Local Plan Technical Report

2018/2019 Infrastructure Delivery Plan Appendices

Part 12: Transport – Hertfordshire County Council, Water Infrastructure and Education

Appendices 43 to 52

St Albans City & District Council

Appendix 43: Draft Hertfordshire COMET: 2036 Local Plan Run 4 – St Albans District Council Output Analysis and Draft Appendix A: Development Flow Analysis (April 2019)

Hertfordshire COMET: 2036 Local Plan Run 4.

St Albans District Council Output Analysis

Project number: 60588905

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Quality information

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1. Introduction

1.1 Background

1.1.1 The development of the COMET model suite was commissioned by Hertfordshire County Council (HCC) in February 2015 in order to provide a structured evidence base for assessing transport policies and strategies on a consistent basis across the county. COMET is a multi-modal model with variable demand modelling capability.

1.1.2 Following the work to date on developing the COMET Base Year (2014) model, HCC commissioned AECOM to produce a 2036 forecast including the Local Plan aspirations (all employment and dwelling growth, regardless of certainty) of the 10 Hertfordshire districts as well as the growth aspirations in the following neighbouring areas: Central Bedfordshire, Luton, Buckinghamshire (all districts), part of Essex (i.e. Epping Forest, Harlow, and Uttlesford), and part of Cambridgeshire (i.e. South Cambs and Cambridge)[1]. This test is known as the COMET 2036 Local Plan Run 4 (LP4).

1.1.3 LP4 includes the proposed transport schemes agreed with Hertfordshire districts in Autumn 2018, and aligns with the Infrastructure Delivery Plans and Transport Strategies at that time. A full list of all transport schemes included in LP4 is detailed in the "*Hertfordshire COMET: Local Plan Run 4 Forecasting Report"* which will be issued to HCC in April 2019. Compared to the COMET Base Year model, over 300 schemes are included in LP4. In the St Albans District Council (SADC) area LP4 contains 39 highways, 5 public transport and 6 mode shift schemes compared to the Base Year model.

1.1.4 LP4 also includes revised light and heavy goods vehicle (LGV/HGV) growth projections detailed in the Department for Transport's Road Traffic Forecast 2018 (RTF2018). Growth projections of LGV/HGV traffic have significantly dropped in RTF2018 compared to those used in previous 2031 Local Plan COMET scenarios (from RTF2015). Similarly, buffer speed changes in RTF2018 were implemented in LP4. These speed changes simulate changes in speeds on the wider road network outside of Hertfordshire.

1.1.5 The forecast is a reflection of the total cumulative growth within the county rather than a test of any specific (set of) developments and/or schemes.

1.2 Purpose of this Document

1.2.1 As part of the LP4 run, high-level results for the county will be presented in the form of a user-friendly presentation and supporting Forecasting Report. These results are unlikely to give sufficient detail for evidence to support the updated SADC Local Plan submission. As a result, more detailed analysis is required and is contained in this report.

1.2.2 This report reflects the requirements detailed in the "*SADC additional COMET LP4 run interpretation"* Specification Note, issued by AECOM on 3 December 2018.

[1] For the rest of Great Britain, the growth in employment and population in the COMET forecast is based on National Trip End Model (NTEM) 7.2 projections.

1.3 Previous Local Plan COMET Forecasting

1.3.1 In Summer 2018 AECOM issued SADC specific analysis of the results from the COMET 2031 Local Plan Run 3 (LP3). This modelling scenario was based on outdated housing and employment projections across all Districts in Hertfordshire. LP4 is based on updated housing and employment projections. Comparisons to results from LP3 are made in this report, however the caveats in the following section should be noted.

1.4 Caveats

1.4.1 Caution should be exercised when comparing the results of the LP4 and LP3. Primarily, the forecast years, transport networks and spatial distribution of developments are considerably different. LP4 includes a number of updates compared to LP3, such as the inclusion of planning data for Central Bedfordshire, updates from RTF2015 to RTF2018 and over 160 additional transport schemes. A direct comparison of the two Local Plan forecasts is therefore not possible, however high-level comparisons are made to provide indicative results and analysis.

1.4.2 As detailed in the Specification Note, there are many other transport schemes which are proposed in SADC which cannot be modelled in COMET. Analysis in this report highlights the possible interactions with these schemes at a qualitative level. Section 6 also includes more detailed commentary.

1.4.3 Analysis focuses on results from the AM peak (0800 to 0900) and PM peak (1700 to 1800), however, results will also be produced for the Inter peak (average hour between 1000 and 1600). Results from the Inter peak will only be reported if they vary considerably from those seen in the AM and PM peaks.

1.5 Report Structure

1.5.1 This report covers the following areas:

- Town Based Distribution Plots;
- 2036 Traffic Conditions in the SADC Area;
- Journey Time Route Analysis;
- Development Flow Analysis;
- Scheme Mitigation; and
- Summary and Discussion

2. Town Based Distribution Plots

2.1 Introduction

2.1.1 To provide a more detailed representation of trips that travel to and from St Albans, Harpenden and Eastern Hemel, the inbound and outbound town based trip distribution plots for both AM and PM peak periods are detailed in this section. Select link analysis (SLA) of trips to and from zones representing the town centres of the urban areas provides this analysis. The thicker the green bar, the higher the flow. Snapshots of the urban town centres are also shown in the top left hand corner of each figure.

2.2 St Albans

2.2.1 Trips into St Albans in the AM and PM peaks show that the majority of traffic uses strategic routes to access the town centre. These include Luton Road and cross country routes along St Albans Road from the north and the A1081 and Watford Road for access to the town centre from the M25 (Junctions 21a and 22). Traffic from Hemel Hempstead uses the A4147 and the A5183. From the east, the majority of traffic accesses St Albans using the A1057 or Coopers Green Lane.

2.2.2 The distribution of traffic from St Albans in the AM and PM peaks follows similar distribution patterns. Northbound trips use the A1081 and A5183. Traffic uses Watford Road and the A1081 for access to the M25. Traffic to Hemel Hempstead uses the A4147 and the A5183.

Figure 1: Inbound trips to St Albans Town Centre 2036 AM Peak

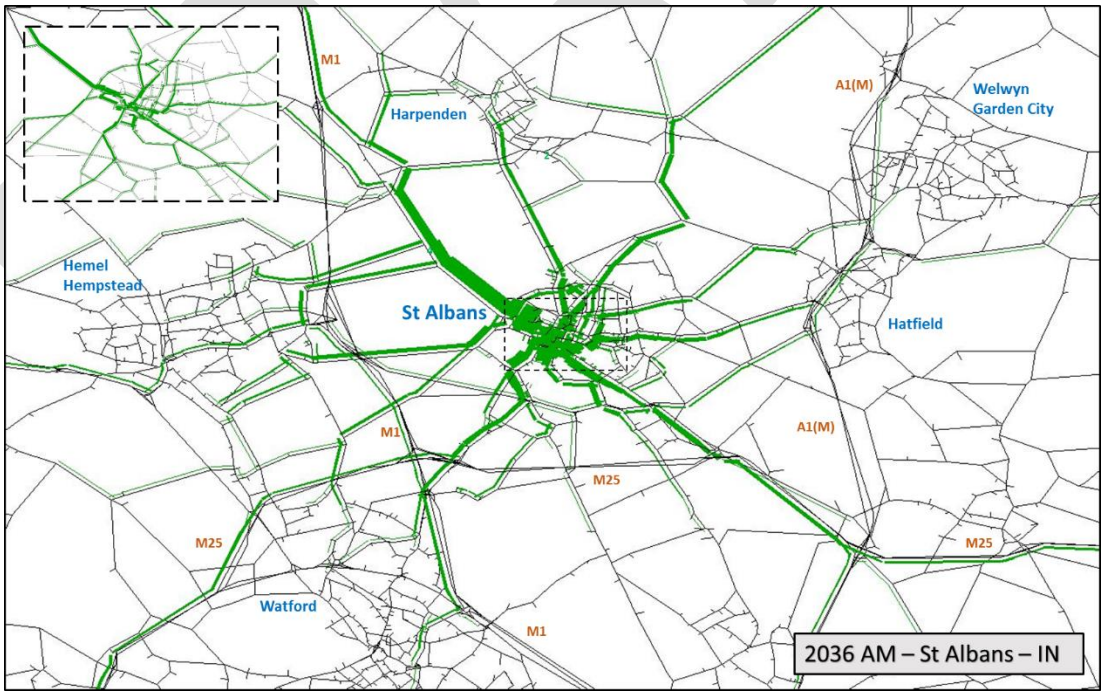


Figure 2: Outbound trips from St Albans Town Centre 2036 AM Peak

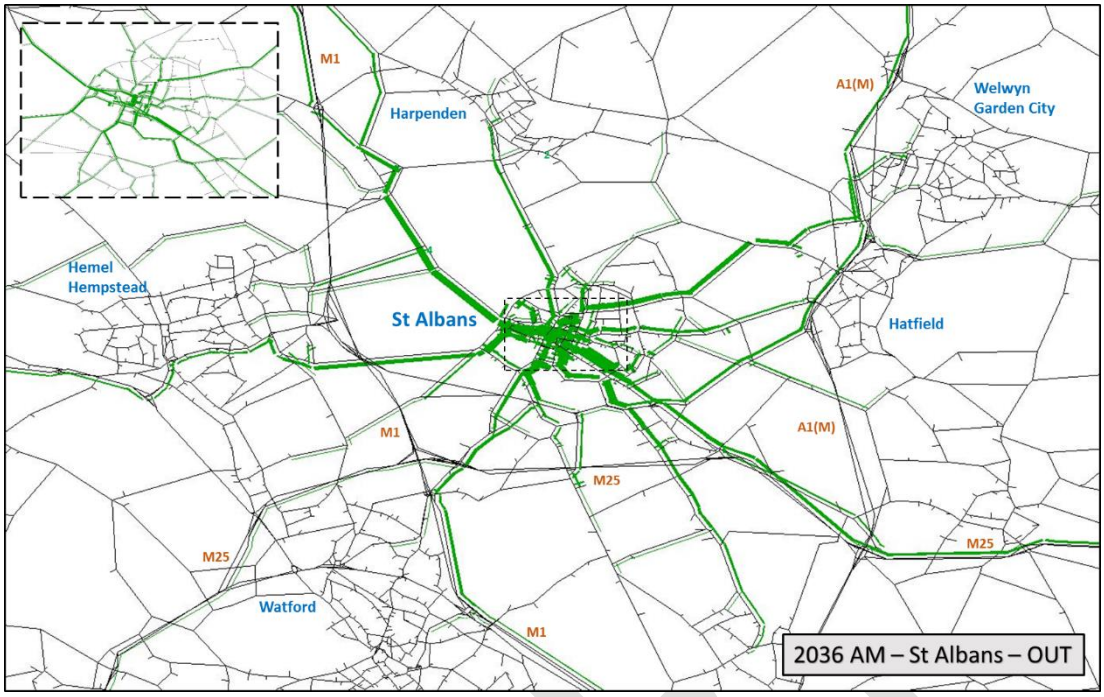


Figure 3: Inbound trips to St Albans Town Centre 2036 PM Peak

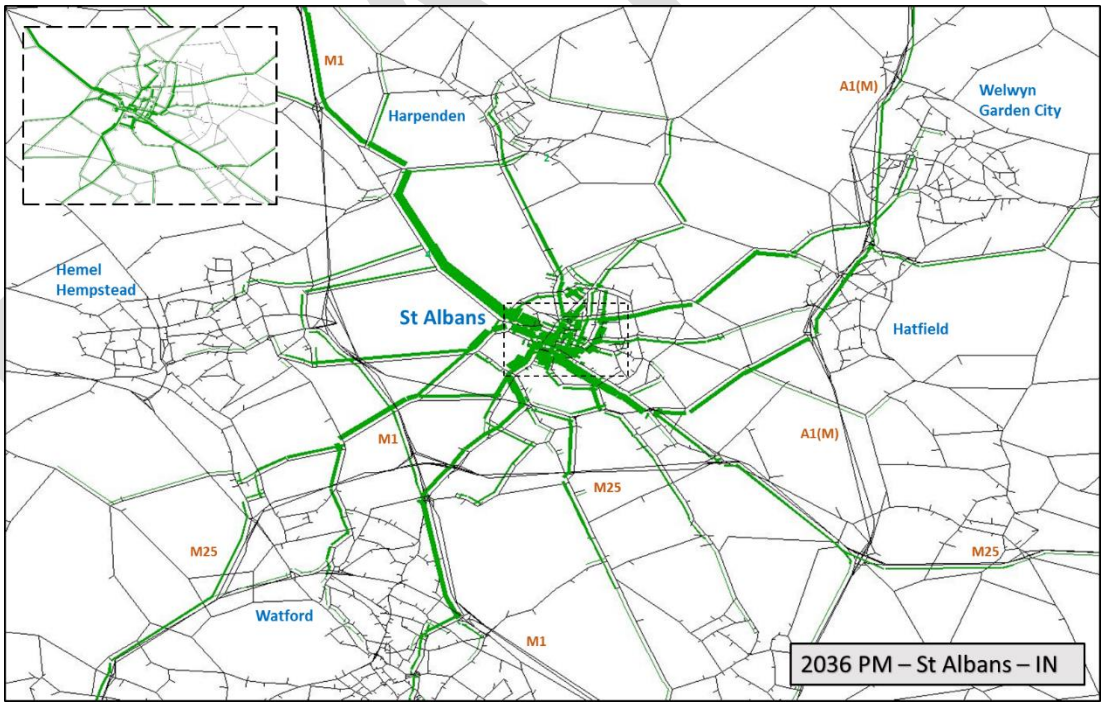
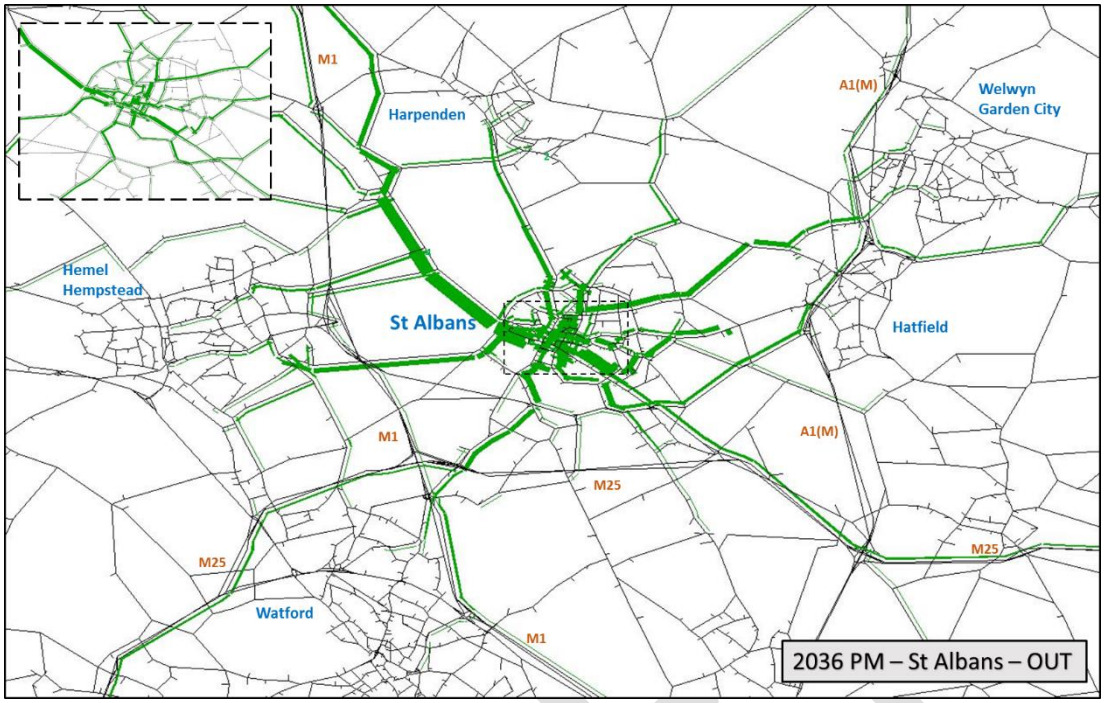


Figure 4: Outbound trips from St Albans Town Centre 2036 PM Peak



2.3 Harpenden

2.3.1 Trips to/from Harpenden in the AM and PM peaks follow similar patterns. From the south traffic uses the M1 or the A1081 to access the town centre, while from the north traffic uses the M1 or Luton Road. Traffic from Hemel Hempstead accesses the town centre on the B487 while traffic from the east uses the B653 to access Harpenden.

2.3.2 Trips from Harpenden follow similar routeing in AM and PM peaks. Traffic accesses the M1 via either Junction 9 or 10 depending on direction. Traffic to Luton uses either Luton Road or the B653. The majority of eastbound traffic uses the B653 cross country to access the A414. Shorter southbound trips use Harpenden Road to travel towards St Albans.

Figure 5: Inbound trips to Harpenden Town Centre 2036 AM Peak

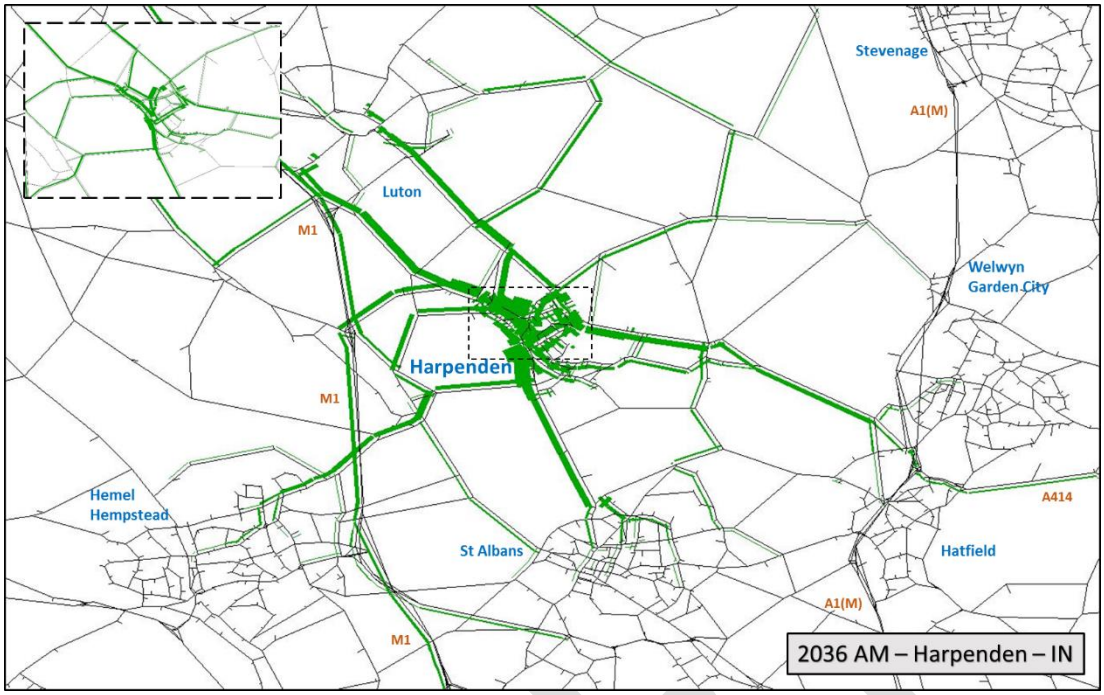


Figure 6: Outbound trips from Harpenden Town Centre 2036 AM Peak

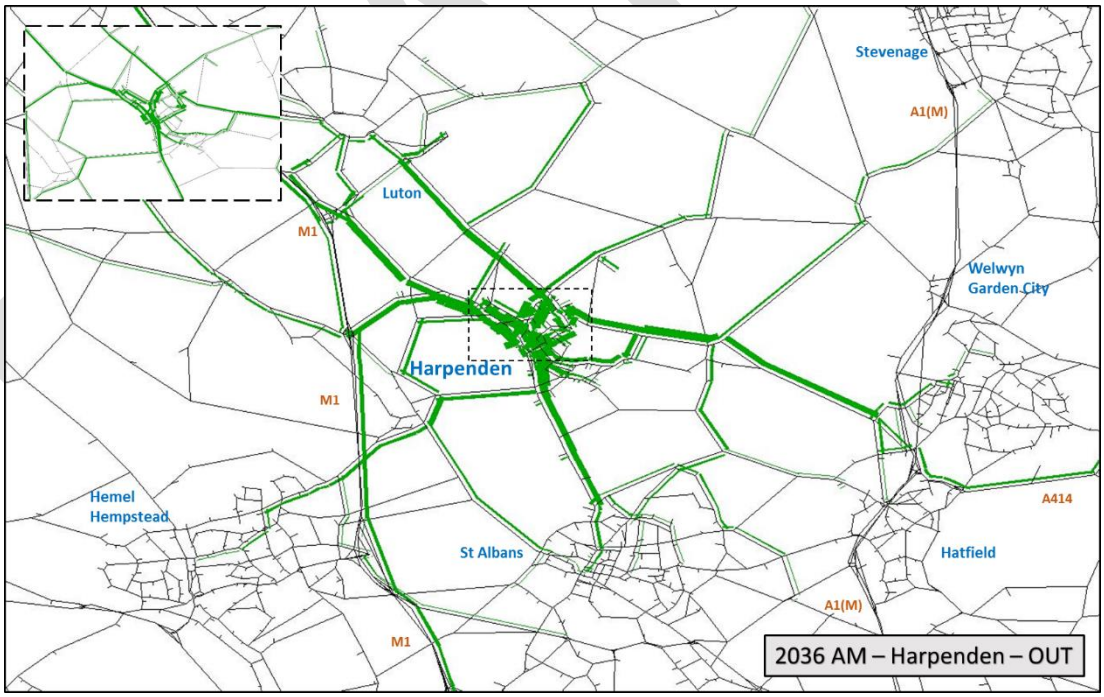


Figure 7: Inbound trips to Harpenden Town Centre 2036 PM Peak

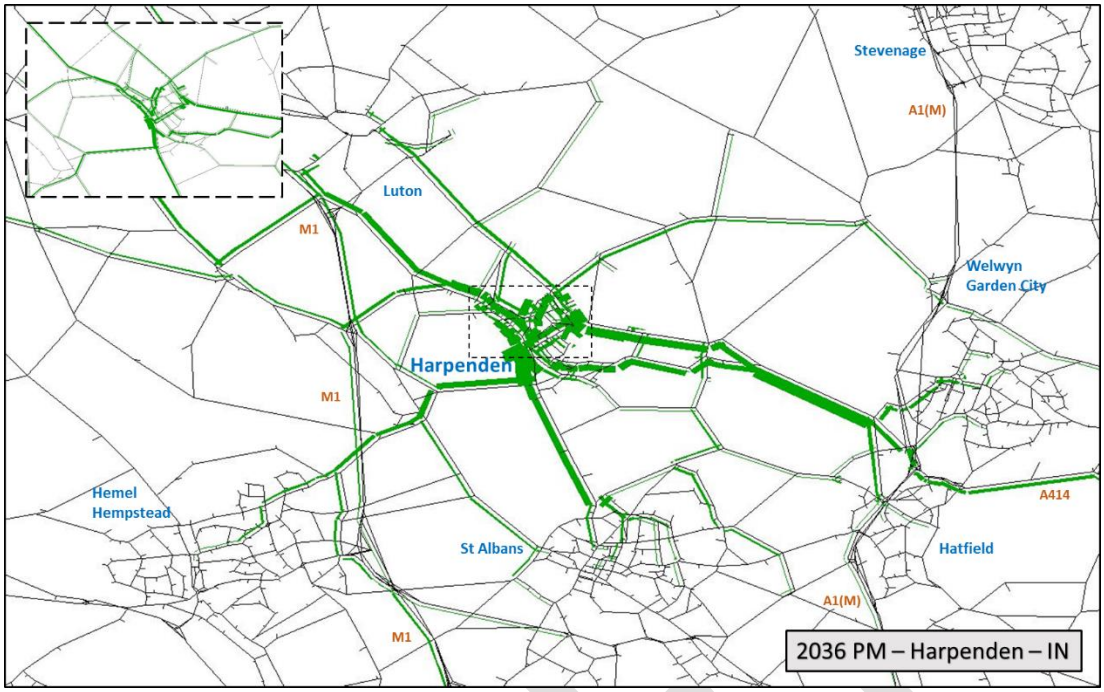
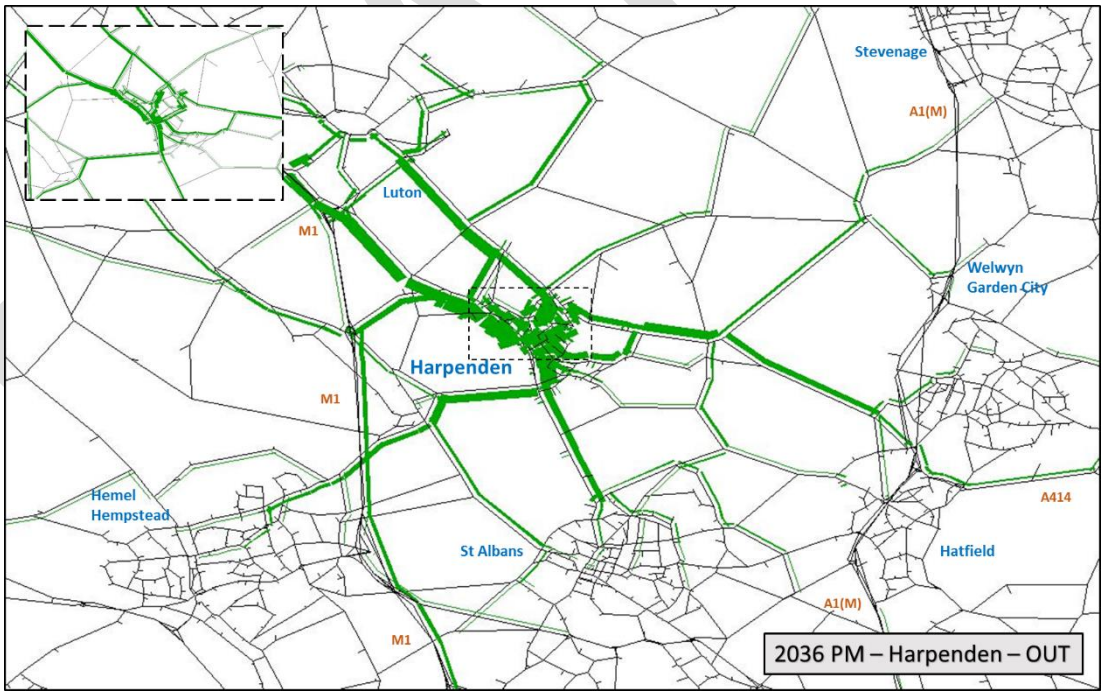


Figure 8: Outbound trips from Harpenden Town Centre 2036 PM Peak



2.4 Eastern Hemel Hempstead

2.4.1 In both AM and PM peaks, traffic from the north or south use the M1 to access eastern Hemel Hempstead. Traffic from the east accesses the Eastern Hemel area either via the A414 or the M25 then M1. The A41 is the key route used to access eastern Hemel from the west. From the south, the M1 and M25 are key strategic routes used for access to the area.

2.4.2 Similarly, traffic from Eastern Hemel Hempstead use the same routes to access nearby areas. The M1 is used for most strategic trips to and from the developments. More localised traffic uses the A41, A414, and the M25 for east and west movements.

2.4.3 It can be recognised that trips to and from eastern Hemel Hempstead have a greater impact on the strategic motorway network which is to be expected given the growth planned in this area and proximity to the M1.

2.4.4 It should be noted that even though the zones which represent East Hemel are located in the SADC area, their access points to the highway network are within the Dacorum District.

Figure 9: Inbound trips to eastern Hemel Hempstead 2036 AM Peak

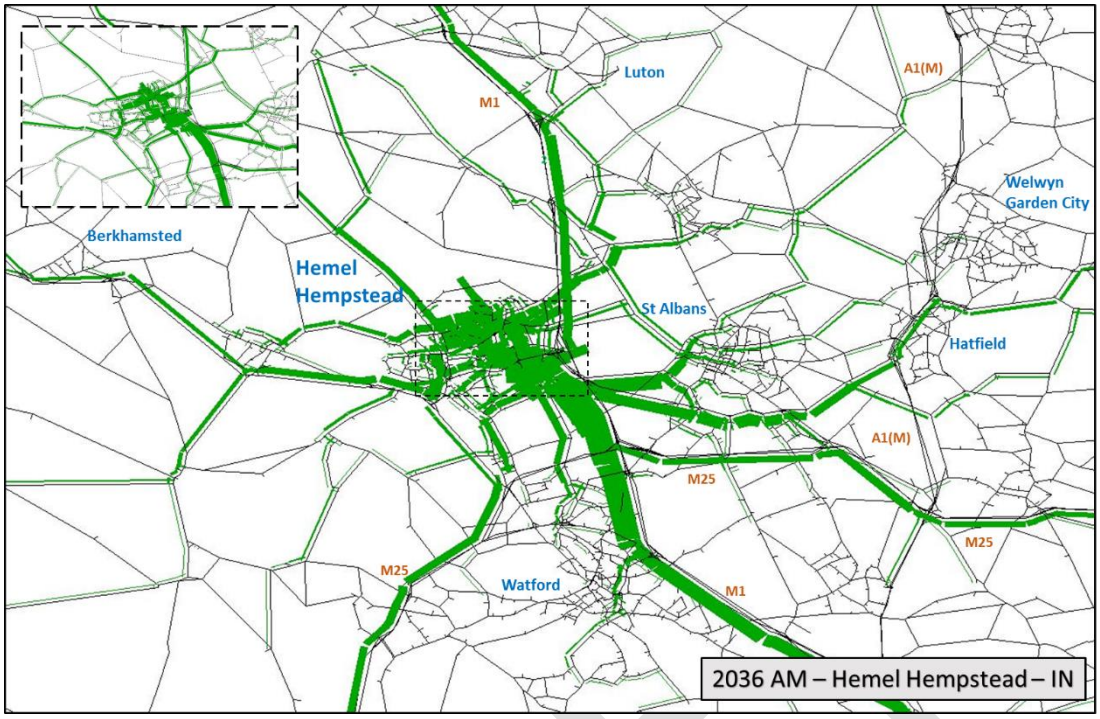


Figure 10: Outbound trips from eastern Hemel Hempstead 2036 AM Peak

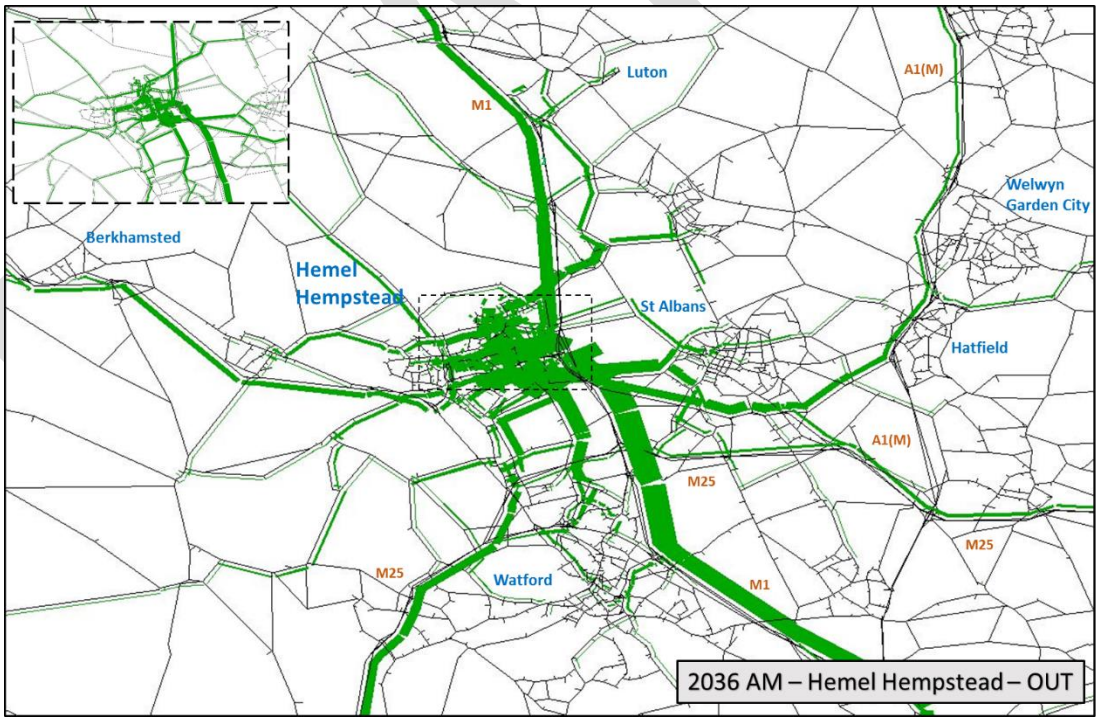


Figure 11: Inbound trips to eastern Hemel Hempstead 2036 PM Peak

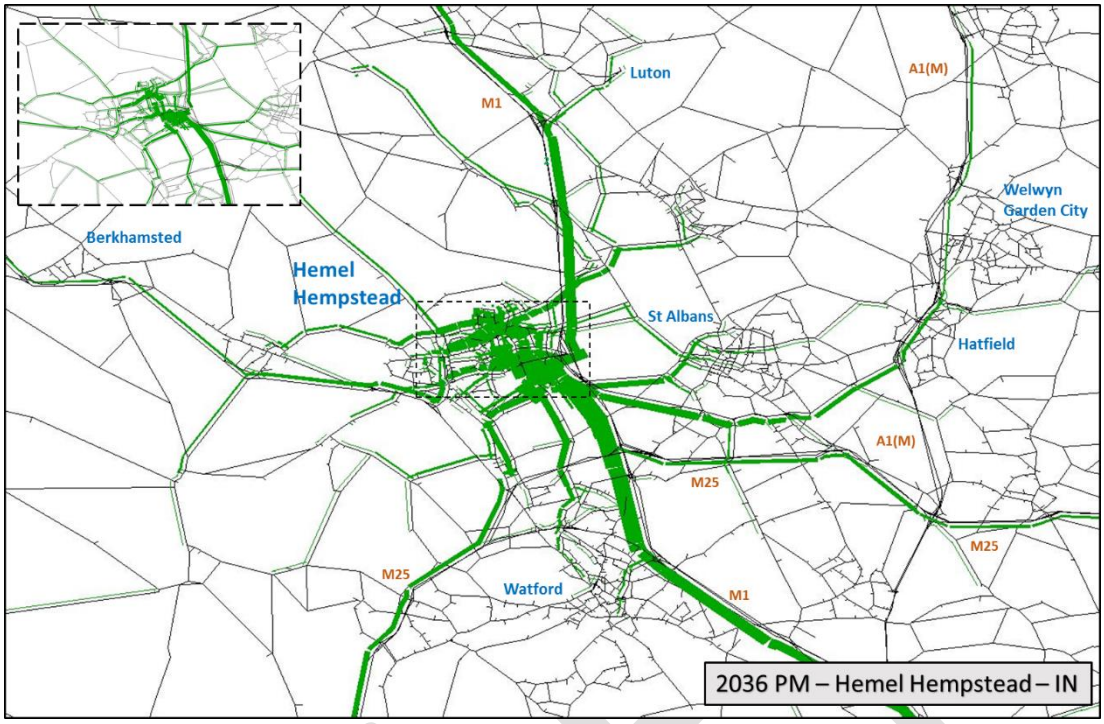
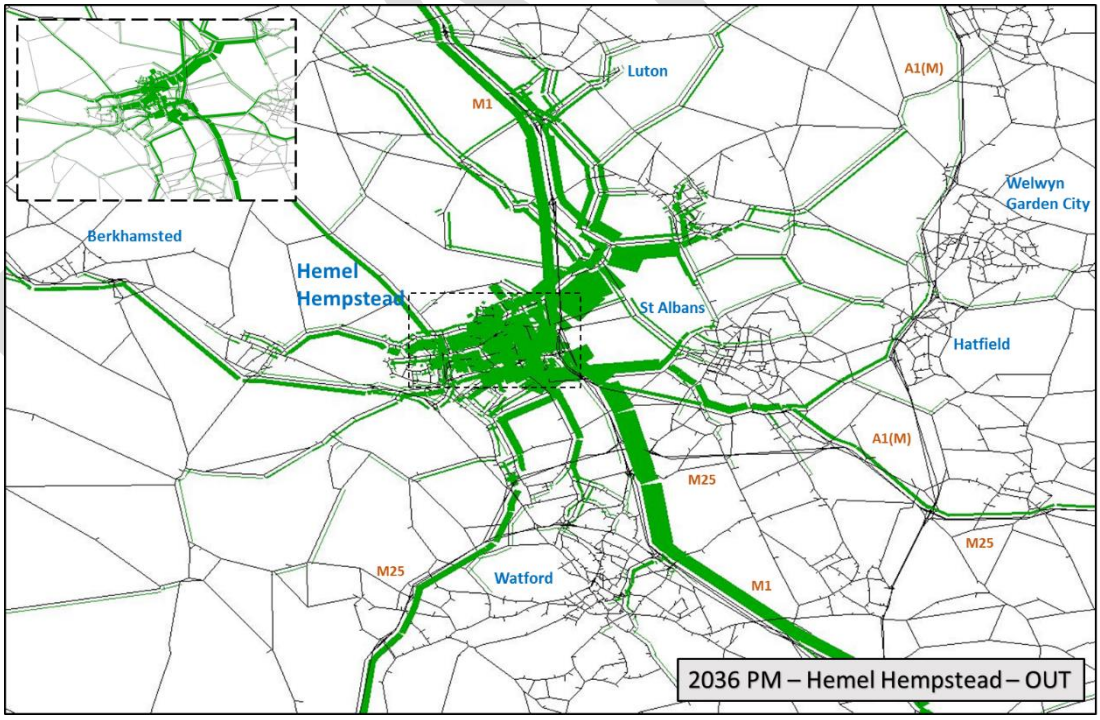


Figure 12: Outbound trips from eastern Hemel Hempstead 2036 PM Peak



3. 2036 Traffic Conditions in the SADC Area

3.1 Introduction

3.1.1 SADC is keen to understand the LP4 traffic conditions at 24 key junctions detailed below:

- Peahen, King William IV, Ancient Britton, Sandpit Lane / Beechwood Avenue, King Harry junctions in St Albans
- A1081 Luton Road /Station Road, A1081 / The Common and A1081 Luton Road / Redbourn Road – Harpenden
- A414 corridor junctions (A414 / A1081 London Colney), A414 /A405, Park Street), A414 / Shenley Lane, Napsbury.
- A1057 Hatfield Road junction with Station Road, Smallford
- A405 / Watford Road junction (the Noke) and A405 /Tippendell Lane
- Harper Lane / Shenley Road junction and Harper Lane / Watling Street junction
- A414 / M1 junction 8
- A414 / Green Lanes Junction, Hemel Hempstead.
- Redbourn Road junctions, Hemel Hempstead.
- Leverstock Green Road / Bedmond Road, Hemel Hempstead.
- B653 Cory Wright Way / Marford Road junction, Wheathampstead
- M25 junctions 21, 21a & 22.

3.2 LP4 Results

3.2.1 To assess traffic conditions in the SADC area, the following plots illustrate node (junction) delay and link (road) stress (also known as V/C, volume over capacity) across the SADC network:

- Node delay is the average delay a vehicle will experience at a junction, regardless of the direction of approach or movement made. It is averaged across all movements at junctions and weighted by flows; and
- Link stress (or V/C) represents the level of congestion along a link (road). Below 80% roads are expected to be relatively free-flowing with minimal delays. Between 80% and 90% roads will begin to show signs of congestion, speeds will lower and delays will occur at junctions. Over 90% the road will be very congested with low average speeds and delays expected at junctions.

3.2.2 The key junctions listed in paragraph 3.1.1 are annotated on the following figures using the legend detailed in Table 1.

Table 1: Key junctions assessed around SADC

1	St Albans	A	Peahen
		B	King William IV
		C	Ancient Britton
		D	Sandpit Lane/Beechwood Avenue
		E	King Harry
2	Harpenden	A	A1081 Luton Road/Station Road
		B	A1081/The Common
		C	A1081 Luton Road/Redbourn Road
3	London Colney	A	A414/A1081 London Colney
	Park Street	B	A414/A405
	St Albans	C	A414/Shenley Lane, Napsbury
4	Smallford	-	A1057 Hatfield Road/Station Road
5	St Albans	A	A405/Watford Road (the Noke)
		B	A405/Tippendell Lane
6	Radlett	A	Harper Lane/Shenley Road
		B	Harper Lane/Watling Street
7	Westwick Row	-	A414/M1 junction 8
8	Hemel Hempstead	-	A414/Green Lanes
9	Hemel Hempstead	A	Redbourn Road/Queensway
		B	Redbourn Road/Link Road
		C	Redbourn Road/Shenley Road
		D	Redbourn Road/Cherry Tree Lane
10	Hemel Hempstead	-	Leverstock Green Road/Bedmond Road
11	Wheathampstead	-	B653 Cory Wright Way/Marford Road
12	St Albans	A	M25 junction 21
		B	M25 junction 21a
		C	M25 junction 22

3.2.3 The following plots (figures 13 to 15) detail areas of stress / junction delay in LP4.

Figure 13 Map showing congestion and node delay at key junctions in LocalPlan v4 AM Peak

Figure 14 Map showing congestion and node delay at key junctions in LocalPlan v4 Inter Peak

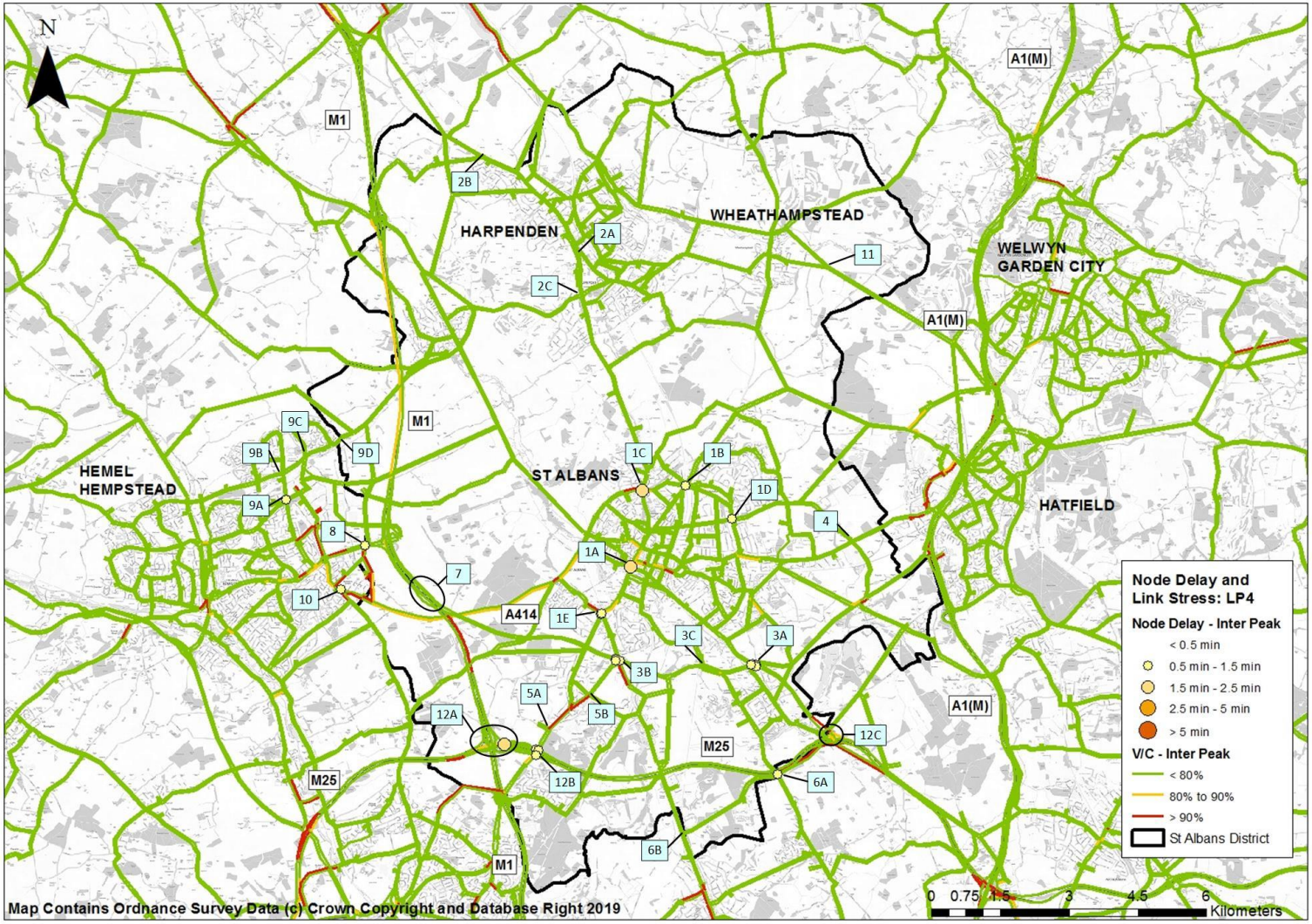


Figure 15 Map showing congestion and node delay at key junctions in LocalPlan v4 PM Peak

3.3 2036 Conditions and comparison to COMET Base Year (2014) and LP3 (2031)

3.3.1 The following table details the traffic conditions at the junctions identified in Table 1. Analysis is descriptive as there are many fundamental differences between the scenarios assessed (see the Caveats section above).

Table 2: 2036 Traffic conditions at key junctions in the SADC area

ID	Junction Name	LP4 Traffic Conditions	Comparison LP4 vs LP3	Comparison LP4 vs BY
1A	**Peahen Junction**	Maximum average delays of 1.5 minutes . Greatest congestion on London Road, Chequer Street and Holywell Hill in the AM peak with largest delays of 2 minutes on the London Road arm.	Slight increase in delays at Peahen junction due to signal timings.	Increase in junction delays by approximately 30 seconds due to flow increases on the High Street.
1B	**King William IV Junction**	Delays of 30 seconds in AM and PM peaks.	Increase in flows at the junction but no significant change in delays.	Increase in flows at the junction but no significant change in delays.
1C	**Ancient Britton Junction**	Average delays at the junction of up to 3.5 minutes with congestion on all arms of the junction. Batchwood Drive observed to have greatest delays of 5 minutes.	Delay differences < 30 seconds Increase in traffic approaching junction on Batchwood Drive.	Delays increase by up to a minute. Greatest increases observed for Batchwood Drive.
1D	**Sandpit Lane/Beechwood Avenue**	Average delays of up to 1 minute for all arms.	Delays remain similar in all time periods. Small increases in flows on Beechwood Avenue.	Flows increase for all arms. Delays remain similar in AM and IP but show marginal reductions in the PM.
1E	**King Harry Junction**	Average maximum delays of up to 2 minutes. Watford Road and St Stephens Hill arms have the largest delays of 3 and 2 minutes respectively (AM Peak).	Increase on King Harry Lane and Watling Street but reductions on Watford Rd and St Stephen's Hill.	Overall flows through the junction increase. Delays reduced by up to 1 minute.

2A	**A1081 Luton Road/Station Road**	No significant delays or congestion observed.	Reduction in traffic on A1081 through Harpenden.	Increase in traffic on A1081 but small reduction on Station Road.
2B	**A1081/The Common**	No significant delays or congestion observed.	No change in delays. Increase in flows on The Common in all time periods.	No change in delays. Increase in flows on The Common and A1081 in all time periods.
2C	**A1081 Luton Road/Redbourn Road**	Maximum average delays of 1 minute. Congestion on all arms approaching the roundabout.	Increase in flows along Redbourn Road and Walkers Road. Delays remain similar in all time periods.	Flows increase on all arms in AM and increases in delays by 1 minute.
3A	**A414/A1081 London Colney**	Delays of 1 to 2 minutes at all arms of the roundabout. Greatest delays on the A1081 southbound arm with some congestion.	Increase in flows on North Orbital Road eastbound arm and A1081 in AM, but reduction in PM. Traffic reroutes onto strategic route from London Colney High street. Delays increase seconds in AM peak but delays remain similar in IP and PM.	Increase in flows along North Orbital and A1081. Traffic reroutes onto strategic route from London Colney High street. Increase in delays of up to 1 minute at the A1081 southbound arm.
3B	**A414/A405**	Congestion on Watling Street in both directions. Delays of up to 1 minute for A414 eastbound traffic.	Increase in flows using Watling Street, North Orbital and A414 westbound. Delays remain similar.	Delays increase by up to 1 minute. Increase in flows on A414, North Orbital and Watling Street southbound.
3C	**A414/Shenley Lane, Napsbury Lane**	Congestion on Napsbury Lane to join North Orbital westbound in AM peak. No significant delays.	Reduction in traffic on Napsbury Lane and Shenley Lane but increase on North Orbital. No significant delays.	Increase in flows using North Orbital in both directions. Some traffic uses A414/Shenley Lane/Napsbury Lane instead of A414/A1081 London Colney. No significant delays.
4	**A1057 Hatfield Road/Station Road**	Average maximum delays of up to 1 minute. Congestion on A1057 westbound arm with delays up to a minute.	Reduction in flows on Oaklands Lane and Station Road. Delays remain similar.	Reduction in delays in all time periods. Overall increase in volume of traffic using the junction in all time periods.

5A	**A405/Watford Road (the Noke)**	Congestion on approach to signalised junction on all arms. Average delays of up to 2.5 minutes with 2 minutes for all approaches.	Reduction in flows on all roads approaching junction. Increase in delays on approach to junction.	Reduction in flows on Watford Road and increase in flows along North Orbital approach to junction. No significant delays.
5B	**A405/Tippendell Lane**	No significant delays or congestion.	Reduction in traffic approaching junction on North Orbital but increase on Tippendell Lane. No significant delays.	Increase in flows on all arms on approach junction. No significant delays.
6A	**Harper Lane/Shenley Road**	Congestion on all arms with maximum average delays up to 1.5 minutes.	Reduction in delays up to a minute caused by reduction in flows through the junction. Marginal increases in traffic using the B556 (Harpers Lane, Bell Lane) westbound.	Increase in flows approaching from Harpers Lane, Bell Lane and Shenleybury.
6B	**Harper Lane/Watling Street**	No delays or congestion observed.	Reduction in flows using the junction at all arms.	Reduction in flows on Harper Lane but increases on Watling road. No significant delays observed.
7	**A414/M1 junction 8**	Some congestion on approach to slip roads in both directions.	Increase in flows joining the M1 from the A414 westbound. Increase in flows on M1 with flow reductions for A414 eastbound.	Increase in flows using M1 and A414 in both directions.
8	**A414/Green Lanes**	Congestion on Breakspear Way on approach to junction in all time periods. Average delays of up to 30 seconds.	Increase in eastbound flows on Breakspear Way, Green Lane and westbound flows on the M1 off slip. No significant change in delays.	Increase in eastbound flows on Breakspear Way and westbound flows on the M1 off slip. No significant change in delays.
9A	**Redbourn Road/Queensway**	No significant congestion at junction. Maximum average delays of up to 30 seconds.	No significant change in delays. Increase in flows on Redbourn Road in all time periods. Decrease in flows on Swallowdale Lane, Queensway and High Street Green.	Increase in flows on all arms on approach to junction. No significant delays.

9B	**Redbourn Road/Link Road**	Congestion on approach from all arms. No significant delays.	Increase in flows on both arms of Redbourn Road. No significant changes in delays.	Increase in flows on Link Road and Redbourn Road. No significant changes in delays.
9C	**Redbourn Road/Shenley Road**	Some congestion on Redbourn Road westbound in AM peak. No significant delays.	Increase in flows on all arms. No significant change in delays.	Reduction in flows on Three Cherry Trees Lane, but increase in flows on Redbourn Road in both directions. No significant changes to delays.
9D	**Redbourn Road/Cherry Tree Lane**	No significant delays or congestion observed.	Increase in flows on all arms. No significant change in delays.	Increase in flows on all arms on approach to junction. No significant delays.
10	**Leverstock Green Road/Bedmond Road**	Congestion on all arms approaching the junction. Maximum average delays of up to 1 minute.	Increases in flows from the south on Leverstock Green Road and Bedmond Road. Delays remain similar in all time periods.	Increases in flows on all arms. Delays remain similar in all time periods.
11	**B653 Cory Wright Way/Marford Road**	Some congestion on approach from Cory Wright Way in AM peak. No significant delays in any time period.	Increase in flows on Cory Wright Way southbound and Marford Road westbound. Delays reduced in AM and PM peaks from 1 minute to < 30 seconds.	Increase in flows on Cory Wright Way southbound and Marford Road westbound. No significant change in delays.
12A	**M25 Junction 21**	Congestion westbound on M25 and northbound on M1 as traffic merges with mainline traffic flows. Congestion eastbound through the junction with delays where diverging traffic crosses over for next junction.	Increase in westbound flows on M25. Reduction in westbound flows, and on M1 flows in either direction. Increase in traffic using eastbound slip M25 to M1 northbound and M1 south to M25 eastbound. Reduction in flows on M1 southbound to M25 westbound and M25 westbound to M1 northbound.	Reduction in flows using M25 eastbound to M1 northbound slip and M1 south to M25 westbound slip. Increase in flows westbound M25 slip to M1 northbound and M1 southbound to M25 eastbound slips. Increase in mainline flows on both M25 and M1.

