

Maidstone VISUM Model

2017 and 2026 Forecast Models – South East Maidstone Strategic Link Impacts Summary

FINAL REPORT

December 2009

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1 Introduction

Jacobs were commissioned by Kent County Council & Maidstone Borough Council in August 2007 to undertake the development of a multi-modal transport model for the town of Maidstone in Kent. The scope of the report outlines the impact of future year land use developments, including the South East urban extension and the South East Maidstone Strategic Route (SEMSL) from the completed base and forecast models of Maidstone VISUM models.

The Maidstone Multi Modal Transport Models for the AM peak and PM peak were developed using the VISUM modelling software to represent the base year conditions for 2007. The model encompasses Maidstone Borough and the immediate surrounding area in detail, whilst the wider network extends to include the major transport routes across Kent and into London to reflect long distance commuting. The models have been developed to reflect typical weekday morning and evening peak conditions.

The models were successfully calibrated and validated against 2007 transport conditions using the standard DfT guidelines and the base model is reported in the *Maidstone Multi Modal Transport Model, Local Model Validation Report, (April 2009)*. The study area around the town of Maidstone which is modelled in detail is shown in **Figure 1.1**.



Figure 1.1 Detailed Study Area around Maidstone

The 2007 modelled network operates within capacity but with significant delays at key locations across the town, which is a robust reflection of the actual level of congestion and delay already experienced across the town.

The Maidstone Multi Modal model is based on travel demand and the 2007 base model demand has been shown to represent the actual observed travel demand in Maidstone.

The Multi Modal Model approach, which allows for travellers to switch between car, bus, rail and park and ride options in response to travel costs and congestion, provides a better representation of actual travel behaviour than a purely highway based model.

The 2017 and 2026 forecast models include the anticipated travel demand which will arise from background growth and new developments such as new homes, businesses and retail development. The Forecast Models, therefore, show the expected demand flows on the network in 2017 and 2026 and demonstrate the impact it will have on the town.

The development of the Local Development Framework (LDF) for Maidstone is an ongoing process and there already have been some changes to the anticipated LDF development assumptions for the forecast years. An initial representation of these assumptions has been incorporated in the latest Forecast Models.

The performance of the Forecast Model is and has shown to be significantly affected by the type of development, size of development and the location across the town. It is therefore critical to establish an agreed key set of assumptions as a base case first.

It has been agreed that Year 2017 will be the year without the South East Strategic Link (SEMSL). SEMSL is assumed to be ready for the Year 2026 and therefore is inputted into the forecast models for Year 2026.

2 Maidstone VISUM Forecast Models

2.1 Modelled Scenarios

Forecast models have been developed to represent the AM and PM peak periods for the years 2017 and 2026, with different development and infrastructure assumptions.

The 2017 and 2026 forecast models already include:

- *Park and Ride site at Parkwood (400 spaces in 2017 and 600 spaces in 2026).*
- *Bus only lanes on sections and improvements along the A274 corridor.*
- *Increased bus frequencies on key routes to 10 minute intervals, where not already at that level of service.*
- *HA signals at M20 junctions and merge improvements at M20 Junction 8 (for 2026 models only).*
- *SEMSL for 2026 models only*
- *Allowance for non motorised trips, which are not modelled.*

The models do not as yet include:

- *Further demand management strategies.*
- *Potential for policy changes.*
- *Any other infrastructure changes expected for 2017 and 2026.*

2.2 LDF Assumptions

The LDF assumptions built into the most recent forecast models are based on information available from the recent reports on predicted housing and retail floor space needs.

The current 2017 AM and PM peak forecast models include anticipated development across the town in addition to a total of 1000 homes and 15,900 sqm retail floor space at the urban extension. The 2017 models do not include the SEMSL. Development at the urban extension at this stage has been allocated to zones near to Parkwood which are connected to the A274 Sutton Road.

The most recent 2026 models include anticipated development across the town in addition to a total of 4000 homes and 15,900 sqm retail floor space at the urban extension. As for the 2017 models, the development at the urban extension has been allocated to zones near to Parkwood which are connected to the A274 Sutton Road. The 2026 models include the SEMSL.

See Appendix A – Development Assumptions

2.3 SEMSL Assumptions

The SEMSL is modelled as single carriageway links with a 60mph speed limit. The scheme includes a link forming a bypass to a section of the A274 from west of Langley to just north of the Five Wents junction with the B2163.

The SEMSL route and the terminal junctions are at the outline stage of design and the junctions modelled may therefore be modified. At the northern end the SEMSL ties into a roundabout at the junction of the A20 with the M20 link road. This junction is currently modelled as a large signalised roundabout in order to provide as much capacity as possible to manage delays on the approaches.

There is a link from the SEMSL to the existing B2163, between Leeds and Langley Heath, at which left in and left out movements only have been allowed to the new route.

Local rural and minor roads to the east of the town have been modelled with limited capacity and low link speeds to inhibit 'rat running' traffic.



Figure 2.1 **Proposed SEMSL at the Northern end with A20/M20 roundabout**

3 Model Summary Output

3.1 Traffic Movements To and Through Maidstone

Traffic movements crossing the inner and outer cordons points shown in Figure 3.1 are used to illustrate the volume of traffic in the forecast models compared to the base.



Figure 3.1 Maidstone Cordons

AM Peak	2007	2017 (1000 houses in UE)	2017 % Diff from 2007	2026 (4000 houses in UE)	2026 % Diff from 2017
		No SEMSL		SEMSL	
Inner Cordon	12520	17285	38%	19445	13%
Outer Cordon	15753	19875	26%	23971	21%
PM Peak	2007	2017 (1000 houses in UE)	2017 % Diff from 2007	2026 (4000 houses in UE)	2026 % Diff from 2017
Inner Cordon	13056	18578	42%	22136	19%
Outer Cordon	16800	19776	18%	22546	14%

Table 3-A Traffic Crossing the Inner and Outer Cordon (vehicles per hour)

In the year 2017, with no SEMSL in place, up to 38% more traffic is estimated to cross the inner cordon, the red dotted line in the figure 3.1 above, and up to 42% more traffic cross the inner cordon in the AM and PM peak respectively than in 2007. This shows that the demand to travel through the town centre has been increased substantially due to the new developments assumed in the Urban Extension (UE) and elsewhere in the town. The traffic is also estimated to increase noticeably from the outer cordon, blue dotted line in the figure 3.1 above, in the year

2017 due to the new assumed developments in Maidstone. Such increase in the traffic level both for the town centre area and the outer cordon has created more delays and congestion on the already congested network..

