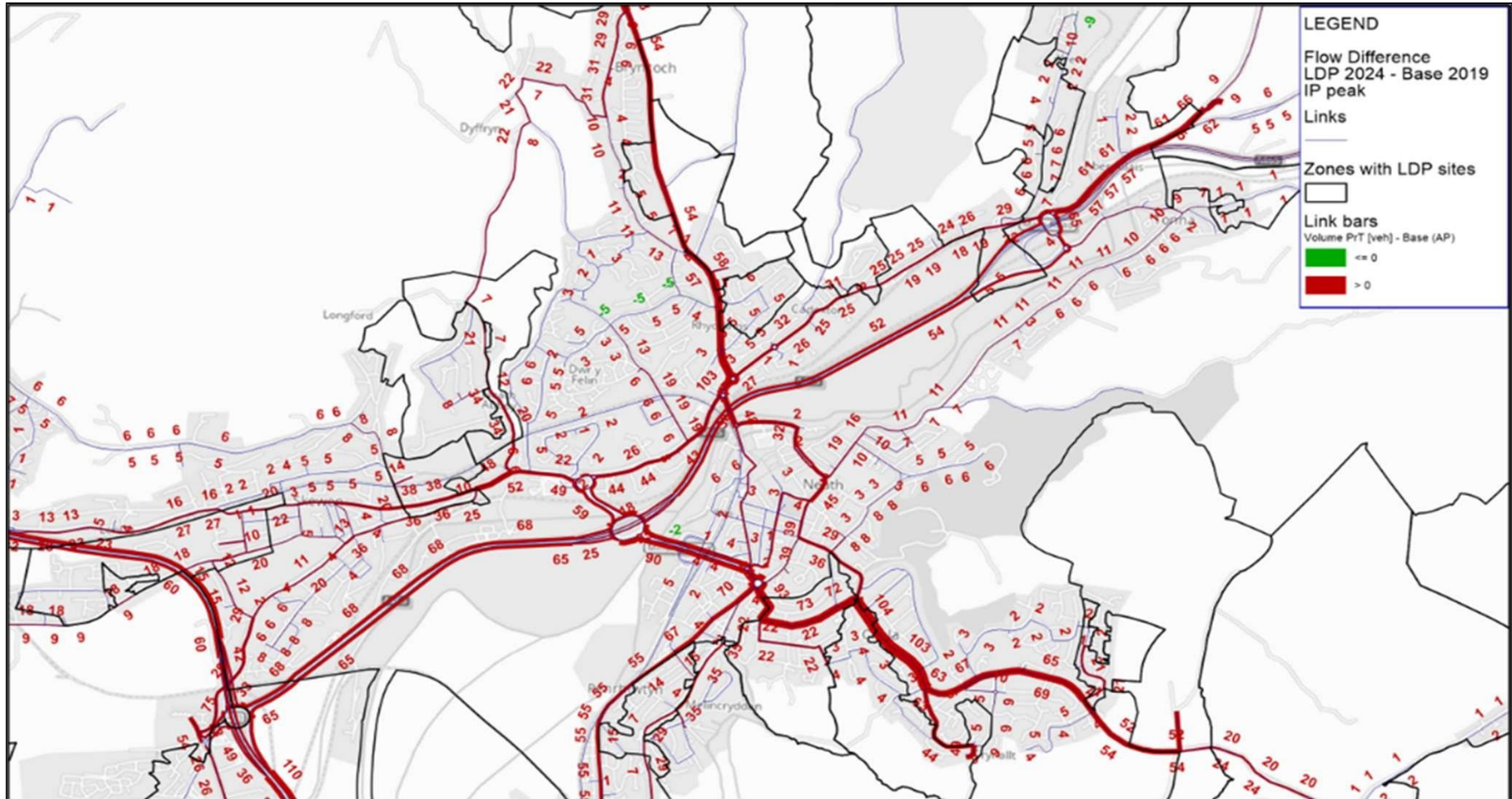


Figure 10 - Link flow difference LDP 2024 – base 2019 (AM zoom) (NOTE: threshold of 20 veh applied on link bars)



4.7. The link flow difference plot shows the impact of the modelled development over and above 2019 flows. The key



impacts are summarised as follows:

- M4 Junction 43 Up to 191 additional vehicles (base flow 2044 vehicles/per hour) on the circulatory carriageway of the roundabout and between 32 and 95 additional vehicles on each approach and base flow varies between 472 and 2038 vehicles per hour.
- A4230 towards Tesco roundabout: Up to 134 additional vehicles (base flow 913 vehicles/per hour) heading westbound and up to 36 vehicles (base flow 728 vehicles/per hour) heading eastbound on the A4320. Up to 141 additional vehicles (base flow 1346 vehicles/per hour) on the circulatory carriageway on the Tesco roundabout.
- B4434/ Cadoxton Road: Up to 121 additional vehicles (base flow 855 vehicles/per hour) in the vicinity of the two adjacent roundabouts.



Figure 11 - Link flow difference LDP 2024 – base 2019 (AM M4 Junction 43 (NOTE: threshold of 20 veh applied on link bars))

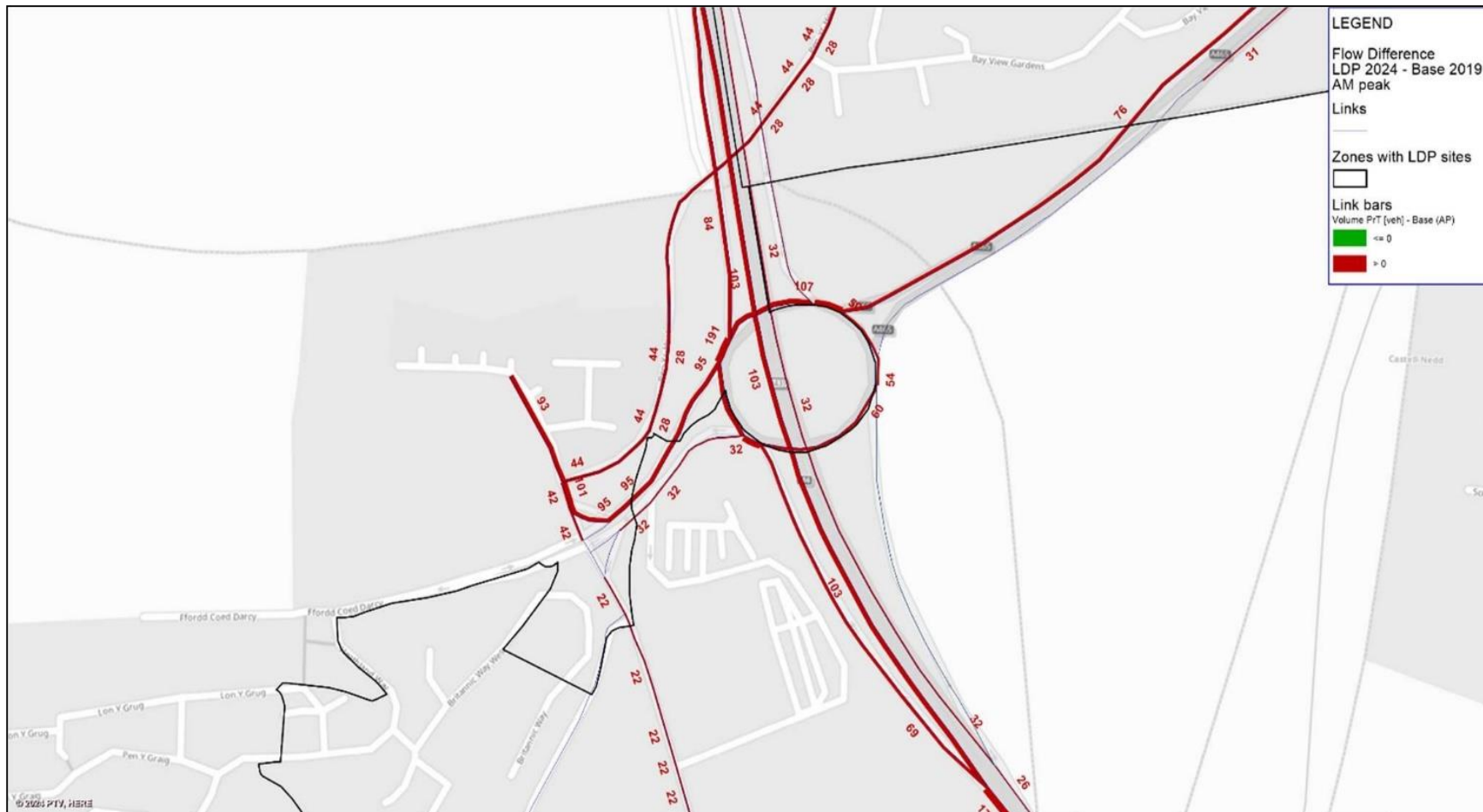




Figure 12 - Link flow difference LDP 2024 – base 2019 (AM A4320 towards Tesco roundabout) (NOTE: threshold of 20 veh applied on link bars)

