St. Helens Council

ST. HELENS LOCAL PLAN

Forecasting Report

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JUNE 2018

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Forecasting Report

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1 INTRODUCTION

1.1.1. St. Helens Council (SHC) has appointed WSP to undertake a Transport Impact Assessment (TIA) to inform the planning and infrastructure strategy around the preferred sites for the Local Plan[1].

1.1.2. To support the assessment of traffic impacts, a forecast model has been developed to assess the cumulative impact of upcoming developments and to identify areas of increased stress on the highway network. The forecast model has been developed from the St. Helens SATURN Model (SHSM), a 2017 base-year model produced by WSP[2].

1.1.3. This report summarises the methodology and results of this study and can be considered a technical appendix to the TIA. It is structured as follows:

- **Chapter 2** summarises the base model and the methodology for developing the forecast model;
- **Chapter 3** defines the do-minimum scenario and describes the assumptions made;
- **Chapter 4** defines the do-something scenarios and describes the assumptions made;
- **Chapter 5** documents the outputs of the forecast model; and finally
- **Chapter 6** provides a short summary and conclusion.

A series of appendices are then included, to cover:

- **Appendix A** – a series of performance metrics at key junctions in St Helens;
- **Appendix B** – model outputs showing differences in traffic flows between modelled scenarios;
- **Appendix C** – the methodology used to build the forecast year matrices; and
- **Appendix D** – the developments included within each of the modelled scenarios along with relevant assumptions.

[1] The TIA has been produced to inform the development of the St. Helens Local Plan Proposed Submission version. It is not a TIA of the Proposed Submission version of the Local Plan, rather it is a TIA of the proposed Allocations of the 2016 Local Plan Preferred Options. The analysis of the LPPO allocation sites has been used to help inform the selection of sites for the PSLP, and the recommendations for improving sites has been used to inform policy.
[2] Local Model Validation Report v5.pdf, WSP, 2018

2 BASE MODEL AND FORECASTING METHODOLOGY

2.1 BASE YEAR MODEL OVERVIEW

2.1.1. The starting point of the SHSM base year model in terms of the network and zonal coverage was the Liverpool City Region Transport Model (LCRTM), which was subsequently focussed on the St Helens local authority district and extended to incorporate the M62 corridor up to the Croft Interchange and an area around M6 Junction 23 and Golborne.

2.1.2. The SHSM study area is illustrated in Figure 1.

2.1.3. SHSM constitutes a peak-hour model, producing model outputs for the time periods given in Table 1.

Table 1 – SHSM Modelled Hours

Time Period	Modelled Peak hour
AM	08:00-09:00
IP	Average hour 10:00-16:00*
PM	17:00-18:00

*Currently not modelled in forecast

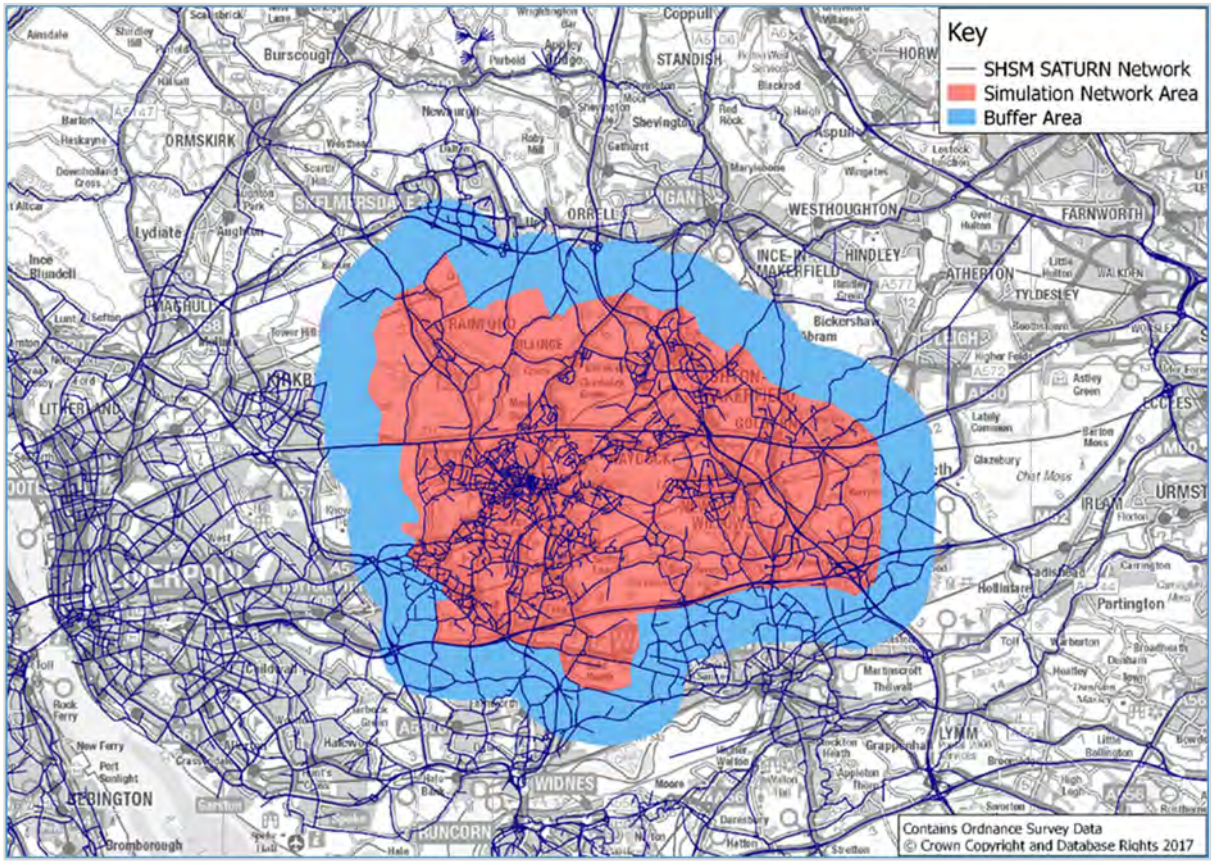


Figure 1 – SHSM study area

2.1.4. The model was calibrated to 2017 traffic flows and speed data using matrix estimation and was validated as described in the SHSM LMVR.

2.2 FORECAST MODEL PURPOSE

2.2.1. The forecast model has been designed as a highway only model to be used for the Local Plan TIA; as such this report should be read in the context of the wider TIA report[3]. The Model Forecasting Report includes the evaluation of the impact of Local Plan development-driven demand and the testing of highways improvement and mitigation schemes on the Key Route Network (KRN), which is expanded upon in the TIA report.

2.2.2. Key highway schemes tested in the forecast scenarios include the Parkside Link road, a re-design of the M62 Junction 7 roundabout and a hypothetical scheme incorporating further grade separation at Junction 23 on the M6. The outcome of these changes is documented in Chapter 5 of this report and a wider discussion of the impacts of these proposed schemes can be found in the wider TIA report.

2.2.3. Model output tools have been developed to present various metrics for the key links and junctions in the model and allow for easy visual comparison of the impact and performance of the model scenarios. These tools, along with the commentary in this report form the main component of the forecast model analysis.

2.3 FORECAST SCENARIOS

2.3.1. All forecast models were developed from the 2017 validated SHSM model. For forecasting three scenarios have been developed:

- Do Minimum (DM);
- Do Something 1 (DS1); and
- Do Something 2 (DS2); which is split into three individual tests.

2.3.2. Each scenario is developed for a forecast year of 2033.

2.3.3. Scenarios were defined according to the perceived likelihood of the build out of each development and highway scheme commencing before the modelled future year. The inclusion of developments and schemes for the DM and each of the DS scenarios is indicated in Table 2.

Table 2 – 2033 forecast scenario definition

Scenario	Development inclusion	Highways scheme inclusion
DM	Committed and Local Plan developments with planning permission	All committed highways schemes
DS1	Committed and Local plan developments Major developments without planning permission	As per DM
DS2a	As per DS1 with an overall vehicle trip reduction applied to reflect adoption of sustainable travel initiative	As per DS1
DS2b	As per DS1	As per DS1 Additional highways schemes
DS2	As per DS2a and DS2b	As per DS2a and DS2b
DS2c	As per DS2	As per DS2 40mph limit applied to A580

2.4 FORECAST MODEL LIMITATIONS

2.4.1. As with all models, there are limitations in terms of their applicability. In the case of SHSM, the model was developed for the analysis of development and highway options within St Helens. As such, the model is not suitable for the evaluation of schemes external to the study area. Any further studies within the study area

[3] St Helens TIA.docx, WSP, 2018

should incorporate a review and possible amendment of the demand matrices according to the latest available information before attempting to evaluate new schemes or scenarios. Additional detail may also be required in the network coding.

2.4.2. The St. Helens forecast model has been developed using a methodology suitable for its intended use within the context of the Local Plan TIA. Noteworthy limitations of the modelling approach include:

- The model incorporates traffic assignment of a fixed forecast demand only.
  - There is no public transport modelling, beyond the inclusion of fixed bus routes and hence switching of models (from private car use to public transport and vice versa) is not modelled.
  - Peak spreading is not accounted for so there is no shifting of demand into the periods pre- and post the peak modelled hour.
- The model has been developed based on neutral weekday-averages and there is currently no modelling of peak travel demands over a weekend.

2.4.3. The St. Helens forecast model will therefore not be suitable to any investigations reliant on model behaviours outside these parameters.

2.5 BACKGROUND GROWTH - MATRIX DEVELOPMENT

2.5.1. In accordance with the desired use of the model, a hybrid approach was taken in the production of forecast year matrices to represent a level of background growth irrespective of the larger committed development sites and Local Plan sites.

2.5.2. For developments within St. Helens Local Authority District (LAD) growth factors were derived from application of the 'alternative assumptions' facility within the DfT's TEMPro software.

2.5.3. The alternative forecasts were produced by extracting the basic increase in jobs and households, as calculated by TEMPro itself, and replacing it with Strategic Housing Land Availability Assessment (SHLAA) housing developments and committed developments of less than 50 units. The total volume of these developments matched well to the volume given in TEMPro, and using the alternative assumptions in this manner allowed for more accurate representation of where these areas of growth would be focussed.

2.5.4. A comparison of the total volume of households and jobs included in the alternative assumptions versus the volume proscribed by TEMPro can be seen in Table 3.

Table 3 – Total background growth applied

Source of background growth:	TEMPro	St. Helens LAD development
Households	4,213	4,987
Jobs	2,952	1,262

2.5.5. External to St Helens district, full TEMPro factors were applied as background growth.

2.5.6. As the National Trip End Model (NTEM) data accessed through TEMPro does not contain information on goods vehicles, background growth factors were derived from the National Transport Model (NTM).

2.5.7. Demand growth was applied to the base model using a custom method to factor the base matrices and distribute development trips. The SATURN suite of software, including the Furness factoring algorithm was used in the distribution of this demand.

2.5.8. The development of an uncertainty log, used to derive the demand included in the DM scenario is described in Chapter 3 and the demand assumptions applied to the Do Something scenarios are discussed in Chapter 4.

2.5.9. Further detail on the application of background growth and the distribution of development trips is given in Appendix C (Forecast Matrix Development).

2.6 FUTURE COST PARAMETERS

2.6.1. Generalised cost is used in assignment modelling as method of comparing the attractiveness of different routes in the network to each class of road user. This is achieved by assigning a perceived cost per minute and per kilometre travelled, which are combined during the assignment process. Generalised cost parameters were calculated for each user class for the forecast year following the guidance in TAG unit M3.1 and using data contained in the latest DfT approved WebTAG databook (July 2017). The values for Pence per Kilometre (PPK) and Pence per Minute (PPM) for the base year and forecast year 2033 are given in Table 4.

Table 4 – 2033 generalised cost price base

Vehicle Type	Purpose	PPM		PPK		Ratios PPK/PPM	
		AM	PM	AM	PM	AM	PM
Car	Work	39.33	39.90	11.50	11.50	0.29	0.29
	Commute	26.37	26.47	5.30	5.30	0.20	0.20
	Other	18.20	19.06	5.30	5.30	0.29	0.28
	Average	*25.28*	*24.57*	*6.32*	*6.04*	*0.25*	*0.25*
LGV	Average	27.80	27.80	13.87	13.87	0.50	0.50
HGV	Average	64.91	64.91	43.68	43.68	0.67	0.67

3 DO MINIMUM SCENARIO

3.1 DEVELOPMENTS

3.1.1. An uncertainty log was produced to catalogue known developments for inclusion in the forecast demand as well as highway schemes to be included in the model. Data was sourced directly from St Helens Council who provided mapping and site description data and St Helens planning portal.

3.1.2. Developments were identified for explicit representation in the DM scenarios or for absorption into background growth. Developments considered near certain or highly likely to occur were included in the DM scenario, which included all committed and SHLAA developments. Where given in planning documents, the development trajectory was used to determine level of completion by the forecast year. Elsewhere, assumptions were made as to the likely trajectory and were documented in the uncertainty log.

3.1.3. When compiling the uncertainty log, assumptions about the committed, local plan and SHLAA developments were made and applied consistently throughout the modelling work. The main assumptions made for all development sites in the Do Minimum scenarios are as follows:

- All sites with a planning application located on the St. Helen's planning portal are assumed to be developed in a 0 to 5-year period from 2017/18 to 2022/23.
- For those committed developments where a planning application could not be located on the planning portal, a trajectory of 0-5 years from the base year 2017 was assumed.
- All developments will have a build out trajectory of either: 20 units per annum (for developments of total size<50 units), 30 units per annum (50-150 units) and 45 unit per annum (150+ units) if otherwise unspecified.
- The build out years for each employment site have been estimated according to the job trajectory data provided by SHC and the sites have been assumed to be fully build out by 2033.

3.1.4. The forecast development totals included in the DM scenario are given in Table 5 and development sites are listed in Appendix D (Scenario Developments).

3.1.5. Developments incorporated into the background growth are illustrated in Figure 2. The locations of the sites distributed individually (rather than adopted into the background growth) are shown in Figure 3.

Table 5 – DM forecast developments

Use	Area (ha)	Jobs (2033)	Dwellings (2033)
Background Growth (Residential)	212.7	N/A	4,995
Employment	61.4	1,232	N/A
Residential	121.7	N/A	4,203
Retail	1.37	254	N/A
Total	**397.1**	**1,486**	**9,198**

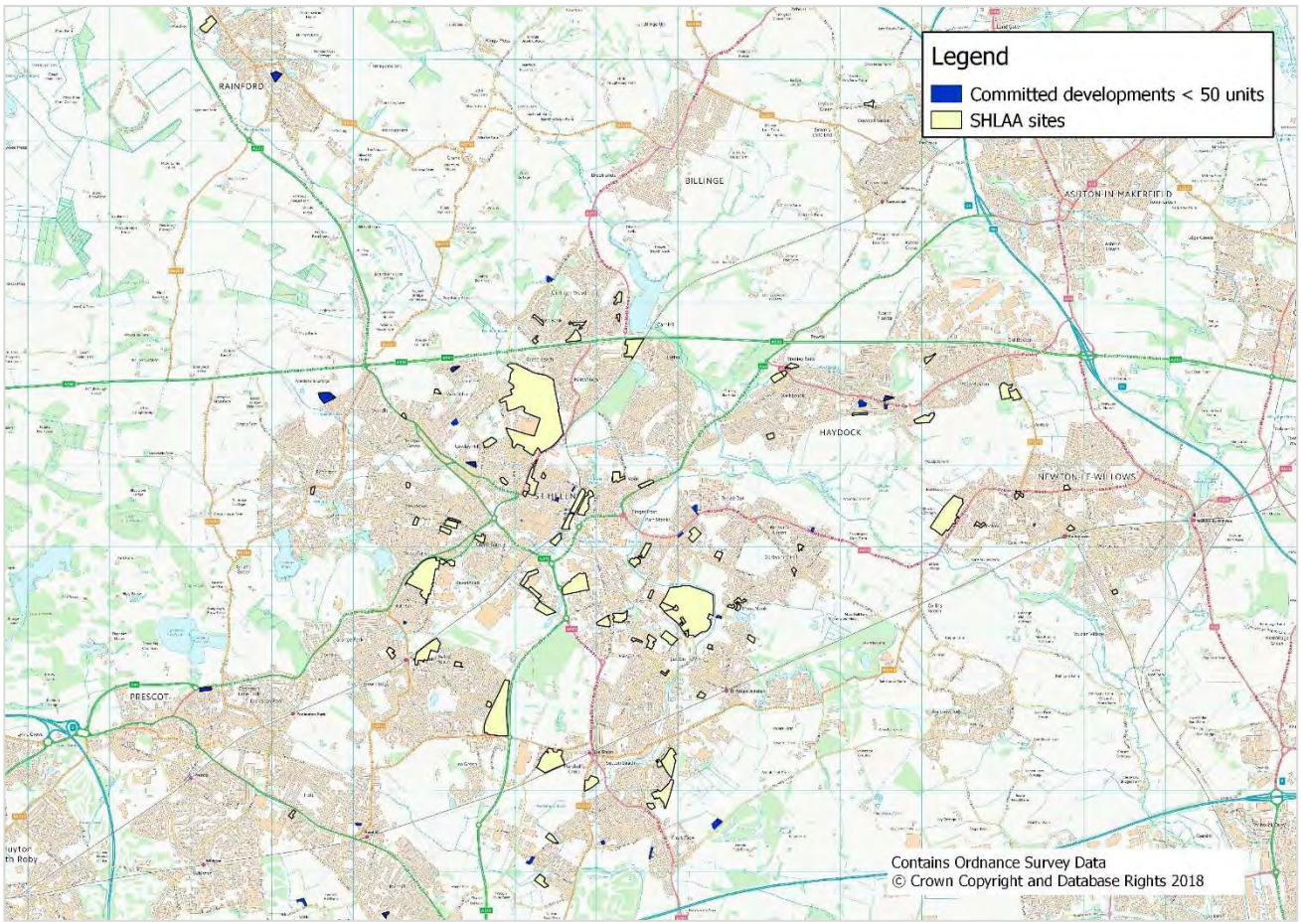


Figure 2 – Locations of developments incorporated into background growth

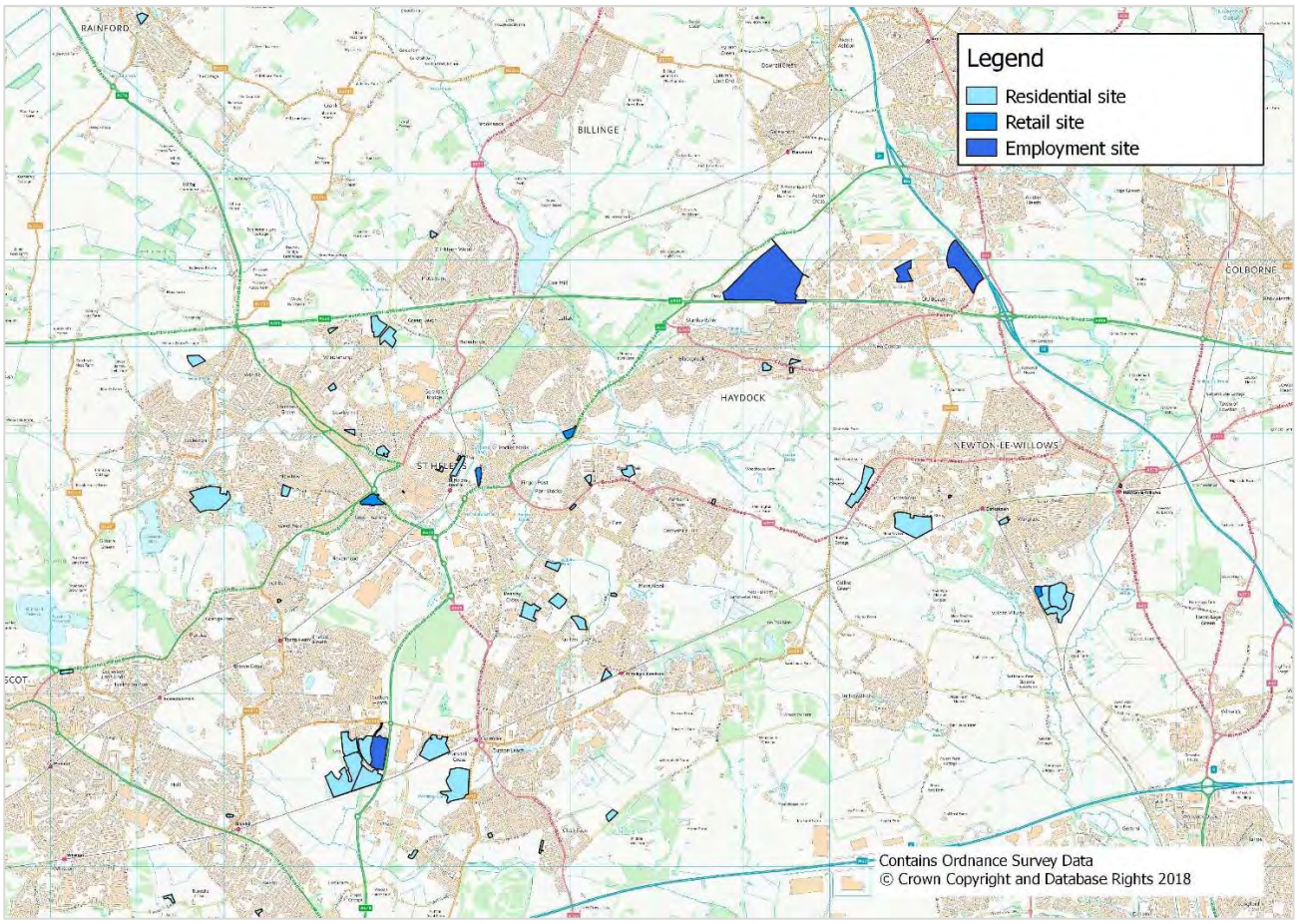


Figure 3 – Locations of developments represented explicitly in DM scenario

3.2 HIGHWAYS SCHEMES

3.2.1. The uncertainty log documents highway infrastructure and access schemes in the model study area including local network schemes and strategic road network (SRN) schemes. Provided by St Helens Council and Highways England, both development and highway scheme descriptions and profiles were collated and presented in the Uncertainty log.

3.2.2. Highway schemes included in the DM model are shown in Figure 4 and are described in Table 6. These are schemes with a high likelihood of completion before the forecast year of 2033.

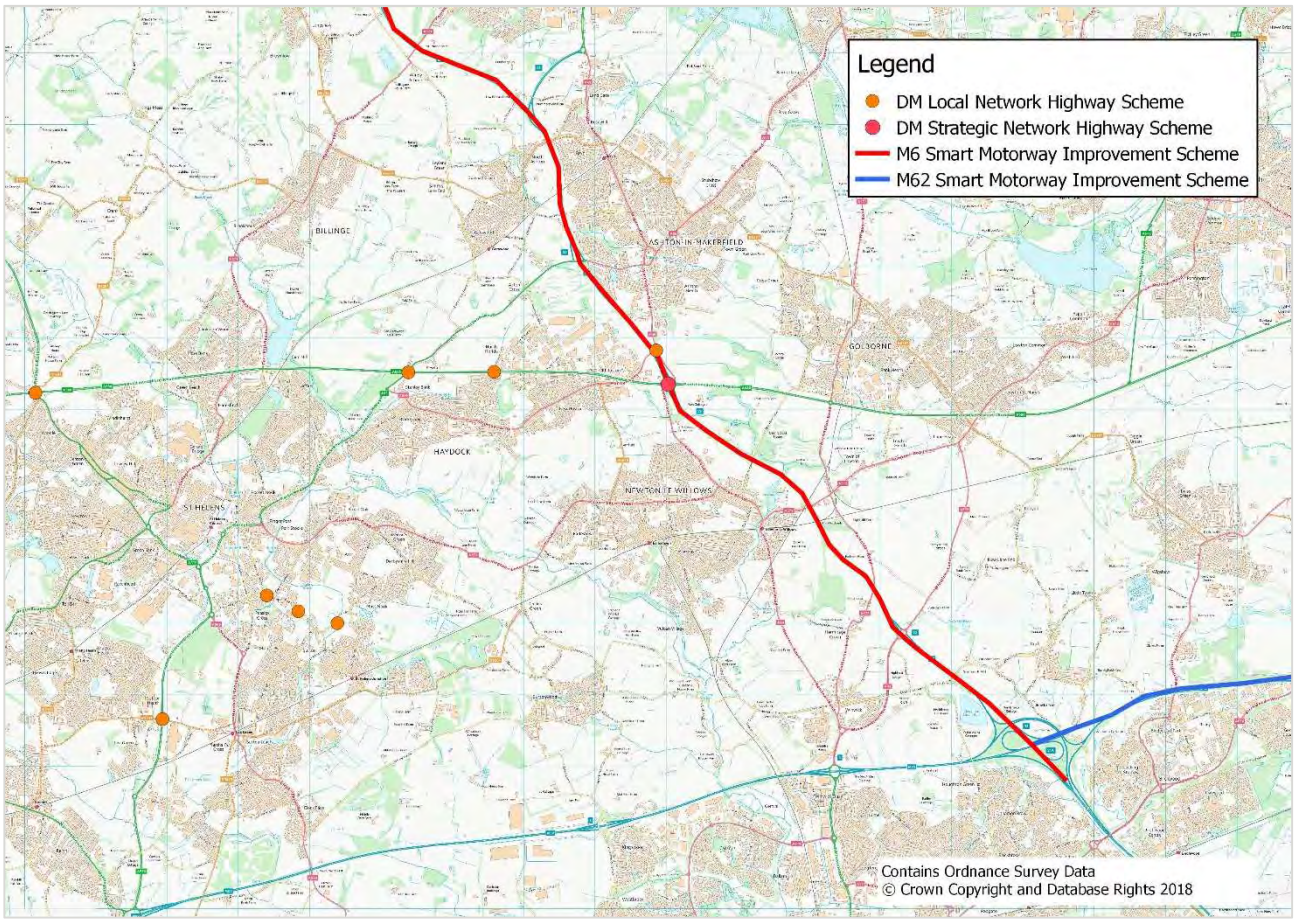


Figure 4 - Locations of DM highway schemes

Table 6 – DM highway schemes

Scheme Name	Network	Area	Summary Description
A580/Haydock Lane	Local	St. Helens (Borough)	Scheme underway to deliver improved signalised junction at A580/Haydock Lane, including cycling improvements.
A580/A58	Local	St. Helens (Borough)	New crossing points for pedestrians and cyclists across the A580 and well as junction improvements at Haydock Industrial Estate to enable right hand turns
Elton Head Road/A570 St Helens Linkway	Local	St Helens (Rainhill)	Lower speed limit from 70mph to 50mph and introduce crossing points at key intersections for cyclists.
Sutton Road/Jackson Street	Local	St. Helens (Borough)	Junction capacity and safety improvements. Widening of junction approach from 1 lane to 2. New signalling changes and phases.
Sutton Road/Watery Lane	Local	St. Helens (Borough)	New spine road layout with 4 mini roundabouts with pedestrian refuge points and crossings.
Windle Island	Local	St Helens (Rainford)	Relocation of Crank Road junction further north along Rainford Road, closer to the golf club.
Penny Lane/Lodge Lane	Local	St. Helens (Borough)	Removal of island on northbound approach – replacement with new island and signalling & phasing. New triangular island w/t Pedestrian crossing along 1) Penny lane north and triangle. 2) Lodge Lane parallel to traffic.
M62 Smart Motorway Improvements: M62 J10–12	Strategic	St. Helens (Borough)	M62 mainline capacity and reliability **i**mprovement**s**.
M6 Smart Motorway Improvements: M6 J21A-26	Strategic	St. Helens (Borough)	M6 mainline capacity and reliability improvement.
M6 J22 Upgrade	Strategic	St. Helens (Borough)	Upgrade to provide additional capacity including widening the gyratory and new pedestrian footbridge.

4 DO SOMETHING SCENARIOS

4.1 DO SOMETHING 1 DEMAND SCENARIO

4.1.1. Scenario DS1 looks to test the impact of the increased traffic volumes on the Do Minimum network from the inclusion of Local Plan developments.

4.1.2. Additional developments (i.e. over and above those in the DM) included in the DS1 scenario are illustrated in Figure 5. Development trips were distributed according to census 'journey to work' data as detailed in Appendix C (Forecast Matrix Development). A full list of developments included in this scenario is listed in Appendix D (Scenario Developments).

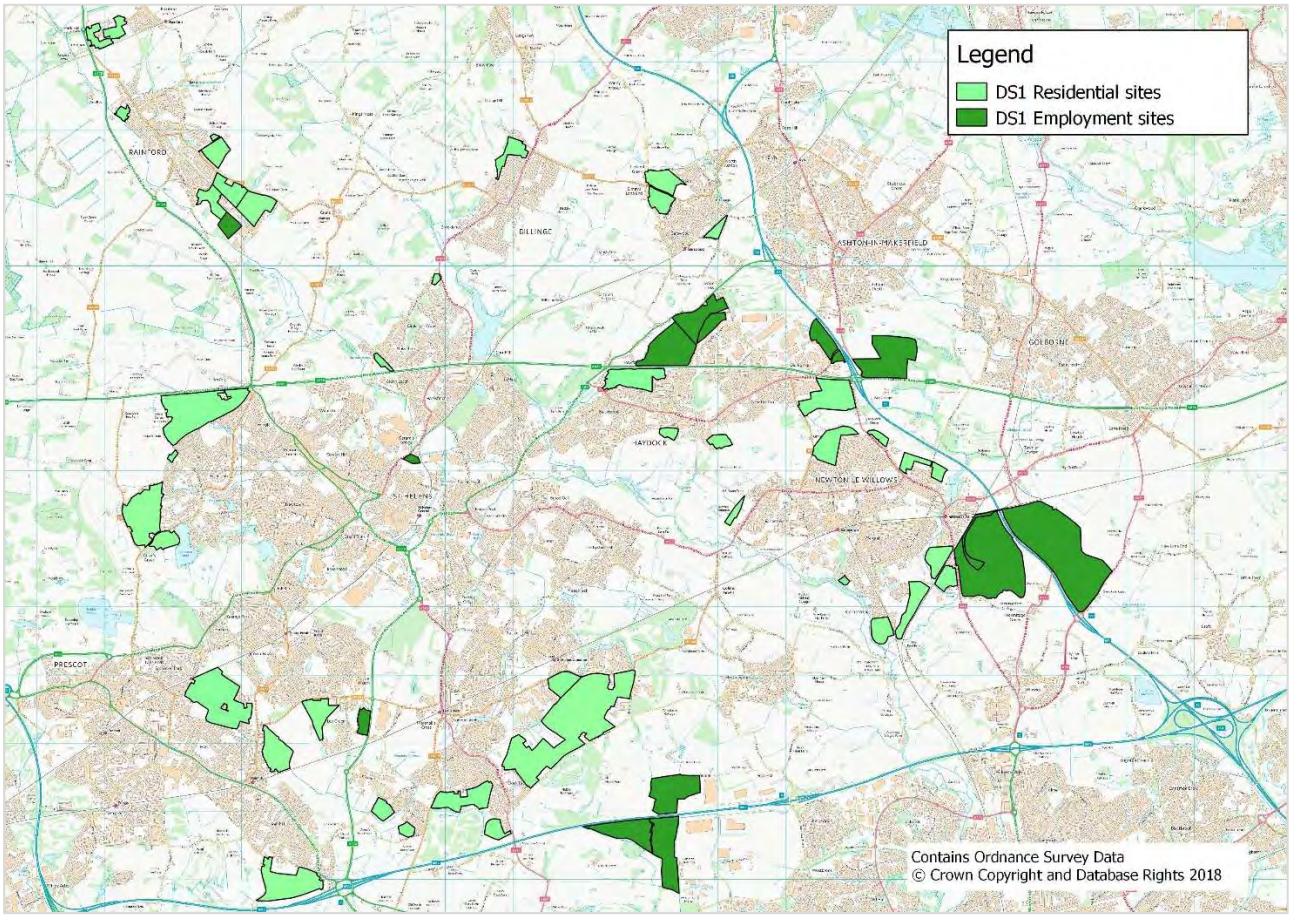


Figure 5 – Locations of DS1 additional developments

4.1.3. A summary of the additional volumes included in the DS1 scenario is given in Table 7

Table 7 – DS1 additional developments

Use	Area (ha)	Jobs (2033)	Dwellings (2033)
Employment	273.65	12,992	N/A
Residential	464.86	N/A	8,582

4.1.4. Household trajectory data for 19 local plan sites have been estimated based on the St Helens Local Plan Preferred Option Core Strategy (Dec 16 p.45, 62).