In the forecast year 2026, apart from other additional developments in Maidstone, the UE has 3000 more houses than 2017. This directly implies more traffic and hence more congestion in the network when compared to the 2017 forecast year. In order to keep the traffic moving and transport network flowing in 2026, it is almost essential to consider SEMSL. Due to this fact, the 2026 forecast year has been modelled with SEMSL. The estimates from the model run showed that the overall generated traffic demand using the inner cordon has been limited to an increase by 13% and 19% only in the AM and PM peak respectively when compared to the traffic levels in 2017. The 2026 traffic estimate indicates a substantially lower increase in traffic crossing the inner cordon when compared with 2017 in spite of a substantial development growth. There is also a reduction in the level of increase for traffic demand has been noticed for both AM and PM peak using the outer cordon in the year 2026 when compared to 2017.

SEMSL in 2026, therefore, has shown its full potential to alleviate the general increase in traffic level around Maidstone and hence some of the severe congestion problem that may arise with the 2026 development assumptions and no SEMSL.

It is obvious that 2026 has much more traffic than 2017 and hence SEMSL can not provide a single stop solution to all congestion problems in Maidstone. Therefore, more traffic management schemes besides SEMSL are recommended to further improve the congestion on the network.

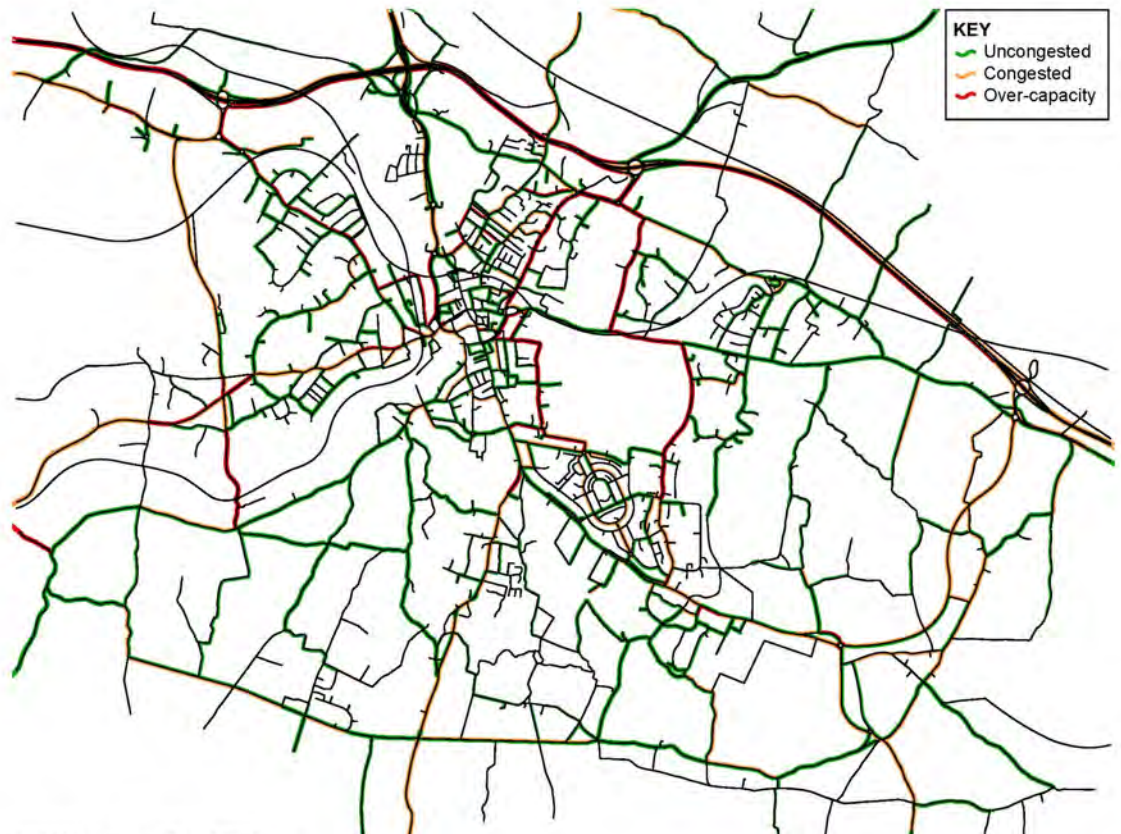
3.2 Network Performance

2007 Base year models reflect the existing situation with sections of the major road network operating under congested conditions, although the modelled traffic can move through the network. Some parts of network are showing signs of overcapacity in the PM peak.



2017 AM Forecast year – development across the town & 1000 homes at UE

There is significantly more congestion across the network with multiple sections of major routes showing signs of overcapacity, where demand is well in excess of the actual traffic that can use that part of the network. The outcome would be severe delays across the town.



2026 AM Forecast year – development across the town & 4000 homes at UE & SEMSL

Despite the added capacity provided by the SEMSL, overcapacity is flagged on key routes as well as minor routes used to move through the town. This shows that there are unacceptable delays across the town with the level of demand input.

The forecast year 2026 model shows more rat runs around the town centre area. The model also indicates overcapacity along the A249 Sittingbourne Road in 2026. On the other hand, the model also shows that the traffic condition, especially during the AM peak, improves on the southern approach of the Maidstone Bridge Gyratory, A274 Sutton Road, Langley and surrounding the areas of SEMSL when compared with 2017. PM 2026 traffic condition has shown a reduction in rat running traffic particularly at Willington Street, New Cut Road and the areas surrounding SEMSL.

With SEMSL, the traffic congestion is efficiently constrained specially in the South and East of Maidstone. In return it helped to lessen the pressure at the Bridge Gyratory in the town centre.

See Appendix B - Network Performance

3.3 SEMSL Traffic

The select link analysis for the SEMSL (Appendix C) indicates that the proposed road infrastructure serves Year 2026 traffic movements from the south and east of Maidstone to the A20/M20 corridor. The SEMSL route accommodates some traffic from the UE. Without the SEMSL, many of these traffic movements are more likely to travel through the town or using the surrounding roads of the nearby parishes.