12B	**M25 Junction 21a**	Average maximum delays up to 3.5 minutes observed for M25 off slips. Congestion on eastbound M25 on and off slips and on parts of elevated roundabout. No congestion on mainline M25 flows.	Increase in mainline M25 flows in both directions. Overall increase in flows joining M25 for both directions. No significant change in delays.	M25 mainline flows increase. Flows on M25 on slip roads on and off M25 increase except for westbound off slip. Increase in delays up to 2 minutes at off slips.
12C	**M25 Junction 22**	Congestion on Barnet Road, both A1081 arms, Coursers Road and M25 eastbound on slip for merging traffic. Delays of up to 30 seconds at junction.	Increase in flows on A1081, M25 mainline and off slips. No significant changes in delay.	Increase in flows on all arms A1081, M25 mainline and off slips. Increases in delay of up to 30 seconds.

4. Journey Time Route Analysis

4.1 Zone to Zone Analysis

4.1.1 '*Zone to Zone* Analysis' of journey time changes between the key urban areas in St Albans District and other urban areas in Hertfordshire in LP4 are detailed in this section. This includes the urban areas of St Albans, Harpenden, Redbourn, Wheathampstead and East Hemel. Journey times are averaged across all possible routes traffic may use to travel between town centres.

4.1.2 The journey time analysis includes comparisons with conditions against the 2014 base year and LP3 COMET models for both AM and PM peak periods. Figure 16 and Figure 17 detail the journey times in the LP4 AM and PM peak periods between the key urban areas in Hertfordshire. In SADC, the urban areas of St Albans, East Hemel, Harpenden, Redbourn and Wheathampstead are included. Conditional formatting has been applied to the following tables where the highest figures or differences are highlighted in red and the lowest figures or differences are highlighted in green.

4.1.3 Figure 16 and Figure 17 illustrate that journey times in the AM peak are marginally longer than those in the PM peak. Across all routes, journey times average 32 minutes in the AM peak and 31 minutes in the PM peak.

4.1.4 St Albans experiences journey times of approximately 35 minutes to reach most other major towns within the HCC area. The longest journey time is to reach Cheshunt or Bishops Stortford. East Hemel, Redbourn, Harpenden and Wheathampstead experience similar journey time patterns to St Albans.

Figure 16: Journey time analysis – LP4 AM peak

2036 LP4 AM (min) Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	34	62	74	78	29	38	38	43	60	71	65	65	59	50
Cheshunt	37	0	29	41	46	21	25	34	42	39	41	35	39	47	36
Borehamwood	57	30	0	36	29	34	31	35	38	33	35	29	33	40	32
Rickmansworth	76	49	40	0	22	50	49	53	55	38	23	27	31	40	45
Watford	71	44	25	20	0	46	45	48	48	31	24	18	22	31	36
Hertford	29	18	35	50	52	0	10	20	25	34	45	38	37	31	21
Welwyn Garden City	37	21	29	44	47	10	0	17	19	26	38	32	28	23	12
Stevenage	40	32	39	54	57	21	23	0	11	33	45	39	35	28	19
Hitchin	44	43	44	58	60	31	31	13	0	34	45	39	35	27	20
St Albans	57	40	33	35	35	31	25	31	32	0	19	11	11	13	13
Hemel Hempstead	65	47	36	30	32	40	37	40	41	22	0	9	11	21	25
East Hemel	58	40	29	28	25	33	29	33	35	13	9	0	5	15	19
Redbourn	63	44	34	32	29	37	35	34	32	13	11	5	0	11	15
Harpenden	61	47	42	41	38	37	30	30	27	16	20	14	10	0	10
Wheathampstead	52	37	35	43	44	29	21	20	20	14	26	20	16	11	0

Figure 17: Journey time analysis – LP4 PM peak

2036 LP4 PM (min) Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	34	57	69	64	29	38	39	44	60	68	62	63	59	50
Cheshunt	38	0	29	41	36	22	25	35	44	37	39	33	38	46	37
Borehamwood	64	40	0	43	28	41	37	43	45	38	38	32	36	46	38
Rickmansworth	79	54	41	0	19	56	53	59	61	37	30	29	34	43	47
Watford	82	58	37	24	0	60	56	62	62	40	34	28	32	42	45
Hertford	31	19	29	47	42	0	10	21	28	32	40	34	37	33	24
Welwyn Garden City	39	23	23	41	36	10	0	20	22	24	34	28	27	24	15
Stevenage	39	32	32	50	44	21	21	0	11	31	41	35	32	28	19
Hitchin	43	40	32	50	42	27	21	12	0	32	39	33	30	26	20
St Albans	61	40	29	35	26	34	25	32	32	0	19	11	11	14	13
Hemel Hempstead	70	45	31	24	22	44	36	42	41	19	0	8	10	20	23
East Hemel	64	38	24	26	15	37	30	37	36	12	9	0	5	14	18
Redbourn	64	42	28	30	19	37	28	33	32	12	10	5	0	11	14
Harpenden	60	45	36	37	27	33	24	29	27	15	19	13	10	0	10
Wheathampstead	51	35	27	41	31	23	14	19	20	13	22	17	14	10	0

4.1.5 Figure 18 and 19 detail the journey time changes observed in LP4 compared to the 2014 base year model. On average journey times have increased by 4 minutes in the AM peak and 3 minutes in the PM peak. There are some small reductions and negligible changes in some areas. This will be due to rerouteing in the assignments generated by the planning data, infrastructure schemes and forecasting process through the variable demand model. On average, journey times to and from St Albans increase by approximately 2 minutes in the AM peak and 1.5 minutes in the PM peak.

4.1.6 It can be recognised that the greatest increases are predominantly in south west Hertfordshire around the towns of Watford, Rickmansworth and Borehamwood. Journeys to/from the towns in SADC and Cheshunt, Rickmansworth and Watford show the greatest increases.

Figure 18: Journey time analysis – LP4 compared to the 2014 base year- AM peak

2036 LP4 - BY AM (min) Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	1	5	8	13	0	0	1	2	2	5	2	5	3	2
Cheshunt	4	0	3	6	12	2	0	4	4	4	6	3	5	3	2
Borehamwood	11	10	0	8	8	8	7	8	8	6	8	4	6	8	7
Rickmansworth	12	11	8	0	7	7	7	8	6	4	3	4	4	6	8
Watford	14	13	5	2	0	9	10	10	6	6	4	1	3	5	6
Hertford	0	-1	4	10	13	0	0	0	0	4	7	4	3	1	0
Welwyn Garden City	-1	-4	3	9	13	0	0	0	0	3	5	2	4	1	1
Stevenage	1	2	5	11	15	1	2	0	1	0	5	2	3	1	1
Hitchin	2	3	2	9	13	2	1	1	0	0	7	5	6	1	1
St Albans	1	5	2	6	8	4	2	1	1	0	2	-3	0	1	0
Hemel Hempstead	5	13	6	5	9	8	6	7	4	4	0	3	1	3	3
East Hemel	2	10	2	6	6	4	3	3	2	-1	3	0	-2	0	1
Redbourn	2	11	3	7	7	3	6	3	3	2	1	-1	0	2	2
Harpenden	4	7	4	8	8	5	4	1	1	2	2	0	1	0	0
Wheathampstead	4	2	4	6	10	6	3	1	1	-1	4	1	3	0	0

Figure 19: Journey time analysis – LP4 compared to the 2014 base year- PM peak

2036 LP4 - BY PM (min)

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	2	3	4	5	0	1	2	3	2	6	3	3	3	3
Cheshunt	2	0	5	6	6	2	0	3	4	5	6	3	5	3	3
Borehamwood	16	16	0	14	9	12	13	12	13	10	8	6	7	13	12
Rickmansworth	13	13	8	0	4	9	11	9	11	3	4	3	5	6	6
Watford	13	13	6	0	0	10	10	9	8	2	2	0	1	3	3
Hertford	-4	-4	3	7	6	0	0	0	0	2	5	3	3	2	2
Welwyn Garden City	-4	-3	1	4	4	0	0	-2	-1	0	3	0	2	2	2
Stevenage	1	0	4	8	7	1	4	0	1	1	5	3	1	1	1
Hitchin	1	-1	1	5	2	1	1	1	0	1	2	-1	1	0	1
St Albans	-1	5	2	2	2	5	3	1	1	0	1	-3	0	0	0
Hemel Hempstead	12	11	5	2	3	10	7	3	2	1	0	2	1	2	2
East Hemel	6	5	-1	-2	-2	4	1	-1	-1	-4	1	0	-3	-2	-1
Redbourn	3	9	2	1	1	5	3	2	2	0	1	-1	0	1	2
Harpenden	2	4	4	3	2	4	2	1	0	2	1	-1	1	0	0
Wheathampstead	2	3	4	4	2	4	2	1	0	0	1	-1	1	0	0

4.1.7 Figure 20 and 21 detail the journey time changes observed in LP4 compared to LP3. On average journey times have increased by 1 minute in both the AM and PM peaks. There are some small reductions and negligible changes in some areas. This will be due to rerouteing in the assignments generated by the planning data, infrastructure schemes and the forecasting process through the variable demand model. The greatest changes compared to LP3 are for journeys to/from Watford, Rickmansworth and Borehamwood.

4.1.8 On average, journey times from the towns in SADC increase by approximately 1 minute in the AM peak with negligible changes in the PM peak. However it should also be noted that journeys to St Albans town centre do display some reductions compared to LP3. This is partly due to the revised planning assumptions which locate a lot of largest developments outside the existing condensed town centre area.

Figure 20: Journey time analysis – LP4 compared to LP3- AM peak

2036 LP4 - 2031 LP3 AM (min)

Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	1	2	2	4	1	1	1	1	0	2	1	3	3	3
Cheshunt	0	0	0	1	2	-1	0	0	0	-1	0	-1	-1	0	-1
Borehamwood	3	1	0	2	2	2	2	1	2	2	0	-1	-1	1	0
Rickmansworth	1	1	2	0	-2	0	1	0	0	0	0	-1	0	-1	0
Watford	-1	-1	-1	-3	0	-1	-1	-2	-2	-3	-1	-3	-3	-3	-2
Hertford	0	0	2	4	3	0	0	0	0	-1	2	1	1	0	0
Welwyn Garden City	0	0	1	3	4	0	0	-1	0	0	0	0	0	-1	-1
Stevenage	1	0	1	3	4	0	0	0	1	-2	1	1	1	0	0
Hitchin	1	1	0	2	5	0	-1	1	0	-1	3	3	3	0	0
St Albans	2	1	3	4	5	1	0	0	0	0	0	0	0	0	0
Hemel Hempstead	2	3	3	2	3	1	2	1	1	0	0	0	0	0	1
East Hemel	1	3	2	2	2	1	1	0	1	0	0	0	0	0	1
Redbourn	1	3	2	2	2	1	2	1	1	0	0	0	0	0	1
Harpenden	1	0	2	2	3	0	-1	1	1	0	1	0	0	0	0
Wheathampstead	0	-2	-1	0	3	0	-2	0	0	-2	1	1	1	0	0

Figure 21: Journey time analysis – LP4 compared to LP3- PM peak

2036 LP4 - 2031 LP3 PM (min) Town	Bishop's Stortford	Cheshunt	Borehamwood	Rickmansworth	Watford	Hertford	Welwyn Garden City	Stevenage	Hitchin	St Albans	Hemel Hempstead	East Hemel	Redbourn	Harpenden	Wheathampstead
Bishop's Stortford	0	3	3	0	1	1	1	3	3	5	5	5	3	3	3
Cheshunt	0	0	2	1	2	0	0	0	1	2	2	1	2	1	1
Borehamwood	3	1	0	1	0	1	1	0	2	0	-2	-2	-2	1	1
Rickmansworth	4	3	4	0	1	3	3	2	4	1	3	1	1	1	1
Watford	3	1	2	-3	0	2	3	2	1	1	1	1	1	1	1
Hertford	0	0	-1	1	3	0	0	0	0	2	1	1	2	1	1
Welwyn Garden City	-1	-1	-1	1	2	0	0	-2	0	0	1	1	2	2	1
Stevenage	0	-1	0	2	3	0	1	0	0	0	0	0	0	0	0
Hitchin	0	-1	-1	1	0	0	-1	0	0	0	0	-1	0	0	0
St Albans	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0
Hemel Hempstead	4	2	2	0	1	1	2	0	0	0	0	0	0	0	0
East Hemel	3	1	1	-2	1	1	1	0	0	0	0	0	0	0	0
Redbourn	2	1	1	-2	1	0	0	0	0	0	0	0	0	0	0
Harpenden	2	-1	0	-2	0	-1	-1	0	0	1	0	0	0	0	0
Wheathampstead	2	-2	-1	-1	0	-1	-1	0	0	0	0	0	0	0	0

4.2 Route Analysis

4.2.1 TBC if required by SADC in due course.

5. Development Flow Analysis

5.1 Introduction

5.1.1 To understand the impacts of the new site allocations, a series of select link analyses (SLAs) have been undertaken to provide supplementary evidence in terms of overall impact of traffic flow 'to' and 'from' each of the key developments in SADC The SLAs have been extracted from the LP4 AM and PM peaks for the new site allocations listed below:

- East Hemel Hempstead (new north and south allocations plus site in total)
- Hemel Hempstead (north) – include commentary on interaction with East Hemel
- North of St Albans
- West of London Colney
- West of Chiswell Green
- Park Street Garden Village
- North East Harpenden – include consideration of interaction with NW Harpenden site

5.1.2 Additional commentary below provides context as to whether there are any particular issues with the location of the new site allocations and where they are close to sites already allocated in the Strategic Local Plan. This includes further commentary on how these sites influence the key strategic junctions. Flows are represented by green lines and the thicker the bar, the greater the flow. It should be noted that projected trip rates or distributions from these developments have not been included in LP4. Generic trip rates and distribution patterns based on the size of the developments have been applied by the COMET forecasting process. These are based on neighbouring zones with similar characteristics.

5.1.3 A range of sustainable travel initiatives are proposed as part of the GTP work, which are (and are not) being modelled. These are detailed in Section 6. The interpretation of the modelling results includes commentary regarding these sustainable travel initiatives. The sustainable travel initiatives under consideration by SADC were submitted by HCC[2]:

5.1.4 Development flow analysis from each 2036 time period and direction is included in Appendix A. Key headlines from a selection of inbound/outbound are detailed in this section.

5.2 East Hemel Hempstead

5.2.1 Trips to and from the East Hemel developments are heavily linked to the M1 which is to be expected given the developments proximity to the motorway network via junction 8. Figure 16 and 17 illustrate routeing to and from the developments. There is limited interaction with central Hemel Hempstead as southbound traffic uses either the M1 or A41 to access the M25. There is some interaction with the A4147 towards St Albans and onwards towards the A414 and Hatfield. It is noted there is a lot of development planned around the Maylands area of Hemel Hempstead. Consideration of how these developments interact should be made (possibly using the Hemel Paramics Model).

[2] Email entitled *"COMET model LP4 additional St Albans analysis* "dated 15 November 2018

5.2.2 Examining the GTP schemes in Section 6, the East Hemel development will have a limited impact on these schemes as the development links strongly to the motorway network and more strategic routes. There may be interactions with the St Albans Green Ring, however this would require linkages along the A4147 between the development and the Green Ring network surrounding St Albans.

Figure 22: Inbound trips to the East Hemel Hempstead development – 2036 AM

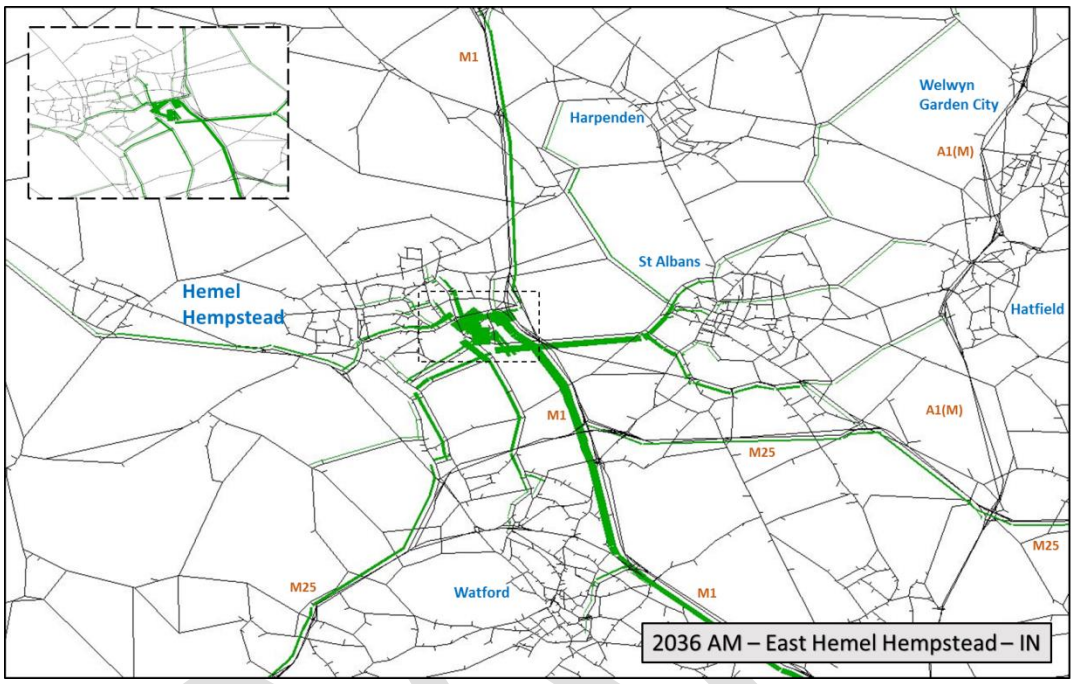


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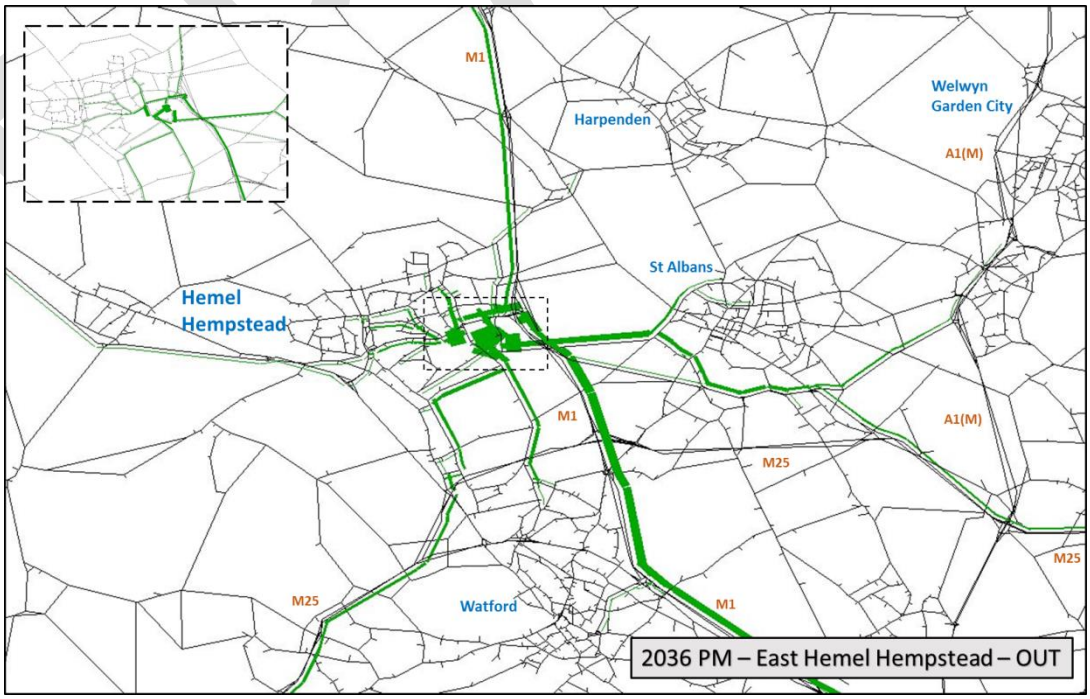
Figure 23: Outbound trips from the East Hemel Hempstead development – 2036 PM



5.3 Hemel Hempstead (north)

5.3.1 Trips to and from the Hemel Hempstead (north) development are also heavily linked with the M1 which is to be expected given the developments proximity to the motorway network via junction 8. Figure 18 and 19 illustrate routeing to and from the development.

Figure 24: Outbound trips from the Hemel Hempstead (north) development – 2036 AM

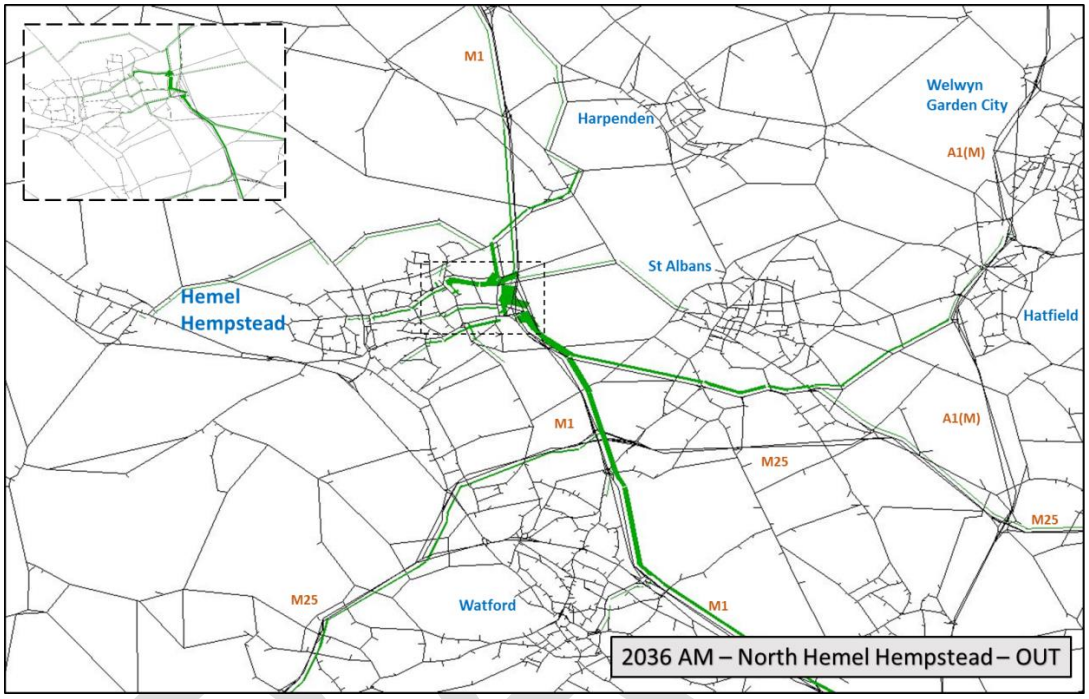
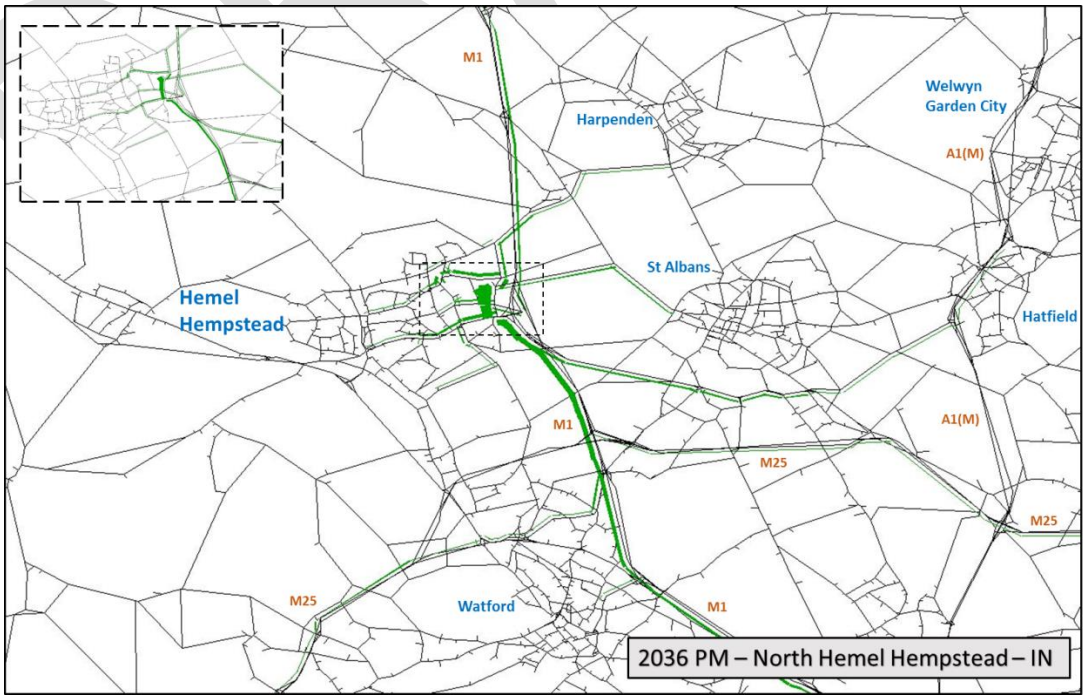


Figure 25: Inbound trips to the Hemel Hempstead (north) development – 2036 PM



5.3.2

5.3.3 Given the developments location there is more interaction with the Maylands Area of Hemel Hempstead and routes west of the development to and from the town centre. The interaction with the M1 via junction 8 is clearly illustrated. Compared to the East Hemel Hempstead developments, there is further interaction with the A414 south of St Albans and across to A1(M) junction 3 in south Hatfield. Consideration should also be given with interaction with development planned around Maylands (possibly using the Hemel Paramics Model).

5.3.4 Examining the GTP schemes in Section 6, the Hemel Hempstead (north)development will have a limited impact on these schemes as the development links strongly to the motorway network and more strategic routes. There may be some interaction with the A414 Highway Improvements south of St Albans. Linkages of the Hemel developments to any form of sustainable transport corridor along the A414 south of St Albans should be examined where possible.

5.4 North of St Albans

5.4.1 Trips to and from the North of St Albans development show interactions with the A4147 and Batchwood Drive across to western St Albans. Traffic heading north uses the A1081 towards Harpenden or the B487 across to Redbourn and rural routes towards Hemel Hempstead. Heading east, traffic uses Coopers Green Lane or Oaklands Lane to travel to/from Hatfield. There is limited interaction with St Albans town centre which would suggest some of these trips may be undertaken by other modes. In the PM peak there is limited interaction with central St Albans and routes to the south of the development. Most of the traffic originates from Harpenden/Redbourn area or routes across from Hatfield in the east.

5.4.2 Given the proximity of this development to the centre of St Albans, there is an opportunity to integrate this development with many of the GTP proposals detailed in Section 6. This could include the City Centre Improvements along St Peter's/Victoria Street and the St Albans Green Ring. Accessibility to St Albans Abbey and City stations should be enhanced wherever possible and link to developments such as North of St Albans which are close enough for sustainable travel to be used. This development may also have linkages with the Alban Way improvements between St Albans and Hatfield. As the development is close to central St Albans it is important that sustainable routes link this development to and from the town centre.

Figure 26: Outbound trips from the North of St Albans development – 2036 AM

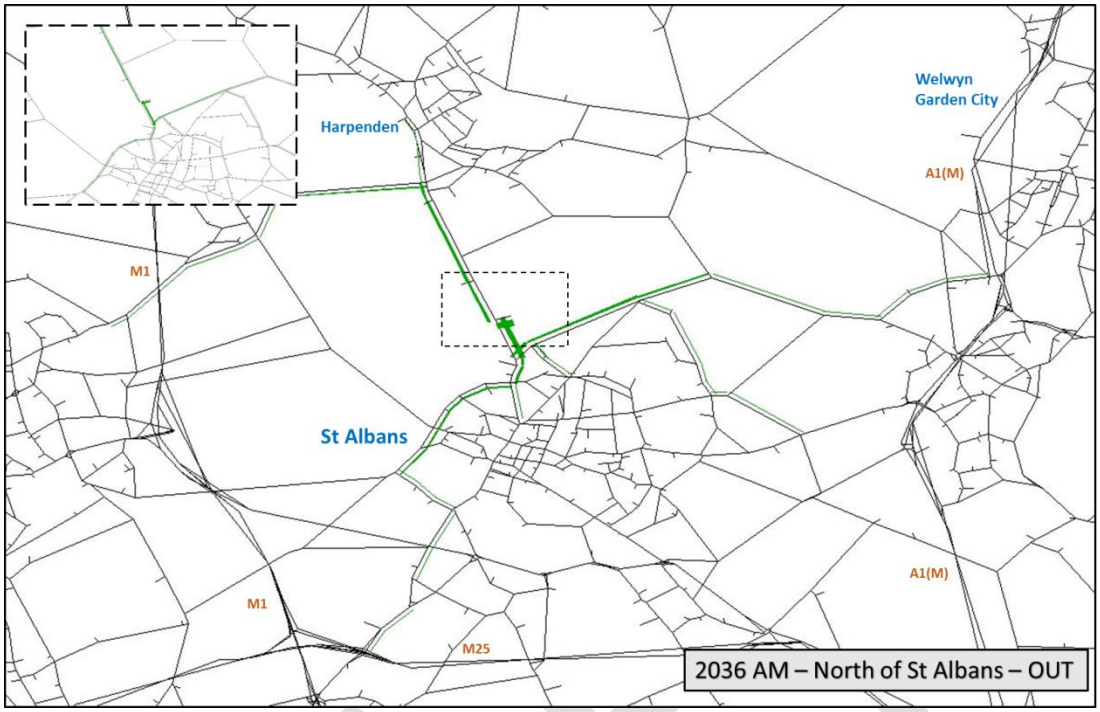
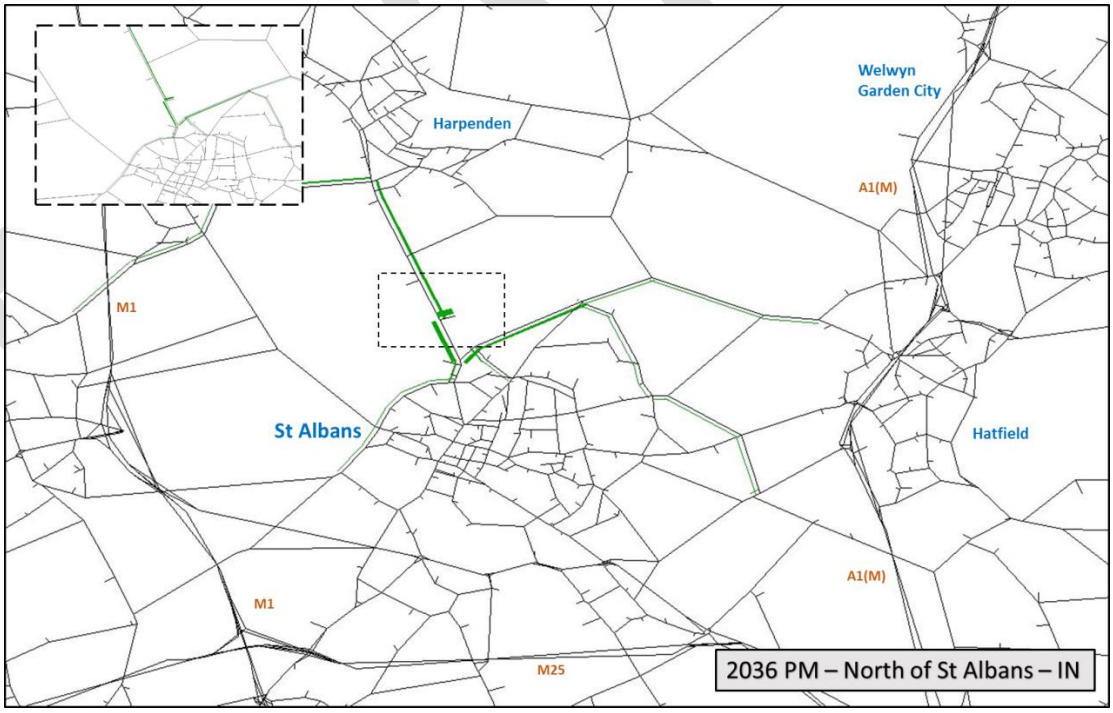


Figure 27: Inbound trips to the North of St Albans development – 2036 PM



5.5 West of London Colney

5.5.1 Trips to and from the West of London Colney development are quite varied. In the AM peak, outbound trips show linkages with the A414 east and west of St Albans, the M25 in either direction and the A41/M1 to destinations in North London. There is also interaction with local zones around London Colney which may suggest that opportunities for more sustainable travel initiatives should be investigated.

Figure 28: Outbound trips from the West of London Colney development – 2036 AM

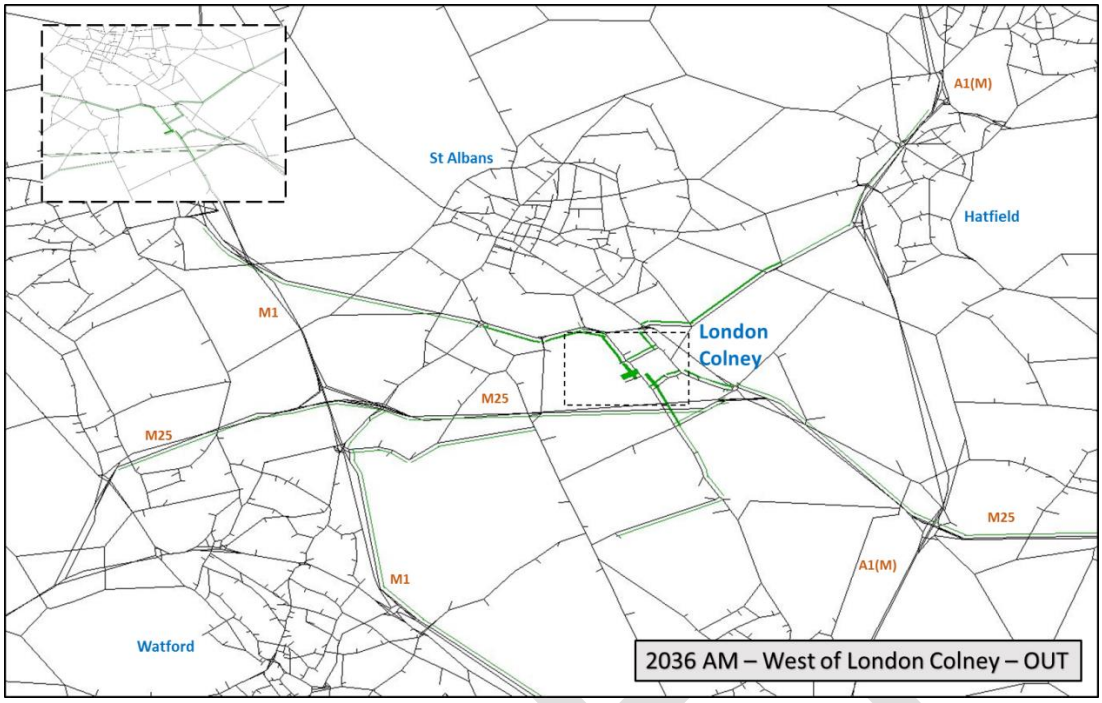
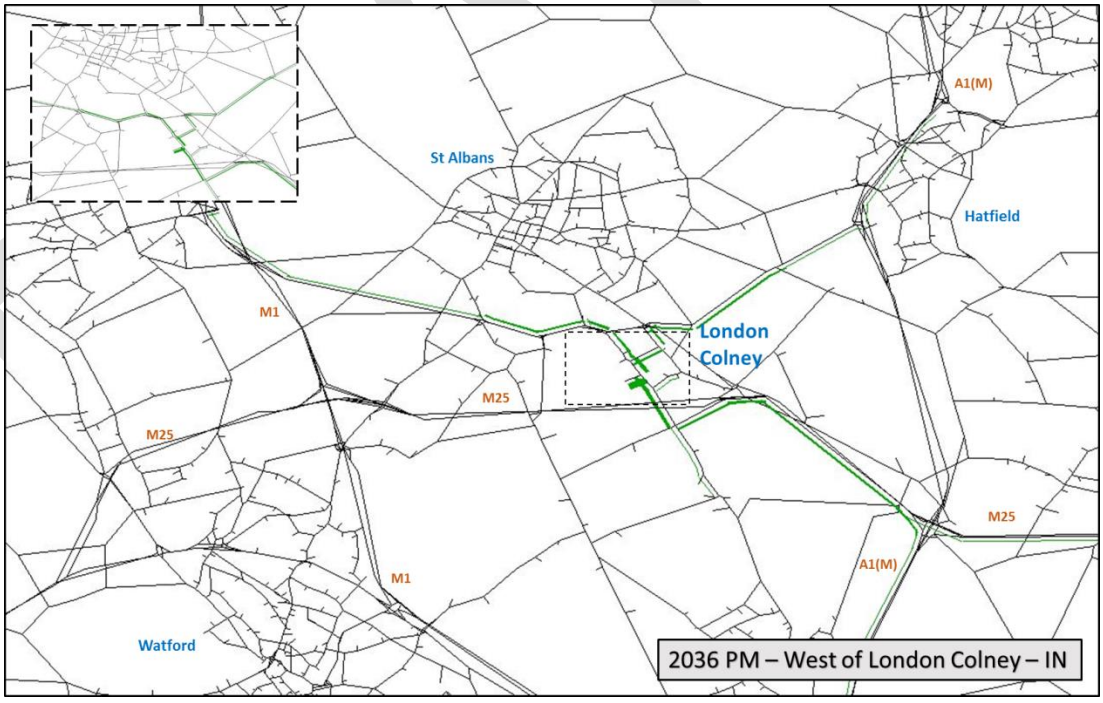


Figure 29: Inbound trips to the West of London Colney development – 2036 PM



5.5.2 The West of London Colney development will have interactions with the London Colney Inter-Urban Local Connectivity and Internal Connectivity GTP schemes. Improvements to the High Street would be experienced by residents/businesses in this development and linkages to St Albans via the High Street and A1081 should be enhanced and improved wherever possible.

5.6 West of Chiswell Green

5.6.1 Trips to and from the West of Chiswell Green development are quite varied. There is a strong interaction with the outer St Albans road network, as well as the M25 and A414 which are used for trips east and west of the development. There are linkages to the M1 south of St Albans and Watford town centre as well as the A1(M) and Hatfield to the east.

Figure 30: Outbound trips from the West of Chiswell Green development – 2036 AM

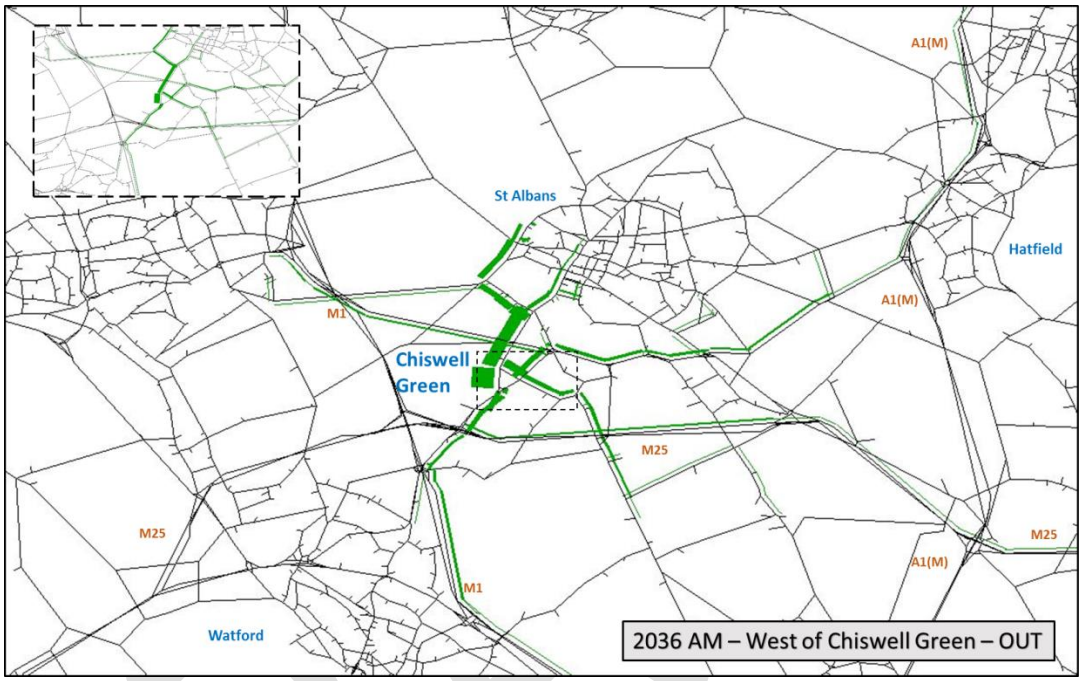
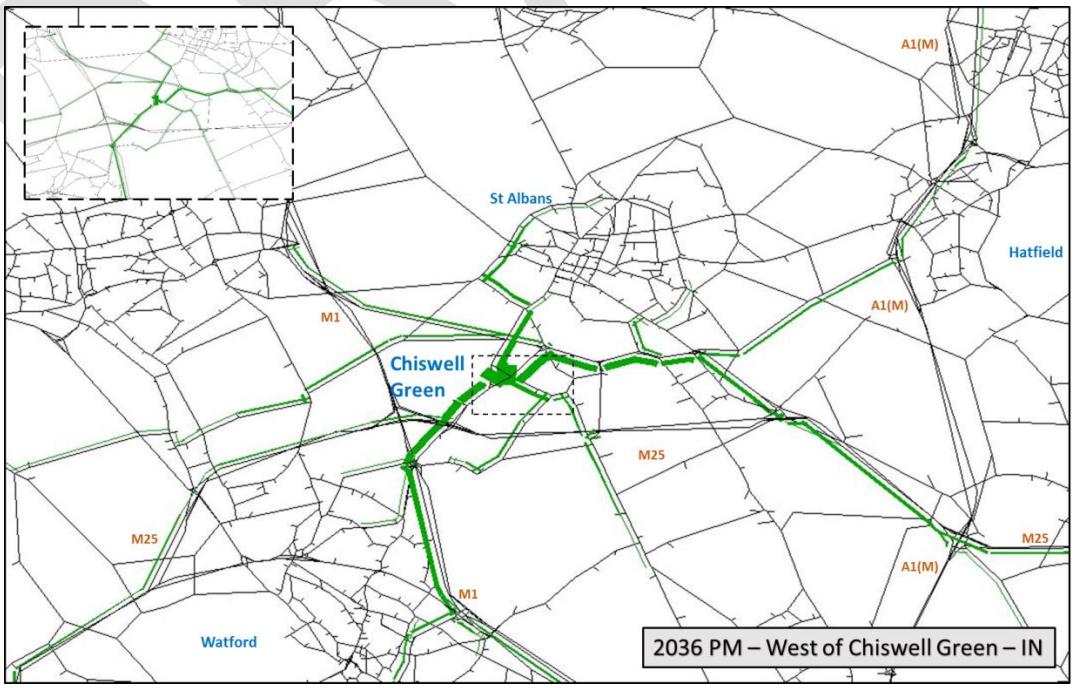


Figure 31: Inbound trips to the West of Chiswell Green development – 2036 PM



5.6.2 The West of Chiswell Green development will have interactions with the St Albans Green Ring proposals and the A414 Highway Improvements south of St Albans. Given the location of the development there will also be strong interaction with the Chiswell Green Corridor Active Travel Improvements. Consideration should also be given to ensure linkages with this development and the two railway stations in St Albans are maximised. Directions and way-finding should encourage trips by sustainable modes between such productions and attractions.

5.7 Park Street Garden Village

5.7.1 Trips to and from the Park Street Garden Village interact with many routes south of the A414 and central St Albans. The A414 is used to travel to/from Hemel Hempstead and Hatfield and locations further north using the A1(M) and M1. Traffic uses local roads south of the A414 to reach the M1 to the west of junction 22 of the M25 to the east. The development also exhibits strong linkages with the M25 and strategic road network compared to other developments in SADC. There are also linkages to areas north of St Albans which should be encouraged by sustainable modes.

5.7.2 The Park Street Garden Village development will have interactions with the St Albans Green Ring on the western side of St Albans and the A414 Highway Improvements south of St Albans. Linkages to the stations in St Albans should be maximised, although it is acknowledged Park Street station is located close to the development.

Figure 32: Outbound trips from the Park Street Garden Village development – 2036 AM

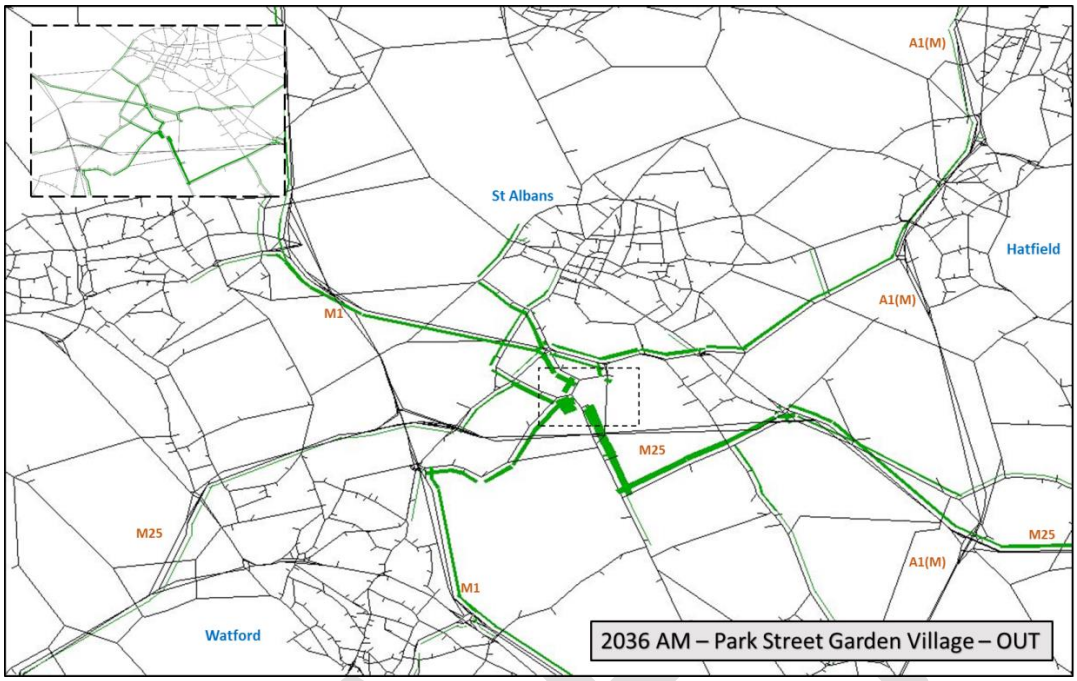
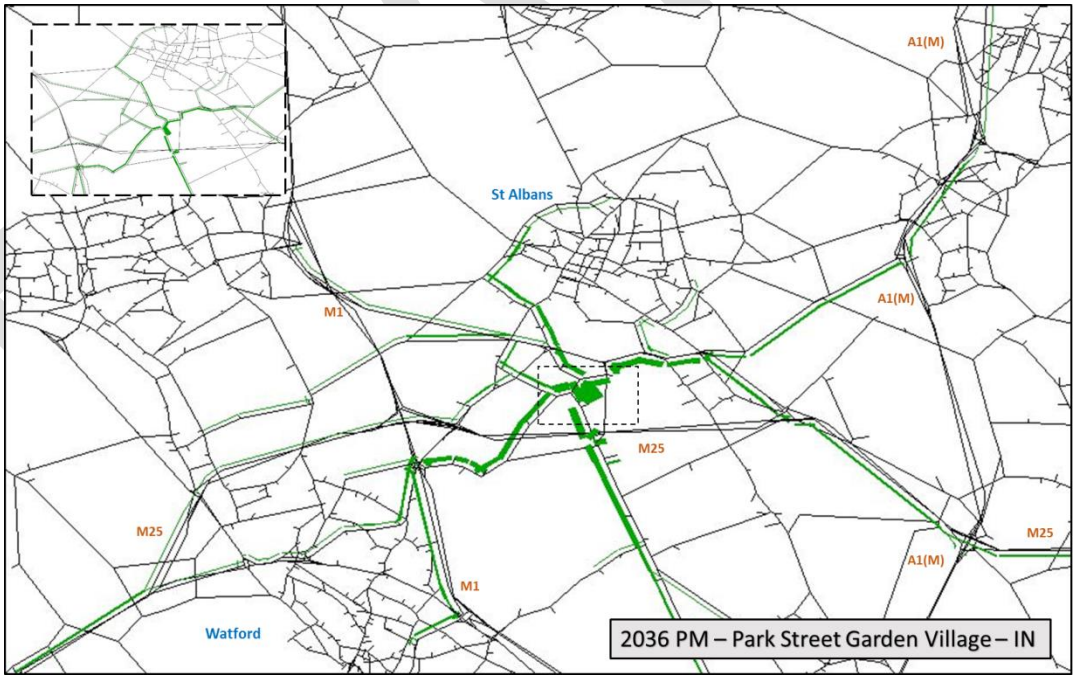


Figure 33: Inbound trips to the Park Street Garden Village development – 2036 PM



5.8 North East Harpenden

5.8.1 The North East Harpenden development has interactions with routes east and west of Harpenden as vehicles travel to/from the M1 and A1(M) motorways. Patterns of movements are very similar in the AM and PM peaks suggesting that some local movements may be accommodated by other modes.

Figure 34: Outbound trips from North East Harpenden development – 2036 AM

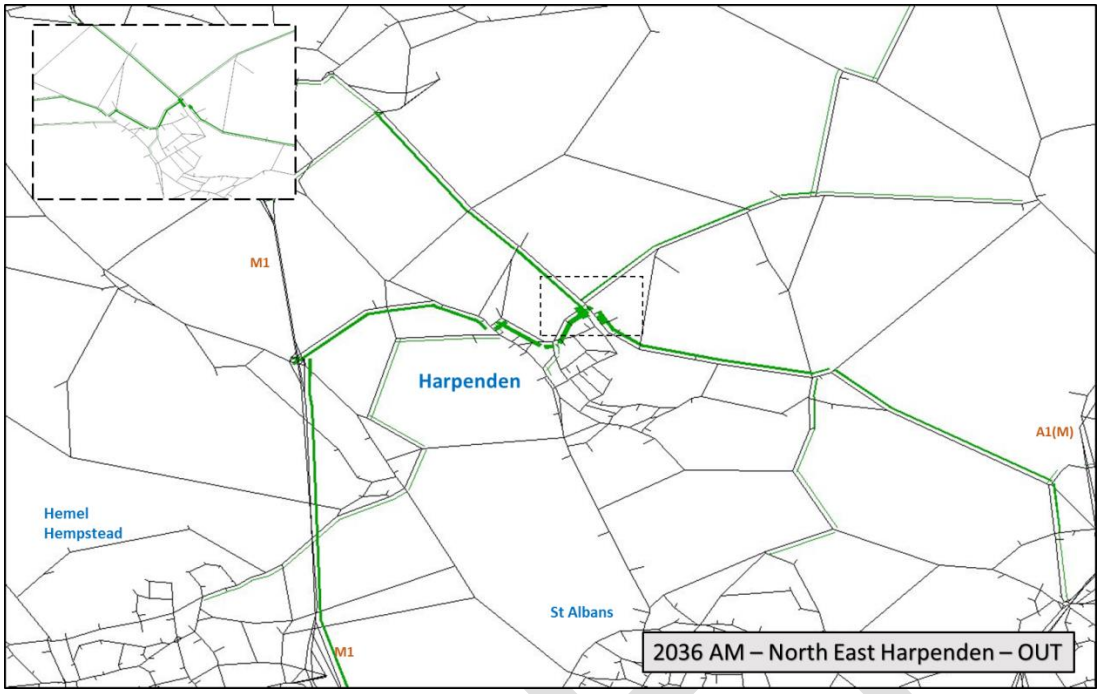
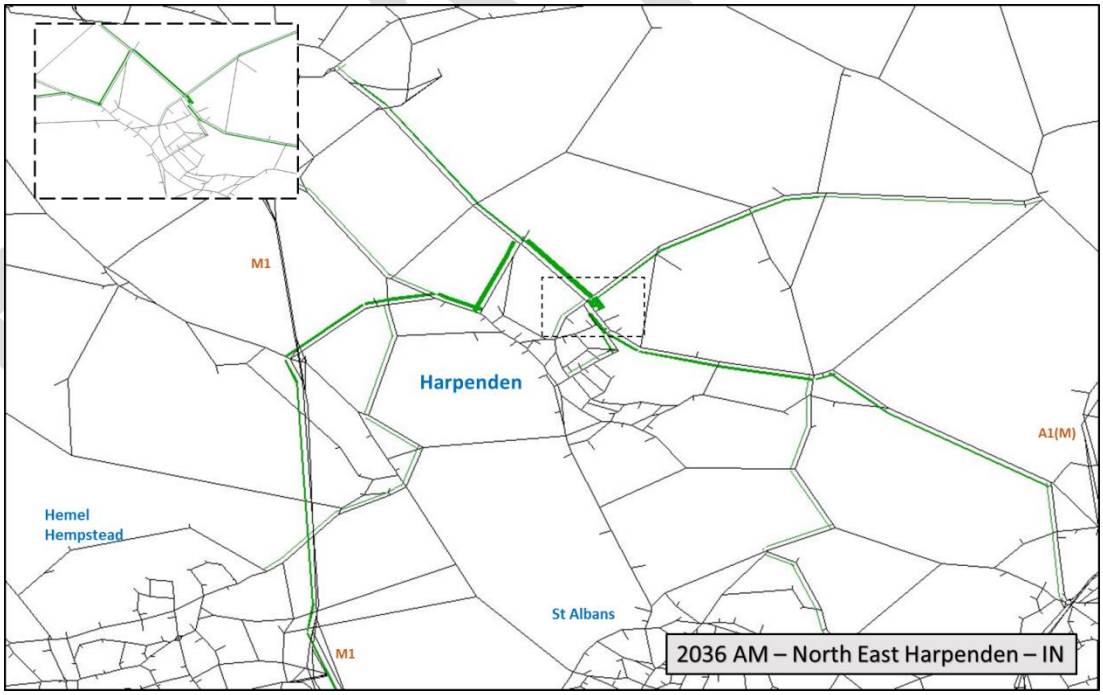


Figure 35: Inbound trips to North East Harpenden development – 2036 PM



5.8.2 The North East Harpenden development will predominantly benefit from the Luton-Wheathampstead-Hatfield and Welwyn Garden City GTP cycle improvements. As Harpenden has its own railway station, linkages to St Albans should be encouraged, however these may already be served by the railway service.

