East Lothian Council

local development plan main issues report

technical note: transport appraisal 2014

TECHNICAL NOTE – EAST LOTHIAN LOCAL DEVELOPMENT PLAN ASSESSMENT

MODELLING RESULTS

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1. SUMMARY

1.1.1 SYSTRA was commissioned by East Lothian Council to undertake transport modelling work to support the development of their Local Development Plan.

1.1.2 This exercise was undertaken using the version of the SEStran Regional Transport Model (SRM) developed previously for the assessment of the SESplan Strategic Development Plan (SDP). The SRM is designed to represent strategic traffic (ie town to town) within the SEStran area (and between SEStran and the rest of Scotland), rather than being concerned with detailed traffic movements within towns.

1.1.3 The existing SRM was enhanced to include additional network and zonal detail in East Lothian for the purpose of this work. The housing allocation data in the existing SRM for East Lothian was updated with more recent and spatially detailed data supplied by East Lothian Council in the form of a Reference Case (ie Committed Development only) and 12 development forecast scenarios representing new housing allocations of various volumes.

1.1.4 For the purpose of this exercise, occupiers of these new developments are assumed to be additional to East Lothian.

1.1.5 Employment patterns are assumed to be unchanged in the scenarios modelled.

1.1.6 The Reference Case plus the scenarios were coded into the SRM and run for a 2024 forecast year. The incremental impact of the scenarios in terms of traffic and congestion on the road network was then analysed with respect to the Reference Case forecast. Furthermore, the Reference Case was analysed with respect to the 2010 Base network.

1.1.7 For each scenario, AM peak hour analysis has been undertaken which shows:

- Forecasts of the impact of the additional traffic on junction delays;
- Forecasts of the impact of the additional traffic on queue lengths;
- Forecasts of the impact of the additional traffic on the total vehicle distance travelled; and
- Forecasts of the impact of the additional traffic on journey times between East Lothian settlements and Newcraighall.

1.1.8 The results generally indicate predicted increases in delay and queue lengths at Old Craighall and Musselburgh (High Street / Dalrymple Road). There is also a slight increase in delay in Tranent, which is reduced by the introduction of a Tranent Bypass.

1.1.9 The delay and queuing at Old Craighall is predicted to be reduced by the introduction of a link between Millerhill and Queen Margaret University (QMU).

1.1.10 Mitigation measures are discussed in Chapter 7.10.1.

2. INTRODUCTION

2.1.1 This note provides a report on the traffic modelling undertaken by SYSTRA with respect to the emerging East Lothian Local Development Plan.

2.1.2 This work has been undertaken using the SEStran Regional transport Model (SRM).

2.1.3 Within East Lothian, the housing data has been revised to reflect the Reference Case (committed) housing provided by East Lothian Council (ELC), plus 12 LDP forecast scenarios, which comprise additional allocations to the Reference Case for 2024.

2.1.4 The modelling has been undertaken using SATURN Version 10.9.22.

3. ZONE SYSTEM

3.1.1 The original SRM has 24 model zones covering East Lothian, at a relatively aggregate level of detail. In order to better represent population and employment within East Lothian, the SRM zone system was disaggregated to form 39 zones within the region. Planning data information provided by ELC was used to support this zone splitting process.

3.1.2 There were three criteria used to form the basis for disaggregation:

- Original spatial representation of existing population/employment was too aggregate, eg Musselburgh, Haddington;
- Original spatial representation of existing population/employment does not accurately reflect location of current and future sites, eg Queen Margaret University and A1 access; and
- Additional zonal detail was required in order to accurately represent the location of proposed new development sites, eg Blindwells.

3.1.3 Datazones, used as the building blocks for SRM zones, also form the basis for splitting into ELM zones, ie no further disaggregation or splitting was undertaken below datazone level.

4. NETWORK ENHANCEMENTS

4.1 General

4.1.1 In conjunction with additional zonal detail, the existing SRM network was reviewed in terms of East Lothian modelling requirements. Four different types of enhancements were identified as follows:

- Simulation of Musselburgh and A1 Newcraighall – in the SRM, these sections of the network are modelled as buffer areas, so it was necessary to convert this into full simulation coding;
- Additional simulation network coding – some extra network detail was added at a number of locations, eg Queen Margaret University, Musselburgh and North Berwick;
- Modification of lane arrangements and signal timings as requested by ELC on 11th August 2014, eg Musselburgh High Street signal timings; and
- Modification of existing, and the creation of new, zone loading points throughout East Lothian.

4.2 Musselburgh and A1 Newcraighall simulation

4.2.1 Only the eastern side of the Musselburgh network is simulated in the original SRM, therefore the following routes were converted into simulation coding in the ELM:

- A199 Bridge Street westwards to Milton Road East (Edinburgh)
- Seaview Terrace (Edinburgh);
- A6095 Mall Avenue westwards to A6106 junction (Edinburgh)
- Newhailes Road; and
- B6415 Eskview Terrace southwards to Old Craighall Road.

4.2.2 In addition, the Newcraighall junction on the A1 is coded as buffer network in the SRM, and is also based on the mini-roundabout layout which was in place in 2007. This was converted into signalised junctions to match what is on the ground now.

5. MODEL RE-CALIBRATION

5.1.1 In order to deliver an enhanced representation of East Lothian within the SRM, a set of counts were used to support re-calibration of the model.

5.1.2 Counts were obtained from three sources, namely the following:

- Automatic Traffic Counts (ATC) undertaken by NDC – covering a number of routes across East Lothian, excluding the A1 (23 count sites);
- Scottish Roads Traffic Database (STRDb) Junction Turning Counts (JTC) covering A1 – a set of JTC counts taken from the SRTDb (22 count sites); and
- Midlothian Council strategic counts – a selection of counts used previously in the Midlothian LDP Modelling work (13 count sites).

5.1.3 There were originally 24 ATC counts to be used from the NDC data collection exercise. However, Site 1 "A199 Edinburgh Road (east of Milton Road East / Seaview Terrace junction)" was repeatedly vandalised and therefore no usable data was obtained at this location.