4.2 DO SOMETHING 2

4.2.1. Do Something 2 (DS2) is a series of tests considering a range of potential mitigation to address the capacity issues that arise from DS1. The DS2 tests are comprised of a combination of network and matrix modifications which are described below.

NETWORKS

4.2.2. The Do Something 2 (DS2) scenario makes use of two different network structures and an additional test that considers changes to speed limits over a discreet area.

- For the test **DS2a**, the network is *identical* to that used for the DM and DS1 scenarios.
- For test **DS2b** and the combined scenario **DS2**, the network includes additional schemes as well as coding changes at key junctions as described later in this chapter.
- Test **DS2c** includes a speed reduction to 40mph along the A580 applied to the DS2 network.

4.2.3. Scenario DS2b models the inclusion of several schemes not in the Do Minimum scheme as well as an approximation of expected improvements at key junctions identified as being over 90% capacity in the DS1 scenario.

4.2.4. DS2b, DS2 and DS2c contain additional schemes, shown in Table 8, corresponding to expected highway improvements identified in collaboration with SHC. Additionally, an assumption was made that some form of further grade separation was likely to occur at Junction 23 on the M62 and so junction changes were coded accordingly.

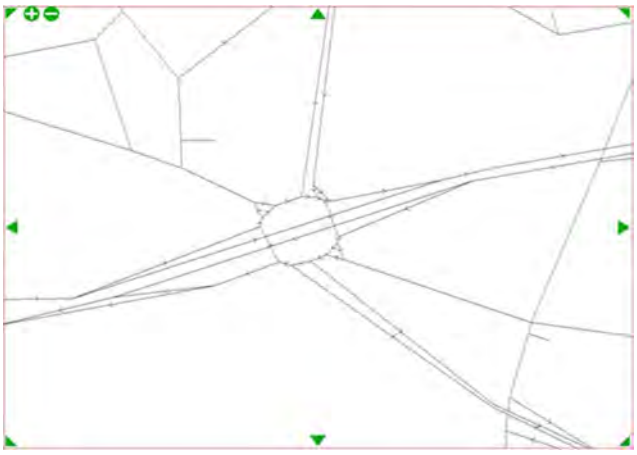
Table 8 - DS highway schemes

Scheme Name	Network	Area	Description
Parkside Link Road	Strategic	St Helens (Borough)	Provides new highway links from M6 Junction 22 into Parkside site to enable development. Link Road required to open land for development.
M62 J7	Strategic	St Helens (Borough)	Junction capacity and reliability improvements with removal of A57 (SE) arm from roundabout and addition of slip road links from A57 to M62 J7 via A557.
M6 J23	Strategic	St Helens (Borough)	A580 Enhancement Programme, which includes improving the capacity of the junction.

4.2.5. The main changes to network coding between the DM network structure and the DS2b network structure are illustrated below.

M62 Junction 7

M62 Junction 7 Scheme:

DM	DS2b
	

4.2.6. The scheme at Junction 7 of the M62, near Rainhill, comprises the removal of the south-eastern arm (Warrington Road) of the roundabout and the addition of a northbound free-flow slip from the A557. Additionally, the southbound free-flow slip from the A570 is extended and two new links are added at the junction between the A557 and the B5419 to allow access onto the M62 for vehicles which previously would have used the Warrington Road arm. These secondary slip roads are coded in the buffer area of the model, and so impacts at the A557/B5419 junction should not be assessed without further development of the model.

4.2.7. It should be noted that the M62 Junction 7 scheme is subject to an ongoing study and so elements of the design may be subject to change requiring further development of the model in this area. Coding of this scheme has been performed in accordance with the indicative plans available during the development of the forecast model.

Parkside Link Road

Parkside Link Road Scheme:

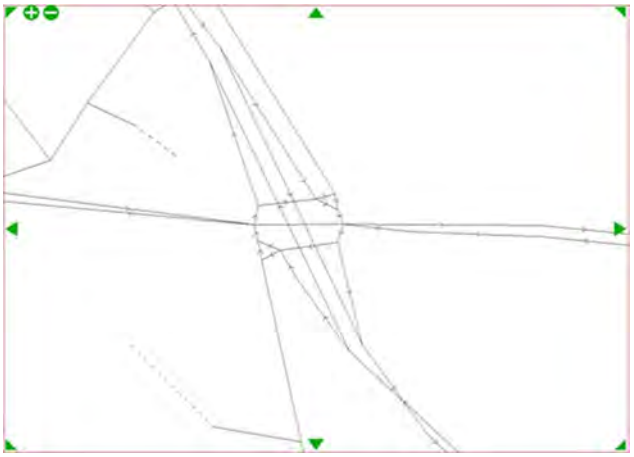
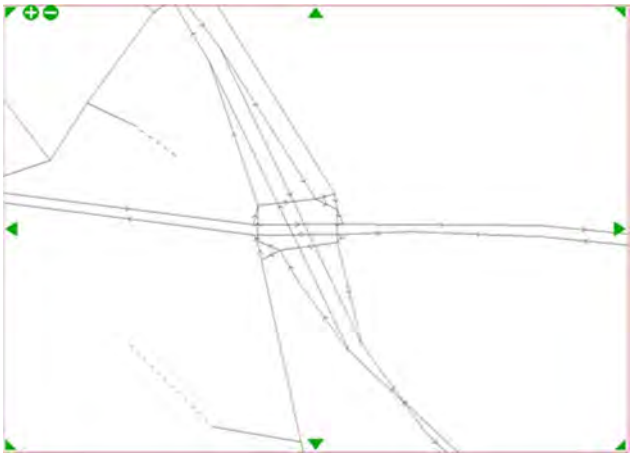
DM	DS2b
	

4.2.8. The Parkside Link Road scheme is intended to improve access for the planned Parkside development. The scheme connects the A49 to the A537 north of Hermitage Green as well as replacing Barrow Lane as a connection between Parkside Road and the A579. The new junction will be positioned closer to M6 Junction 22. Spigots for the relevant development zones were repositioned to better represent the loading point of the development traffic onto the network.

4.2.9. A SATURN model assessing the impact of the Parkside development and the Link Road scheme has been developed to support the Parkside transport assessment and independently to the current Local Plan modelling. The results presented in this document have not been cross-referenced against any forecasts provided in the Parkside Link Road TA.

M6 Junction 23 Upgrade

M6 Junction 23 Upgrade:

DM	DS2b
	

4.2.10. It has been assumed that improvements will be made at Junction 23 of the M6 before the forecast year of 2033. St Helens has recently commissioned a feasibility study into potential improvement options, however the outcomes from this study are not known at this time.

4.2.11. Without prejudicing the outcomes from the feasibility study, WSP has assumed that the improvement to the junction will take the form of further grade-separation of the A580 to isolate the mainline traffic along the A580 from the circulatory flow of the Junction 23 roundabout. The modifications have been coded into the network with minimal changes to the other elements of the junction and would require a more detailed appraisal before assessing direct impacts in the surrounding area. It was felt, however, that a modification to the network at this location was appropriate since the commencement of a feasibility study at the location demonstrates an intent by St Helens Council to address current and future capacity issues.

DS2 Junction Capacity Uplift

4.2.12. In addition to the schemes included in the DS2b network, the capacity at key junctions identified as underperforming in the DS1 scenario was improved by uplifting the saturation flows of each movement by 10%. The uplift was designed to represent improvements at these junctions not linked to a currently defined scheme, but expected to occur by the 2033 forecast year. Such improvements might include the adoption of improved signalling technologies or minor changes to the junction layouts. The junctions where this has been applied are given in Table 9 and their locations indicated in Figure 6.

Table 9 - Junctions where 10% capacity uplift has been applied in DS2b

Junction Code	Junction
R1	A580/Blindfoot Road
53	East Lancashire Road/Green Leach Lane
52	East Lancashire Road/Carr Mill Road
66	St Helens Road/Burrows Lane
115	St Helens Road/Portico Lane
15	Parr Street/Jackson Street
18	Parr Street/Ashcroft Street
21	Park Road/Merton Bank Road
23	Park Road/Boardmans Lane
90	Blackbrook Road/Chain Lane
20	Parr Stocks Road/Chancery Lane
N_5	Sherdley Roundabout
69	Linkway West/Canal Street
R3	A58 ASDA
40	Crow Lane West/Market Street
41	Crow Lane West/Vista Road
N_7	Southworth Road/ Parkside Road/ Newton Road/ Golbourne Dale Road
135	Church Road/Southworth Road
62	Warrington Road/Rainhill Road
61	Warrington Road/Wilmere Lane/Jubits Lane
N_2	Church Road/Vista Road/Penny Lane

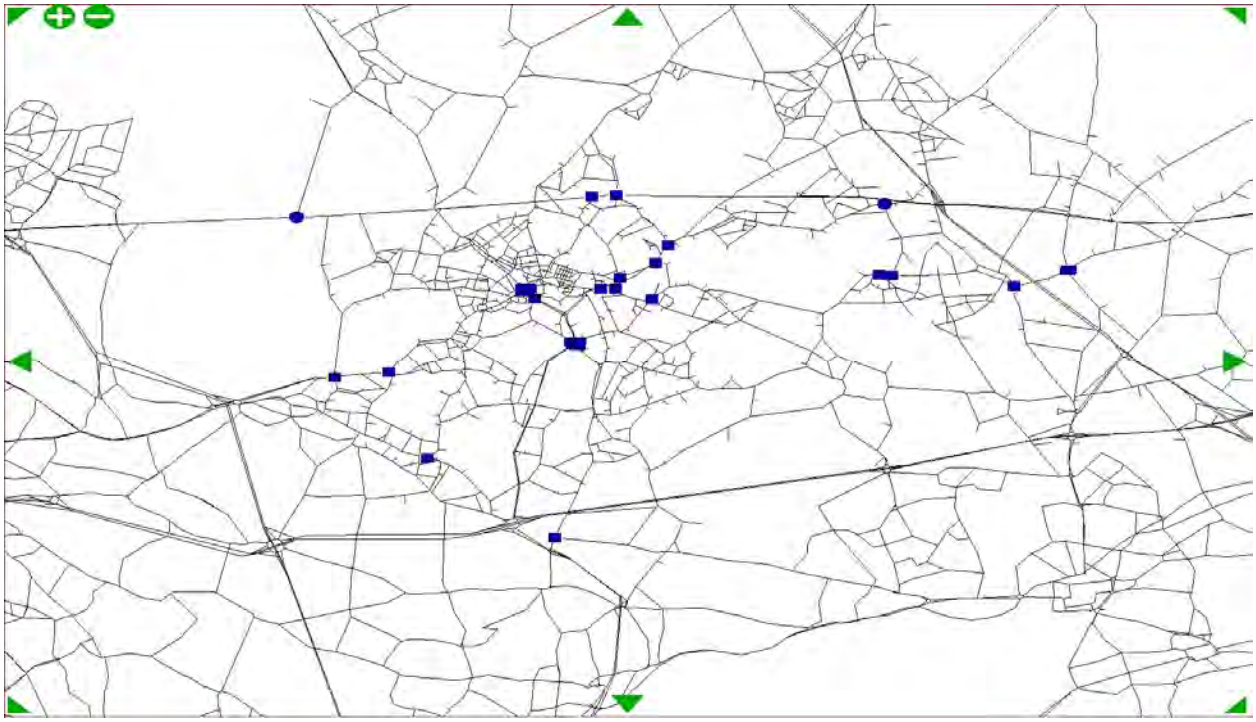


Figure 6 - Junctions where 10% capacity uplift has been applied in DS2b

DS2c A580 Speed Reduction

4.2.13. Scenario DS2c was undertaken as a sensitivity test to scenario DS2, whereby the speed on the A580 through the model study area was limited to 40mph. The network links where this reduction in speed has been applied is illustrated in Figure 7.

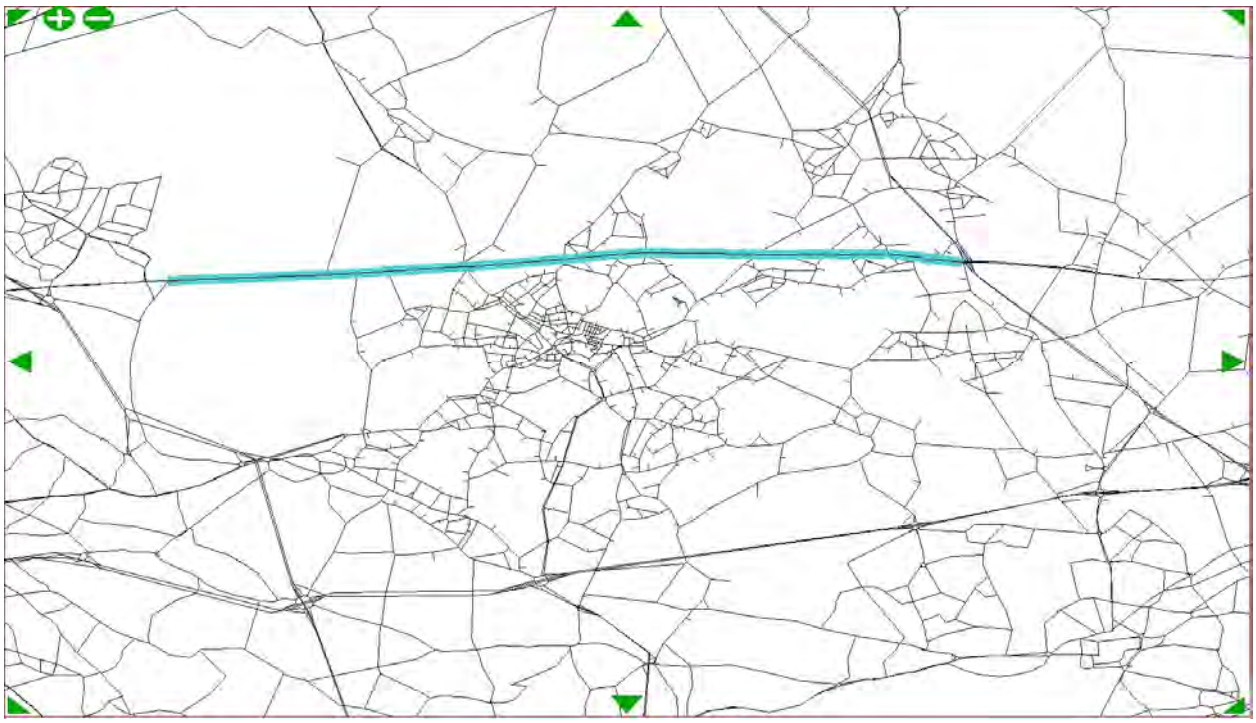


Figure 7 - Links highlighted where 40mph limit has been applied in DS2c

MATRIX MODIFICATIONS

4.2.14. The aim of the do something 2a scenario is to test the impact of an overall reduction to commuting trips to and from St. Helens district due to SHC's policy of promoting sustainable modes of transport as well as a shift towards non-traditional working patterns, such as home-working and flexible hours. The applied assumption is that the impact of this reduction in peak-hour commuting traffic will be uniform across the district, and will not apply to external-external movements. A 5% reduction was considered to reasonable and in line with the trends observed and reported in influencing travel behaviour research (and discussed more fully in the TIA document itself).

4.2.15. The demand, in PCUs, under the DM scenario is shown in Table 10, while the increase in demand of scenario DS1 over the DM scenario is given in Table 11 and the overall reduction in demand in DS2a compared with DS1 is shown in Table 12 (note that the percentage is less than 5% as the summary tables refer to all journey purposes and not just commuting).

Table 10 – DM scenario matrix totals

	AM Peak		PM Peak	
From/To	St. Helens	Elsewhere	St. Helens	Elsewhere
St. Helens	12,216	14,706	12,355	12,192
Elsewhere	9,864	395,737	12,404	371,787

Table 11 – Percentage increase in demand DM to DS1

	AM Peak		PM Peak	
From/To	St. Helens	Elsewhere	St. Helens	Elsewhere
St. Helens	10%	20%	11%	14%
Elsewhere	19%	0%	16%	0%

Table 12 – Percentage demand reduction DS2a-DS1

	AM Peak		PM Peak	
From/To	St. Helens	Elsewhere	St. Helens	Elsewhere
St. Helens	-3%	-3%	-3%	-2%
Elsewhere	-3%	-	-2%	-

5 CORE SCENARIOS OUTPUTS

5.1.1. This section provides a summary of the model outputs used to assess the DM and DS Network configuration performance when combined with the various demand scenarios. It also contains details of key model statistics that are used in the appraisal process.

5.2 MODEL CONVERGENCE

5.2.1. Convergence is the measure used to determine model stability during the assignment process. A suitably converged model can be expected to produce consistent outputs with minimal model noise.

5.2.2. The convergence criteria recommended in TAG Unit 3.1 are given in Table 13 below.

Table 13 – WebTAG model convergence criteria

Measure of Convergence	Base Model Acceptable Values
Delta and % Gap	less than 0.1% or at least stable with convergence fully documented and all other criteria met
percentage of links with flow change (P) < 1%	four consecutive iterations greater than 98%
percentage of links with cost change (P2) < 1%	four consecutive iterations greater than 98%
Percentage change in total user costs (V)	Four consecutive iterations > 0.1%

5.2.3. More rigorous criteria of 0.05% gap and 99% flow difference over four iterations were applied to all forecast scenario assignments in SHSM (to be consistent with that achieved in the base model). All scenarios converged to these criteria.

5.3 NETWORK PERFORMANCE

5.3.1. Network performance statistics for the base year and each scenario are included in Table 14 and Table 15.

Table 14 – AM network statistics – simulation links only

Performance Statistic	Unit	DM	DS1	DS2a	DS2b	DS2	DS2c
TRANSIENT QUEUES	pcu hrs	3,361	4,091	3,911	3,899	3,742	3,708
OVER-CAPACITY QUEUES	pcu hrs	662	1,114	1,025	988	885	835
LINK CRUISE TIME	pcu hrs	10,696	11,478	11,284	11,459	11,263	11,530
TOTAL TRAVEL TIME	pcu hrs	14,718	16,683	16,220	16,346	15,890	16,073
TRAVEL DISTANCE	pcu kms	806,446	854,105	843,051	855,161	843,687	843,706
AVERAGE SPEED	kph	54.80	51.20	52.00	52.30	53.10	52.50

Table 15 – PM network statistics – simulation links only

Performance Statistic	Unit	DM	DS1	DS2a	DS2b	DS2	DS2c
TRANSIENT QUEUES	pcu hrs	3,702	4,224	4,054	4,069	3,945	3,969
OVER-CAPACITY QUEUES	pcu hrs	821	1,191	1,099	1082	1,027	1,042
LINK CRUISE TIME	pcu hrs	11,339	11,944	11,774	11,966	11,779	11,961
TOTAL TRAVEL TIME	pcu hrs	15,862	17,359	16,926	17,117	16,751	16,972
TRAVEL DISTANCE	pcu kms	853,588	887,920	878,439	889,914	880,706	874,419
AVERAGE SPEED	kph	53.80	51.20	51.90	52.00	52.60	51.50

5.3.2. Total travel time increases significantly in the forecast scenarios due largely to the increased number of trips in the network. Figure 8 illustrates how the considerations applied in scenario DS2 produce a reduced estimate of the total travel time (compared against DS1) in the simulation area of the model at the forecast year.

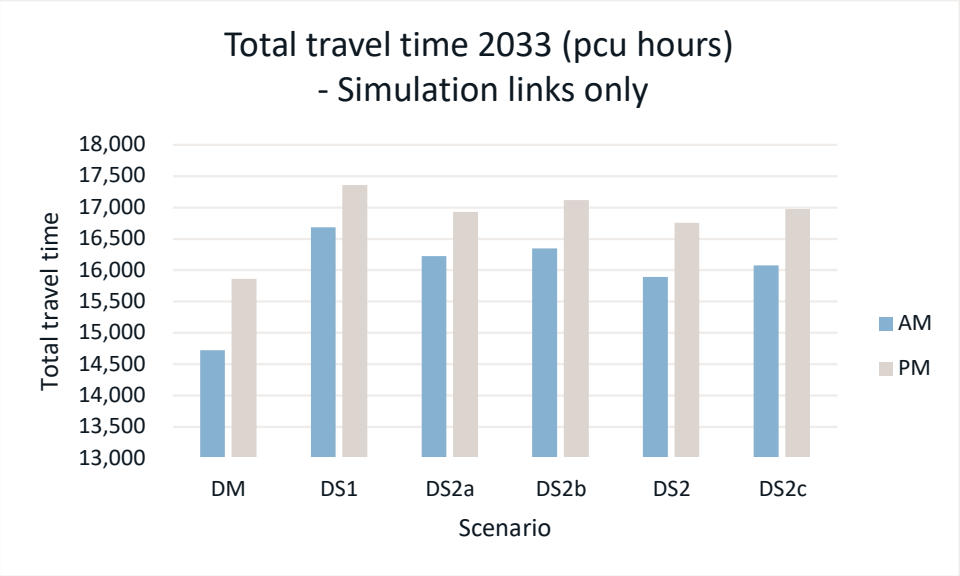


Figure 8 – Graph showing the impact of DS2 assumptions on total travel time on the network

5.3.3. Figure 9 shows the total travel distance on the simulation links of the model network and demonstrates that the total distance increases slightly in the DS2 scenario over the DS2a scenario despite the total time decreasing as shown in Figure 8. This would imply that traffic is able to traverse the network with less delay in the DS2 scenario. This is borne out in the increased average speed of the DS2 scenario over DS2a as shown in Table 14 and Table 15.

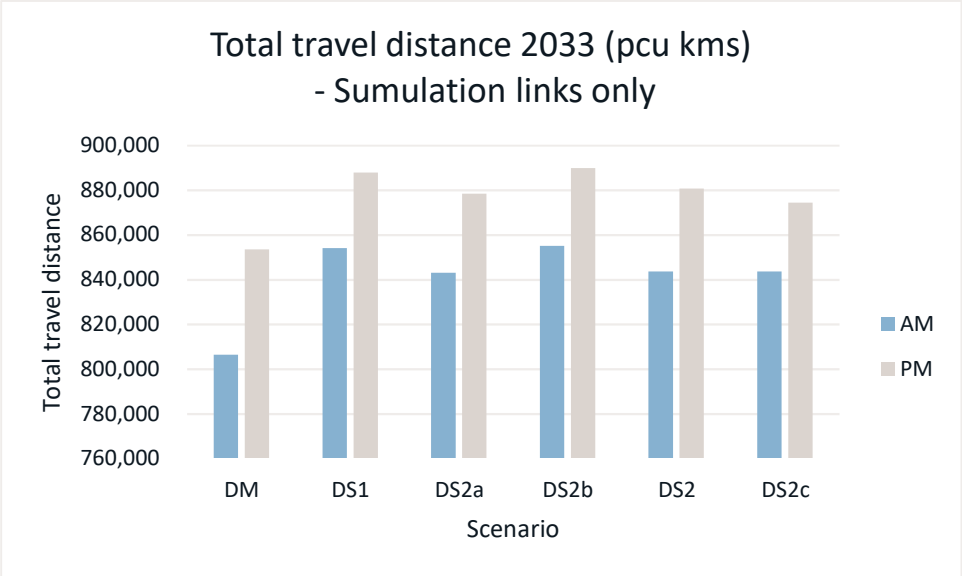


Figure 9 – Graph showing the impact of DS2 assumptions on total travel distance on the network

5.3.4. The impact of the DS2c test is to increase the total travel time on the simulation network whilst maintaining a similar or slightly lower total travel distance to the DS2 scenario. This is most likely a combination of the direct effect of limiting the speed on the A580 as well as a deterrence effect to longer distance trips which may have previously been routing along the A580.

5.3.5. Comparison of over-capacity queuing in the DS2 scenarios shows considerable improvements over DS1 as illustrated in Figure 10. This suggests that the mitigations included in the DS2 scenarios are effective at improving network performance.

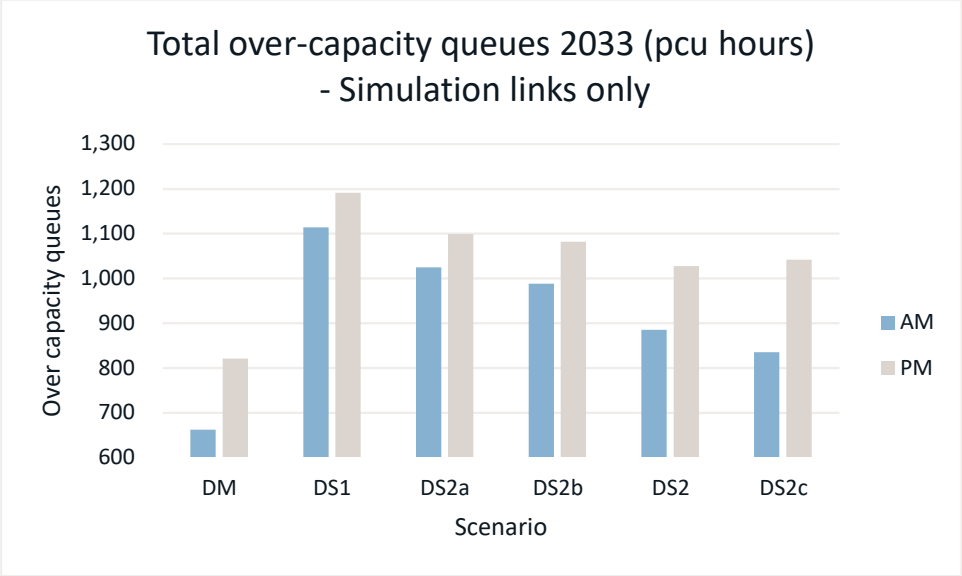


Figure 10 – Graph showing the impact of DS2 assumptions on over-capacity queueing on the network

KEY AREAS PERFORMANCE AND TRAFFIC PATTERNS

5.3.6. Journey time routes, as defined in the SHSM base model were reviewed in the forecast model. The routes are illustrated in Figure 11 and a full analysis of the relative performance along these routes has also been conducted4. The journey times for these routes generally show comparable or improving performance under DS2 from the DS1 scenario. Notable improvements to travel times can be seen on the routes along the A580 and the A49 as shown in Figure 12 and Figure 13.

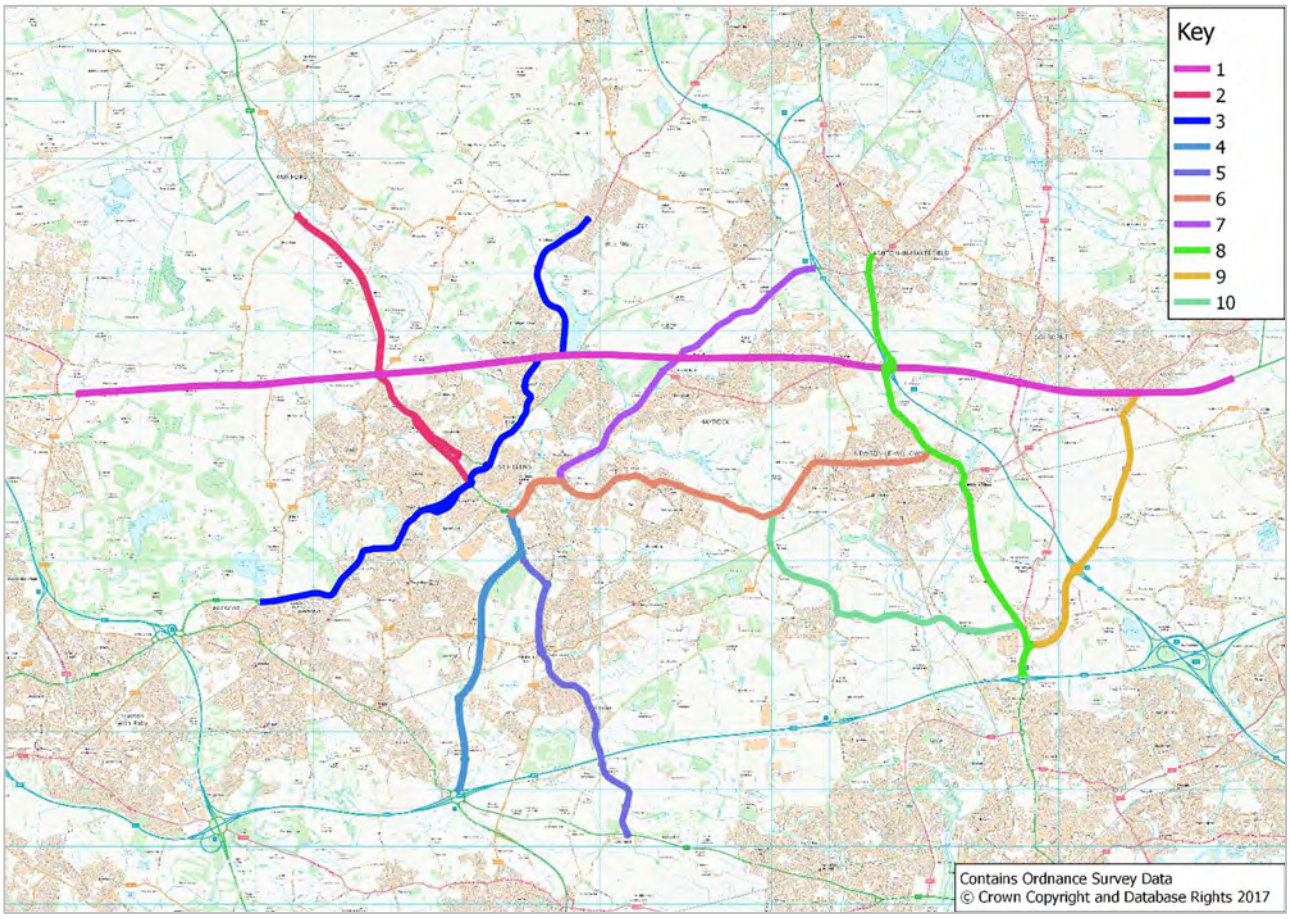


Figure 11 – Journey time routes

[4] Journey_Times_29-04.xlsx, WSP, 2018

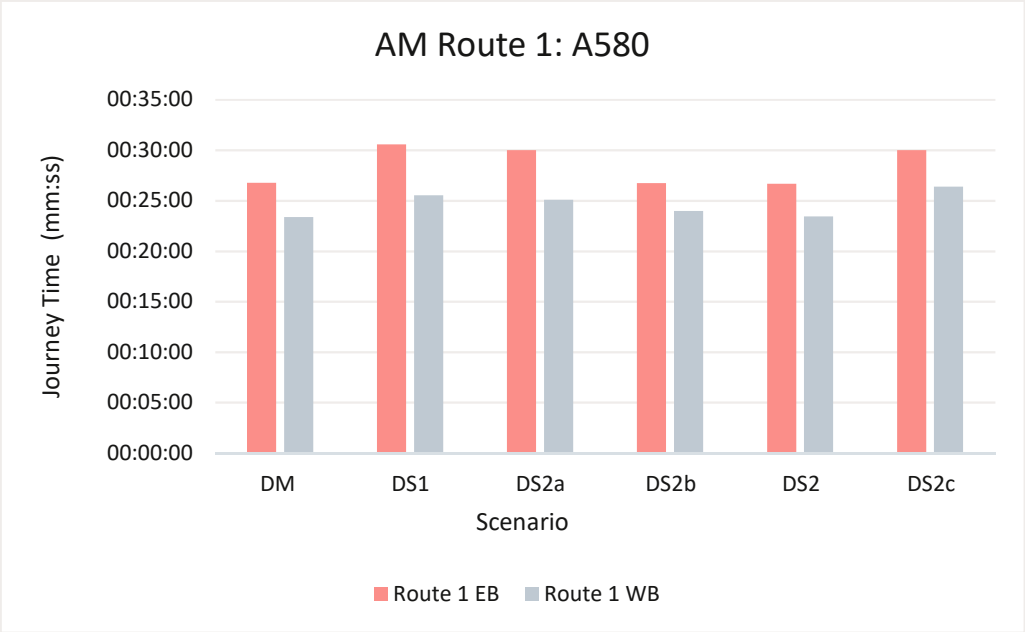


Figure 12 – Journey time comparison for the A580 route

Figure 13 – Journey time comparison for the A49 route

5.4 JUNCTION PERFORMANCE

DO MINIMUM

5.4.1. The Do Minimum assignment shows an expected increase in congestion in the model network. The areas worst affected include the A580 corridor and the junctions with the M6. Appendix A (Key Junction Performance) includes a table showing the volume over capacity (percentage v/c) of the worst performing movement through the key junctions in the model network. Movements above 90% v/c can be considered poorly performing, whilst areas over 100% v/c are over capacity and will lead to queuing and possibly blocking-back.