In the PM peak, the model shows that due to the congestion in the town centre the traffic from the southern part of Maidstone town centre is using SEMSL and M20 Junction 8 to make their journeys .

See Appendix C - SEMSL Select Link Analysis

Forecast models have been developed to represent the AM and PM peak periods for the years 2017 and 2026, with different LDF developments and infrastructure assumptions.

The SEMSL is modelled as a single carriageway links with a 60mph speed limit. The scheme includes a link forming a bypass to a section of the A274 from west of Langley to just north of the Five Wents junction with the B2163. Local rural and minor roads to the east of the town have been modelled with limited capacity and low link speeds to inhibit 'rat running' traffic.

2017 is the year without the proposed SEMSL scheme while 2026 is taken as the year with SEMSL. For the purposes of assessing the SEMSL, the forecast models are based on the information available on anticipated forecast developments and a partial developed traffic demand management strategy for the town and for the relevant years.

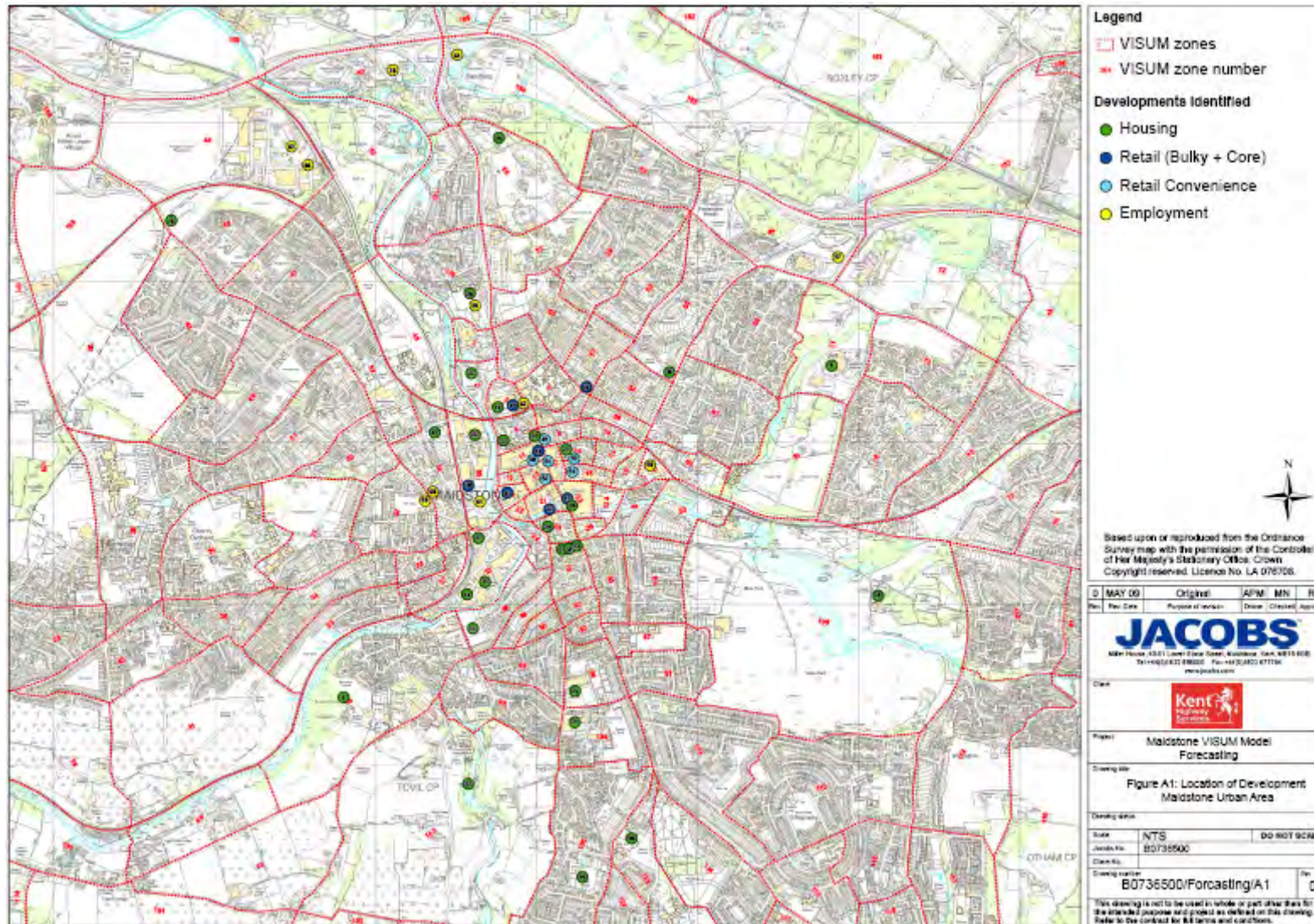
In the year 2017, the LDF development at UE and other locations in Maidstone has resulted in majority of the traffic using the town centre road network. This increase in 2017 town centre traffic levels has created more delays and congestion not only in the town centre itself but also in the surrounding areas.