6. MODELLED SCENARIOS

6.1 Planning Data

6.1.1 ELC provided details of 13 planning scenarios to be used in this exercise. This included a 2024 Reference Case (ie Committed Development) and 12 forecast scenarios. In addition, a 2010 Base network was to be used for comparison purposes.

6.1.2 The table below details the allocations for each scenario and the locations of developments are mapped in Figure 1 and Figure 2.

Table 1. East Lothian LDP Scenarios

ID	DESCRIPTION	BLINDWELLS (COMMITTED)	BLINDWELLS 1	BLINDWELLS 2	TRANENT EAST	GOSHEN	LONGNIDDRY	OTHER SITES	TOTAL UNITS
ELC1	Reference Case	1,600						5,000	6,600
ELC2	Preferred Blindwells 1	1,600	6,000					11,000	18,600
ELC3	Preferred Blindwells 2	1,600		1,200				11,000	13,800
ELC4	Preferred Blindwells 1 / excluding Goshen, including Longniddry expansion	1,600	6,000				1,000	10,000	18,600
ELC5	Preferred Blindwells 2 / excluding Goshen, including Longniddry expansion	1,600		1,200			1,000	10,000	13,800
ELC6	Preferred Blindwells 1 / Longniddry and Goshen expansion	1,600	6,000			1,000	1,000	10,000	19,600
ELC7	Preferred Blindwells 2 / Longniddry and Goshen expansion	1,600		1,200		1,000	1,000	10,000	14,800

ID	DESCRIPTION	BLINDWELLS (COMMITTED)	BLINDWELLS 1	BLINDWELLS 2	TRANENT EAST	GOSHEN	LONGNIDDRY	OTHER SITES	TOTAL UNITS
ELC8	Preferred Blindwells 1 / Tranent East	1,600	6,000		600	1,000		10,000	19,200
ELC9	Preferred Blindwells 2 / Tranent East	1,600		1,200	600	1,000		10,000	14,400
ELC10	Preferred BW1 / Tranent East and Longniddry	1,600	6,000		600	1,000	1,000	10,000	20,200
ELC11	Preferred BW2 / Tranent East and Longniddry	1,600		1,200	600	1,000	1,000	10,000	15,400
ELC12	Preferred and Alternative Blindwells 1	1,600	6,000		600	1,000	1,000	14,000	24,200
ELC13	Preferred and alternative Blindwells 2	1,600		1,200	600	1,000	1,000	14,000	19,400

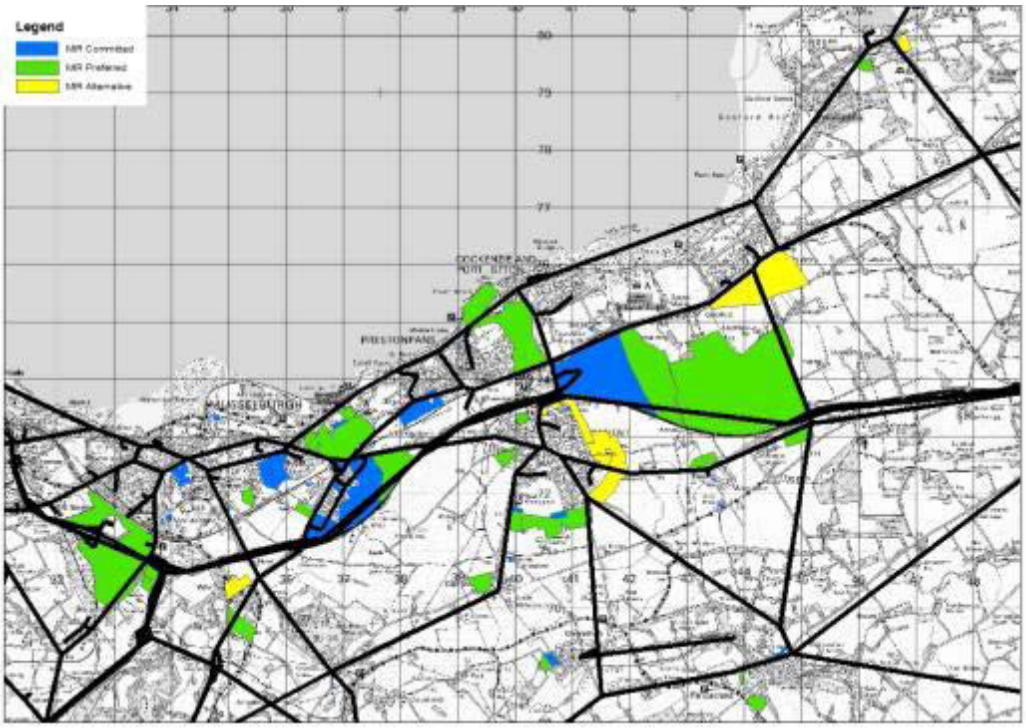

Figure 1. Committed, Alternative and Preferred Sites (West)