5.4.2. Sutton Hall roundabout shows improved v/c in the DM scenario, despite the increased demand in the DM assignment. This can be attributed to junction improvements included in the DM network, as well as re-routing

due to saturation of other junctions in the area. The junction performance in this area of the network is shown in Table 16.

Table 16 – South St. Helens junction performance DM and BY

	2017 Base Year V/C%		2033 DM V/C%	
Junction	**AM**	**PM**	**AM**	**PM**
A570 Carrington	54	69	76	62
A570 Saints Park	54	59	50	44
Robins Lane/Marshall Cross	42	49	61	48
Marshalls Cross/Shorecross	34	44	41	38
A570 Sutton Hall	100	90	97	89
Sherdley Roundabout	91	94	96	101
Marshall Cross Bridge Mill Lane	32	31	40	40

5.4.3. The increase in flow from the base year assignments on key routes in the study area can be seen in Figure 14.

Figure 14 – Flow difference bandwidths showing DM minus BY flows (AM, pcu)

5.4.4. The SRN and key radial links show a substantial increase in traffic as would be expected given overall regional growth in demand by 2033. Significant reductions in performance can be seen at the key motorway junctions as shown in Table 17.

Table 17 – DM impact on motorway junction performance

	2017 Base Year V/C%		2033 DM V/C%	
Junction	**AM**	**PM**	**AM**	**PM**
M62 J7	96	96	100	100
M62 J8	88	91	113	107
M62 J9	100	100	103	98
M6 J22	72	76	98	97
M6 J23	100	100	107	106
M6 J24	103	75	106	78

5.4.5. Larger figures and PM assignment outputs can be found in Appendix B (Scenario Bandwidth Plots).

DS1 SCENARIO OUTPUTS

5.4.6. The Do Something 1 scenario differs from the DM scenario only through increased demand and so would be expected to perform worse than the DM scenario. This can be seen from the junction v/c figures given Appendix A (Key Junction Performance) and the bandwidth plots Figure 15 and Figure 16.

Figure 15 – Flow difference bandwidths showing DS1 minus DM flow (AM, pcu)

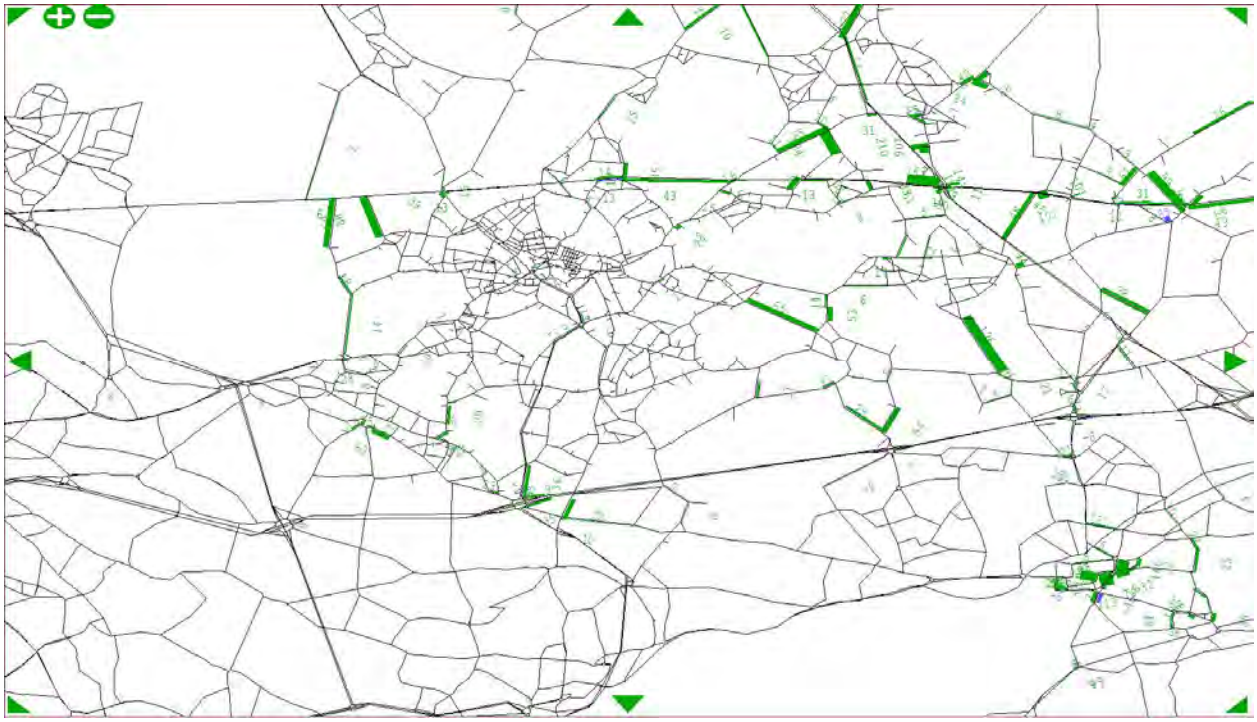


Figure 16 – Delay (s) bandwidths showing DS1 minus DM (AM)

5.4.7. Areas of stress identified in DS1 include junctions along the A580 corridor, as shown in Table 18, and southbound on Alder Root Lane, near Winwick, in the AM.

Table 18 – A580 corridor performance BY, DM and DS1

	2017 Base Year V/C%		2033 DM V/C%		2033 DS1 V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
A580/Blindfoot Road	101	78	100	86	100	93
East Lancashire Road/Rainford Rd/Windle	106	102	104	105	107	106
East Lancashire Road/Green Leach Lane	95	88	99	95	98	93
East Lancashire Road/Carr Mill Road	101	114	102	118	105	118
East Lancashire Road/Liverpool Road/Pewfall	104	102	101	103	105	103
A580/Haydock Lane	91	84	92	71	107	97

5.4.8. Larger figures and PM assignment outputs can be found in Appendix B (Scenario Bandwidth Plots).

DS2 SCENARIO OUTPUTS

DS2a

5.4.9. The sustainability demand reduction applied in scenario DS2a can be expected to reduce the impact of the developments across the study area. Figure 17 shows the reduction in flow across the network compared to the DS1 scenario. Reduced delays can be seen on various links in the network as shown in Figure 18, however the reduction in delay is generally only marginal under this scenario.

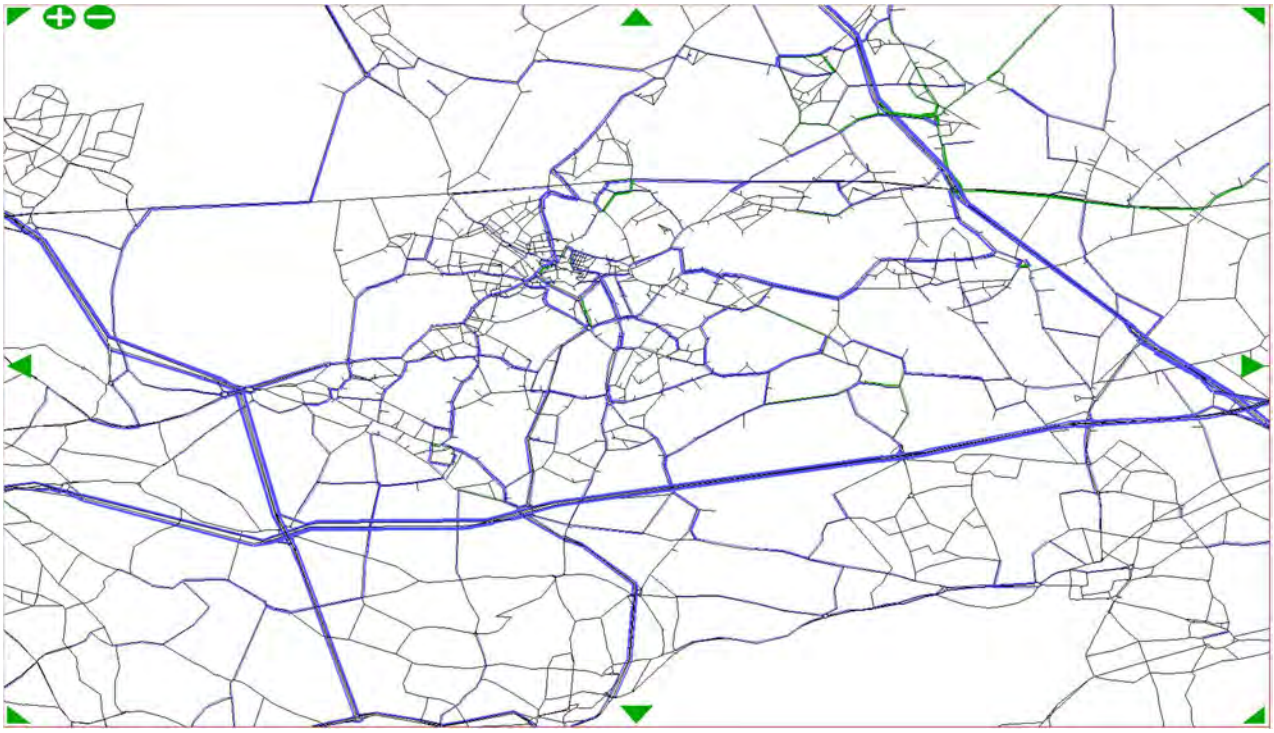


Figure 17 – Flow difference bandwidths showing DS2a minus DS1 flow (AM, pcu)

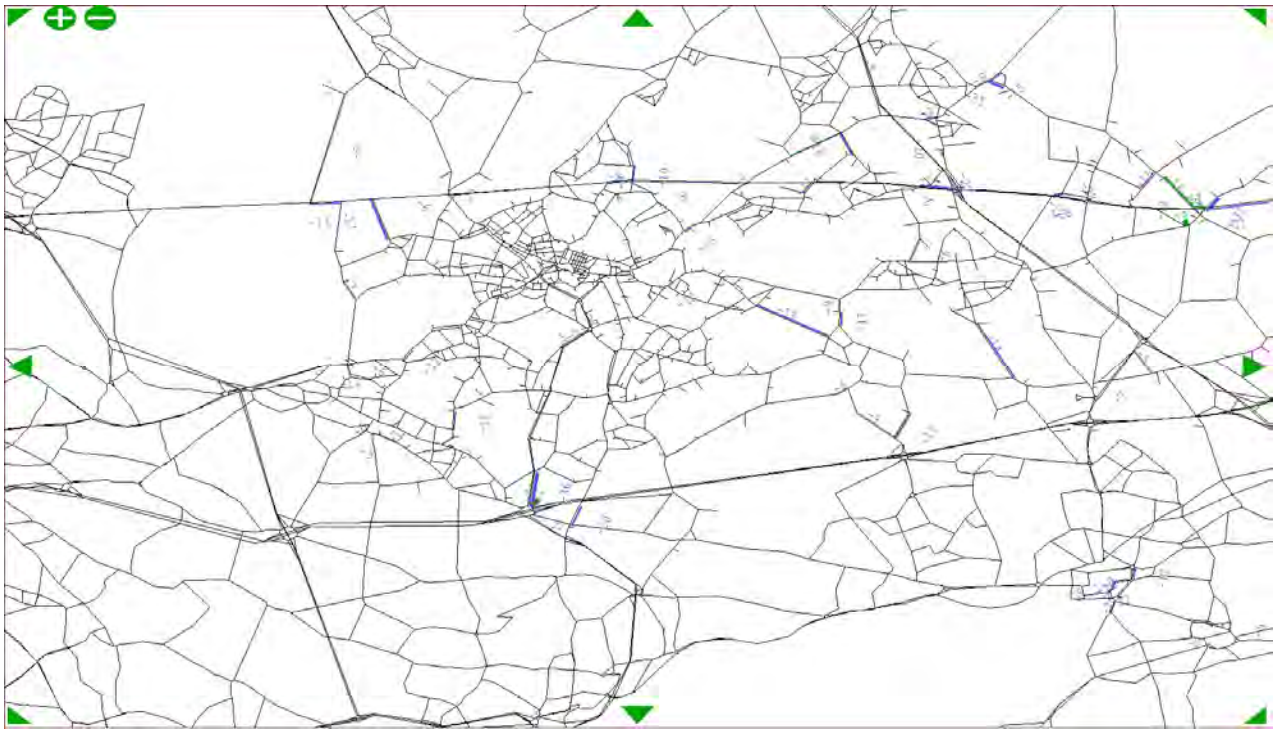


Figure 18 – Delay (s) bandwidths showing DS2a minus DS1 AM

5.4.10. Generally small improvements can be seen at most key junctions in the DS2a scenario as compared with DS1. The reduced congestion at key junctions can be seen in Appendix A (Key Junction Performance) and larger figures and PM assignment outputs can be found in Appendix B (Scenario Bandwidth Plots).

DS2b

5.4.11. Additional mitigation schemes are included in the DS2b network as described in chapter 5.3. Scenario DS2b includes these changes along with the full demand from the DS1 scenario. The outcome of these changes over the DS1 scenario, seen in Figure 19, shows significant re-routing in the network, with flows increasing along the A580 and reducing along the M56 and M62. This suggests an overall improved performance along the A580 corridor, drawing more traffic onto this route.

Figure 19 – Flow difference bandwidths showing DS2b minus DS1

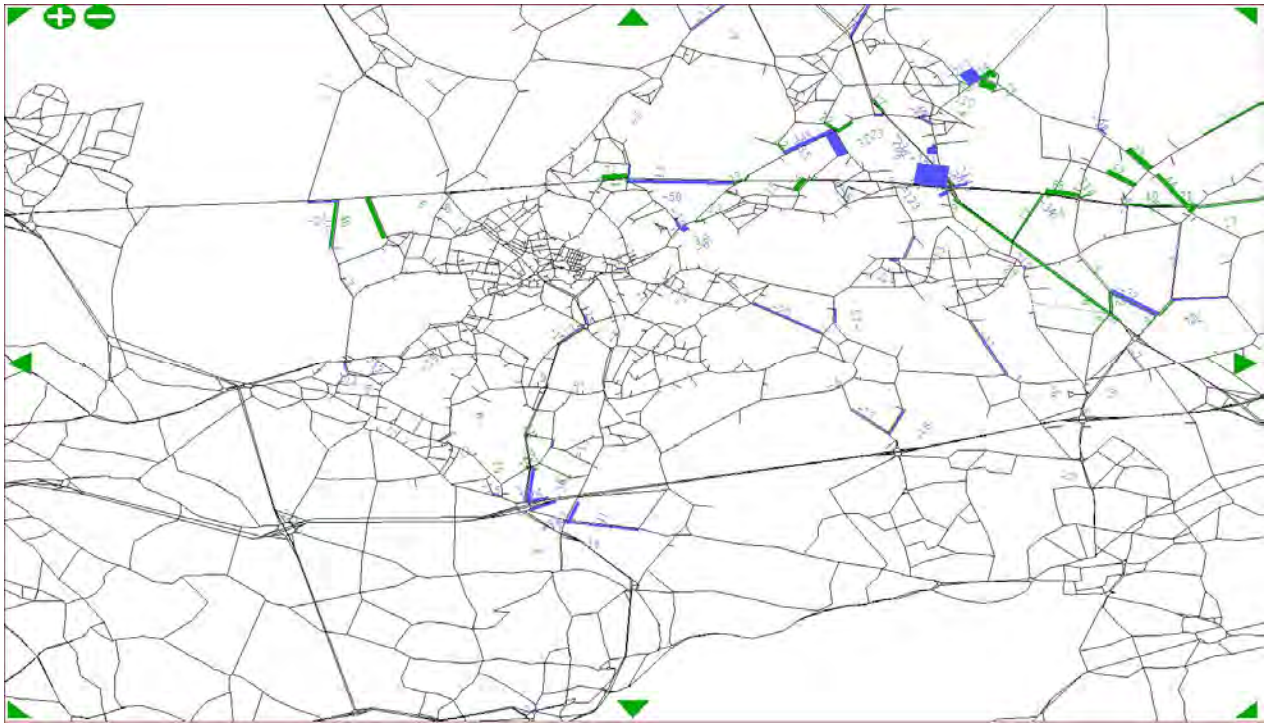


Figure 20 – Delay (s) bandwidths showing DS2b minus DS1

5.4.12. Analysis of key junctions as shown in Appendix A (Key Junction Performance) demonstrates that for most junctions along this corridor, this re-routing has largely counteracted the reduction in congestion that might be expected given the inclusion of these schemes as demonstrated in Table 19. Benefits are more apparent at junctions on alternative routes to the A580 such as along the M57, M62 and M6 as shown in Table 20.

Table 19 – A580 corridor performance DM, DS1 and DS2b

	2033 DM V/C%		2033 DS1 V/C%		2033 DS2b V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
A580/Blindfoot Road	100	86	100	93	93	92
East Lancashire Road/Rainford Rd/Windle	104	105	107	106	107	107
East Lancashire Road/Green Leach Lane	99	95	98	93	98	92
East Lancashire Road/Carr Mill Road	102	118	105	118	104	116
East Lancashire Road/Liverpool Road/Pewfall	101	103	105	103	103	103
A580/Haydock Lane	92	71	107	97	107	96

Table 20 – Motorway junction performance DM, DS1 and DS2b

	2033 DM V/C%		2033 DS1 V/C%		2033 DS2b V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
M62 J7	100	100	102	101	100	102
M62 J8	113	107	114	107	113	107
M62 J9	103	98	103	100	103	99
M6 J22	98	97	99	99	99	98
M6 J23	107	106	115	109	104	91
M6 J24	106	78	109	92	106	85

5.4.13. Larger figures and PM assignment outputs can be found in Appendix B (Scenario Bandwidth Plots).

DS2

5.4.14. The DS2 scenario incorporates the DS2a demand reduction as well as the network changes of DS2b. This scenario shows greater improvements over DS1 than either DS2a or DS2b individually. Figure 21 and Figure 22 show the changes in flow and delay from the DS1 scenario.

Figure 21 – Flow difference bandwidths showing DS2 minus DS1 (AM, pcu)

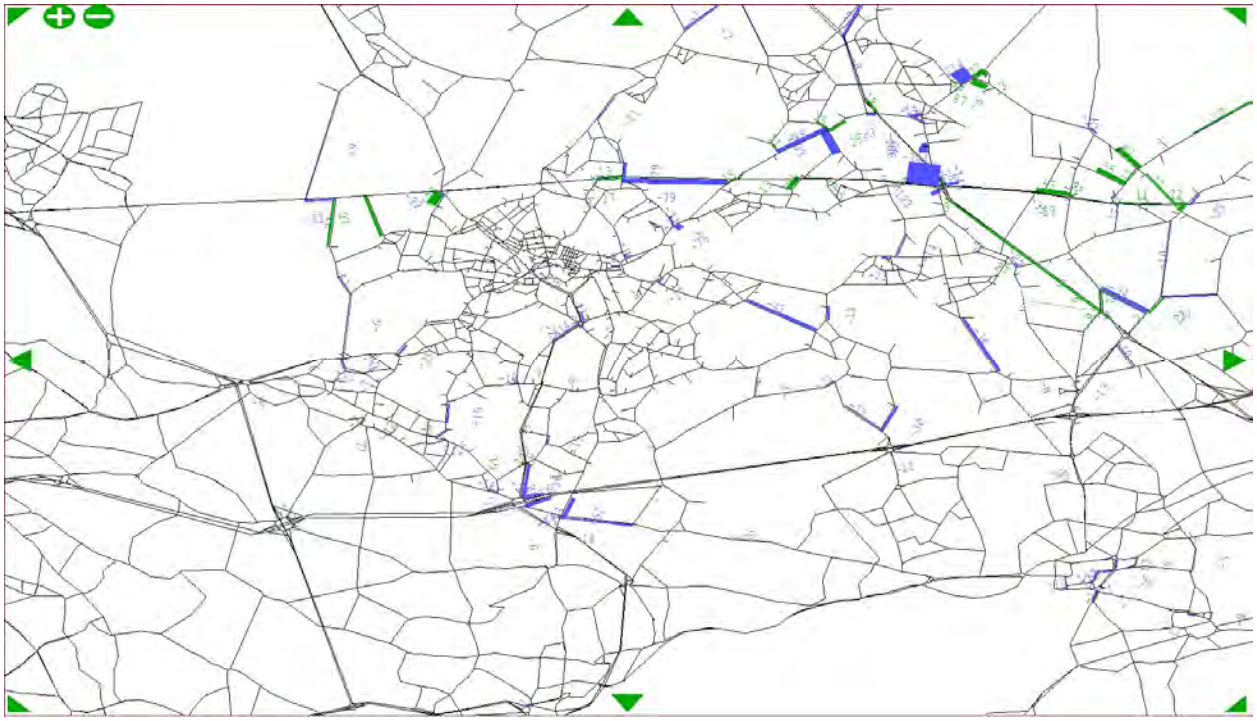


Figure 22 – Delay (s) bandwidths showing DS2 minus DS1 (AM)

5.4.15. The two key junctions north of the A580 generally perform better in DS2 than in the DS1 scenario, as shown in

Table 21.

Table 21 – Performance of junctions north of A580 DM, DS1 and DS2

	DM V/C%		DS1 V/C%		DS2 V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Main Street/Newton Road	41	69	46	85	42	78
Liverpool Rd/Millfield Lane/Tithebarn Rd/Ashton X	92	90	104	93	97	98

5.4.16. Junctions along the A580 corridor show a largely similar performance in the DS2 scenario as in DS2b, as shown in Table 22.

5.4.17. There are notable improvements to junction performance at key junctions in the east of St Helens and the south of St Helens, including the A570 corridor – as shown in Table 23 and Table 24.

5.4.18. The A570 Carrington junction operates at higher v/c in the AM under scenario DS2, but still below practical capacity

Table 22 – A580 corridor performance DS2b and DS2

	DS2b V/C%		DS2 V/C%	
Junction	**AM**	**PM**	**AM**	**PM**
A580/Blindfoot Road	93	92	91	88
East Lancashire Road/Rainford Rd/Windle	107	107	105	106
East Lancashire Road/Green Leach Lane	98	92	99	95
East Lancashire Road/Carr Mill Road	104	116	101	118
East Lancashire Road/Liverpool Road/Pewfall	103	103	102	104
A580/Haydock Lane	107	96	107	96

Table 23 – East St. Helens junction performance DM, DS1 and DS2

	2033 DM V/C%		2033 DS1 V/C%		2033 DS2 V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
A58 Peasley Cross	65	73	71	77	63	71
Parr Street/Atlas Street	79	79	81	86	78	78
Parr Street/Jackson Street	71	97	74	100	64	93
Parr Street/Ashcroft Street	100	100	100	101	100	96
Park Road/Merton Bank Road	93	91	95	93	91	83
Park Road/Boardmans Lane	75	70	78	87	70	73
Blackbrook Road/Ashurst Drive	88	86	90	86	93	91
Blackbrook Road/Chain Lane	100	102	102	104	97	101
Parr Stocks Road/Chancery Lane	89	86	90	89	83	83
Broad Oak road/Chancery Lane	53	69	56	73	54	74

Table 24 – South St. Helens and A570 corridor performance DM, DS1 and DS2

	2033 DM V/C%		2033 DS1 V/C%		2033 DS2 V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
A570 Carrington	76	62	75	65	83	72
A570 Saints Park	50	44	51	43	54	50
Robins Lane/Marshall Cross	61	48	63	55	63	47
Marshalls Cross/Shorecross	41	38	38	42	45	39
A570 Sutton Hall	97	89	97	91	94	87
Sherdley Roundabout	96	101	100	102	95	100
Marshall Cross Bridge Mill Lane	40	40	48	44	50	46

5.4.19. The motorway junctions show the same or marginally improved performance under scenario DS2 when compared to DS2b, as shown in Table 25.

Table 25 – Motorway junction performance DS2b and DS2

	2033 DS2b V/C%		2033 DS2 V/C%	
Junction	**AM**	**PM**	**AM**	**PM**
M62 J7	100	102	100	102
M62 J8	113	107	113	107
M62 J9	103	99	103	99
M6 J22	99	98	98	97
M6 J23	104	91	103	90
M6 J24	106	85	106	84

5.4.20. Performance at all key junctions under DS2 is given in Appendix A (Key Junction Performance) and larger figures and PM assignment outputs can be found in Appendix B (Scenario Bandwidth Plots).

DS2c

5.4.21. The DS2c scenario incorporates the DS2 scenario as well as an additional sensitivity test of a speed reduction on the A580 to 40mph. The impact of this change to the DS2 scenario can be seen in Figure 23 and clearly shows that traffic has been deterred from using the A580.

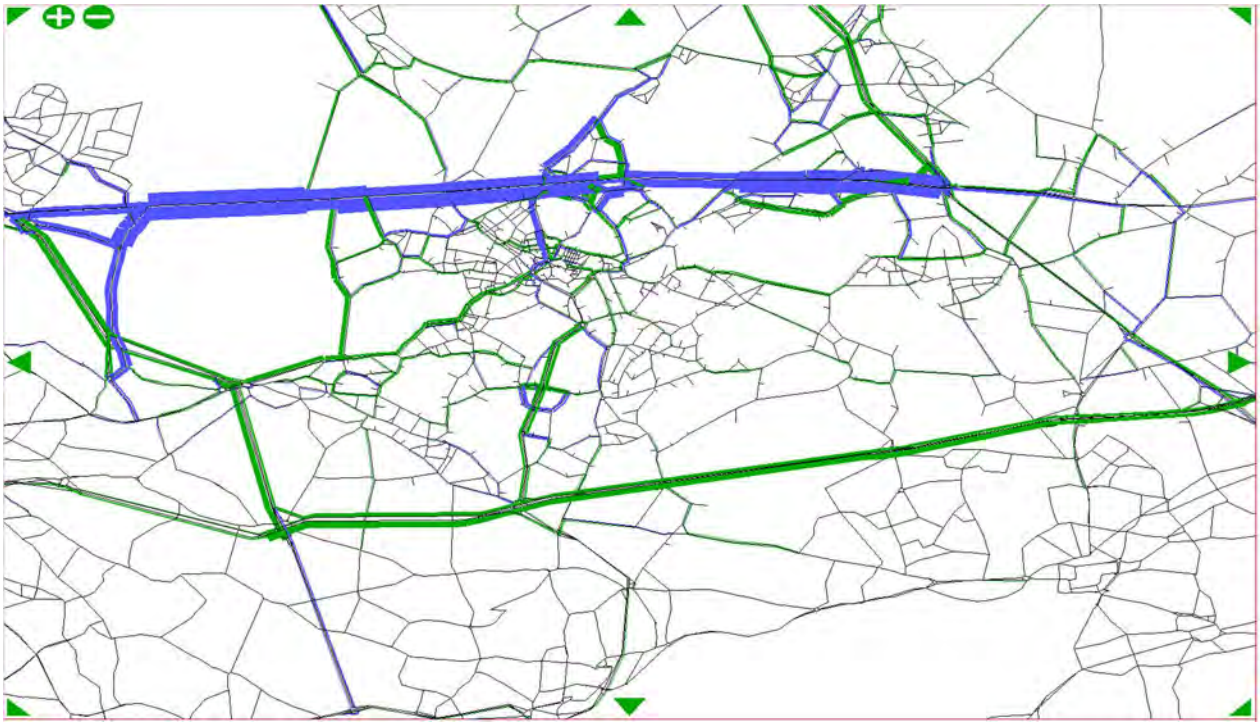


Figure 23 – Flow difference bandwidths showing DS2c minus DS2 (AM, pcu)

5.4.22. This leads to a reduction in delay along the A580 corridor as can be seen in Figure 24.

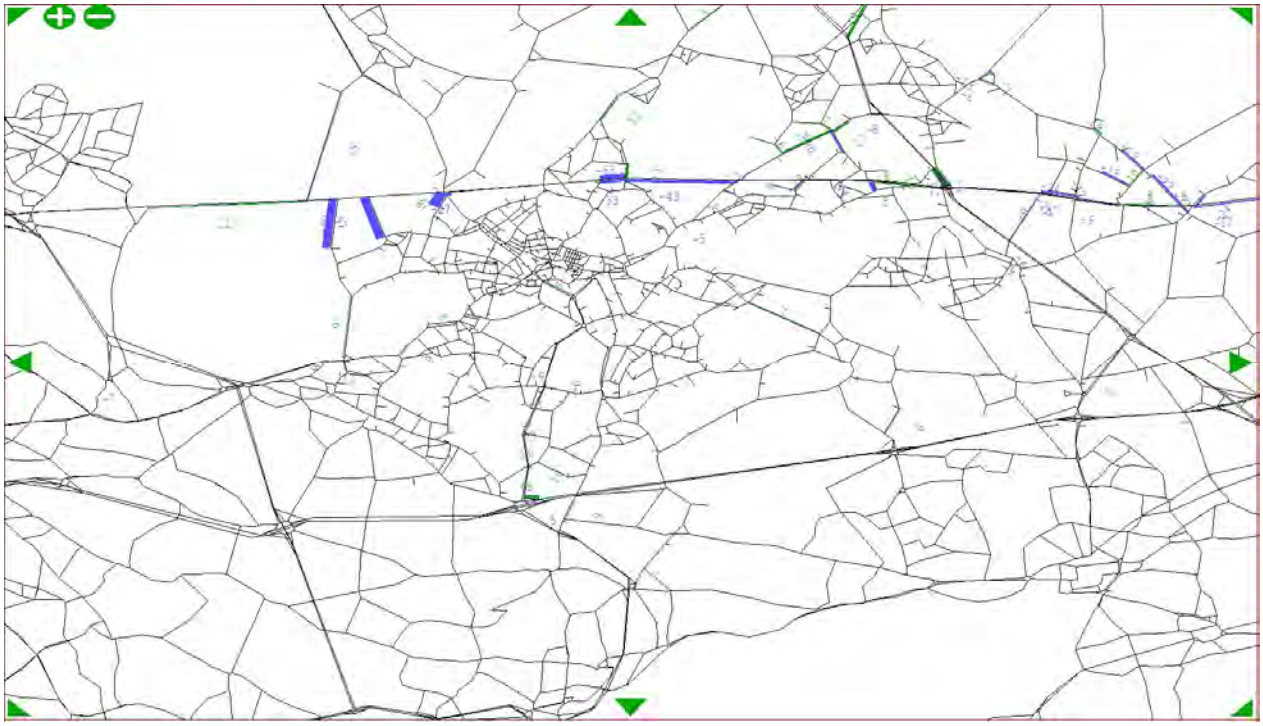


Figure 24 – Delay (s) bandwidths showing DS2c minus DS2

5.4.23. The most notable improvements along the A580 corridor are at the junction with Blindfoot Road and the junction with Green Leach Lane. Other junctions along the corridor maintain similar V/C% to the DS2 scenario as shown in Table 26

Table 26 – A580 corridor performance DS1, DS2 and DS2c

	2033 DS1 V/C%		2033 DS2 V/C%		2033 DS2c V/C%	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
A580/Blindfoot Road	100	93	91	88	71	44
East Lancashire Road/Rainford Rd/Windle	107	106	105	106	107	107
East Lancashire Road/Green Leach Lane	98	93	99	95	89	83
East Lancashire Road/Carr Mill Road	105	118	101	118	102	113
East Lancashire Road/Liverpool Road/Pewfall	105	103	102	104	102	104
A580/Haydock Lane	107	97	107	96	107	95

5.4.24. Larger figures and PM assignment outputs can be found in Appendix B (Scenario Bandwidth Plots).

6 SUMMARY AND CONCLUSIONS

6.1 SUMMARY

6.1.1. This report describes the methods and assumptions in developing a forecast model for the St Helens area from a 2017 base-year model. A 2033 forecast year has been considered under three main scenarios. Forecast scenarios were defined in agreement with SHC and model assignments converged to the same criteria as the SHSM base model.