6. Scheme Mitigation

6.1.1 The modelling results and findings from LP4 have identified the strengths, weaknesses and opportunities of the traffic modelling and inform the likely impact of the new Local Plan allocations. This section includes further recommendations which will conclude with considerations on whether there is a need for potential further mitigation options.

6.1.2 This will include considerations of whether there is a need for further potential measures to encourage the use of sustainable transport (beyond those already suggested in the GTP work) as well as traditional highway capacity measures to alleviate network stress and delay.

6.1.3 HCC sent[3] AECOM a full list of sustainable measures SADC are considering which cannot be modelled in COMET. These are detailed in Table 3 along with qualitative analysis from LP4 which helps provide a narrative for the proposals.

[3] Emails from Sue Jackson entitled "*COMET model LP4 additional St Albans analysis*" received on 15-Nov-18 and "*COMET 2036 LP4: Final Infrastructure Queries*" received on 26-Nov-18

Table 3: Commentary on sustainable transport measures in light of LP4 results

Package Ref & Name	Scheme ID	Scheme Name & Details	Indicative Commentary on Schemes from LP4
PK 16 - Luton-Wheathampstead-Hatfield and Welwyn Garden City Corridor	**PR101**	Harpenden-Wheathampstead Cycleway - Complete missing link in National Cycleway 57 between Harpenden and Wheathampstead.	LP4 indicates congestion on Redbourn Lane and the B653 through Wheathampstead, the key east-west routes between the M1 and A1(M) in north SADC. This would suggest encouraging east-west movements by cycling could help reduce local trips on these congested corridors. Due to the heavy volumes of flows, crossing the A1(M) to reach Hatfield should be carefully considered.
	PR101	Wheathampstead-Hatfield Cycleway - Investigate options for cycling route between Wheathampstead and Hatfield, linking to new development at Symondshyde, potentially along Tower Hill Lane/Hammonds Lane	
PK 24 - St Albans City Centre Improvements	**PR139**	St Albans Footway Improvements Study - Investigate potential for widening or otherwise improving narrow footways in the town centre to improve conditions for pedestrians	LP4 includes wide scale speed reductions across the urban St Albans town centre. The majority of the town centre displays volume over capacity figures of under 80% indicating relatively free flowing traffic, however delays are experienced at Ancient Briton and the Peahen junction which are located near the High Street area. The results would suggest that strategic trips are not routeing through the town centre which is desired. Reducing capacity for vehicular traffic by increasing footway widths or providing sustainable measures could be accommodated.
	SM142b	St Peter's Street/Victoria Street Junction Reconfiguration - Junction reconfiguration to improve conditions for pedestrians and cyclists - widened footways on the north eastern and south-eastern corners of the junction. Victoria Street continues to be open to all traffic. Traffic signal single-way working will enable buses to take a wider turn as there will not be opposing traffic to avoid, therefore enabling the footways to be increased in size.	
	SM144	Enhanced Victoria Street-Civic Centre-St Peter's Street Pedestrian Link A new/enhanced link for pedestrians, associated with planned development on the former Police station and office block, between Victoria Street/Bricket Road, the Civic Centre and St Peter's Street (Nationwide Building Society).	

PK 25 - St Albans Green Ring	**PR148**	St Albans Green Ring Enhancement - Beech Bottom/Batchwood Drive Beech Bottom-Batchwood Drive raised speed table crossing and improved markings.	There is some congestion around the St Albans Green Ring, particularly west of the town centre on routes to/from Hemel Hempstead. Delays are experienced at the Ancient Briton and King William IV junctions. Any schemes which may impact capacity on the western side of St Albans may induce further congestion if vehicle speeds lower and road space is reallocated with other modes. Routes between southern St Albans and Hatfield do experience some congestion, particularly around the A1081/A414 junction at London Colney and approaches to/from the A1(M). The Alban Way would provide a viable alternative to these routes and also reduce flows on the A1081 between London Colney and St Albans. LP4 modelling would suggest that there is some capacity on the radial routes east of St Albans therefore if additional road space was removed and converted to cycle lanes to link to the Alban Way this may be feasible.
	PR149	St Albans Green Ring Enhancement - Townsend Drive. Introduce a raised speed table crossing where the cycle route crosses Townsend Drive.	
	SM152	Existing level crossing closure – replacement facility. SM152a - A new bridge over the Abbey Line for pedestrians and cyclists broadly in the vicinity of the existing level crossing	
	SM152b	A new route alongside the Abbey Line between Cotton Mill Lane and Abbey Station	
	SM153	St Albans Green Ring 'Spoke' Routes - New cycle 'spoke' route - better signposting between the City Station, Hatfield Road and the Alban Way in the vicinity of Flora Grove, Breakspear Avenue, Vanda Close and Camp Road	
	PR154	Alban Way Lighting - Implement lighting along Alban Way, either 'always on' or sensor activated	
	PR155	Alban Way Wayfinding - Wayfinding to Alban Way in St Albans And Hatfield. Extension of Alban Way branding/signage/wayfinding beyond the extents of the actual cycleway to provide easier wayfinding to it	
	PR156	Alban Way Cycle Signage- Improved cycle signage along Alban Way. Include 'reference point' signage to provide an indication to cyclists of where they are in relation to nearby prominent land use features, and distances/estimated journey times to key locations	

	SM157	Alban Way Physical Improvements -"Physical improvements including surface, crossings, general maintenance, etc. Maintain the crossing over the Abbey Line as a priority, and incorporate into any improvement scheme. Investigate sensor lighting. Manage vegetation along the route, and clear leaf mould regularly from the relatively new surface to avoid mud building up. Investigate widening and lighting the path as it passes through Hatfield, especially to the east of the Galleria, or consider alternative busier routes as part of the Hatfield regeneration plans."	
	PR158	Alban Way Marketing and Promotion - Marketing and promotion of Alban Way as an attractive sustainable transport connection alongside Hatfield regeneration plans	
PK 26 - St Albans Abbey Station Accessibility	**PR159**	Cycle Parking - Increase cycle parking provision at St Albans Abbey station.	Volume over capacity in the area of St Albans Abbey Station suggests that congestion is minimal, however there are delays at the Peahen junction further north. It should be considered that there is congestion and delays on the approaches to the King Harry junction which is a known bottleneck south of the station. An alternative junction on the A414 may relieve some congestion, however any park and ride may be limited if the bus queues in the traffic predicted. Access to the Cottonmill area from the A414 would appear more feasible , however there is also congestion on Shenley Lane parallel to the A414 currently which could increase if this route offered
	SM161	St Albans Abbey Station Relocation - Investigate long term potential for relocation of St Albans Abbey station to Cottonmill area of St Albans to facilitate development in the area and realise opportunities for a bus interchange at the station. This may be less viable if an additional or enhanced station is provided on the southern edge of St Albans (see SW-SM13 below). A station relocation could release the existing station site for redevelopment. A relocation could however be costly, with the existing rail track and overhead wires removed.	

	SW-SM13	Abbey Line Park and Rail Hub - SW-SM13a Extension of Park Street station platform northwards to facilitate the introduction of a Park and Rail hub south of the A414. Vehicle access provided off the A414 at a new at-grade junction.	another destination. The provision of off-road cycle and walking routes to the station would appear to offer the best solution.
	SW-SM13b	Abbey Line Park and Rail hub at an extra new station (Cottonmill area) north of the A414. Vehicle access provided off the A414 at a new at-grade junction. Local pedestrian/cycle links into southern St Albans.	
	SW-SM13c	Abbey Line Park and Rail hub at an extra new station (Cottonmill area) north of the A414. Vehicle access provided off A414 at a new at-grade junction. Local pedestrian/cycle links into southern St Albans. Plus new bus link into southern St Albans (to City Station) via Holyrood Crescent or Butterfield Lane.	
	SW-SM13d	Abbey Line Park and Rail hub at a relocated Park Street station south of the A414 - car park linked to the A414. Local pedestrian/cycle links plus new bus link into southern St Albans (to City Station). Bridge over A414 for buses, cyclists and pedestrians	

PK 27 - St Albans City Station Accessibility	**SM163**	Victoria Street Footway Improvements - Improved and widened footways at the junctions with Ridgemont Road and Alma Road/Beaconsfield Road and the link in between to increase capacity for high pedestrian volumes to/from the City station especially during peak periods. The potential impact of a loss of roadspace could be increased queues and delays. Any magnitude of impact will need to be carefully investigated prior to implementation of any changes. The objective however of this intervention is to improve the walking environment and encourage modal shift by 'nudging' motorists out of their cars, especially those making shorter distance journeys within St Albans e.g. taking pupils to/from school	There is some congestion on Victoria Street in LP4, however this is to be expected with many junctions in close proximity. COMET does not include any road widths and it is noted Victoria Street is very wide with kerbside parking along some of its length which does not impact vehicle flows. There are opportunities to reallocate road space to other modes and encourage journeys by other modes. The geometry of Beaconsfield Road/Victoria Street/Alma Road could be improved to narrow the junction and cater for the high pedestrian demand to and from the station.
	PR164	Victoria Street Wayfinding - Improved wayfinding between town centre and station	
	SM165	Pedestrian Crossing Improvements - Improve crossings at intersections with consistent type and placement of signals and signal call buttons, and pedestrian priority interventions such as zebra crossings at intersections and maintaining footway level/surfacing across minor roads.	
	SM166	Victoria Street Urban Realm Improvements Urban Realm Improvements along Victoria Street to improve conditions for pedestrians and improve amenity of the street.	
	PR167	Cycle Parking. Maintain or increase current and safeguard locations for future provision of cycle parking at St Albans City station and in the town centre, especially as part of the proposed station ticket hall improvements on Ridgmont Road which could also form part of a cycle hub facility.	

	PR168	Grosvenor Road-Ridgemont southern active travel route to the station - Improved walking/cycling infrastructure along Grosvenor Road and Ridgemont Road for access to the City station. Also as part of SW-SM13, there is the potential for a bus St Albans City-Southern PT Hub bus link which could route via Ridgmont Road. Further investigations would be required	
PK 28 - Hatfield Road Corridor - St Albans	**PR169**	Hatfield Road Parking Study - Undertake parking study to understand parking requirements and investigate potential for removal of parking along Hatfield Road. Prior to any changes being implemented, any study should also involve consultation with local residents and businesses and an impacts assessment undertaken to determine if there would be any detrimental effect on local businesses.	Hatfield Road suffers from congestion and delays at its eastern end approaching Hatfield. This could be combined with promotion of the Alban Way to encourage sustainable travel between the towns. COMET does not consider parking and the road is only one lane in each direction, however any reduction in speed limit would probably increase the congestion along this route (or reallocate to parallel routes).
	SM171	Hatfield Road Urban Realm Improvements - Urban Realm Improvements along Hatfield Road to improve conditions for pedestrians and improve amenity of the high street, potentially as a result of parking removal along all or part of the street as recommended by the parking study (PR169)	
PK2 29 - London Road Corridor - St Albans	**PR172**	Odyssey Cinema revised footway and crossing - Widening of the footway outside the cinema and relocation of the signal controlled crossing north-westwards to improve safety for pedestrians entering/exiting the cinema.	There is limited congestion in this area in LP4. Results would suggest that capacity and road space could be reallocated to other modes and there would be limited impact. Given the proximity of

	PR173	Parking revisions - A review of on-road parking provision along the corridor to consider whether it can be rationalised in order to improve conditions for cyclists and provide additional crossing facilities. Prior to any changes being implemented, any study should also involve consultation with local residents and businesses and an impacts assessment undertaken to determine if there would be any detrimental effect on local businesses.	other junctions around the town centre there would only be a very local impact.
PK 30 - A414 Highway Improvements (South of St Albans)	**SM180**	Traffic Routing Signage - Review and renew signage within St Albans and the surrounding area to ensure motorists are directed towards the A414 for making onward journeys on the A1(M).	There are delays and congestion along the A414 south of St Albans however the route is a high speed road with many large junction. It is assumed any improvements for other modes would not be on carriageway due to safety concerns. Any mode shift to sustainable modes could be encouraged by improvements should be promoted and linkages with the Alban Way made to help reduce congestion on the A414.
	SM181	A414 Cycle Route upgrade London Colney-Hatfield - Improve the existing footway alongside the A414 to accommodate pedestrians and cyclists between the London Colney Roundabout and Comet Way (Hatfield). Consideration will also need to be given to a grade-separated link over the A1081 north of the A414 junction (potentially to be linked with the existing or improved bridge over the A414).	
	SM206	A414 Corridor Park Street-Napsbury-London Colney Cycle Route - Upgrade of the existing footway to facilitate shared use by pedestrians and cyclists, providing better connectivity between Park Street (including the proposed station hub (SW-SM13)), the proposed Napsbury interchange for Herts Rapid and London Colney.	

PK 31 - London Colney Inter-Urban Strategic Public Transport Connectivity	**SM182**	London Colney A414 Bus Interchange associated with a potential strategic EW Bus Rapid Transit route ('Herts Rapid') - Small bus interchange at Napsbury to provide access to Herts Rapid services from London Colney	LP4 results indicate London Colney is surrounded by key junctions which experience congestion and delay: 1. M25 Junction 22 2. A414/A1081 London Colney Hamburger 3. B556/B5378 mini roundabout Any public transport measures to help reduce highway journeys would help reduce congestion and delays at these junctions. Key linkages by sustainable modes should be made to St Albans City Railway Station, the Alban Way and towns further south in Hertsmere.
	SM183	London Colney Railway Station - Investigation into a long term aspiration for a new railway station on the Midland Main Line served by Thameslink rail services, comprising of 2 platforms on the 'slow' tracks only or 4 platforms (to mirror the provision at all other MML Thameslink stations). Station would be served by all 'stopping' Thameslink services between Luton/St Albans and London (and beyond) and could potentially be served by some or all fast Thameslink services. This would require extensive consultation with DfT, Network Rail and rail operators to determine operational feasibility and a favourable business case which will confirm if there is a need and it presents good value for money. New link road to London Colney will be required, incorporating a lit, shared footway/cycleway and some parking (the amount of parking will need to be determined). Station could be located broadly west of London Colney.	
	SM184	Combined London Colney Railway Station and A414 Bus Interchange associated with a potential strategic EW Bus Rapid Transit route ('Herts Rapid') - Park, Bus and Rail Parkway Interchange, located closer to Napsbury than London Colney. Improvements to the B5378 Shenley Road would be required to make the route attractive to pedestrians and cyclists, as would the A414 Napsbury grade separated junction.	

	SM185	Upgrade of the A414 Napsbury Junction - Improvements to the A414 Napsbury Junction in conjunction with a new PT facility (SM182), including upgrade of slip road merges and diverges to ensure they comply with current design standards	
	SM186	B5378 Active Travel Corridor (if a PT interchange is provided at Napsbury) - Upgrade of existing footway to provide shared use footway/cycleway along the entire length between the junction with St Annes Road (London Colney) and the A414 Napsbury Junction.	
	SM187	B5378 Active Travel Corridor (if a PT interchange is provided west of London Colney) - Upgrade of existing footway to provide shared use footway/cycleway along the length of the B5378 between the St Annes Road and Coombes Road junctions.	
	SM206	A414 Corridor Park Street-Napsbury-London Colney Cycle Route - Upgrade of the existing footway to facilitate shared use by pedestrians and cyclists, providing better connectivity between Park Street (including the proposed station hub (SW-SM13)), the prop	
PK 32 - London Colney Inter-Urban Local Connectivity	**PR188**	London Colney A414 Cycle/Pedestrian Bridge Improvements - Improvements to the existing overpass approaches including thinning vegetation to increase security, removal of kissing gates, wayfinding and signage, etc.	LP4 indicates limited congestion along London Colney High Street however delays are recorded at the junctions either end (A414/A1081 and M25 Junction 22). Any improvements that would reduce highways trips would help reduce congestion at

	SM208	London Colney A414 Sustainable Travel Bridge - Investigate longer term options for a new, more attractive sustainable travel bridge over the A414 which will be capable at least of accommodating pedestrians and cyclists but also potentially future PT and autonomous mass transit vehicles	these junctions. There are delays at the A414/A1081 hamburger junction therefore accommodating additional bus services should be carefully considered.
	SM190	Improved Pedestrian and Cycle Links within London Colney on the High Street - Improved active travel infrastructure between London Colney and St Albans, including footways, cycleways, crossings, lighting, signage, etc., to encourage more trips to be made by active modes	
	SM176	A414/A1081 London Colney Roundabout Upgrade - Conversion of the existing signal-controlled roundabout into a signal-controlled hamburger junction which incorporates an east-west A414 through-link. Consideration should be given to the movement of bus services through the junction and how this could be optimised.	
	SM206	A414 Corridor Park Street-Napsbury-London Colney Cycle Route - Upgrade of the existing footway to facilitate shared use by pedestrians and cyclists, providing better connectivity between Park Street (including the proposed station hub (SW-SM13)), the prop	
PK 33 -London Colney Internal Connectivity	**SM192**	High Street streetscape improvements - Streetscape improvements adjacent to High Street shopping parade incorporating a new crossing facility, traffic calming, reduced parking (with space given over to cycle parking) and widened footway with new surfacing	There is limited congestion on local roads within the London Colney area suggesting there is capacity available for other modes or reallocation of road space to accommodate them.

	PR195	Cross-town core pedestrian and cycle route linked to potential new housing development - Cross-village core pedestrian and cycle route or routes linked to potential new housing development on land to the west of London Colney. Should comprise of new signal-controlled crossing provision on B5378 Shenley Road and improvements along St Annes Road (to the High Street and onward connection to the retail park)	
PK 34 - St Albans-Hatfield Local Connectivity	**SM196**	Traffic Routing Signage - Review and renew signage within St Albans and the surrounding area to ensure motorists are directed towards the A414 for making onward journeys on the A1(M).	LP4 indicates there is congestion on the approaches to the Hatfield Avenue / Coopers Green Lane junction. Any scheme which may reduce capacity is likel;y to intensify congestion and delays in this area.
	SM198	Coopers Green Lane Active Travel Infrastructure (SW of Hatfield Avenue) - Cycling and footway infrastructure along Coopers Green Lane, including link to Hatfield Business Park	
PK 35 - Chiswell Green Corridor Active Travel Improvements	**SM177**	A414 Park Street Roundabout Improvements - An improvement to the existing roundabout layout with signal-control introduced to most if not all arms and some minor physical alterations to the junction's layout	LP4 indicates there are delays and congestion on all approaches to the Park Street Roundabout. Signalisation should be considered and linked to other signal junctions in the local area.
PK 36 - Alban Way Improvements	**PR154**	Alban Way Lighting - Implement lighting along Alban Way, either 'always on' or sensor activated	Routes between southern St Albans and Hatfield do experience some congestion, particularly around the A1081/A414 junction at London Colney and approaches to/from the A1(M). The Alban Way would provide a viable alternative to these routes and also reduce flows on the A1081 between London Colney and St Albans. LP4 would suggest there is some capacity on the radial routes east of St Albans
	PR155	Alban Way Wayfinding - Wayfinding to Alban Way in St Albans and Hatfield. Extension of Alban Way branding and wayfinding signage beyond the extents of the actual cycleway to provide easier wayfinding to it. New signs along the route will point out nearby local features to help guide users as to where they are.	

	PR156	Alban Way Cycle Signage - Improved cycle signage along Alban Way. Include 'reference point' signage to provide an indication to cyclists of where they are in relation to nearby prominent land use features, and distances/estimated journey times to key locations	therefore if additional road space was removed and converted to cycle lanes to link to the Alban Way this may be feasible.
	SM157	Alban Way Physical Improvements - Physical improvements including surface, crossings, general maintenance, etc. Maintain the crossing over the Abbey Line as a priority, and incorporate into any improvement scheme. Investigate sensor lighting. Manage vegetation along the route, and clear leaf mould regularly from the relatively new surface to avoid mud building up. Investigate widening and lighting the path as it passes through Hatfield, especially to the east of the Galleria, or consider alternative busier routes as part of the Hatfield regeneration plans.	
	PR158	Alban Way Marketing and Promotion - Marketing and promotion of Alban Way as an attractive sustainable transport connection alongside Hatfield regeneration plans	

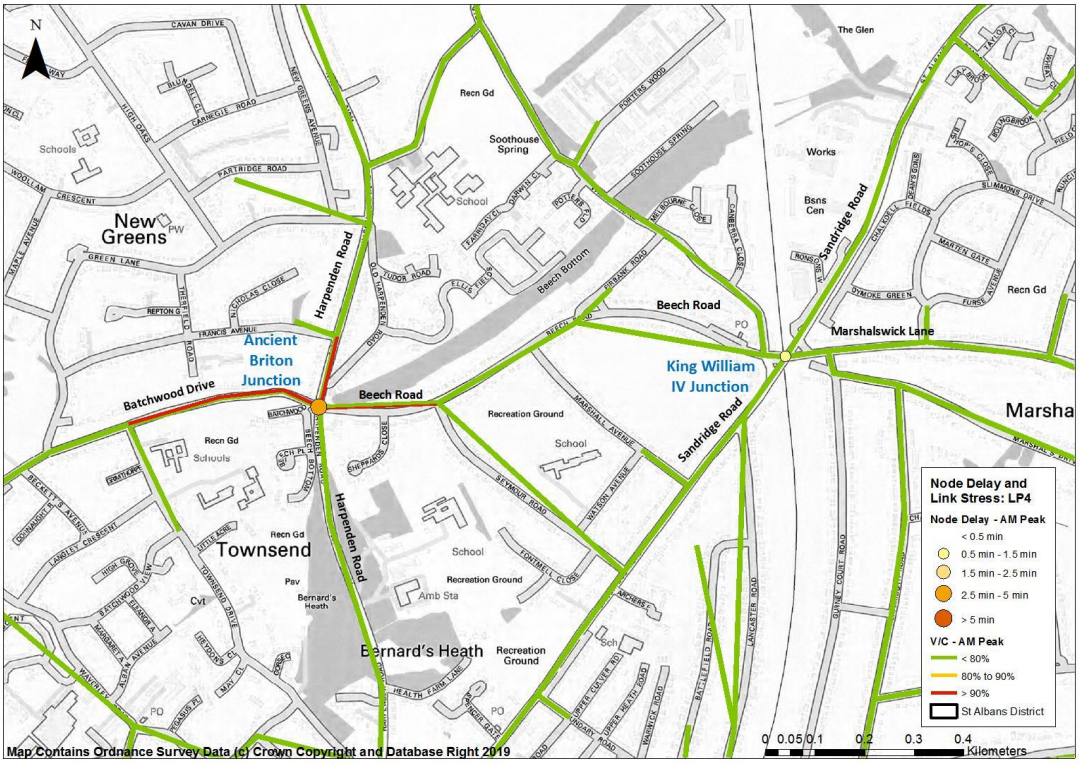
6.1.4 Analysing the results of LP4 further there are 6 other locations within SADC which may require further mitigation considerations as detailed below. This report only contains high level suggestions of possible mitigation measures which should be investigated further by SADC/HCC.

6.2 Ancient Briton and King William IV Junctions

6.2.1 Signal optimisation undertaken in LP4 did not reduce delays at either junction. At the Ancient Briton junction delays are greatest for Batchwood Drive (up to 3 minutes). There is limited scope to improve conditions due to the highway boundary around the junction. At the King Willian IV junction delays are greatest for straight ahead movements on Marshalswick Lane (5-6 minutes), Beech Road (5 minutes) and straight and left turn movements on Sandridge Road. The left turn from Sandridge Road northbound also experiences delays of up to 4 minutes. There is limited scope for improvements due to the proximity of the railway.

6.2.2 It is acknowledged that the highway boundary and existence of buildings around these junctions does not provide much capacity to propose alternative measures. Ancient Briton and King William IV junctions form part of the outer link road network around St Albans. Both junctions will be influenced by the North of St Albans development which is located north of the Ancient Briton junction. Traffic flows and volumes may also be influenced by the St Albans Green Ring proposals in this area which may reduce speeds and therefore the attractiveness of the route as road space may be reduced or allocated to other modes.

Figure 36: LP4 traffic conditions at the Ancient Briton and King William IV Junctions



6.2.3 Given the pressures on these junctions it is imperative that any traffic signals are linked and can adapt to changing flows during the day. It may be that delays at these junctions have to be accommodated as they help complement other measures, or there are no viable alternatives given the limited carriageway space available.

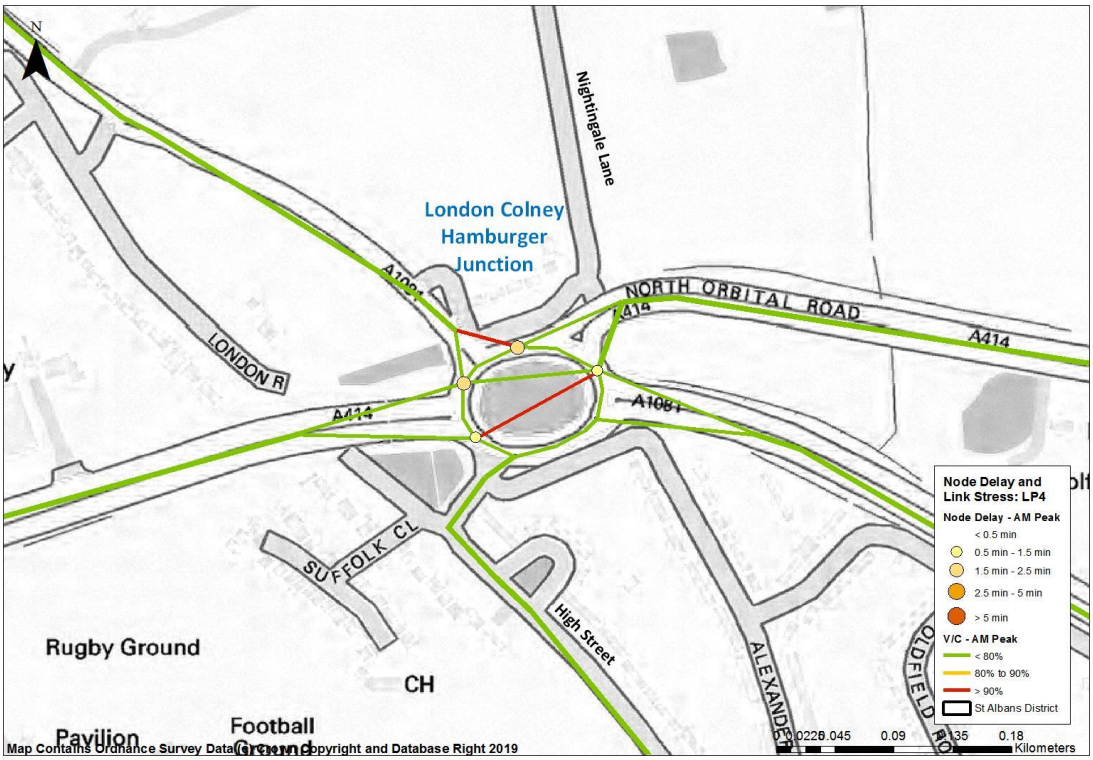
6.3 London Colney Hamburger Roundabout

6.3.1 Delays at this junction may be reduced once the full signal timings for the scheme are known. The timings are estimated based on flows, however COMET does not allow further optimisation. No signal timings were provided for this junction, all timings were assumed. Delays of up to 2 minutes are experienced at this junction. The A1081 southbound arm experiences the greatest delays in both time periods (5 minutes in AM, 2.5 minutes in PM). There are also delays of up to 4 minutes for A414 eastbound flows. The greatest demand in flows at the junction comes from the A414 arms and the northbound A1081 arm.

6.3.2 It is acknowledged this junction will be impacted by surrounding developments, particularly at Radlett Railfreight and Tyttenhanger Garden Village. It is important that delays at this junction are minimised to ensure growth does not materially increase delays and congestion in the area. Signal timings should be vehicle actuated and more detailed junction modelling would help refine the scheme at this location.

6.3.3 This junction is also one of the key access points to London Colney which is subject to various sustainable transport measures. Delays could reduce the impact of these measures if the area is surrounded by congestion. A longer term aim of installing a railway station would encourage mode shift and reduce congestion at this junction. Linking London Colney to St Albans via the cycling measures proposed would also help reduce dependency on car trips through this junction.

Figure 37: LP4 traffic conditions at the London Colney Hamburger junction

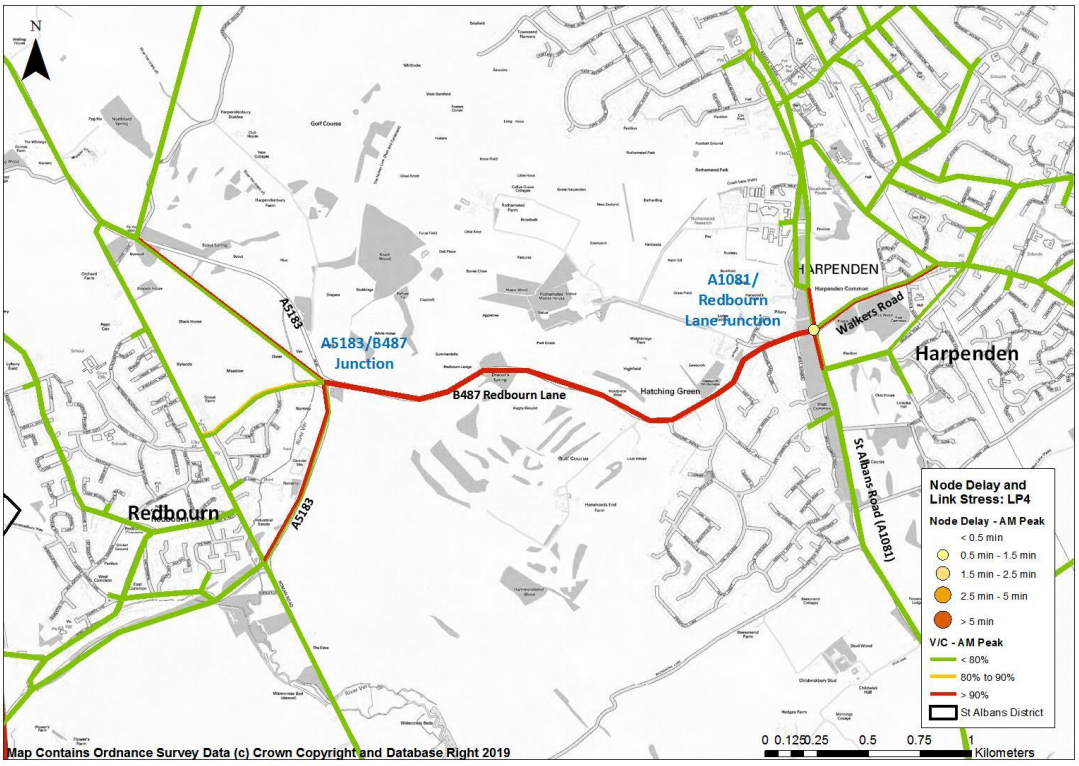


6.4 Redbourn to Harpenden

6.4.1 The congestion between Redbourn and Harpenden is partly generated by the junctions at either end of Redbourn Lane. Consideration should be given to signalising both junctions to help smooth traffic flows and react to any delays as they develop. The route also forms an alternative east-west route between the M1 and A1(M) corridors across northern SADC. Delays at the A5183/B487 junction are up to 45 seconds. The Harpenden Lane and A5183 arms have delays of up to 1 minute at the roundabout. Similar demand flows are experienced for all major arms, the A5183 and Redbourn lane. Delays at the Redbourn Lane/A1081 junction are up to 1 minute, with up to 2 minute delays for Walkers Road caused by right turners from Redbourn Lane and the straight ahead from the A1081 to the A1081 southbound.

6.4.2 It is acknowledged that improvements to cycle facilities are only proposed as far as Harpenden. Consideration should be given to linking proposals to Redbourn and ensuring that a viable transport mode is provided. The speed limit on this link also varies and consideration of lowering it to 30mph along its entire length along with traffic calming measures may help ensure the route is only used for local movements and any rat running is dissuaded.

Figure 38: LP4 traffic conditions Redbourn to Harpenden

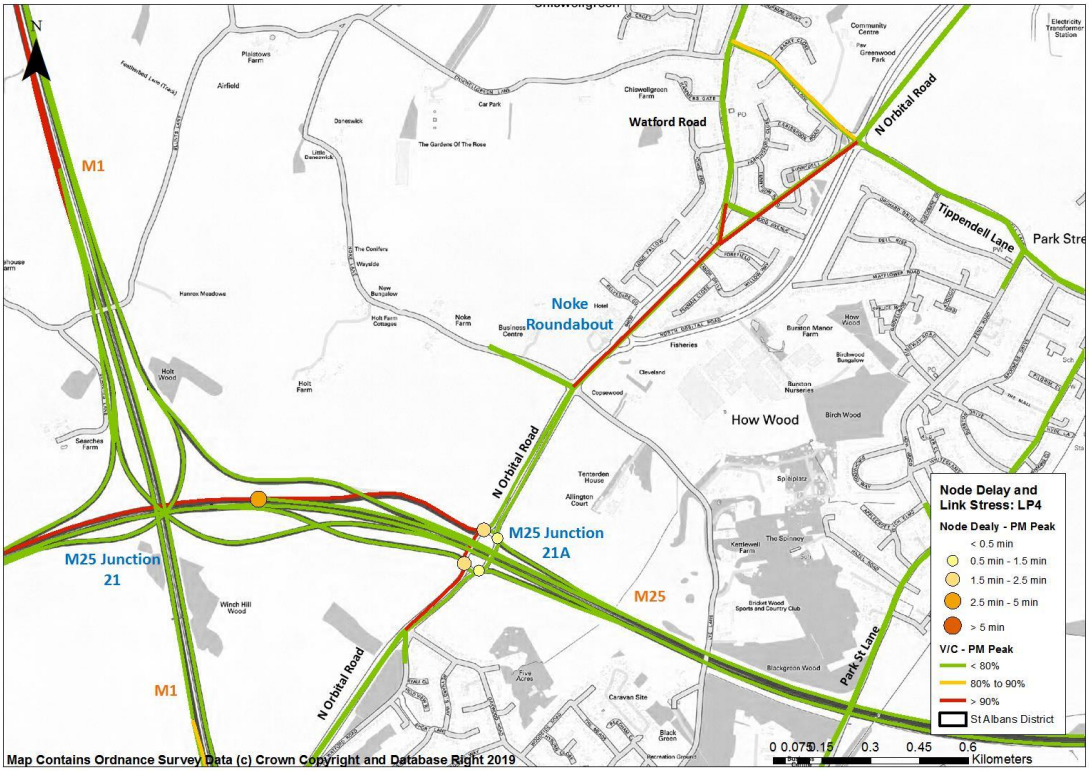


6.5 M25 Junction 21 and Associated Signals

6.5.1 This area has been highlighted as it was found to be very sensitive during modelling. Any attempts to revise signal timings would generate convergence issues. Further localised modelling will help ensure accurate signal timings are used in future scenarios. LP4 includes the signalisation of junctions north of Junction 21A and consideration should be given to linking signals and installing demand responsive timings. The signals also contribute to the high levels of congestion in the area.

6.5.2 Delays of up to 3.5 minutes are experienced by eastbound traffic on the off slip approaching Junction 21a. Congestion is experienced on all approaches to the Noke roundabout with delays up to 2.5 minutes. There are delays on the A405 of up to 3 minutes for southbound flows in the AM peak and 4.5 minutes northbound on the A405 in the PM peak.

Figure 39: LP4 Traffic conditions around M25 Junction 21A



6.6 St Albans to Hatfield East/West Routes

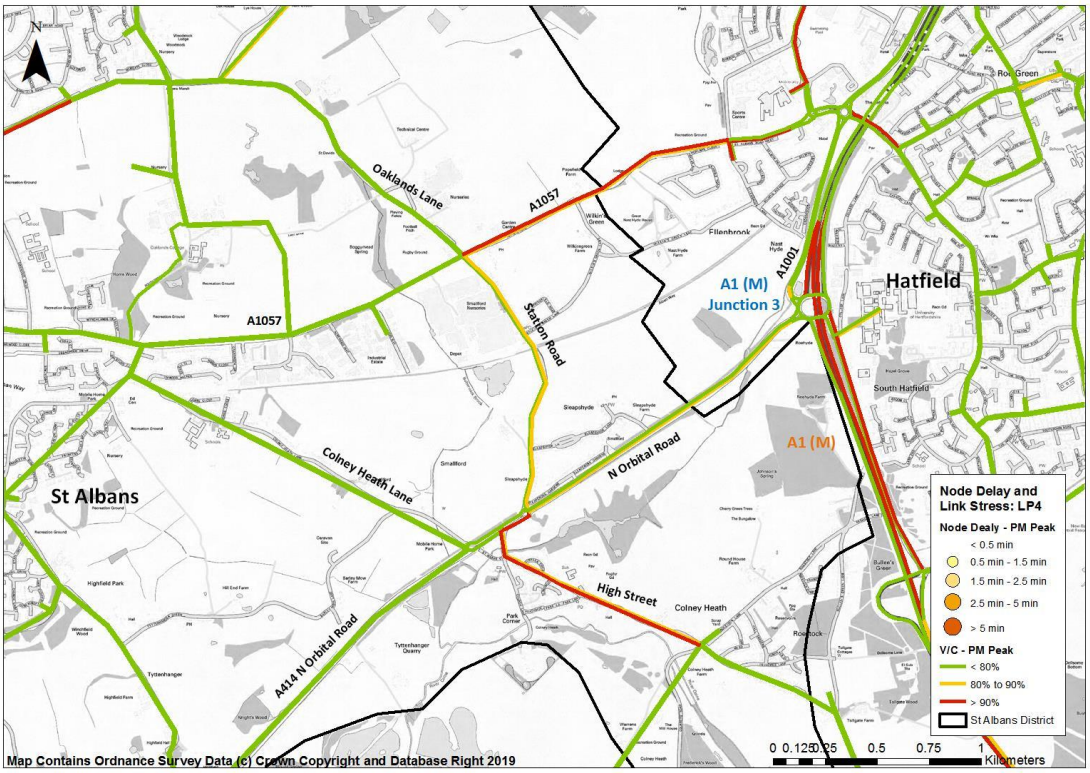
6.6.1 This area has been identified as there are high levels of congestion east of St Albans on the approaches to the A1(M) and Hatfield. It is observed there may be rerouting onto cross country routes to avoid delays and congestion associated with A1 (M) junctions. The A1(M) itself through Hatfield shows high levels of congestion in both directions.

6.6.2 Delays of up to 30 seconds are observed on the A1057 eastbound at Oaklands Lane junction. There are delays on minor arm priority junctions for the A414/Colney Heath Lane Long-about with average delays of up to 1.5 minutes through the junction and 2.5 minutes for the High Street.

6.6.3 Consideration may be given to lowering speeds on the A414 to help meter flows on these routes. More detailed junction modelling will help determine the signal timing that should be implemented at this junction.

6.6.4 Sustainable measures to promote use of the Alban way would help cater for movements between St Albans and Hatfield and encourage mode shift away from these congested routes.

Figure 40: LP4 Traffic conditions around eastern St Albans

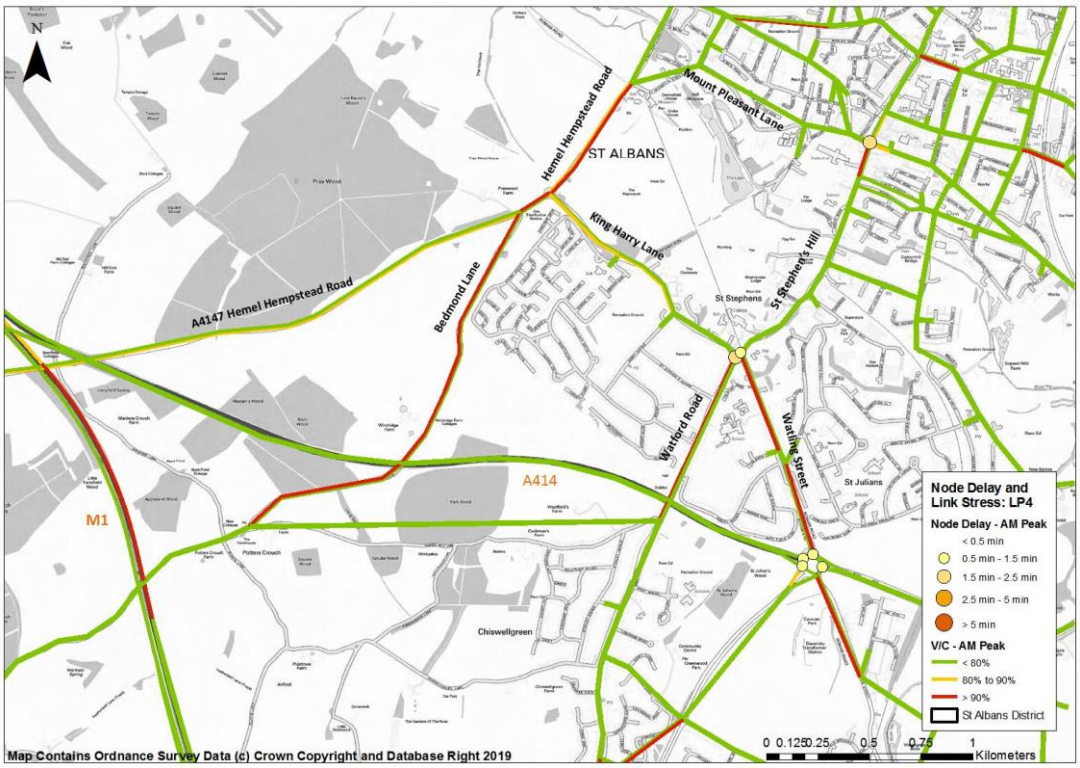


6.7 St Albans to Hemel Hempstead East West Routes

6.7.1 This area has been examined in further detail as it is acknowledged there is a lot of development planned around East Hemel and interaction with St Albans will be key. There are a series of junctions with delays of up to 30 seconds including Bedmond Lane/A4147 junction and 1 minute at King Harry Lane/A4147 junction. Hemel Hempstead Road experiences congestion from King Harry Lane/A4147 roundabout to the Bedford Lane priority junction. There are delays on this arm of up to 2 minutes. There are also delays at the King Harry double mini roundabout up to 2 minutes averaged across the junction. For traffic from the south on Watford Road delays are up to 3 minutes.

6.7.2 Given the development planned around East Hemel consideration may be given to extending sustainable transport schemes between the areas. This network also forms part of the St Albans Green Ring where capacity may be reduced by future schemes. This may lead to further congestion and delays.

Figure 41: LP4 Traffic conditions around western St Albans



7. Summary and Discussion

7.1 Summary

7.1.1 LP4 has indicated that there are several areas of congestion and delay around SADC, however no obvious “showstoppers” where very long delays or high levels of congestion are recorded. Many of the junctions experiencing delays are currently known as congestion hotspots.

7.1.2 The locations of the new strategic sites appear to be feasible around SADC, however they do generate congestion on the approaches to some of the urban centres such as Hemel Hempstead, St Albans and Hatfield. Journey times increase as expected however the locations of developments away from traditional town centres appears to benefit some movements.

7.1.3 LP4 does not indicate that any of the sustainable measures proposed would conflict with the planned growth, however more could be made of links to the east of the District, such as East Hemel and Redbourn.

7.1.4 LP4 suggests the interaction of SADC with the M1, M25 and A1(M) strategic network is key. As the District is bordered by these routes it is paramount that any rat running onto the District network is discouraged wherever possible.

7.2 Discussion

Future Uncertainty and COMET Forecasts

7.2.1 The COMET forecasting methodology takes into consideration future changes in population, number of jobs and dwellings, as well as rising costs of travel and proposed transport infrastructure schemes.

7.2.2 However, there is currently no allowance for factors that may fundamentally alter the nature of travel in Hertfordshire or elsewhere in Great Britain. These factors may include the introduction of new technologies (e.g. autonomous vehicles) or a significant shift in travel patterns relative to the Base Year model as a result of behavioural change. Such behavioural change may be brought about by factors such as changing demographic characteristics / consumer preferences, economic instability, climate change and globalisation.

7.2.3 Consequently, COMET forecasts should be viewed as possible representations of the future in Hertfordshire among a number of potentially different alternatives that require unconventional approaches to planning and investment in the county.

Sustainable Transport

7.2.4 It should be noted that the approach to modelling modal shift in a multi-modal model (such as COMET) should be based on the inclusion/coding of infrastructure to facilitate such behaviour change in the forecast network. Without doing so (as applies to this forecast) the modelled modal shift is not a result of COMET’s Variable Demand Model representing behavioural change; rather, it is the result of a parameter adjustments that are currently not based on any specific interventions to the transport network. Once more specific scheme assumptions regarding the proposed sustainable travel initiatives are known, these should be coded into COMET as other forecast schemes already are.