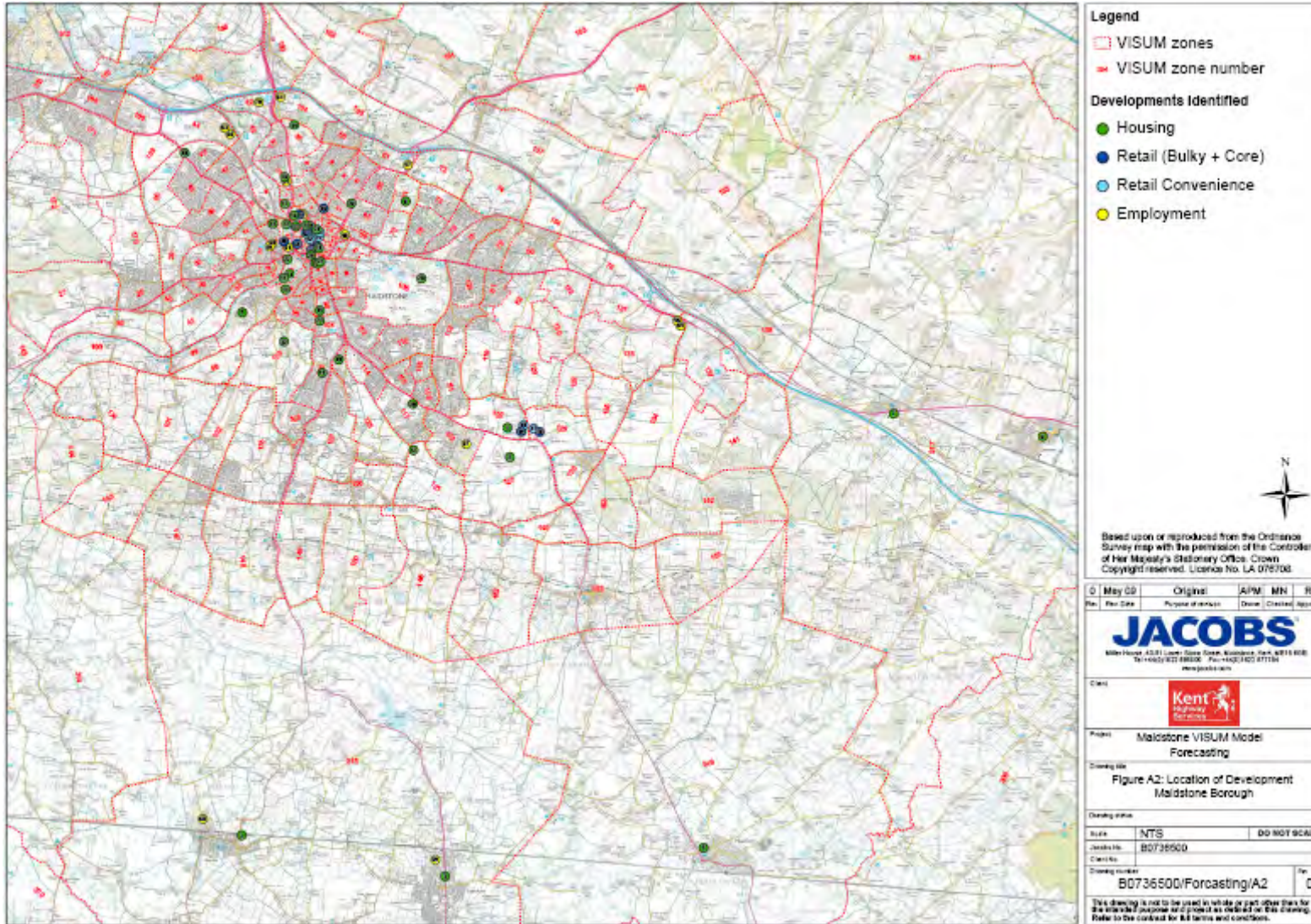
The year 2026 incorporates a substantial increase in the development assumptions, both at the UE and other locations in Maidstone, from 2017. With more developments and SEMSL in the year 2026, the magnitude of increase in traffic demand is not reflected in volume of traffic crossing traffic cordons as opposed to 2017 with no SEMSL. This shows that SEMSL has high potential of handling traffic from South and East of Maidstone and UE. Without SEMSL, many of these movements are more likely to travel through the town centre or using the surrounding roads of the nearby parishes and hence will increase congestion substantially in the town centre itself.

The additional capacity provided by the SEMSL in 2026 has assisted in improving the traffic pressure from South and East of Maidstone and hence mitigating the congestion in Maidstone as a whole. However, the overcapacity is still flagged on some of the key routes as well as the minor routes in the town. The general traffic congestion in Maidstone is greater in the PM than in the AM peak. Supplementary traffic management strategies for both AM and PM are essential to a overall approach in tackling the growth in traffic level for Maidstone.

It is likely that a number of alternative demand management options will need to be tested in order to determine the optimum scenario. These forecast models are the best existing and reasonable base from where to start looking at further strategies.