6.2 CONCLUSIONS

6.2.1. The model effectively demonstrates the impacts of development and highways scheme construction on congestion levels in St Helens district and neighbouring key routes. It has been shown that additional mitigations to those included in the DM scenario help to reduce the impact of the large developments included in the Do-Something demand. Further investigations into the impacts of additional schemes may be tested using the model as a base for future updates.

6.2.2. The results are not intended for economic analysis, but rather are aimed at informing planning decisions made by SHC in respect of the Local Plan.

Appendix A

KEY JUNCTION PERFORMANCE

Table 1 – Maximum turning volume over capacity (v/c%) at key junctions

	2017 BY		2033 DM		2033 DS1		2033 DS2a		2033 DS2b		2033 DS2		2033 DS2c	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Main Street/Newton Road	34	37	41	69	46	85	45	81	44	77	42	78	42	70
Liverpool Rd/Millfield Lane/Tithebarn Rd/Ashton X	91	89	92	90	104	93	103	94	98	99	97	98	99	99
A580/Blindfoot Road	101	78	100	86	100	93	98	91	93	92	91	88	71	44
East Lancashire Road/Rainford Rd/Windle	106	102	104	105	107	106	106	105	107	107	105	106	107	107
East Lancashire Road/Green Leach Lane	95	88	99	95	98	93	98	93	98	92	99	95	89	83
East Lancashire Road/Carr Mill Road	101	114	102	118	105	118	104	114	104	116	101	118	102	113
East Lancashire Road/Liverpool Road/Pewfall	104	102	101	103	105	103	105	104	103	103	102	104	102	104
A580/Haydock Lane	91	84	92	71	107	97	107	96	107	96	107	96	107	95
St Helens Road/Burrows Lane	100	101	99	95	101	99	100	98	99	99	99	98	100	97
St Helens Road/Portico Lane	93	94	100	98	100	100	100	98	99	97	97	96	99	99
Prescot Road/Lugsmore Lane	43	54	50	52	54	56	52	55	54	56	52	55	55	57
Prescot Road/Dunriding Lane	50	54	62	52	72	56	70	55	65	56	63	55	64	57
Prescot Road/Boundary Lane/Borough Road	24	42	26	32	26	33	26	31	27	33	27	32	27	33
Prescot Road/Eccleston Street/Borough Road	49	88	68	88	76	89	69	88	71	89	69	88	71	89
A58 Peasley Cross	43	58	65	73	71	77	67	72	68	75	63	71	71	72
Parr Street/Atlas Street	54	60	79	79	81	86	79	80	81	81	78	78	80	81

	2017 BY		2033 DM		2033 DS1		2033 DS2a		2033 DS2b		2033 DS2		2033 DS2c	
Parr Street/Jackson Street	59	85	71	97	74	100	73	97	65	96	64	93	63	88
Parr Street/Ashcroft Street	87	78	100	100	100	101	100	100	100	100	100	96	100	100
Park Road/Merton Bank Road	85	88	93	91	95	93	92	92	92	84	91	83	86	85
Park Road/Boardmans Lane	55	57	75	70	78	87	77	75	72	74	70	73	69	64
Blackbrook Road/Ashurst Drive	75	91	88	86	90	86	89	85	94	92	93	91	92	93
Blackbrook Road/Chain Lane	84	98	100	102	102	104	101	103	98	100	97	101	95	98
Parr Stocks Road/Chancery Lane	75	69	89	86	90	89	90	87	86	87	83	83	83	78
Broad Oak road/Chancery Lane	40	49	53	69	56	73	54	72	55	76	54	74	55	77
A570 Carrington	54	69	76	62	75	65	77	62	83	71	83	72	84	70
A570 Saints Park	42	49	61	48	63	55	61	49	67	49	63	47	64	47
Robins Lane/Marshall Cross	42	49	61	48	63	55	61	49	67	49	63	47	64	47
Marshalls Cross/Shorecross	34	44	41	38	38	42	38	40	44	40	45	39	43	40
A570 Sutton Hall	100	90	97	89	97	91	97	90	95	88	94	87	93	84
Sherdley Roundabout	91	94	96	101	100	102	97	102	95	101	95	100	95	101
Marshall Cross Bridge Mill Lane	32	31	40	40	48	44	46	43	52	47	50	46	49	46
Boundary Road/Duke Street/Dentons Green Lane	42	38	44	30	45	31	44	30	46	31	45	31	45	29
Boundary Road/Kirkland Street	15	23	20	25	20	25	20	24	20	25	20	25	21	27
College Street/Standish Street	59	77	63	67	66	70	64	67	67	70	67	67	65	63

	2017 BY		2033 DM		2033 DS1		2033 DS2a		2033 DS2b		2033 DS2		2033 DS2c	
Linkway West/Canal Street	98	90	97	102	97	103	97	102	97	102	96	101	96	101
A58 ASDA	97	83	100	90	100	94	100	91	100	89	100	86	100	86
A571 The Landings	58	59	59	67	64	68	60	68	68	70	64	69	69	77
Crow Lane West/Market Street	63	60	89	81	95	87	94	86	87	82	86	80	86	80
Crow Lane West/Vista Road	53	73	92	95	97	100	96	100	88	97	86	97	78	83
Crow Lane West/Belvedere Road	51	40	49	68	62	70	59	68	60	62	59	61	60	65
Crow Lane West/Victoria Road	49	38	52	50	63	70	58	64	60	56	57	52	63	63
Crow Lane West/Queens Drive	31	33	46	46	61	55	59	52	61	43	59	42	58	44
Southworth Road/ Parkside Road/ Newton Road/ Golbourne Dale Road	69	66	61	77	73	92	70	91	84	78	82	74	85	72
Crow Lane West/High Street	28	35	51	49	81	70	74	66	64	58	60	55	60	52
Church Road/Southworth Road	53	46	47	88	46	91	46	90	47	86	46	84	47	87
Warrington Road/Holt Lane/Whiston Hospital	52	52	49	51	52	50	52	50	54	51	53	50	53	51
Warrington Road/Longton Lane	37	52	38	51	31	50	34	50	34	51	36	50	37	51
Warrington Road/Rainhill Road	94	89	93	88	98	95	97	94	97	89	96	88	96	88
Warrington Road/Wilmere Lane/Jubits Lane	70	93	97	100	100	100	98	99	97	90	94	88	96	90
M62 J7	96	96	100	100	102	101	102	101	100	102	100	102	100	102
M62 J8	88	91	113	107	114	107	114	107	113	107	113	107	113	106

	2017 BY		2033 DM		2033 DS1		2033 DS2a		2033 DS2b		2033 DS2		2033 DS2c	
M62 J9	100	100	103	98	103	100	103	99	103	99	103	99	103	99
M6 J22	72	76	98	97	99	99	99	98	99	98	98	97	98	98
M6 J23	100	100	107	106	115	109	114	108	104	91	103	90	103	93
M6 J24	103	75	106	78	109	92	109	90	106	85	106	84	106	84
Piele Road/Church Road	33	31	73	35	88	46	85	44	91	43	87	42	86	46
Church Road/Vista Road/Penny Lane	28	40	64	42	79	51	76	49	49	53	46	51	69	54
Penny Lane/Lodge Lane	76	77	92	84	91	84	91	83	99	91	99	92	101	102
Clipsey Lane/Haydock Lane	35	37	60	44	59	44	58	44	59	44	57	44	63	51

Appendix B

SCENARIO BANDWIDTH PLOTS

Figure 1 – AM DM-BY actual flow (pcu)

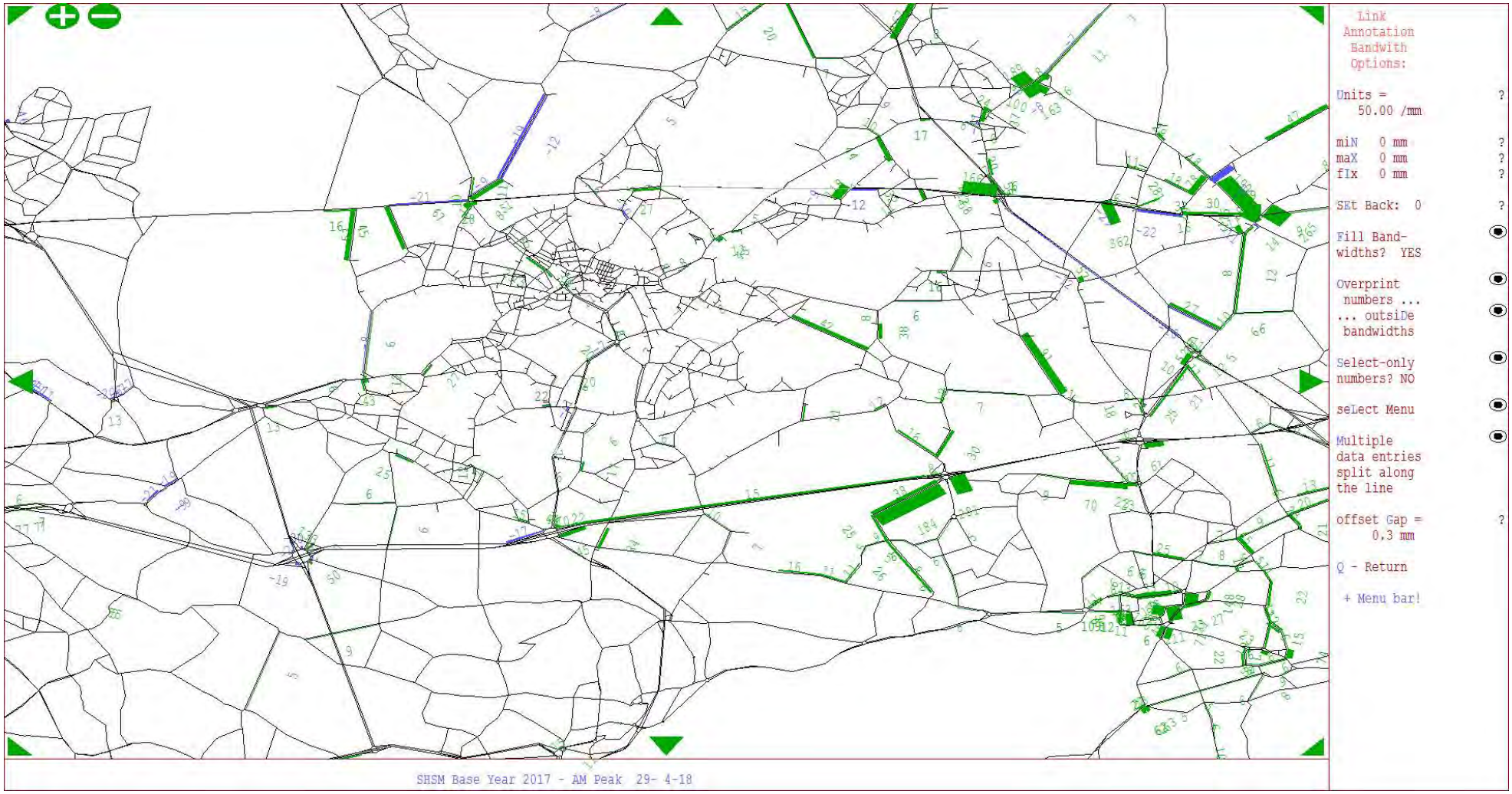


Figure 2 – AM-BY delay (s)

Figure 3 – PM DM-BY actual flow (pcu)

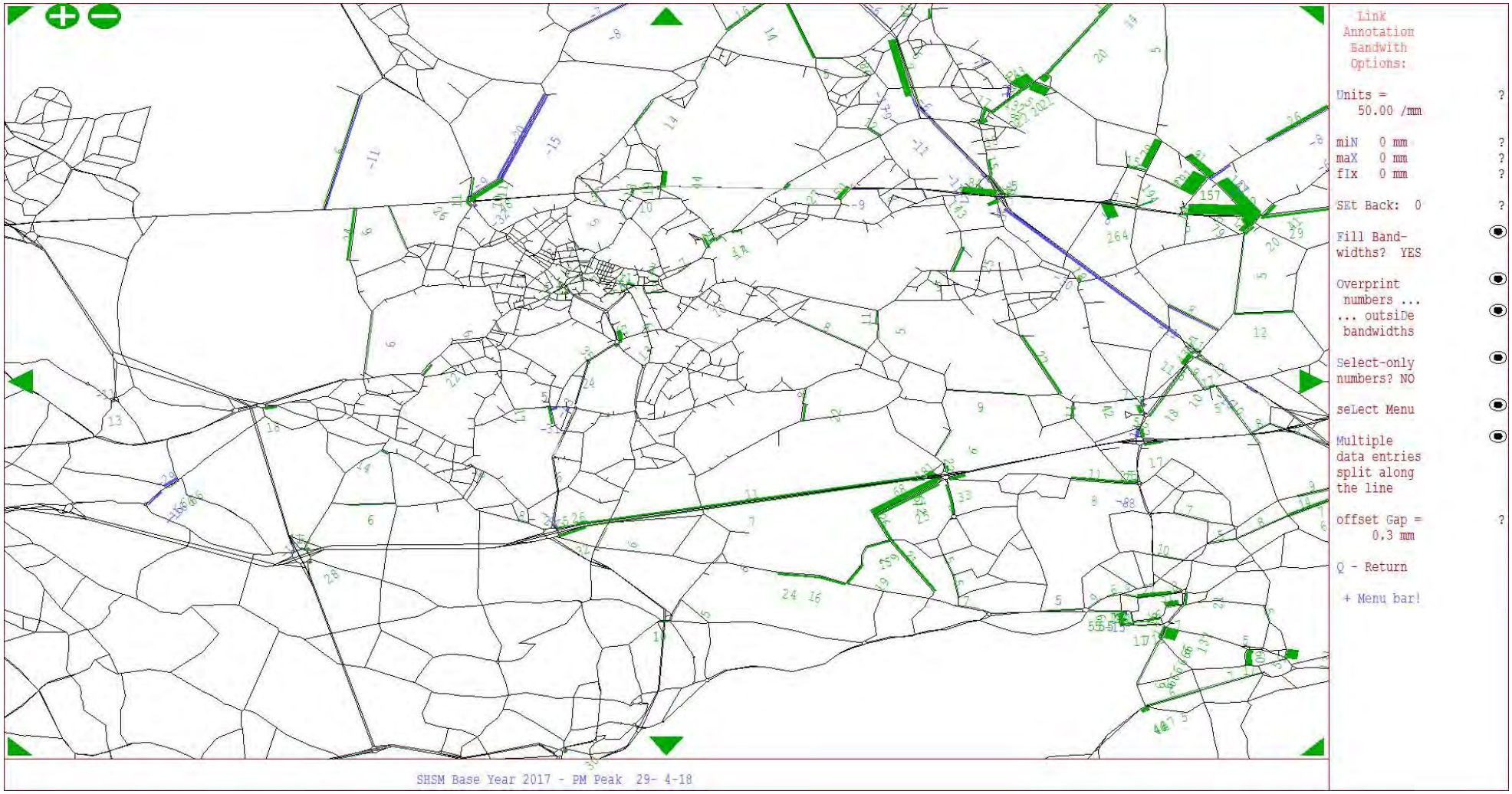


Figure 4 – PM DM-BY delay (s)

Figure 5 – AM DS1-DM actual flow (pcu)

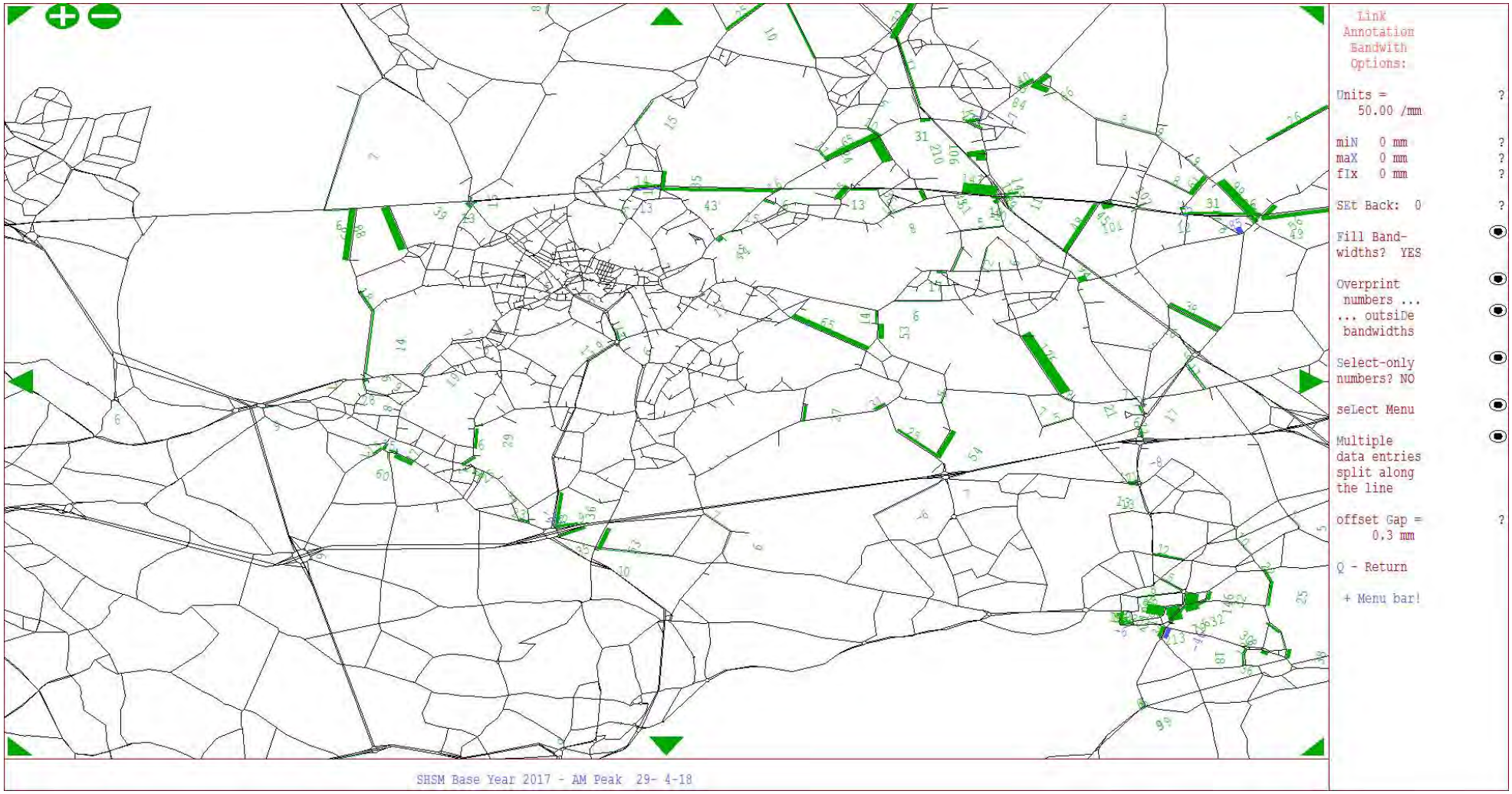


Figure 6 – AM DS1-DM Delay (s)

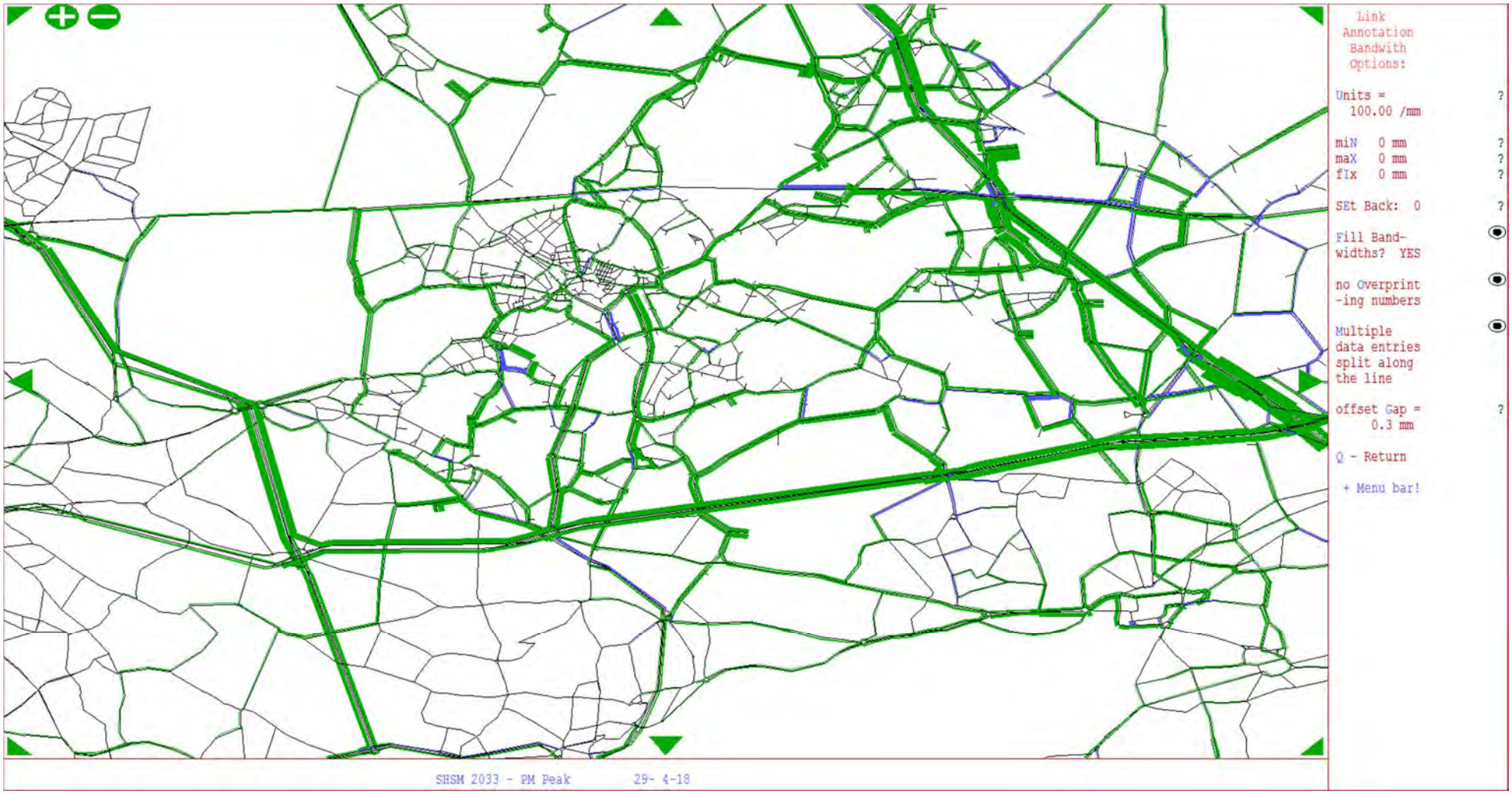


Figure 7 – PM DS1-DM actual flow (pcu)

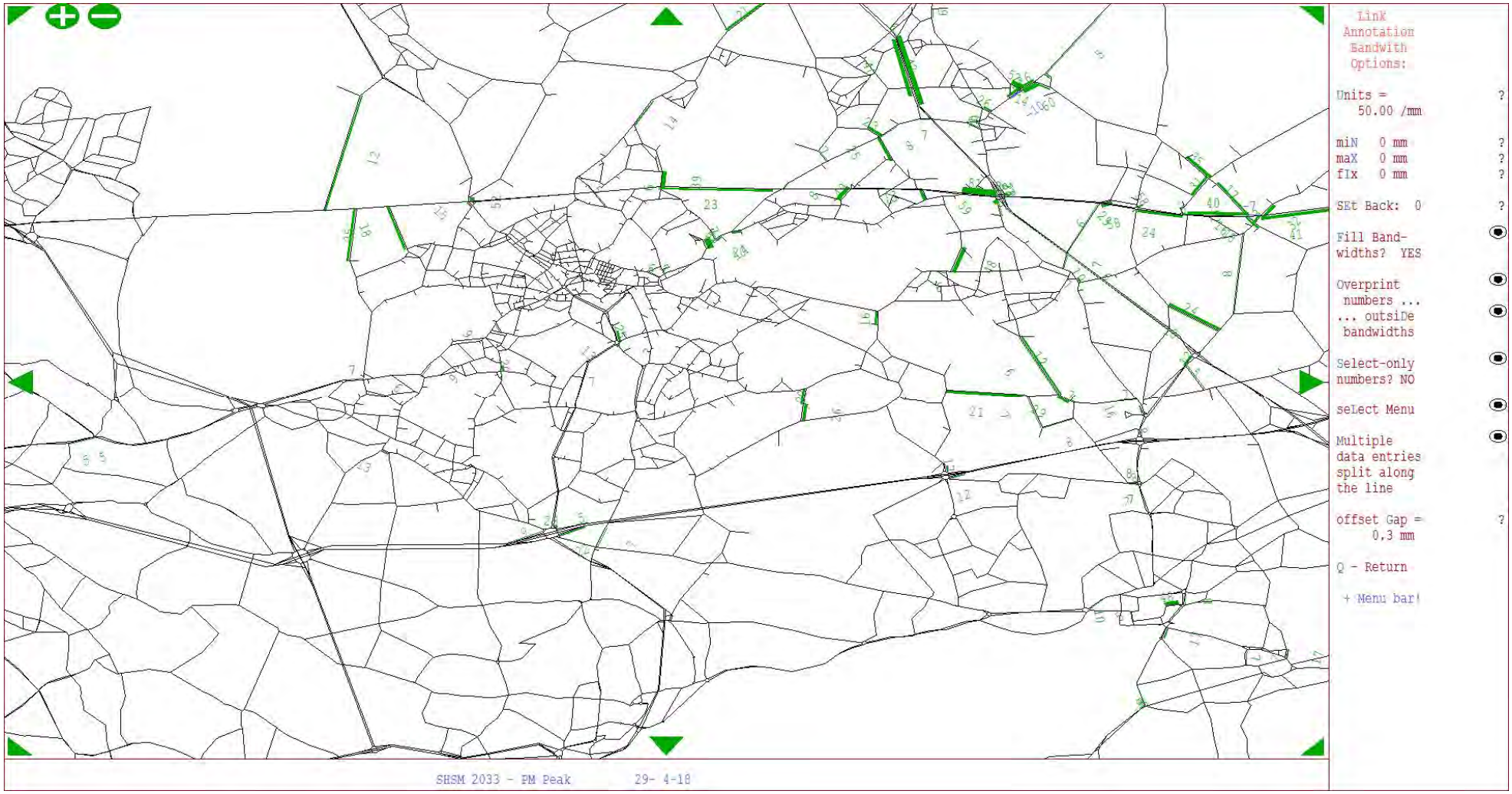


Figure 8 – PM DS1-DM delay (s)

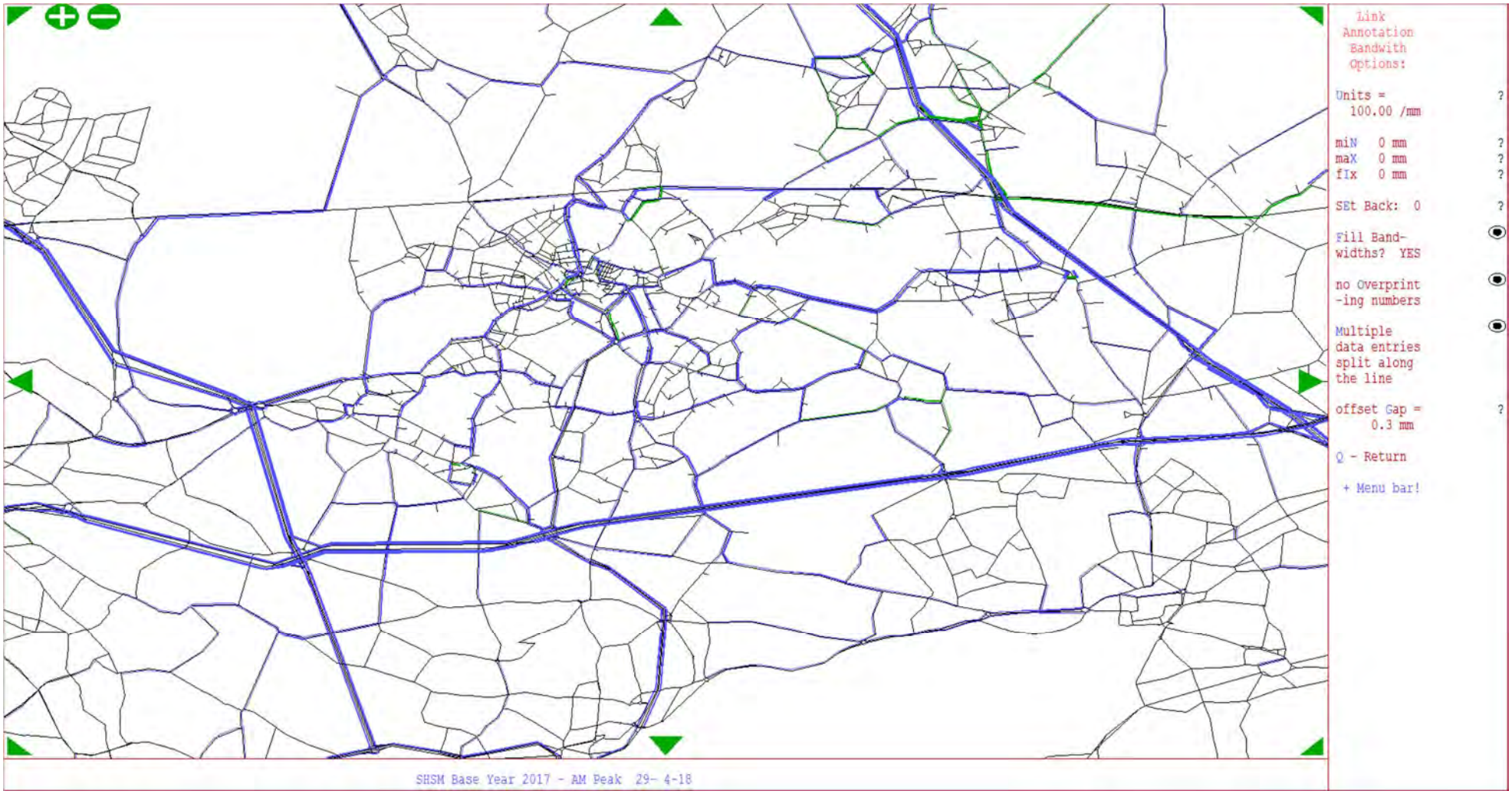


Figure 9 – AM DS2a-DS1 actual flow (pcu)