8. Appendices

8.1.1 Appendix A: Development Flow Analysis (PDF presentation supplied separately)

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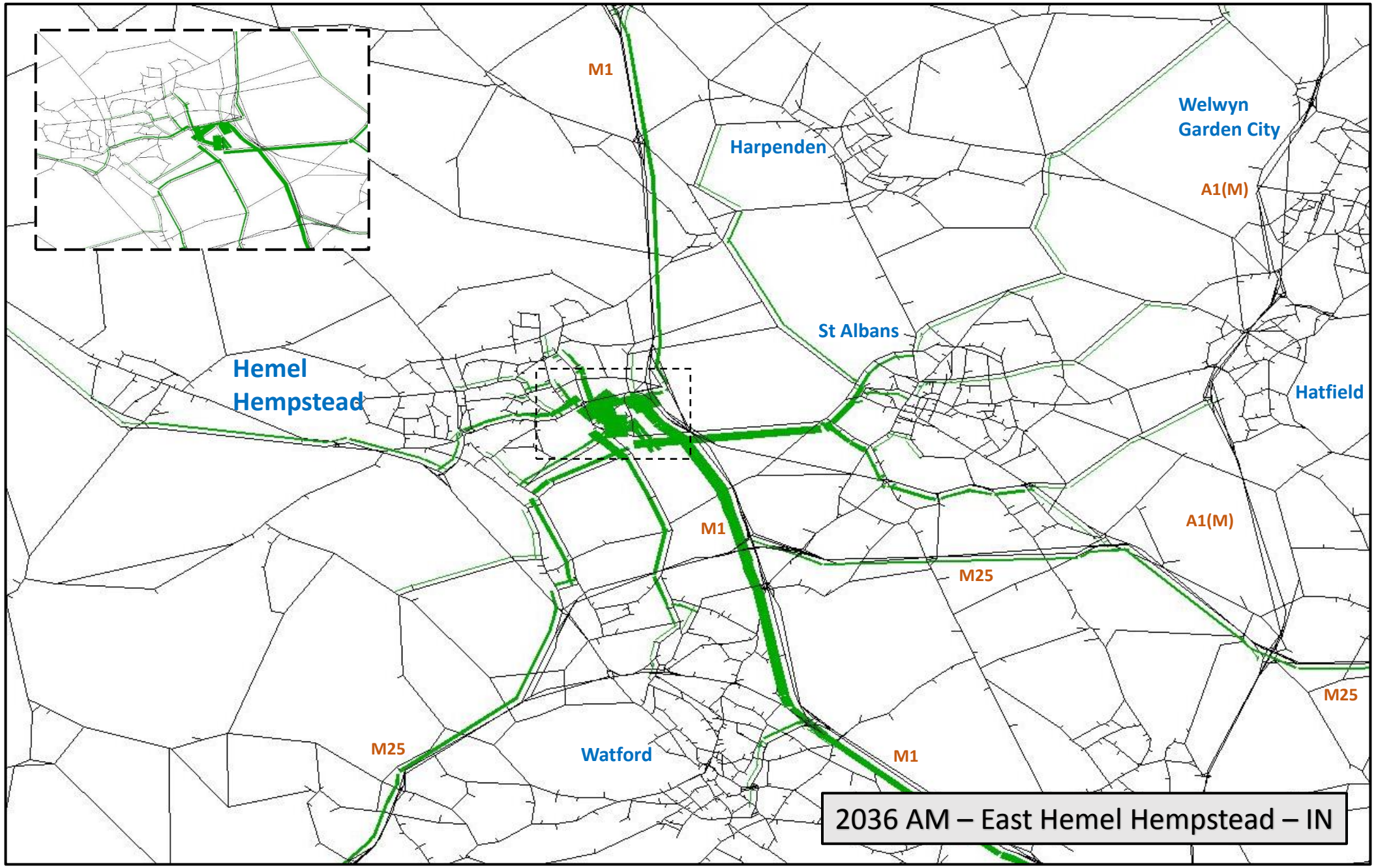
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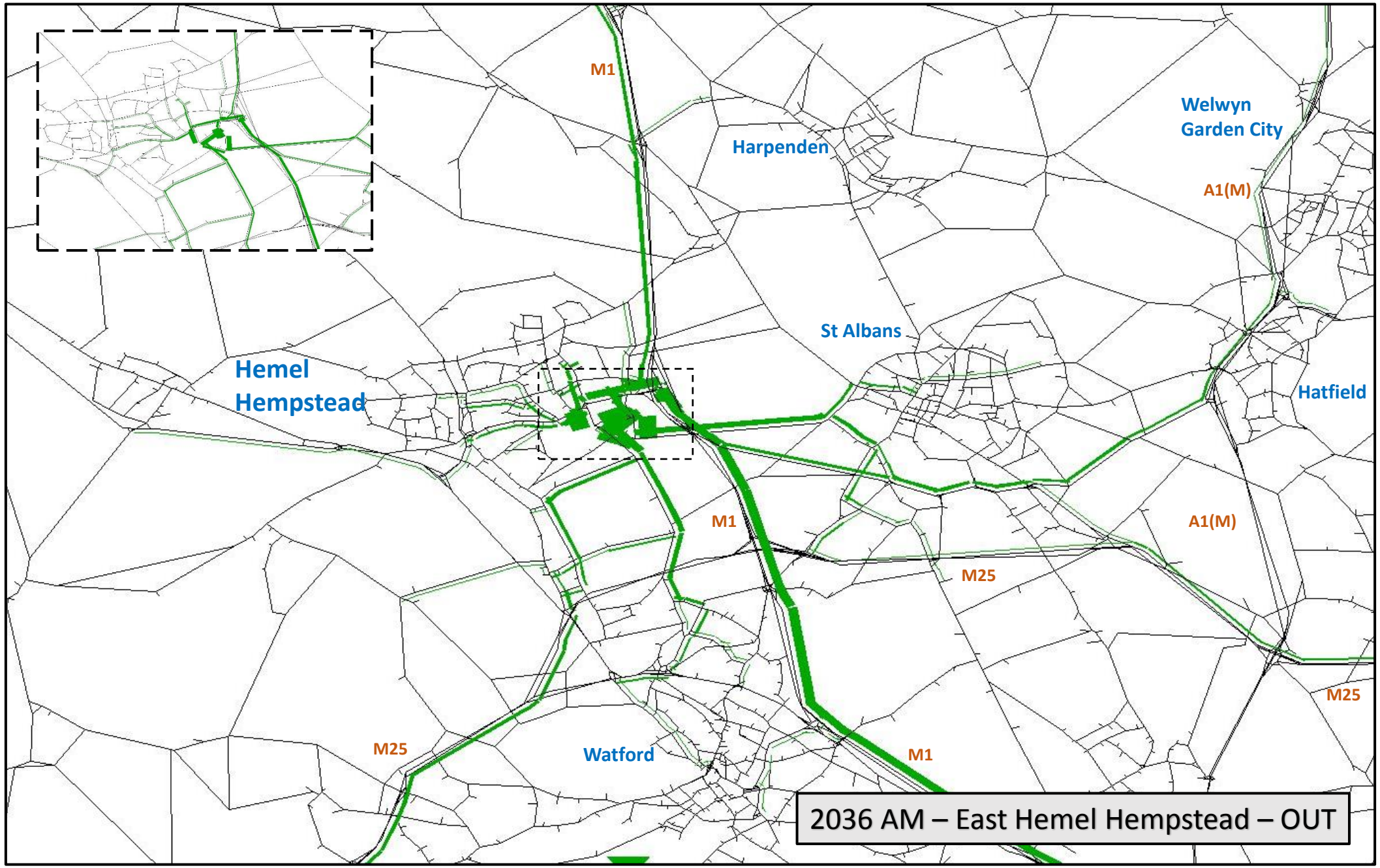
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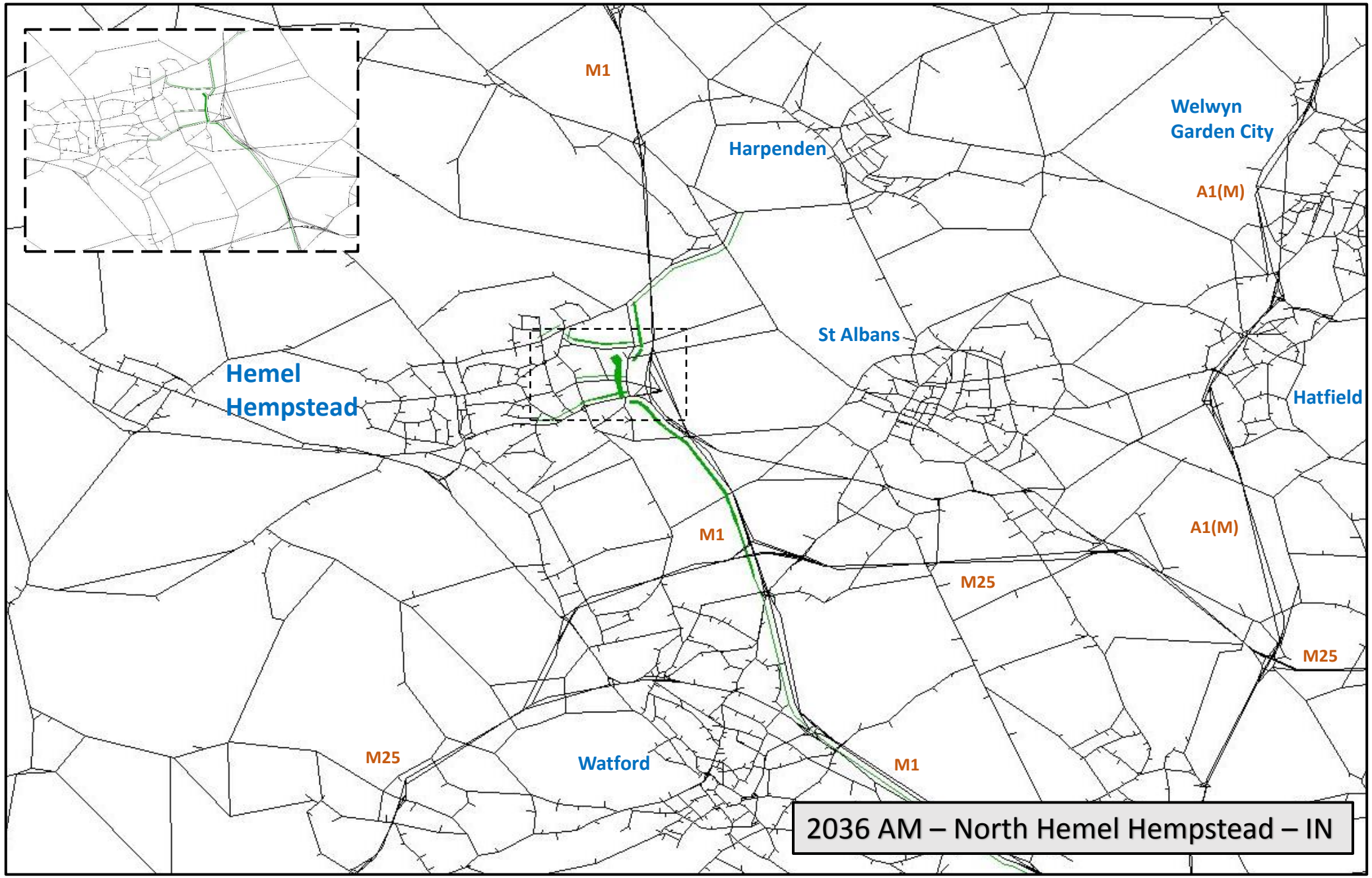
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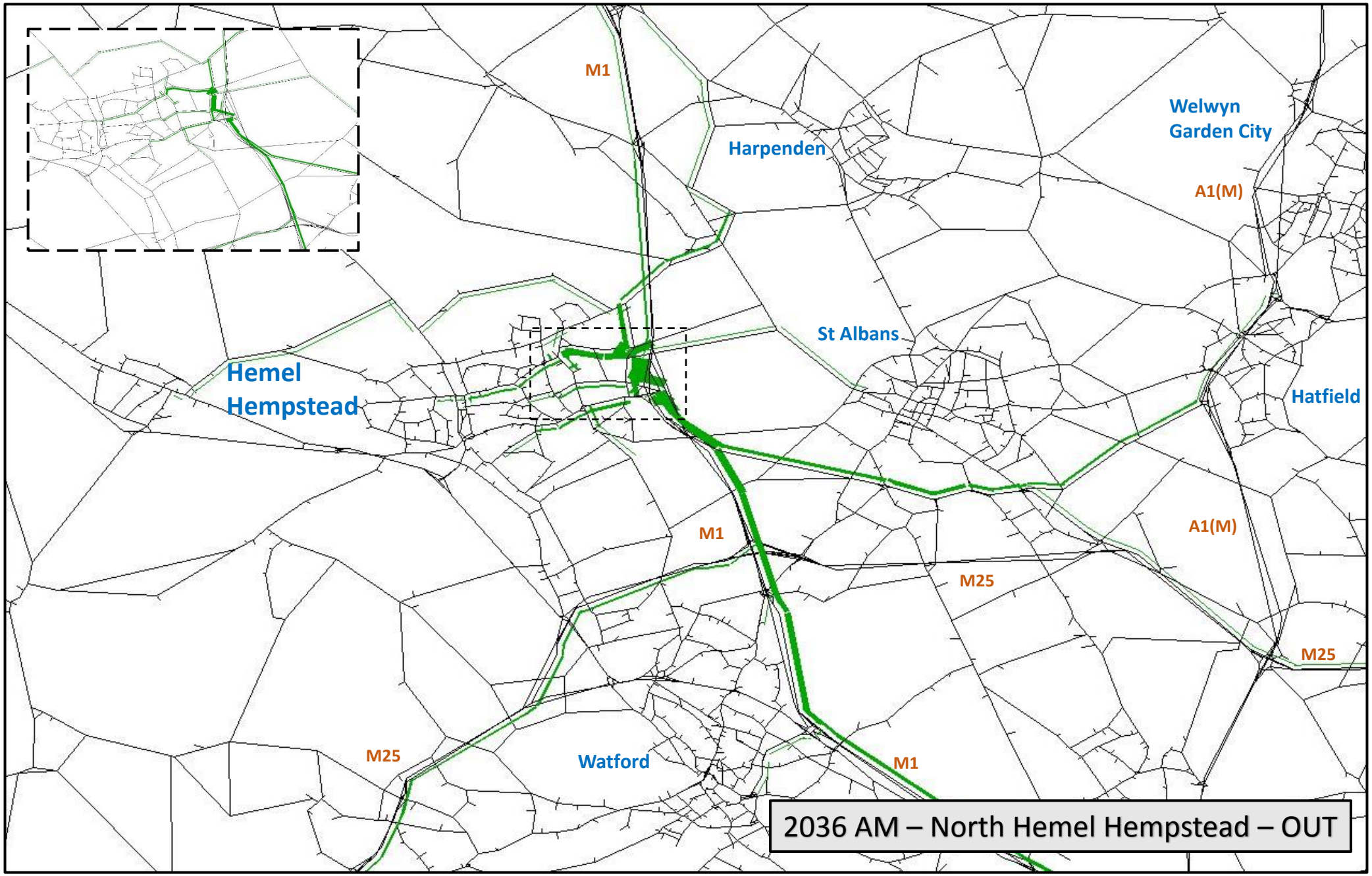
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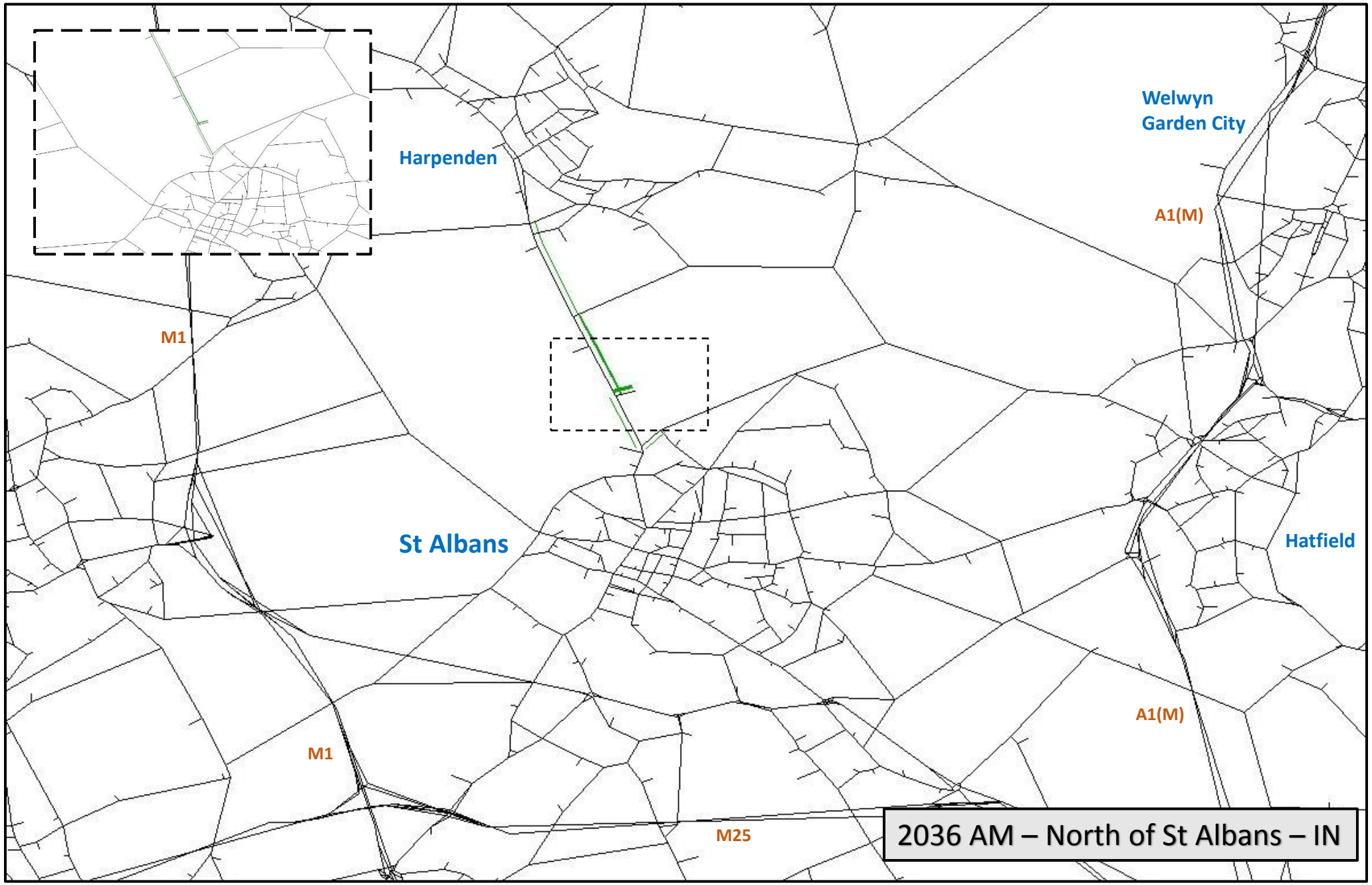
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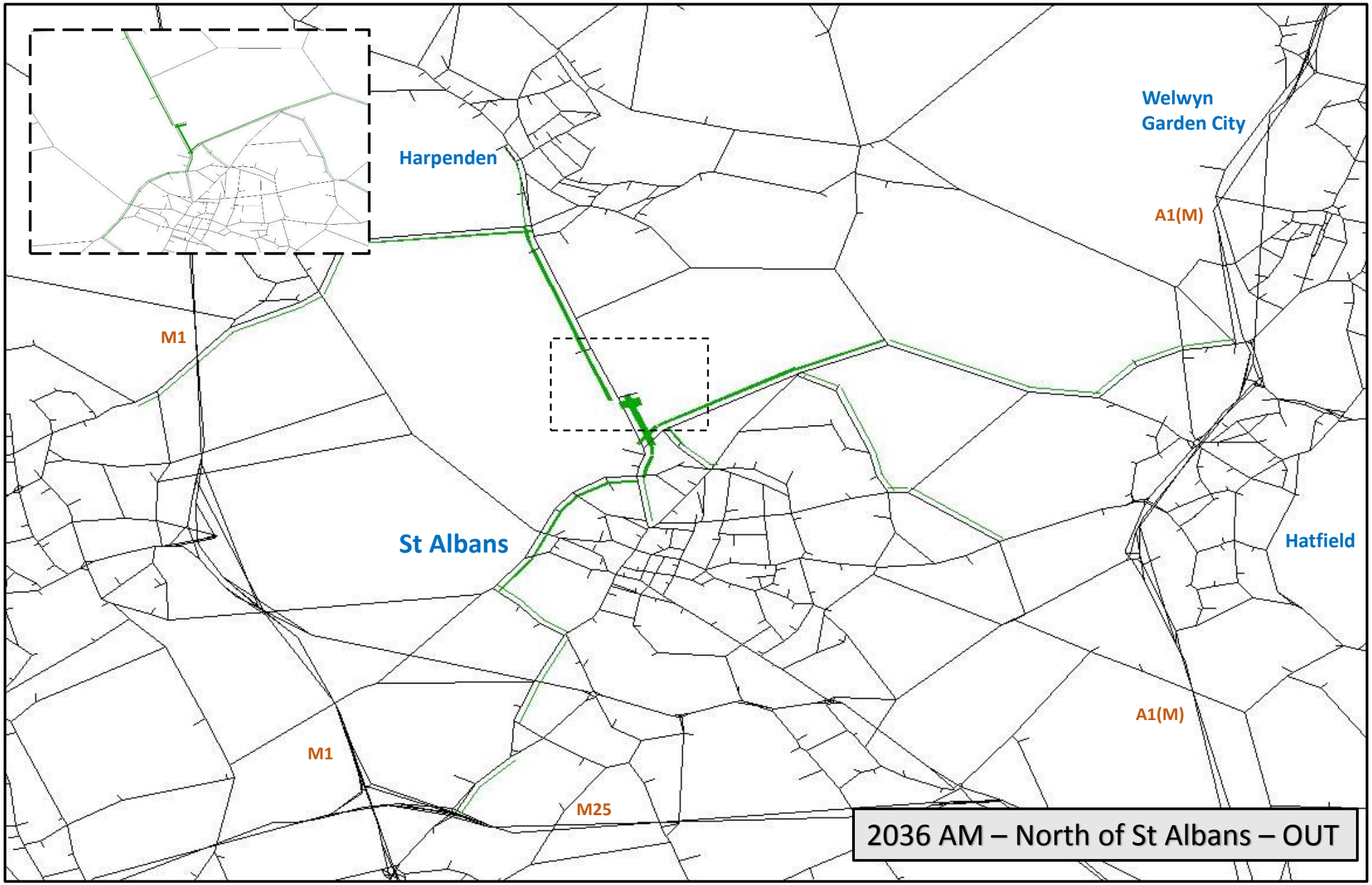
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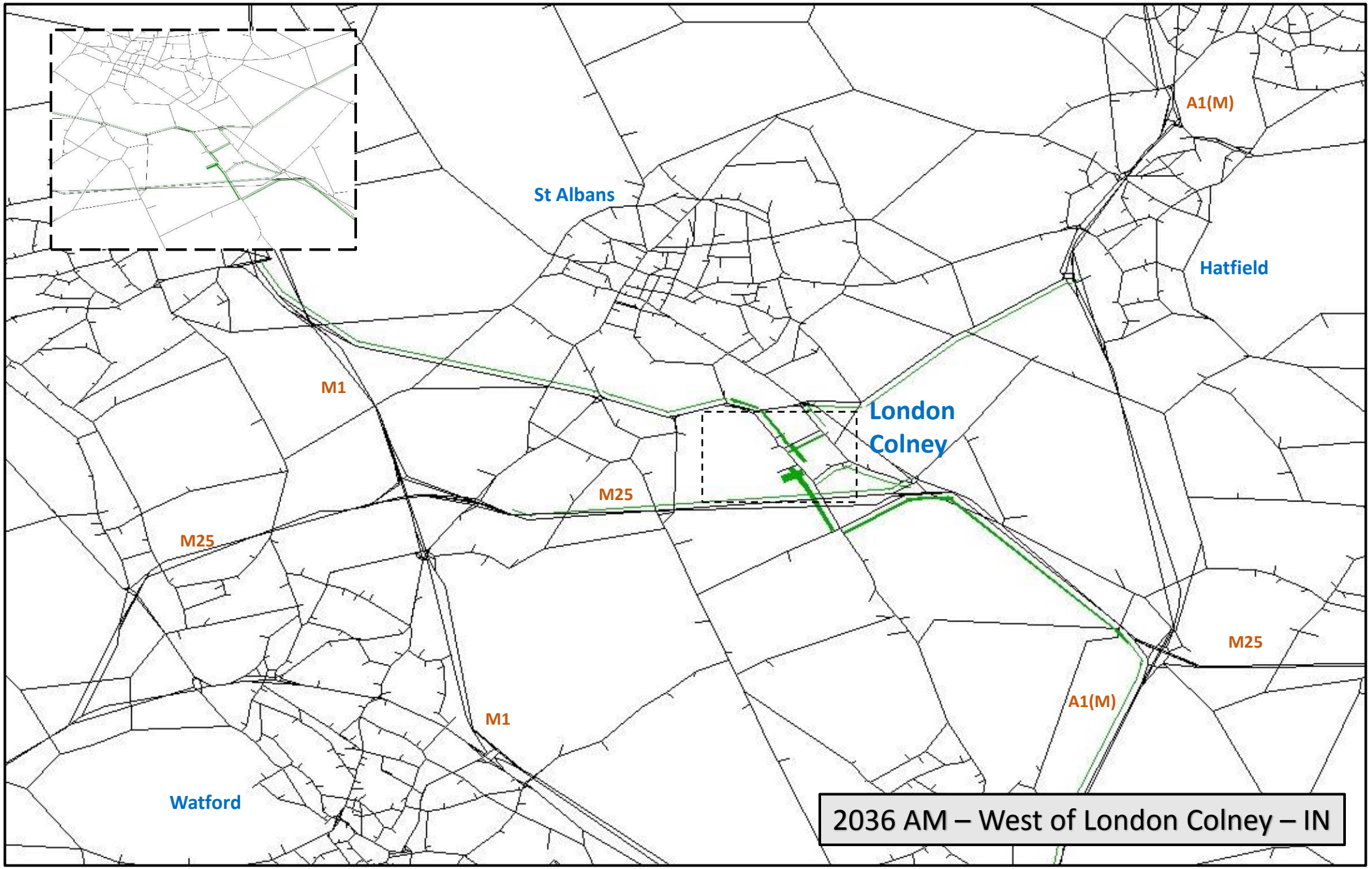
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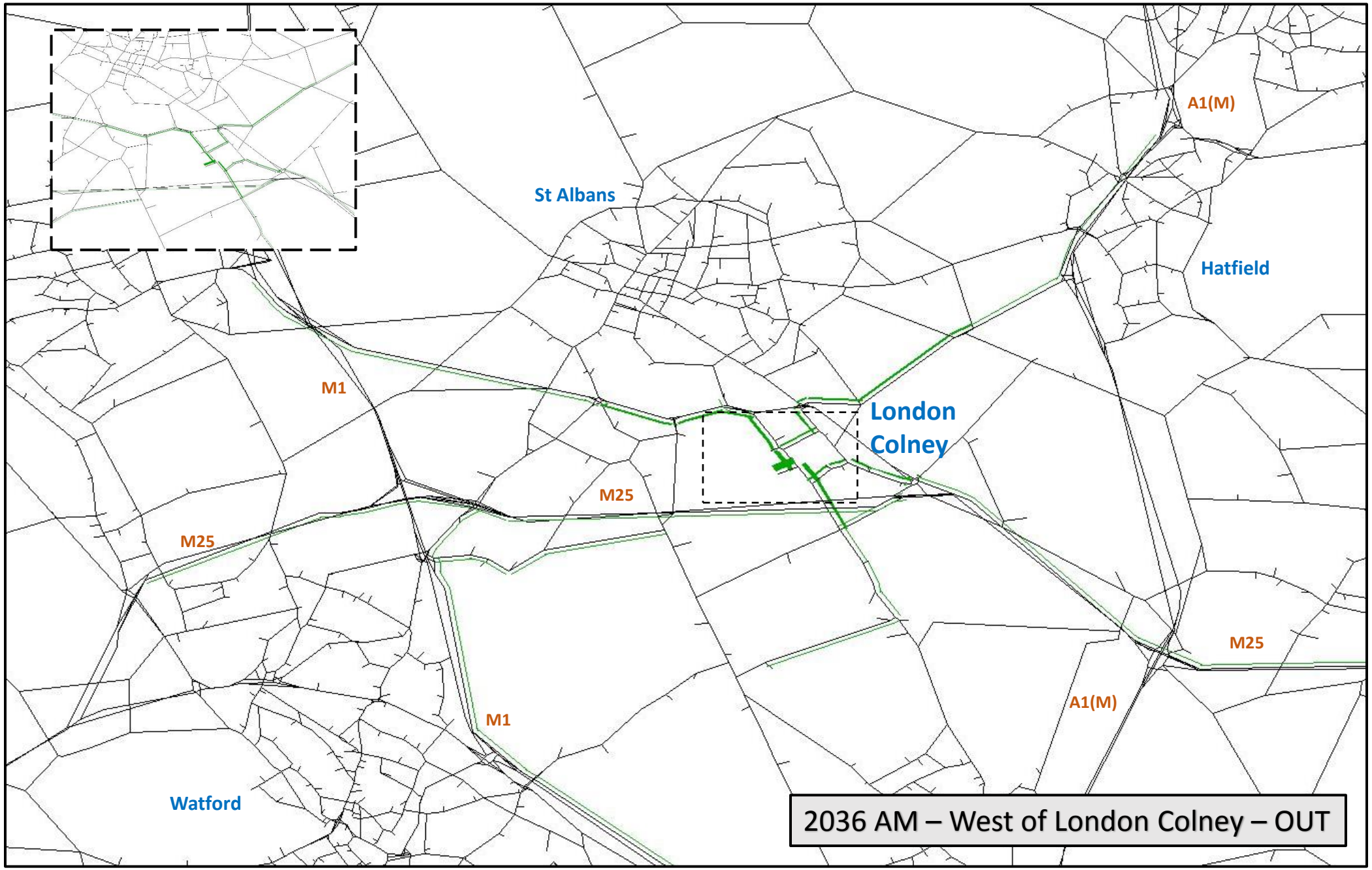
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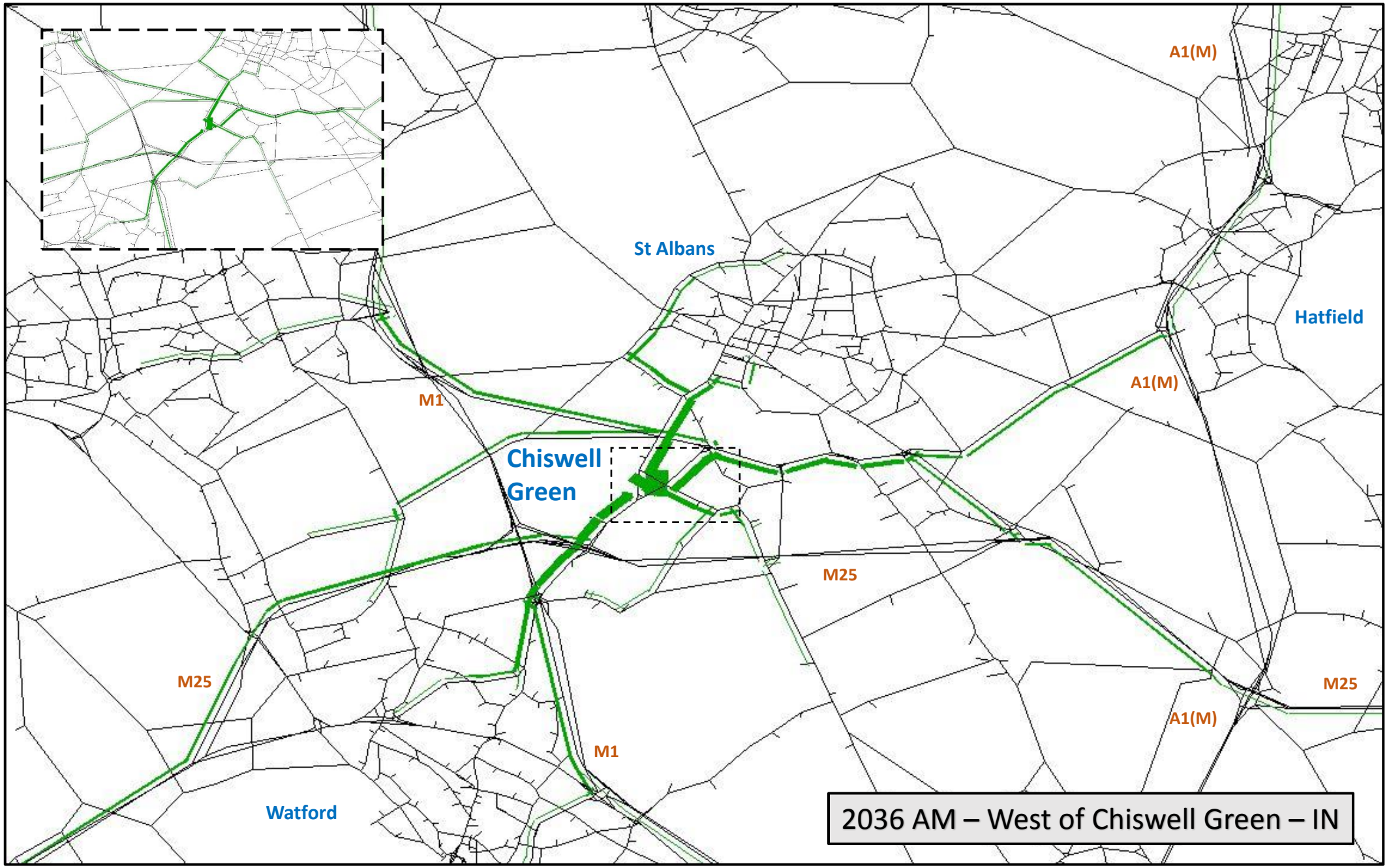
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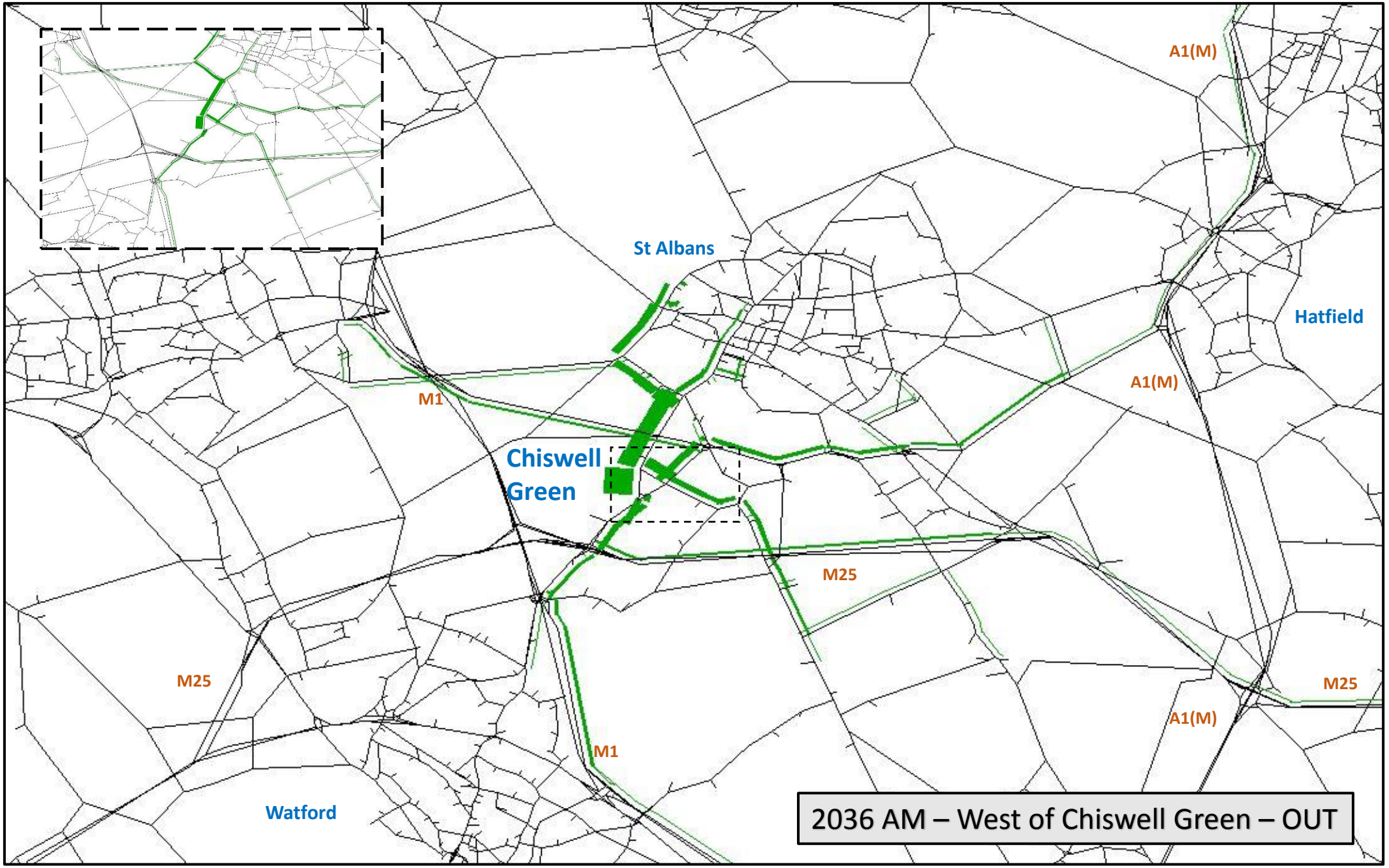
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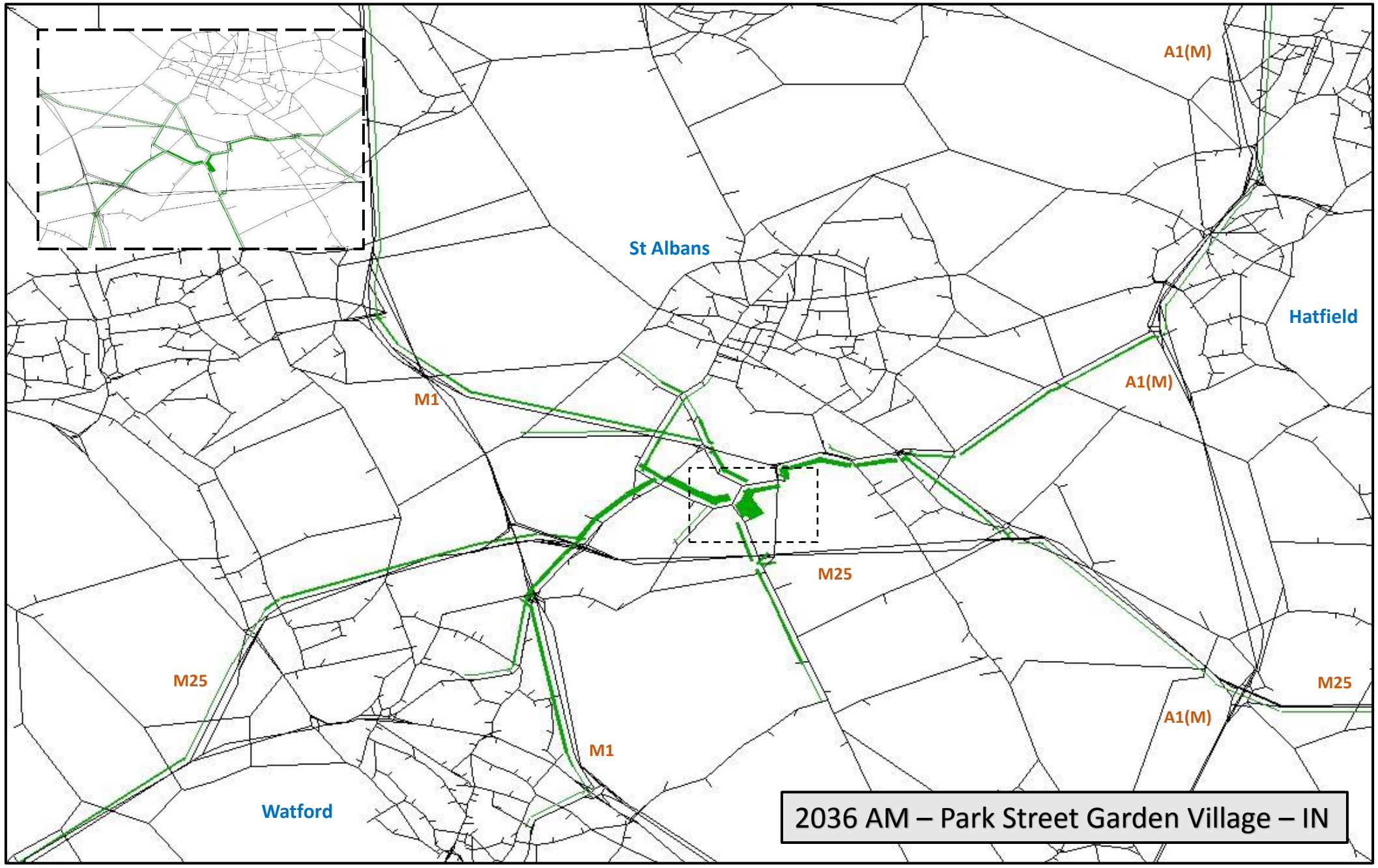
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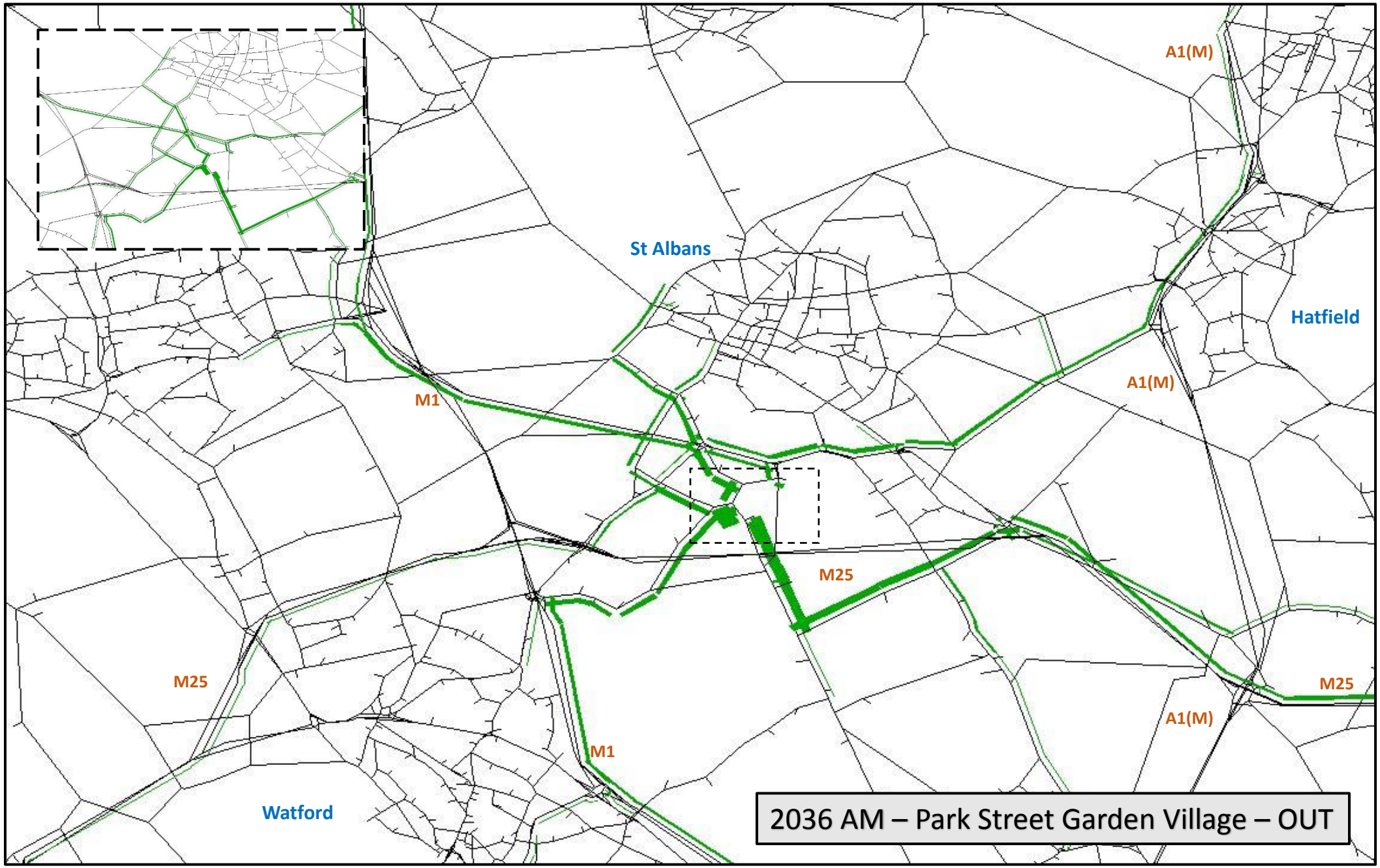
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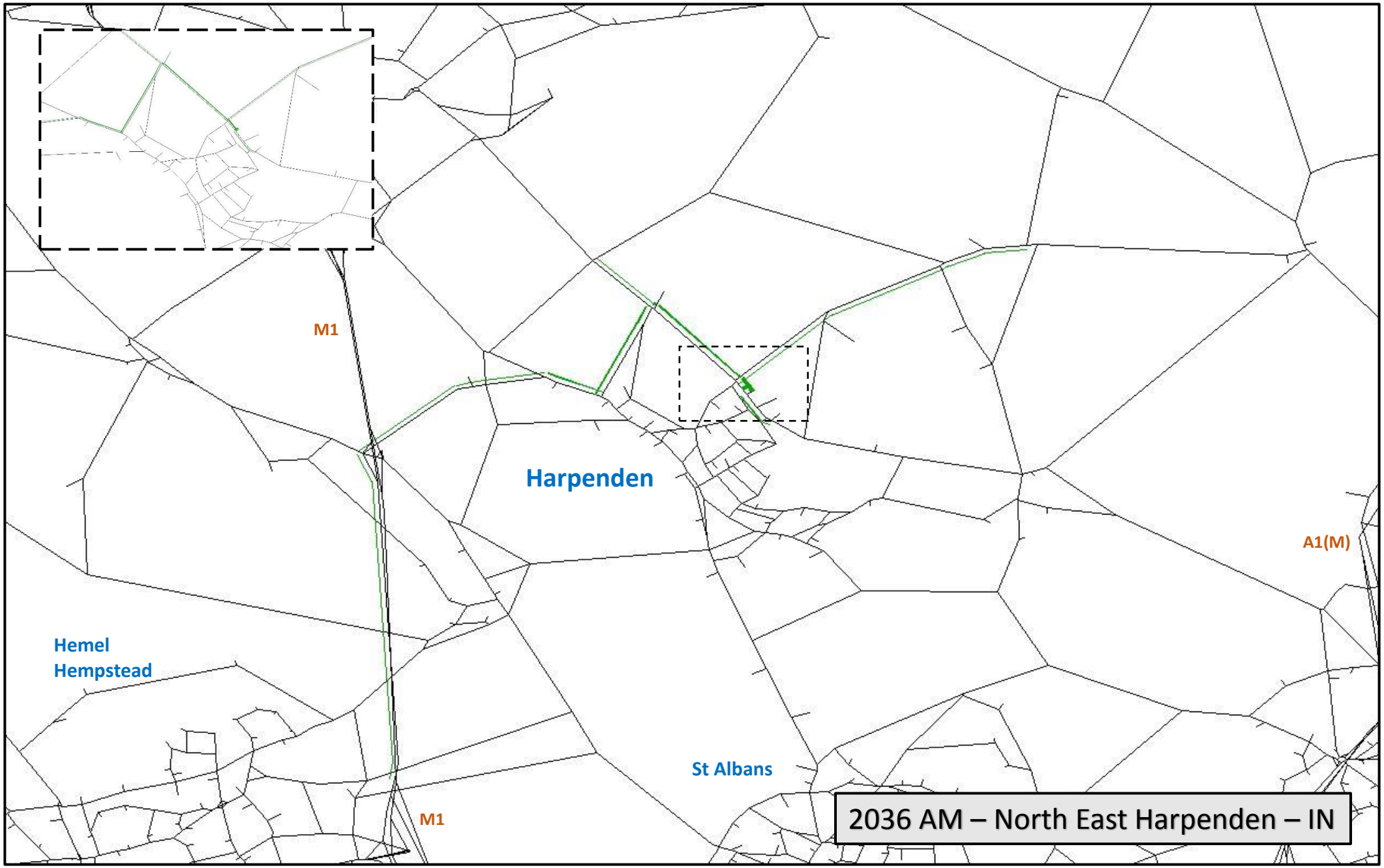
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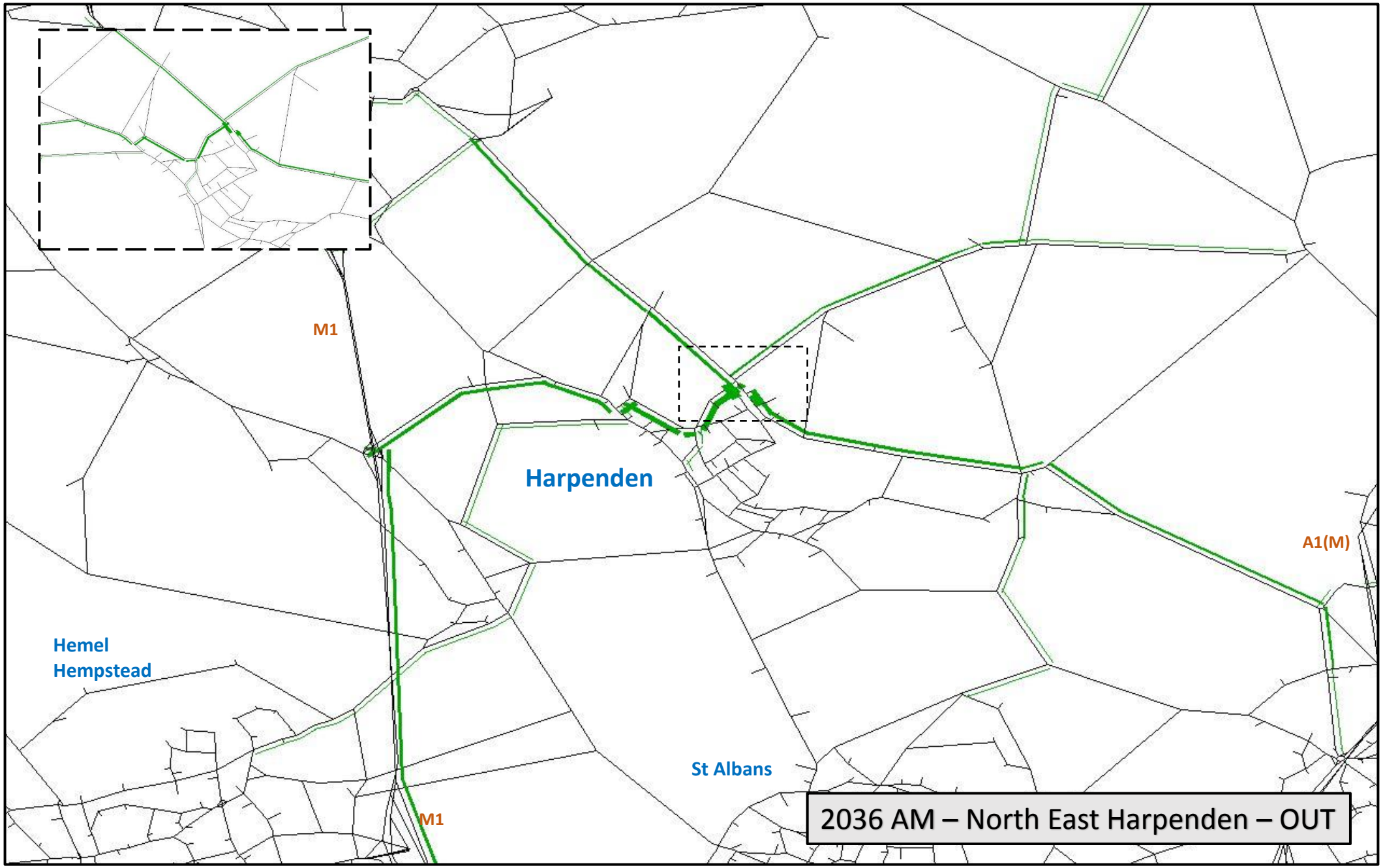
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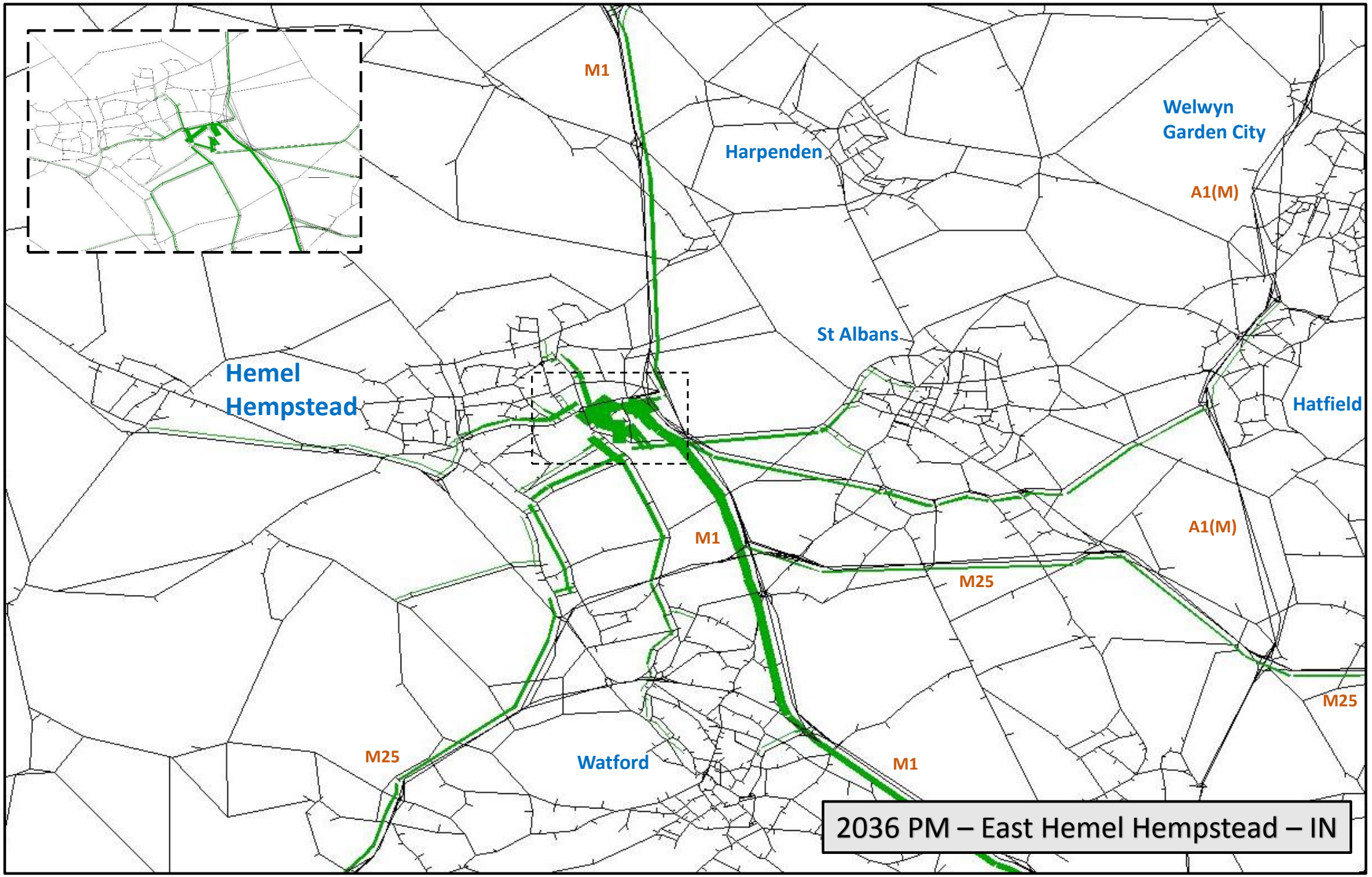
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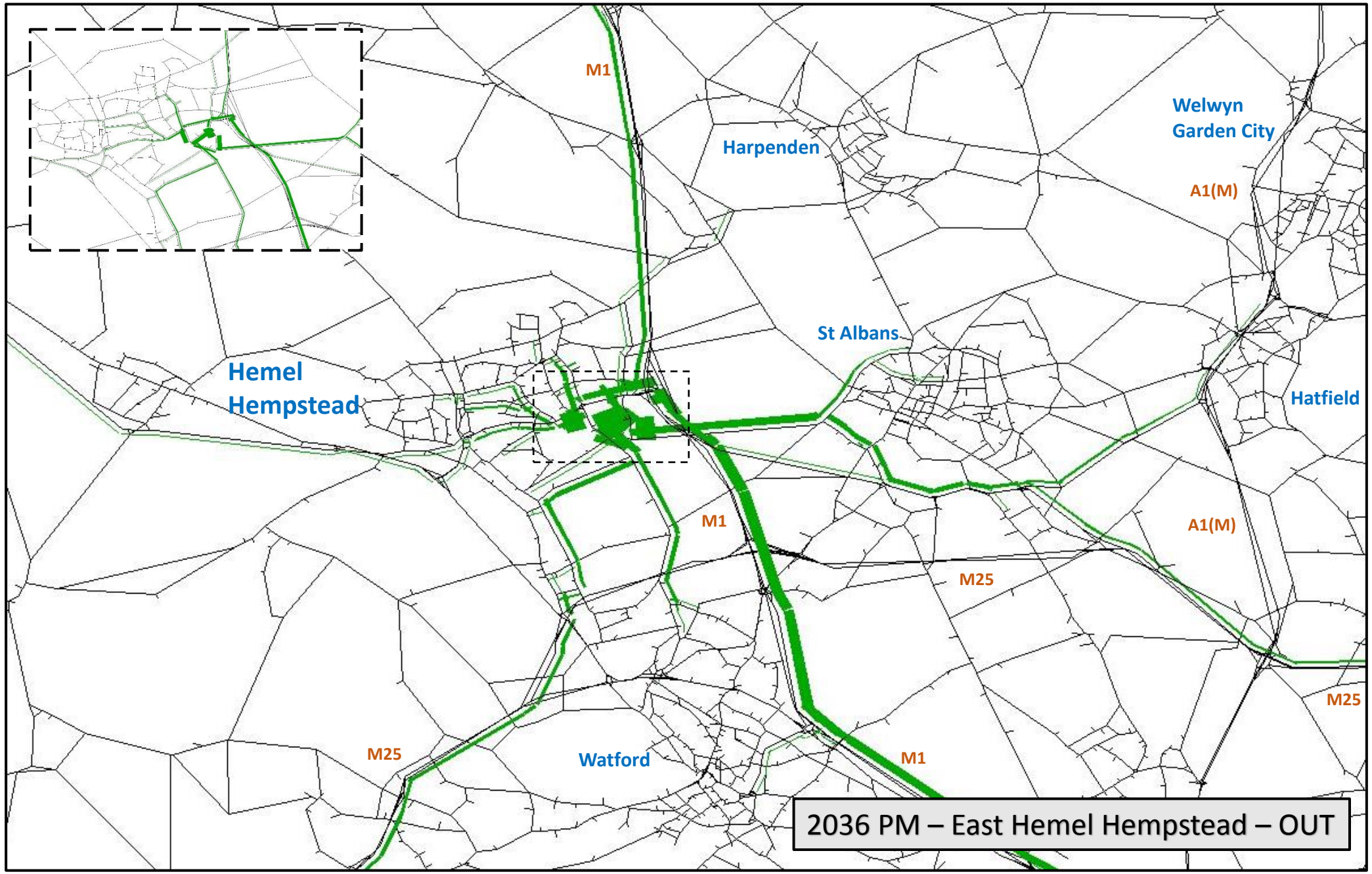
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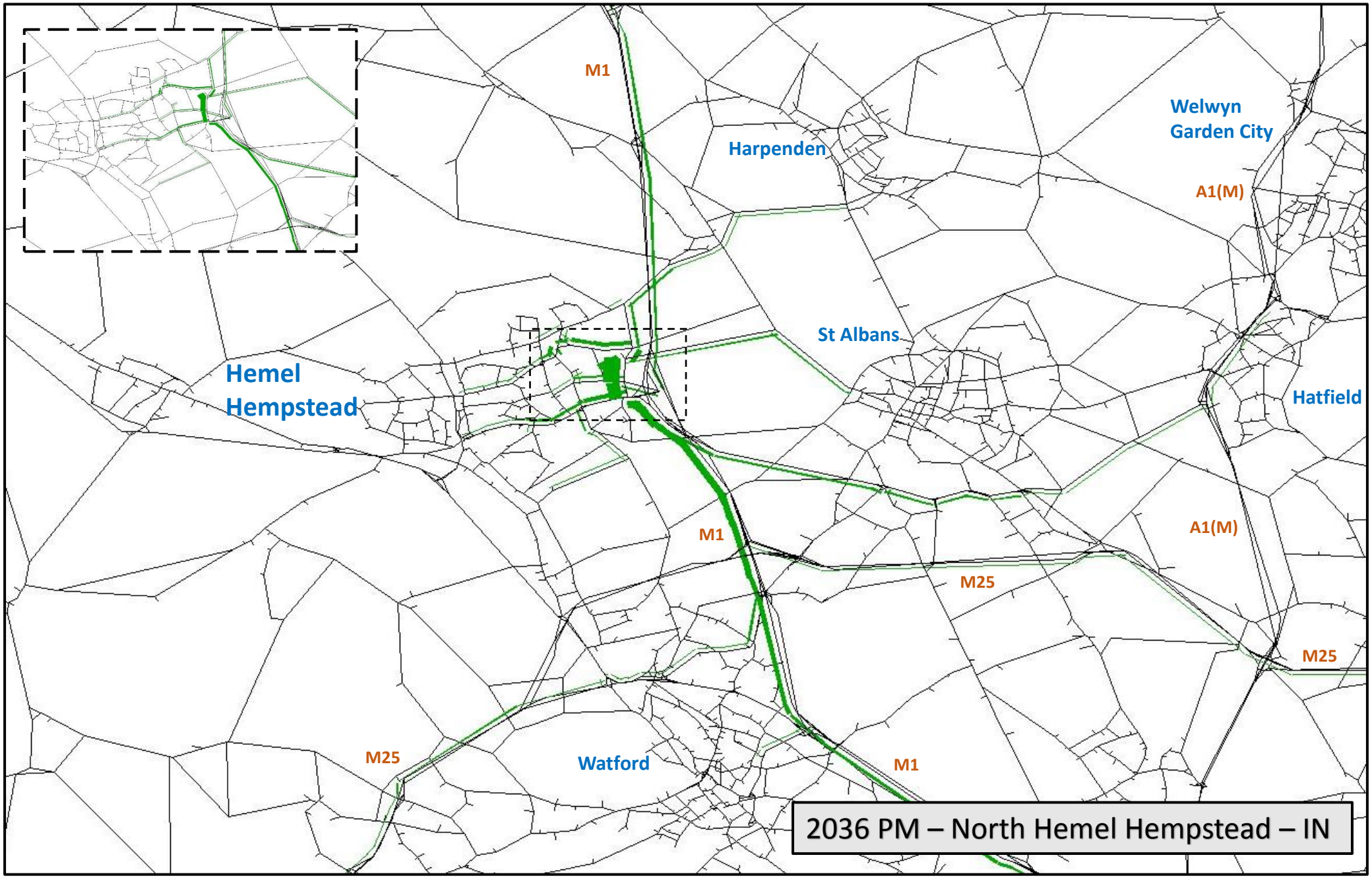
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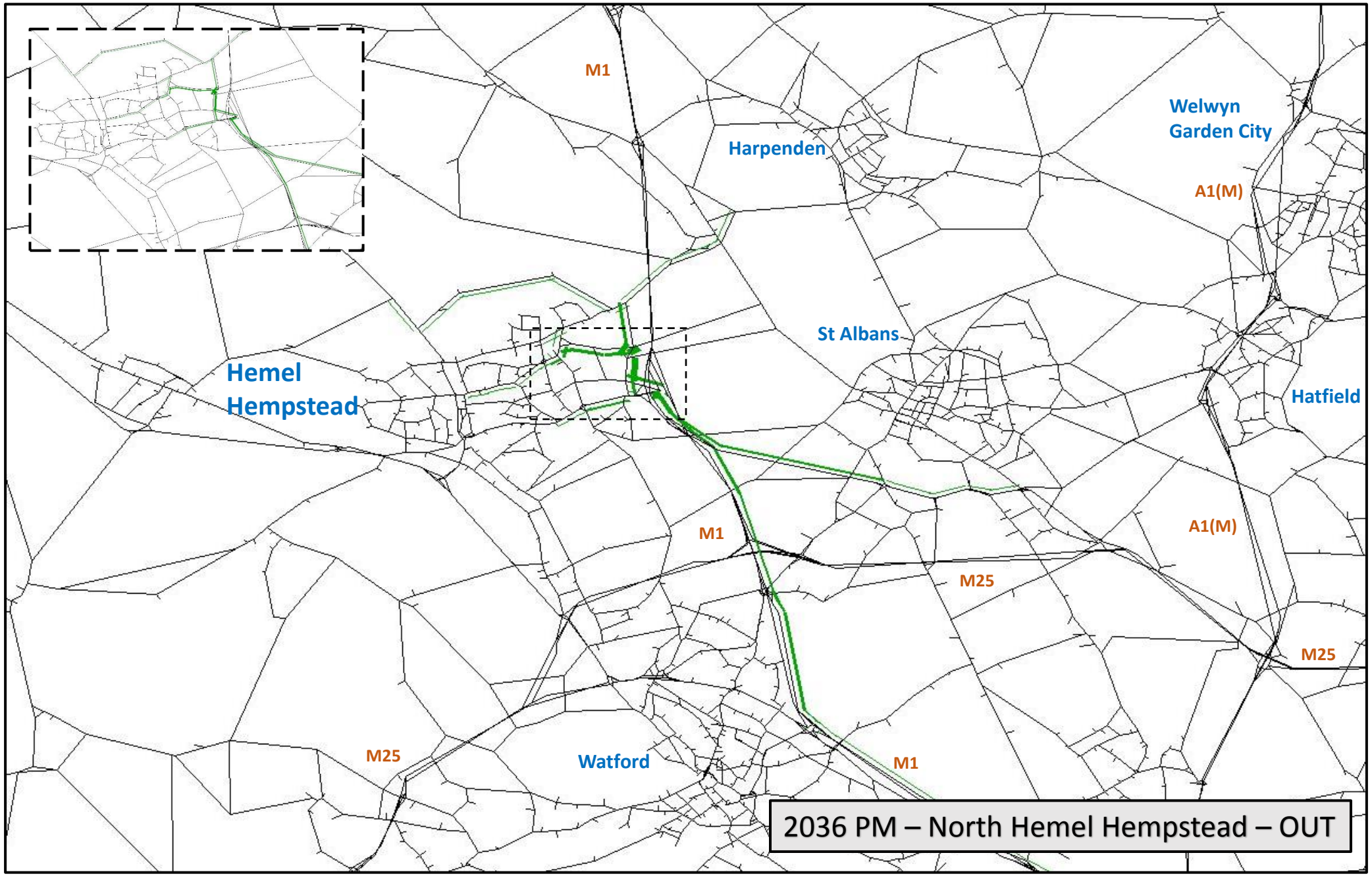
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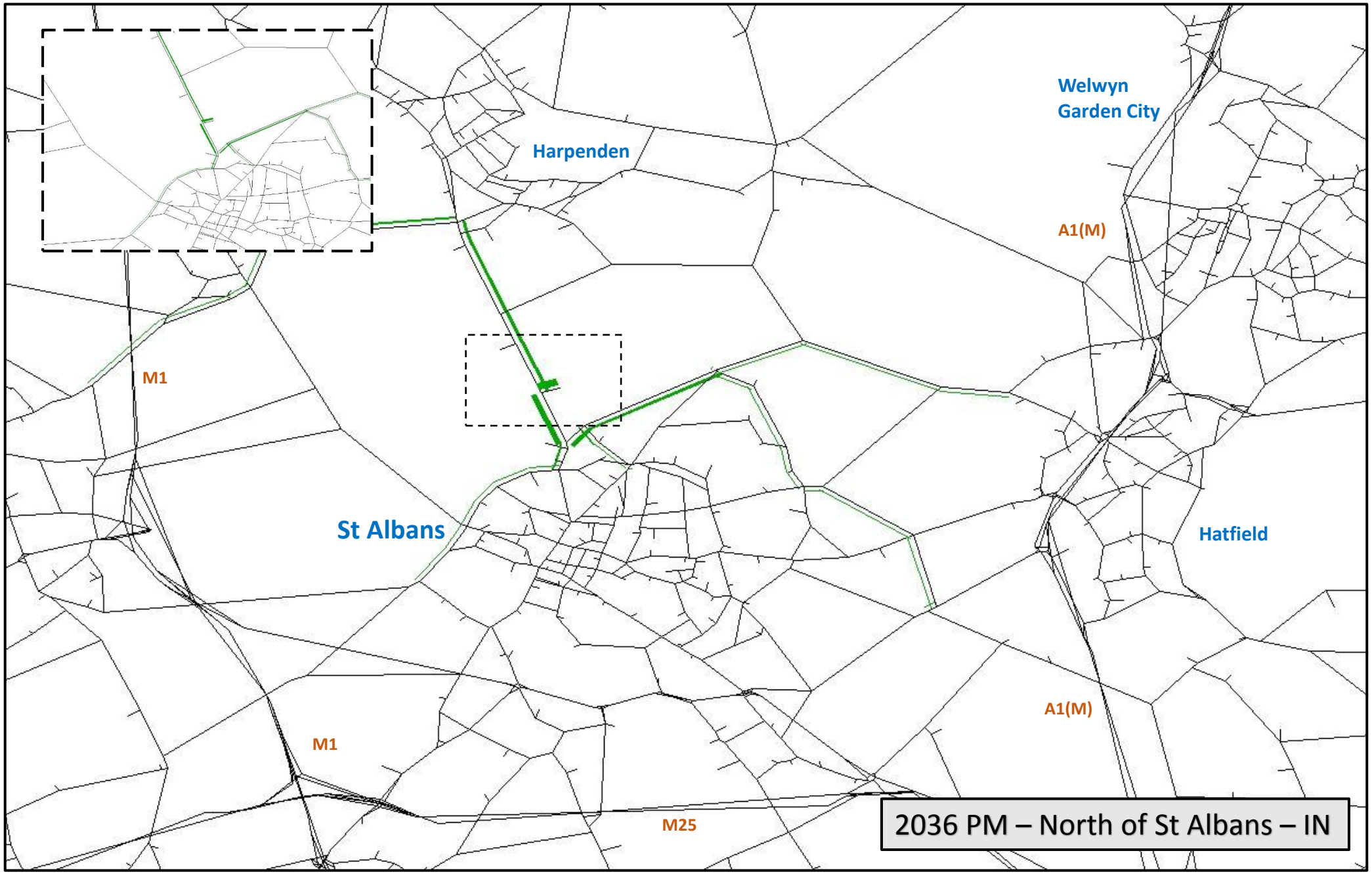
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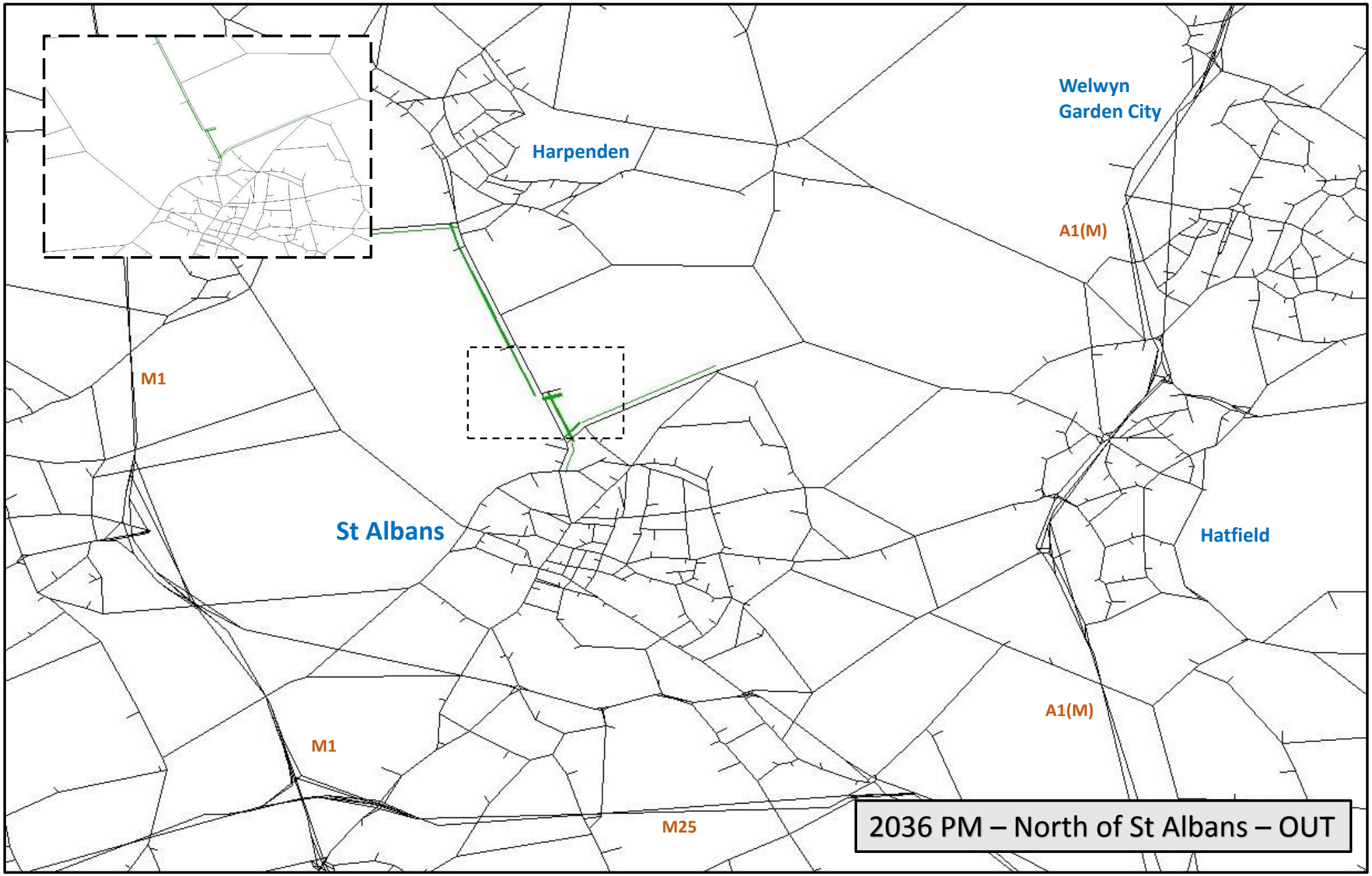
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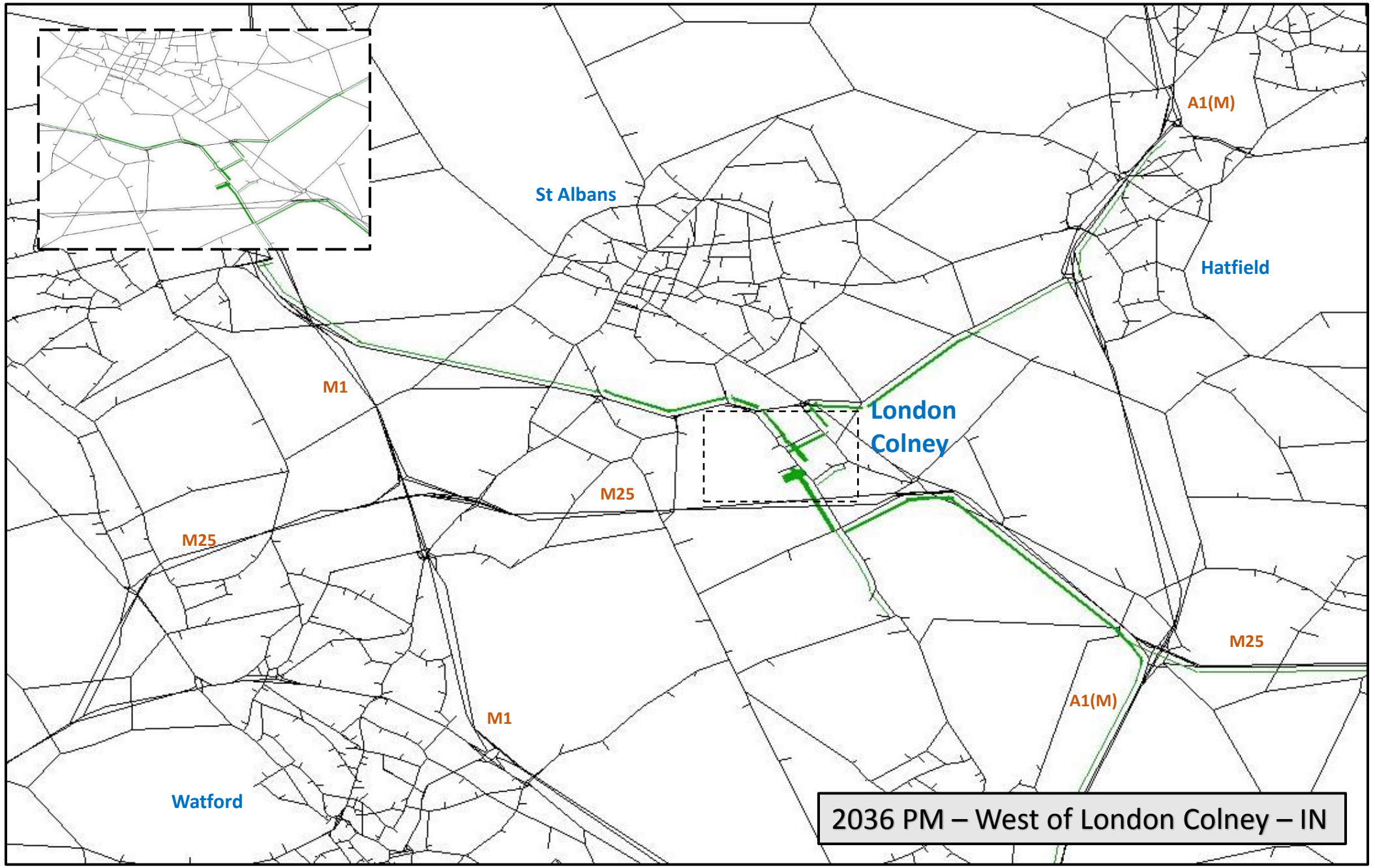
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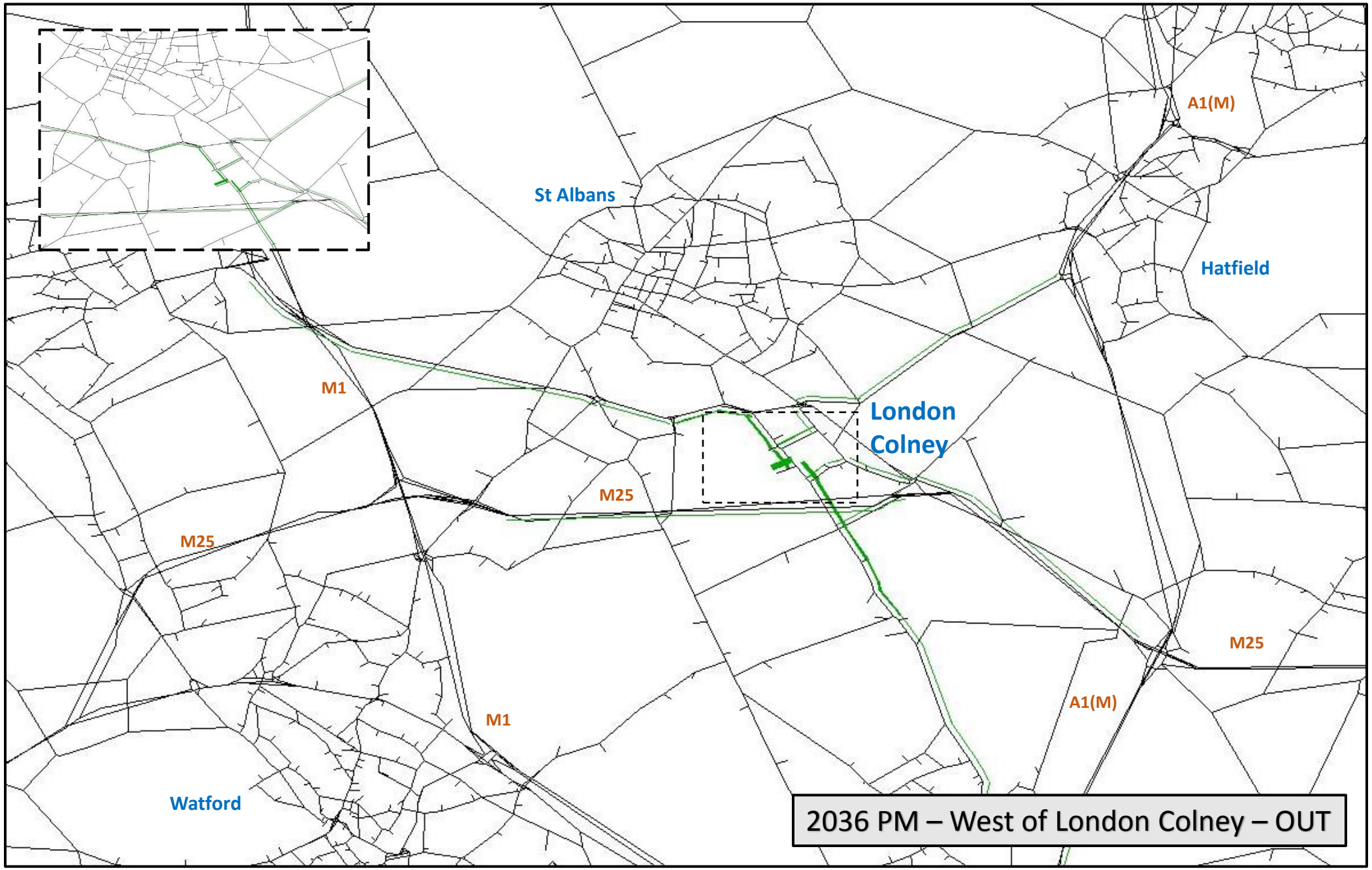
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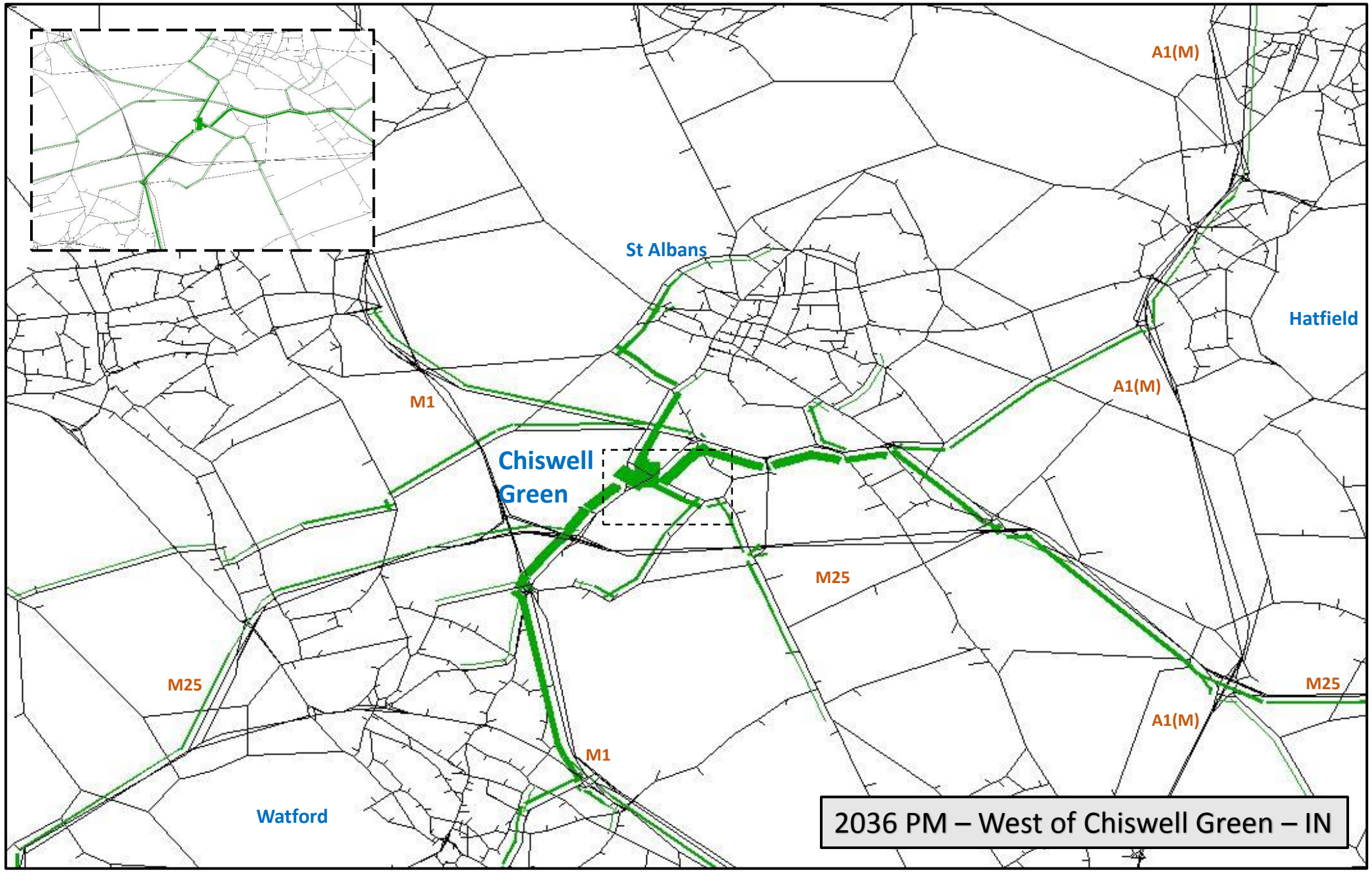
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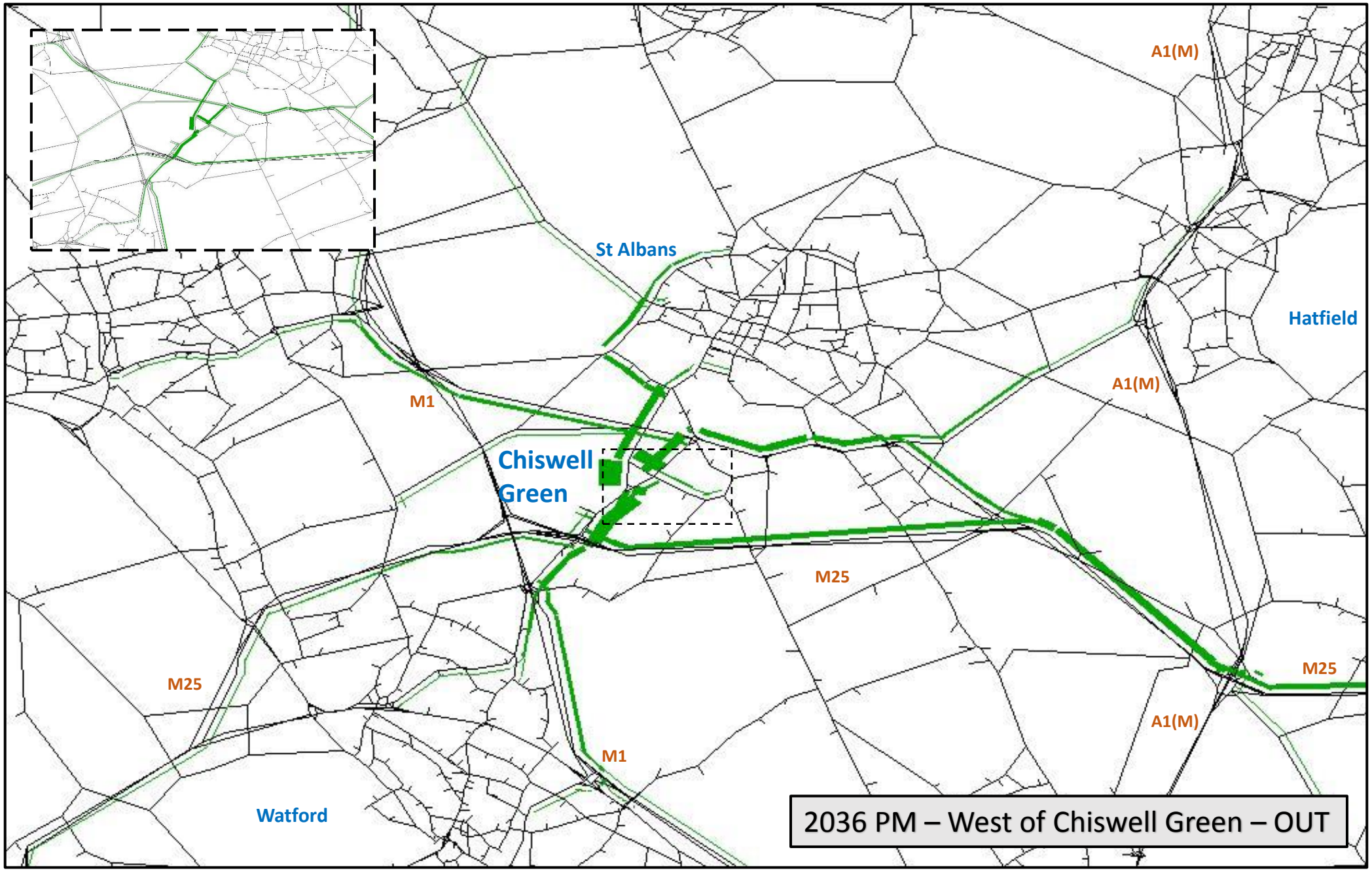
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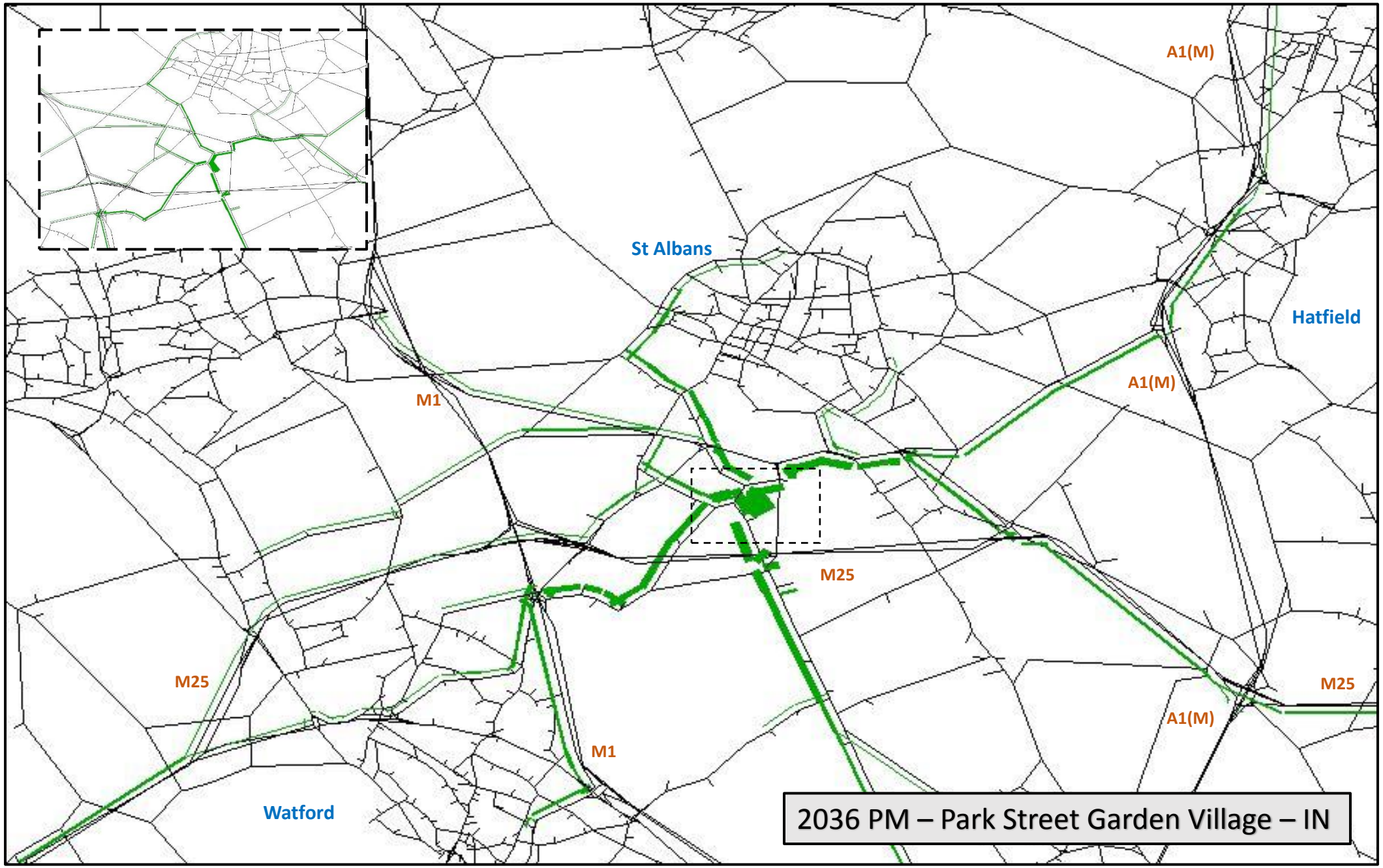
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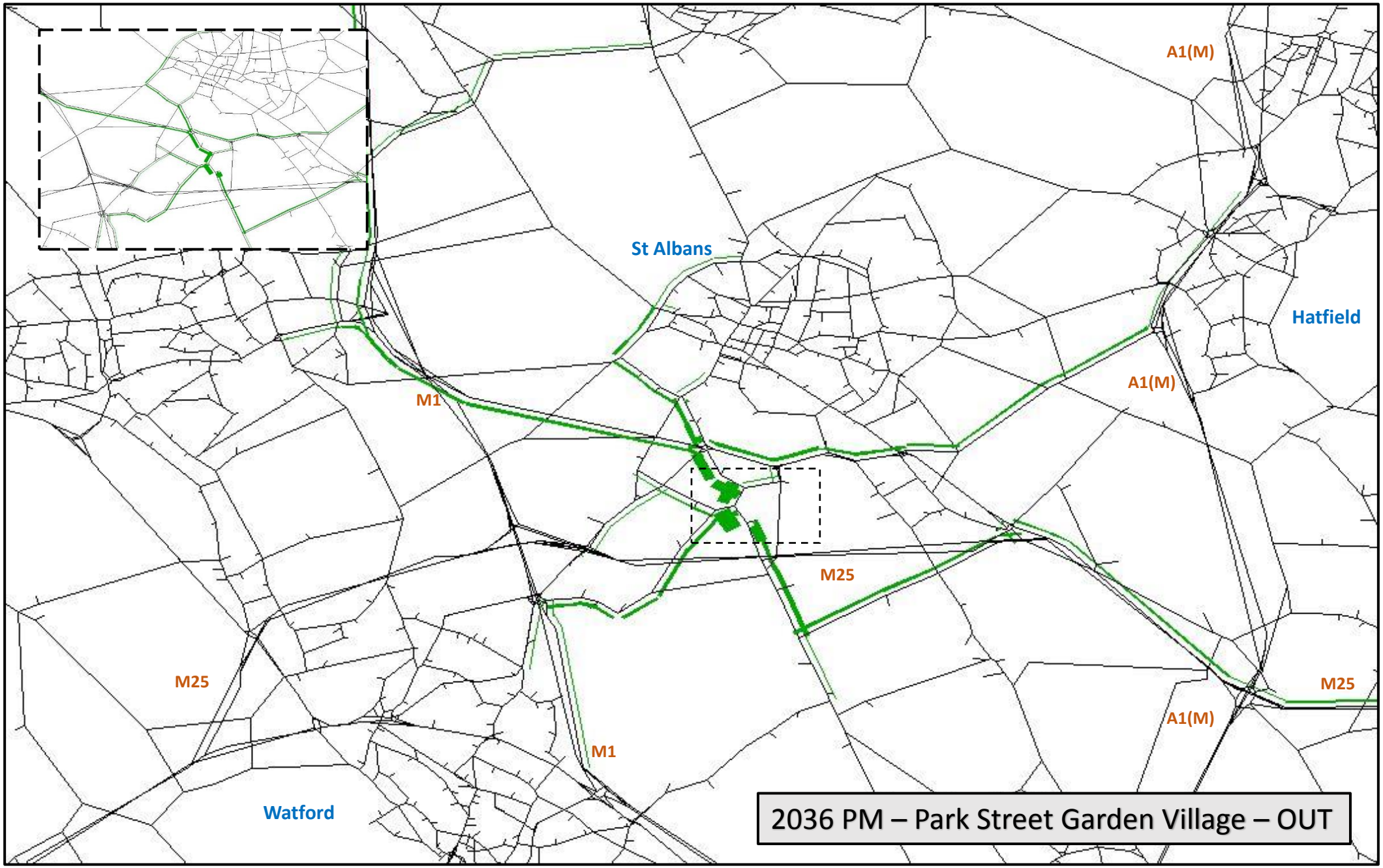
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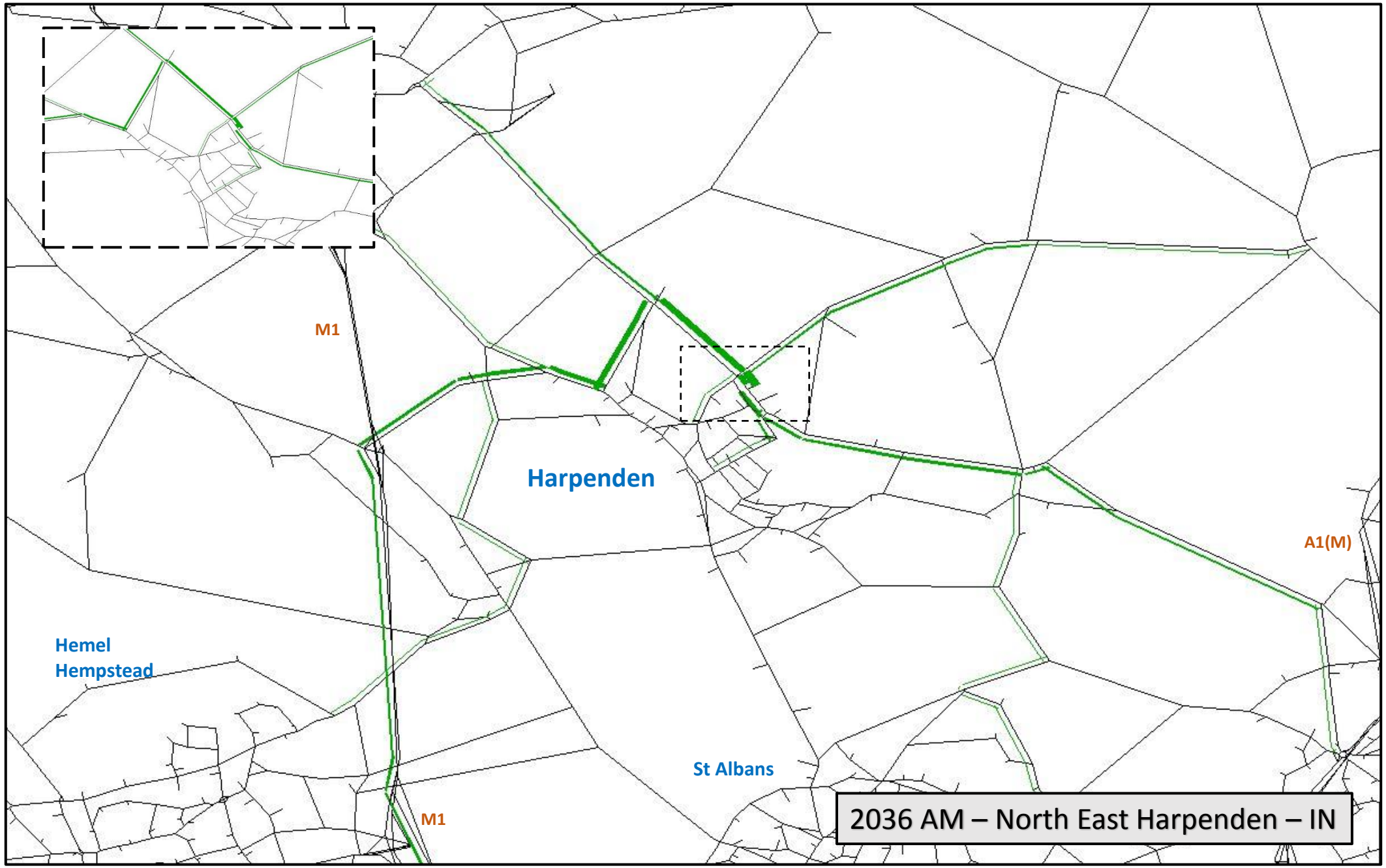
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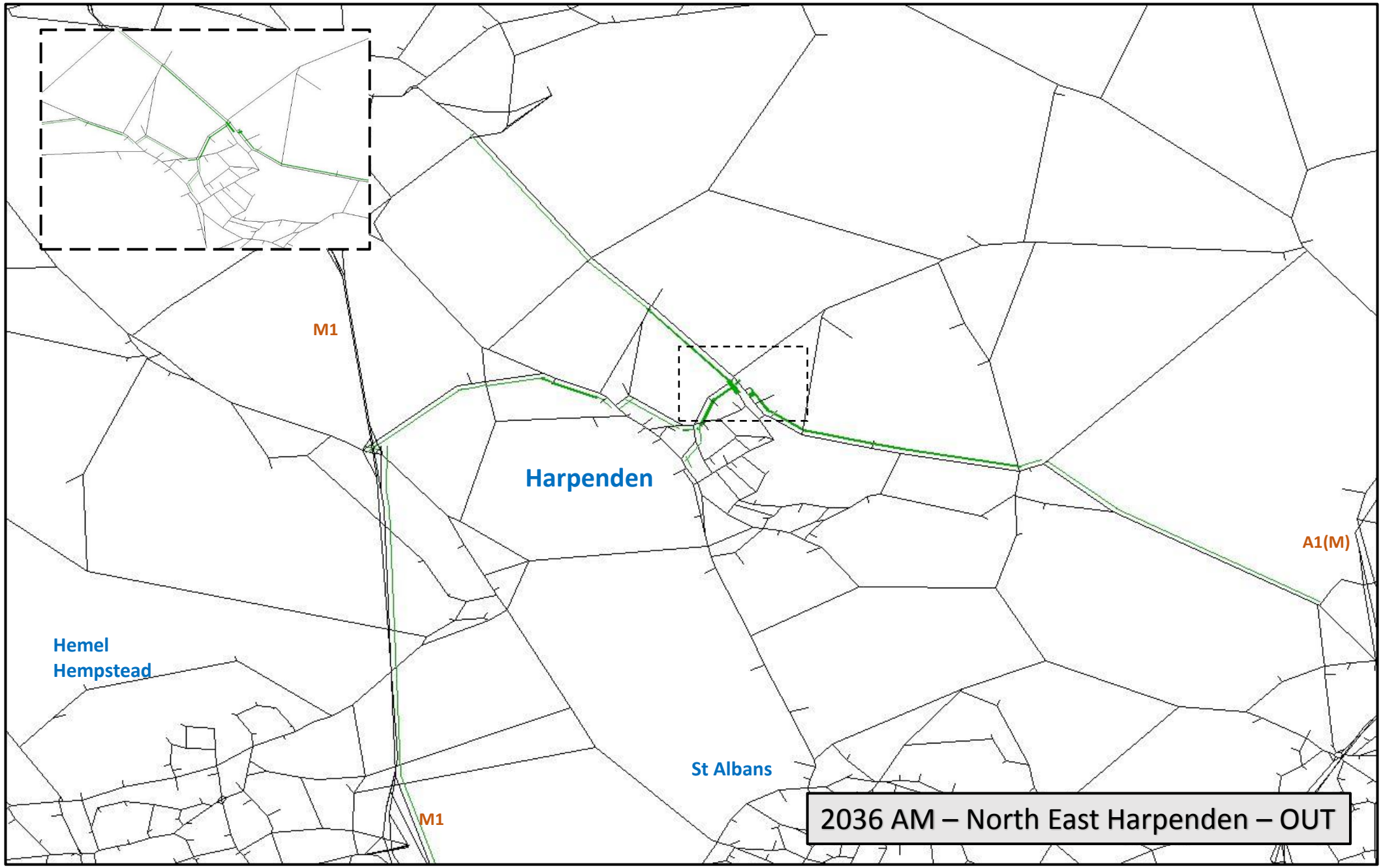
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Water Infrastructure