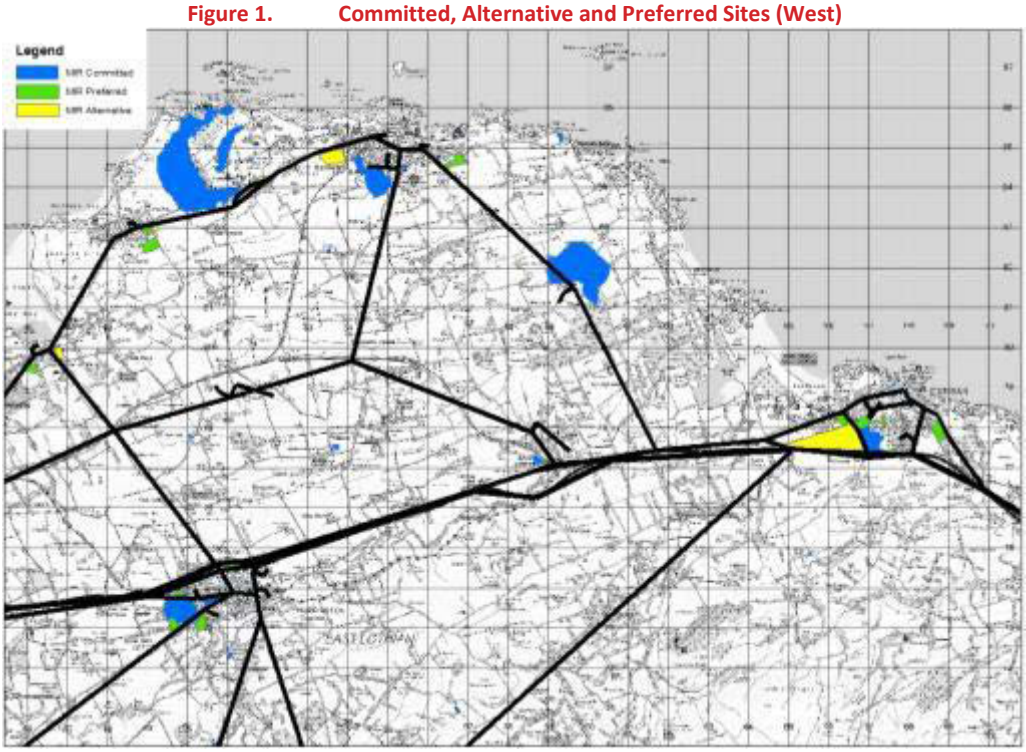

Figure 2. Committed, Alternative and Preferred Sites (East)

6.2 Networks

6.2.1 To test the required scenarios, several network were developed; each network was assigned a network identification number (ID), which was then linked to a planning scenario.

6.2.2 The Network IDs are:

- ELCB – 2010 Base Network;
- ELCY – 2024 Standard Network (this includes all enhancements described in Chapter 4 of this document);
- ELCT – as per ELCY plus inclusion of a proposal for a Tranent Bypass; and
- ELCU – as per ELCY plus inclusion of a link road between the A720 Millerhill Junction and the A1 QMU junction.

6.2.3 The Tranent Bypass coded in the SATURN model is displayed in Figure 3. The Bypass has been modelled as a single carriageway road with an appropriate speed-flow curve assigned. The free-flow speed has been modelled as 83kph, which is consistent with many of the other single carriageway roads in the SATURN model. All junctions along the Bypass and at either end have been modelled as roundabouts with single lane approaches.

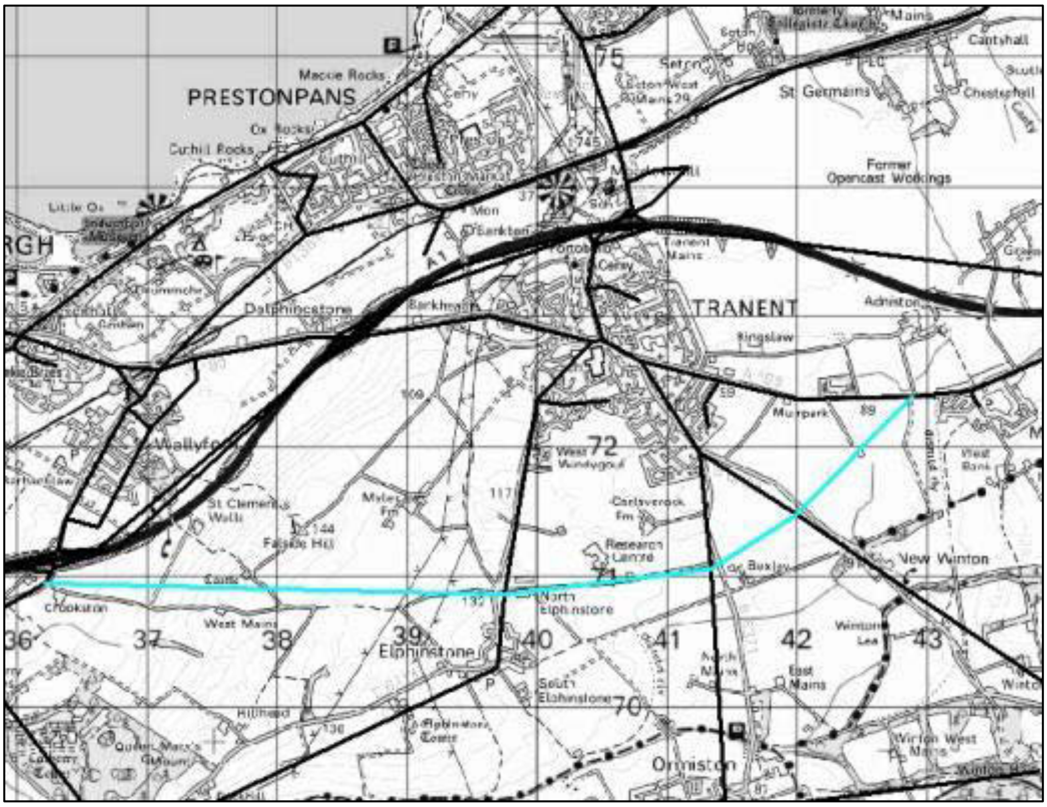

Figure 3. Tranent Bypass SATURN Coding

6.2.4 The Millerhill to QMU link road (two separate links) coded in the SATURN model is displayed in Figure 4. The links have been modelled as single carriageway roads with an appropriate speed-flow curve assigned. The free-flow speed has been modelled as 45kph, which is consistent with that of the B6415, the road that connects the new links. These connections have been modelled as roundabouts with single lane approaches, and the links tie into roundabout junctions at either end of the 'existing' network (although the QMU roundabout is not yet on the ground).