Appendix A - Development Included in Forecast Models



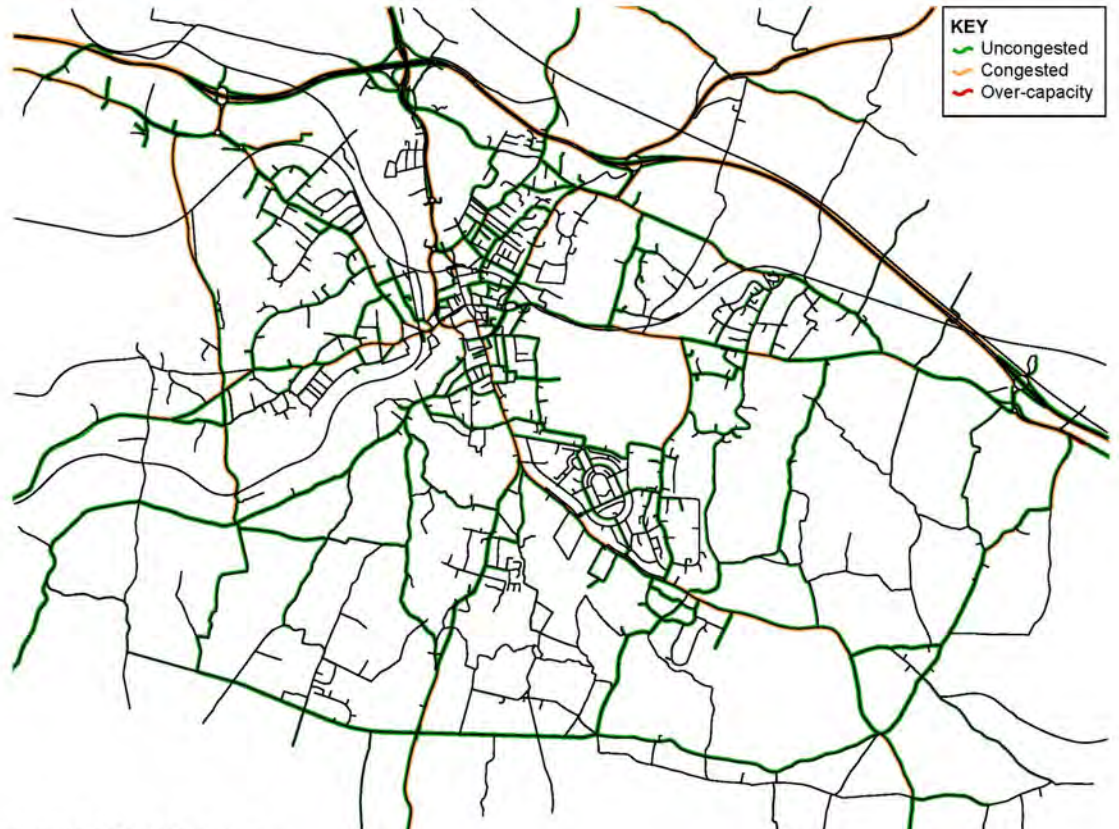


Plan Key No.	Zone	2017 Development Site Name	Residential Units	Employment & Other uses		Land Use Code
				Use Class	Floorsp. Sq.ms	
		Completed 2006/07 Completed 2007/08	6,066 714 792	Residential - mixed Residential - mixed		
--- Housing ---						
South East Urban Extension			1,000			
1	122	South East Urban Extension	500	Residential - mixed		M1
2	127	South East Urban Extension	500	Residential - mixed		M1
Rural service Centres			600			
3	315	Staplehurst	120	Residential - mixed		H2
4	315	Marden	120	Residential - mixed		H2
5	316	Headcorn	120	Residential - mixed		H2
6	317	Lenham	120	Residential - mixed		H2
7	317	Harrietsham	120	Residential - mixed		H2
Edge of Urban			550			
8	71	Maidstone Studios	140	Residential - mixed		M1
9	88	Tovil (Burke Land)	270	Residential - mixed		M1
10	125	Loose (Fire Station)	140	Residential - mixed		M1
Schedule of Other Identified/Potential Sites			2,410			
11	33	Hart Street	200	Residential - mixed		M1
12	121	Furfield quarry	150	Residential - mixed		M1
13	54	Buckland Hill	20	Residential - mixed		M1
14	86	Beaconsfield Road/Eccleston Road	250	Residential - mixed		M1
15	96	Hayle Place	200	Residential - mixed		M1
16	3	Maidstone East	30	Residential - mixed		M1
17	2	West of Royal Eng. Way	100	Residential - mixed		M1
18	45	London Road Garden Centre	100	Residential - mixed		M1
19	106	Y centre	80	Residential - mixed		M1
20	117	Senacre	300	Residential - mixed		M1
21	104	Armstrong Road Depot	85	Residential - mixed		M1
22	55	Powerhub	100	Residential - mixed		M1
23	91	Wrens Cross Regeneration Area	250	Residential - mixed		M1
24	14	Ophthalmic Hospital	100	Residential - mixed		M1
25	11	A&N Week Street	25	Residential - mixed		M1
26	178	Springfield	50	Residential - mixed		M1
27	33	Maidstone West	40	Residential - mixed		M1
28	105	Mote House - Residential Home for the Elderly	80	Residential - mixed		M1
29	25	ASLR Area	150	Residential - mixed		M1
30	23	Granada House	100	Residential - mixed		M1
Assumed Housing Developments 2007-2008						
31	33	Hart Street - additional devs	110	Residential - mixed		M1
32	103	Hayle Mill - 50%	25	Residential - mixed		M1
33	6	Aspects - 50%	44	Residential - mixed		M1
34	91	Iconica - 50%	12	Residential - mixed		M1
35	56	Sandling Park - 50%	54	Residential - mixed		M1
36	65	Sittingbourne rd - crown house and - 50%	52	Residential - mixed		M1
37	91	15, Knightrider Street, Hotel	25	Residential - mixed		M1
Total - Resid. Units			4,560			
Retail Comparison (Bulky + Core)						
38	128	Vicinity of urban extension (Same Polygon)		Retail - Bulky+Core	0	A1a
39	122	Vicinity of urban extension (Same Polygon)		Retail - Bulky+Core	0	A1a
40	55	St Peters Street		Retail - Bulky+Core	20,000	A1b
41	11	Week Street		Retail - Bulky+Core	1,400	A1b
42	21	Palace Avenue - Robin & Day Peugeot		Retail - Bulky+Core	15,000	A1b
43	23	Gabriels Hill - Granada House		Retail - Bulky+Core	5,000	A1b
44	9	Medway Street - Redevelopment of existing car park		Retail - Bulky+Core	5,000	A1b
45	6	Maidstone East - Rail Station Redevelopment		Retail - Bulky+Core	5,000	A1b
46	63	Aldi		Retail - Bulky+Core	3,000	A1b
Retail Convenience						
47	128	Vicinity of urban extension (Same Polygon)		Convenience Shops	0	A1a
48	122	Vicinity of urban extension (Same Polygon)		Convenience Shops	0	A1a
49	8	Town Centre		Convenience Shops	525	A1b
50	11	Town Centre		Convenience Shops	525	A1b
51	12	Town Centre		Convenience Shops	525	A1b
52	13	Town Centre		Convenience Shops	525	A1b
53	14	Town Centre		Convenience Shops	525	A1b
54	15	Town Centre		Convenience Shops	525	A1b
Total - Retail					57,550	
Employment Land - Offices						
55	178	Springfield		B1(a&b)	3,000	B1a+b
56	136	Gallagher@J8		B1(a&b)	3,000	B1c
57	61	Eclipse		B1(a&b)	3,000	B1a+b
58	20	Albion Place		B1(a&b)	1,800	B1a+b
59	32	London Road (Same Polygon)		B1(a&b)	0	B1a+b
60	54	London Road (Same Polygon)		B1(a&b)	0	B1a+b
61	55	Powerhub		B1(a&b)	0	B1a+b
62	6	Maidstone East		B1(a&b)	1,950	B1a+b
63	44	20/20 Allington		B1(a&b)	1,950	B1d
64	164	Abbey Court		B1(a&b)	315	B1d
65	136	Gallagher@J8		B1c,B2,B8	315	Bm
66	44	20/20 Allington		B1c,B2,B8	315	Bm
67	123	Parkwood		B1c,B2,B8	315	Bm
68	315	Marden		B1c,B2,B8	315	Bm
69	315	Staplehurst		B1c,B2,B9	315	Bm
70	42	Former Veglios Motel Site - Audi Car Showroom		Retail - Bulky+Core	0	B1d
Total - Offices					16,590	