Appendix 44: Water Study Project for Hertfordshire Project Brief

Water Study Project Brief

Overview

Hertfordshire is located within the East of England, the driest region in the UK. Hertfordshire's natural environment makes a significant contribution to the quality of life of its residents. This environment is under increasing stress. The Upper Lee Catchment Abstraction Management Plan found that in nine out of 32 water bodies within the Upper Lee Catchment, average actual flows were not sufficient to support their ecology.

Water supply and wastewater treatment facilities are enabling infrastructure - that is they have an important role in supporting the provision of housing and jobs. Current growth levels in Hertfordshire will increase pressure on water related infrastructure and the environment. Development success is critically dependent on timely decisions throughout the planning process. Without adequate and timely infrastructure provision, housing and jobs are likely to be delayed or lost as developers and companies look to where provision is more certain and at lower cost.

All the water companies serving Hertfordshire predict significant deficits in water supply in the medium term. There are some known waste water capacity issues which are currently unresolved. All water scarcity and wastewater treatment issues are resolvable on some level. Under the Water Industry Act 1991, water companies have a general duty to ensure that their area is effectively drained and to develop and maintain an efficient and economical system of water supply. Water companies require certainty around the scale, location and phasing of growth to plan for future infrastructure needs.

Failing to take a proactive approach to infrastructure provision could result in a number of potential risks. These could, if not carefully managed, include:

- decreasing environmental quality such as habitat degradation and loss e.g. dried up rivers and streams and changing ecological parameters such as when water is transferred into a chalk catchment from a nonchalk catchment
- an increase in the cost of infrastructure to the developer, affecting the viability of a development and reducing the potential for realising other benefits
- increasing costs to the consumer as more energy is used to provide water over longer distances or higher level treatment processes are required to meet water quality standards
- increased risk of flooding when water is transferred into catchments
- a delay in the delivery of housing and provision of jobs
- reduced water pressure for existing residents
- increased risk of disruption to supply at times of peak demand

For growth to happen sustainably and in good time, these issues must be explored. We need to know how the land use and water resources planning processes can best plan for sustainable resource use and where the synergies lie. We need to know where infrastructure capacity exists on a catchment scale, so that future growth does not breach environmental limits. We also need to know how resilient the networks are, to ensure that water can be moved about to where it is needed most, and wastewater treated, at times of peak demand.

Purpose and Context

Development

Strategic development aspirations for the study area look to be a minimum of around 85,000 homes by 2021, entailing 68,000 new employment opportunities, according to the now defunct Regional Spatial Strategy. The two largest district councils, North Hertfordshire District Council and East Hertfordshire District Council, are currently proposing 7,000 and 12,000 new homes respectively. This level of development looks to increase the population of Hertfordshire by around 15%, which is 10% more than the current national average for the same period. This higher rate will inevitably put greater pressure on various infrastructure assets and services when considered in the local context, exemplifying the necessity for local partners to work together based on local needs and constraints.

The Hertfordshire Local Enterprise Partnership (LEP) has three growth areas aimed at creating flagship housing, employment and improving transport connectivity in the area, levering £430m of public and private investment. The £22.3m investment secured from the Local Growth Fund will be used to support the delivery of 20,000 new homes and 15,000 new jobs by 2021, demonstrating the effectiveness of the partnership in driving the local economy. This study will be aimed at providing evidence to directly support the LEP and their strategic goals, specifically aimed at securing funding for their growth areas.

High levels of growth are proposed in Hertfordshire, influenced heavily by the region's location within the London commuter belt. This in turn drives affluence that leads to higher consumption rates. This effectively leads to extra demands on 'service' that can form a cycle of self-sustaining inflation in investment requirements. Considered alongside the issues of climate change and an ageing infrastructure the true pressures in the region start to emerge. Growth is also inexorably linked to the underlying economic stability of the UK, an aspect of urban development that has been less stable recently. This adds uncertainty to development trends and future 'scenarios', creating the need to implement holistic strategies that incorporate all the tangible factors that may influence the build out of proposed development.

An integrated and sustainable approach to water infrastructure planning, as proposed for this study, is vital given the regional and local pressures on the water environment. The requirement is reinforced by both Planning Policy Statement 12 and the supplement to Planning Policy Statement 1, which highlights the requirement for Planning Authorities to take account the capacity of existing infrastructure and the phasing and delivery of new infrastructure to support development strategies.

Climate Change & Urban Creep

Climate change and its effect on the hydrogeological and urban environments is one of the biggest challenges faced by infrastructure and asset managers. Current projections indicate the summers in Hertfordshire are likely to be around 7% to 10% drier by the mid-century. Reductions in rainfall will inevitably lead to increased abstraction rates without the provision for additional storage or catchment transfer, all of which create their own specific environmental and economic impacts. Even though the region is generally one of the driest places in the UK, introducing its own pressures on water supply, rainfall in winter is likely to increase by 10% to 15% in winter. Increased rainfall reduces the capacity to accommodate runoff, let alone the ever-increasing runoff associated with continued development and urban creep, within an aging wastewater infrastructure. Uncertainty associated with climate change and urban growth hampers the linking of infrastructure investment with local and strategic council planning, an issue that is central to the outcome of this study. The outputs of this study should help not only the various partners share information and strategies, but also assist them

internally, ensuring different departments have a wider appreciation of the impact of their policies and activities.

The pressures on the wastewater infrastructure assets and networks are significant and challenging. Based on a recent Water & Wastewater Treatment study only 0.2% of public sewers were replaced each year between 2000 and 2008 across the UK, at a rate implying that new pipework installed today needs to last for over 500 years. This demonstrates an essential need to pursue alternative, novel and strategic approaches to manage wastewater infrastructure to meet this challenge.

Urban creep and small-scale in-fill development is a hidden danger for wastewater infrastructure, gradually eating away at spare capacity and headroom with treatment processes, reducing long-term resilience. This aspect of runoff management is very hard to identify and mitigate at the local scale, typically requiring strategic investments to resolve.

Water Quality

Pollution due to discharges from wastewater assets, such as intermittent sewer discharges, final effluent and flooding, are likely to worsen due to increases in winter rainfall. Growth and the potential increase in rainfall runoff will inevitably exacerbate this issue further. With the two main Water Framework Directive waterbodies currently failing compliance, the pressures on infrastructure not to impact them through additional discharges will be become more significant.

Infrastructure Planning

County, district and local councils already understand to a reasonable degree the long-term projections, likely outturns for development and employment. With planning at the core of their operation, the development of strategic outlooks can be robust and relatively holistic. However, for water companies, planning at this scale entails a range of alternative challenges. The AMP reporting cycle can also hinder a water company's ability to develop and implement effective long-term strategies aimed at accommodating climate change, urban development and integrated asset management.

TW, Anglian Water (AW) and Affinity Water (AfW) cover this region and are responsible for overlapping elements of the water supply and wastewater treatment infrastructure. It is essential for long-term planning across multiple organisations that each understands the others infrastructure management strategies, their assets and how all their work fits in with the overarching development planning frameworks.