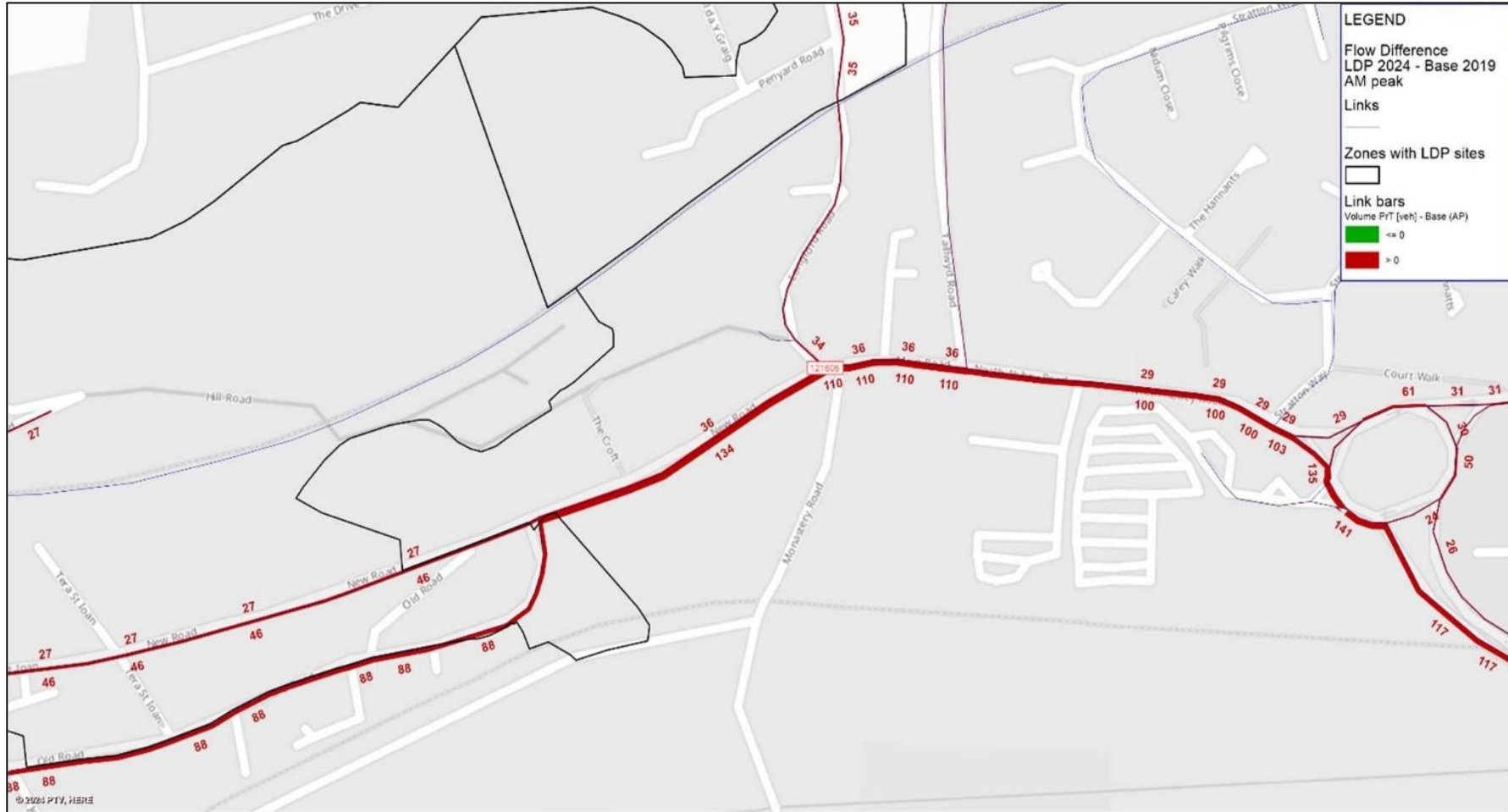
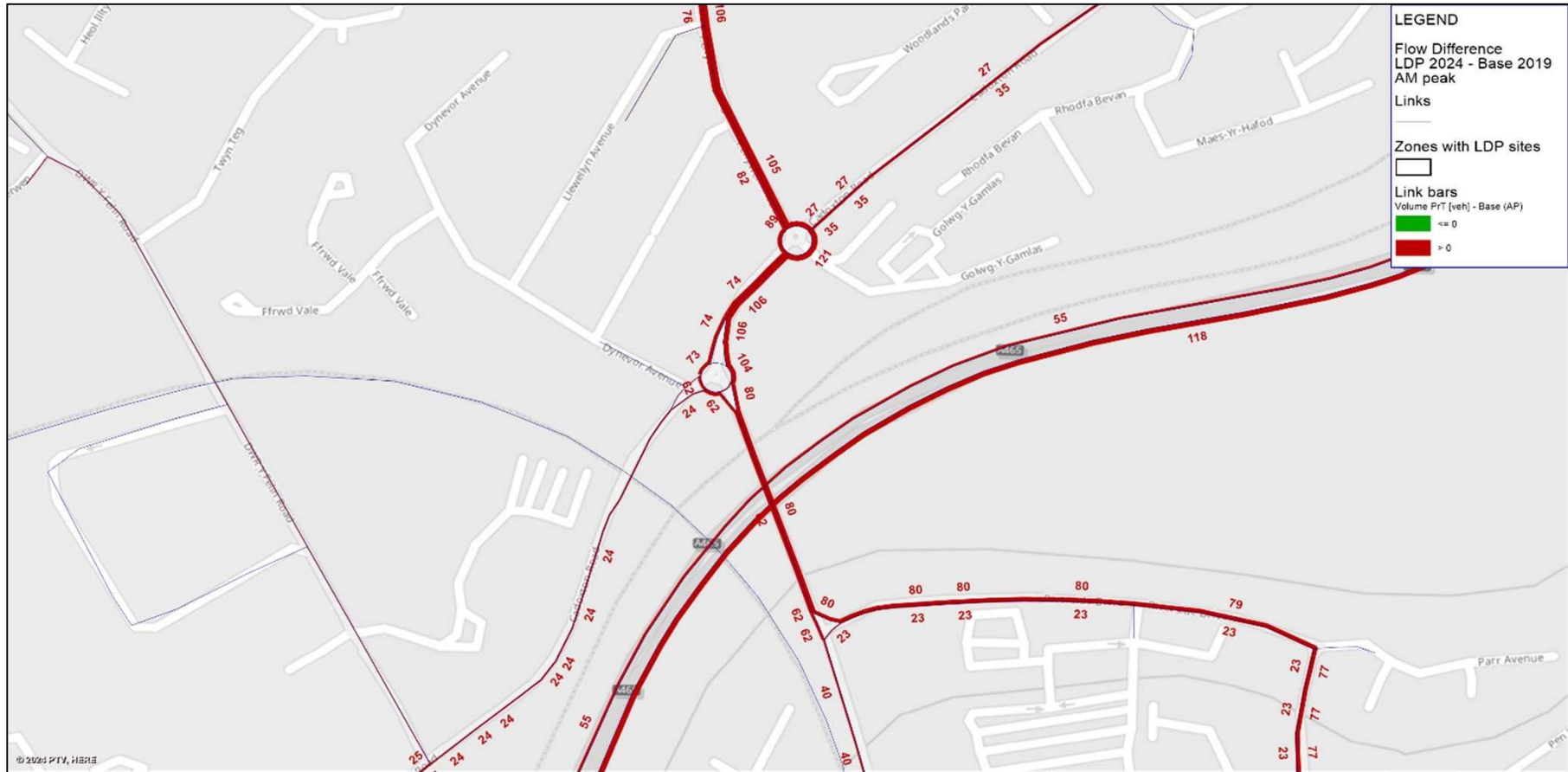




Figure 13 - Link flow difference LDP 2024 – base 2019 (AM B4434 / Cadoxton Road) (NOTE: threshold of 20 veh applied on link bars)