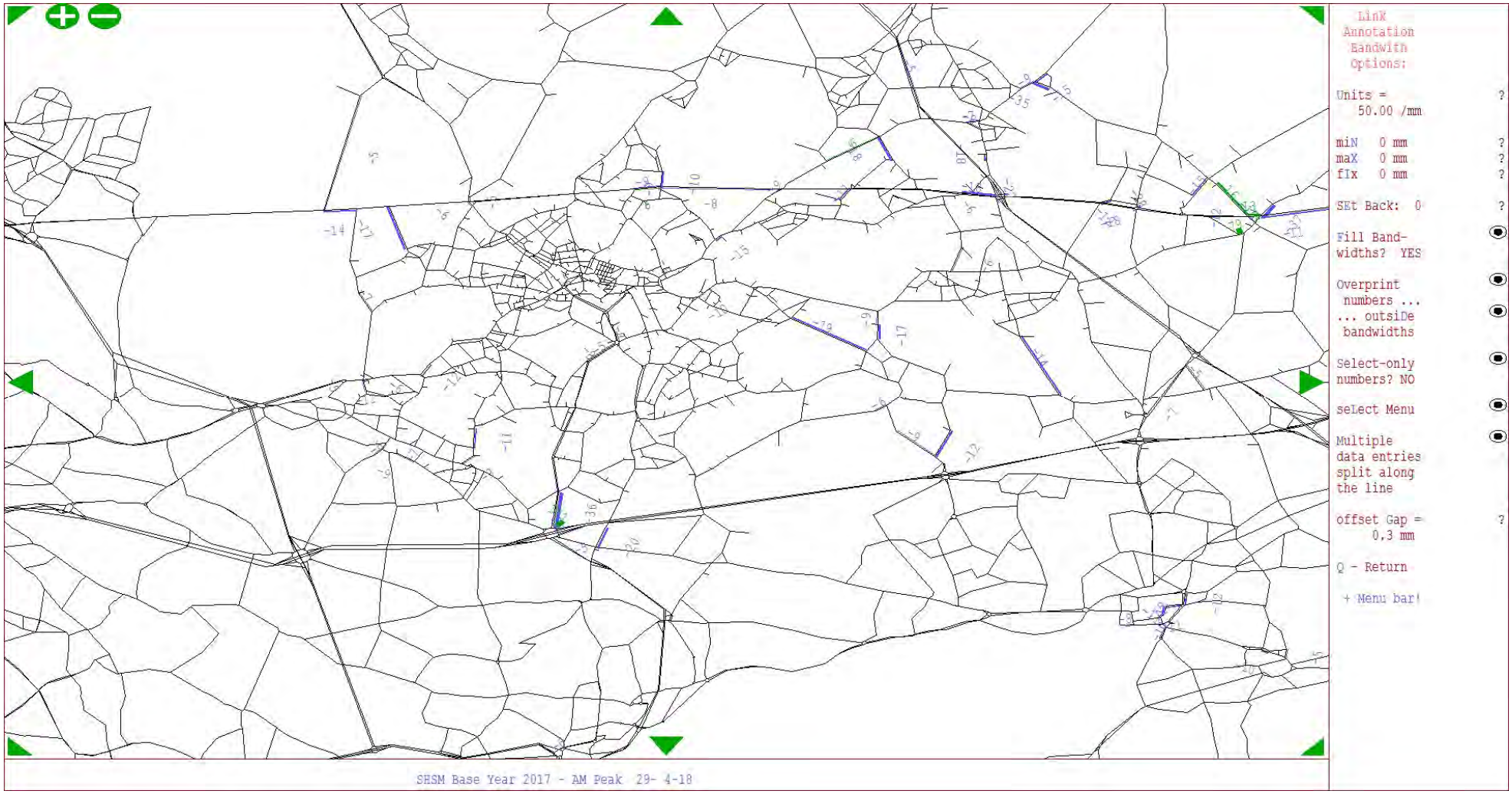


Figure 10 – AM DS2a-DS1 delay (s)

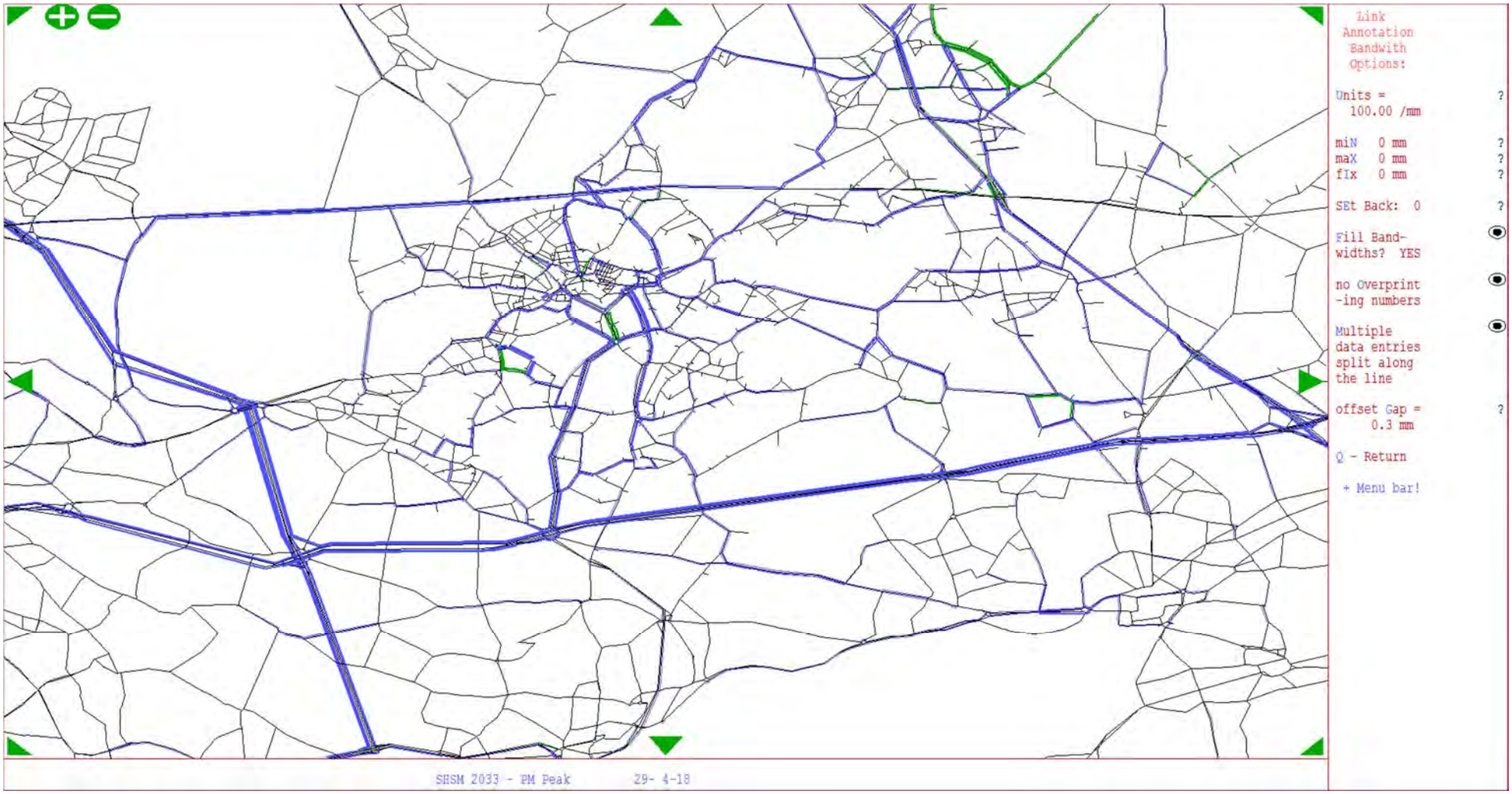


Figure 11 – PM DS2a-DS1 actual flow

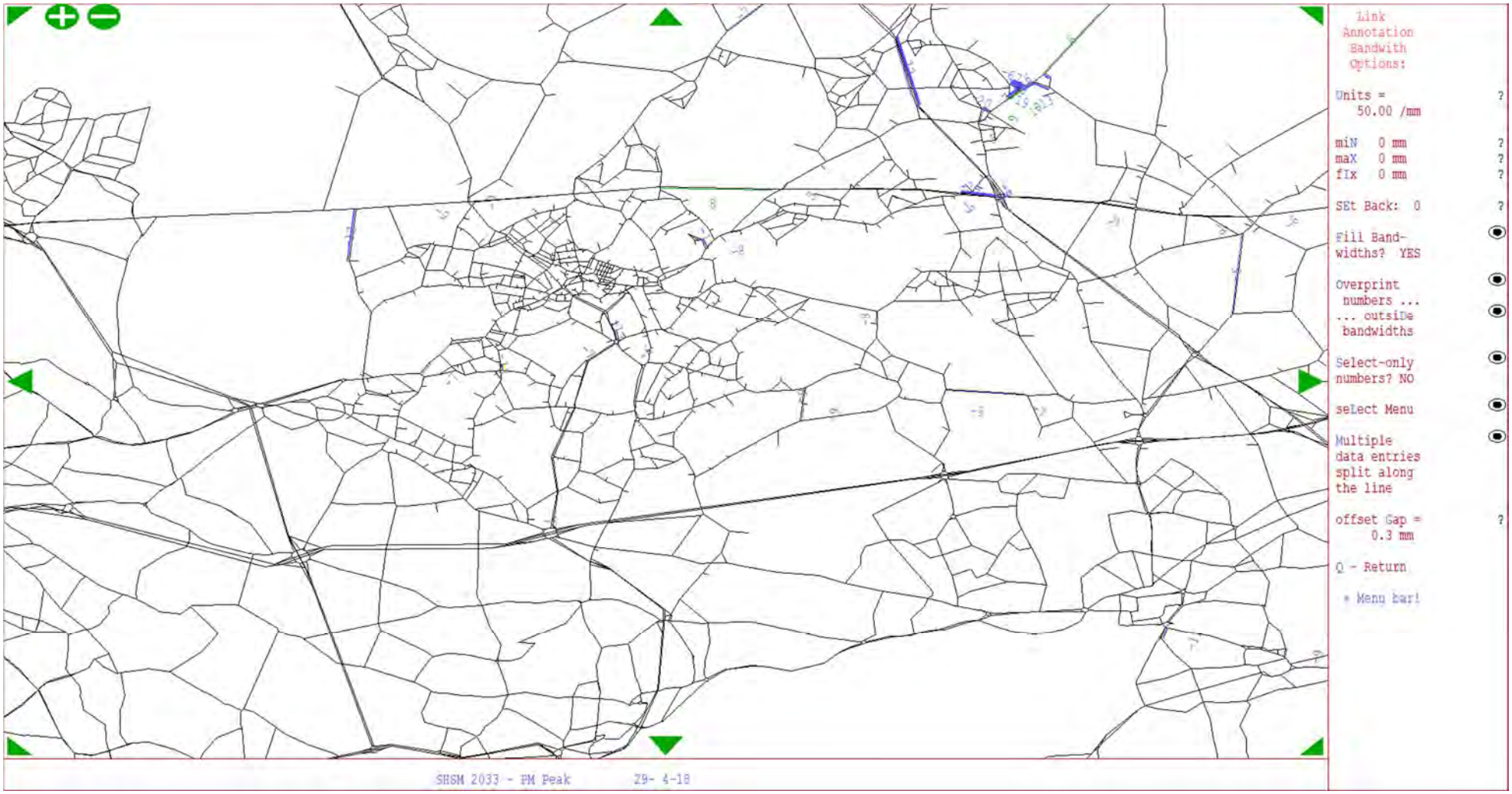


Figure 12 – PM DS2a-DS1 delay (s)

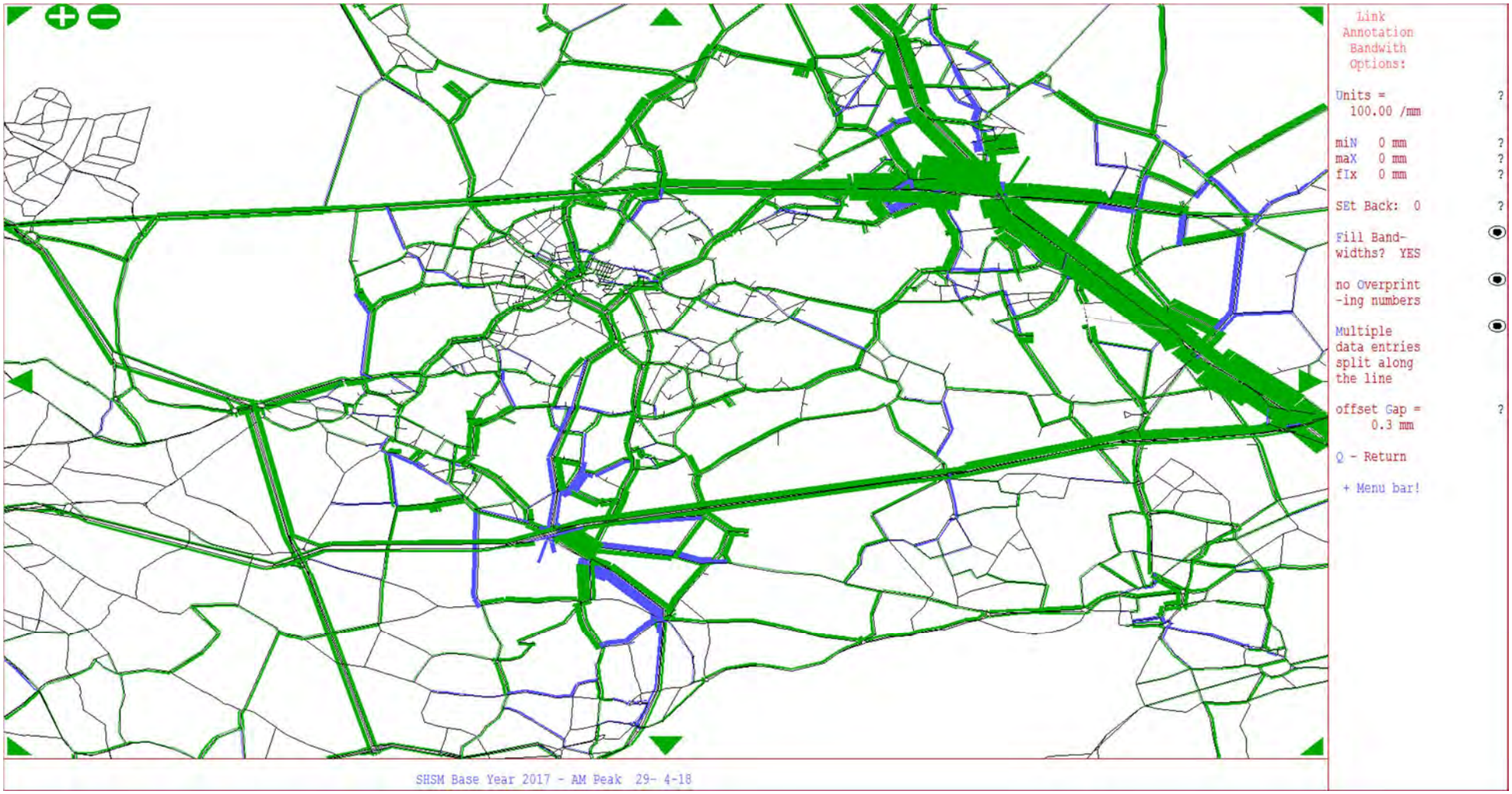


Figure 13 – AM DS2b-DM actual flow (pcu)

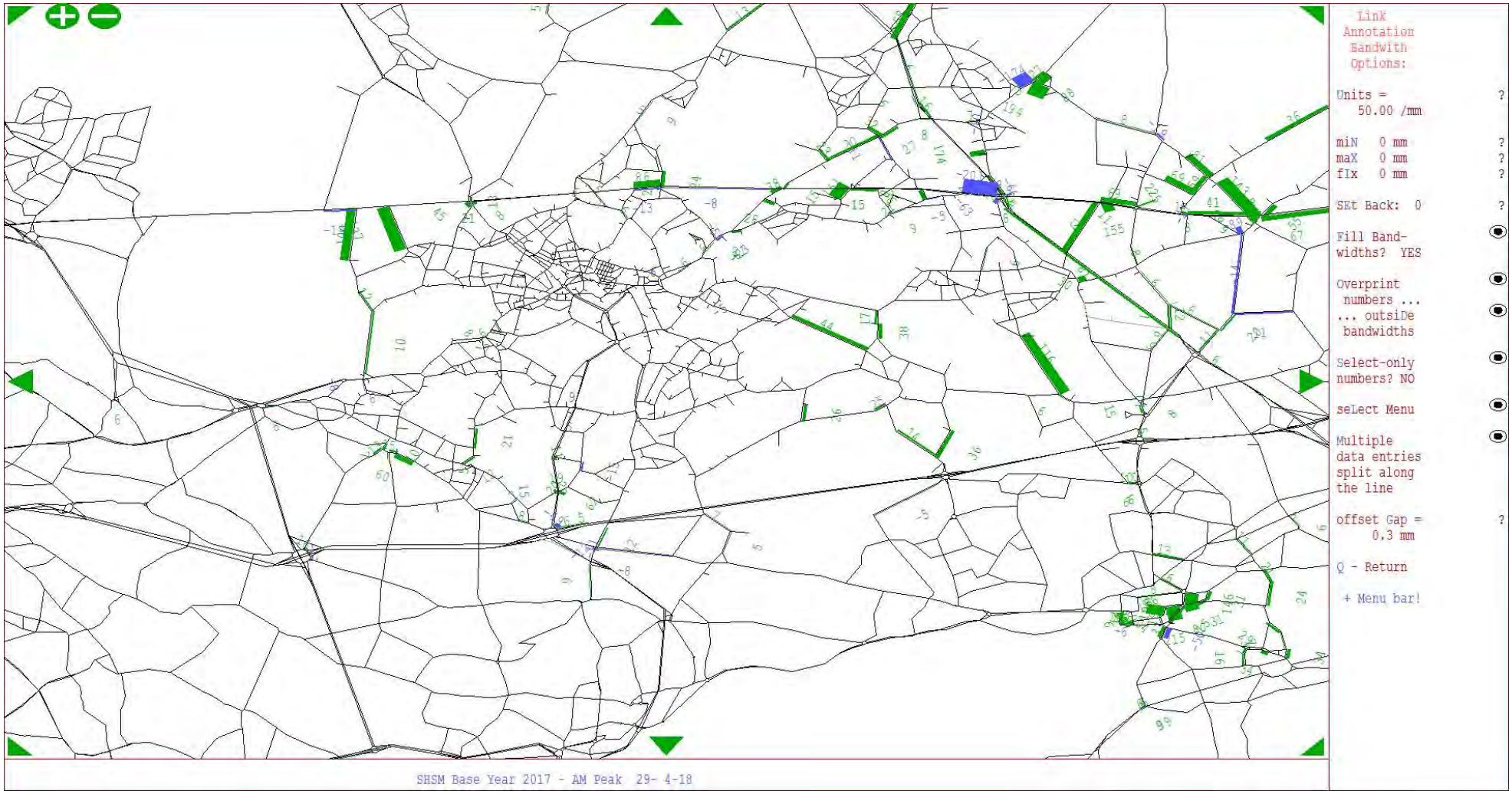


Figure 14 – AM DS2b-DM delay (s)

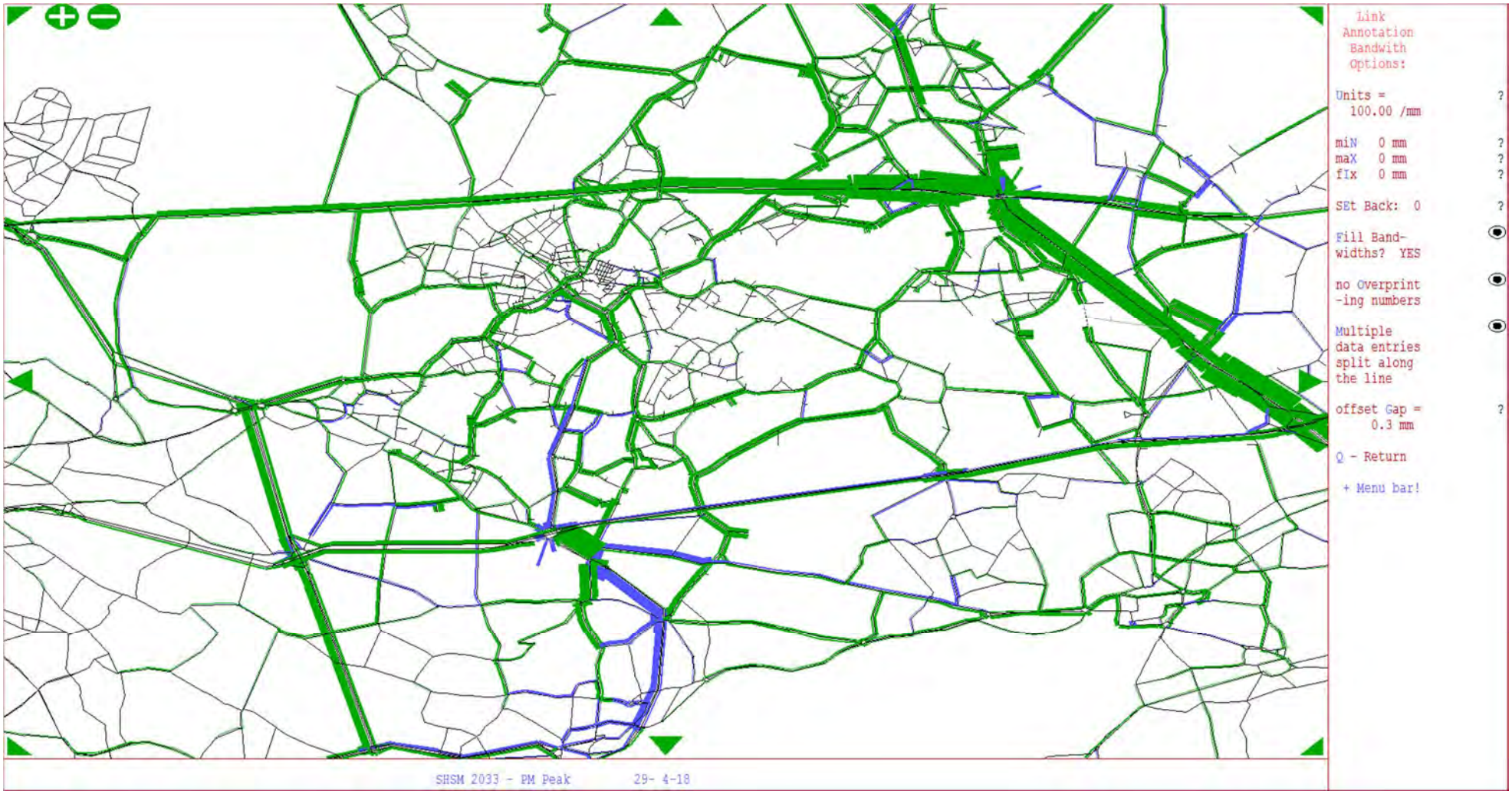


Figure 15 – PM DS2b-DM actual flow (pcu)

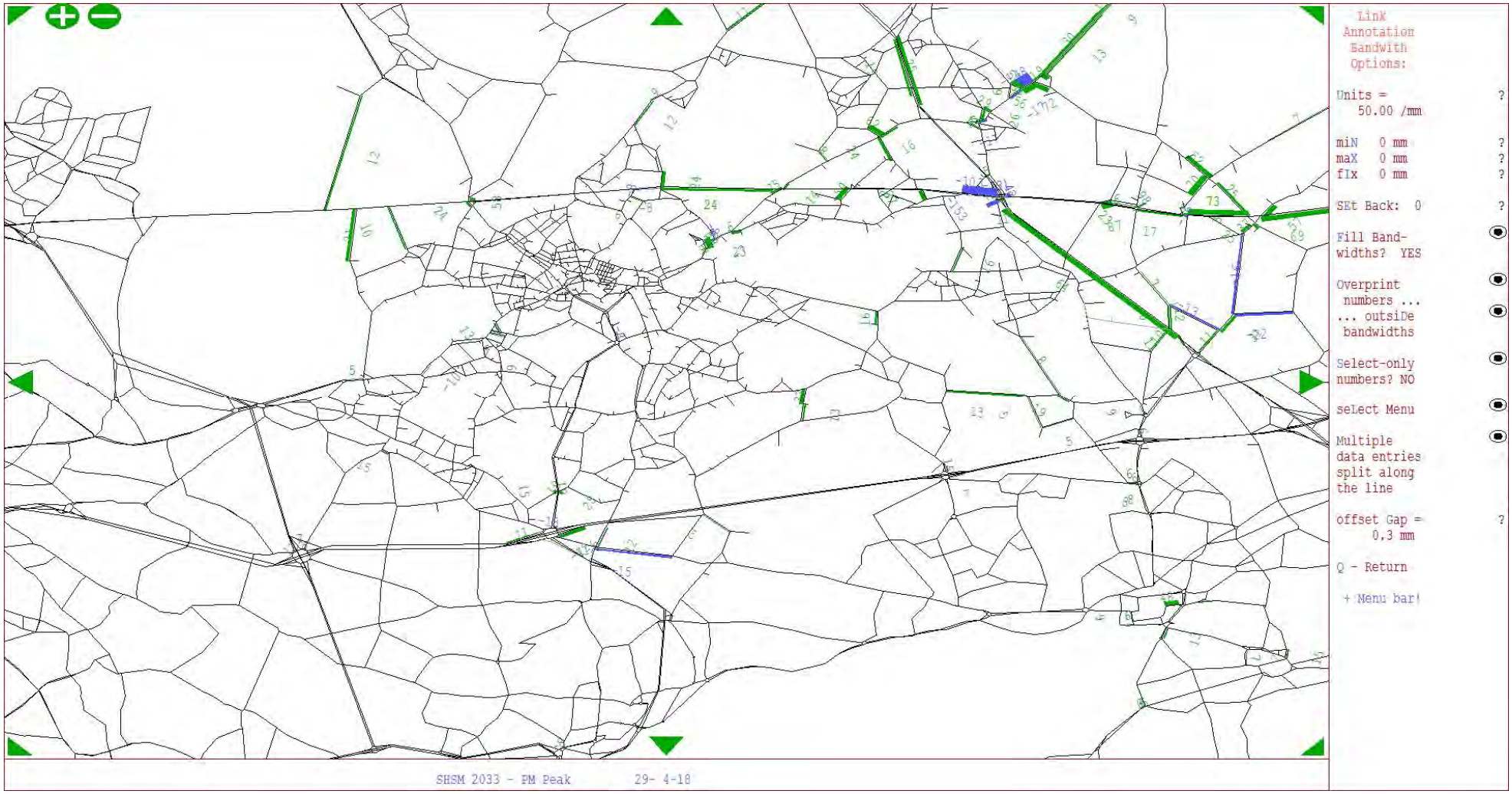


Figure 16 – PM DS2b-DM delay (s)

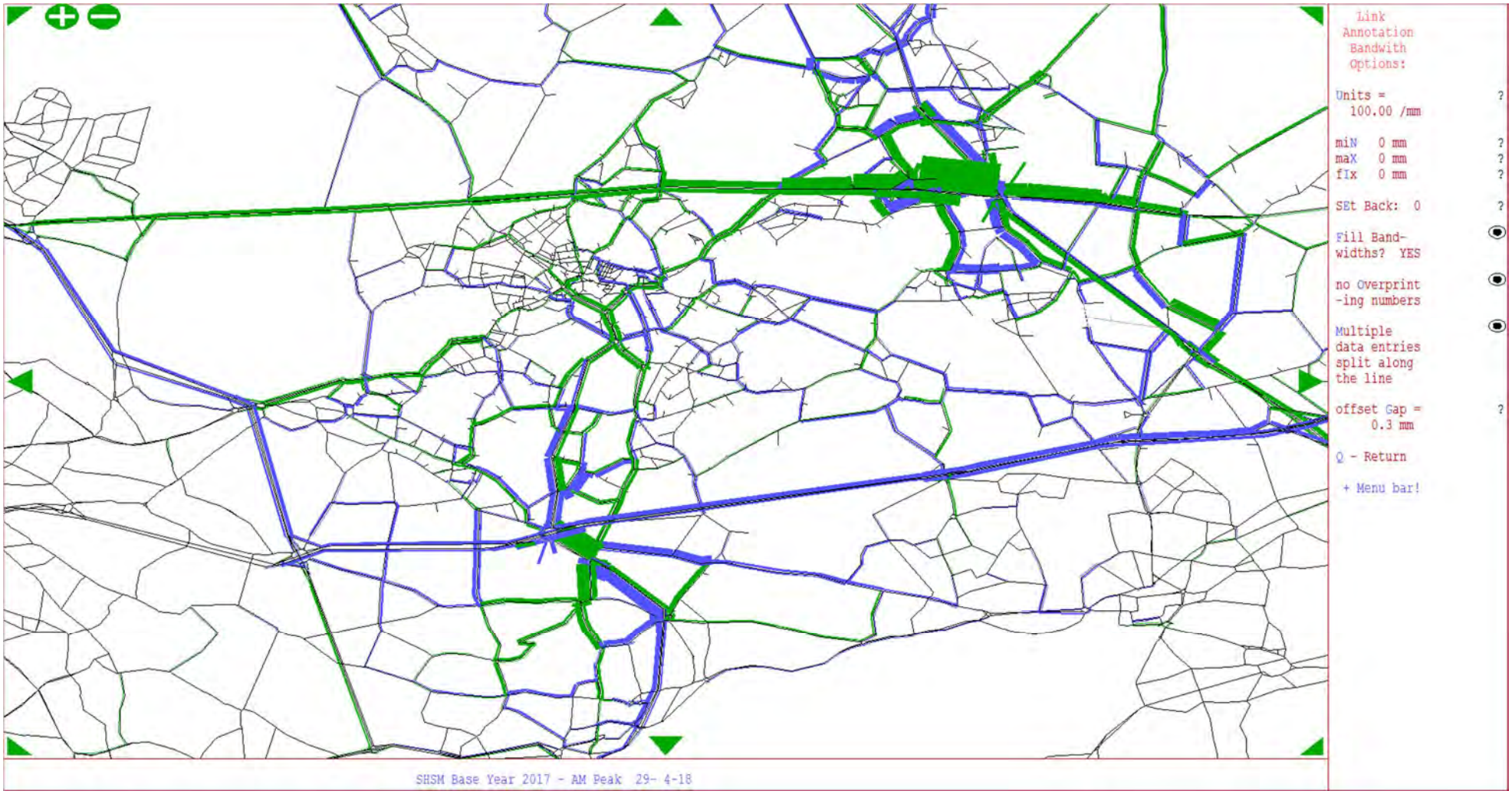


Figure 17 – AM DS2b-DS1 actual flow (pcu)

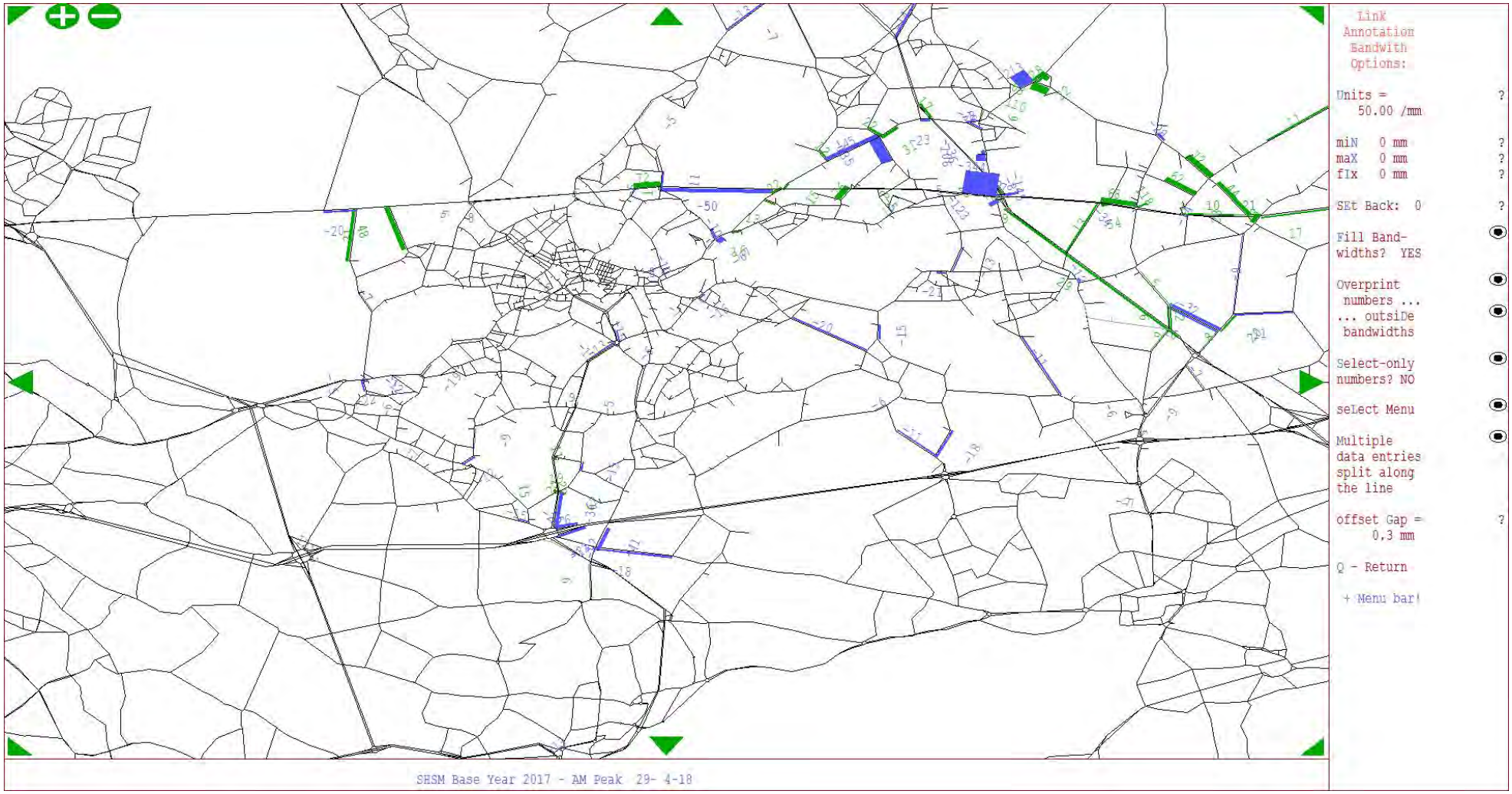


Figure 18 – AM DS2b-DS1 delay (s)