This study and its outputs will provide a robust evidence base and aims to assist the key partners as follows:

Local Authorities: Evidence base for their LDFs, and sets out the water and wastewater infrastructure, amongst other measures, that will need to be in place to achieve their growth targets. There are nine Local Authorities within the study area of Hertfordshire, one within Buckinghamshire County to the west (Chilterns District Council) and Hertfordshire County Council (HCC) itself. As some only lie partly within the catchment, the relevance of the information to the LDF process contained within this study may be variable.

Hertfordshire Local Economic Partnership: Their focus on driving sustainable economic growth will reply on sound holistic advice on the long-term development of key urban infrastructure, including water supply and wastewater. This study will provide valuable insight into the areas and direction for

growth, assisting their coordinated strategies ensuring that any barriers to growth can be avoided. The economic viability of this region is important to ensure the LEP can continue to provide infrastructure to support its position within the 'Golden Research Triangle'.

Environment Agency: Provides them with the confidence needed to support the scale of development that is proposed, making sure that no deterioration of the environment is felt. However, this study does not constitute the approval of the EA on any specific site allocation or development policy. The EA retain the right to comment upon site specific planning applications.

Water Companies: AW, TW and AfW will be able to use this study as a mechanism to improve their knowledge of development proposals and increase the level of communication with the Local Authorities. It can be used to support their business plans for the provision of key infrastructure to meet internal and Ofwat agreed targets. An integrated strategy based on the entire catchment, rather than individual water company boundaries, can allow for the development of more sustainable solutions and for possible collaboration to be explored.

Objectives

Key objectives are:

Objective 1 - To identify how current and planned local water supply and wastewater treatment infrastructure could affect future growth levels for Hertfordshire, and where possible and relevant, neighboring areas. This will be achieved through the development of robust scenarios based on the standardisation of council planning information within a single GIS database. An array of partner and external GIS datasets will facilitate the definition of sub-catchment boundaries, relevant to administrative boundaries, drainage network catchment, natural watersheds and the general urban makeup of Hertfordshire. Our modelling experience and familiarity with the water companies serving Hertfordshire will enable us to assess and breakdown the capacity and headroom within the water supply and wastewater treatment infrastructure, integrating into the GIS database and effectively assessed against the future development scenarios. Our robust selection of the study catchment area will enable all partners to see how their areas fit in within the wider context and encourage greater collaboration. The study will hopefully help address issues that transect administrative boundaries.

Objective 2 - To identify potential changes to water supply and wastewater treatment infrastructure required to support the scale of development envisaged for the county as a whole, and considering the Local Enterprise Partnership (LEP) growth corridors, and wider sub-region, where relevant. Informative and innovative data graphics and excel-based analytics will ensure that this objective can be challenged and ultimately met. Modelling results for the baseline and development scenarios will be analysed to identify trends and thresholds, used to determine points of intervention and long-term headroom / capacity issues. From this, infrastructure improvement strategies will be derived, measured against the modelling results and targeted at accommodating the evaluated developments scenarios for the various timeframes.

Objective 3 - To scope out potential environmental impacts of the development of water supply and wastewater treatment related infrastructure. Our expertise in environmental impact assessment will be utilised to ensure we can effectively identify and classify all potential current and future environmental constraints, providing a clear guide as to the likely options which will have to be pursued. Consideration will be given to the potential that environmental consents may be tightened in future, leading to short-sighted funding commitments and / or abortive works. This consideration will enable us to ensure proposed investments are robust and environmentally sound for the extent of the various scenarios and timeframes.

Objective 4 - To provide a range of options to meet strategic and local infrastructure needs, and an indication of the scale of investment required at the sub-catchment level. International best practice advisors and urban water specialists within ARCADIS Global will provide technical direction throughout the optioneering stage, alongside our UK-based Hyder experts. This broad range of expertise will ensure we can propose a wide range of pragmatic and feasible options, incorporating innovative and sustainable approaches taken from the UK and further afield. The project online SharePoint site will promote 'live' collaboration during the development and feasibility design of options, helping to ensure that all potential partner concerns, site issues and other risk elements can be identified. Innovation will be central to the options identification and development process to ensure climate change resilience and environmental protection remain key pillars of long-term development. This approach should also help to elevate the region's attractiveness to prospective 'Golden Research Triangle', aligning infrastructure development with the underlying growth of sustainable thinking in high-tech industries. The options developed within the Water Resources in the South East Project (WRSEP) will be appraised and used as the springboard in this study, building upon previous work and partner engagement. This will help ensure that this project ties in with previous work and forms the logical next step in the process to procuring and implementing the necessary infrastructure improvements.

Objective 5 - To set out a range of wider policy options and solutions to remedy any shortfalls in infrastructure provision. The identification and assessment of necessary infrastructure investment strategies and options will provide a clear and objective profile to assist long-term planning. This process will clearly demonstrate where direct infrastructure investments will facilitate development and where some of the catchment constraints are unlikely to be resolved. Policy options and solutions will be discussed and tailored to fit around any defined options, supplementing them with supporting strength and removing uncertainly where possible.

Modelling & Analysis

ARCADISs Principal Consultants, Senior Consultants and International Expert Advisors will work together to define a range of critical factors and thresholds, agreed through consultation with the water companies and other partners. The primary elements that will be considered will include, but are unlikely to be limited to, the following.

- Wastewater drainage network conveyance capacity
- Key wastewater asset capacity (e.g pumping stations)
- STW process headroom
- Wastewater consents
- Water supply capacity
- Water supply storage reservoir capacity
- WTW processing capacity

Water abstraction limits / consents All the final critical factors and thresholds form the basis of a numerical assessment of infrastructure deficits and will be used to inform the sensitivity testing methodology.

Some of the likely impacts of future growth, which will be assessed in order to identify the key catchment constraints, include the following:

- Increased consented discharges of treated effluent from the STWs, leading to increased suspended solids, increased bio-chemical oxygen demand and eutrophication. EA compliance

requirements may prevent growth in some catchments, requiring costing for STW process improvement works.

- Reduction in the capacity of the sewerage network, leading to increased frequency of intermittent discharges to the environment and risk of foul sewer flooding, polluting nearby watercourse and creating a public health hazard. OFWAT regulation of the water companies tightly controls flooding and environmental discharges and could severely inhibit the achievement of the desired growth levels.
- Increased abstraction of water to support both the residential growth and potential industrial needs, leading to reduced volumetric flows in rivers, decreased water levels and detrimental environmental impacts on natural wetlands. This would restrict abstraction and denote that large-scale catchment transfer schemes would be required prevent severe river impacts.
- Increased rainfall creating additional pressure on combined sewerage systems and reducing available headroom in the network and for treatment to accommodate urban developments. Additional development inflows could also results in increased intermittent discharges to the environment, impacting compliance levels and resulting in fines.

ARCADIS are acutely aware of the potential conflicts between growth aspirations, the current economic climate and upheaval of planning policy framework, protection of the water environment, and the statutory responsibility of water companies. We have experience of successfully resolving such conflicts at a local level to the agreement of all parties, which we can bring to bear for this study. Constraints and opportunities will be classified in terms of severity / importance using a Red Amber Green (RAG) system to allow clear interpretation by the project partners

Optioneering

With reference to the LDPs, HCC Strategic Infrastructure Plan, WRSE, WREA and water company AMP plans, the Principal and Senior Consultants will identify and develop outline schematic plans for a range of conceptual changes to offset the projected deficits. We will compare the expected water and wastewater demand with the infrastructure capacity, constraints and deficits, and through consultation with the partners agree a long list of infrastructure, water resource and wastewater treatment options to provide the necessary capacity at a local, strategic and policy scale. The Partnership The Water Companies SharePoint Site

ARCADIS will consult with stakeholders to develop a clear set of sustainability objectives and targets against which any proposed solutions will be assessed, including:

- Water quality and biodiversity opportunities
- Carbon (both embedded and operational, i.e. energy use)
- Water efficiency and impact on resources
- Technical feasibility and deliverability risk
- Affordability and funding options
- Development / infrastructure lead-in time / phasing
- Organisational / administrative responsibilities ♣ Wider sustainability considerations

ARCADIS will work with partners to develop the sustainability framework and identify a suitable scoring and weighting mechanism to allow the robust and transparent comparisons of potential solutions.

The serious water stress experienced in this region can be a positive influence, in that there is a pressing need to investigate and promote sustainable and resilient principles will have to be made to work. The ‘business as usual’ approach is not an option. The aspiration for water neutrality must also

be explored at all levels to ensure existing water resources and the environment are protected, allowing greater flexibility to accommodate future development.

All our options strategies will be identified and designed through collaboration with our International Expert Advisors, drawing confidence from the success of various schemes delivered by ARCADIS in other countries, specifically the Netherlands. Some potential options that could be considered during this stage include the following:

- Formation of blue-green corridors (providing recreational opportunities and enhanced biodiversity potential, as we designed for the Waterakkers Water Park project in Breda, Netherlands)
- Import of water from neighboring catchments
- Optimisation and / or re-tasking of existing assets, such as the conversion of obsolete STW / SPS tanks into storm storage or balancing tanks
- Use of purified surface water runoff to recover groundwater levels as part of large-scale separate drainage and / or strategic sustainable infrastructure
- Approaches such as this should help to demonstrate the HCCs, and the other partners, commitment to innovation and sustainability, elevating the regions attractiveness to prospective 'Golden Research Triangle' companies
- Development of surface water separation strategies to relief expected pressures on foul sewer networks, providing headroom and addressing pollution through reduced intermittent discharges to the environment
- Smart operational control-based EA permitting framework to maximize urban wastewater system performance by balancing conflicting objectives such as operational cost, treatment processes and environmental risk simultaneously. (University of Exeter, A Cost-effective Regulation Framework for Water Quality Risk Management)
- Implementation of nutrient release reducing schemes to balance any residual, post treatment increase arising from proposed development

All option plans and working drawings will be hosted on the SharePoint and used as the basis for partner consultation and inclusion within the optioneering process. The feasibility and environmental impact of options will be assessed, used to target the most appropriate and relevant options.

ARCADIS will review the water company's performance standards and capacity constraints through consultation with the asset owners, and identify any relevant existing plans for rehabilitating or upgrading the existing assets.

Appraisal of the options will be undertaken using a multi-criterion appraisal tool, to identify those options which are most socially acceptable, economically viable, technically feasible and sustainable (it is assumed that detailed cost estimates are not required, but high-level indications of likely off-site network and treatment costs to allow robust option comparison). The appraised options will be presented by the Principal Consultant to the project partners at the second workshop, with the aim of securing acceptance of the final options short-list which will be evaluated and detailed in full within the final report.

A complete review of the Water Companies current AMP6 and longer-term investment and management plans will be undertaken to align any proposals, with the aim of identifying existing synergy and promoting the re-evaluation of plans to incorporate wider goals.

ARCADIS will ensure that option development accounts for innovative international best practice through continued collaboration with our International Expert Advisors, and opportunities for

including smart technologies and providing multi-functional solutions are fully explored (e.g. water retention and purification / highway water transport systems etc.).

The results of the optioneering, along with all the other activities and outputs of the whole project, will be summarised in a Final Report. At this stage we will also identify the key limitation and confidence in the proposals for this 'Phase 1' work, outlining missing data or identified improvements to help guide the 'Phase 2' work

Appendix 45: The Hertfordshire Water Study 2017 – Report to HIPP 22nd March 2017

HIPP 22nd March 2017

The Hertfordshire Water Study 2017

Report Author: Rob Shipway, R S Regeneration (rob.shipway@btinternet.com)

1. Summary

1.1 This report is a companion to the presentation on the findings of the Hertfordshire Water Study to HIPP, to be led by the consultants who have prepared it, Arcadis UK.

1.2 That presentation will cover the methodology adopted, the results of the research, overall conclusions and actions that should be undertaken going forward. This report sets out the context to that work, provides a reminder of what the Study was seeking to achieve, and considers the extent to which it has achieved it.

2. Background

2.1 There have been regular updates to HIPP on progress on the Water Study since its autumn 2015 inception, and it is not the intention to replicate previous statements.

2.2 One point of clarification at this stage is needed. Throughout this report there is the reference to 'water' (the Water Study, water companies, water infrastructure etc). The description 'water' is a term used by the industry itself but is actually (and is used here and in the Study) as a catchall for 'water and sewerage'.

2.3 The final point is that at the time of writing the contents of the Study are not yet signed off, although the work is at an advanced stage and the hope if not the expectation is that sign-off will be achieved without significant amendment; on that basis the conclusions discussed here and included in the presentation appear robust.

3. Some general considerations around the Water Study

3.1 It is perhaps helpful to point out some important considerations around the Water Study:

- **it is hugely technical**, tackling as it does advanced hydraulics, a vast and interconnected system of pipework, pumps and treatment works, innovative modelling techniques and a complex governance and regulatory system that has been operating since privatisation. There is no other area of infrastructure planning that is quite so arcane, and most if not all of those who are not part of the industry struggle to obtain a complete picture of it. Presenting the findings in a way a lay audience will understand without detracting from its meaning has been one of the key challenges

- **the partnership is a complex one**, involving as it does 16 agencies in all, including a mix of private and public sector interests, with each one striving to secure a specific individual outcome to meet its needs without there being any suggestion in the report that the organisation is presented in a less than favourable light in the current long term arrangements for planning water infrastructure; the Study finds no evidence of this and the fact that the partnership has remain intact and has worked well together is testament to all involved

- what cannot be overlooked is that **the Study has suffered delay**, with the original completion date of July 2016 significantly exceeded. The technical complexity of both the research and the partnership noted above has been the principal reason as Arcadis have struggled to agree future development scenarios with local authorities, secure the basis for and completing the detailed modelling work and present technical findings in a way that can be readily understood by all those reading it

4. What the Study Represents

4.1 It is perhaps worth setting out what is covered in the Study and what isn't, because this has proved to be one of the hardest things for the individual study partners to appreciate.

What the Study covers	
Area covered	**Comment**
Long term network resilience	This has never been attempted before – the current industry setup and funding model considers this on essentially a short term basis
The impact of growth on a collectively agreed long term growth strategy	Local authorities were asked to define where they consider growth would most likely to be located over the period 2021 – 51 for the purposes of modelling the impact of that growth
Where there are long term pressures in the system	Based on that long-term strategy, the Study has been able to identify where the water infrastructure network (both connections and treatment works) comes under pressure - and crucially when
Where there is long term capacity	Equally the Study identified where growth *could* be located to take advantage of spare water infrastructure capacity and reduced long term investment costs (whilst also readily recognising that for other reasons, development in this location might not be appropriate)
Water infrastructure considerations not parochially but across the whole Study Area	Whilst there have been studies exploring wider than district issues in the county (e.g. for Rye Meads) the Study takes this to a whole new level
Infrastructure planning on a sub-catchment basis	Many studies focus on administrative boundaries only; though these are important considerations picked up by the Study, it also considers infrastructure needs in each of Hertfordshire's 15 sub-catchments
Infrastructure needs based on a range of population growth scenarios	One of the critically important aspects of the Study is that it does not look at long term growth one dimensionally but considers the *'what if'* – specifically, it builds in low, medium and high population growth scenarios to enable sensitivity testing

4.2 The Study **does not cover** the following:

What the Study doesn't cover	
Area not covered	**Comment**
Does not render invalid any current or emerging growth strategy	There was never the intention of the Study to challenge any growth strategy and there are established liaison mechanisms in place between LPAs and water companies on local plan issues. The Study does not suggest any capacity issues that are not capable of being overcome in the plan period without the appropriate level of investment (but see 4.3 below on the value that it adds to the Local Plan process)
It doesn't propose that long term growth should be sited in any one particular location within specific districts in accordance with the assignment of growth that was tested	The growth scenarios that have been tested (a 2021 baseline, and then a 2031 and 2051 assignment of growth) have been discussed and agreed with the districts for the purposes of modelling only. The Study makes it clear that the assignment of long term growth is for this purpose alone and should not be taken as any more than this – there are heavy caveats throughout the report but particularly in any mapping that provides a visual presentation of growth locations
Does not say where development should or shouldn't go	Again, this is not the intention of the report – no constraints on growth will be imposed as a result of Study outcomes, although it is important to note that some locations will require greater technical solutions and incur higher infrastructure costs than others
It doesn't provide costings of infrastructure need	As a high level study of long term growth, the Study was never able to go into detailed costings and after consideration it was decided any 'finger in the air' indicative costings would be would run the risk of being inaccurate and therefore misleading. The opportunity to address such considerations arises in any Stage 2 of the Study as discussed later
Does not suggest that provision of water infrastructure should be the principal determinant of growth	There is a clear recognition that water infrastructure provision is only one of a number of considerations that will determine where future sustainable development should be sited, and, just because growth could take place in one location to take advantage of spare network capacity, it may be inappropriate for a number of other reasons

4.3 There are some additional considerations arising out of the two tables above which are as follows:

- it is understandable that local planning authorities would have wished the Study to provide **specific support for growth in the shorter term** (and specifically in providing assistance with emerging local plans). Though that was never the intention, the Study does in fact provide support and several concerns have been ironed out as a result of the close liaison that has taken place between partners during Study progression (for instance the Environment Agency has withdrawn its blanket objection to proposed local plan growth for South West Herts on discharge grounds as it now understands more about the issue through its participation in the Study)

- during the time of the Study several additional points **in respect of local plan progression** have emerged; Thames Water have provided additional liaison and feedback on local plan growth strategies (e.g. St Albans, Chiltern) through contact that has been made in Project Board meetings, and the County Council has offered to prepare a technical evidence paper for local plan examinations and appear with the EA at inquiries to explain the technical evidence provided by the Study. This should demonstrate to Inspectors that the issue of water infrastructure planning is being taken seriously in the Study Area and that the Study outcomes can offer considerable comfort that investment needs are now much better understood

- on a separate issue, the fact that local planning authorities have been uncomfortable about being asked to provide a **profile of potential future growth beyond the current plan period**, on the grounds that this does not represent local authority policy but could easily – although mistakenly – be taken as representing just that. It would have been impossible to undertake modelling the long term consequences of growth and its impact on the water network without these assumptions, so these difficult judgements have had to be made. However, the Study has been at great pains to make it very clear that these assumptions are for testing purposes only and for no other reason

- a final consideration is around **sub-catchment planning**; water infrastructure is no greater respecter of administrative boundaries and in many ways Hertfordshire's 15 sub-catchments (smaller divisions of the country's major river systems) have greater significance for infrastructure planning. What the Study has been able to illustrate is that as sub-catchments are typically spread over 2 or more districts, cross boundary water infrastructure planning is absolutely vital, as siting growth in one district in one part of a sub-catchment will have ramifications for infrastructure capacity terms for the sub-catchment overall, and therefore for other districts

4. Study outcomes

4.1 These are covered within the presentation but the structure (and key actions) are summarised here.

Conclusions

4.2 These are summarised in multiple formats:

- Overall general
- Immediate considerations overall to 2021

- Medium Term overall to 2031
- Longer term overall (2031 – 51)
- Specific conclusions (a range of structural/cultural changes in the water infrastructure planning process that should be pursued)
- District conclusions
- Sub-catchment conclusions
- A proposed strategy for Hertfordshire (with the topics of planning, collaboration, vision and investment cross referenced with the key agencies - HCC, districts, water companies, developers and the Environment Agency)

Next steps

4.3 There are a number proposed, but specifically there is 5 point Action Plan which is reproduced, with a commentary, in Appendix A

5. The Study and its relationship with the move towards longer term growth and infrastructure planning and promoting housing delivery

5.1 The Study outcomes are being published at a time when there is heightened interest in the issue of both longer term planning for growth and infrastructure beyond the timeframe of local plans, and of ensuring that barriers which might prevent the delivery of housing growth are removed.

5.2 HIPP has itself recognised the need for this in committing to creating a longer term countywide vision of growth beyond 2031, with a key part of that agenda being around collaborative work on infrastructure planning. In that sense, the Water Study outcomes are the first illustration of what such collaboration might mean since that commitment was entered into in January.

5.3 Other areas of infrastructure are (or can be expected to) take a similar view, and the current actions to create a Transport Vision for 2050 in Hertfordshire similarly recognises that to plan for the immediate, one needs to develop an understanding of what the future might look like.

5.4 There is also the sense that future timelines for local plans are acknowledging the longer view, with forthcoming reviews by the South West Herts authorities expected to push into the mid to late 2030s, and with several authorities already recognising that an early review of the emerging local plan might be needed to reflect increased housing projections (and, in the case of North Herts, an acknowledgement of the fact that it may be necessary to plan for a new settlement from the mid 2020s).

5.5 The long term view provided by the Study feeds into this agenda, as it does into the concerns the government has about barriers that may be preventing housing delivery as set out in February's White Paper *"Fixing our Broken Housing Market".*

5.6 The White Paper notes that in December 2014, the Government published *Better Connected*, setting out the process for securing utility provision for developments, providing a shared expectation for utility connections from companies and developers, reaffirming statutory performance measures already in place, and introducing new voluntary standards for water and sewerage (as well as telecoms).

5.7 The White Paper provides a commitment to review Better Connected, assessing its impact so far, and how existing performance standards and penalties are working to support house building at all scales. The aim is to consider what more could be done to ensure that utilities planning and delivery keeps pace with housebuilding and

supports development across the country: aligning investment in utilities provision with local development plans that set out where and, crucially, when houses will be built is likely to be key in achieving this, speeding up timely connections for new homes.

5.8 As part of this review, and depending on progress made by the sector, the government will closely monitor performance to ensure house building is not being delayed and, if necessary, will consider obligating utility companies to take account of proposed development. In that sense, the Study plays perfectly into this agenda.

6. A possible Stage 2

6.1 As a possible follow up to the Study, consideration will be given to a Stage 2 commission which has already be identified. This would be aimed at taking the strategic conclusions from the report and turning it into detail (in terms of precise requirements of infrastructure need and their cost) on a district by district basis.

6.2 The County Council has agreed to draw up a generic brief but it will be for individual districts to decide (possibly in partnership with others) whether or not to take this forward.

7. Conclusions

7.1 Ultimately the Study represents a both wide ranging and significant body of work which defines the key issues associated with water planning in the county, and specifically in the time period after the early 2030s - when the current round of emerging local plans will be coming to the end of their natural life – through to the year 2051.

7.2 What it has been able to achieve is a collective knowledge of the many considerations there are associated with this issue – as well as shared intelligence – for all those involved at the issue within the Study area. There is much than can be built on as a result of this work and also much that can be done with sharing the findings on a wider scale, including potentially the ongoing national debate about how to secure appropriate and timely development related infrastructure to support and maintain growth.

Recommendations:

That HIPP notes;

1. The findings of the Water Study, and the considerable value that it adds to the longer term understanding of future water infrastructure need and the planning that needs to go into secure it

2. That notwithstanding the fact that the purpose of the Study was not to examine in detail short term needs, the Study outcomes are of considerable value to the local plan process in that they show that, subject to appropriate future investment, no critical issues which would undermine local plan growth strategies have been uncovered, and that the fact that local authorities are taking a longer term holistic view of water infrastructure will earn them considerable credit at local plan examination

3. That in support of point 2 above, the County Council (and, it is understood, the Environment Agency) has indicated its willingness to prepare a technical paper and appear at local plan examinations to explain the detail underpinning the Study's conclusions

4. The government's concerns around utility planning and infrastructure rollout being a potential source of delay in relation to housing delivery, and the potential template the Study identifies for multiple agency working on this issue

That HIPP agrees to;

5. Feed the Study outcomes into the 'Planning for Hertfordshire beyond 2031' visioning work that it has agree to promote

6. Receive in due course a report specifically around the recommendations for long term actions including a consideration of:

    - a water infrastructure partnership
    - the identification of a single point of contact across Hertfordshire to act as liaison between water companies and local planning authorities on the strategic aspects of water infrastructure planning

7. Receiving and considering a brief for Stage 2 individually tailored piece of work for each of the districts to explore specific long term water infrastructure needs and costs

8. A joint HIPP/Water Companies session on water infrastructure planning and the Study outcomes

Appendix A - The Water Study's 5-point Action Plan

Action Point	Summary of potential implications
A Water and Sewerage Infrastructure Delivery Partnership	A proposed public/private partnership formed from the current Study Partners and bringing in others (both other local authorities and other private stakeholders) to build on the collaborative work that has been at the heart of the Study. The partnership would have the overarching responsibility of taking forward the remainder of the Study's recommendations. Evidence from elsewhere (e.g. the GLA's role in London's water infrastructure planning) suggests that this would improve Hertfordshire's collective standing in such matters
An Integrated Planning Portal and a Single Point of Contact	One of the current weaknesses identified from the Study are the limited arrangements to share technical data (on proposed development locations, water and sewerage infrastructure, groundwater conditions etc) and this hinders both the process of planning for growth and the understanding of the implications of that growth in water and sewerage infrastructure terms. The key to taking up this recommendation would however be who would be prepared to host the portal Another consideration is the potential establishment of a single point of contact within Hertfordshire's authorities to act as liaison between them, the water company, the Environment Agency and other relevant bodies
Growth Risk Profile	Profiling would help emerging local plan growth strategies to be assessed for their risk in terms of impact on the existing water and sewerage network. This would allow water companies to co-ordinate investment against the growth strategy, which would improve the profiling of such investment in future Asset Management Plan periods (which operate in 5 year tranches), or alternatively, challenge that growth strategy were the company to form the view that an alternative profile might be more cost effective or easier to implement
Exploration of Long Term Funding Opportunities	Notwithstanding water companies' willingness to match investment against future growth needs (see next point) this investment is recognised as being essentially short term and reactive. One of the Study recommendations is to seek ways of getting ahead of the funding game to secure long term investment (particularly at the pan district, sub catchment level) to build up capacity in the system and provide greater certainty for long term planning for growth Such opportunities (which would see early investment coupled with a later recoup as development was rolled out) could potentially involve a role for the Hertfordshire LEP or a 'Bank of Hertfordshire' style investment (a concept mooted as forming part of the development of a Vision for Hertfordshire and collaborative work on infrastructure funding) and delivery discussed previously by HIPP)
Planning for AMP7 (2020 – 25) and the forthcoming Price Review Mechanism (PR19)	As identified at the outset of the commission, the Study provides a high level examination of technical issues including investment priorities and costs over a significant timescale, as its focus is on long term solutions. Looking to the shorter term the Study recommends an immediate second phase of detailed work which will greatly assist the water companies in planning for the next Asset Management Period (AMP 7 2020 – 25), particularly when the companies review the health and performance of their network, although it will also assist infrastructure investment planning beyond that period. As such, this will be of great value to local planning authorities in future proofing the latter phases of their emerging and adopted local plans

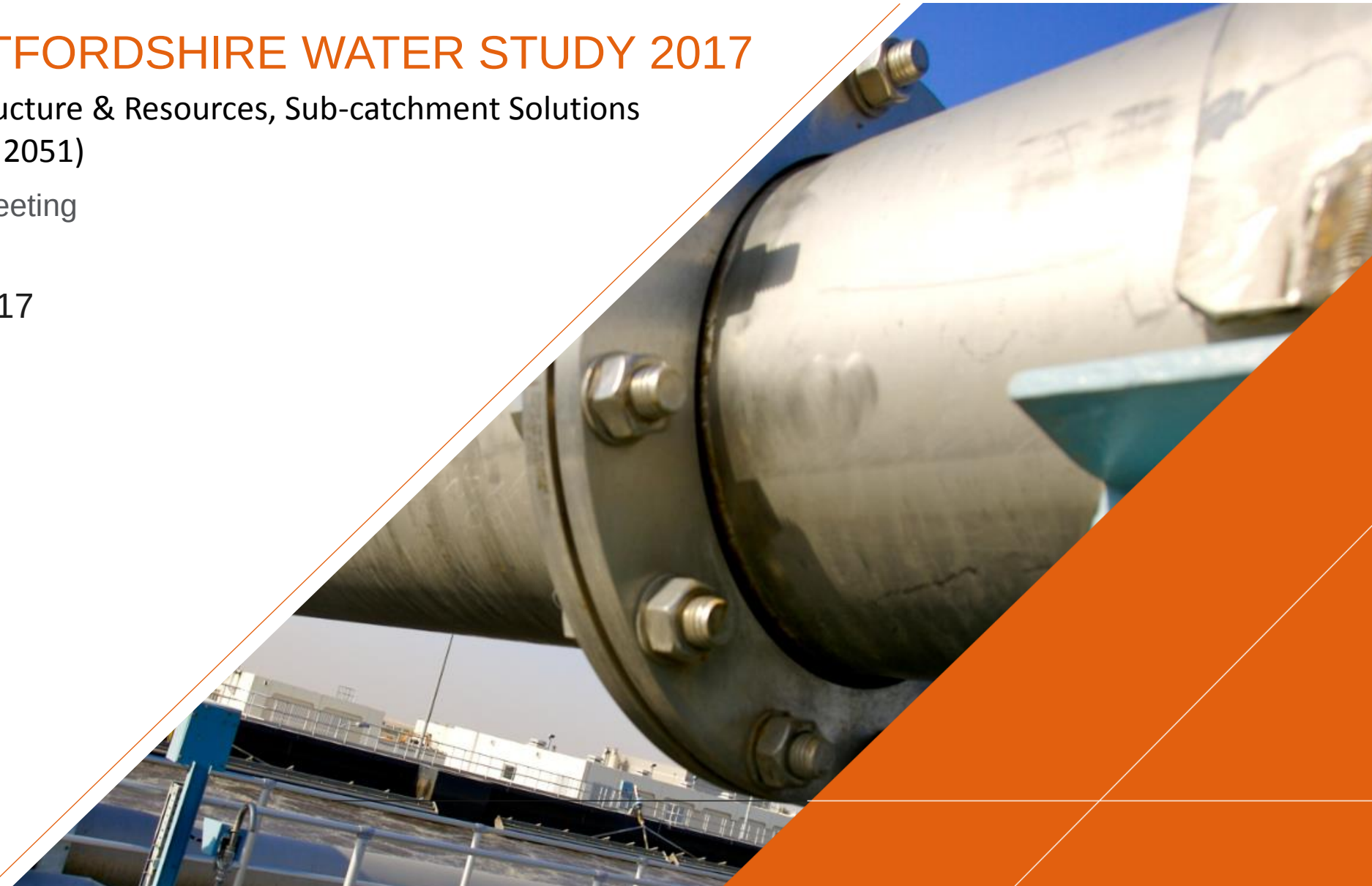
Appendix 46: Arcadis Hertfordshire Water Study 2017 Presentation to HIPP Meeting (March 2017)

HERTFORDSHIRE WATER STUDY 2017

Infrastructure & Resources, Sub-catchment Solutions (2021 – 2051)

HIPP Meeting

Mar 2017



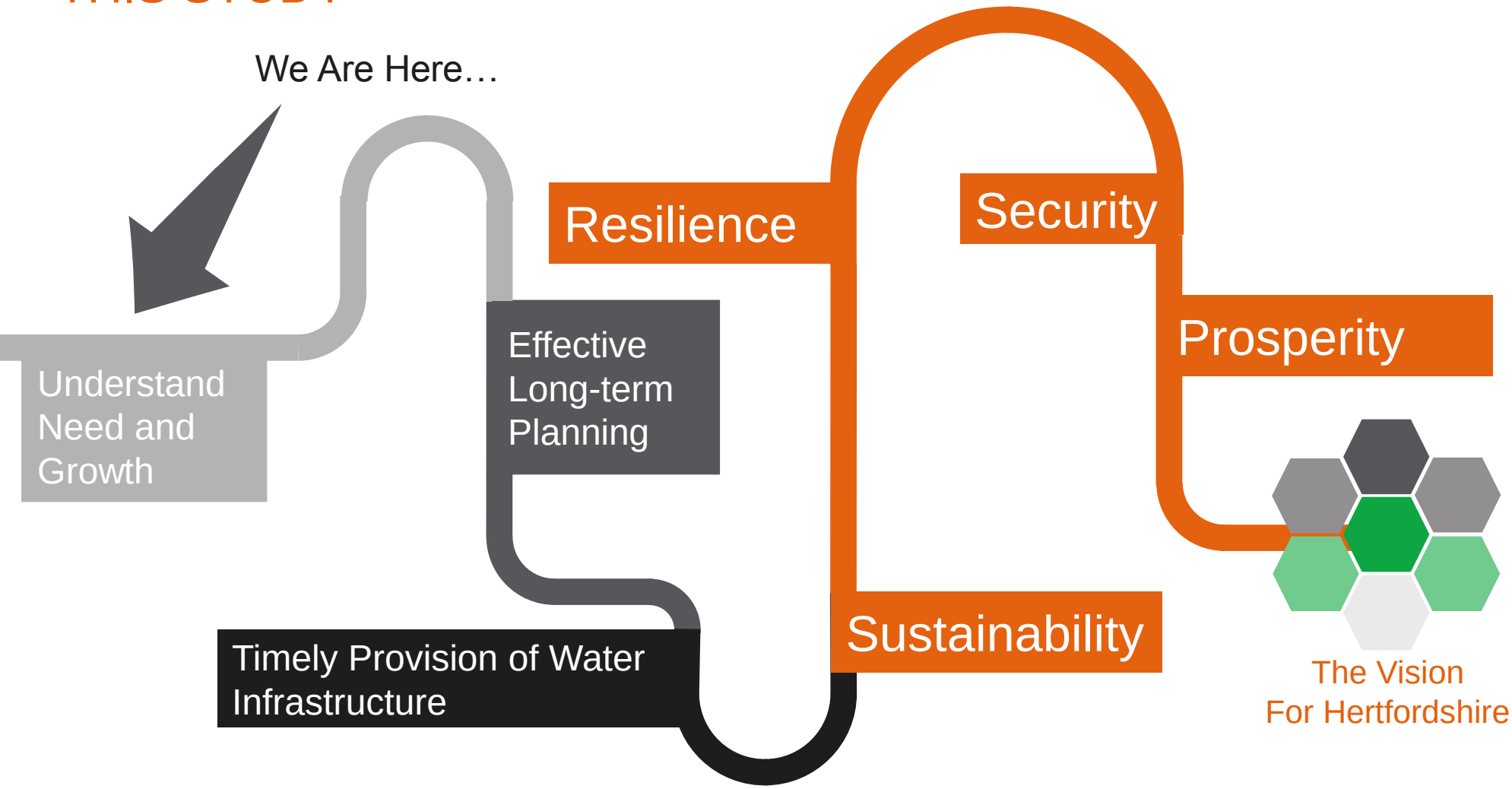
WATER VISION FOR HERTFORDSHIRE

We proposed a Vision for Hertfordshire to underpin the aims and objectives of this project and help steer the identification of options and strategies. The vision has was encapsulated as follows:

> A water **resilient**, **sustainable** and **secure** Hertfordshire, where all administrative organisations, water authorities and local environmental groups **collaborate to provide efficient water infrastructure** and **preserve the quality of the water environment** for the benefit of everyone, especially its chalk rivers and the valuable ecosystems they host.
>
> An **integrated** and **diverse wastewater infrastructure** that will help **remove obstacles to planned growth** and **contributes to local economic prosperity**, whist helping to maintain healthy groundwater supplies. **Innovative** and **water sensitive developments**, designed to deliver sustainable benefits to their local water and regional water environment, former part of a wider **holistic water management strategy** to ensure **Hertfordshire is an exemplar** of **integrated planning**, **effective catchment management** and **environmental protection**.

WATER VISION FOR HERTFORDSHIRE

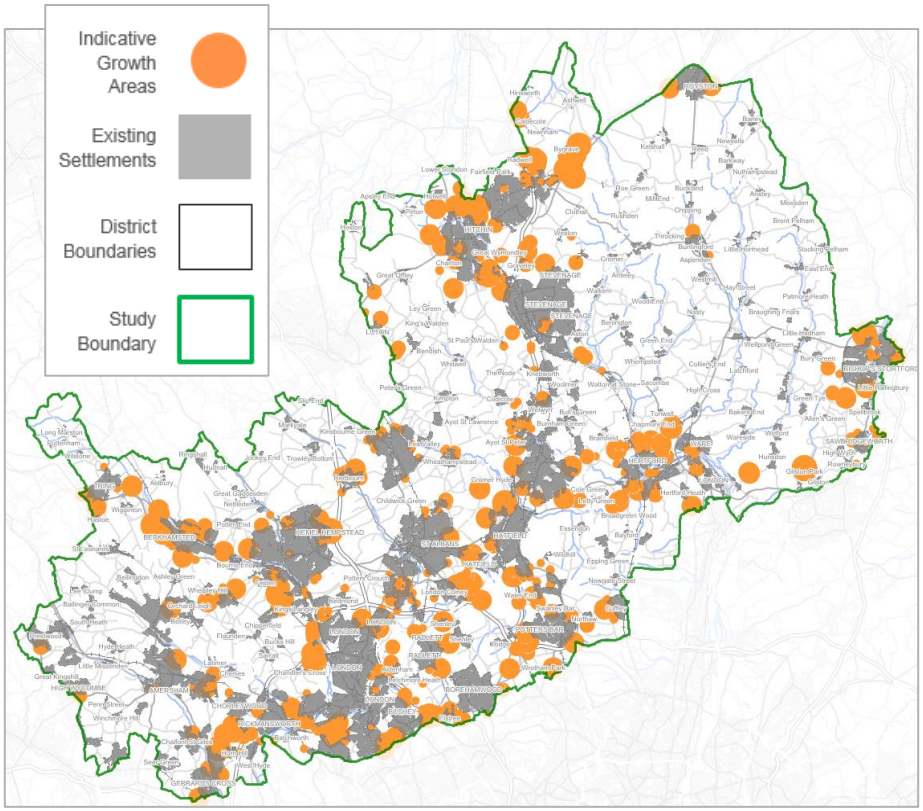
THIS STUDY

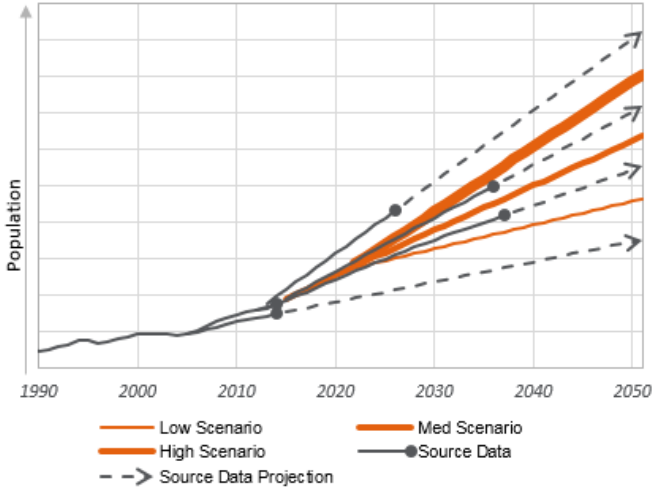

We Are Here…
Understand Need and Growth
Effective Long-term Planning
Timely Provision of Water Infrastructure
Resilience
Security
Prosperity
Sustainability
The Vision For Hertfordshire

STUDY APPROACH

Understanding Development & Growth Trends

- Future Time Horizons
- Clarify growth expectations through district consultations
  - Local Plans
  - Growth strategies
  - Population projections (ONS, SHMA etc.)
  - Indicative growth areas
- Create robust projections to 2051

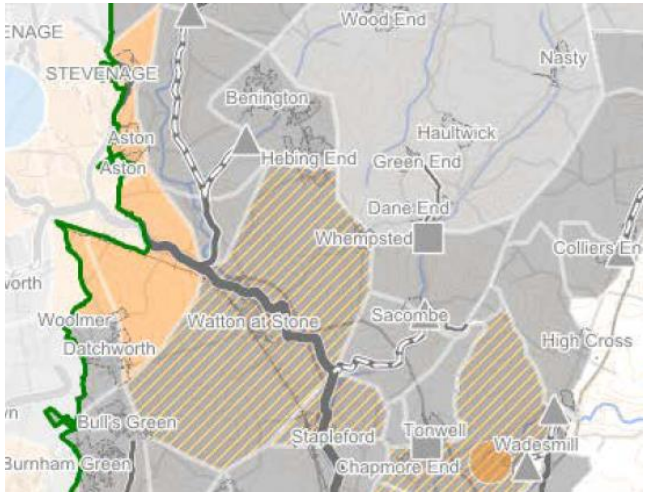


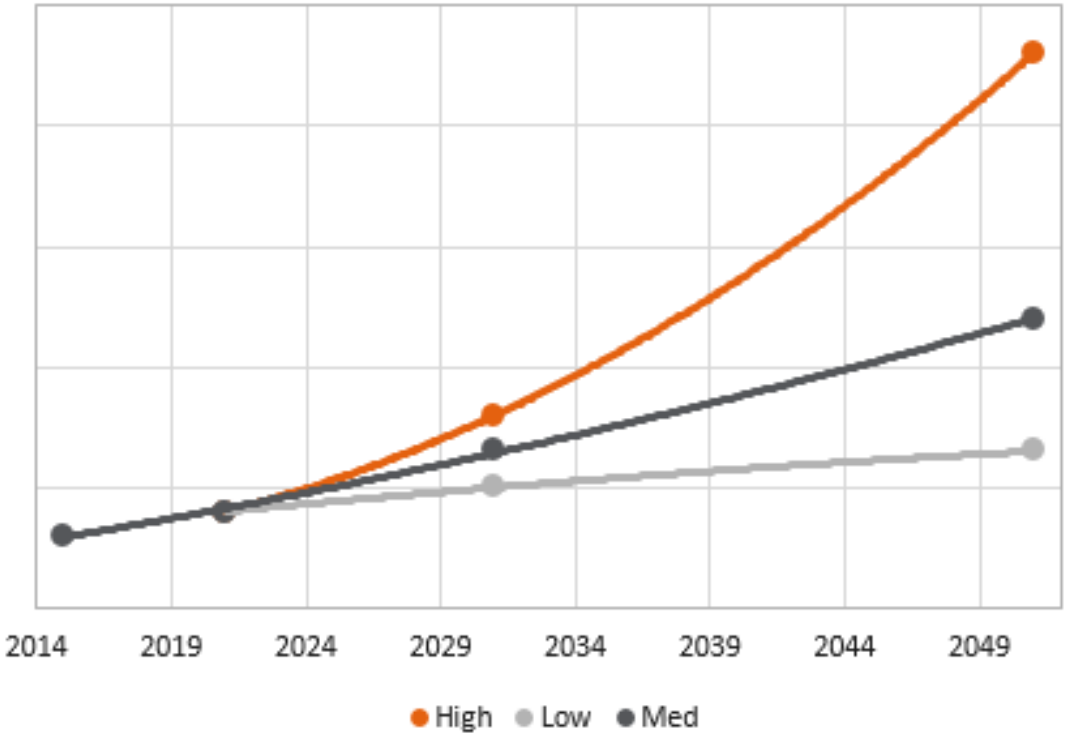


STUDY APPROACH

Understanding & Managing Uncertainty

- Population change inherently uncertain
- Created uncertainty scenarios (Low / Medium / High)

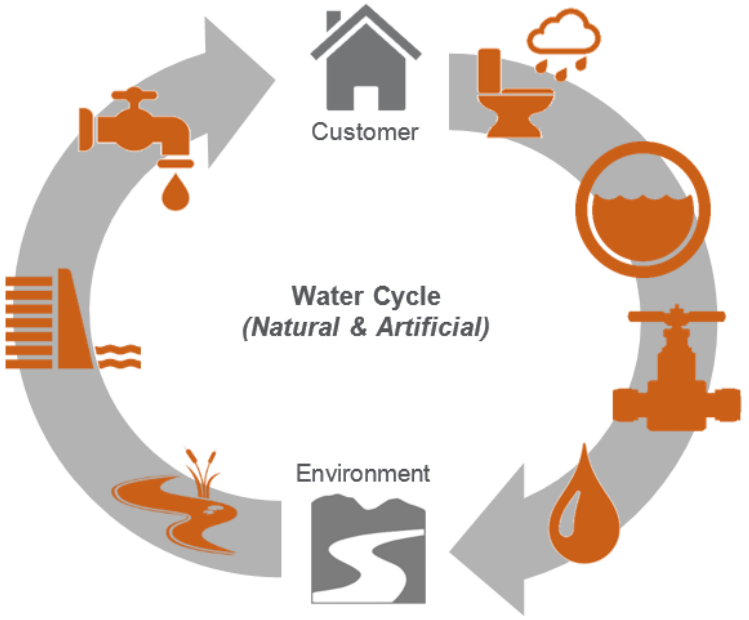




STUDY APPROACH

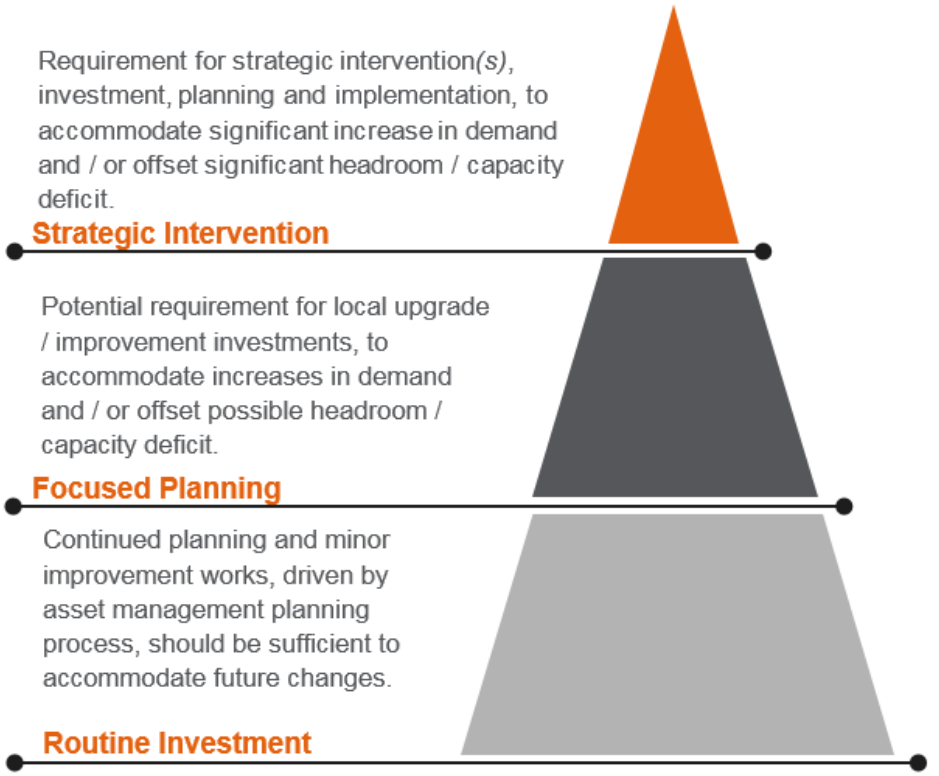
Establishing Strategic Understanding of Water Infrastructure

- Catchment Schematic
- High-level Numerical / Hydraulic Modelling



Evaluating Future System Capacity and Potential Deficits

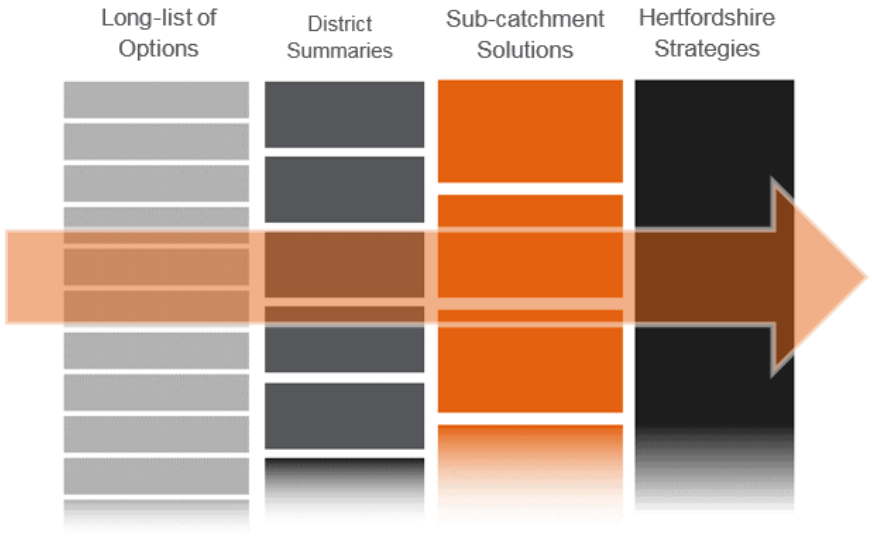
- Classification of Need



STUDY APPROACH

Identification of Water Infrastructure Options

- Undertaken based on the three key principles of **sustainability**, **resilience** and **security**
- A **'bottom-up' approach** applied



Long-list of Options

- Broad range of industry approaches

District Summaries

- **District-level understanding** of the potential water infrastructure requirements
- **Graphically represented** Classification of Need
- Provides districts with **information to support site selection**

Sub-catchment Solutions

- Strategic infrastructure solutions
- Opportunities to **implement multi-stakeholder multi-benefit schemes**

Hertfordshire Strategy

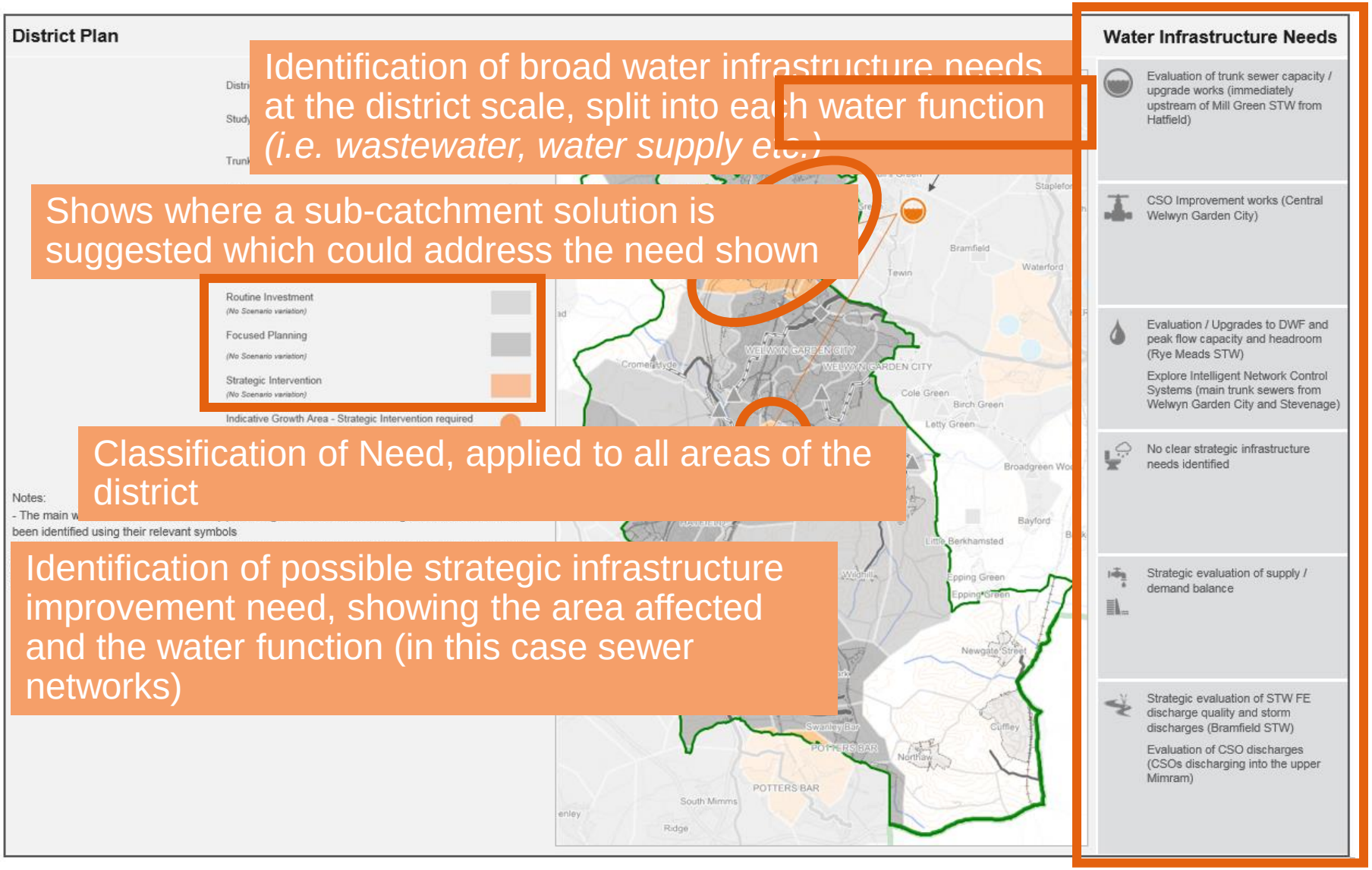
- Overarching **catchment strategy**

Policy Based Options

- Help facilitate the implementation of strategic and long-term engineering options

DISTRICT SUMMARIES

8.10.4 Welwyn Hatfield Classification of Need – Immediate Recommendations (2021)



Identification of broad water infrastructure needs at the district scale, split into each water function *(i.e. wastewater, water supply etc.)*

Shows where a sub-catchment solution is suggested which could address the need shown

Classification of Need, applied to all areas of the district

Identification of possible strategic infrastructure improvement need, showing the area affected and the water function (in this case sewer networks)