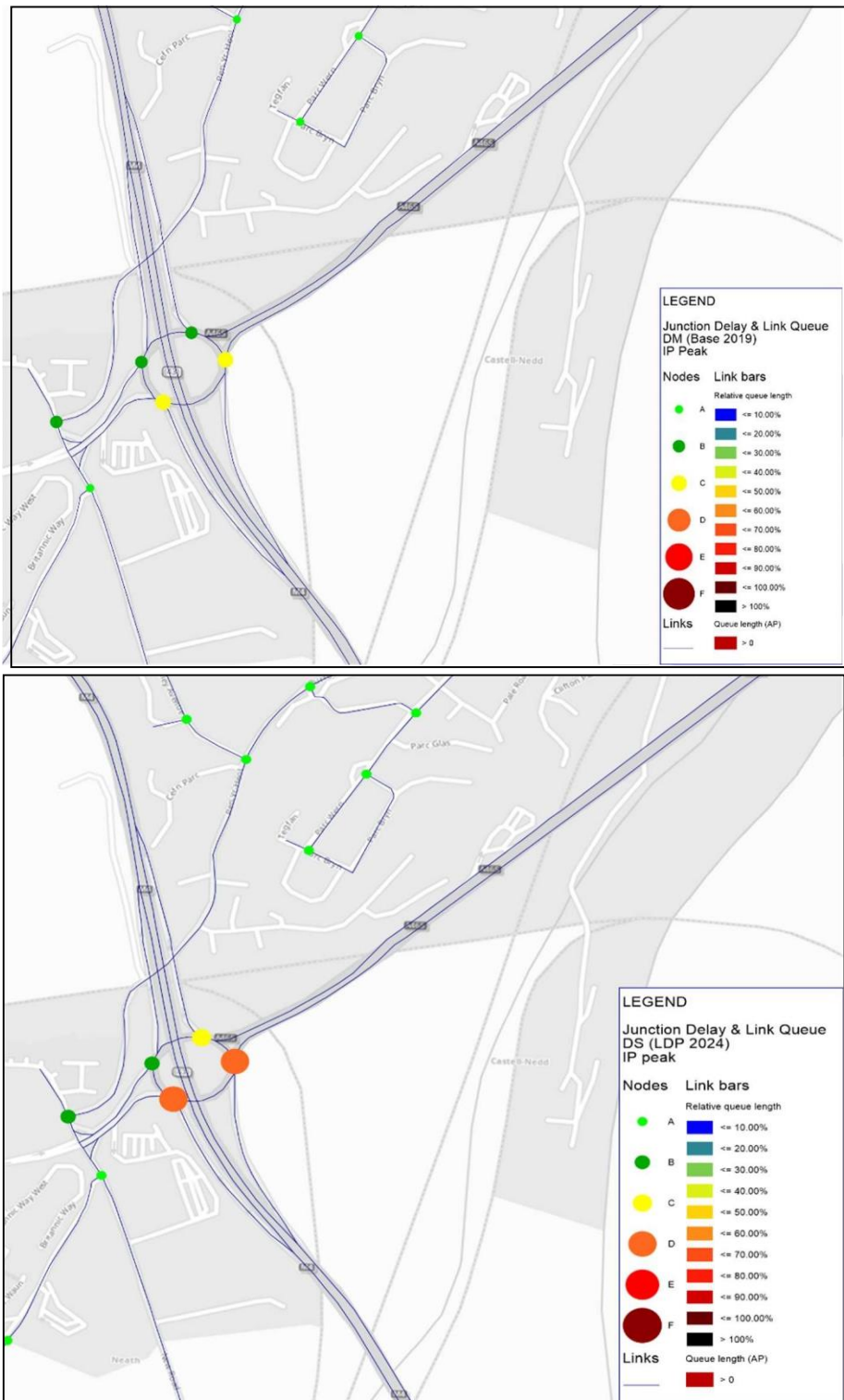




Interpeak Results

- 4.8. Interrogation of junction delay and link queue shows that the level shows:
- M4 Junction 43 Multiple nodes changing delay category, either from performance category B to C or from C to D.

Figure 14 - Junction delay and link queues: IP M4 Junction 43 (Base 2019 top, LDP 2024 bottom)



4.9. The overall link flow differences for the interpeak are shown in Figure 15 and Figure 16. There is an overall flow increase of 1.11% across the network in the interpeak.



Figure 15 - Link flow difference LDP 2024 – base 2019 (IP wide)

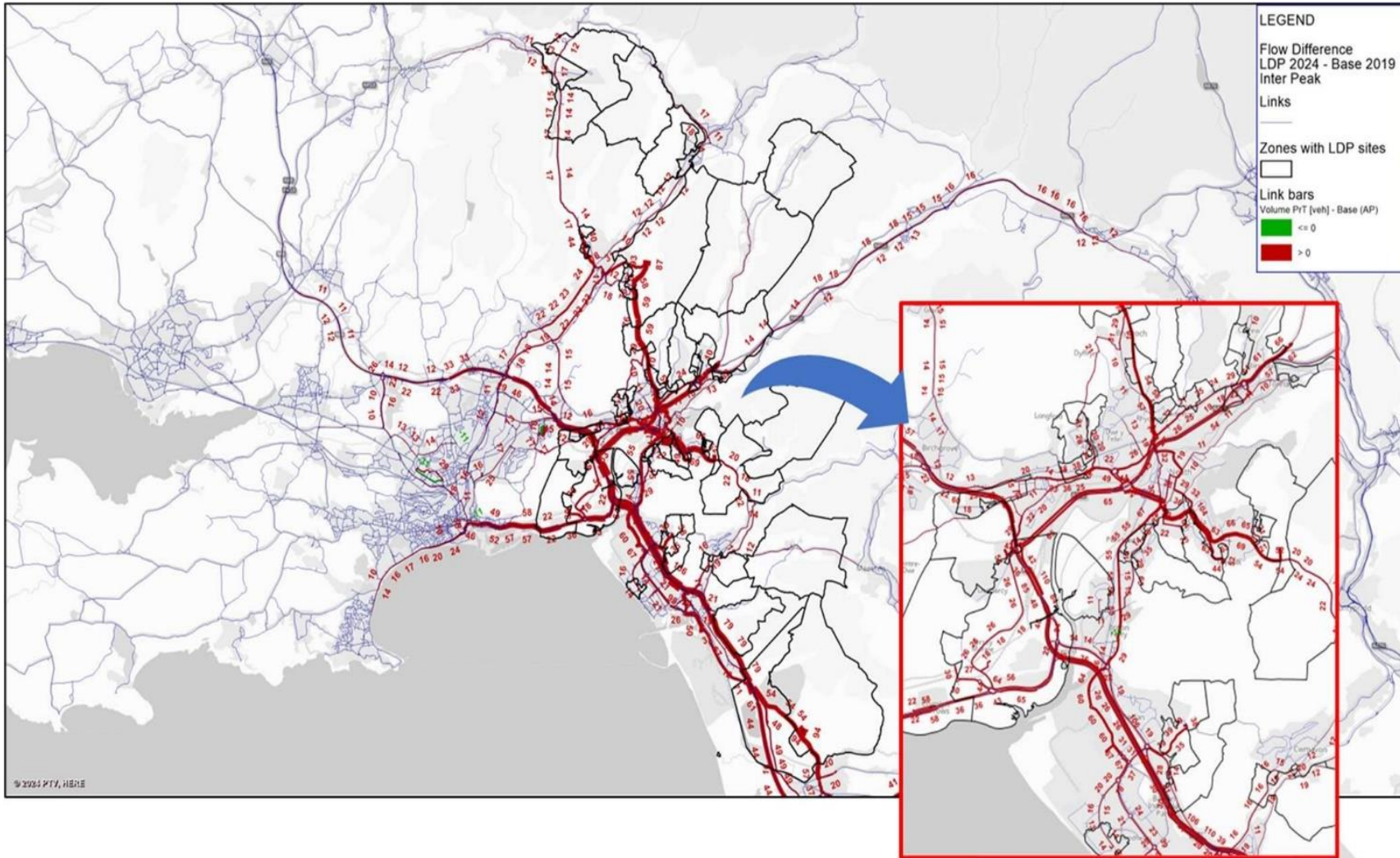
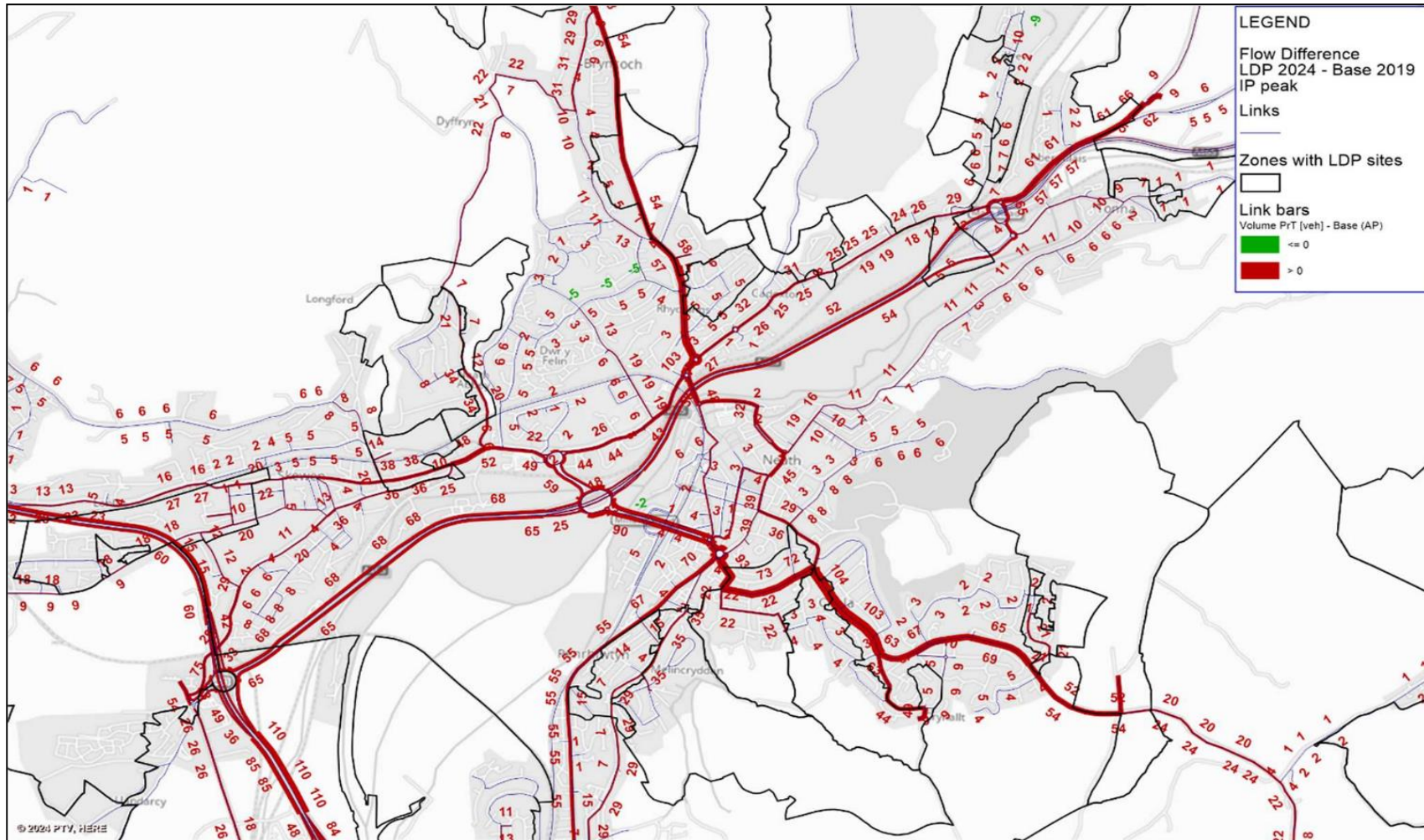