Plan Key No.	Zone	2026 Development Site Name	Residential Units	Employment & Other uses		Land Use Code
				Use Class	Floorsp. Sq.ms	
		Completed 2006/07 Completed 2007/08	10,016 714 792	Residential - mixed Residential - mixed		
		Housing ---				
		South East Urban Extension	4,000			
1	122	South East Urban Extension	2,000	Residential - mixed		M1
2	127	South East Urban Extension	2,000	Residential - mixed		M1
		Rural service Centres	850			
3	315	Staplehurst	170	Residential - mixed		H2
4	315	Marden	170	Residential - mixed		H2
5	316	Headcorn	170	Residential - mixed		H2
6	317	Lenham	170	Residential - mixed		H2
7	317	Harrietsham	170	Residential - mixed		H2
		Edge of Urban	550			
8	71	Maidstone Studios	140	Residential - mixed		M1
9	88	Tovil (Burke Land)	270	Residential - mixed		M1
10	125	Loose (Fire Station)	140	Residential - mixed		M1
		Schedule of Other Identified/Potential Sites	3,110			
11	33	Hart Street	200	Residential - mixed		M1
12	121	Furfield quarry	150	Residential - mixed		M1
13	54	Buckland Hill	20	Residential - mixed		M1
14	86	Beaconsfield Road/Eccleston Road	250	Residential - mixed		M1
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29	25	ASLR Area	150	Residential - mixed		M1
30	23	Granada House	100	Residential - mixed		M1
	172	Hermitage Lane	700	Residential - mixed		M1
		Assumed Housing Developments 2007-2008				
31	33	Hart Street - additional devs	110	Residential - mixed		M1
32	103	Hayle Mill - 50%	25	Residential - mixed		M1
33	6	Aspects - 50%	44	Residential - mixed		M1
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35	56	Sandling Park - 50%	54	Residential - mixed		M1
36	65	Sittingbourne rd - crown house and - 50%	52	Residential - mixed		M1
37	91	15, Knightrider Street, Hotel	25	Residential - mixed		M1
		Total - Resid. Units	8,510			
		Retail Comparison (Bulky + Core)				
38	128	Vicinity of urban extension (Same Polygon)		Retail - Bulky+Core	7,200	A1e
39	122	Vicinity of urban extension (Same Polygon)		Retail - Bulky+Core	7,200	A1e
40	55	St Peters Street		Retail - Bulky+Core	20,000	A1e
41	11	Week Street		Retail - Bulky+Core	1,400	A1e
42	21	Palace Avenue - Robin & Day Peugeot		Retail - Bulky+Core	15,000	A1e
43	23	Gabriels Hill - Granada House		Retail - Bulky+Core	5,000	A1e
44	9	Medway Street - Redevelopment of existing car park		Retail - Bulky+Core	5,000	A1e
45	6	Maidstone East - Rail Station Redevelopment		Retail - Bulky+Core	5,000	A1e
46	63	Aldi		Retail - Bulky+Core	3,000	A1c
		Retail Convenience				
47	128	Vicinity of urban extension (Same Polygon)		Convenience Shops	750	A1a
48	122	Vicinity of urban extension (Same Polygon)		Convenience Shops	750	A1a
49	8	Town Centre		Convenience Shops	525	A1b
50	11	Town Centre		Convenience Shops	525	A1b
51	12	Town Centre		Convenience Shops	525	A1b
52	13	Town Centre		Convenience Shops	525	A1b
53	14	Town Centre		Convenience Shops	525	A1b
54	15	Town Centre		Convenience Shops	525	A1b
		Total - Retail			73,450	
		Employment Land - Offices				
55	178	Springfield		B1(a&b)	10,000	B1a+b
56	136	Gallagher@J8		B1(a&b)	20,000	B1c
57	61	Eclipse		B1(a&b)	10,000	B1a+b
58	20	Albion Place		B1(a&b)	10,000	B1a+b
59	32	London Road (Same Polygon)		B1(a&b)	5,000	B1a+b
60	54	London Road (Same Polygon)		B1(a&b)	5,000	B1a+b
61	55	Powerhub		B1(a&b)	5,000	B1a+b
62	6	Maidstone East		B1(a&b)	5,000	B1a+b
63	44	20/20 Allington		B1(a&b)	4,000	B1d
64	164	Abbey Court		B1(a&b)	3,000	B1d
65	136	Gallagher@J8		B1c,B2,B8	25,000	Bm
66	44	20/20 Allington		B1c,B2,B8	15,000	Bm
67	123	Parkwood		B1c,B2,B8	20,000	Bm
68	315	Marden		B1c,B2,B8	10,000	Bm
69	315	Staplehurst		B1c,B2,B9	10,000	Bm
70	42	Former Veglios Motel Site - Audi Car Showroom		Retail - Bulky+Core	8,000	B1d
		Total - Offices			165,000	

Appendix B - Network Performance

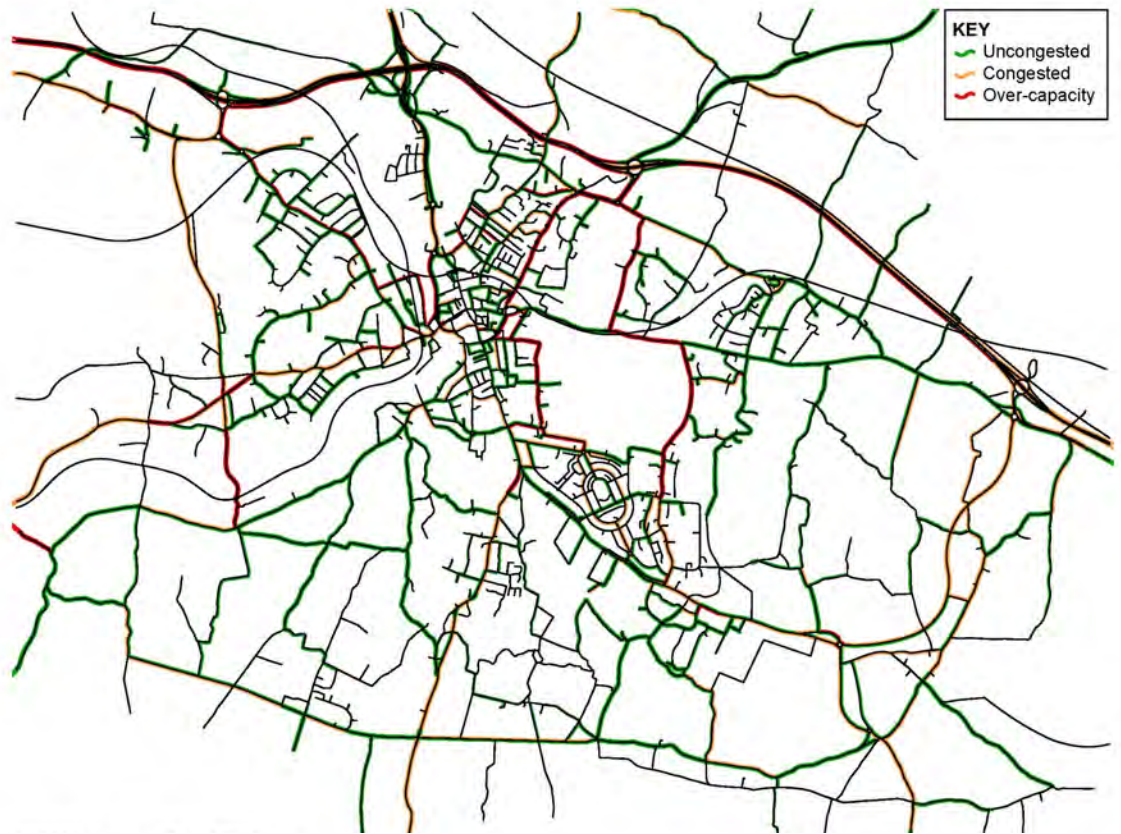
Network Congestion (Volume / Capacity) Plots