DISTRICT SUMMARIES

8.10.5 Welwyn Hatfield Classification of Need – Recommended Medium-Term Investment (2031)

District Plan

District Boundary

Study Boundary

Trunk Network

SPS

STW

Indicative Growth Areas, derived through consultation – indicates possible development, necessary to facilitate the modelling and assessment (NOT Planned / Agreed Development)

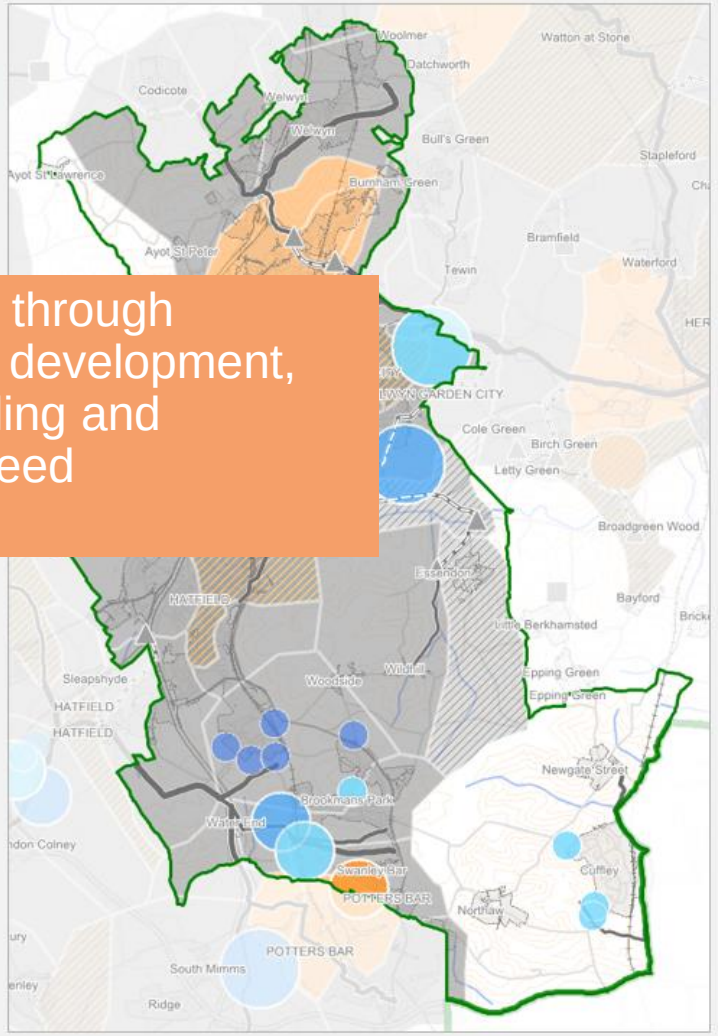
Strategic Intervention
(No Scenario variation)

Growth Area - Strategic Intervention required Med Scenario
(Potentially constrained without investment)

Indicative Growth Area - Low Scenario
(Relatively unconstrained)

Indicative Growth Area - Med Scenario
(Relatively unconstrained)

Indicative Growth Area - High Scenario
(Relatively unconstrained)



Notes:
- The main water infrastructure function(s) resulting in the need for a Strategic Interventions have been identified using their relevant symbols
- The water infrastructure function symbols only shown for the relevant time horizon when a Strategic Intervention is first required
- The indicative growth areas represent a broad indication of the likely locations of development and do not represent specific sites for development, unless they have been provided by the districts for the 2021 scenario

Water Infrastructure Needs

Trunk sewer upgrade works (Northern Hatfield to Mill Green STW / along A414)

Strategic rainfall runoff reduction investment (Hatfield)

Trunk sewer upgrade works (Northern Hatfield to Mill Green STW / along A414)

Strategic rainfall runoff reduction investment (Hatfield)

No clear strategic infrastructure needs identified

Strategic Foul Flow Reduction (Hatfield)

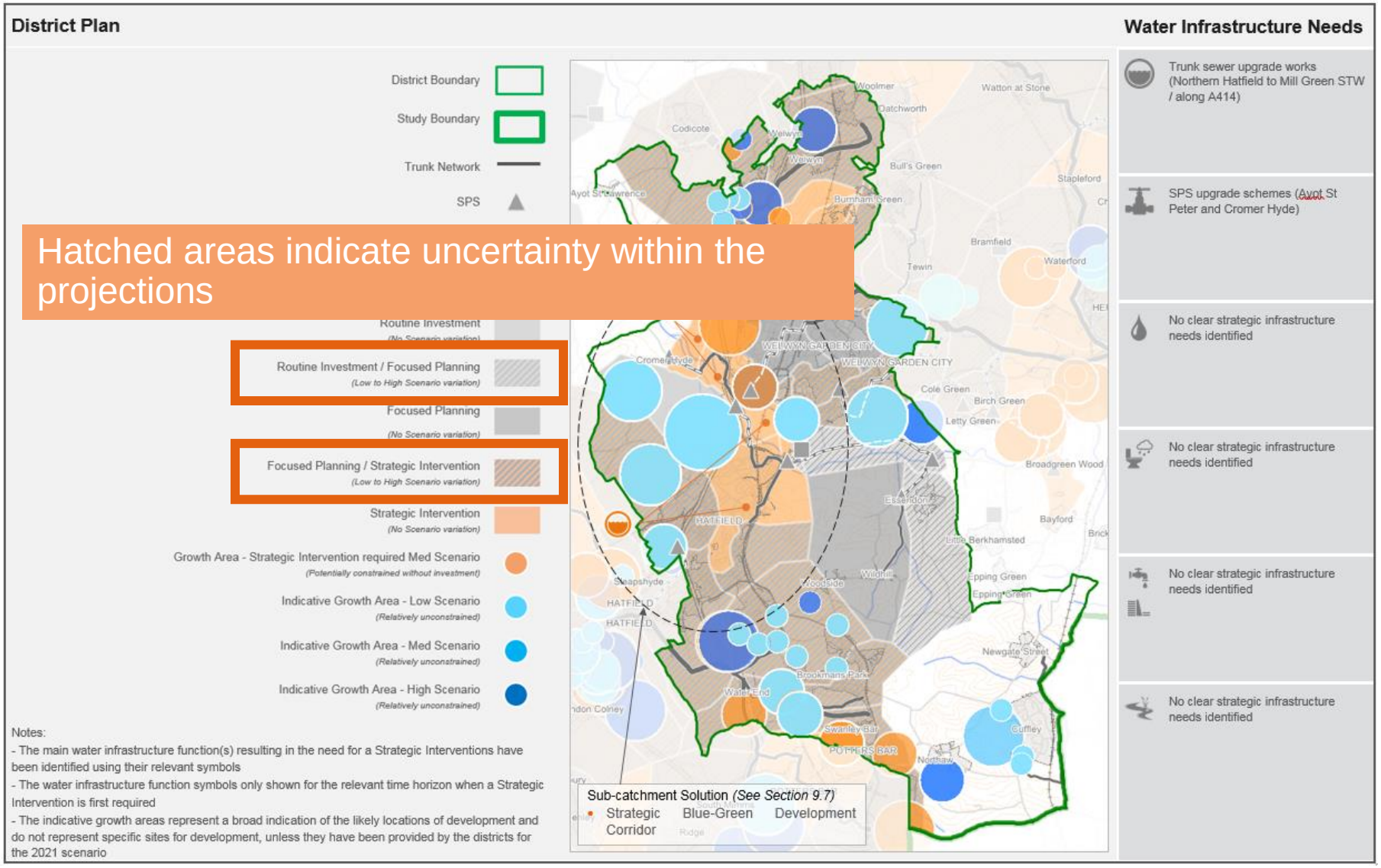
Strategic additional resource / reduced demand investment

Strategic rainfall runoff reduction investment (catchment served by Mill Green STW)

DISTRICT SUMMARIES

8.10.6 Welwyn Hatfield Classification of Need – Suggested Long-Term Considerations (2051)

District Plan



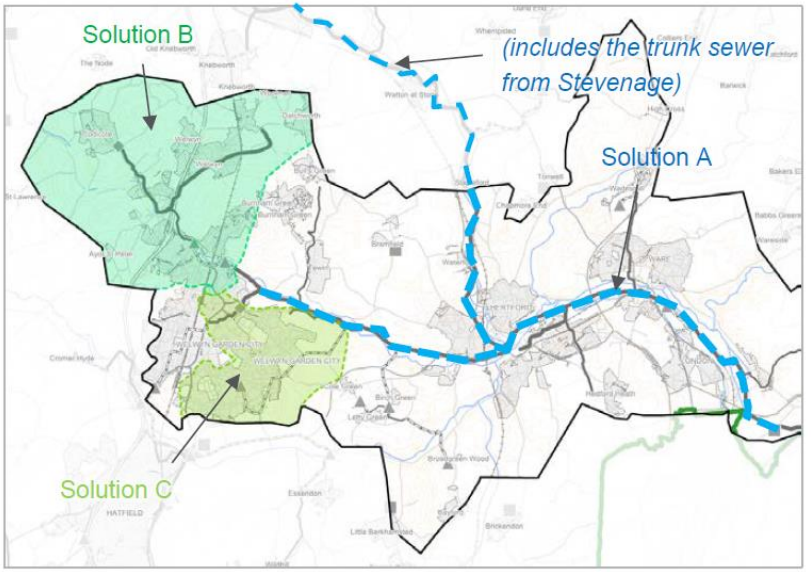
SUB-CATCHMENT SOLUTIONS

Sub-Catchments

- Present **opportunities to address** key growth challenges and infrastructure demands **at key strategic scales**
- Allow **critical and strategic decisions to be made**
- Assess and plan based on **water infrastructure need** (*not administrative Boundaries)*

Definition

- **Drainage infrastructure** *(consolidating areas with comparable issues, risks and opportunities)*
- **Geographical context** (following natural and artificial watersheds, transcending administrative boundaries and responsibilities)
- **Settlement boundaries**



CONCLUSIONS

Main Conclusions

- Ensuring adequate **water infrastructure capacity is critical** to support the projected quantum of growth
- Indicative confirmation that **current growth strategies are broadly robust**
- Continued **partnership collaboration is necessary** to facilitate the development of robust long-term planning
- Remains **challenging linking long-term infrastructure planning with investment**
- A wide range of **options available**
- **Current water management and efficiency policies broadly robust** and effective, specifically related to water supply

Other Outcomes

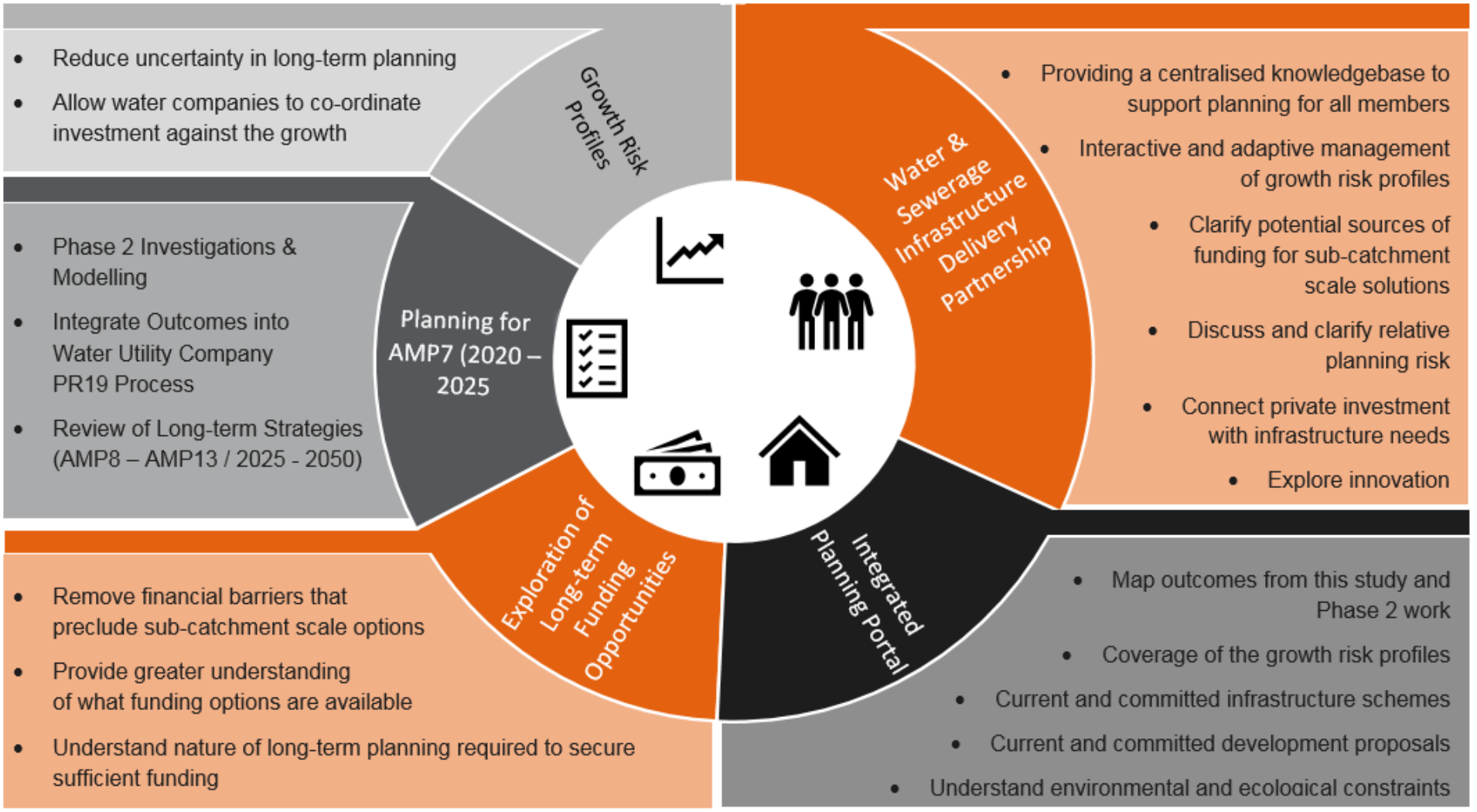
- Potential need for a **more self-reliant water resource strategy**
- Sustainable Water Utility Company **investment reliant on robust understanding of growth** plans and expectations
- Benefits of **consolidating growth proposals** into geographically discrete areas
- Benefits of a **collective voice**
- **Difficult to incorporate** the **intangible elements** of the development planning process when defining growth
- Complexities of catchment water systems will require range of **Phase 2 investigations to** fully clarify uncertainty and improve long-term planning

ACTION PLAN

Next Steps

- First phase or a (at least) two-phase project
- Five-Point Action Plan
  - **Water & Sewerage Infrastructure Delivery Partnership**
  - **Shared Planning Portal**
  - **Growth Risk Profiles**
  - **Exploration of Long-term Funding Opportunities**
  - **Planning for AMP7 (2020 – 2025)**

ACTION PLAN



INTO THE FUTURE

Integrated Long-term Planning

Collaboration & Transparency

Sharing of Data & Information

Innovation

Commitment to Sustainable Growth

Appendix 47: Hertfordshire County Council Environment, Planning and Transport Cabinet Panel 1 November 2017 – Hertfordshire Water Study

HERTFORDSHIRE COUNTY COUNCIL

ENVIRONMENT, PLANNING AND TRANSPORT CABINET PANEL

WEDNESDAY, 1 NOVEMBER 2017 AT 10.00AM

Agenda Item No.

4

HERTFORDSHIRE WATER STUDY

Report of the Chief Executive and Director of Environment

Authors: Sally Talbot, Planning officer, Tel: 01992 555047.
John Rumble, Head of Environmental Resource Planning, Tel: 01992 556296.

Executive Member: Derrick Ashley, Environment, Planning and Transport.

1. Purpose of report

1.1 To update the Panel on the findings of the Hertfordshire Water Study. This report will also be accompanied by a short presentation.

2. Summary

2.1 The Hertfordshire Water study was commissioned in 2015 to identify how water supply and treatment could affect the potential for growth in Hertfordshire. The study aimed to identify the possible changes to water infrastructure needed to overcome any potential constraints and look at how demand for water may impact the environment in the future. The study also examined and set out a range of options for both strategic and local infrastructure that will be required to assist with the future growth challenges faced within the county.

2.2 The Hertfordshire Water study was jointly funded by a partnership made up of the County Council, the Environment Agency, the Hertfordshire LEP, 9 of the 10 Hertfordshire District and Borough Councils (Broxbourne chose not to take part) and the statutory water undertakers that operate in the county, Thames Water, Anglian Water and Affinity Water. In addition, Chiltern District Council also participated as they face similar issues to Hertfordshire in relation to water supply and waste water treatment.

2.3 The consultants commissioned to conduct the study were Arcadis Consulting UK Ltd (Arcadis). They were commissioned to produce a strategic assessment of water infrastructure in Hertfordshire with evidence to support planning for growth over the next 35 years. Arcadis facilitated collaboration within the partnership through consultation and

engagement. This involved the collection of data, agreement of assumptions and provided a level of transparency across the partners for all aspects of development and water utility planning.

2.4 The study is expected to be completed in late autumn 2017 and will be published by all partners when it has been agreed. The main conclusions of the consultant's report are that there is existing water supply and waste water capacity to meet growth currently planned for within the current round of local development plans to 2031. However, additional work and investment will be needed to service growth levels that are being anticipated for the period 2031 to 2051.

3. Recommendation

3.1 That the Panel note the content of this report.

4. Background

4.1 The Hertfordshire Water Study examines the impact of future development and housing growth on the long-term infrastructure planning issues associated with water supply and waste water management. This study looked at long-term housing growth to determine what, if any, infrastructure issues would arise from growth already allocated in Local Plans as well as that likely to take place beyond the current timeframes. The study will provide an evidence base for the current round of local plans and a guide to future infrastructure needs beyond the current plan periods. This will assist in ensuring that any barriers which might prevent the long-term delivery of housing growth can be appropriately considered. The study will also form the basis for Hertfordshire submissions to the 2019 round of water resource plans being produced by Affinity Water, Thames Water and Anglian Water which will be due for submission in mid-2018.

4.2 The partnership for the Hertfordshire Water Study includes the key organisations responsible for facilitating urban development, managing water utility provision and protecting the water environment in the county. These were the County Council, 9 of the 10 District and Borough Councils (excluding Broxbourne who chose not to take part), the Hertfordshire LEP and the statutory water undertakers that operate in the county, Thames Water, Anglian Water and Affinity Water, and the Environment Agency. In addition, following a request from the Environment Agency Chiltern District Council were added to the partnership as they were facing similar infrastructure concerns as the Hertfordshire local planning authorities.

4.3 Within Hertfordshire, sewerage and wastewater treatment is jointly managed by Thames Water Utilities Ltd and Anglian Water Services Ltd (Anglian), while water supply is provided by both Thames Water

and Affinity Water Ltd (Affinity Water). Infrastructure planning for water supply and waste water management is undertaken on a five-yearly basis as part of the national price review process undertaken by the Office of Water Regulation (OFWAT). The findings of the Hertfordshire Water Study will feed into the response to the upcoming price review process, PR19.

4.4 Following procurement, Arcadis Consulting (UK) were commissioned by the Council to undertake a strategic assessment of water infrastructure to provide project partners, including local districts and the Water Utility Companies, with evidence to support planning for growth over the next 35 years. Arcadis were selected to undertake the study because of their experience in working within the water sector and the methodology being proposed to look at the future infrastructure needed to support housing growth in the medium to long term. . Arcadis Consulting UK Ltd (Arcadis) facilitated collaboration within the partnership through active consultation and engagement.

4.5 Local development planning within Hertfordshire is undertaken by the 10 district and borough councils. The various local planning authorities are all at different stages in the development of their local development plans; however, the majority of them had similar concerns about future water supply and waste water treatment capacity. Chiltern District Council, within the neighbouring county of Buckinghamshire participated in the study as they share a range of common issue in relation to capacity at the Maple Lodge Sewerage Treatment Works (STW) the catchment of which serves a large proportion of South West Hertfordshire.

4.6 The Partnership provided a mechanism for gathering data and information, consulting on outcomes and agreeing the basic study assumptions on how growth was to be projected and assigned to specific locations up to 2051. The key to the project was to work collaboratively in order to obtain information on the scale and location of future housing growth. The primary outcome of the study is the development of an evidence base which provides statutory plan makers with the information to prepare plans and strategies. Data to analyse growth was gathered from Local Plans with any anticipated development beyond the plan periods (up to 2051) being derived from housebuilding and population projections.

4.7 This data fed in to the development of low, medium and high-level growth scenarios broken down to the catchment scale[1] for water supply and waste water infrastructure, these are then provided to water companies to be fed into their high-level numerical and hydraulic modelling systems. The water company's modelling then looked at the infrastructure impact of these different growth scenarios to determine

[1] A catchment represents the spatial area that is served by the strategic water supply or waste water network. The wider water infrastructure network is broken down into catchments to enable effective management of the network.

what levels of investment and support may be necessary to ensure that growth could be delivered. This has led to an understanding of current and future system capacity, and the potential impacts of growth.

4.8 The study's modelling has taken account of various scenarios, including environmental changes such as drought and flooding. Short and long term issues have been factored in to the modelling process to anticipate extreme changes, especially anticipated growth up to 2031. It has also explored strategic solutions to address potential future deficits for three growth scenarios (low, medium and high) over three time periods (2021, 2031 and 2051) for both wastewater and water resources.

4.9 The consultant's study, their conclusions and main recommendations were reported to the Hertfordshire Infrastructure and Planning Partnership (HIPP) on 22nd March 2017. At this meeting, the study conclusions were reported and the main recommendations, which are focused on the need for any ongoing work, were agreed in principle subject to the final study report being agreed and signed off by all partners.

5. The Hertfordshire Water Study Conclusions

5.1 Due to the importance of water infrastructure to serve future growth it was essential to define precisely what the study conclusions mean and what they don't mean. A summary of the conclusions and what they mean is set out in table A1 in Appendix 1 of this report. In addition, a summary of what the conclusions do not imply is set out in Table A2 in the same Appendix.

5.2 The Hertfordshire Water Study has delivered the following outcomes:

- The modelling has enabled an understanding of system capacity across all partner local planning authorities broken down to local authority boundaries and by water catchment. This will include some understanding of neighbouring areas, including Broxbourne, to ensure that the impact of growth in neighbouring areas has been accounted for;
- From this, there is now a geographical understanding of infrastructure 'need' and this is provided with summaries for each district area;
- This enabled the creation of sub-catchments to understand future infrastructure requirements which have an impact across district boundaries;
- The strategic understanding of water infrastructure need will assist with the preparation of Local Plans and provide clarity where there has been uncertainty about the ability to deliver future growth in terms of water supply and disposal;

- The study, and the partnership created, has provided the means to engage the water utility companies more effectively in the local plan making process;
- The options identified will input to the development of water supply and waste water management infrastructure in the county and provide a basis for Hertfordshire's input to the next round of water resource plans being developed as part of the PR19 process.
- Confirmation that there is available water supply to support projected levels of growth in the current round of local plans.
- That waste water treatment capacity is available to support current growth levels to 2031, but investment in capacity will be required to service growth beyond that period.

5.3 The study conclusions are that there is enough water supply and sufficient waste water capacity to service expected growth levels to 2031. This reflects the water companies current water resource plans and their ability to adjust these over the short to medium term. It also assumes that the approach being taken at present to try to reduce demand for water in the county will meet with success. In addition, the water supply companies are able to bring in additional resources from sources such as Grafham Water to service increased demand should that be necessary. The improvements required for waste water infrastructure to 2031 and the investment necessary to achieve this are all considered to be within normal working practices and can be achieved with the necessary lead in times. Furthermore, the opportunity to adjust the approach within the next cycle of water resource planning gives sufficient flexibility for the period to 2031. The partnership including Hertfordshire County Council will be able to communicate concerns at these opportunities and assist with the development of water infrastructure.

5.4 Deriving growth projections at the district level to 2051, using Local Plan figures and regional projections has shown that ensuring adequate water infrastructure capacity is critical to support the projected growth beyond the period covered by the current round of local plans, 2031 and beyond. Understanding water supply and waste water treatment needs up to 2051 has removed some of the uncertainties in the timings for new infrastructure needed to serve growth. The partnership has enabled a collaborative and strategic approach to water infrastructure in the county, although to effectively produce policy and plan for the future continued collaboration and more work will be required at the local level. Long term planning will be a constant dialogue between partners and a way of future proofing growth. There will be more water management rounds leading up to 2031, to assess resilience in the long term. This will enable partners such as Hertfordshire County Council the opportunity to communicate on growth and the capability of the water infrastructure in place.

5.5 Although residents in Hertfordshire will recognise that there has been drier weather over the last few years, and may question the

conclusions in the study. The Council has also been concerned that the constrained approach by the consultants in developing the report may not present a picture of the state of supply that would be recognised by those living in the county. Recent consultations by the water companies and modelling within the water study suggest the infrastructure is able to deliver, even with climatic changes and development growth up to 2031. The water companies are prepared for drought conditions and investment is already planned for, which will take account of concerns. As already stated above, the Council will continue to work closely with all those in the water study to ensure our water infrastructure is resilient for the coming years and our environment is protected. Partnership working has opened up communication channels and offers opportunities to express concerns, through the partnership.

5.6 The study has not provided all of the answers, additional work, principally to look at the period beyond 2031 will be necessary and this will need to be conducted at the local level. The scale and nature of the work to be undertaken jointly by the local planning authorities and the relevant water companies will be dependent upon the scale and location of growth. Within the study, these are known as Phase 2 investigations and these will be necessary to ensure that effective and resilient water infrastructure is available to support future growth in the county.

5.7 The study has highlighted five key recommendations and these are summarised in the table below:

	Action Point	Summary of potential implications
1	The creation of a Water and Sewerage Infrastructure Delivery Partnership for Hertfordshire.	This would be formed from the current Study Partners and bring in other local authorities and private. The partnership would have the responsibility to take forward the Study's recommendations. Evidence from elsewhere (e.g. the GLA's role in London's water infrastructure planning) suggests that this would improve Hertfordshire's collective standing with the water companies in such matters.
2	Development of an Integrated Planning Portal and a Single Point of Contact on water matters.	One of the current weaknesses identified by the Study is the limited arrangements to share technical data on proposed development locations, water and sewerage infrastructure, groundwater conditions etc. and that this hinders the process of planning for growth and the understanding of its implications in water and sewerage infrastructure terms. Another consideration is the potential establishment of a single point of contact to act as liaison between relevant bodies
3	Integration of risk profiling into local	Profiling would help emerging local plan growth strategies to be assessed for their risk in terms of

	Action Point	Summary of potential implications
	growth planning.	impact on the existing water and sewerage network. This would allow water companies to co-ordinate investment against the growth strategy, which would improve the timing of such investment in future Asset Management Plan periods (which operate in 5-year tranches).
4	Exploration of Long Term Funding Opportunities	Notwithstanding water companies' willingness to match investment against future growth needs this investment is recognised as being essentially short term and reactive. One of the Study recommendations is to seek ways of to secure long term investment particularly at the pan district, sub catchment level.
5	Planning for Asset Management Period 7 (2020 – 25) and the forthcoming Price Review Mechanism (PR19)	The Study recommends a second phase of work to assist the water companies in planning for the next Asset Management Period (AMP 7 2020 – 25), particularly in relation to the water companies review of the health and performance of their network, although it will also assist infrastructure investment planning beyond that period. This will be of value to local planning authorities in future proofing the latter phases of their emerging and adopted local plans

5.8 To assist taking forward these recommendations, the Council has agreed to initially act as the main point of contact for water matters in the county and will work to develop the partnership. This work will be based in the Environment Department and will be undertaken by officers in the Environmental Resource Planning and Strategic Land Use Planning teams. In addition, the Council has agreed to co-ordinate input to the AMP7 and PR19 processes for the three main water companies operating in the county. Finally, to support the current round of local plans the county council and the Environment Agency have agreed to represent the work of the Water Study at any local plan inquiries should that be necessary.

6. Regulation of the Water Companies AMP7 and PR19

6.1 The water industry operates on five-yearly investment cycles called AMP periods, with the next cycle being AMP7. Through this process prices for services, both water supply and waste water management are set by Ofwat (the Water Utility Company regulator) at the beginning of each period and the level of investment that Water Utility Companies can make are determined. The price setting process is also known as the price review and the latest review, PR19, will coincide with AMP7 period.

6.2 Ofwat have recently consulted on the approach to PR19 and this finished on 30 August 2017). The final results of PR19 will be

published in December 2019 and will operate for the five year period 2020 to 2025. The water companies are now beginning their consultations on the water resource plans that they will submit to Ofwat as part of the AMP7 and PR19 processes and the local authorities will be a key consultee in this process as it takes place in 2017 and early 2018.

6.3 To ensure that the necessary investment identified as required by the Water Study is forthcoming the county council will be coordinating a response to the AMP7 and PR19 consultations using the findings from the study as the basis for a Hertfordshire response. This response will be coordinated through HIPP but will also allow scope for each partner to make their own bespoke response should they wish to. The Panel will get an opportunity to review and input to the county councils' submission to the water resource plans being put forward by those water companies that serve the county at the appropriate time.

6.4 In addition, the information and modelling undertaken by the study will assist the water utility companies to update their information on development to plan for their next five-year investment cycle. This study will also assist water companies to participate in the local planning process through a better understanding of growth and Local Plans. The local planning authorities will also gain an understanding of the water resource management planning process and this will be more evident through any collaborative work that is necessary on phase 2 of the water study. It should be noted that any necessary phase 2 works will be the responsibility of the local planning authority as it will need to be conducted at a very local level.

7. Next Steps for Hertfordshire County Council

7.1 To assist the completion of the water study and facilitate the findings in to the local plan considerations and the AMP7 and PR19 processes, the Council has agreed to the following actions with the partners from the study:

- To assist with the publication of the completed Water Study by Autumn 2017;
- As a lead partner, theCounty Council will lead and work with partners to pursue the actions listed above to ensure the recommendations within the study are carried forward;
- To continue to help manage partnership working and where appropriate assist the partnership with future initiatives;
- To lead on the Hertfordshire response and input in to the water management resource process of AMP7 and PR19;
- Phase 2 investigations into specific water resource issues will need to be coordinated by the respective districts. The Council will endeavour to support and provide assistance where necessary; and

- The Council has offered to appear at local plan examinations to explain the technical detail underpinning the Study's conclusions where this is requested by the inspector.

8. Financial Implications

8.1 The Hertfordshire water Study has been funded by each of the partners involved with the study. The District and Borough Councils (apart from BBC) have each contributed £3,500 to the study, the Council and the Environment Agency £10,000 each and the Hertfordshire LEP £30,000. The water utility companies have provided in-kind support through their activities to model the growth scenarios tested within the study.

8.2 There are no financial implications arising from this report, additional activity to support the findings of the study are being met from existing resources.

9. Equalities Implications

9.1 When considering proposals placed before Members it is important that they are fully aware of, and have themselves rigorously considered the equality implications of the decision that they are making.

9.2 Rigorous consideration will ensure that proper appreciation of any potential impact of that decision on the County Council's statutory obligations under the Public Sector Equality Duty. As a minimum this requires decision makers to read and carefully consider the content of any Equalities Impact Assessment (EQiA) produced by officers.

9.3 The Equality Act 2010 requires the County Council when exercising its functions to have due regard to the need to (a) eliminate discrimination, harassment, victimisation and other conduct prohibited under the Act; (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it and (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it. The protected characteristics under the Equality Act 2010 are age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion and belief, sex and sexual orientation.

9.4 No EqIA has been undertaken in relation to this report.

Background Information

HERTFORDSHIRE WATER STUDY 2017: Infrastructure & Resources, Sub-catchment Solutions (2021 – 2051); draft report, March 2017

Appendix 1

Table A1: Issues covered by the Hertfordshire Water Study

What the Study covers	
Area covered	**Comment**
Long term network resilience	This has never been attempted before – the current water industry setup and funding model considers this on essentially a short term basis
The impact of growth on a collectively agreed long-term growth strategy	Local authorities were asked to define where they consider growth would most likely be located over the period 2021 – 51 for the purposes of modelling the impact of that growth.
Where there are long-term pressures in the system	Based on the long-term strategy, the Study has been able to identify where the water infrastructure network (both connections and treatment works) comes under pressure and crucially when.
Where there is long-term water infrastructure capacity.	The Study also identified where growth could be located to take advantage of spare water infrastructure capacity and reduced long-term investment costs, whilst also readily recognising that for other reasons, development in this location might not be appropriate.
Water infrastructure considerations not parochially dealt with but examined across the whole Study Area	Whilst there have been studies exploring wider than district issues in the county (e.g. for Rye Meads sewage treatment works) the Study takes this to a county level.
Infrastructure planning on a sub-catchment basis	Many studies focus on administrative boundaries only; though these are important considerations picked up by the Study, it also considers infrastructure needs in each of the 15 sub-catchments identified for Hertfordshire.
Infrastructure needs based on a range of population growth scenarios	One of the critically important aspects of the Study is that it does not look at long term growth one dimensionally but considers the 'what if', specifically it builds in low, medium and high population growth scenarios to enable sensitivity testing.

Table A2: Issues not covered by the Hertfordshire Water Study

What the Study doesn't cover	
Area not covered	**Comment**
The study does not render invalid any current or emerging growth strategy.	It was not the intention of the Study to challenge any growth strategy and there are established liaison mechanisms in place between LPAs and water companies on local plan issues. The Study does not suggest any capacity issues that are not capable of being overcome in the plan period without the appropriate level of investment.
The study does not propose that long term growth should be sited in any one particular location within specific districts in accordance with the assignment of growth that was tested.	The growth scenarios that have been tested (a 2021 baseline, and then a 2031 and 2051 assignment of growth) have been discussed and agreed with the districts for the purposes of modelling only. The Study makes it clear that the assignment of long term growth is for this purpose alone and should not be taken as any more than this, there are heavy caveats throughout the final report but particularly in any mapping that provides a visual presentation of growth locations.
The study does not say where development should or should not go	Again, this is not the intention of the report, no constraints on growth will be imposed as a result of Study outcomes, although it is important to note that some locations will require greater technical solutions and incur higher infrastructure costs than others.
No infrastructure costings are provided.	As a high level study of long-term growth, the Study was never able to go into detailed costings and after consideration it was decided any 'finger in the air' indicative costings would run the risk of being inaccurate and therefore misleading. The opportunity to address such considerations arises in any Stage 2 work that may need to be undertaken.
There is no suggestion that provision of water infrastructure should be the principal determinant of growth	There is a clear recognition that water infrastructure provision is only one of a number of considerations that will determine where future sustainable development should be sited. Just because growth could take place in one location to take advantage of spare network capacity, it may be inappropriate for a number of other reasons.

Appendix 48: Hertfordshire County Council Environment, Planning and Transport Cabinet Panel 1 November 2017 – Hertfordshire Water Study Presentation

HERTFORDSHIRE WATER STUDY

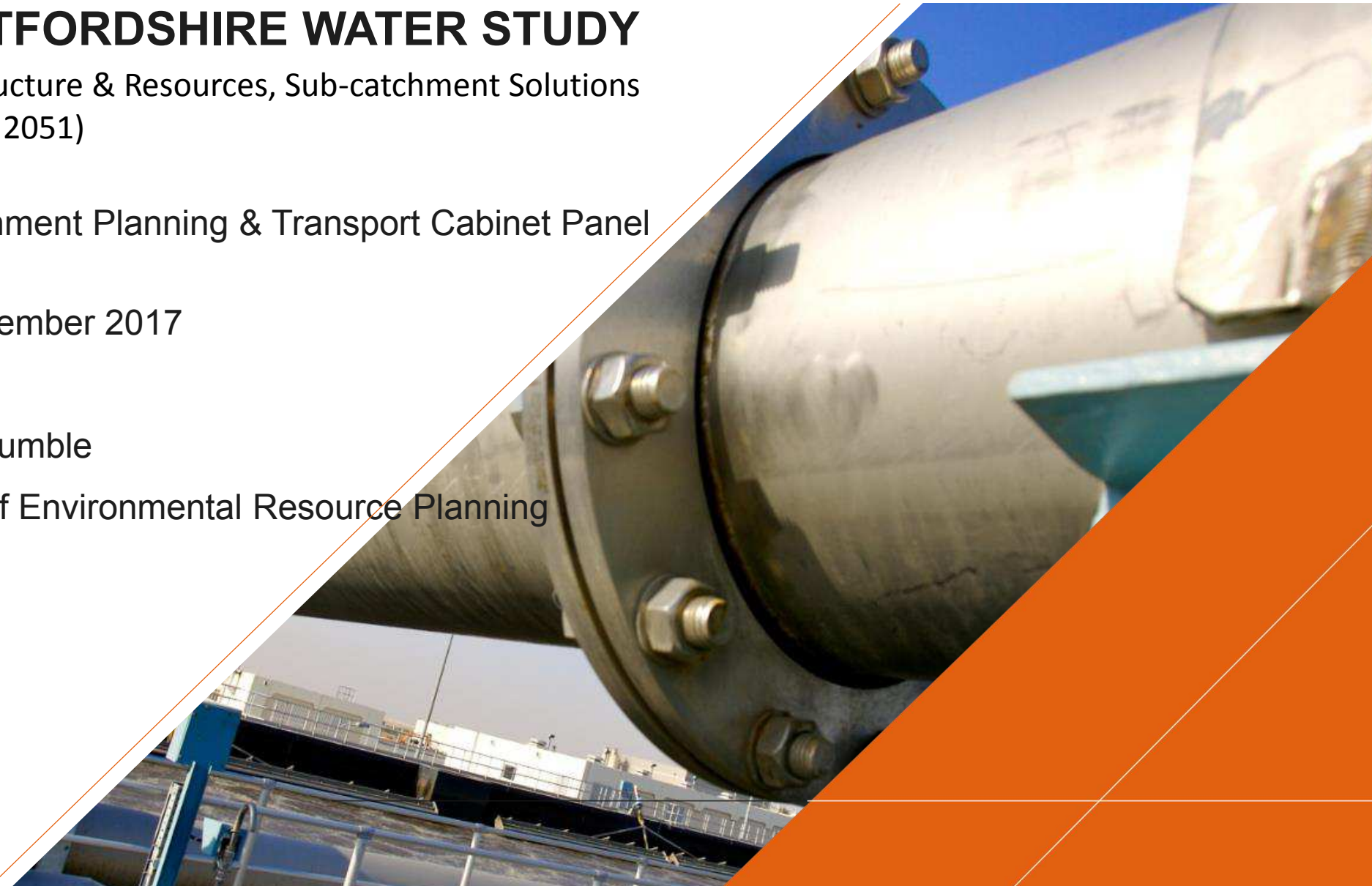
Infrastructure & Resources, Sub-catchment Solutions
(2021 – 2051)

Environment Planning & Transport Cabinet Panel

1st November 2017

John Rumble

Head of Environmental Resource Planning



Background

Key dates

- 2012 – potential drought, then 18 months of rain!
- 2013 – Hertfordshire Water Summit
- 2014/15/16 – Flooding
- 2017/18 – Drought, flood or both?

Issues

- High demand for water
- Demand reduction programmes
- Quality of water in the environment
- Uncertainty about growth and future demand for water services
- Water infrastructure planning and spatial planning process misaligned.

Project objectives

- To identify how current water infrastructure could affect future growth levels;
- To identify water infrastructure required to support the scale of development in the county,
- To identify any environmental impacts arising from the development of water infrastructure;
- To identify options to meet infrastructure needs, and the investment required;
- To set out policy options to remedy any shortfalls in infrastructure provision

Study APPROACH

Understanding Growth Trends

- Future Time Horizons
- Clarify growth expectations through district consultations
- Create robust projections to 2051

Understanding Uncertainties

- Created uncertainty scenarios

Strategic view of Water Infrastructure

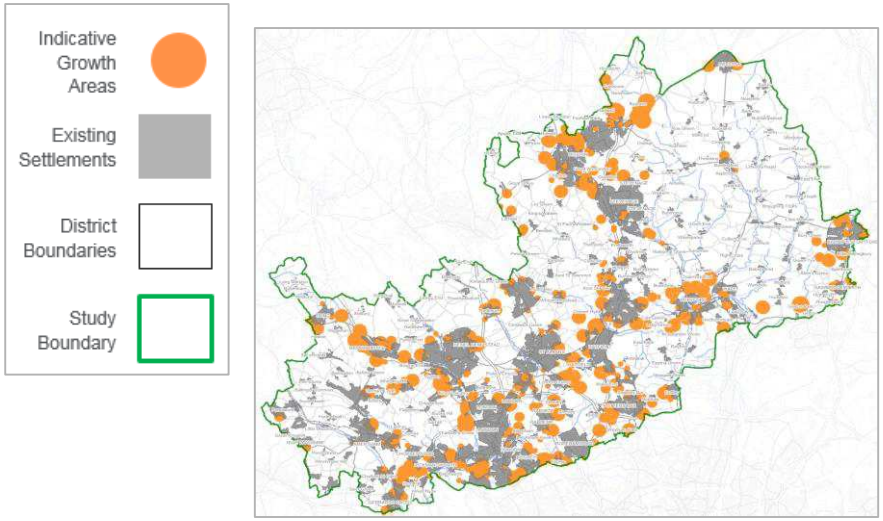
- Catchment based

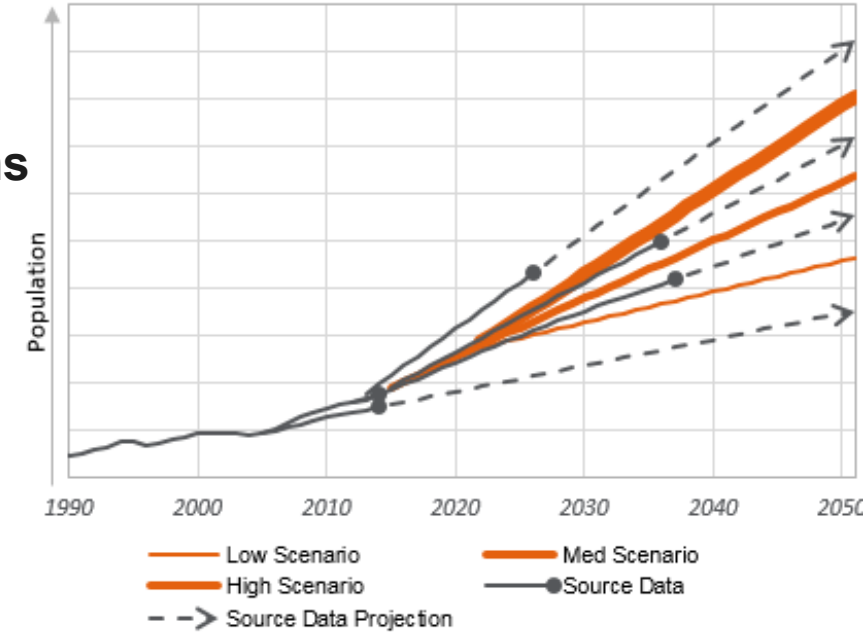
Identification of Water Infrastructure Options

- A ‘bottom-up’ approach applied

Future System Capacity and Potential Deficits

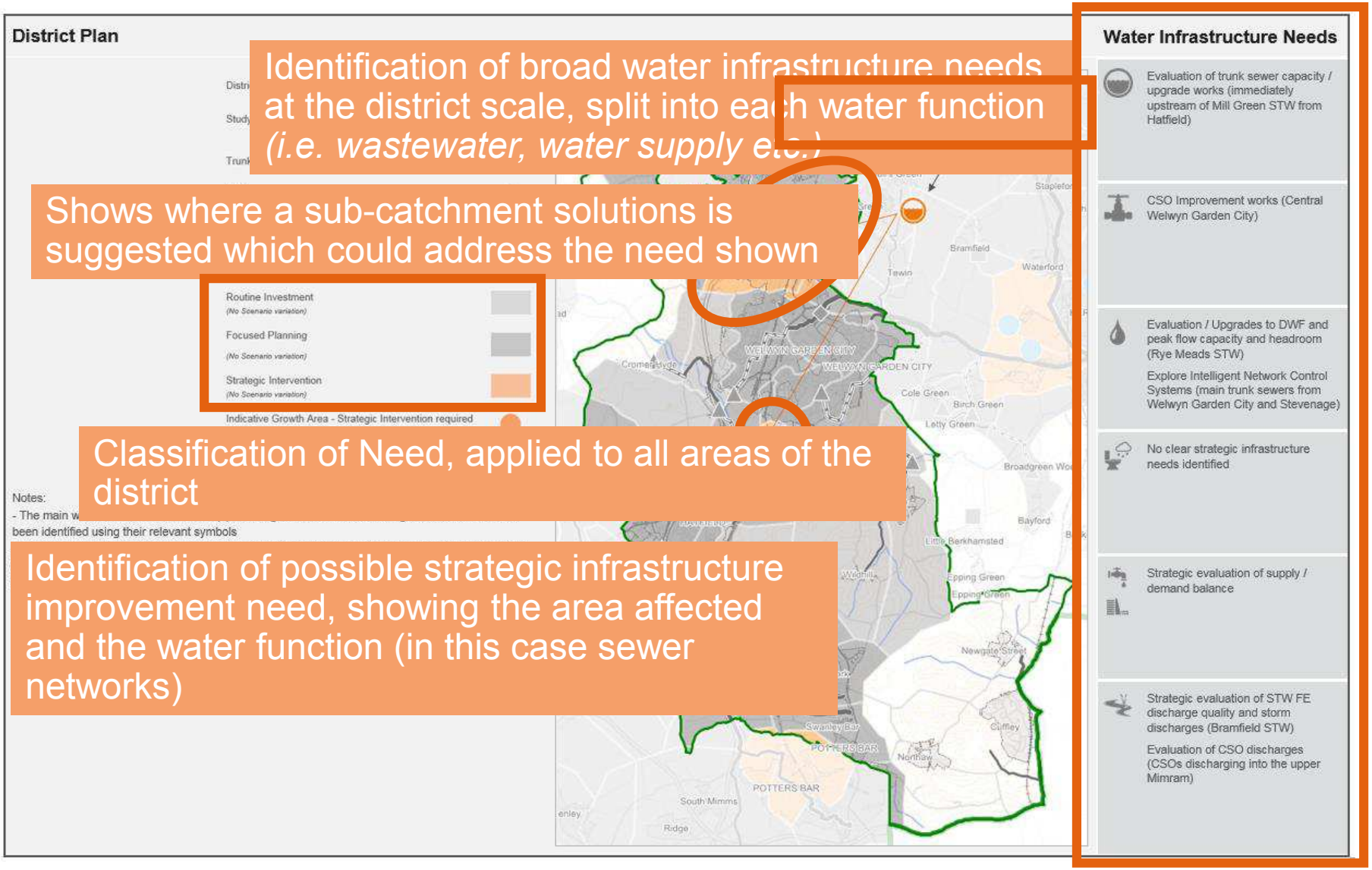
- Classification of Need





DISTRICT SUMMARIES

8.10.4 Welwyn Hatfield Classification of Need – Immediate Recommendations (2021)



Identification of broad water infrastructure needs at the district scale, split into each water function *(i.e. wastewater, water supply etc.)*

Shows where a sub-catchment solutions is suggested which could address the need shown

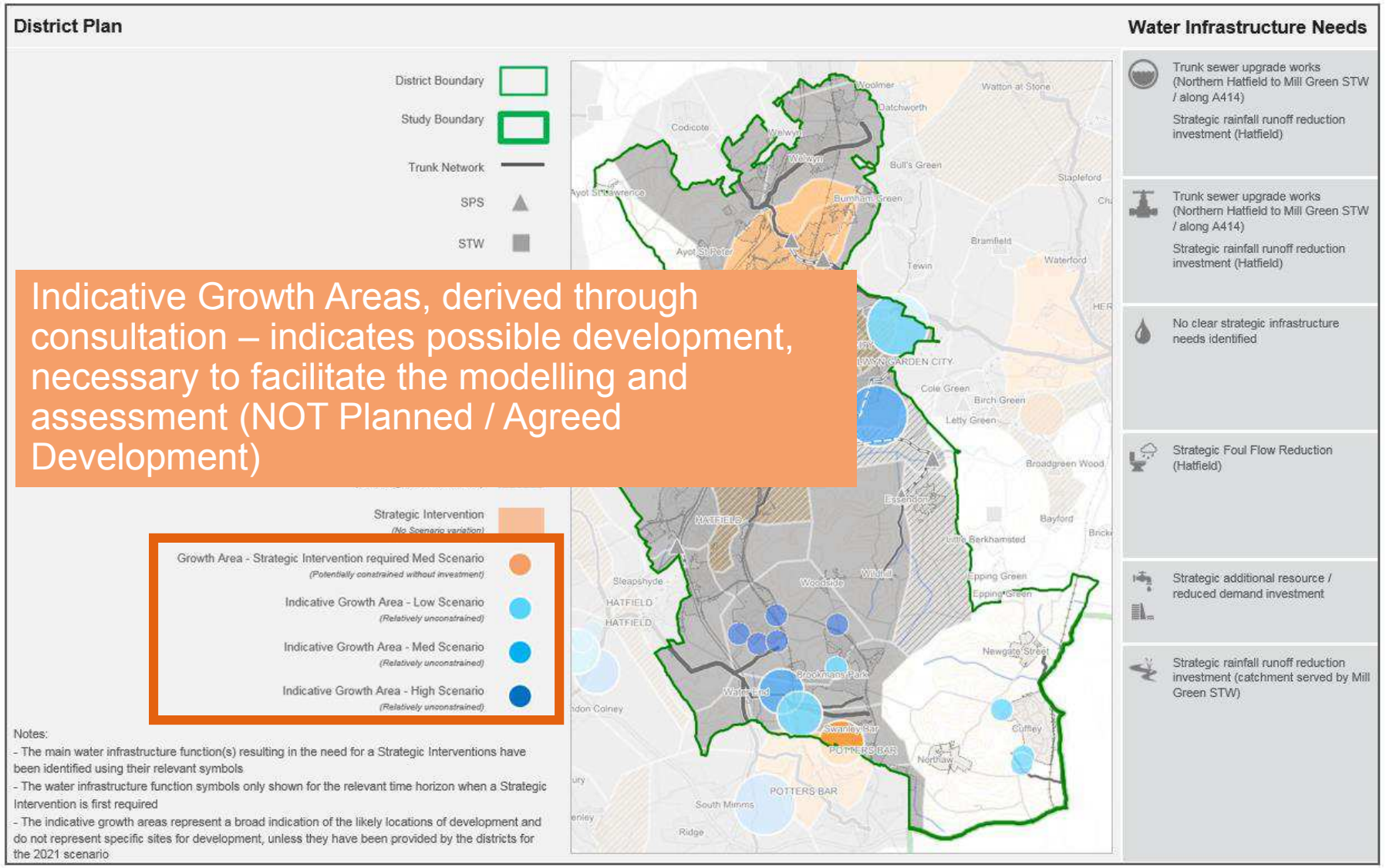
Classification of Need, applied to all areas of the district

Identification of possible strategic infrastructure improvement need, showing the area affected and the water function (in this case sewer networks)

DISTRICT SUMMARIES

8.10.5 Welwyn Hatfield Classification of Need – Recommended Medium-Term Investment (2031)

District Plan



Water Infrastructure Needs

- Trunk sewer upgrade works (Northern Hatfield to Mill Green STW / along A414)
  Strategic rainfall runoff reduction investment (Hatfield)
- Trunk sewer upgrade works (Northern Hatfield to Mill Green STW / along A414)
  Strategic rainfall runoff reduction investment (Hatfield)
- No clear strategic infrastructure needs identified
- Strategic Foul Flow Reduction (Hatfield)
- Strategic additional resource / reduced demand investment
- Strategic rainfall runoff reduction investment (catchment served by Mill Green STW)

DISTRICT SUMMARIES

8.10.6 Welwyn Hatfield Classification of Need – Suggested Long-Term Considerations (2051)

District Plan

District Boundary

Study Boundary

Trunk Network

SPS

Hashed areas indicate uncertainty within the projections

Routine Investment
(No Scenario variation)

Routine Investment / Focused Planning
(Low to High Scenario variation)

Focused Planning
(No Scenario variation)

Focused Planning / Strategic Intervention
(Low to High Scenario variation)

Strategic Intervention
(No Scenario variation)

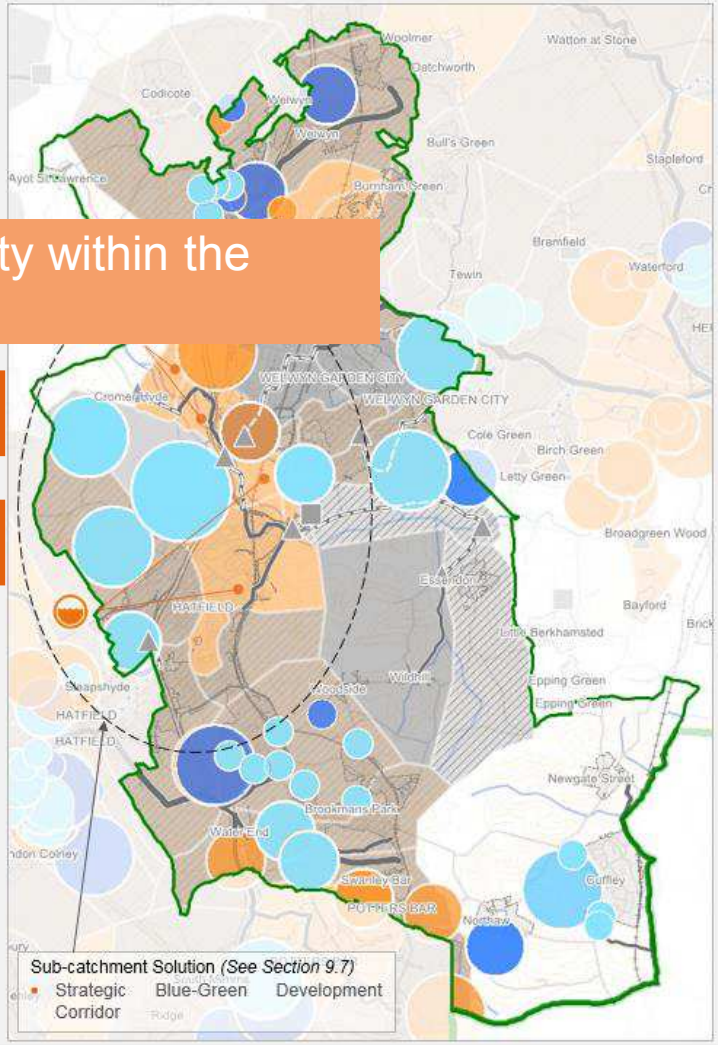
Growth Area - Strategic Intervention required Med Scenario
(Potentially constrained without investment)

Indicative Growth Area - Low Scenario
(Relatively unconstrained)

Indicative Growth Area - Med Scenario
(Relatively unconstrained)

Indicative Growth Area - High Scenario
(Relatively unconstrained)

Notes:
- The main water infrastructure function(s) resulting in the need for a Strategic Interventions have been identified using their relevant symbols
- The water infrastructure function symbols only shown for the relevant time horizon when a Strategic Intervention is first required
- The indicative growth areas represent a broad indication of the likely locations of development and do not represent specific sites for development, unless they have been provided by the districts for the 2021 scenario



Water Infrastructure Needs

Trunk sewer upgrade works (Northern Hatfield to Mill Green STW / along A414)

SPS upgrade schemes (Ayot St Peter and Cromer Hyde)

No clear strategic infrastructure needs identified

No clear strategic infrastructure needs identified

No clear strategic infrastructure needs identified

No clear strategic infrastructure needs identified

CONCLUSIONS

Main Conclusions

- Confirmation that current growth strategies are broadly robust
- Current water management and efficiency policies broadly robust and effective, specifically related to water supply
- Adequate water infrastructure capacity is critical to support the projected levels of growth
- Still a challenge to link long-term infrastructure planning with investment
- Continued partnership collaboration is necessary for robust long-term planning

Other Outcomes

- Potential need for a more self-reliant water resource strategy in the long-term
- Water Utility Company investment is reliant on robust understanding of growth plans and expectations
- Better understanding of impact of growth proposals on catchments
- Difficult to deal with uncertainties within the development planning process when defining growth
- Complexities of water systems will require Phase 2 work to clarify uncertainty and improve long-term planning
- Benefits of a collective voice for PR19

Appendix 49: Draft Hertfordshire Water Study 2017 – St Albans District Summary

ARCADIS Design & Consultancy for natural and built assets

Hertfordshire

HERTFORDSHIRE WATER STUDY 2017

Infrastructure & Resources, Sub-catchment Solutions (2021 – 2051)

MARCH 2017

8.6 St Albans

8.6.1 Assumptions & Projections

Detailed information on the derivation of population projections and growth strategies can be found in Section 6.1 and Appendix E. A summary of the projected population used in the modelling can be seen in Figure 45.