Figure 16 - Link flow difference LDP 2024 – base 2019 (IP zoom) (NOTE: threshold of 20 veh applied on link bars)



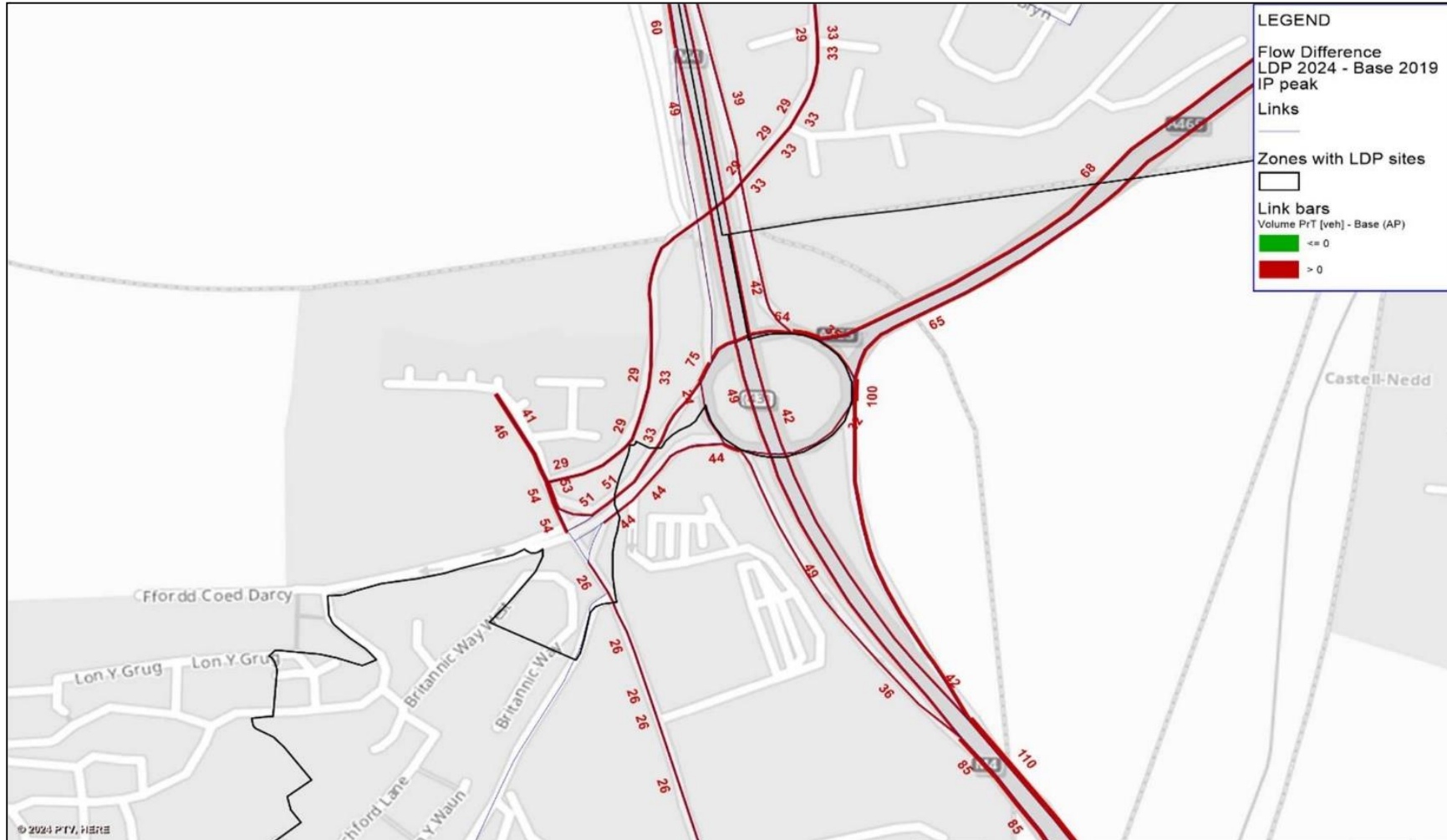


4.10.

The link flow data shows M4 Junction 43 Up to 100 additional vehicles (base flow 1428 vehicles per hour) on the circulatory carriageway of the roundabout and between 36 and 65 additional vehicles on each approach however base flow varies between 106 and 1286 vehicles per hour.



Figure 17 - Link flow difference LDP 2024 – base 2019 (IP M4 Junction 43) (NOTE: threshold of 20 veh applied on link bars)





- 4.11. The link flow data shows A4320 towards Tesco roundabout: Up to 60 additional vehicles (base flow 569 vehicles per hour) heading westbound and 48 vehicles (base flow 532 vehicles per hour) heading eastbound on the A4320. Up to 79 additional vehicles (base flow 982 vehicles per hour) on the circulatory carriageway on the Tesco roundabout.



Figure 18 - Link flow difference LDP 2024 – base 2019 (IP A4320 towards Tesco rbt) (NOTE: threshold of 20 veh applied on link bars)

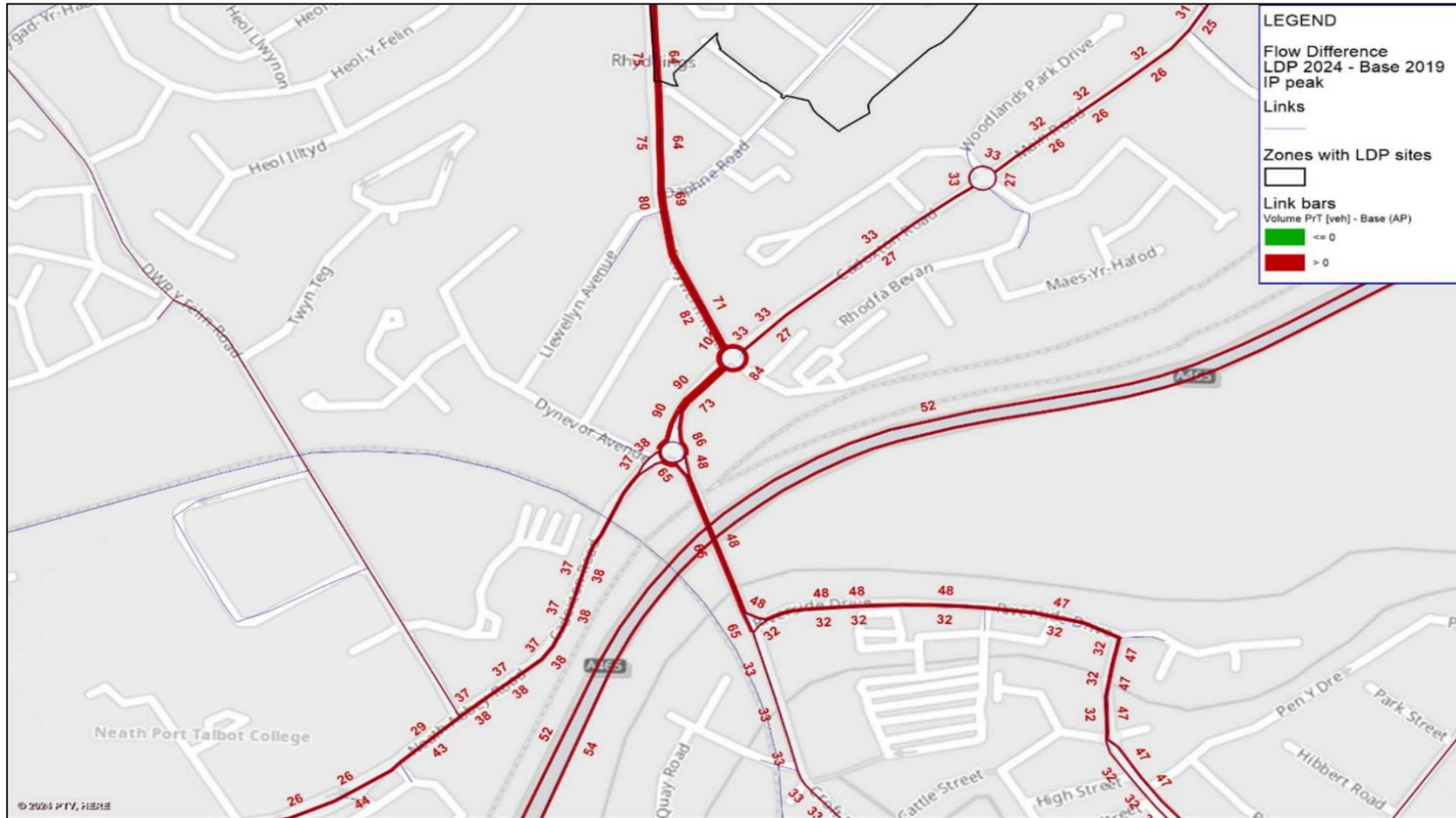




4.12. The link flow data shows B4434/ Cadoxton Road: Up to 90 additional vehicles (base flow 872 vehicles per hour) in the vicinity of the two adjacent roundabouts.