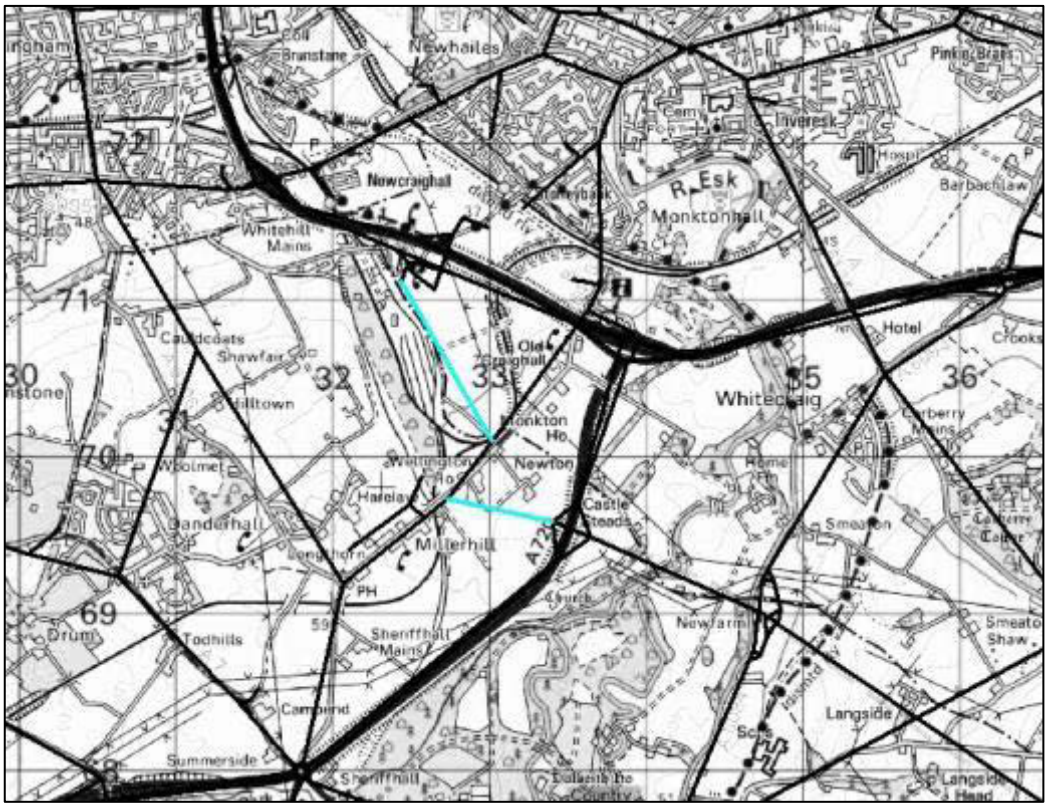

Figure 4. Millerhill to QMU Links SATURN Coding

6.2.5 The following table indicates which planning scenarios were tested with the networks described above.

Table 2. Definition of Test IDs

TEST ID	PLANNING SCENARIO ID	NETWORK ID
1	ELC0	ELCB
2	ELC1	ELCY
3	ELC2	ELCY
4	ELC3	ELCY
5	ELC4	ELCY
6	ELC5	ELCY
7	ELC6	ELCY
8	ELC7	ELCY
9	ELC8	ELCT

TEST ID	PLANNING SCENARIO ID	NETWORK ID
10	ELC9	ELCT
11	ELC12	ELCU
12	ELC12	ELCY
13	ELC13	ELCY

6.3 Housing

6.3.1 For reference, Table 3 below contains a summary of the household forecasts which have been produced over time with respect to East Lothian. Note that for the purpose of this exercise, the occupants of the new housing in East Lothian are assumed to be *entirely additional to the model*. Therefore, this represents a 'worst case', as in practice many occupants of new properties will have moved within East Lothian. In addition to inward migration to an area, new households can also be formed from existing households, for example as a result of separation / divorce, or offspring leaving home.

Table 3. Household Data

TEST ID	HOUSEHOLDS
1	41,000
2	50,000
3	62,000
4	57,500
5	62,000
6	57,500
7	63,000
8	58,500
9	62,500
10	58,000
11	67,500
12	67,500
13	62,500

6.4 Employment

6.4.1 The employment data indicates 28,500 jobs in East Lothian in 2010. This increases to 41,000 in 2024. These figures relate to the location of jobs rather than the place of residence of employed adults. The number of jobs has been assumed to remain unchanged in each of the 2024 models and the testing of variations to the location of East Lothian employment sites would have to be undertaken further.

7. MODELLING FORECASTS

7.1.1 This section reports the predicted impact of the additional households on the road network, in terms of junction delays, queue lengths and journey times. It should be noted that only the AM peak is analysed in this report, except for journey times, for which AM westbound journey times and PM eastbound journey times are reported. PM outputs are available for further interrogation if required however a review of the PM outputs concludes that AM is representative of the issues apparent on the network.

7.1.2 Six tests have been analysed for the purpose of this assessment. These are:

- **Test 1:** this represents the 2010 network and the absolute (as opposed to comparative) data is displayed in this chapter for this model;
- **Test 2:** this represents the 2024 Reference Case, which only includes Committed Development planning data – this scenario is compared to Test 1. The other tests are all compared to Test 2;
- **Test 3** represents an 'average' forecast scenario;
- **Test 9** represents the network with the inclusion of a Tranent Bypass;
- **Test 11** represents the network with the inclusion of a Millerhill to QMU link road; and
- **Test 12** represents the scenario with the highest total of households.

7.1.3 A comprehensive set of junction diagrams for all tests is included in Appendix 1. The forecast AM average delay per vehicle at east junction, and AM queue lengths, for six of the 12 tests are considered below.

7.2 Test 1 – the 2010 network

7.2.1 The AM average delay per vehicle at each junction in the 2010 model (Test 1) is displayed in the Figures 5, 6 and 7. These indicate that the average delay per vehicle at each junction in Test 1 is less than 10 seconds. In particular, at Old Craighall and the Tranent roundabouts, the average delay per vehicle is less than five seconds.

7.2.2 The AM queue lengths on each link in Test 1 are displayed in Figures 8, 9, and 10. These indicate that the vast majority of the queue lengths in Test 1 are under 2.5 Passenger Car Units (PCUs).