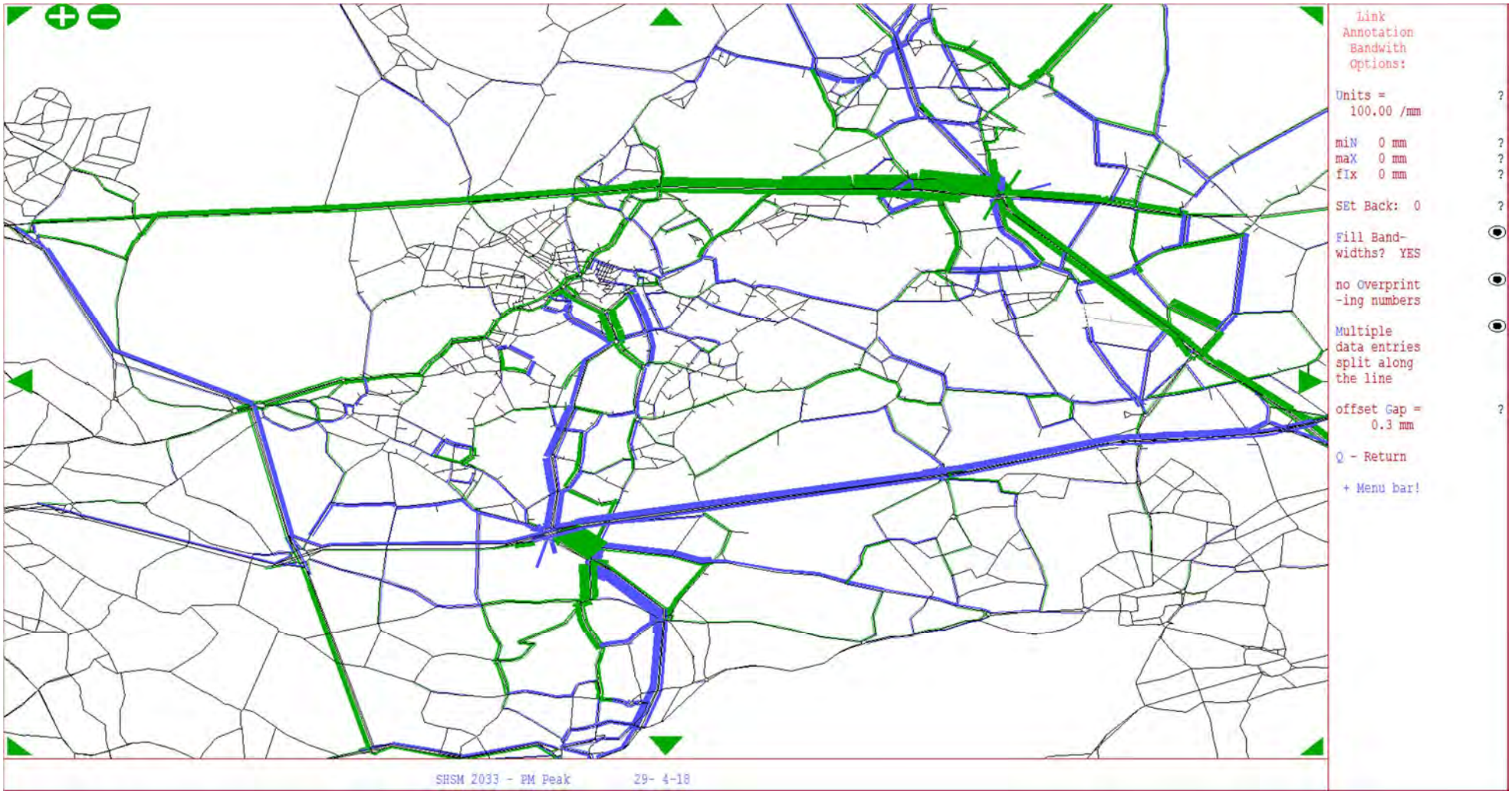


Figure 19 – PM DS2b-DS1 actual flow (pcu)

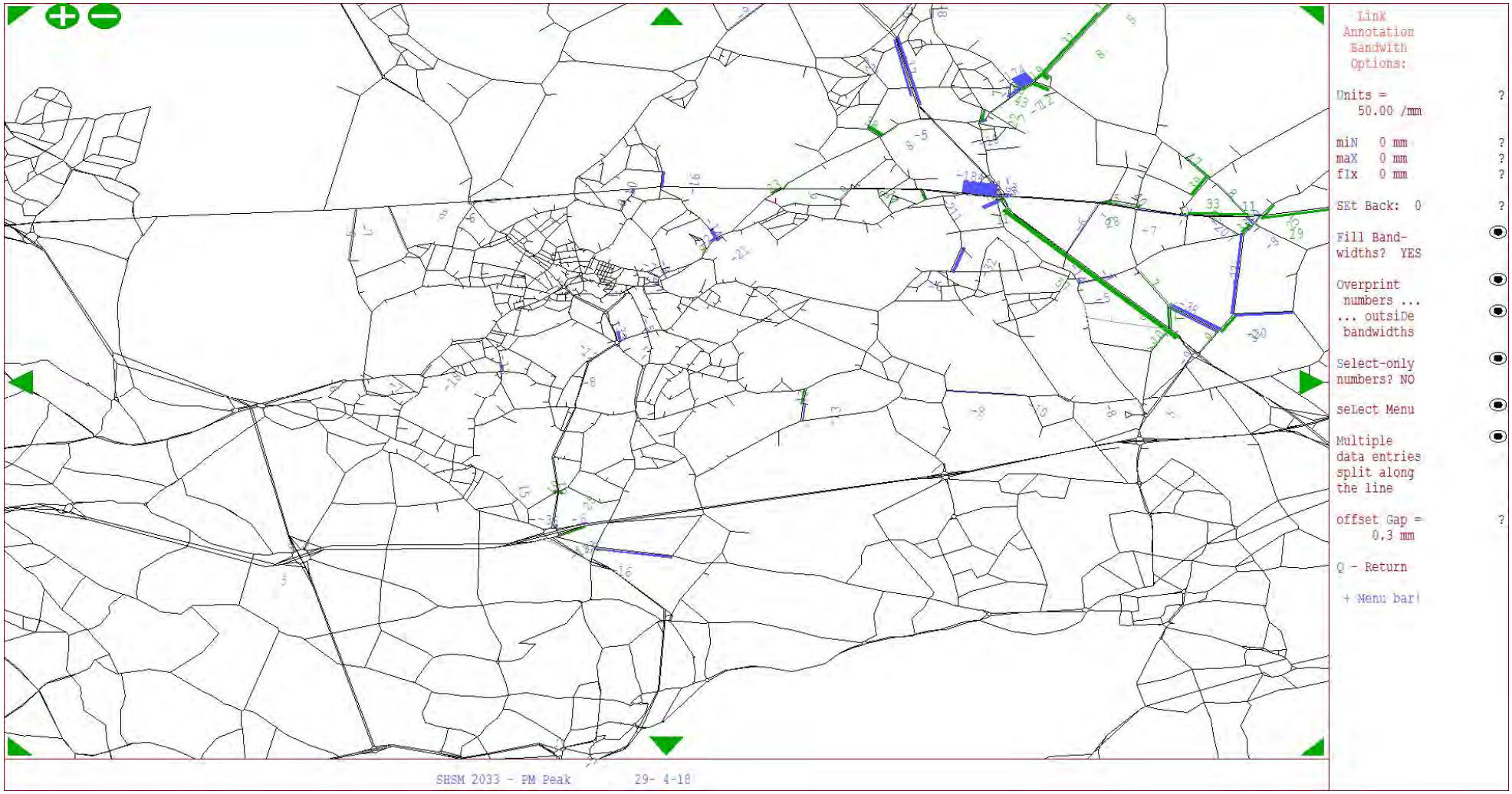


Figure 20 – PM DS2b-DS1 delay (s)

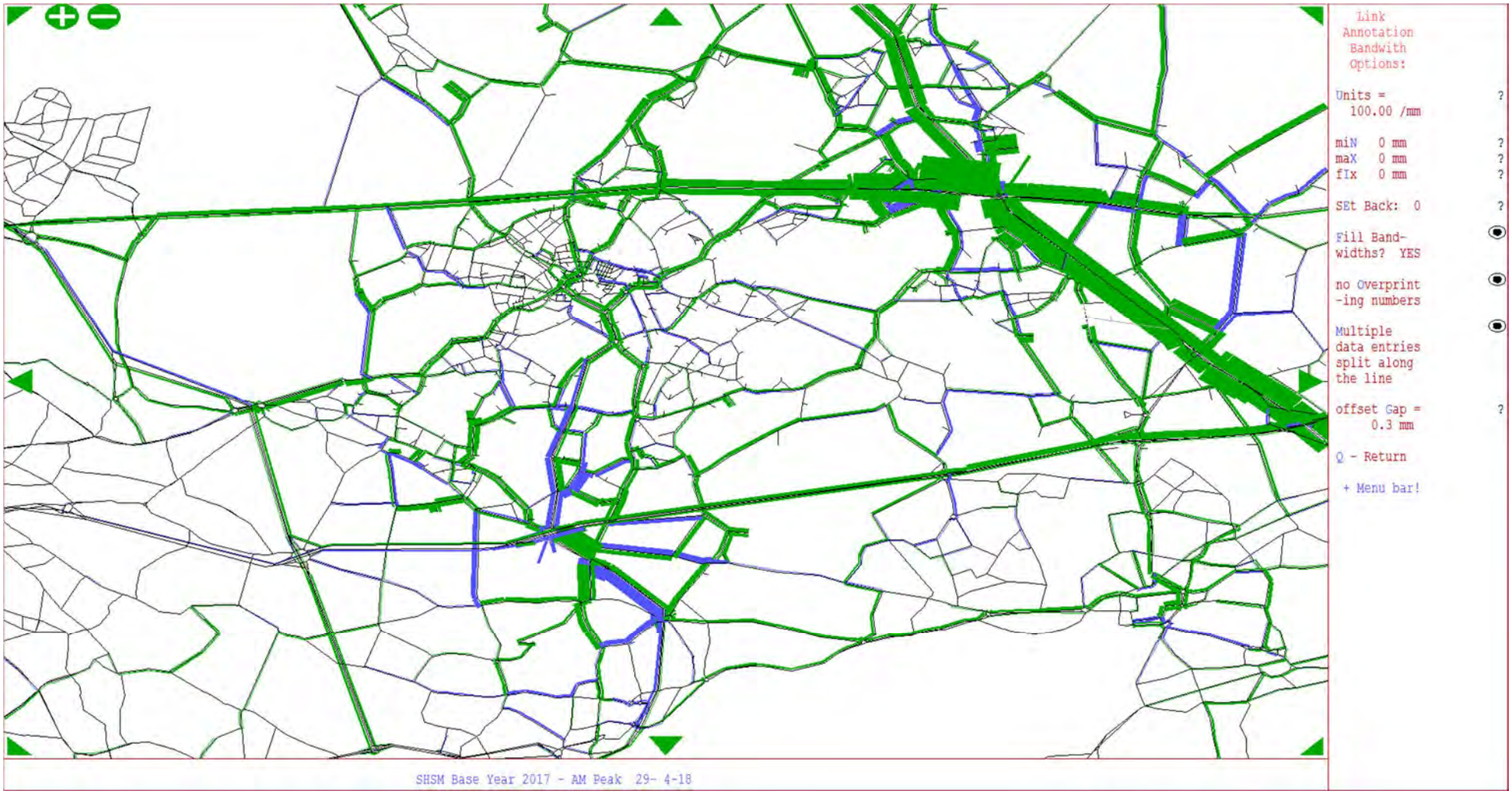


Figure 21 – AM DS2-DM actual flow (pcu)

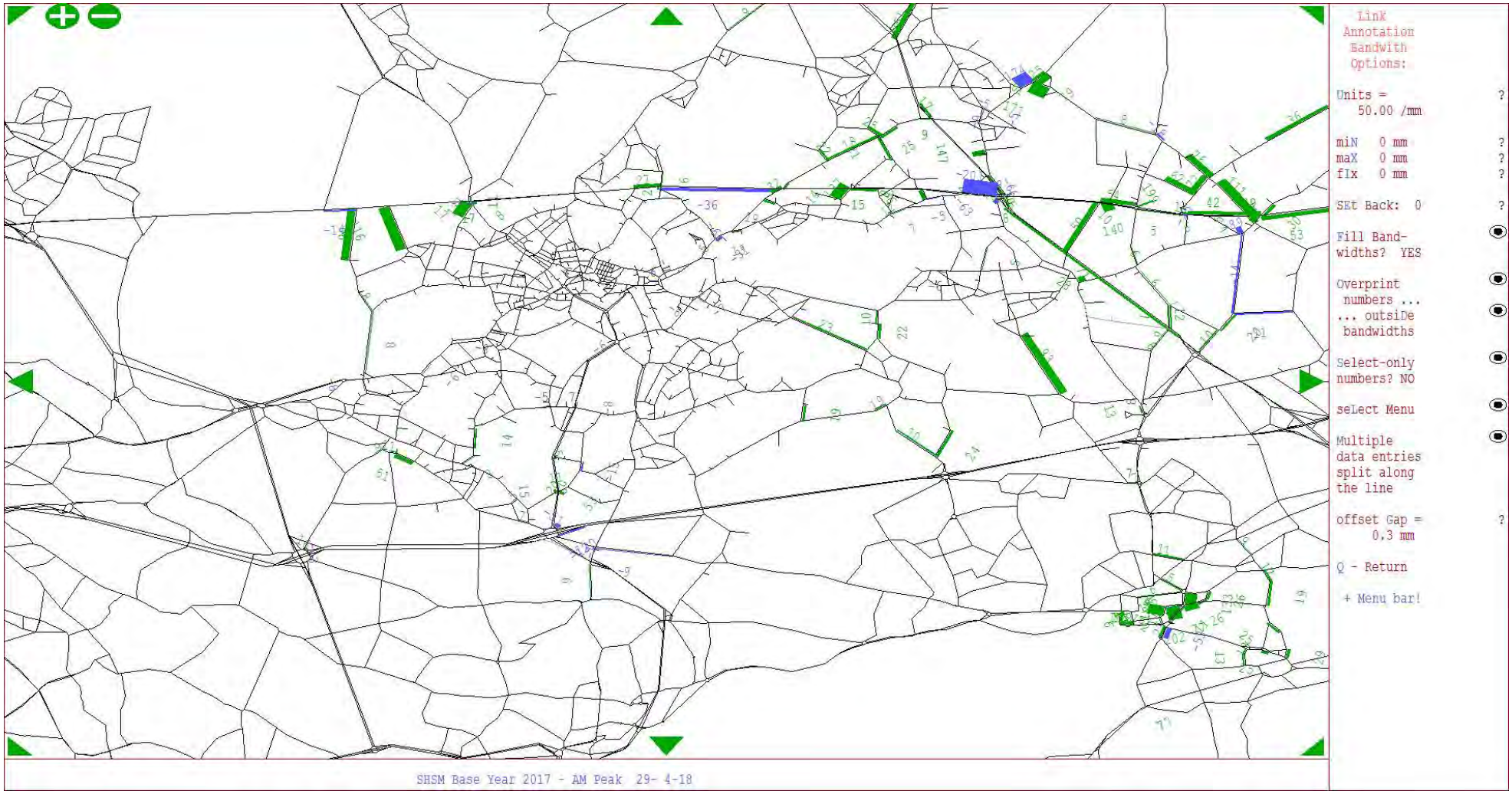


Figure 22 – AM DS2-DM delay (s)

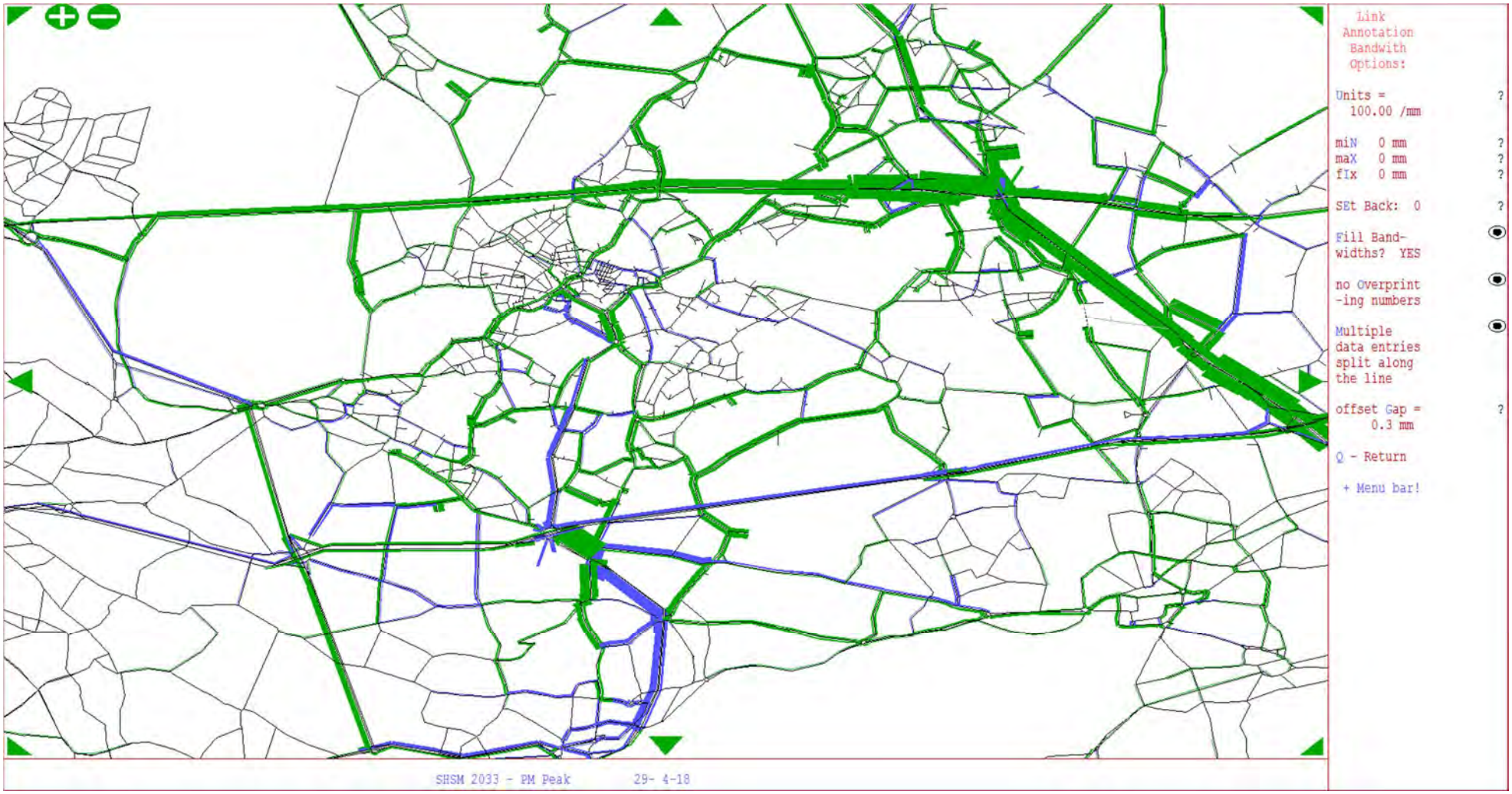


Figure 23 – PM DS2-DM actual flow (pcu)

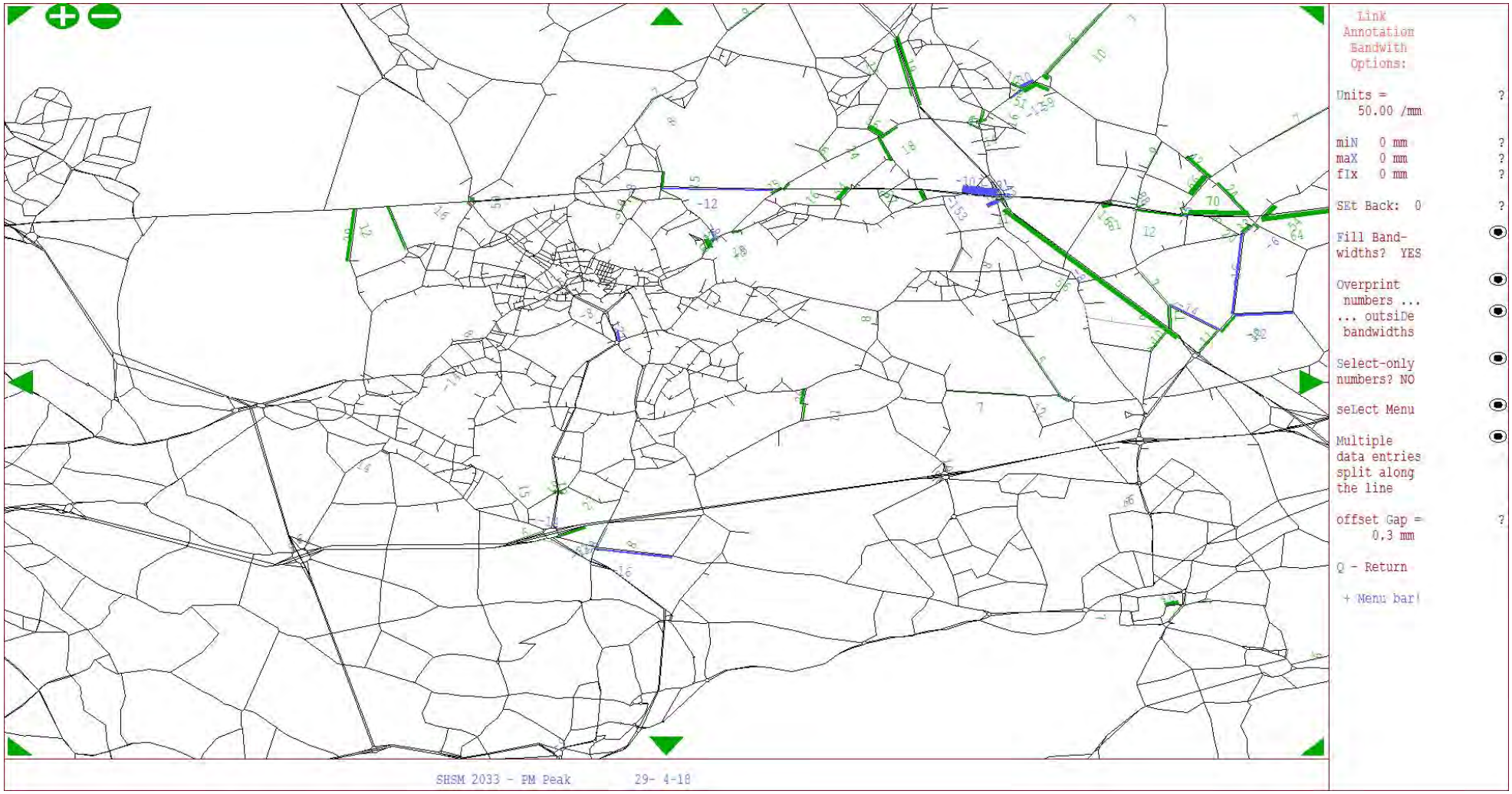


Figure 24 – PM DS2-DM delay (s)

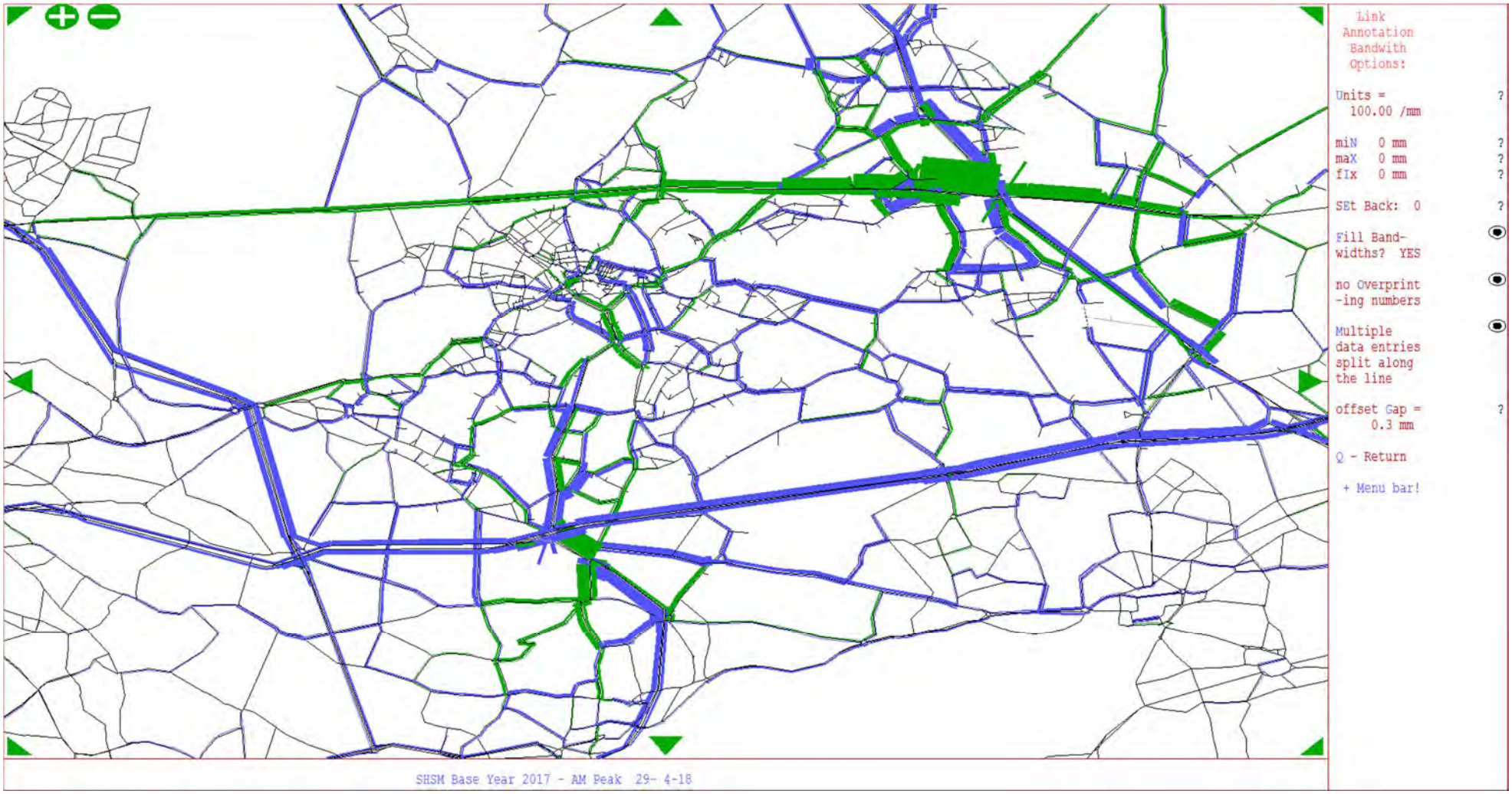


Figure 25 – AM DS2-DS1 actual flow (pcu)

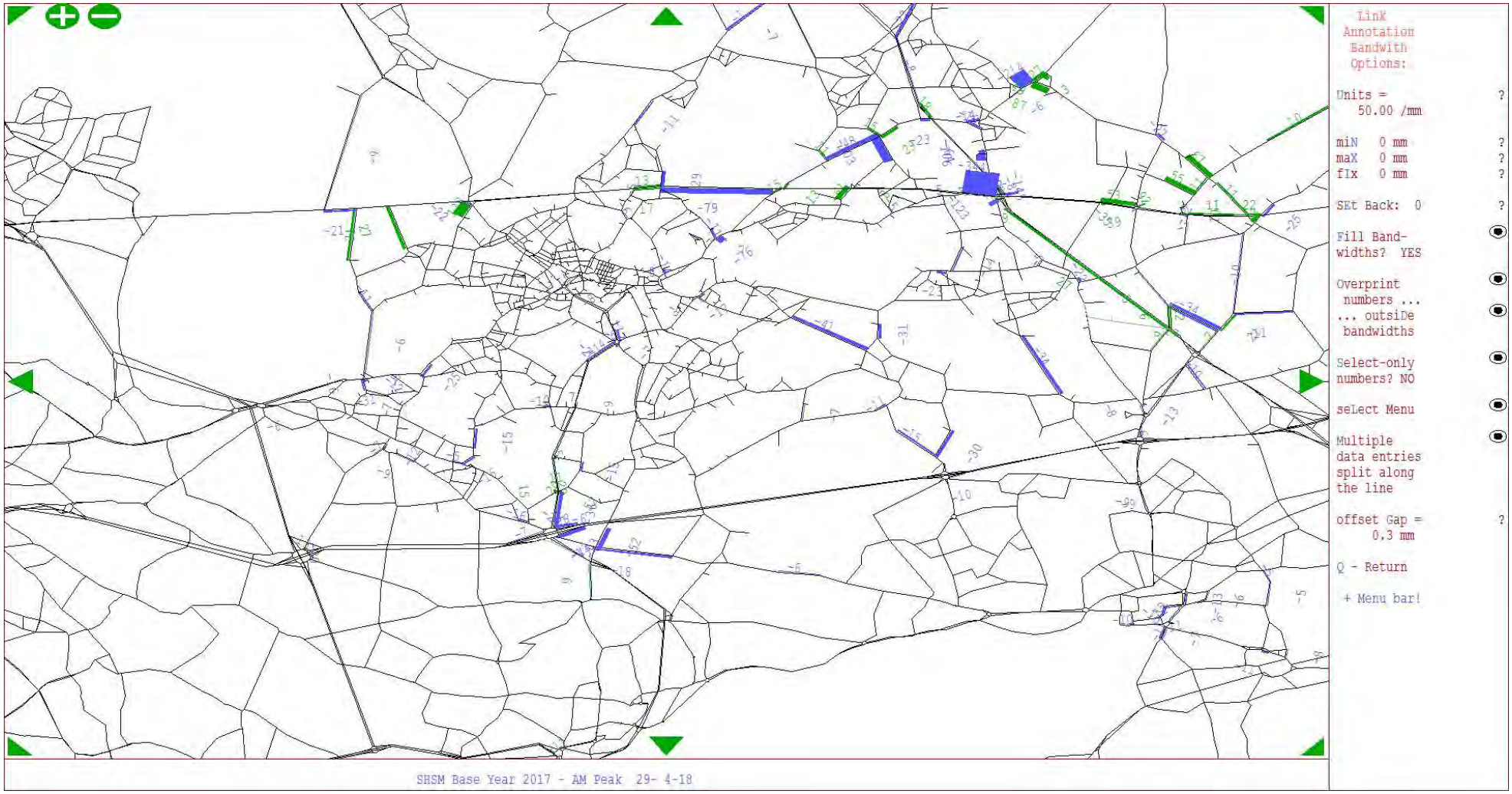


Figure 26 – AM DS2-DS1 delay (s)