Figure 19 - Link flow difference LDP 2024 – base 2019 (IP B4434 / Cadoxton Road) (NOTE: threshold of 20 veh applied on link bars)





PM Peak Results

- 4.13. The junction delay and link queues for PM peak are shown in Figure 20 and Figure 21 for Base 2019 and LDP 2024 respectively.

Figure 20 - Junction delay and link queues: base 2019 (PM)

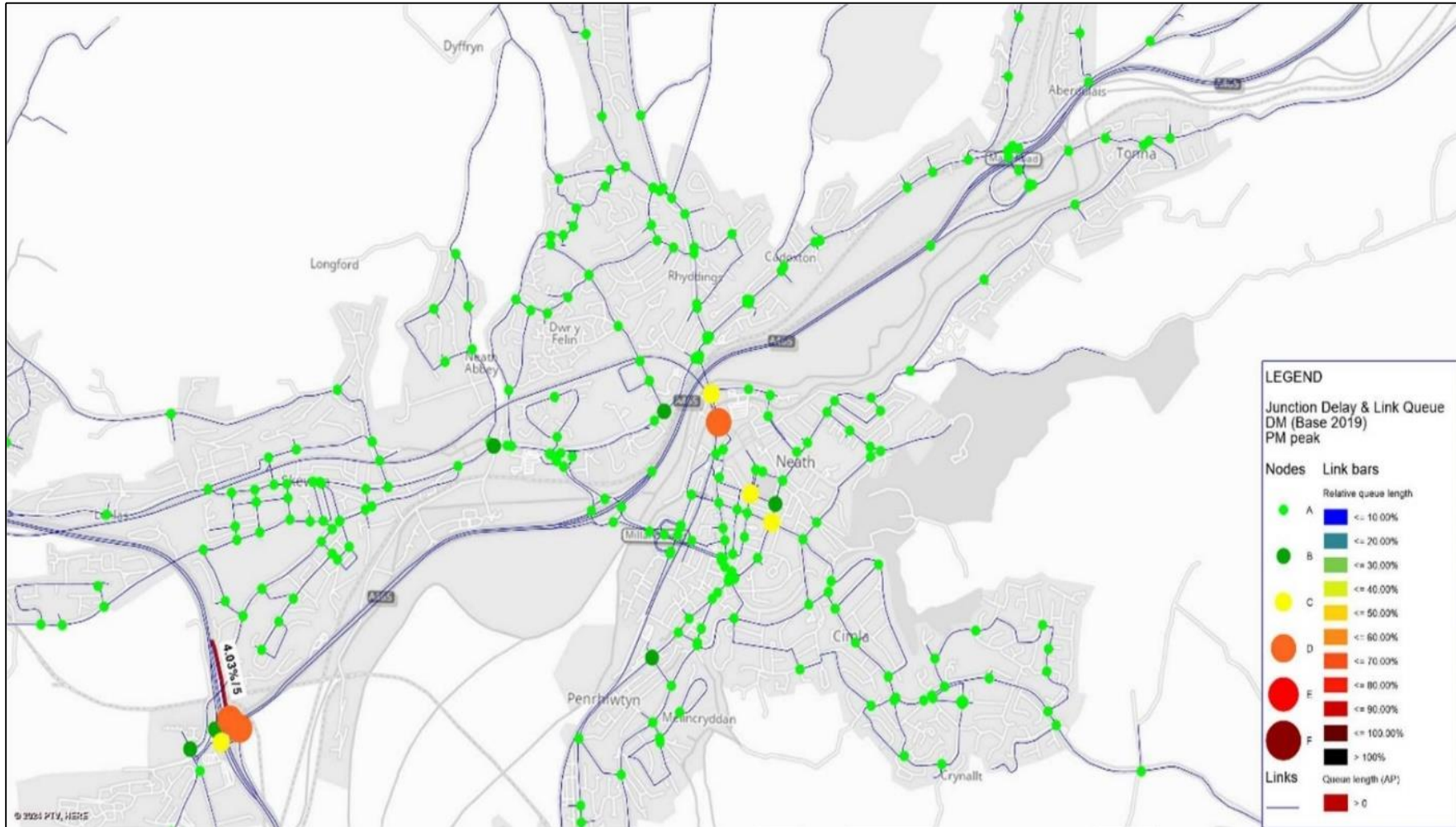
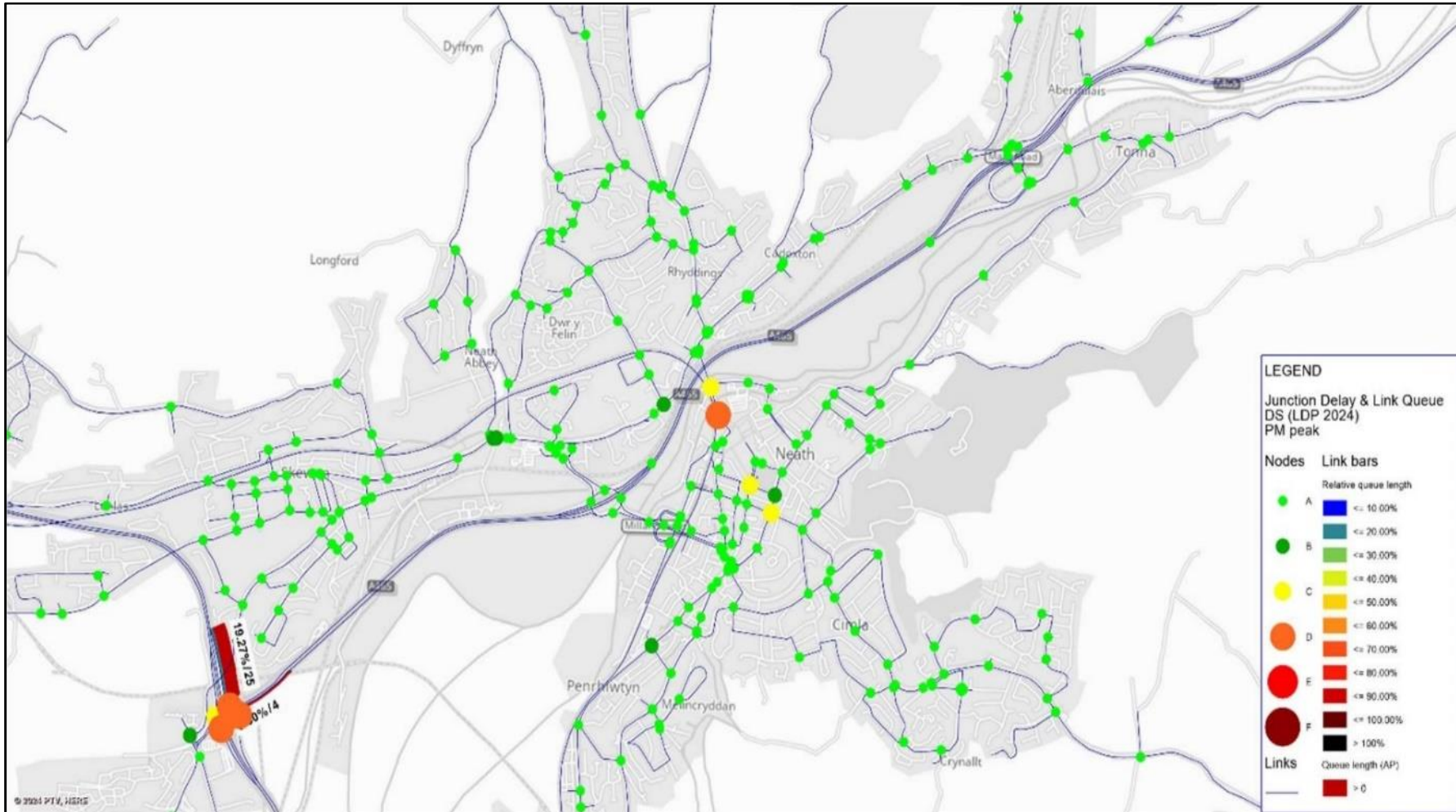
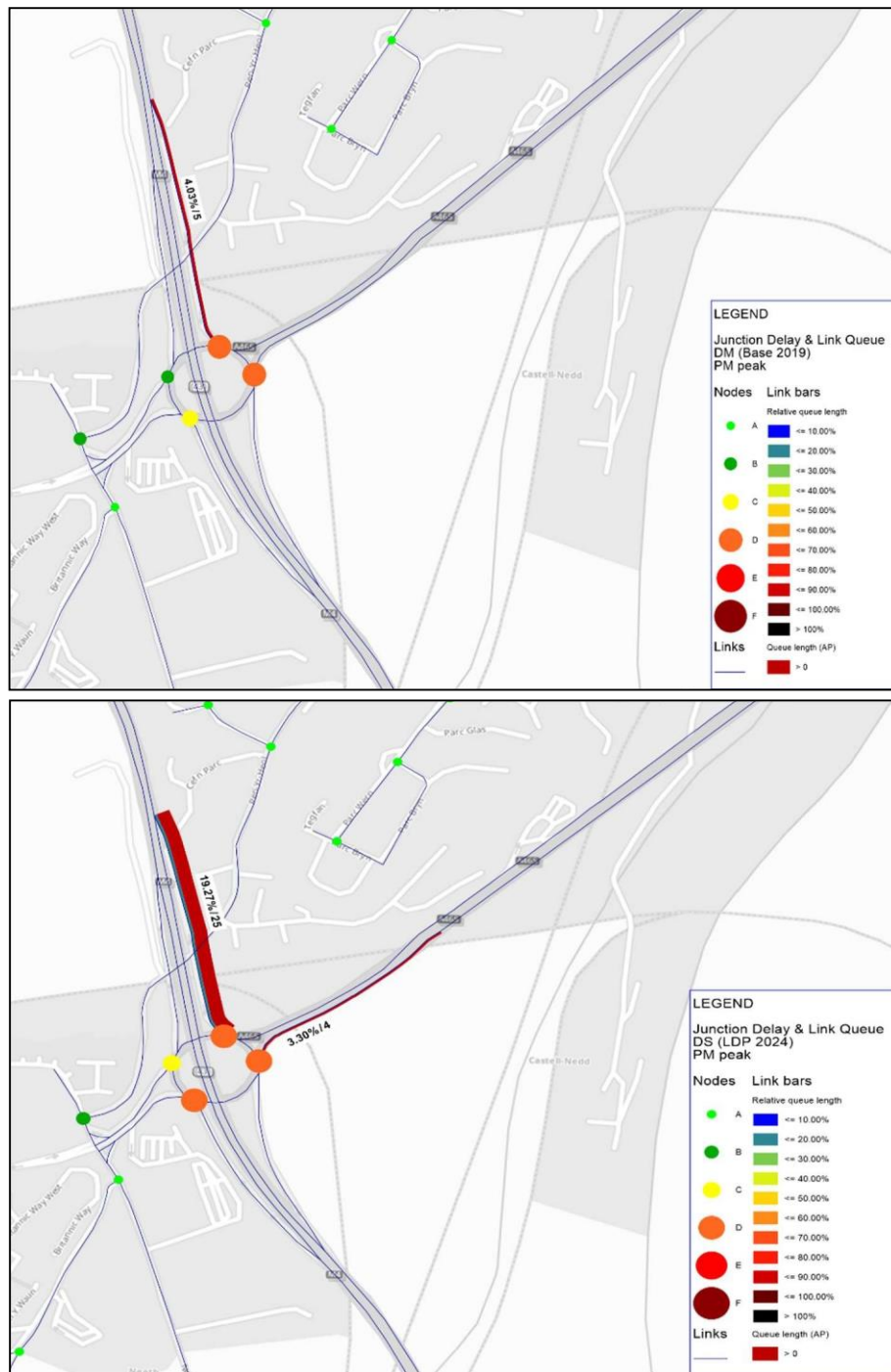