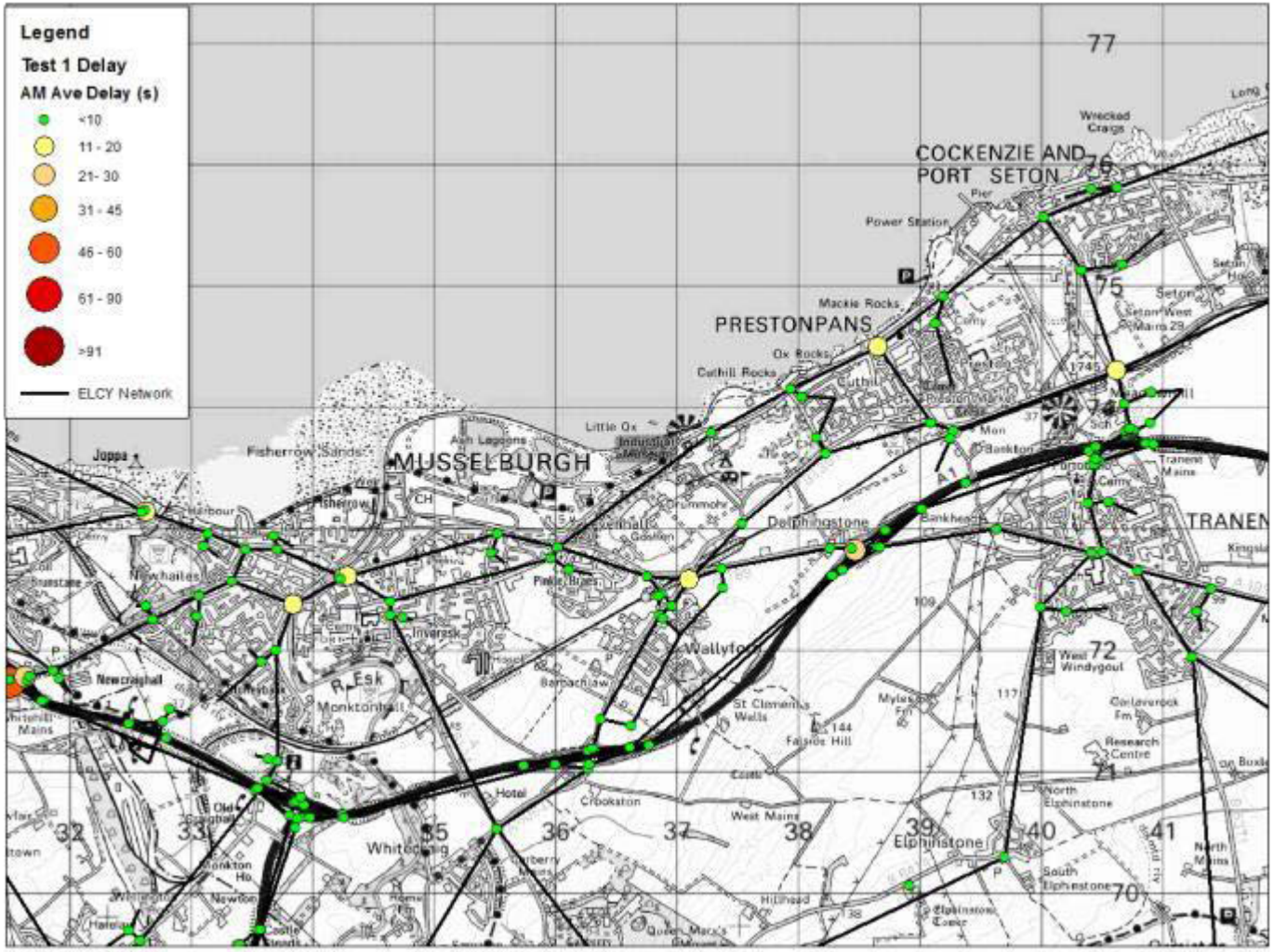

Figure 5. Test 1 Junction Delay – West (average seconds delay per vehicle)