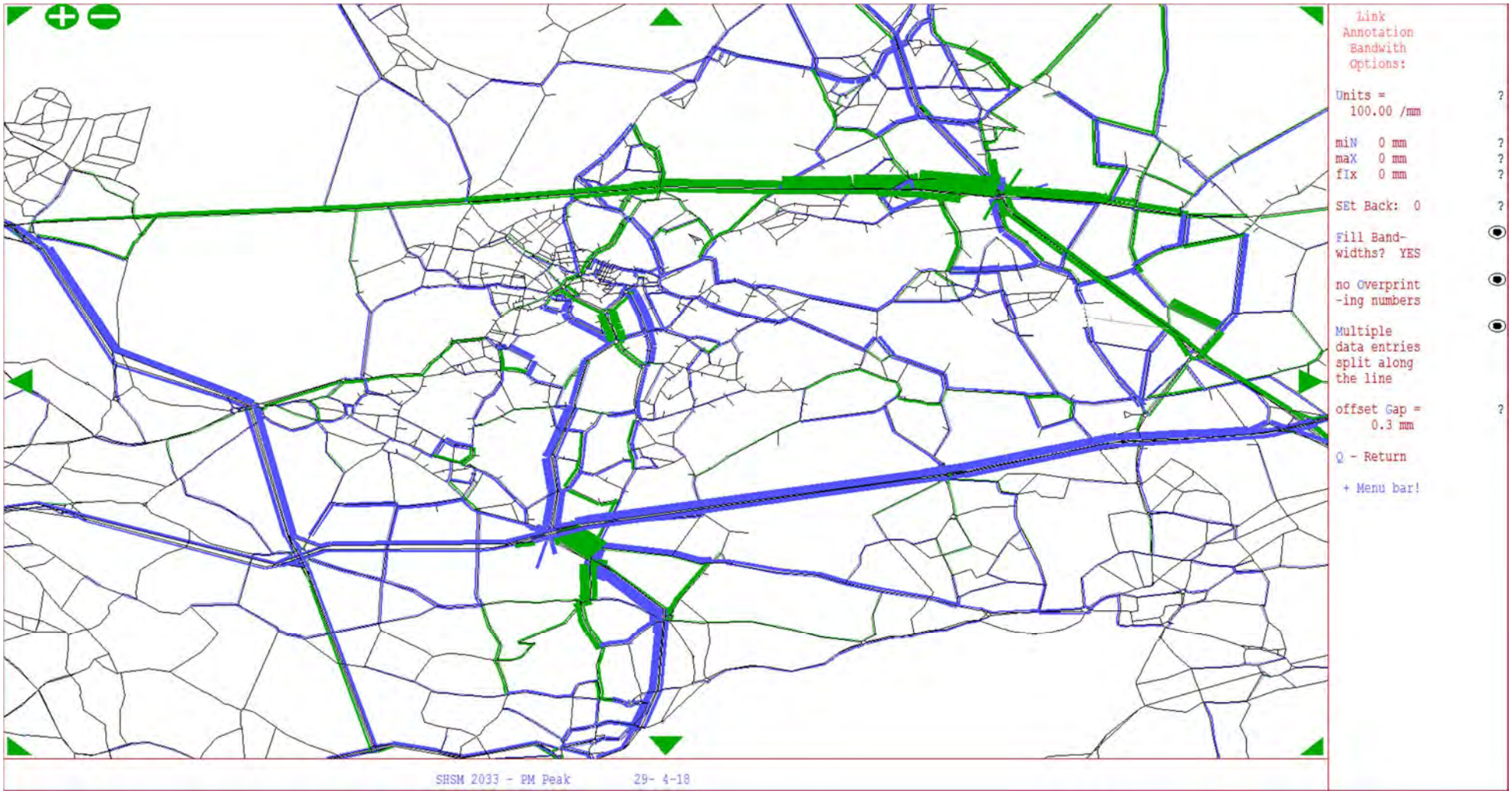


Figure 27 – PM DS2-DS1 actual flow (pcu)

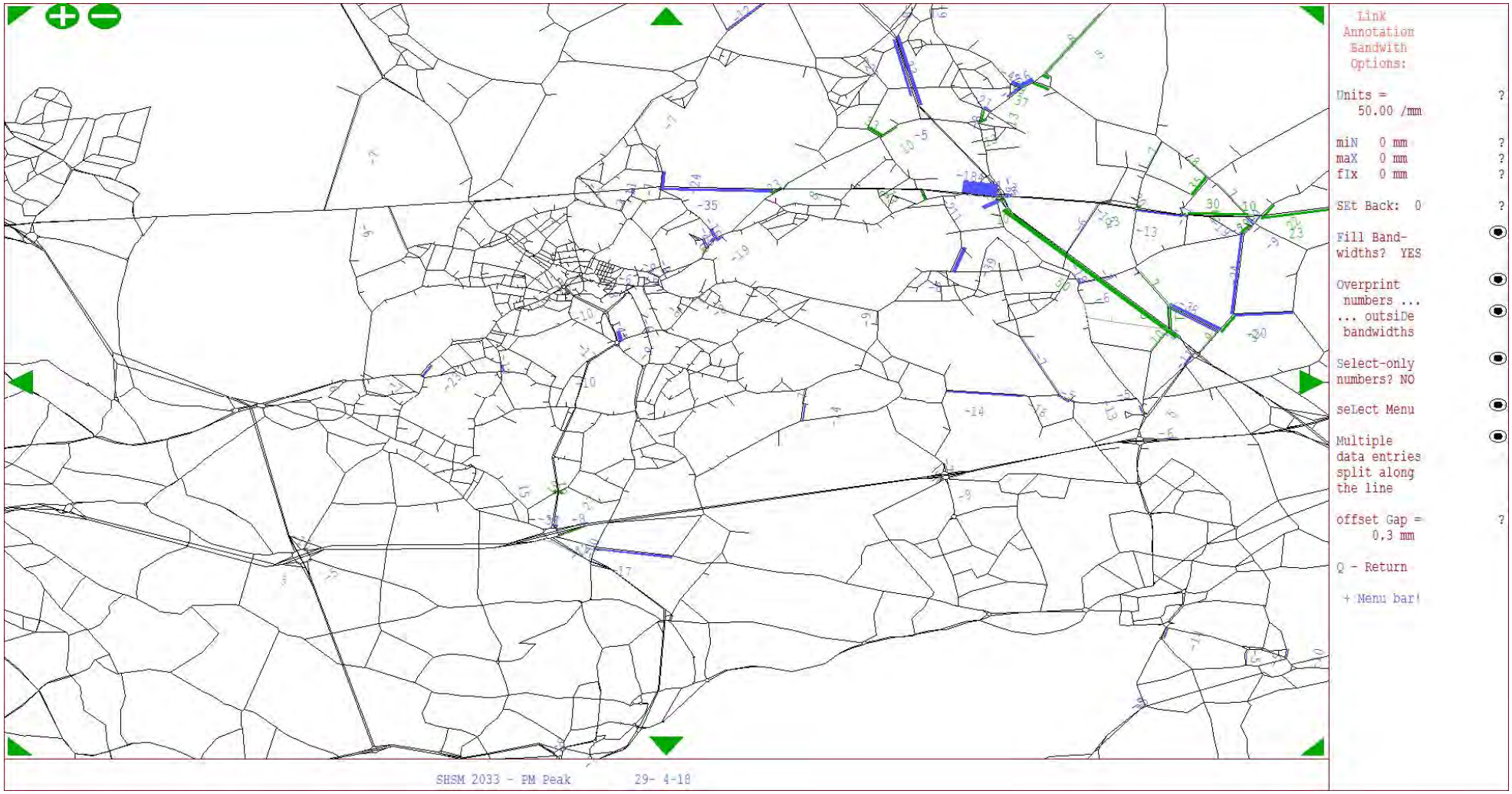


Figure 28 – PM DS2-DS1 delay (s)

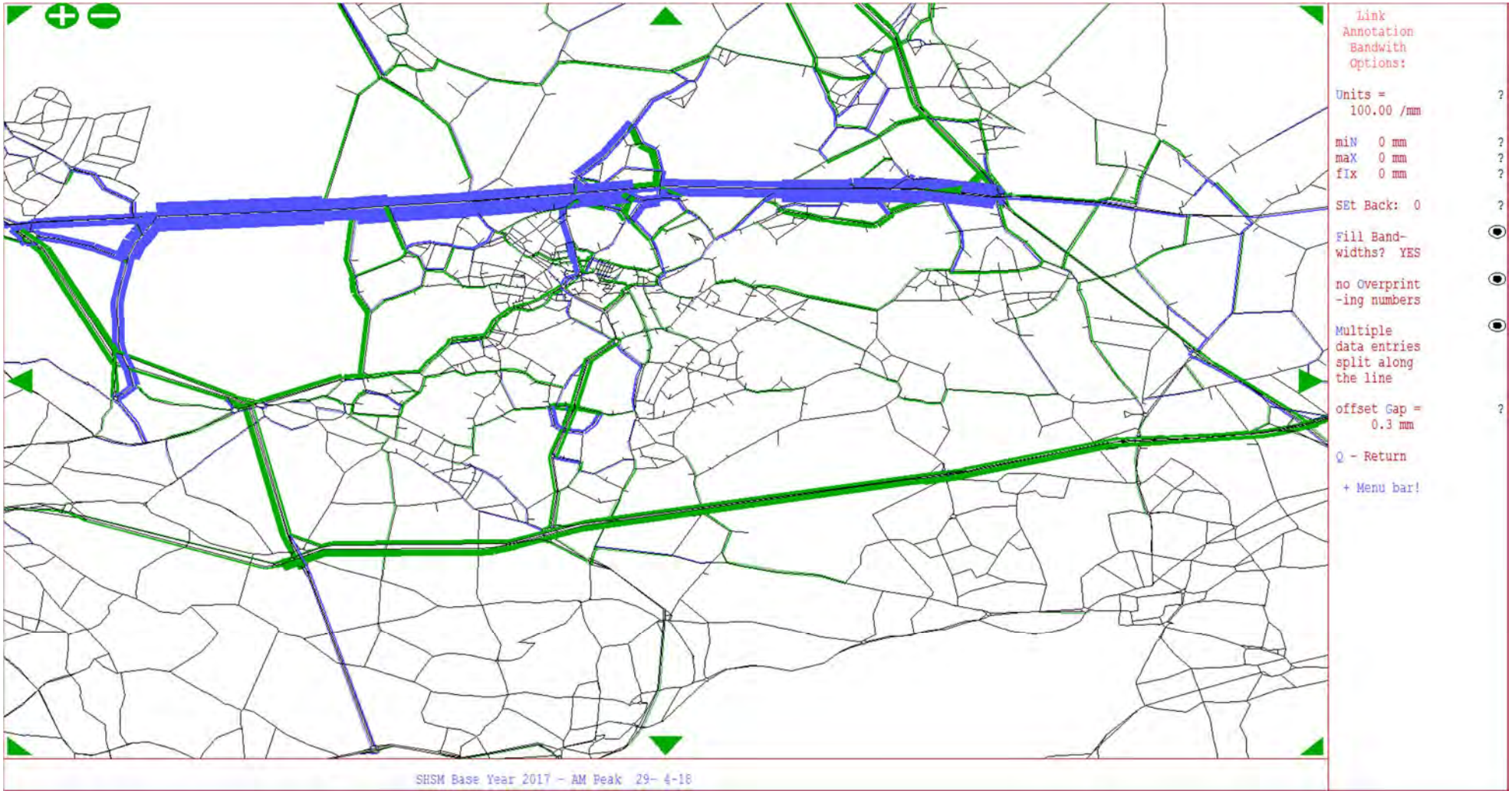


Figure 29 – AM DS2c-DS2 actual flow (s)

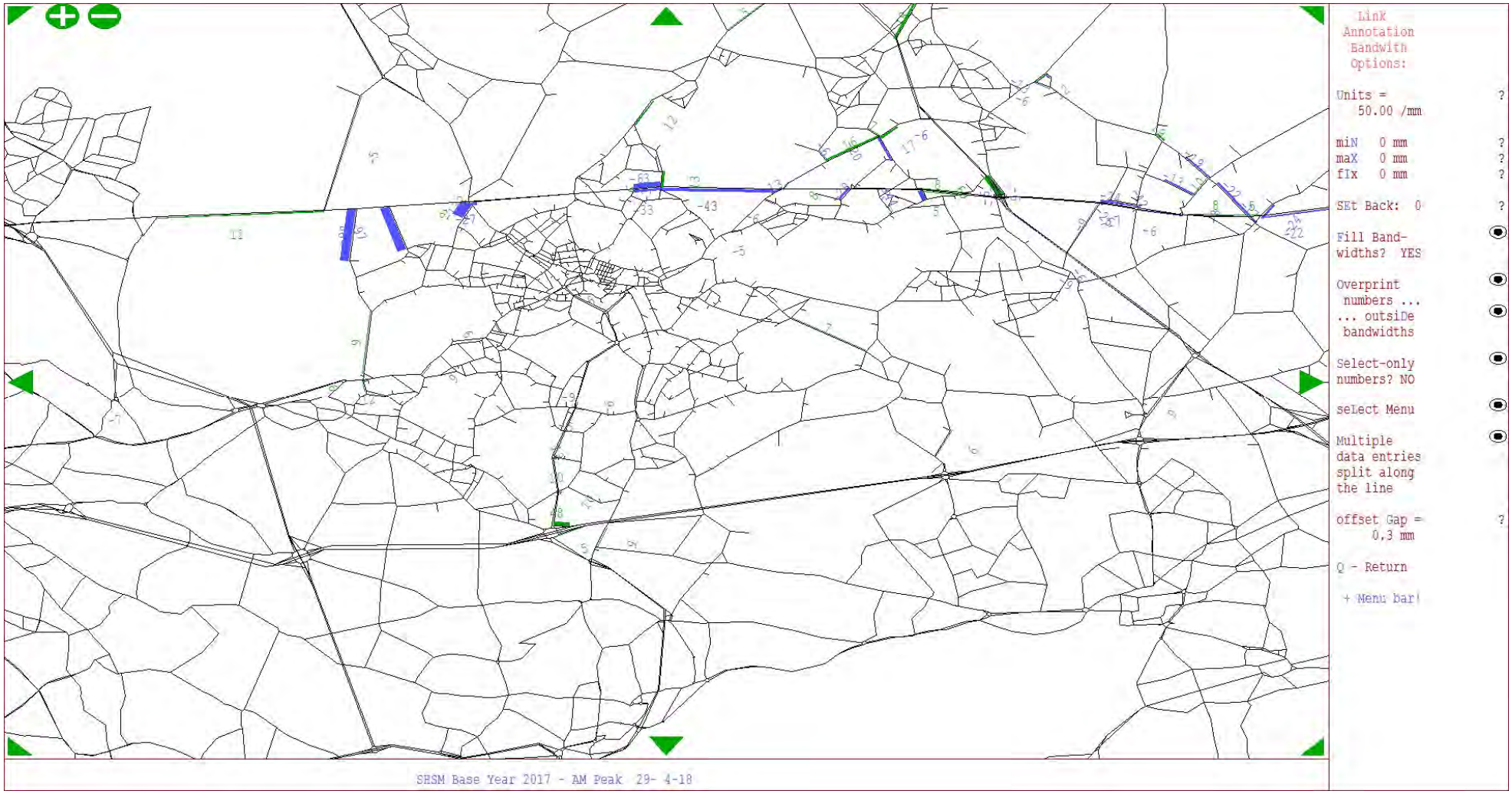


Figure 30 – AM DS2c-DS2 delay (s)

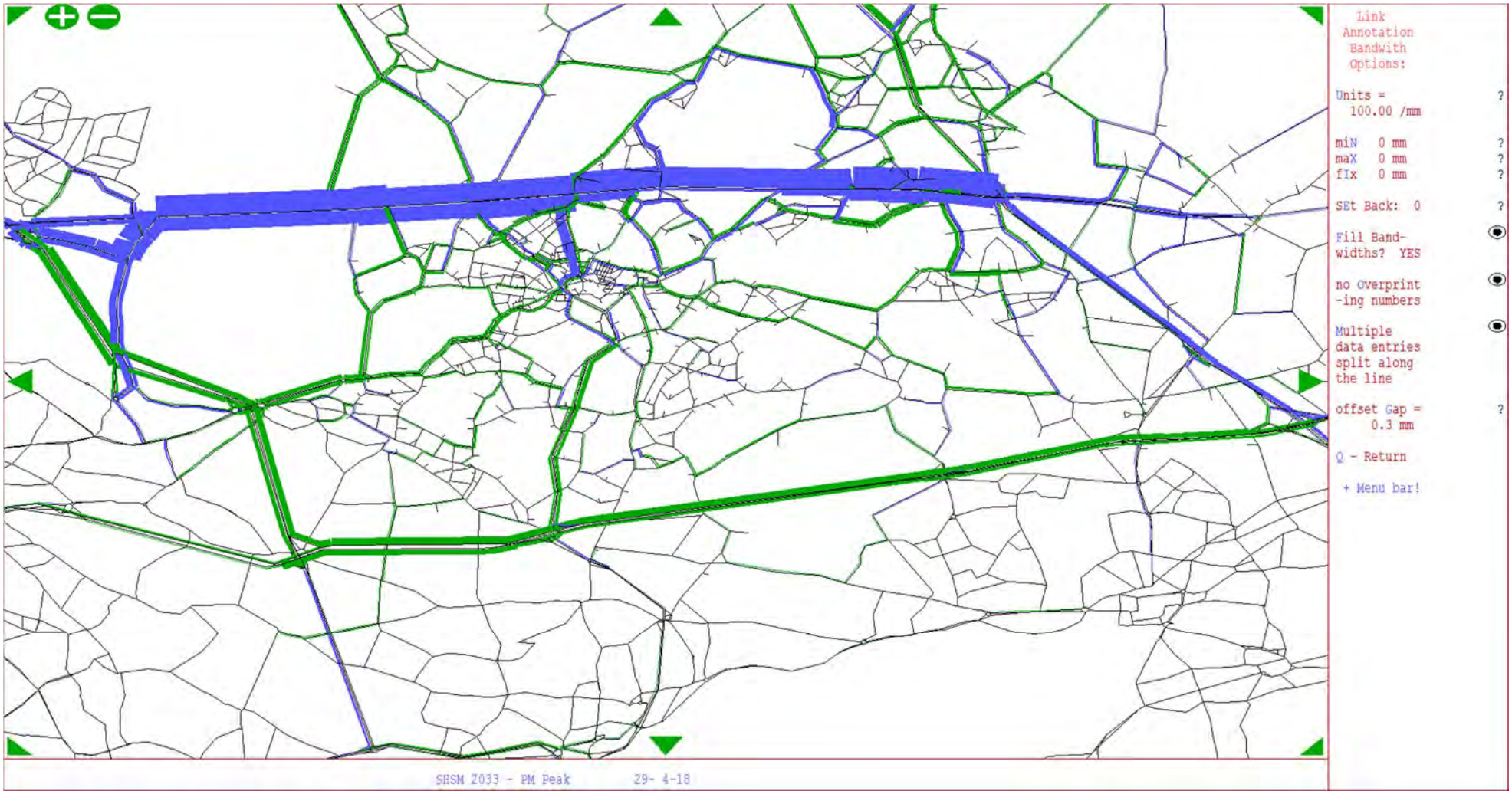


Figure 31 – PM DS2c-DS2 actual flow (pcu)

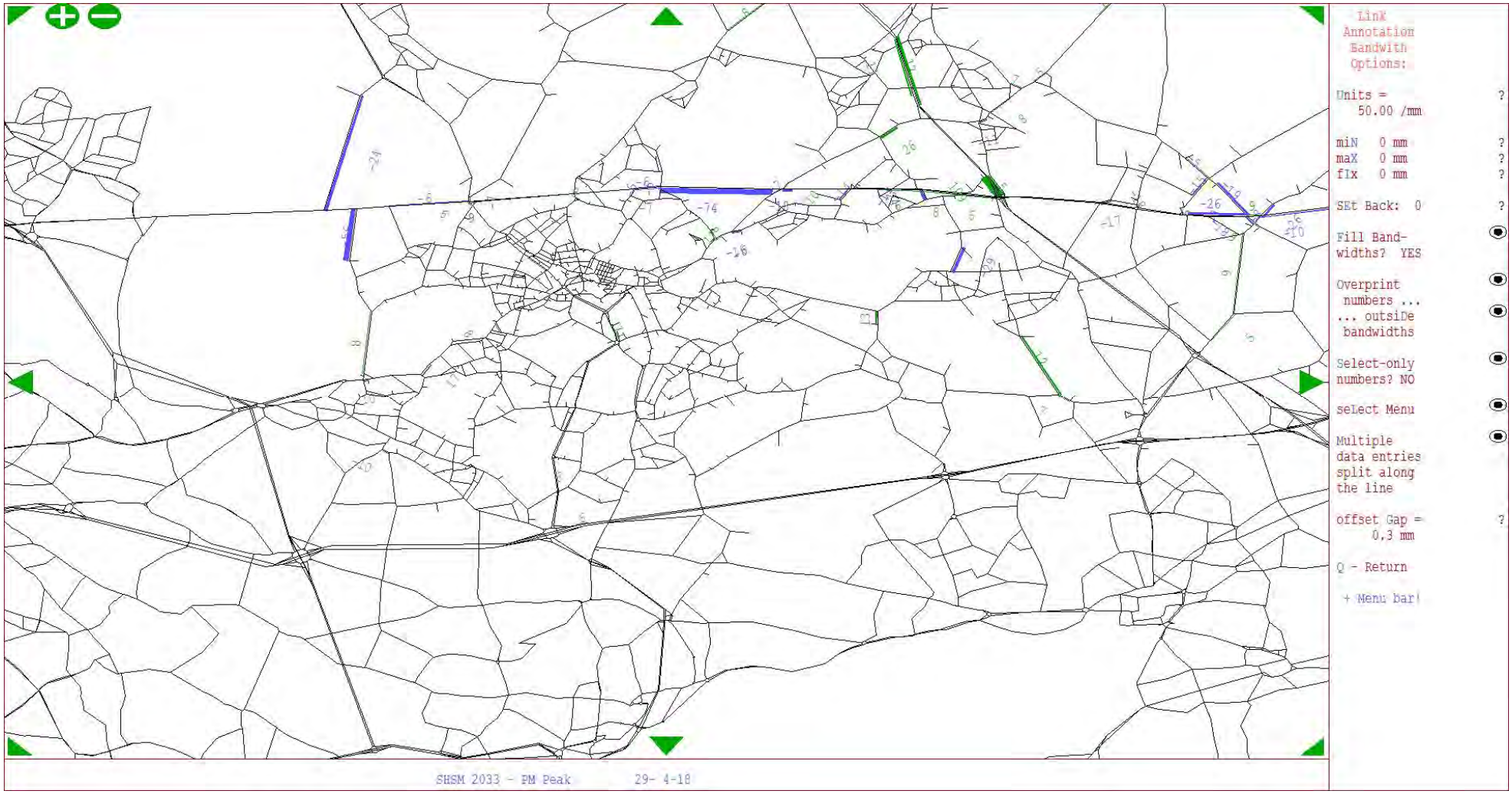


Figure 32 **– PM DS2c-DS2 delay (s)**

Appendix C

FORECAST MATRIX DEVELOPMENT

FORECAST DEMAND

Future year demand was derived by applying background growth to the base year matrices and the inclusion of selected major developments. Various constraints were also applied as appropriate. A diagram of the methodology flow is shown in Figure 1.

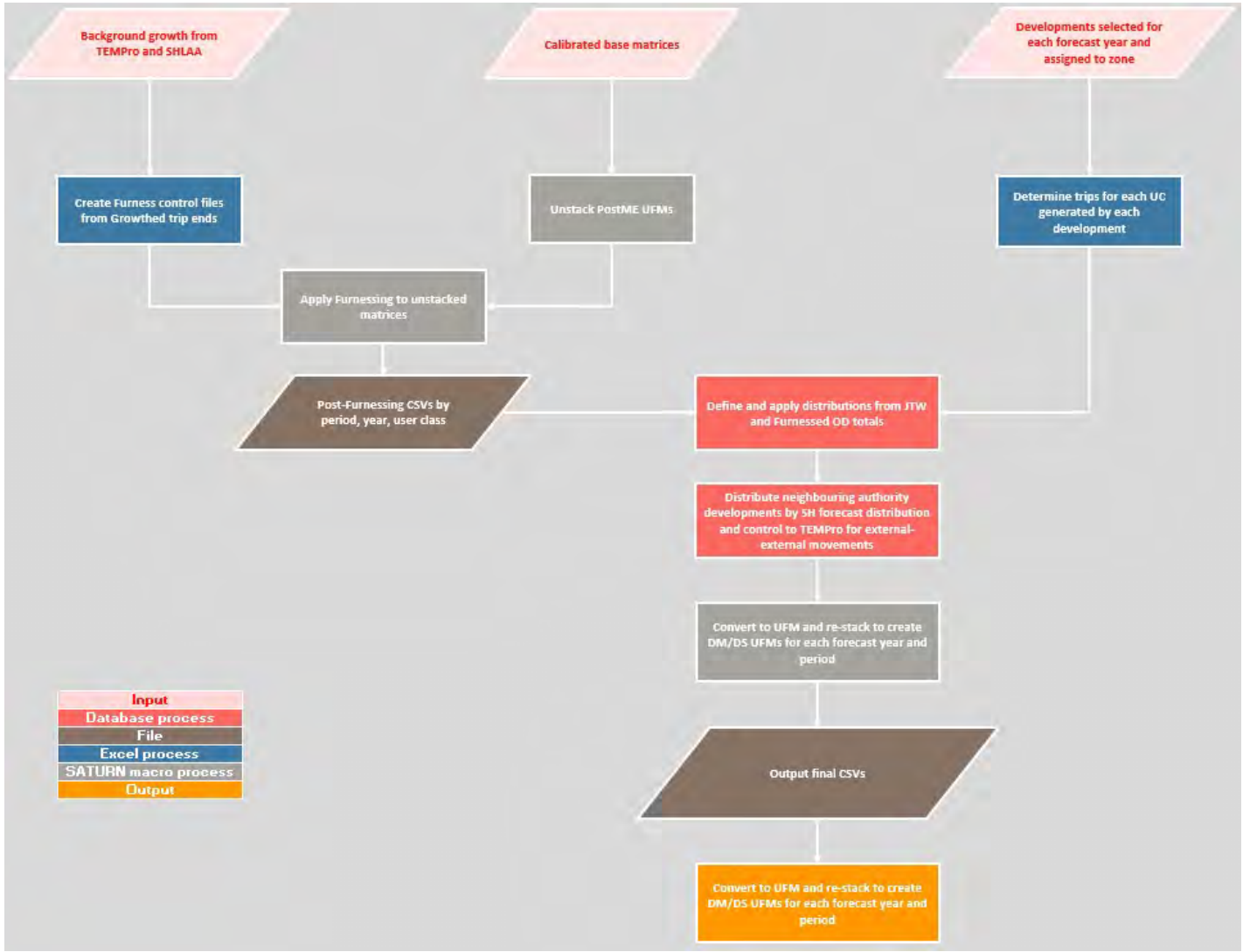


Figure 1 – Forecast demand methodology

BACKGROUND GROWTH

Background growth was applied to scale the base matrix to the predicted demand volume of the forecast year.

To distribute the forecast demand over OD zone pairs in the model, the Furness procedure available in SATURN was applied. This procedure iteratively adjusts matrix elements until the target row and column totals are achieved. The parameters used in this process are given in Table 7.

Table 2 – Furness algorithm parameters

Parameter	Value
Maximum iterations	99
Convergence stopping parameter	0.001
Doubly constrained Furness	Factor both rows and columns to equal their average

TEMPRO BASELINE GROWTH

NTEM data accessed through the DfT tool TEMPro 7.2 formed the principal component of the background growth for car trip demand. Growth factors were selected at MSOA level to apply to zones within St. Helens Local Area District (LAD), at LAD level for the neighbouring authorities and at North West Regional level for all other zones. This was in line with the relevance of each zone to the study area.

TEMPro growth was applied directly to zones external to St. Helens LAD and according to alternative assumptions internally.

TEMPRO ALTERNATIVE ASSUMPTIONS

A functionality within TEMPro is to apply 'alternative assumptions' to the predicted development volumes used in the calculation of growth factors. This made use of in the St. Helens Forecast Model to replace the volumes assumed with more localised volumes derived from planning information.

As such, all assumed increases in households and jobs were removed in the alternative assumptions for St. Helens MSOAs as a base for the alternative forecast. These were then replaced with development volumes identified in the uncertainty log from SHLAA developments and committed developments below 50 units in size.

Demand meeting these criteria was aggregated to MSOA level according to the location of the generating development and were applied as new forecast year demand volumes in the alternative assumptions. A summary of the volume applied to each MSOA within the St. Helens LAD compared with the TEMPro default demand assumptions is given in Table 3.

Table 3 – Background growth assumptions

MSOA Code	MSOA Name	Household (increase 2017-2033)		Jobs (increase 2017-2033)	
		TEMPro default	Alternative assumptions	TEMPro default	Alternative assumptions
E02001406	St. Helens 001	211	49	138	0
E02001408	St. Helens 003	147	20	56	450
E02001409	St. Helens 004	267	659	75	0

MSOA Code	MSOA Name	Household (increase 2017-2033)		Jobs (increase 2017-2033)	
E02001410	St. Helens 005	154	162	385	557
E02001411	St. Helens 006	156	59	53	0
E02001412	St. Helens 007	228	84	85	0
E02001413	St. Helens 008	252	61	50	0
E02001415	St. Helens 010	169	30	38	0
E02001416	St. Helens 011	157	101	46	0
E02001417	St. Helens 012	225	278	388	0
E02001418	St. Helens 013	154	176	119	0
E02001419	St. Helens 014	197	1,471	554	0
E02001420	St. Helens 015	269	19	130	0
E02001421	St. Helens 016	288	206	93	0
E02001422	St. Helens 017	163	90	72	0
E02001424	St. Helens 019	352	1,059	334	255
E02001425	St. Helens 020	279	282	78	0
E02001426	St. Helens 021	142	10	50	0
E02001427	St. Helens 022	264	143	149	0
E02001428	St. Helens 023	139	28	59	0
TOTAL		4,213	4,987	2,952	1,262

NTM GOODS VEHICLE GROWTH

Goods vehicles (GV) demand is not provided through TEMPro and so National Transport Model (NTM) growth factors were applied to scale GV demand to the forecast year. Light goods vehicle (LGV) growth factors were extracted by performing a linear interpolation to derive the appropriate growth factor for the forecast year.

For other goods vehicles (OGVs) growth factors are provided in NTM according to 2 classes, OGV1 and OGV2. The total OGV factor was derived from combining the factors for OGV1 and OGV2 according to the total proportion of each vehicle class observed in MCC data obtained for this study. Linear interpolation was again applied to obtain growth factor for the desired forecast year.

Derived growth factors for GVs are given in Table 4.

Table 4 – Goods vehicles 2033 growth factors

Vehicle class	2033 growth factor
LGV	1.402
OGV	1.104

DEVELOPMENT DISTRIBUTION

Identified demand not included in the background growth was distributed using a custom method based on Journey to Work (J2W) data available from the 2011 census.