Figure 21 - Junction delay and link queues: LDP 2024 (PM)



4.14. The analysis suggests M4 Junction 43 Change in performance category on the northbound offslip approach to M4 Junction 43 from C to D and increasing queues on the southbound off slip approach to M4 Junction 43 (5 vehicles to 25 vehicles) and on the A465 approach (0 vehicles to 4 vehicles).

Figure 22 - Junction delay and link queues: PM M4 Junction 43 (Base 2019 top, LDP 2024 bottom)



4.15. The analysis suggests A4320 towards Tesco roundabout: Change of performance category from A to B at the Monastery Road/ A4320 mini roundabout.

Figure 23 - Junction delay and link queues: PM A4320 towards Tesco roundabout (Base 2019 top, LDP 2024 bottom)



4.16. The overall link flow differences for the PM peak are shown in Figure 24

and Figure 25. There is an overall flow increase of 1.20% across the network in the PM peak.

Figure 24 - Link flow difference LDP 2024 – base 2019 (PM wide)

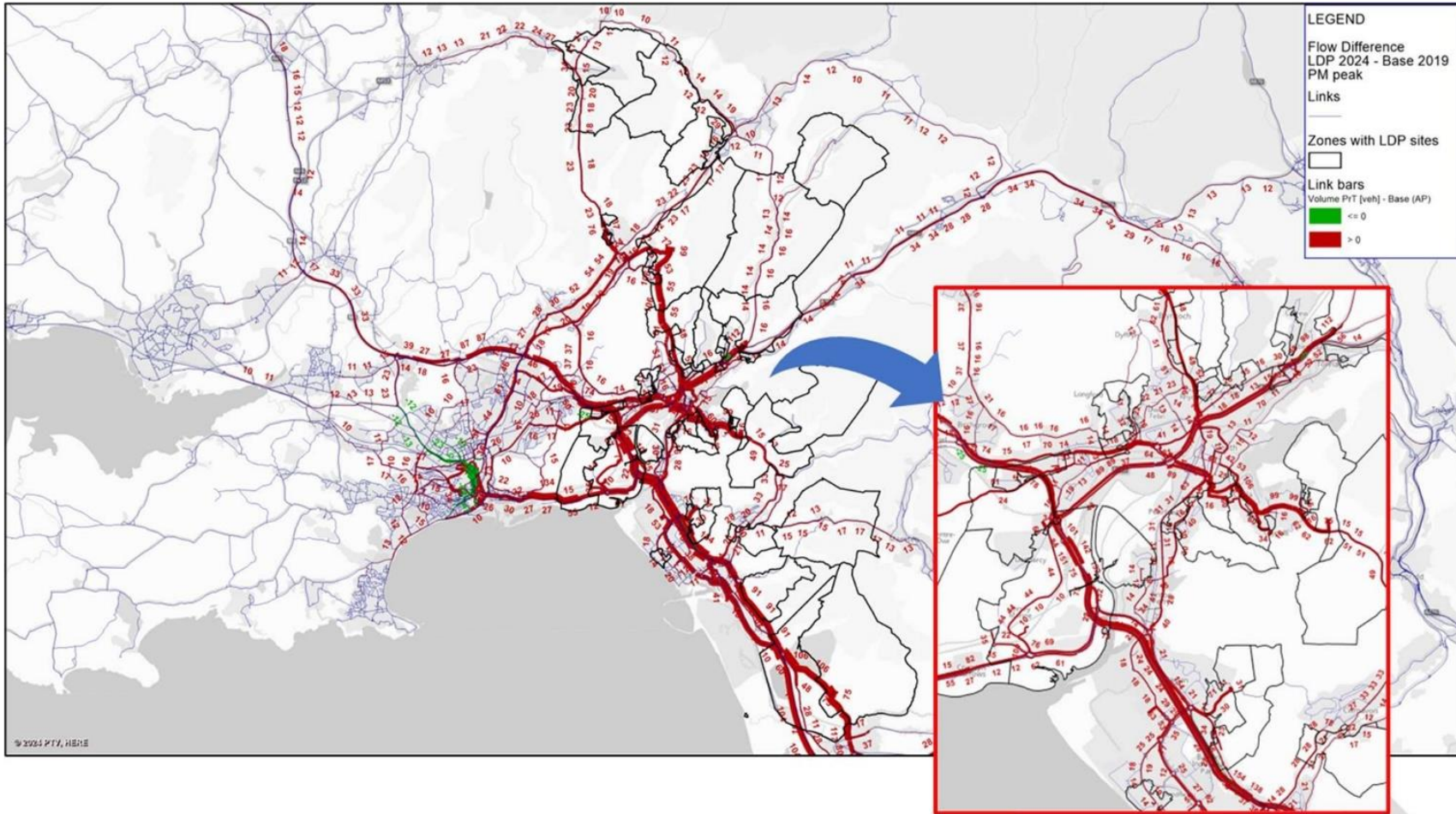