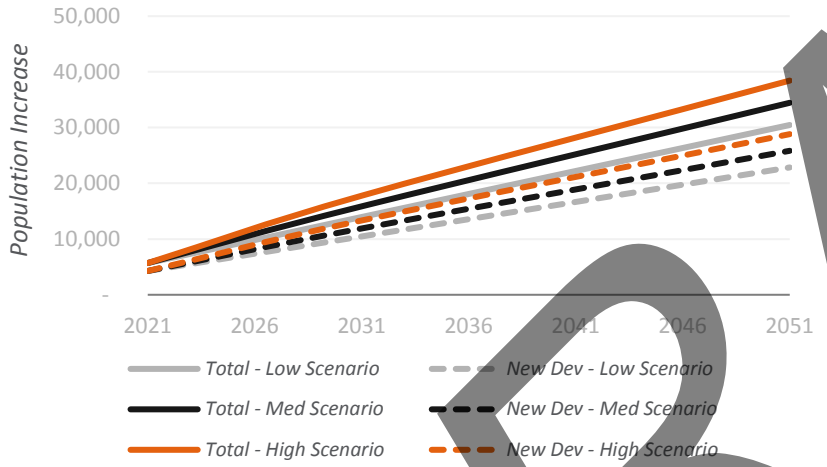


Figure 45 - Projected Population Increase for St Albans

Note: The 'New Dev' lines indicate the proportion of the total population projection that is expected to be delivered within new development sites, rather than within existing settlements (i.e. intensification / infilling)

Current planned and promoted development sites were provided by the districts and used to inform the creation of the indicative growth areas for the 2021 scenario, as detailed in Section 6.1.5. The split of population between identified sites, additional indicative growth areas (derived to apply remaining population not assigned to identified sites or intensification / infilling within existing settlements) and intensification / infilling of existing settlements can be seen in Figure 46.

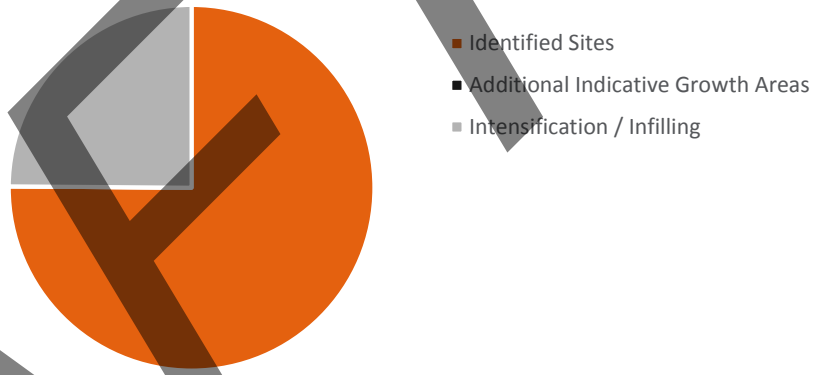


Figure 46 – Split Between Identified Development Sites and Other Types of Development Included to Apply the Projected 2021 Population to the Modelling for St Albans

Note: 'Identified sites' refers to the proportion of growth delivered by 2021 within defined geographical areas provided by the districts during consultation

The majority of the indicative growth areas (identified to facilitate the modelling) for the 2021 and 2031 scenarios are grouped into three areas, Harpenden, East Hemel Hempstead and east of Albans. By 2051, other indicative growth areas become focused to the southeast of St Albans (adjacent to Hatfield), south of St Albans, adjacent to Watford and around Redbourn.

The main outcomes from the evaluation of need for St Albans as follows:

- Any development proposals around the southern and eastern edges of St Albans are likely to require strategic intervention in 2051, potentially linked to large-scale trunk sewer upgrades
- The evaluation indicates a large degree of uncertainty in 2051, with the high scenario demonstrating strategic intervention could be required across the southern part of the district (mainly to improve the capacity

of Maple lodge STW and Blackbirds STW). This scale of intervention could require adaptation of local planning policies and / or construction methods to limit foul flows and promote large-scale water recycling

8.6.2 Sewage Treatment

Maple Lodge STW is predicted to require at least focused planning from 2021 onwards to ensure it can accommodate expected growth. Under the high scenario, strategic interventions could be needed to ensure it has sufficient capacity in 2051.

STWs	Scenario	2021	2031	2051
Maple Lodge STW	High			
	Med			
	Low			

Figure 47 – St Albans STW Classification of Need

Note: table only shows STWs which are predicted to require at least focused planning by 2051

8.6.3 Water Resources

The availably of water resources in St Albans is largely sufficient in 2021 but could require significant improvement by 2051, as with much of the county.

WRZ	2021	2031	2051
1			
2			

Figure 48 – St Albans WRZ Classification of Need

Note: More information on the location, name and extent of the WRZs can be found in Section 6.3.

8.6.4 St Albans Classification of Need – Immediate Recommendations (2021)

District Plan

District Boundary

Study Boundary

Trunk Network

SPS

STW

CSO

Routine Investment
(No Scenario variation)

Focused Planning
(No Scenario variation)

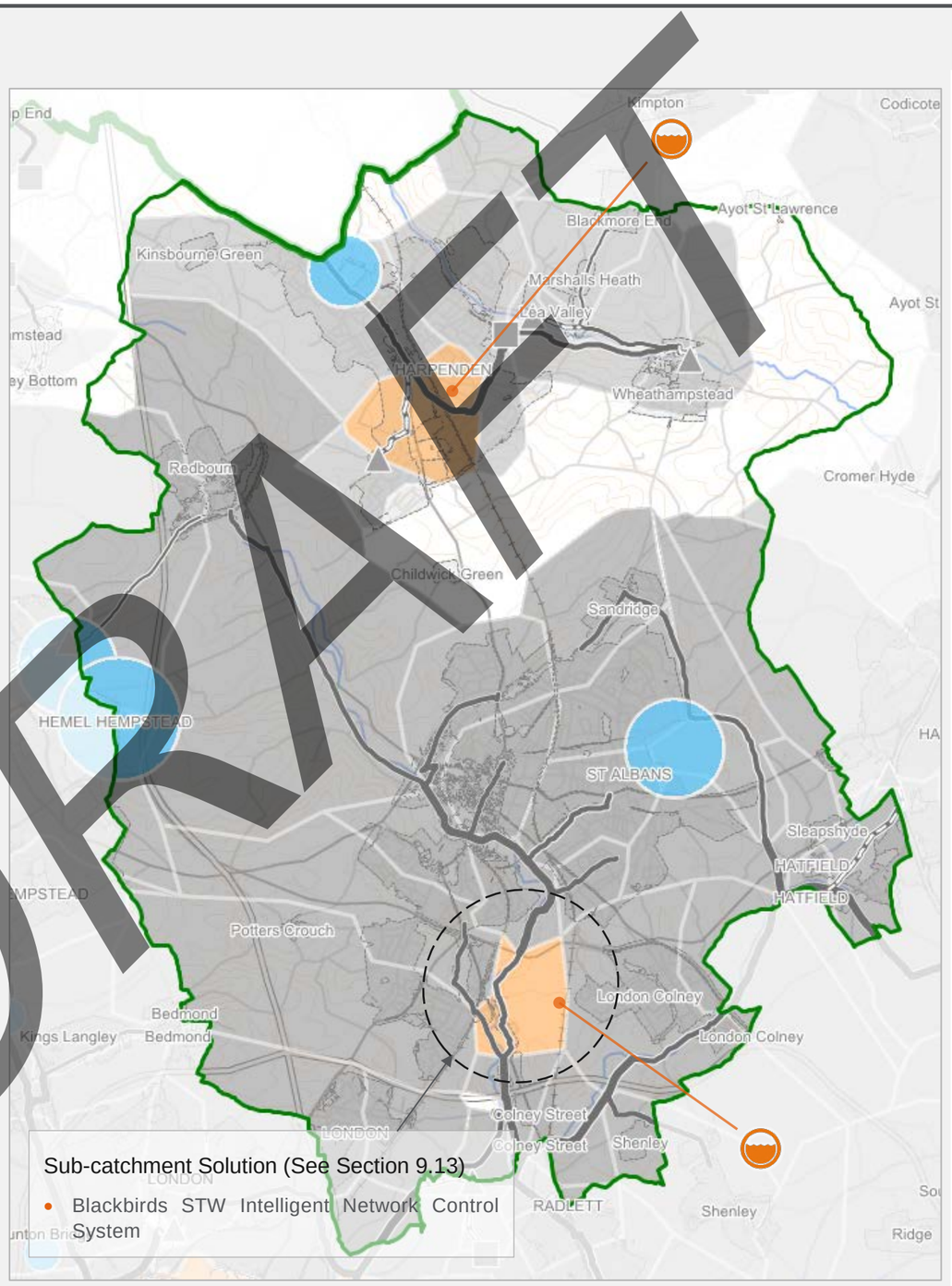
Strategic Intervention
(No Scenario variation)

Indicative Growth Area - Strategic Intervention required
(Potentially Constrained without investment)

Indicative Growth Area
(Relatively unconstrained)

Notes:

- The main water infrastructure function(s) resulting in the need for a Strategic Interventions have been identified using their relevant symbols.
- The indicative growth areas represent a broad indication of the likely locations of development and do not represent specific sites for development, unless they have been provided by the districts for the 2021 scenario



Water Infrastructure Needs

Evaluation of trunk sewer capacity (Hatching Green)

Evaluation of trunk sewer capacity (St Albans between A414 and M25)

Explore opportunistic rainfall reduction potential (St Albans)

No clear strategic infrastructure needs identified

Evaluation of DWF and peak flow capacity and headroom (Maple Lodge STW)

No clear strategic infrastructure needs identified

Strategic evaluation of supply / demand balance

No clear strategic infrastructure needs identified

8.6.5 St Albans Classification of Need – Recommended Medium-Term Investment (2031)

District Plan

District Boundary

Study Boundary

Trunk Network

SPS

STW

CSO

Routine Investment
(No Scenario variation)

Routine Investment / Focused Planning
(Low to High Scenario variation)

Focused Planning
(No Scenario variation)

Focused Planning / Strategic Intervention
(Low to High Scenario variation)

Strategic Intervention
(No Scenario variation)

Growth Area - Strategic Intervention required Med Scenario
(Potentially constrained without investment)

Indicative Growth Area - Low Scenario
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Indicative Growth Area - High Scenario
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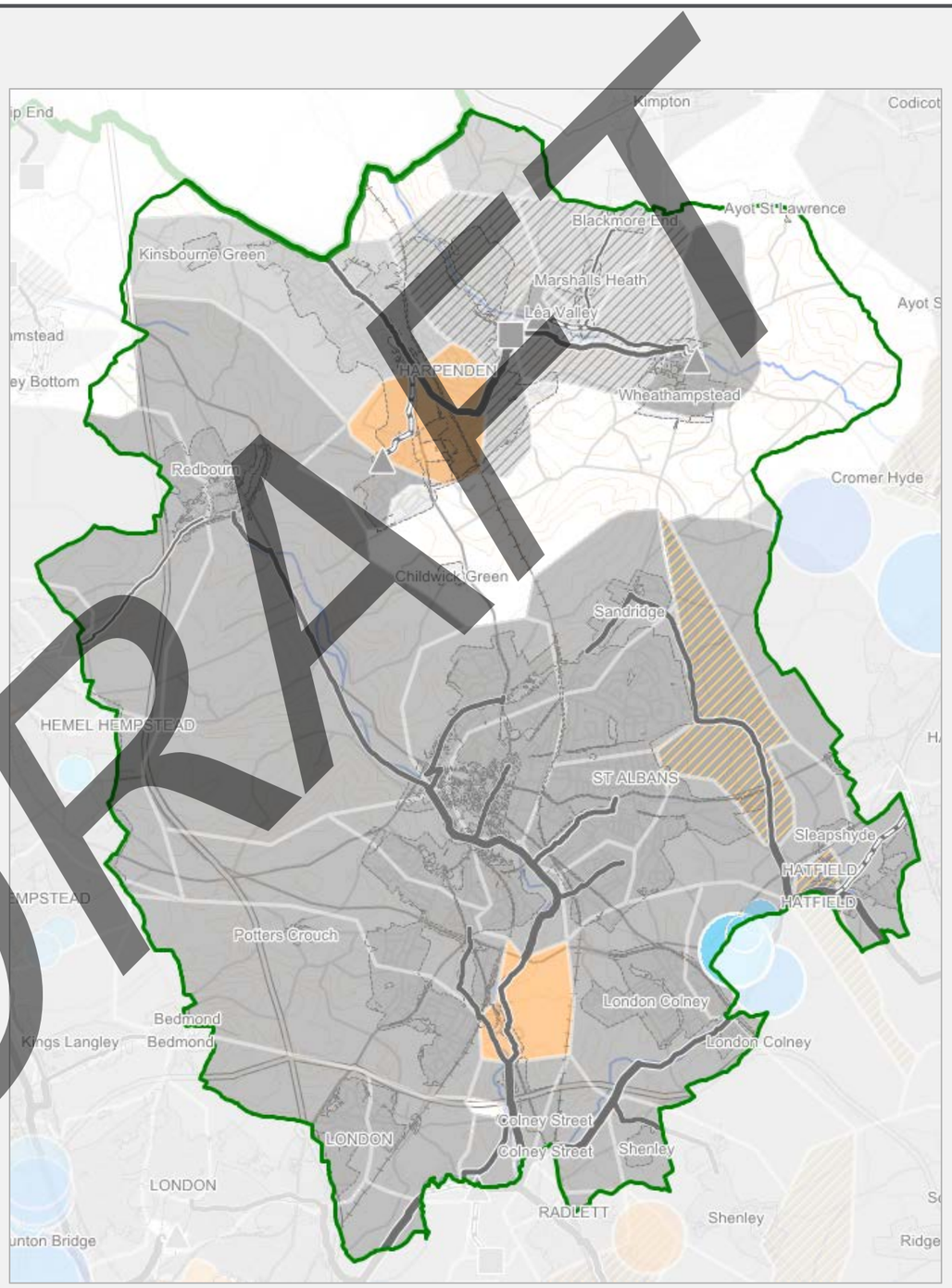

Notes:

- The main water infrastructure function(s) resulting in the need for a Strategic Interventions have been identified using their relevant symbols
- The water infrastructure function symbols only shown for the relevant time horizon when a Strategic Intervention is first required
- The indicative growth areas represent a broad indication of the likely locations of development and do not represent specific sites for development, unless they have been provided by the districts for the 2021 scenario

Water Infrastructure Needs

Targeted rainfall runoff reduction projects (Kinsbourne Green, west Harpenden, Hatching Green and Jersey Farm area)

Evaluation of DWF and peak flow capacity (SPS serving Hatching Green and Wheathampstead)

Strategic rainfall runoff reduction investment

DWF and peak flow capacity upgrade (terminal SPS on main trunk sewer to Blackbirds STW)

CSO evaluation / improvement works (CSOs in Borehamwood)

Upgrade of DWF capacity at Maple Lodge STW

Long-term foul flow reduction strategic for Hatching Green

Strategic evaluation of supply / demand balance

Strategic rainfall runoff reduction investment (catchment served by Harpenden STW / upstream of CSOs discharging to the Tykeswater)

8.6.6 St Albans Classification of Need – Suggested Long-Term Considerations (2051)

District Plan

District Boundary

Study Boundary

Trunk Network

SPS

STW

CSO

Routine Investment
(No Scenario variation)

Routine Investment / Focused Planning
(Low to High Scenario variation)

Focused Planning
(No Scenario variation)

Focused Planning / Strategic Intervention
(Low to High Scenario variation)

Strategic Intervention
(No Scenario variation)

Growth Area - Strategic Intervention required Med Scenario
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Notes:

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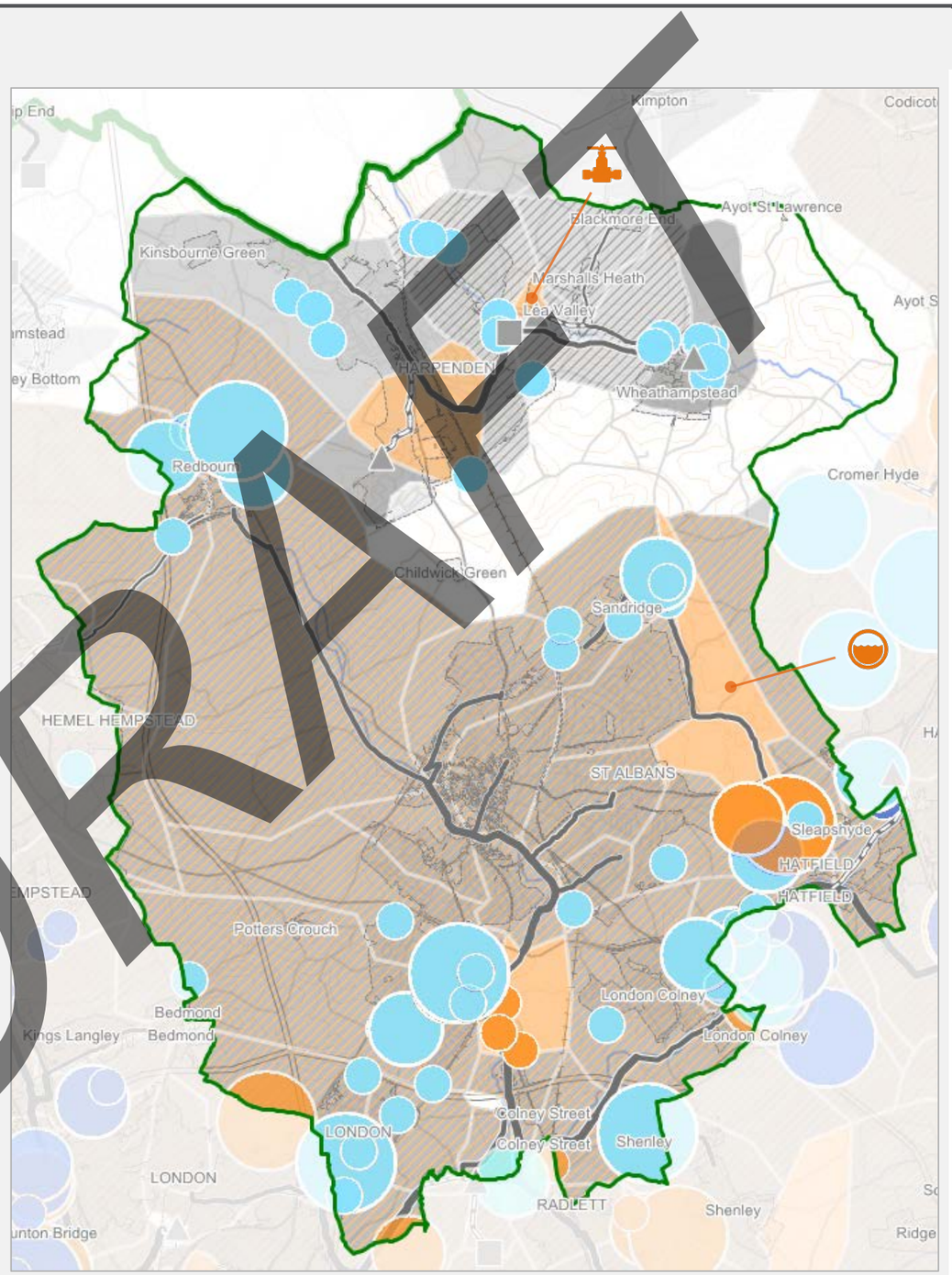


Water Infrastructure Needs

Evaluation of trunk sewer capacity / upgrade works (Hatching Green to Harpenden STW)

Targeted rainfall runoff reduction projects (Batford)

No clear strategic infrastructure needs identified

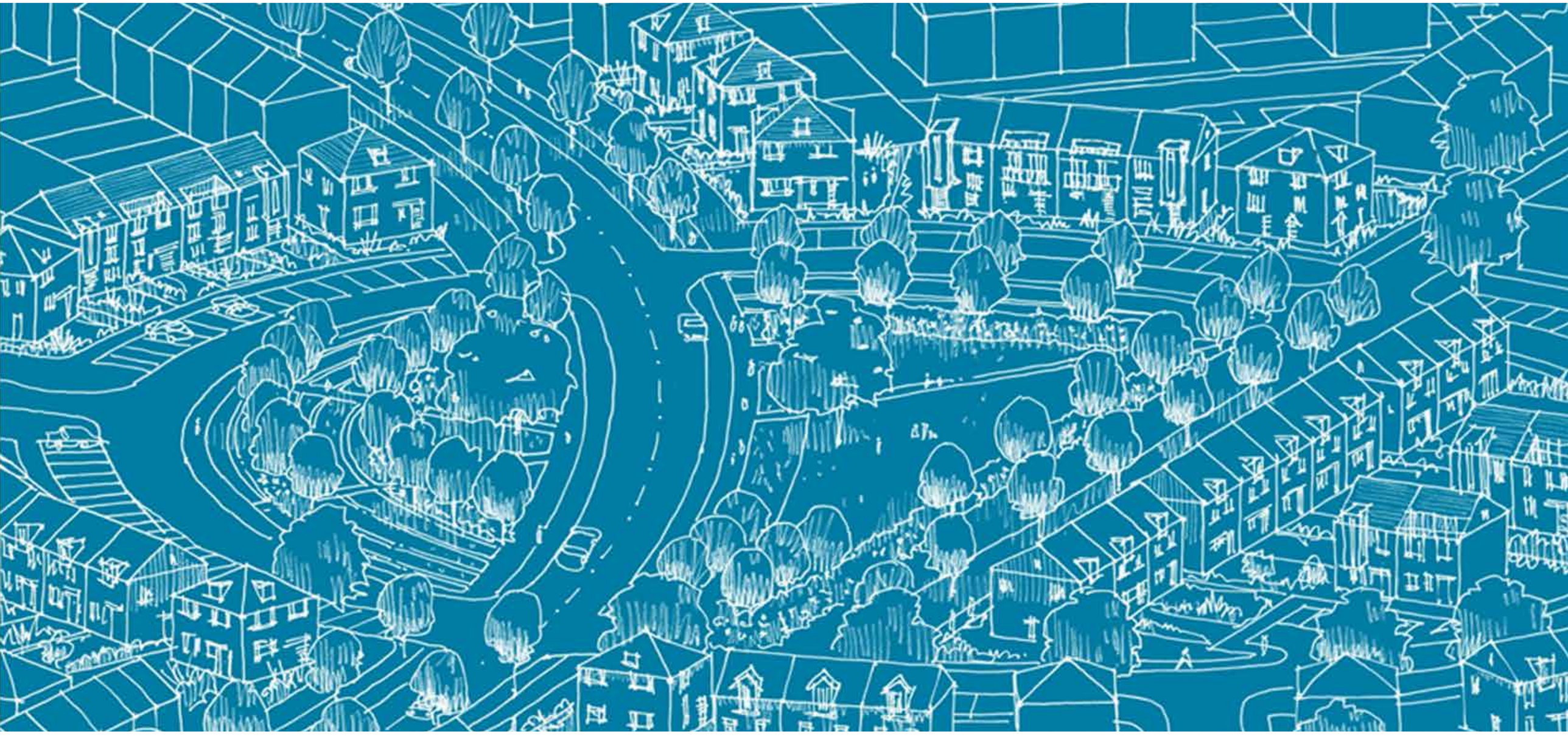
Opportunistic rainfall runoff reduction investment

Strategic additional resource / reduced demand investment

No clear strategic infrastructure needs identified

Education

Appendix 50: Education Facilities Extract of East Hemel Hempstead (North) Landowner/Developer Representations Regulation 19 Consultation (October 2018)



East Hemel: Reg 19 Representations Policy S6(i)

15861-RT-001 Rev3 Policy S6(i)- North
Prepared by Scott Brownrigg
15 Oct 2018

“Policy S6(i) East Hemel Hempstead (North) Broad Location :

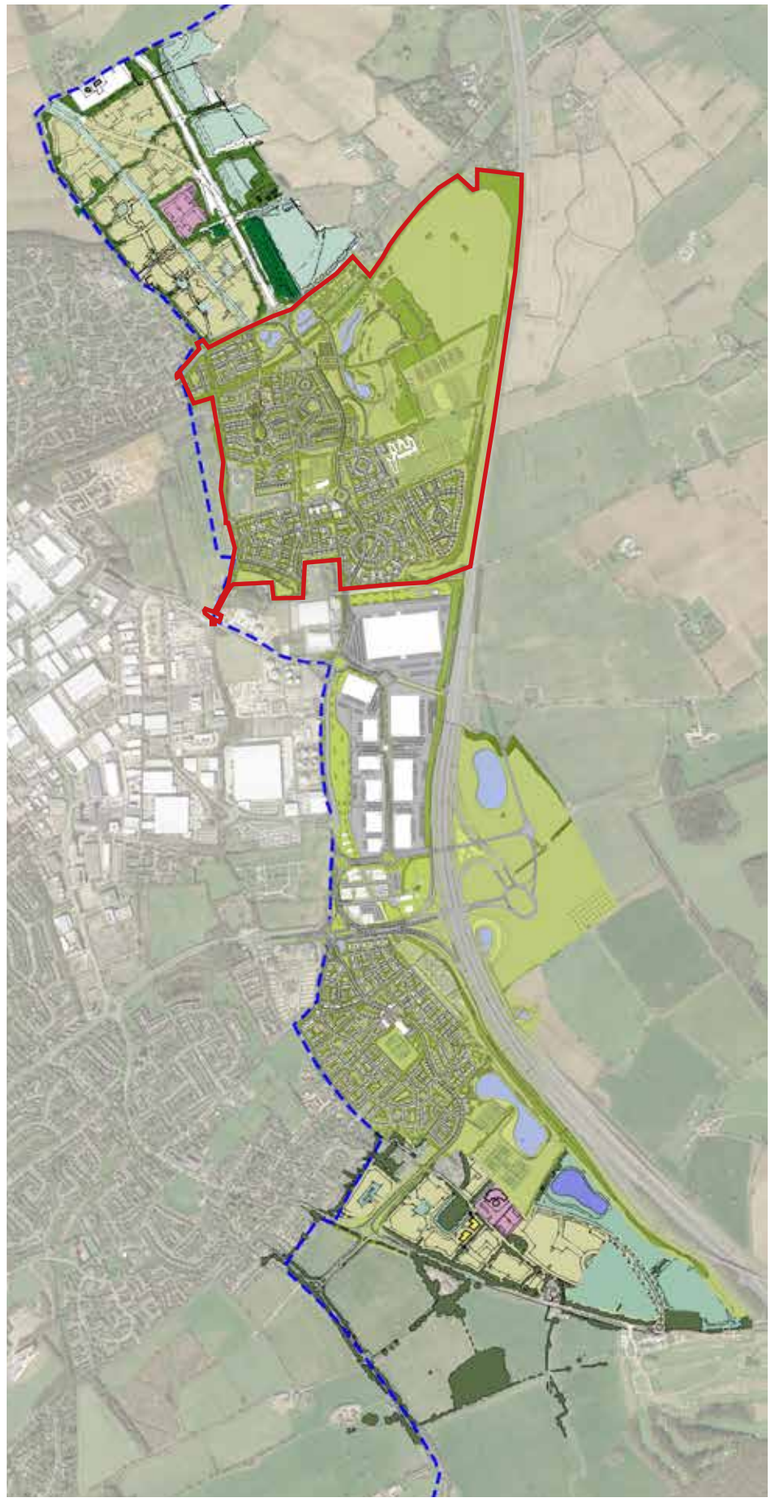
The Crown Estate (TCE) owns the freehold of the land necessary to deliver this Broad Location. Master plan work with St Albans Council has been proceeding for two years and it is intended to submit an outline application for the whole of S6(i) and S6(ii) and the northern part of S6(iii) in 2019. The master plan is well advanced and is shown here.

The planning application will deliver all the components of Policy S6(i) including:

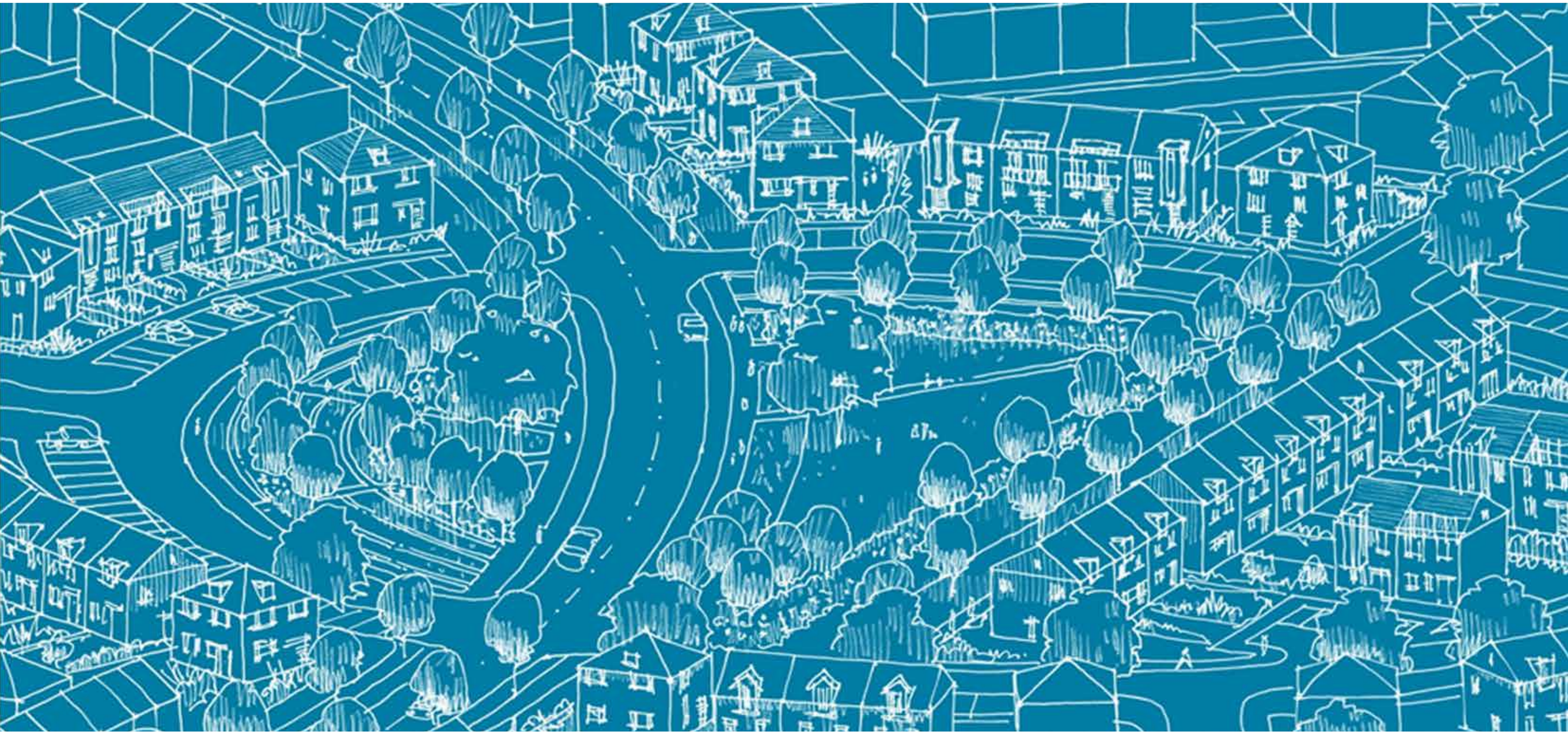
- 1,650 homes (including C2, C3 and special needs housing)
- 40% affordable housing
- a density in excess of 40 dph
- a 3 Form Entry Primary School
- an 8 Form Entry Secondary School
- a new Local Centre with a range of retail, recreational and community uses
- a new Country Park
- strategic and local open space
- a Community Management Organisation.

The Bigger Picture

East Hemel (North) Broad Location forms one of four Broad Locations which make up the Local Plan Reg 19 proposals for East and North Hemel. The Crown Estate and St Albans Council are jointly working on a comprehensive and integrated master plan for the whole of S6(i) to (iv) which will deliver around 5,550 new homes and 55 ha of new employment. The current version of this master plan is shown here and is capable of further extension west into Dacorum Borough if Dacorum's new Local Plan allocates further strategic housing releases across the northern edge of Hemel Hempstead. Together, these areas could form the 'Hemel Garden Community'.



Appendix 51: Education Facilities Extract of East Hemel Hempstead (South) Landowner/Developer Representations Regulation 19 Consultation (October 2018)



East Hemel: Reg 19 Representations Policy S6(iii)

15861-RT-003 Rev2 Policy S6(iii)- South
Prepared by Scott Brownrigg
15 Oct 2018

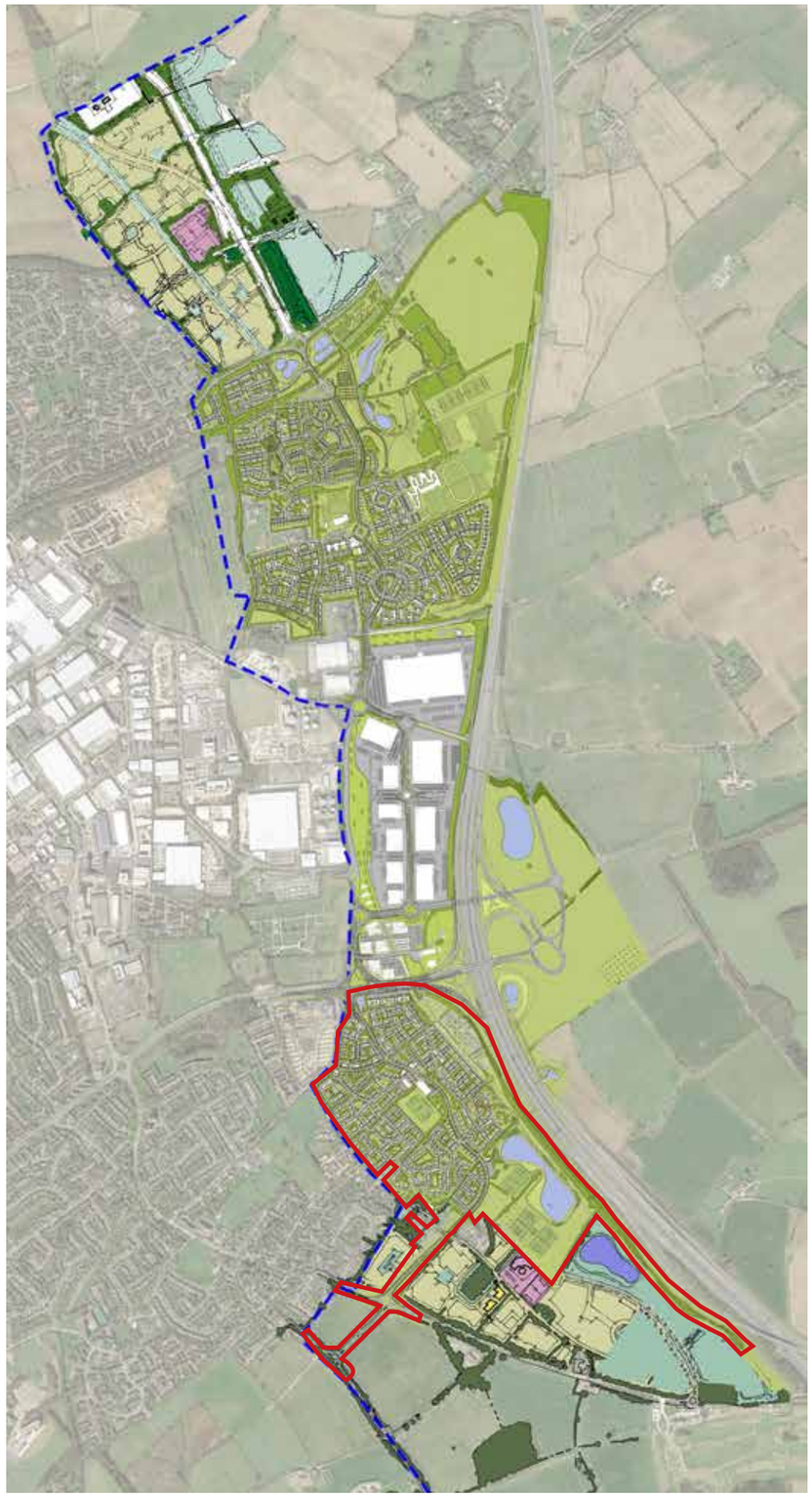
“Policy S6(iii) East Hemel Hempstead (South) Broad Location:

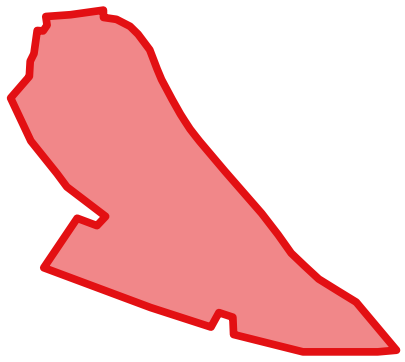
The Crown Estate (TCE) owns the freehold of the land necessary to deliver this Broad Location. Master plan work with St Albans Council has been proceeding for two years and it is intended to submit an outline application for the northern part of S6(iii) along with S6(i) and (ii)) in 2019. This will be followed by a planning application for the rest of S6(iii). The master plan is well advanced and is shown here.

- The two planning applications will deliver all the components of Policy S6(iii) area including
- 2,400 homes (including C2, C3 and special needs housing)
- 40% affordable housing
- a density in excess of 40 dph
- one 3FE and one 2FE primary school
- a Local Centre with a range of retail, recreational and community uses
- a new Country Park
- strategic and local open space
- a Gypsy and Traveller site
- a Community Management Organisation.

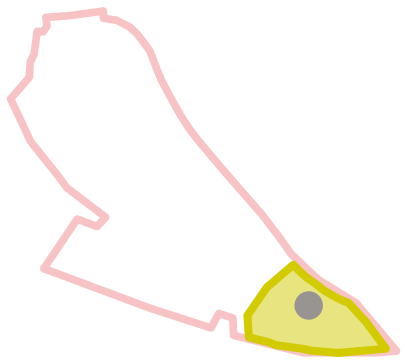
The Bigger Picture

East Hemel (South) Broad Location forms one of four Broad Locations which make up the Local Plan Reg 19 proposals for East and North Hemel. The Crown Estate and St Albans Council are jointly working on a comprehensive and integrated master plan for the whole of S6(i) to (iv) which will deliver around 5,550 new homes and 55 ha of new employment. The current version of this master plan is shown here and is capable of further extension west into Dacorum Borough if Dacorum's new Local Plan allocates further strategic housing releases across the northern edge of Hemel Hempstead. Together, these areas could form the 'Hemel Garden Community'.

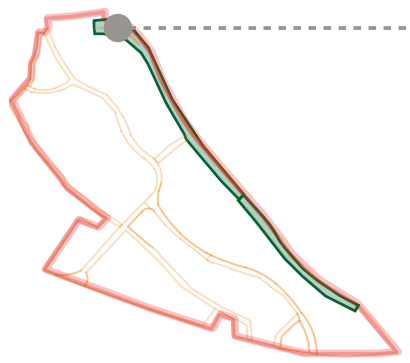




South & South East
Area : 131 ha

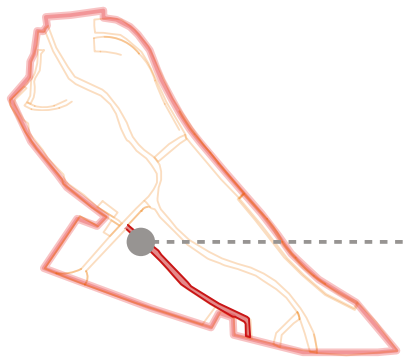


Green Belt
Area : 18.12 ha



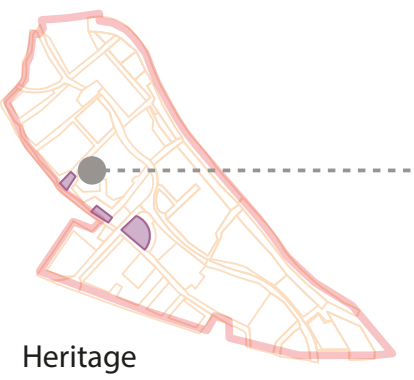
Acoustic Barrier & BPA
Area : 16.50 ha

The acoustic bund and BPA pipeline along the M1 extends to beyond the Green Belt boundary and prevents residential up to the gross redline area.



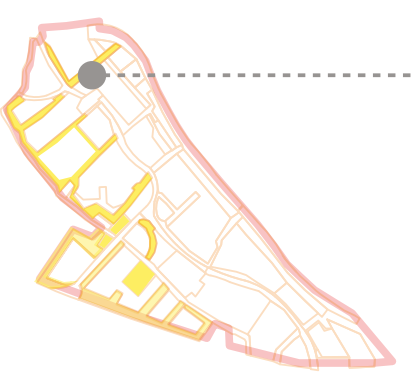
Westwick Road
Area : 3.72 ha

The main access road through the development which connects A414 to A4147.



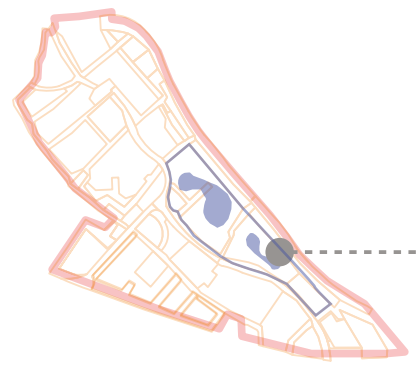
Heritage
Area : 1.70 ha

The heritage features and the associated standoff distance all prevent development from occurring in these areas and reduces the amount of housing capable of being developed in the area.



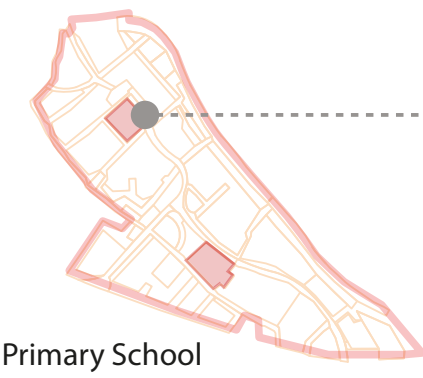
Retained Woodland: 18ha

The woodland blocks, hedges and tree belts are features that are being retained in the masterplan and prevent the area being developed for housing.



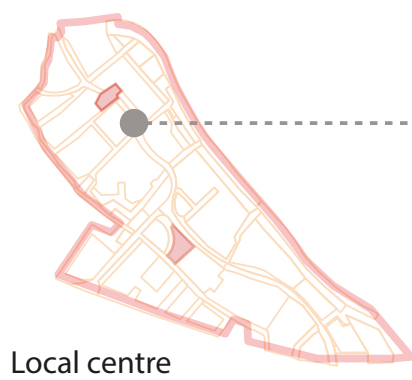
SuDS/ Play/ Strategic Open Space
Area : 22.29ha

The SuDS feature sits at the lowest point in the land and cannot be accommodated in green belt or elsewhere as the land form is higher across the whole of the SE and South of Hemel redline boundary. The water area needs to sit at its lowest point on the site to enable water to follow pipes under the M1 across to SuDS lakes and river courses to the east of the M1. The approximate area follows a similar area required for East Hemel Southern residential area. A network of well designed and cared for open space is designated to local authority standards.



Primary School
Area : 4.80ha

A primary school is a social infrastructure requirement and comprises two 2.4ha sites which would have delivered 192 residential units if available for housing.



Local centre
Area : 1.84ha

The local centres are developed with 2 storeys of apartments over the retail/mixed use space which make an allowance for 80 units to be added to final total making it 1842 units.

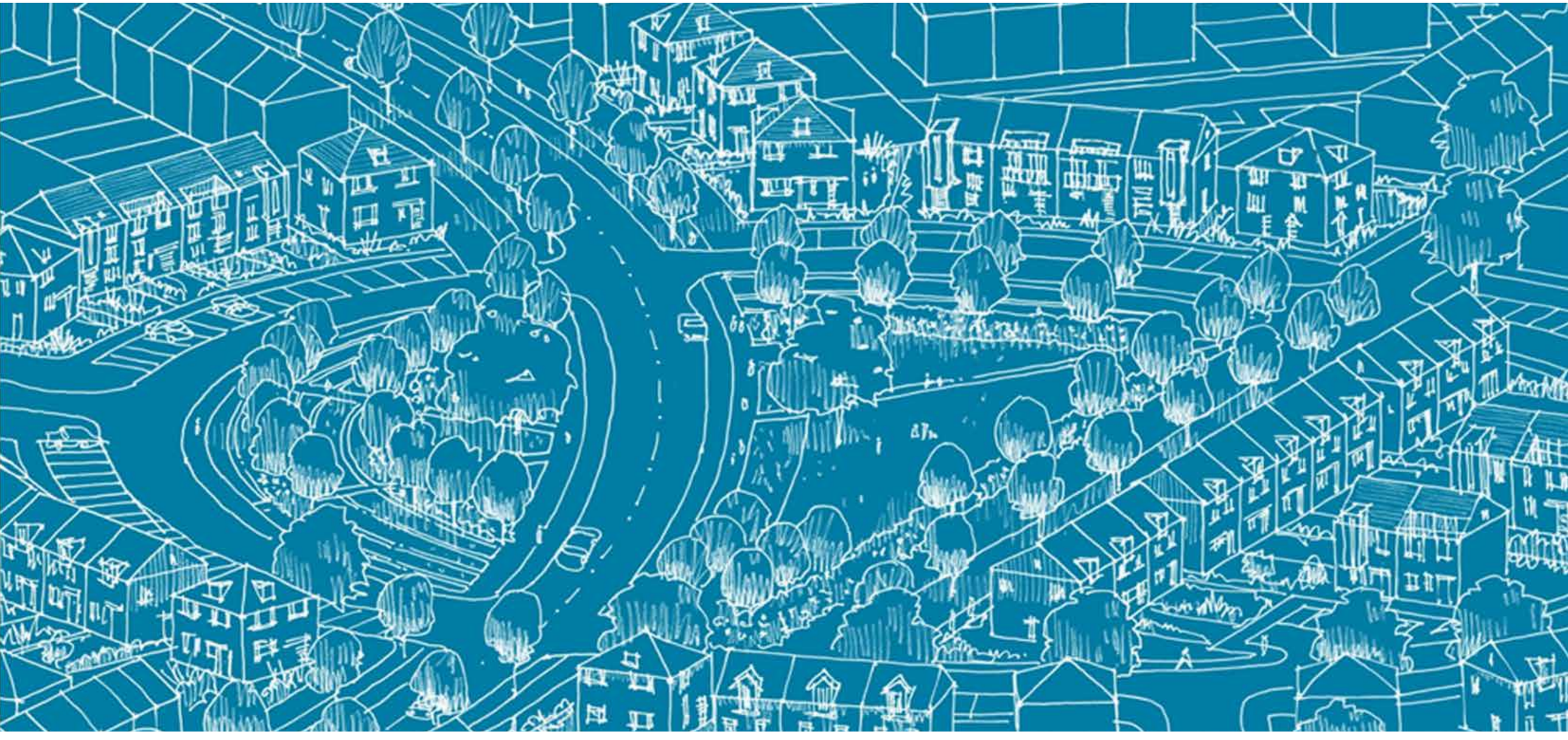
Net residential
Area : 44.03ha

44.03 ha x 40dph = 1,762 residential units plus 80 units in the local centre to be added to the final making it 1842 units.

The above calculation demonstrates that the net residential area is around 44 hectares. At a density of 40dph this delivers only around 1842 homes, around 558 short of the 2,400 homes expected in S6(iii). In order to achieve 2,400 homes in this area, the density would have to rise to over 52/53 dph.

17198-RT-001 Rev5-South East and policy S6(iii) Land use budget break down

Appendix 52: Education Facilities Extract of North Hemel Hempstead Landowner/Developer Representations Regulation 19 Consultation (October 2018)



North Hemel: Reg 19 Representations Policy S6(iv)

15861-RT-004 Rev3 Policy S6(iv)- North
Prepared by Scott Brownrigg
15 Oct 2018

Policy S6(iv) North Hemel Hempstead Broad Location :

The Crown Estate (TCE) is in discussions with the landowners within Broad Location S6(iv) with a view to acquiring their land. However, TCE has progressed masterplan work for this area with St Albans Council in order to produce a comprehensive scheme for all four Broad Locations which would deliver 5,550 homes and up to 10,000 jobs. The master plan is well advanced and is shown here.

The master plan shows how all the components of S6(iv) will be delivered including:

- 1,500 homes(inclusing C2,C3 and special needs housing)
- 40% affordable housing
- a density in excess of 40dph
- one 3FE primary school
- a Local Centre with a range of retail, recreational and community uses
- a new Country Park
- strategic and local open space
- a Community Management Organisation.

The Bigger Picture

North Hemel Hempstead Broad Location forms one of four Broad Locations which make up the Local Plan Reg 19 proposals for East and North Hemel. The Crown Estate and St Albans Council are jointly working on a comprehensive and integrated master plan for the whole of S6(i) to (iv) which will deliver around 5,550 new homes and 55 ha of new employment. The current version of this master plan is shown here and is capable of further extension west into Dacorum Borough if Dacorum's new Local Plan allocates further strategic housing releases across the northern edge of Hemel Hempstead. Together, these areas could form the 'Hemel Garden Community'.