ST. HELENS DISTRICT DEVELOPMENTS

All car trips were distributed according to J2W (i.e. a commute distribution) for simplicity but the proportions of each user class car trips were derived from the base matrices.

For non-development trip ends within St Helens, the J2W distribution was split over model zones within the MSOA of the J2W trip end. This was to provide a less discrete distribution within the study area. To provide a good balance between distributing trips to multiple zones within a MSOA and not 'losing' trips due to near-zero trip volumes, the base model trip distribution was approximated by taking the integer-percent proportion of trips before applying to the J2W trip ends. An adjustment factor was applied to ensure 100% of trips were retained.

The JTW distribution external to St Helens was aggregated to a sector system with each sector represented by the zone within it which had the highest total trip ends in the base model. This was to simplify the distribution of trips outside the area of interest of the model. This sectorisation can be seen in Figure 2. Sectors were defined with attention paid to model zone size, MSOA size and boundary and broad transport corridors such as the M6, A580 and the M62. St. Helens district appears as a single sector despite being the area of most relevance to the model due to a sector-based methodology not being applied here, as described above.

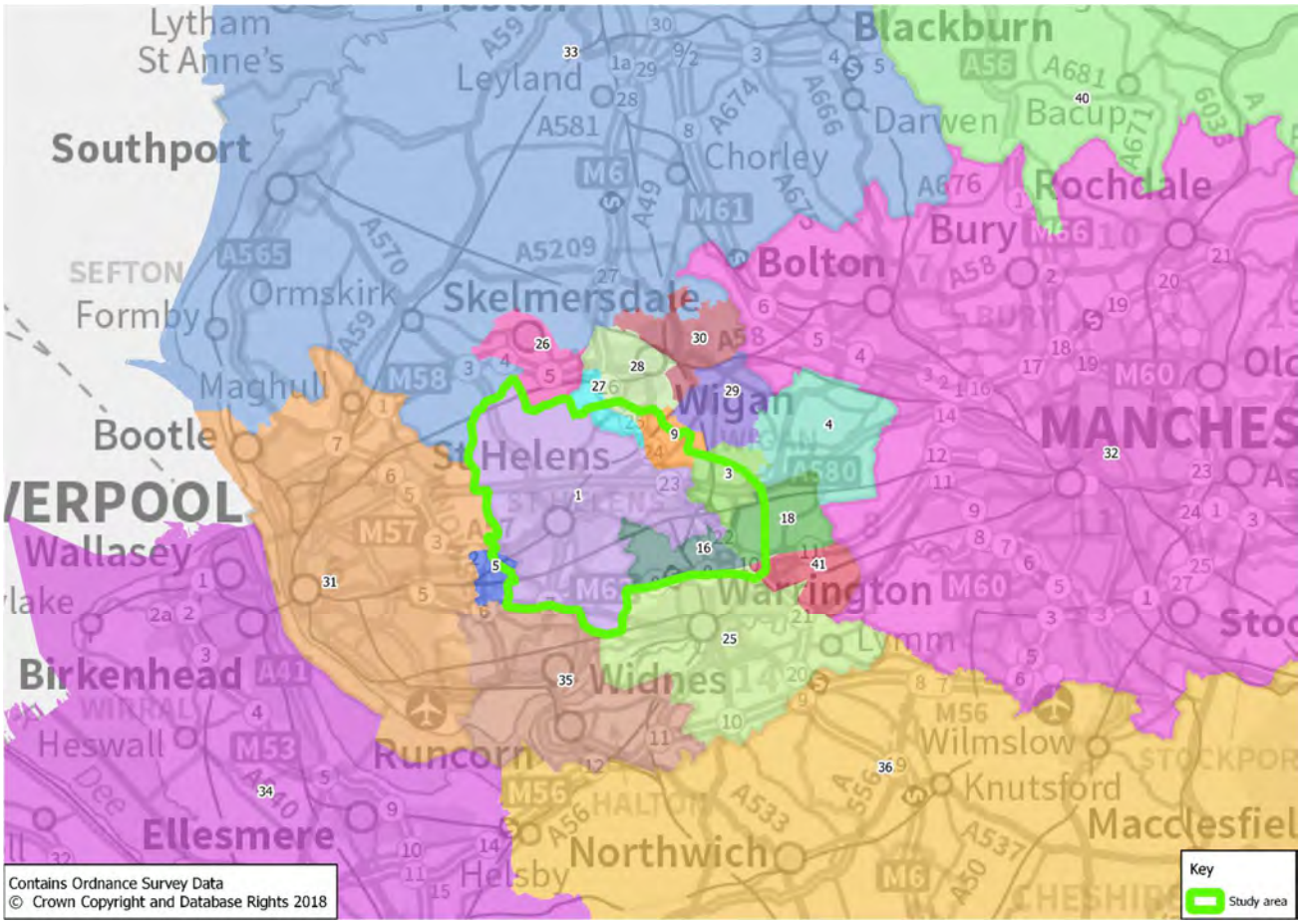


Figure 2 – Forecast sectors

JTW data provides only AM, from home commute trips and so PM distributions were produced by transposing the JTW matrix.

Figure 5 shows illustrative sector-based desire lines for trips with a trip end in St. Helens (movements within St. Helens district are not shown). The desire lines are weighted by trip volume and demonstrate major movements include trips to and from Liverpool, Warrington, Lancashire and Greater Manchester. This distribution is an aggregate of the individual zonal distributions, which are skewed depending on whereabouts in St. Helens district the zone is located. For example, a zone in the east of St. Helens would be expected to show a higher proportion of trips to and from Greater Manchester than would a zone at the furthest western extent of the district.

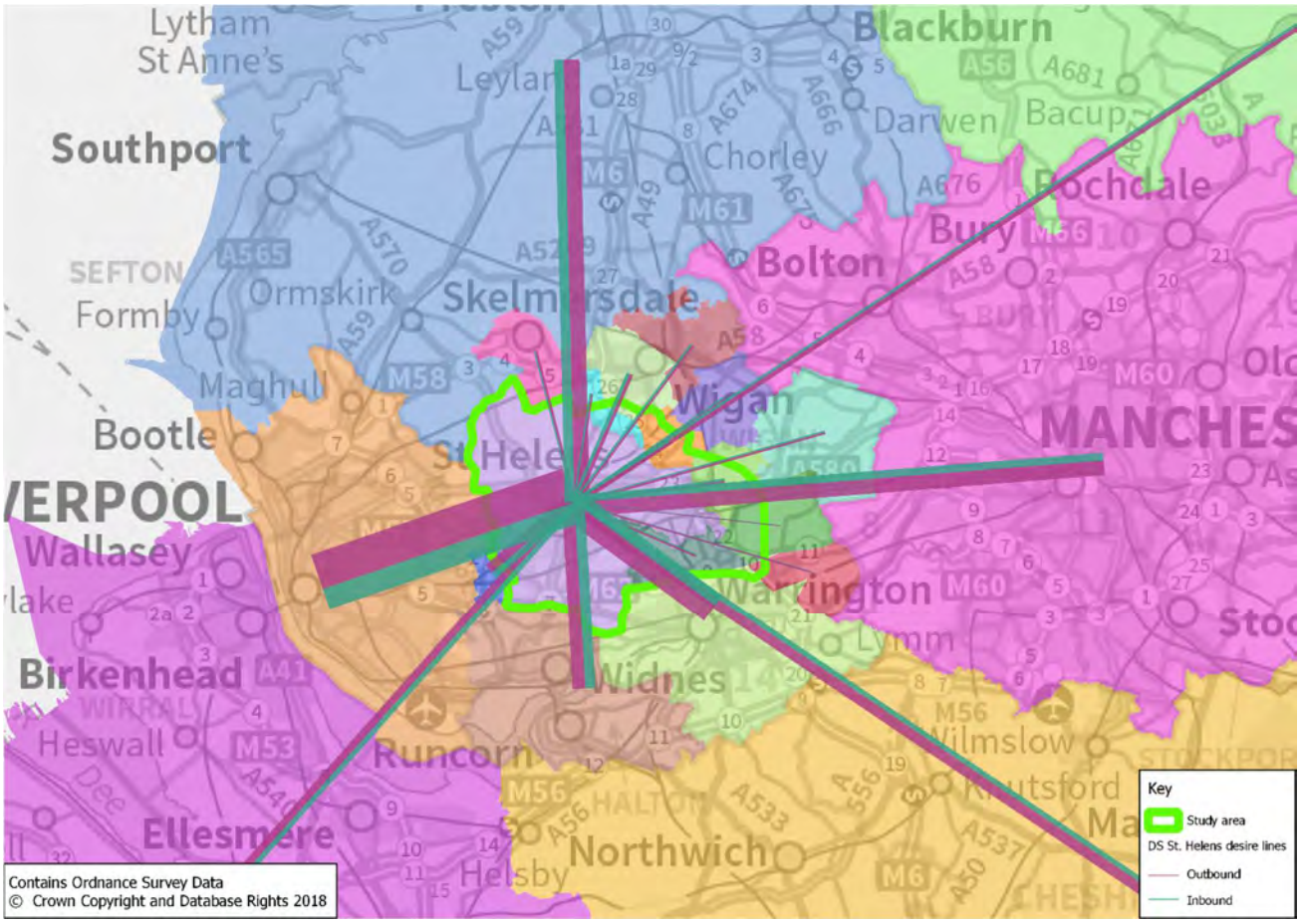


Figure 3 – St. Helens DS1 2033 sector desire lines (weighted by trips)

NEIGHBOURING AUTHORITY DEVELOPMENTS

For developments in neighbouring authorities, development trips were distributed according to the base matrix distribution. Trips not to or from St Helens were constrained to TEMPro levels by factoring this section of the matrix.

GOODS VEHICLES DISTRIBUTION

Goods vehicles were distributed using a donor-zone method, whereby the distribution from a zone with a similar land-use near the development was applied to GV trips from the development zone.

CONSTRAINTS

A number of constraints were applied to the trip generation for the forecast scenarios.

It was considered appropriate for the model to assume a 5% job vacancy rate for employment development trip generation. This was achieved in the model by applying a factor of 0.95 to all trips generated by an employment development and classed as a commute.

Additionally, earlier studies indicate that a proportion of an employment development's trip generation will constitute trips displaced from elsewhere in the region. In accordance with this, a reduction of 35% of the total commute trips generated by an employment site was applied to commute trips elsewhere in the matrix.

FORECAST MATRIX TOTALS

OD totals aggregated to St. Helens LAD and elsewhere are given in Table 5 to Table 8.

Table 5 – Base year matrix totals

AM	St. Helens	Elsewhere	PM	St. Helens	Elsewhere
St. Helens	10,983	11,499	St. Helens	10,604	9,531
Elsewhere	9,530	394,536	Elsewhere	11,857	370,586

Table 6 – DM matrix totals

AM	St. Helens	Elsewhere	PM	St. Helens	Elsewhere
St. Helens	12,216	14,706	St. Helens	12,355	12,192
Elsewhere	9,864	395,737	Elsewhere	12,404	371,787

Table 7 – DS1, DS2b matrix totals

AM	St. Helens	Elsewhere	PM	St. Helens	Elsewhere
St. Helens	13,466	17,581	St. Helens	13,749	13,890
Elsewhere	11,742	395,737	Elsewhere	14,423	371,787

Table 8 – DS2a, DS2, DS2c matrix totals

AM	St. Helens	Elsewhere	PM	St. Helens	Elsewhere
St. Helens	13,077	17,132	St. Helens	13,369	13,566
Elsewhere	11,403	395,071	Elsewhere	14,066	371,123

The do-something scenarios are expected to generate significant additional demand to the DM scenario. This can be expected to cause extra stress on the network and it is the intention of this appraisal to demonstrate whether the mitigations included in the do-something scenarios are sufficient to absorb the impact of the increased demand.

DEVELOPMENT TRIP GENERATION

To obtain the trip generations associated with St. Helens Local Authority District (LAD) developments, trip rate values were used to derive car and OGV generations for residential and employment trips in the region. Where available, trip rates were taken from planning documents associated with the development, otherwise trip rates derived from the TRICS database were used.

To extract generic trip rates for residential sites, large sites (100-800 units) were selected from the TRICS database. This is in accordance with the large size of the residential developments distributed independently.

The smaller residential developments are incorporated into the background growth as described in Appendix C (Forecast Matrix Development).

Similarly, trips rates for employment land use were derived by sub category of land use for sites between 10 and 40 Hectares.

Appendix D

SCENARIO DEVELOPMENTS

Table 1 – Background growth developments

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Leyland Green Road	SHLAA	0.51	C3	7
Land off Wargrave Road	SHLAA	0.3	C3	7
Land rear of Carnegie Crescent and Goodban Street	SHLAA	0.26	C3	7
Land rear of 62-78 Esthwaite Avenue	SHLAA	0.25	C3	8
18 Rainford Road	SHLAA	0.26	C3	8
Auto Safety Centre, Vicarage Road	SHLAA	0.31	C3	9
Site of former 119-133 Crow Lane West	SHLAA	0.3	C3	9
Land adjacent Church of Christ, Heather Brae	SHLAA	0.3	C3	9
Abbey House Hostel, Abbey Road	SHLAA	0.32	C3	10
Christ Church Parish Hall, Chapel Lane	SHLAA	0.36	C3	10
Land rear of 39-67 Valentine Road	SHLAA	0.46	C3	10
Land at Waterdale Crescent	SHLAA	0.26	C3	10
Former Pumping Station, Sutton Road	SHLAA	0.27	C3	10
Site of former 126-154 Birchley Street and 107-125 Brynn Street	SHLAA	0.25	C3	10
Former Bethell Mission Bowling Green, Marsden Avenue	SHLAA	0.27	C3	10
Land at Littler Road	SHLAA	0.52	C3	11
Land Between 8 & 34 Portland Way and 161 & 123 Berry's Lane	SHLAA	0.28	C3	11
Land rear of 17-41 McMinnis Avenue	SHLAA	0.34	C3	11
Land rear of 350 Warrington Road	SHLAA	0.39	C3	11
Land rear of 1-27 Station Road	SHLAA	0.4	C3	12
Newton Clinic, Crow Lane East	SHLAA	0.37	C3	12
Former Revere Graphics, Borough Road	SHLAA	0.37	C3	12
Derbyshire Hill Family Centre, Derbyshire Hill Road	SHLAA	0.32	C3	12
Land rear of 64-94 Marshalls Cross Road	SHLAA	1.43	C3	12
Land at Newby Place	SHLAA	0.34	C3	13
Land adjacent Piele Road	SHLAA	0.61	C3	13
Site of former 56-120 Eccleston Street	SHLAA	0.33	C3	13
Land rear of 13-33 Adelaide Avenue	SHLAA	0.43	C3	13
Land at corner of Fairclough Street and Wargrave Road	SHLAA	0.41	C3	14
Land rear of 2-24 Massey Street	SHLAA	0.35	C3	14
Land rear of 14 to 20 Weymouth Avenue	SHLAA	0.36	C3	14
Land at 19 and 25 Sutton Moss Road	SHLAA	0.54	C3	14
Land at 235-237 Leach Lane	SHLAA	0.45	C3	14
Alexandra House, Borough Road	SHLAA	0.52	C3	16

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Industrial Estate, Station Road and Peckers Hill Road	SHLAA	0.51	C3	16
Land at Kingsway	SHLAA	0.54	C3	17
Land south of Knowsley Road	SHLAA	0.42	C3	18
Land Between Weymouth Avenue & Berry's Lane	SHLAA	0.52	C3	18
Former Sutton Arms PH, Elephant Lane	SHLAA	0.35	C3	18
Site of former St.Marks Primary School, Willow Tree Avenue	SHLAA	0.51	C3	18
Land north of Vicarage Road	SHLAA	0.64	C3	20
Site of former Our Lady's Primary School, Fleet Lane	SHLAA	0.61	C3	21
Land south of Crab Street	SHLAA	0.48	C3	21
Land adjacent St.David's Church, Eskdale Avenue	SHLAA	0.71	C3	22
Farmfoods, Boundary Road	SHLAA	0.76	C3	24
Former Poultry Farm, South Lane	SHLAA	0.79	C3	25
Milton Street	SHLAA	1.27	C3	25
Land to the rear of Carr Mill Community Centre, Kentmere Avenue	SHLAA	0.84	C3	26
Land opposite 2 to 28 Egerton Street	SHLAA	0.38	C3	27
Land adjacent Allotments, Walkers Lane	SHLAA	0.86	C3	27
Land at Park Road	SHLAA	0.78	C3	28
Liverpool Arms and Former Sacred Heart RC Church and School, Borough Road	SHLAA	0.83	C3	29
Former Halton and St Helens PCT HQ, Cowley Hill	SHLAA	1.17	C3	32
Land at junction of Sunbury Street and Fir Street	SHLAA	0.82	C3	32
Former British Lead Mill Works, Salisbury Street	SHLAA	1.01	C3	32
Land west of Vista Road	SHLAA	1.24	C3	33
Land at Holly Bank Street	SHLAA	1.28	C3	34
Crown Works, Eccleston Street	SHLAA	1.1	C3	35
BT Depot, Sutton Road	SHLAA	1.02	C3	36
Land at Former Hay's Chemicals, Baxters Lane	SHLAA	1.19	C3	37
Land to the rear of Juddfield Street	SHLAA	1.14	C3	41
Land & Premises at Lords Fold	SHLAA	2.01	C3	45
Former Central Works, Church Road	SHLAA	1.82	C3	48
Land at Willow Tree Avenue	SHLAA	3.5	C3	50
Site of former Carr Mill Infants School, Ullswater Ave	SHLAA	1.49	C3	53
Site of former Parr Community High School, Fleet Lane	SHLAA	1.52	C3	54
Land at Former Hay's Chemicals, Lancots Lane	SHLAA	1.8	C3	57
Former Red Quarry, Chester Lane	SHLAA	1.93	C3	57

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Land adjacent St.Helens Hospital, Marshalls Cross Road	SHLAA	1.65	C3	59
Land at Somerset Street and Sussex Grove	SHLAA	2.21	C3	66
FDL Packaging, Abbeyway South	SHLAA	2.14	C3	68
Atlas Street	SHLAA	2.37	C3	75
Land at Ravenhead Retail Park, Burtonhead Road	SHLAA	2.52	C3	79
Land adjacent Laffak Road and Carr Mill Road	SHLAA	3.31	C3	99
College Street Northern Gateway	SHLAA	2.88	C3	103
Vacant land adjacent to Rail Line, Elephant Lane	SHLAA	4.33	C3	112
Sidac Sports & Social Club, Applecorn Close	SHLAA	3.65	C3	137
Land to the West of Common Road	SHLAA	9.28	C3	142
Alexandra Park - Former Pilkington HQ	SHLAA	10.84	C3	162
Land North and South of Corporation Street	SHLAA	3.23	C3	169
Former United Glass (Phase 2), Peasley Cross Lane	SHLAA	5.45	C3	172
Land at Elton Head Road, Lea Green	SHLAA	6.35	C3	200
Land north of Elton Head Road	SHLAA	12.5	C3	375
Moss Nook Urban Village, Watery Lane	SHLAA	26.74	C3	802
Land east of City Road, Cowley Hill	SHLAA	47.9	C3	405
388 Clipsley Lane	Committed	0.55	C3	5
Saxon Court Keswick Road	Committed	0.42	C3	6
Land adjacent to Bleak Hill Farmhouse Bleak Hill Road Windle	Committed	6.2	C3	7
107 St Helens Road Eccleston Park	Committed	0.77	C3	8
Land off Stonecross Drive	Committed	0.81	C3	7
Land at Rear Of 46 Windle Hall Drive	Committed	0.43	C3	9
Land at Legh Street Newton Le Willows St Helens	Committed	0.07	C3	10
Land Site of Former Engine Inn 287 Newton Road Newton Road St Helens	Committed	0.18	C3	10
Rainhill Club and Sports Lounge Warburton Hey Rainhill St Helens	Committed	0.24	C3	10
Land at Cannon Street Clock Face	Committed	0.21	C3	10
Land at Sorrel Way Clock Face	Committed	0.36	C3	10
Clough Mill Blundells Lane Rainhill St Helens	Committed	0.52	C3	10
Rainford Ex Servicemens Club 36 Cross Pit Lane Rainford St Helens	Committed	0.46	C3	4
Land at 135 Hall Street St Helens	Committed	0.13	C3	11
Windlehurst Youth Centre Gamble Avenue St Helens Merseyside	Committed	0.47	C3	12
Former Legh Arms 1 Mill Lane Newton Le Willows St Helens	Committed	0.09	C3	12

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
14-16 Bridge Street St Helens Merseyside	Committed	0.03	C3	15
Land Site of Former Black Horse Public House 115 Moss Bank Road St Helens Merseyside	Committed	0.42	C3	16
Haydock Health and Medical Centre 152 Station Road Haydock St Helens	Committed	0.23	C3	5
Land at and Including 24 Bewsey Street Thatto Heath St. Helens	Committed	0.12	C3	16
Land At 305 Walkers Lane Sutton Manor St Helens	Committed	0.5	C3	16
Haydock Cricket and Bowling Club Ireland Road St Helens Haydock	Committed	0.68	C3	17
Sherdley Remec Ltd Gorsey Lane Clock Face	Committed	0.93	C3	14
Former Broadoak Social Club Boardmans Lane St Helens Merseyside	Committed	0.53	C3	21
Former 2-40 Chancery Lane	Committed	0.21	C3	5
Hardshaw House Tolver Street St Helens Merseyside	Committed	0.24	C3	26
Land Site of Bowling Green Inn and Former Beehive Inn Watery Lane St Helens	Committed	0.22	C3	26
TOTAL				**4,995**

Table 2 – DM scenario developments – EMPLOYMENT

Site Name/Address	Type	Area (ha)	Use	Jobs (2033)
Fishwicks Industrial Estate Kilbuck Lane Haydock St Helens WA11 9SZ	Committed	3.17	B8	90
Land at Mere Grange Lowfield Lane St Helens Merseyside WA9 5TA	Committed	10.02	B1,B2	225
Land to North of Penny Lane and West of M6 Motorway Penny Lane Haydock St Helens	Committed	11.15	B8	467
Land at Florida Farm North Slag Lane Haydock St Helens	Committed	37.06	B8	450
TOTAL				**1,232**

Table 3 – DM scenario developments - RESIDENTIAL

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Land to Rear of Old Wargrave Road Newton Le Willows St Helens	Committed	0.58	C3	60
Vulcan Village (Phase 3) Wargrave Road Newton Le Willows St Helens	Committed	3.77	C3	134
Former Lowe House School Site, Crab Street, St. Helens	Committed	1.26	C3	54

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Polar Ford, City Road	Committed	2.75	C3	87
Land site of Bowling Green Inn and Former Beehive Inn Watery Lane St Helens	Committed	0.22	C3	26
Land at Lea Green Colliery and Lowfield Lane Industrial Estate	Committed	5.25	C3	160
Former Caledonia Peugeot Garage, Knowsley Road	Committed	0.96	C3	80
Haydock Cricket and Bowling Club Ireland Road St Helens Haydock	Committed	0.68	C3	17
Deacon Trading Estate	Committed	9.07	C3	324
Former Lea Green Colliery, Lowfield Lane Industrial Estate, Lowfield L	Committed	10.78	C3	354
Pilkington (Eccleston Works), Millfields	Committed	9.50	C3	267
Phase 2a Land site of former Vulcan Works Wargrave Road	Committed	5.20	C3	216
Phase 2b Land site of former Vulcan Works Wargrave Road	Committed	2.54	C3	74
Land site of former Black Horse Public House 115 Moss Bank Road St Helens Merseyside	Committed	0.42	C3	16
Land at Baxters Lane	Committed	1.97	C3	84
Former 2-40 Chancery Lane	Committed	0.21	C3	25
Land at 135 Hall Street St Helens	Committed	0.13	C3	11
Sherdley Remec Ltd Gorsey Lane Clock Face	Committed	0.93	C3	19
Land at Cannon Street Clock Face	Committed	0.21	C3	10
Land at Delta Road St Helens	Committed	1.34	C3	52
Land off Lowfield Lane	Committed	3.60	C3	114
Land at Sorrel Way Clock Face	Committed	0.36	C3	10
Land at and including 24 Bewsey Street Thatto Heath St.Helens	Committed	0.12	C3	16
Land site of Former Engine Inn 287 Newton Road Newton Road St Helens	Committed	0.18	C3	10
Penlake Industrial Estate Land at Emr Recycling and former British Rail Club, Railway Embankment	Committed	10.19	C3	358
Former Ibstock Brick Roughdales Ltd Chester Lane Clock Face St Helens	Committed	8.90	C3	260
Land Off Monastery Lane	Committed	0.03	C3	80
Land adjacent to former Little Lea Green Farm Elton Head Road Thatto Heath	Committed	6.29	C3	180

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Rainhill Club and Sports Lounge Warburton Hey Rainhill St Helens	Committed	0.24	C3	10
Clough Mill Blundells Lane Rainhill St Helens	Committed	0.51	C3	10
Fishwicks Industrial Estate Baxters Lane St Helens Merseyside	Committed	2.83	C3	93
Former Broadoak Social Club Boardmans Lane St Helens Merseyside	Committed	0.53	C3	21
Land at 305 Walkers Lane Sutton Manor St Helens	Committed	0.50	C3	16
Land at Legh Street Newton Le Willows St Helens	Committed	0.08	C3	10
Hardshaw House Tolver Street St Helens Merseyside	Committed	0.24	C3	26
Land at Mere Grange Lowfield Lane St Helens Merseyside	Committed	3.66	C3	98
Haydock Health and Medical Centre 152 Station Road Haydock St Helens	Committed	0.23	C3	16
Windlehurst Youth Centre Gamble Avenue St Helens Merseyside	Committed	0.47	C3	12
Viridor Waste Recycling Limited Lancots Lane St Helens	Committed	1.70	C3	53
Land site of Former 29 Edward Street St Helens	Committed	1.20	C3	52
Land to the west of Common Road Newton Le Willows St Helens	Committed	4.71	C3	142
Former Legh Arms 1 Mill Lane Newton Le Willows St Helens	Committed	0.09	C3	12
14-16 Bridge Street St Helens Merseyside	Committed	0.03	C3	15
Former Pilkingtons Site, City Road	Committed	4.40	C3	153
388 Clipsley Lane	Committed	0.55	C3	5
107 St Helens Road Eccleston Park	Committed	0.77	C3	8
Land at rear of 46 Windle Hall Drive	Committed	0.43	C3	9
Land adjacent to Bleak Hill Farmhouse Bleak Hill Road Windle	Committed	6.20	C3	7
Viridor Glass Recycling, Lancots Lane	Committed	1.76	C3	53
Land off Stonecross Drive	Committed	0.81	C3	8
Saxon Court Keswick Road	Committed	0.42	C3	6
Rainford Ex Servicemens Club 36 Cross Pit Lane Rainford St Helens	Committed	0.46	C3	10
Former AC Complex Site, Shaw Street, St Helens (Stalled site)	Committed	1.40	C3	260
TOTAL				**4,203**

Table 4 – DM scenario developments - RETAIL

Site Name/Address	Type	Area (sqm)	Use	Jobs (2033)
Former Vulcan Works Wargrave Road, Newton Le Willows	Committed	1724	A1	28
Pentagon Printing Co Ltd Park Road St Helens WA11 9AZ	Committed	2468	A1	40
Atlas Street, St Helens	Committed	2867	A1	30
Linkway West	Committed	6637	A1, A3, D2	156
TOTAL				**254**

Table 5 – DS1 scenario developments - EMPLOYMENT

Site Name/Address	Type	Area (ha)	Use	Jobs (2033)
'Omega Extension' - land north of M62	Local Plan	12.87	B2, B8	1581
Parkside West	Local Plan	10.78	B2, B8	170
Land south of Penny Lane	Local Plan	2.16	B8	87
Gerard's Park Phase 3, College Street, St. Helens Town Centre	Local Plan	0.95	B8	293
Land at Lea Green Farm West, Thatto Heath	Local Plan	3.84	B8	1361
Parkside East (SRFI) and Rail Terminal	Local Plan	64.55	B8	426
Land to the West of Haydock Industrial Estate, Haydock	Local Plan	7.75	B8	1429
Land at Florida Farm North, Florida Farm, Slag Lane, Haydock, WA11 9RX	Local Plan	12.73	B2, B8	2460
Land north-east of M6 J23 & south of Haydock Racecourse, Haydock	Local Plan	42.31	B2, B8	495
Land north of Penny Lane, Haydock	Local Plan	13.85	B2, B8	1191
Omega South - Western Extension Phase 1, Land north of Finches Plantation, Bold	Local Plan	31.22	B2, B8	628
Land off Sand Wash Close, Rainford	Local Plan	6.96	B2, B8	1290
Land west of Millfield Lane, south of Liverpool Road and north of Clipsley Brook, Haydock	Local Plan	63.68	B2, B8	1581
TOTAL				**12,992**

Table 6 – DS1 scenario developments - RESIDENTIAL

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Rookery Lane, Rainford	Local Plan	11.61	C3	174
Land at Florida Farm, Slag Lane, Haydock, WA11 0UZ	Local Plan	22.3	C3	495
Eccleston Park Golf Club, Rainhill Road	Local Plan	49.67	C3	495
Haydock Green, Land south west of Junc 23 - M6 Haydock	Local Plan	28.4	C3	495
Land at Vista Road	Local Plan	17	C3	350
Lords Fold, Rainford	Local Plan	2.87	C3	55
Land adjoining Ash Grove Farm, Beacon Road	Local Plan	8.7	C3	163
Land at Weathercock Hill Farm, Garswood Road	Local Plan	9.58	C3	179
Land at Moss Bank Farm	Local Plan	2.66	C3	50
Red Bank Community Home, Winwick Road, WA12 8AE	Local Plan	8.03	C3	150
Land at Gartons Lane	Local Plan	20.26	C3	446
Land East of Chapel Lane	Local Plan	4.25	C3	95
Land at Martindale Road, Carr Mill	Local Plan	1.45	C3	43
Land south of Howards Lane / east of Gillars Lane, Eccleston	Local Plan	36.2	C3	750
Land south of Burrows Lane, Eccleston	Local Plan	7	C3	131
Land at Manor Farm, Mill Lane, Rainhill	Local Plan	37.54	C3	500
Land north of Bell Lane and south-west of Milton Street (individual plots), Bold	Local Plan	3.83	C3	107
Land to west of Bridge Road and Sweet Brier Court, off Clock Face Road, Bold	Local Plan	5	C3	252
Land at Elton Head Road	Local Plan	18.77	C3	86
Land South of Station Road	Local Plan	5.67	C3	168
Land to the South of former Central Works, Balleropon Way	Local Plan	6.59	C3	198
Land north of Strange Road and west of Camp Road, Garswood	Local Plan	4.45	C3	111
Land at Castle Hill and East of Rob Lane	Local Plan	3.5	C3	364
Land at Elms Farm, West of Rob Lane	Local Plan	3.5	C3	105
Parcel B (Housing), Land between Ashton Road and M6, Earlestown, Newton-le-Willows	Local Plan	3.23	C3	600
Land to East of Newlands Grange	Local Plan	15.56	C3	320
Land off Winwick Road, Newton-Le-Willows	Local Plan	12.83	C3	255
Land south of Reginald Road / Bold Road - Northern Section (Phase 1), Bold	Local Plan	10.5	C3	197

Site Name/Address	Type	Area (ha)	Use	Dwellings (2033)
Higher Barrowfield Farm, Houghton's Lane, Eccleston	Local Plan	0.78	C3	8
Former Newton Community Hospital (Simms Ward), Bradlegh Road, Newton-le-Willows	Local Plan	2.01	C3	20
Land south of A580 between Houghtons Lane and Crantock Grove, Windle	Local Plan	54.27	C3	495
Land off Common Road / Swan Road, Newton-le-Willows	Local Plan	3.56	C3	112
Land south of Leyland Green Road, North of Billinge Road and East of Garswood Road, Garswood	Local Plan	12.99	C3	320
Land to the rear of Higher Lane	Local Plan	21.64	C3	153
Bushey Lane South, Rainford	Local Plan	8.66	C3	140
TOTAL				**8,582**

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