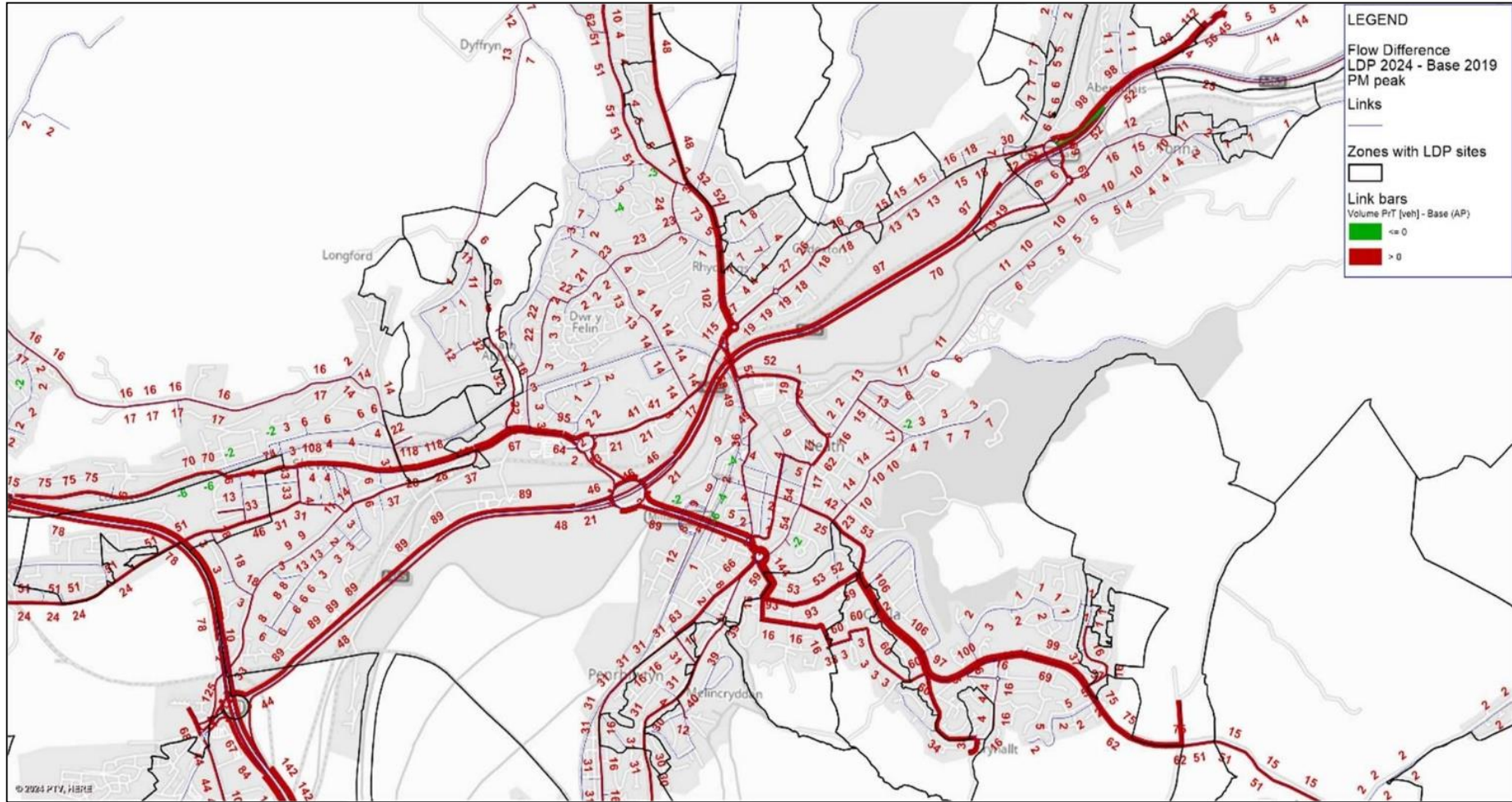
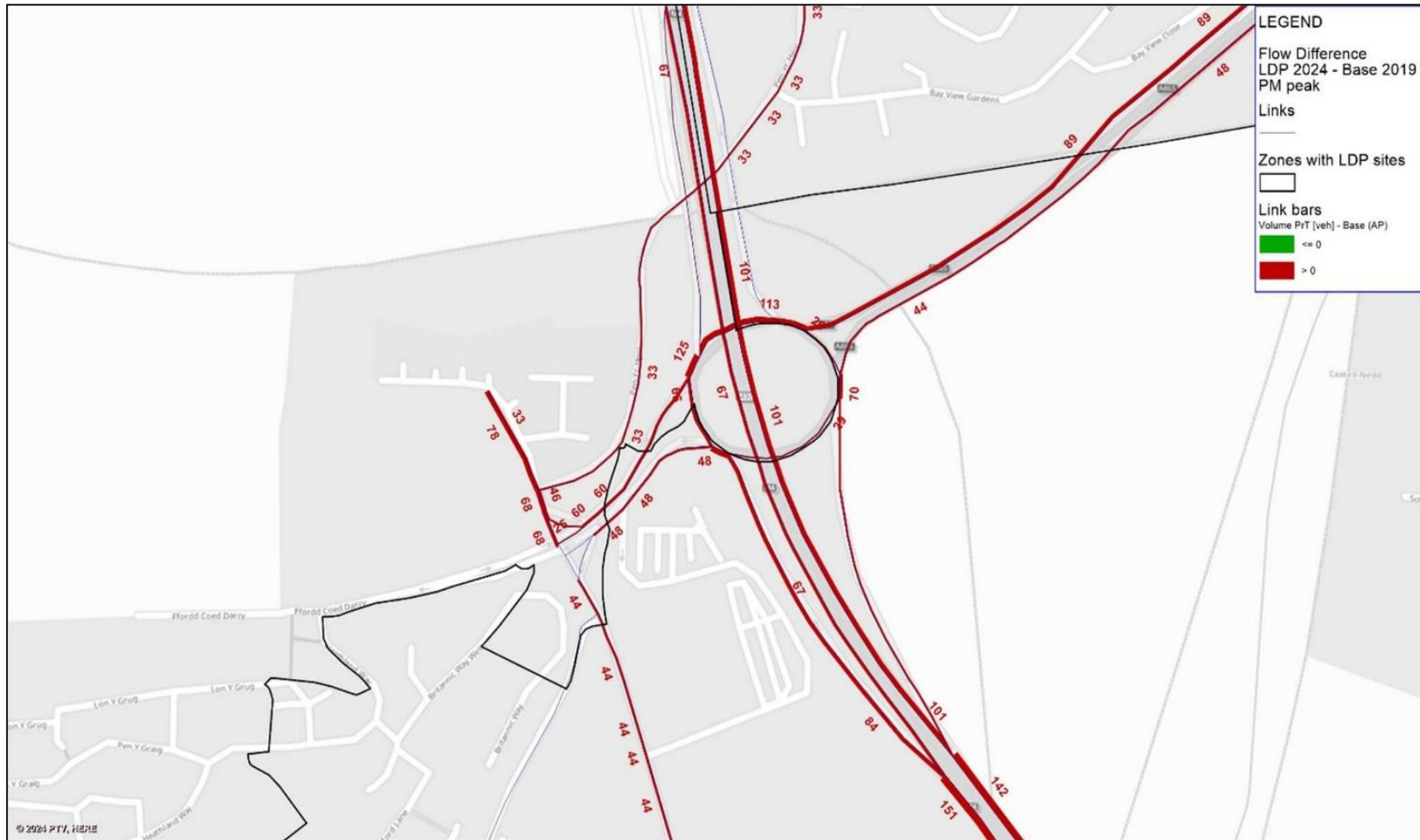


Figure 25 - Link flow difference LDP 2024 – base 2019 (PM zoom) (NOTE: threshold of 20 veh applied on link bars)



4.17. The analysis shows M4 Junction 43: up to 125 (base flow 2253 vehicles per hour) additional vehicles on the circulatory carriageway of the roundabout and between 44 and 84 additional vehicles on each approach however base flow varies between 566 and 1588 vehicles per hour.

Figure 26 - Link flow difference LDP 2024 – base 2019 (PM M4 Junction 43) (NOTE: threshold of 20 veh applied on link bars)



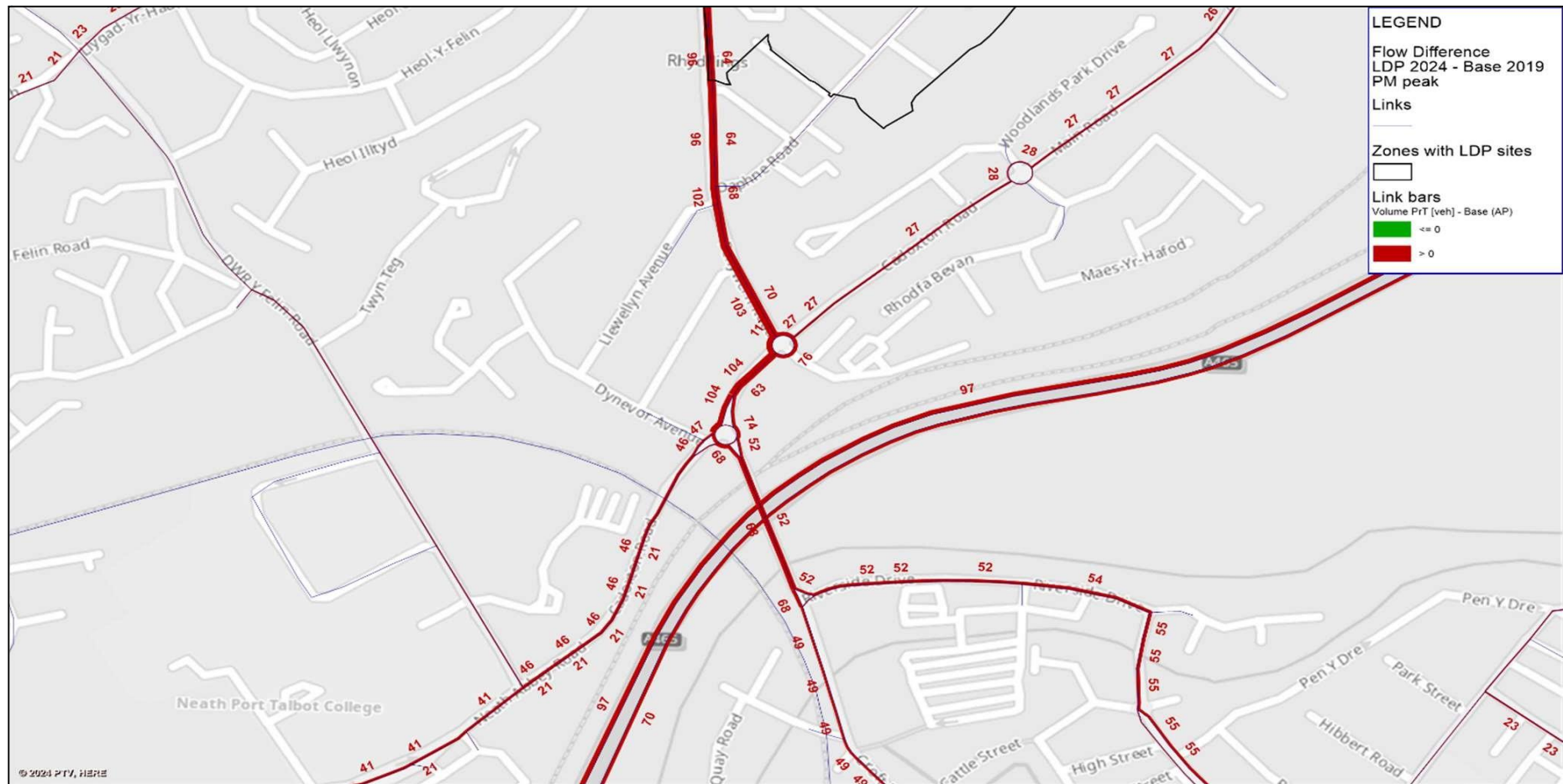
4.18. The analysis shows A4320 towards Tesco roundabout: Up to 128 additional vehicles (base flow 829 vehicles per hour) heading westbound and 48 vehicles (base flow 720 vehicles per hour) heading eastbound on the A4320. Up to 95 additional vehicles (base flow 1243 vehicles per hour) on the circulatory carriageway on the Tesco roundabout.