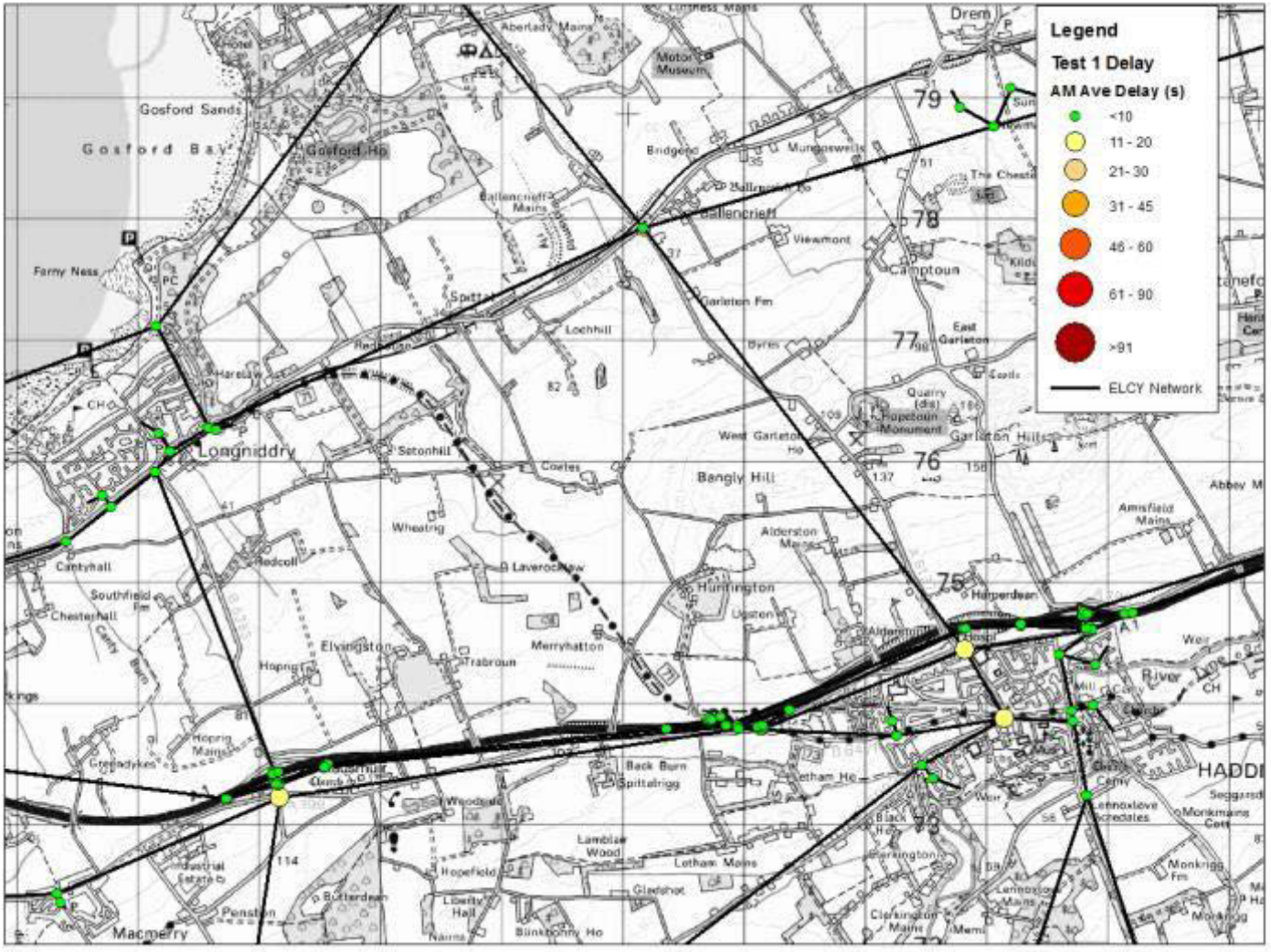

Figure 6. Test 1 Junction Delay – Mid (average seconds delay per vehicle)

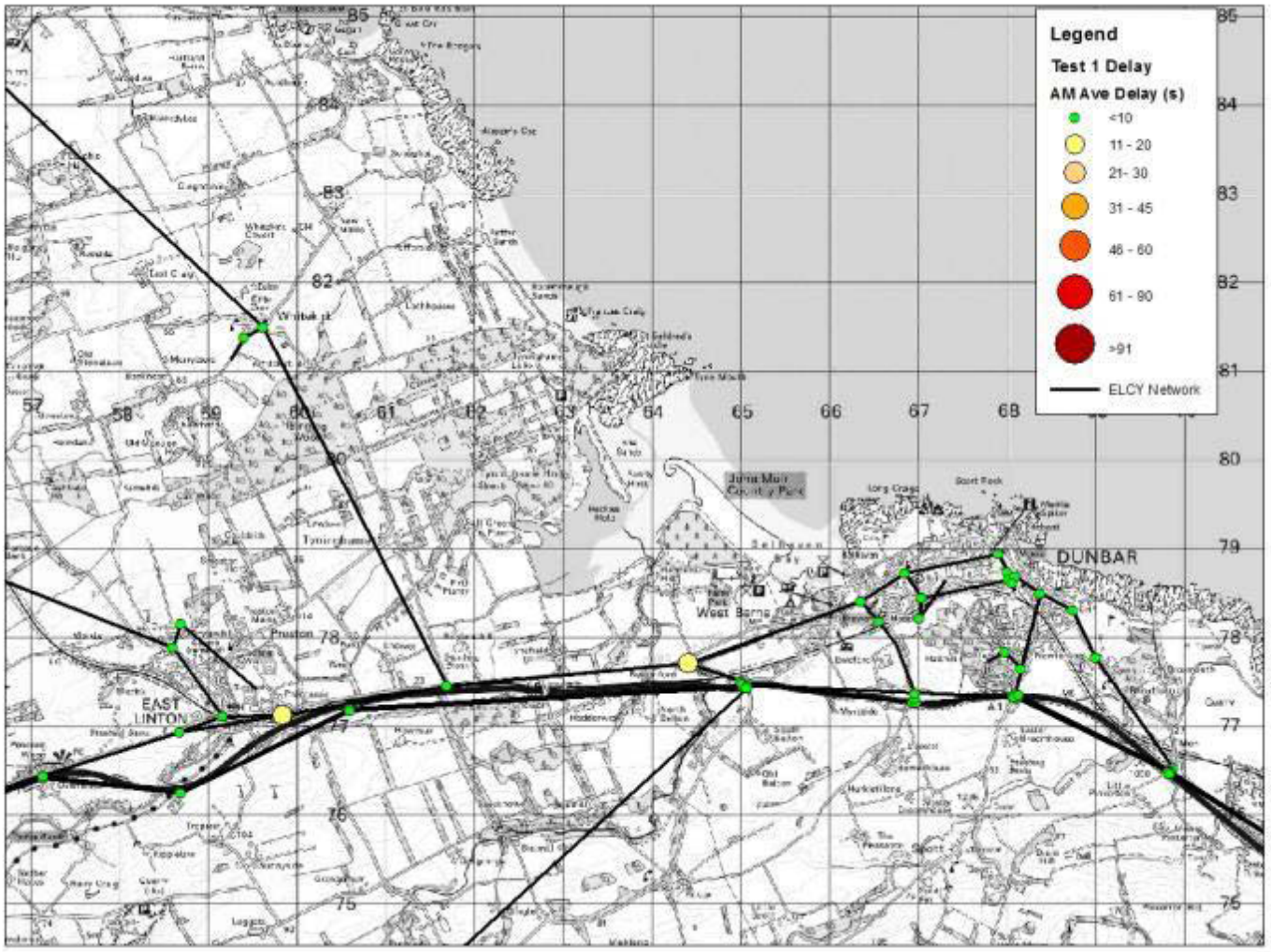

Figure 7. Test 1 Junction Delay – East (average seconds delay per vehicle)