2007 AM Peak



2017 AM Peak



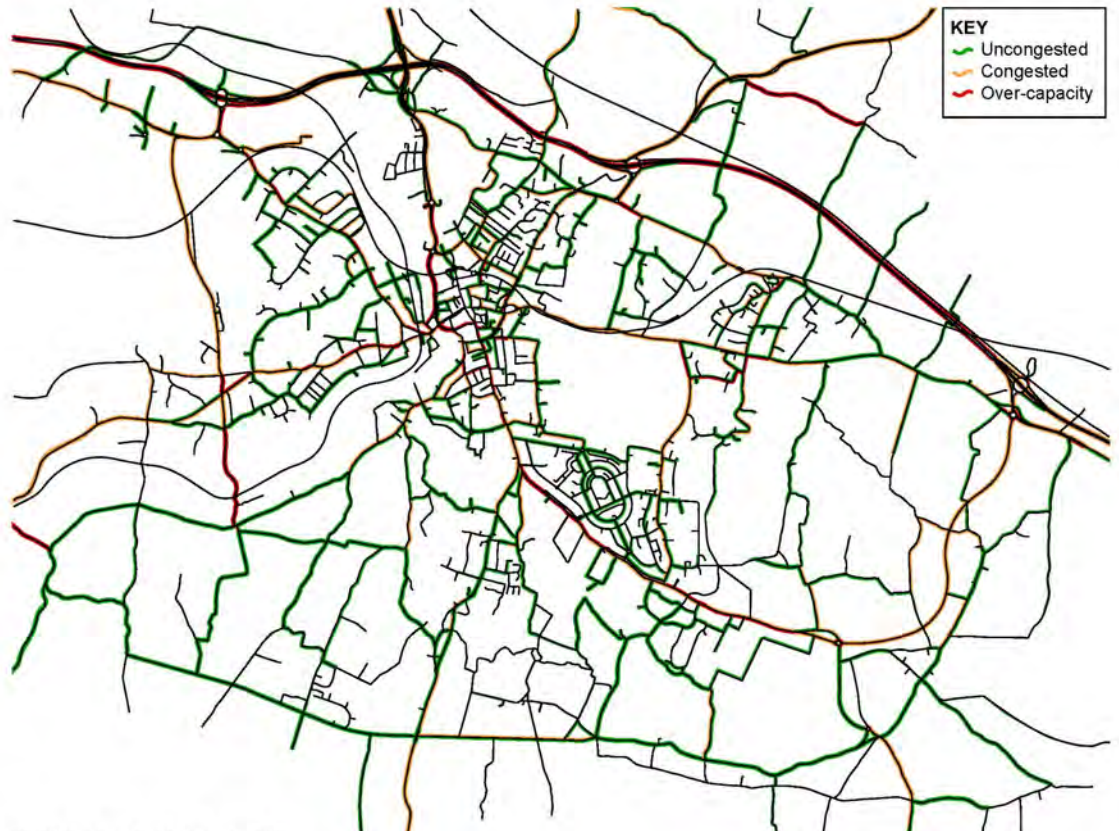
2026 AM Peak



2007 PM Peak

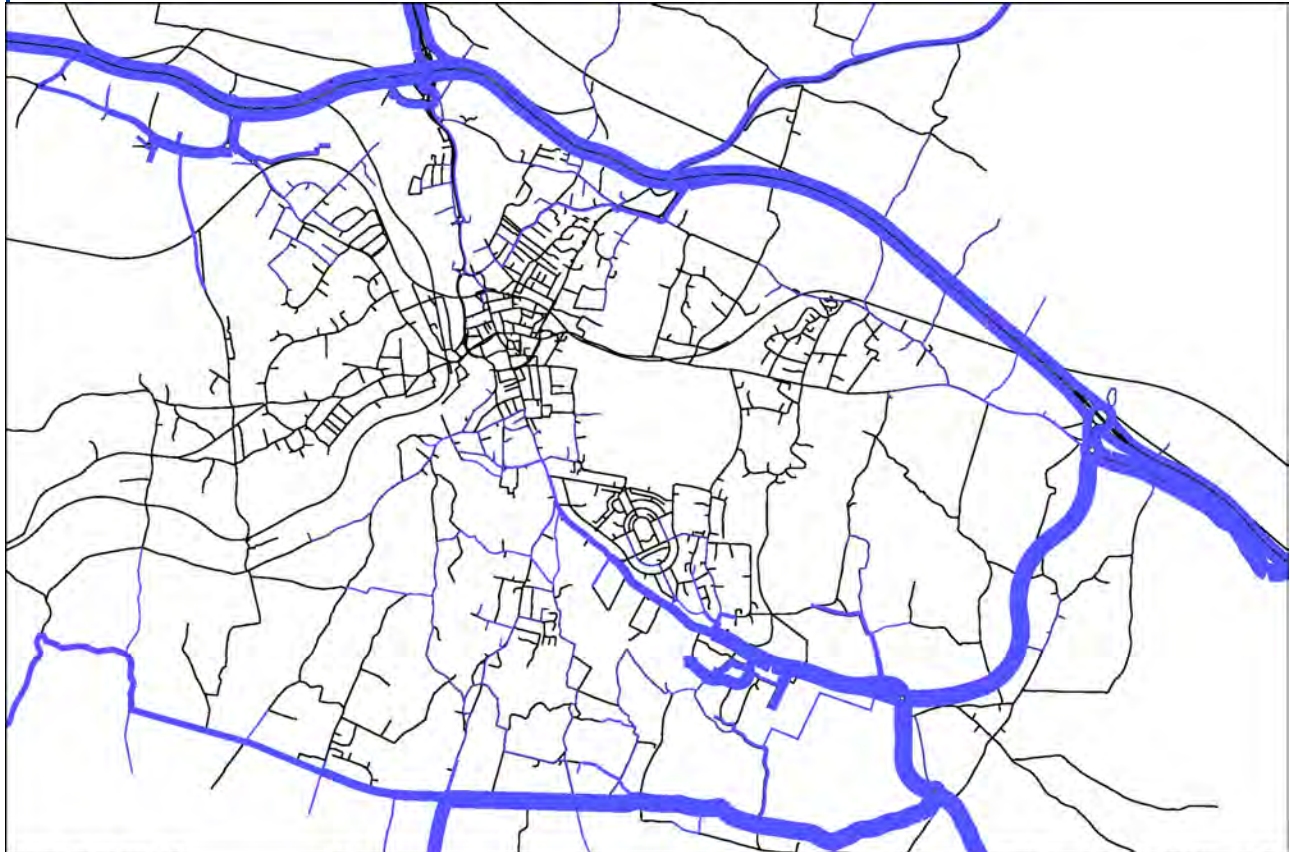


2017 PM Peak



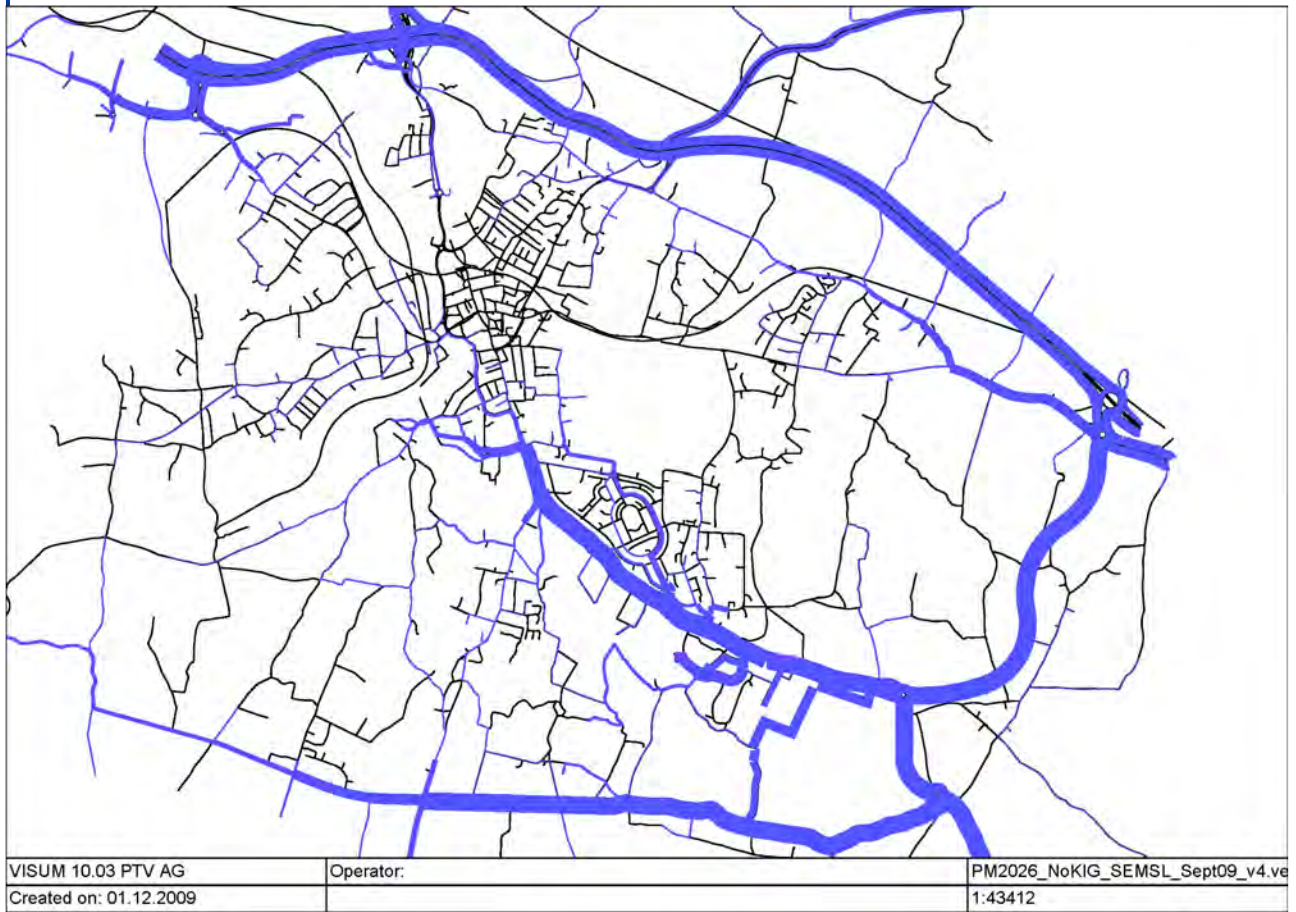
2026 PM Peak

Appendix C - SEMSL Select Link Analysis



VISUM 10.03 PTV AG	Operator:	AM2026_iteration1Dev_SEMSL_v4_MB
Created on: 01.12.2009		1:45549

2026 AM Peak – Distribution of traffic using the SEMSL (Two-Way Flows)



2026 PM Peak – Distribution of traffic using the SEMSL (Two-Way Flows)