Figure 27 - Link flow difference LDP 2024 – base 2019 (PM A4320 towards Tesco roundabout) (NOTE: threshold of 20 veh applied on link bars)



4.19. The analysis shows B4434/ Cadoxton Road: Up to 113 additional vehicles (base flow 1236 vehicles per hour) in the vicinity of the two adjacent roundabouts.

Figure 28 - Link flow difference LDP 2024 – base 2019 (PM B4434 / Cadoxton Road) (NOTE: threshold of 20 veh applied on link bars)



Network Statistics

- 4.20. The overall network statistics of total vehicle kilometers travelled, the total vehicle hours and their ratio as the average vehicle speed, are as shown in Table 6.

Table 6: Network Statistics Comparison for Base 2019 and LDP 2024

Total Vehicle Kilometers				
Peak	Base 2019	LDP 2024	Change	% Change
AM	30364	30690	326	1.07%
	41	74	33	
IP	24037	24305	267	1.11%
	91	39	48	
PM	31044	31416	371	1.20%
	55	53	98	
Total Vehicle Hours				
Peak	Base 2019	LDP 2024	Change	% Change
AM	44836	45486	650	1.45%
IP	34303	34733	430	1.25%
PM	45349	46024	675	1.49%
Average Vehicle Speed (km/h)				
Peak	Base 2019	LDP 2024	Change	% Change
AM	67.7	67.5	-0.3	- 0.37%
IP	70.1	70.0	-0.1	- 0.14%
PM	68.5	68.3	-0.2	- 0.29%

4.21. Due to the development trips added, the total vehicle kilometers increase

in the range of 1.07% to 1.20%. total vehicle hours also increase in the range of 1.25% to 1.49%, and consequently there is a reduction in average vehicle speed in the range of -0.14% to -0.37%. At the network wide level, the impacts of development could be considered to be small, however at individual locations the impacts experienced by road users will be far higher.

5. Summary

- 5.1. NPTC working with TfW have commissioned WSP to undertake a strategic highways assessment using the WG SWMWTM for the NPT RLDP.
- 5.2. The analysis and comparisons of the base year (2019) and the proposed development scenario (2024) shows a modest increase in flow overall within NPT, with slight variation in junction performance. The overall network statistics show increases in vehicle kilometers and vehicle hours in the range of 1.0-1.2%, and a corresponding small reduction in speed (less than -0.5%). Whilst these changes at the network level are relatively small, there are larger, more localised impacts, some of which are discussed as follows.
- 5.3. Specific interrogation of junction delay and link queues for three areas of change has been undertaken within the SWMWTM. At all three locations the level of service materially changes (i.e. moves from one performance category to another). These are:
 - M4 Junction 43
 - A4320 towards Tesco roundabout
 - B4434 / Cadoxton Road
- 5.4. These changes suggest possible future network performance issues. A summary of delay and queue changes is given as follows:
 - M4 Junction 43
 - AM peak: no change in delay categories for each node but an extended queue on the A465 approach from 5 vehicles to 33 vehicles
 - Interpeak: multiple nodes changing delay category, either from performance category B to C or from C to D.

- PM peak: change in performance category on the northbound offslip approach to M4 Junction 43 from C to D and increasing queues on the southbound offslip approach to M4 Junction 43 (5 vehicles to 25 vehicles) and on the A465 approach (0 vehicles to 4 vehicles)
- A4320 towards Tesco roundabout area
 - AM peak: change of performance category from B to C at the Longford Road / A4320 mini roundabout and a change of performance category from A to B at the Monastery Road / A4320 mini roundabout.
 - Interpeak: no change
 - PM peak: change of performance category from A to B at the Monastery Road / A4320 mini roundabout
- B4434 / Cadoxton Road area
 - AM peak: no change
 - Interpeak: change of performance category at Croft Road / Bridge Street from C to D.
 - PM peak: no change

5.5. The following limitations in the SWMWTM should be noted and consequently the results presented in this report interpreted with caution:

- The SWMWTM is a strategic model covering a large area, it has not been validated in detail in the NPT area;
- The assessment has utilised only the highway assignment model from the SWMWTM, no account has been taken of potential future mode shift, including changes brought about by future policy to reduce car travel and promote active and public transport;
- No account has been taken of potential future changes to goods

vehicle demand.

5.6. To facilitate interpretation of these results, flow changes brought about by development in the NPT area have also been provided. These are summarised as follows:

- M4 Junction 43
 - AM peak: up to 191 additional vehicles (base flow 2,044 vehicles/per hour) on the circulatory carriageway of the roundabout and between 32 and 95 additional vehicles on each approach (base flow varies between 472 and 2,038 vehicles per hour).
 - Interpeak: up to 100 additional vehicles (base flow 1,428 vehicles per hour) on the circulatory carriageway of the roundabout and between 36 and 65 additional vehicles on each approach (base flow varies between 106 and 1,286 vehicles per hour).
 - PM peak: up to 125 (base flow 2253 vehicles per hour) additional vehicles on the circulatory carriageway of the roundabout and between 44 and 84 additional vehicles on each approach (base flow varies between 566 and 1588 vehicles per hour).
- A4320 towards Tesco roundabout:
 - AM peak: up to 134 additional vehicles (base flow 913 vehicles/per hour) heading westbound and up to 36 vehicles (base flow 728 vehicles/per hour) heading eastbound on the A4320. Up to 141 additional vehicles (base flow 1346 vehicles/per hour) on the circulatory carriageway on the Tesco roundabout.
 - Interpeak: up to 60 additional vehicles (base flow 569

vehicles per hour) heading westbound and 48 vehicles (base flow 532 vehicles per hour) heading eastbound on the A4320. Up to 79 additional vehicles (base flow 982 vehicles per hour) on the circulatory carriageway on the Tesco roundabout.

- PM peak: up to 128 additional vehicles (base flow 829 vehicles per hour) heading westbound and 48 vehicles (base flow 720 vehicles per hour) heading eastbound on the A4320. Up to 95 additional vehicles (base flow 1243 vehicles per hour) on the circulatory carriageway on the Tesco roundabout.
- B4434 / Cadoxton Road:
 - AM peak: 121 additional vehicles (base flow 855 vehicles/per hour) in the vicinity of the two adjacent roundabouts.
 - Interpeak: up to 90 additional vehicles (base flow 872 vehicles per hour) in the vicinity of the two adjacent roundabouts.
 - PM peak: up to 113 additional vehicles (base flow 1,236 vehicles per hour) in the vicinity of the two adjacent roundabouts.



Appendix 1: Developments and daily trips ends per zone

S. No.	Zone	Trips per Zone	Development per Zone		S. No.	Zone	Trips per Zone	Development per Zone
1	12001	2296	547		26	12133	1469	350
2	12002	159	38		27	12147	513	122
3	12003	50	12		28	12179	315	75
4	12005	82	0		29	12189	143	34
5	12006	155	37		30	12190	918	219
6	12008	126	30		31	12193	269	64
7	12009	105	25		32	12194	504	120



S. No.	Zone	Trips per Zone	Development per Zone	S. No.	Zone	Trips per Zone	Development per Zone
8	12010	231	55	33	12196	1175	280
9	12011	273	65	34	12197	504	120
10	12024	84	20	35	12200	147	35
11	12030	126	30	36	12202	378	90
12	12043	64	0	37	12203	84	20
13	12058	21	5	38	12217	2	0
14	12061	105	25	39	12220	24	6
15	12070	839	200	40	12225	1255	0



S. No.	Zone	Trips per Zone	Development per Zone	S. No.	Zone	Trips per Zone	Development per Zone
16	12083	122	29	41	12227	848	180
17	12094	126	30	42	12230	880	0
18	12099	168	40	43	12233	536	128
19	12104	84	20	44	12235	3022	720
20	12109	1175	280	45	12236	336	80
21	12110	1084	258	46	12238	168	40
22	12111	1259	300	47	12250	180	43
23	12114	147	35	48	12251	21	5



S. No.	Zone	Trips per Zone	Development per Zone		S. No.	Zone	Trips per Zone	Development per Zone
24	12115	294	70		49	12259	63	15
25	12123	315	75		TOTAL		23241	4972

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Neath Port Talbot Council