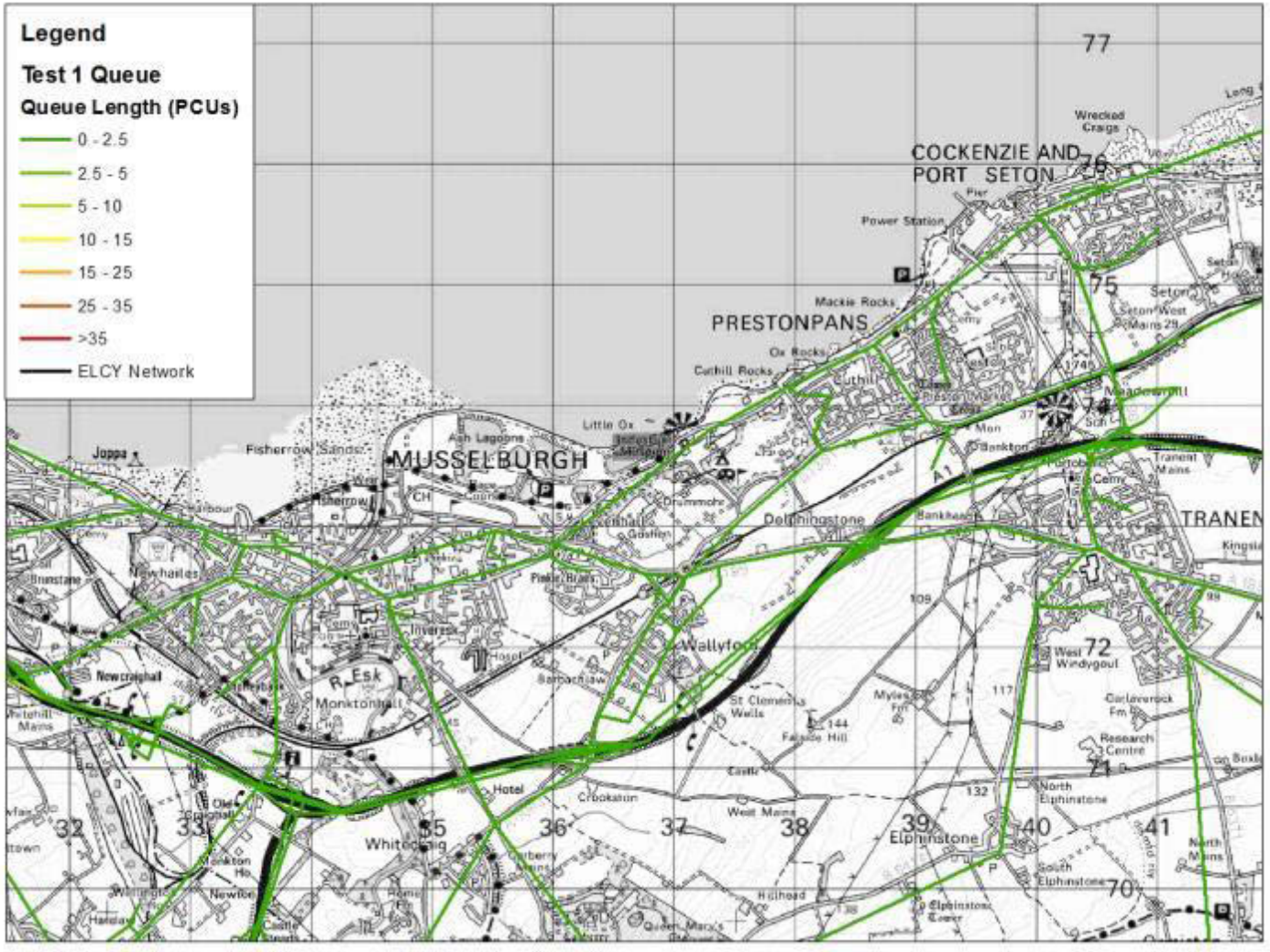

Figure 8. Test 1 Queue Lengths – West

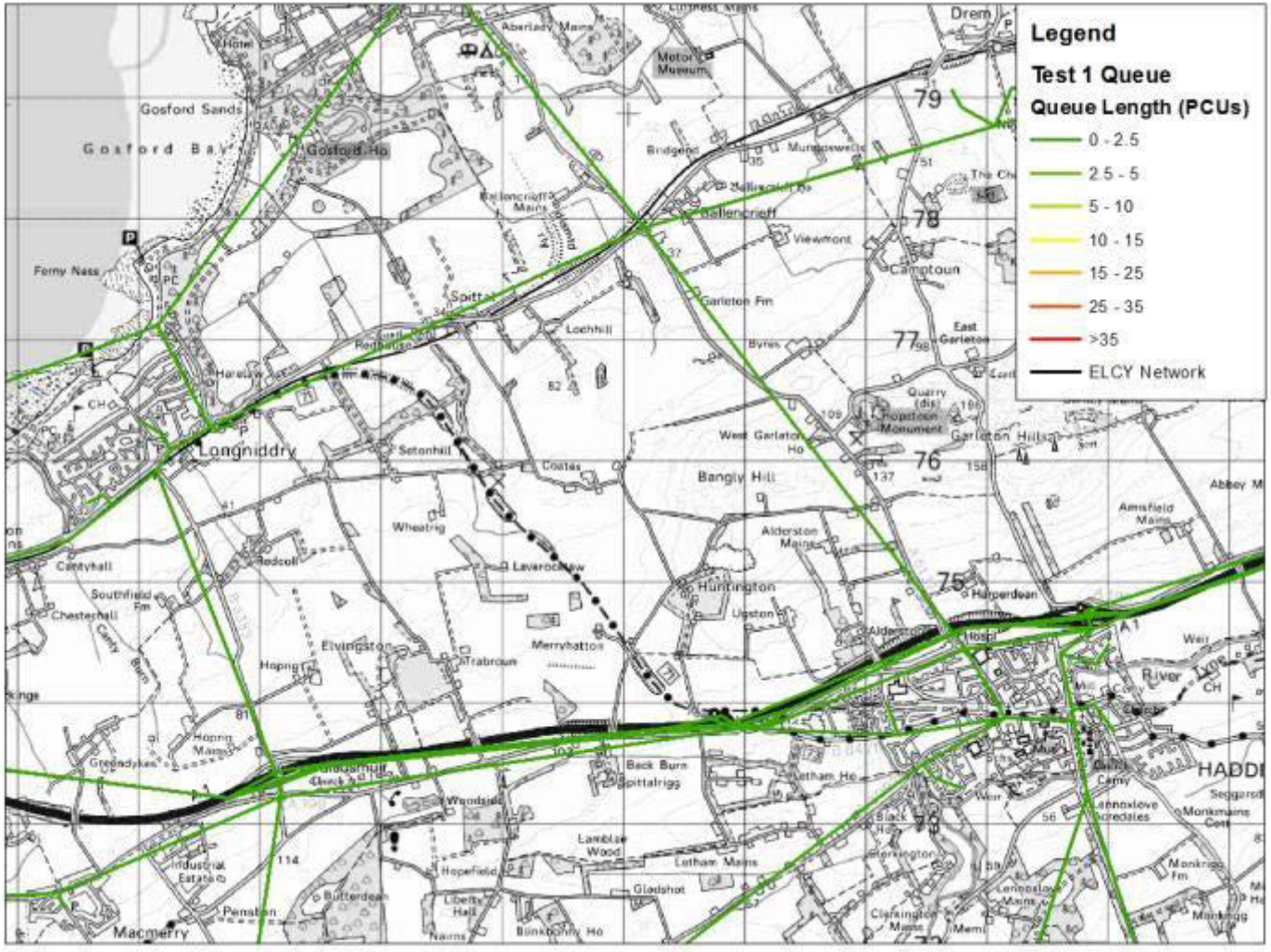

Figure 9. Test 1 Queue Lengths – Mid

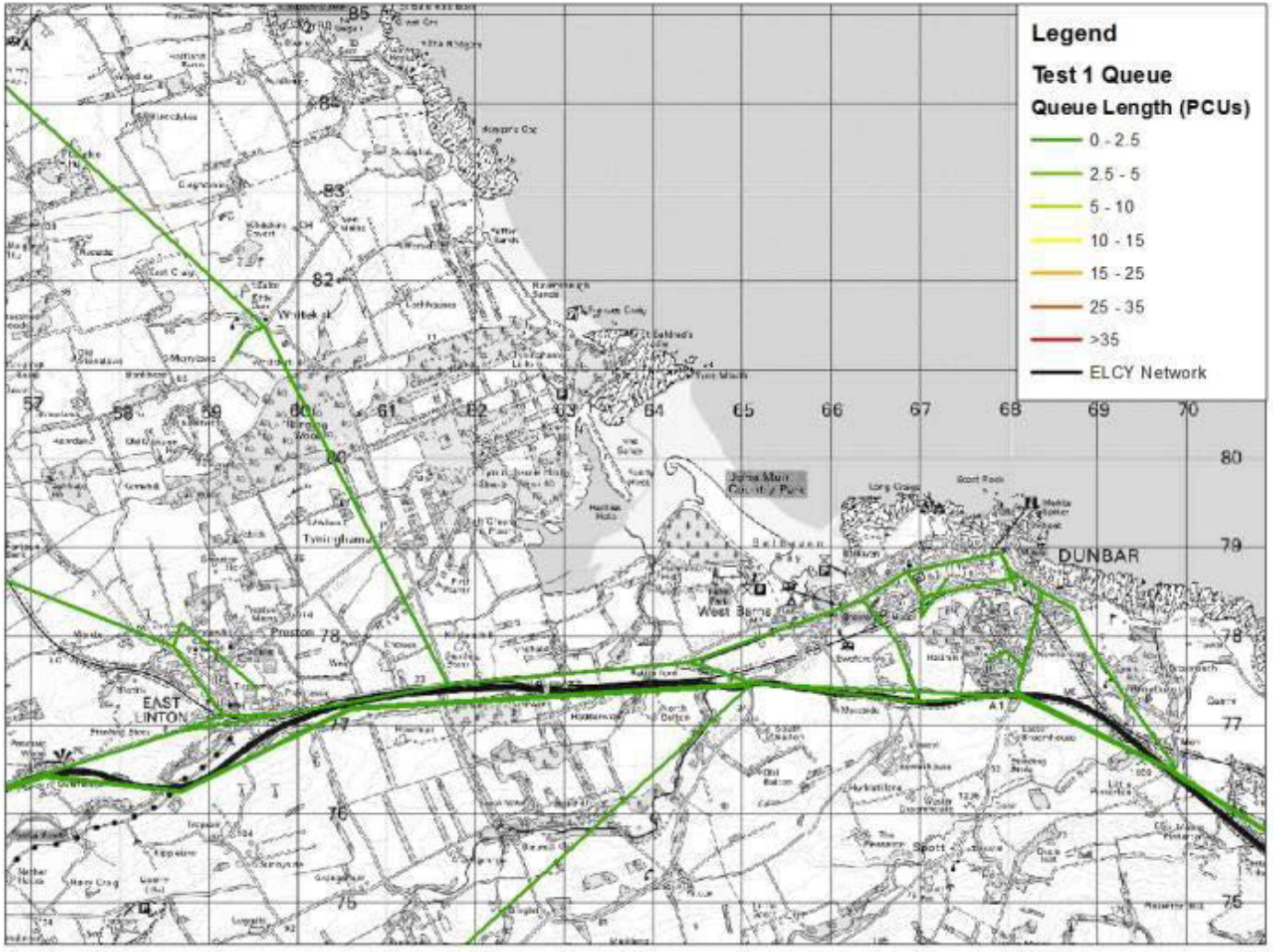

Figure 10. Test 1 Queue Lengths – East

7.3 Test 2 – the 2024 Reference Case

7.3.1 As mentioned above, Test 2 represents the 2024 Reference Case, which only includes Committed Development planning data. This scenario is compared to Test 1. The planning data locations are mapped in Figure 11 and Figure 12.

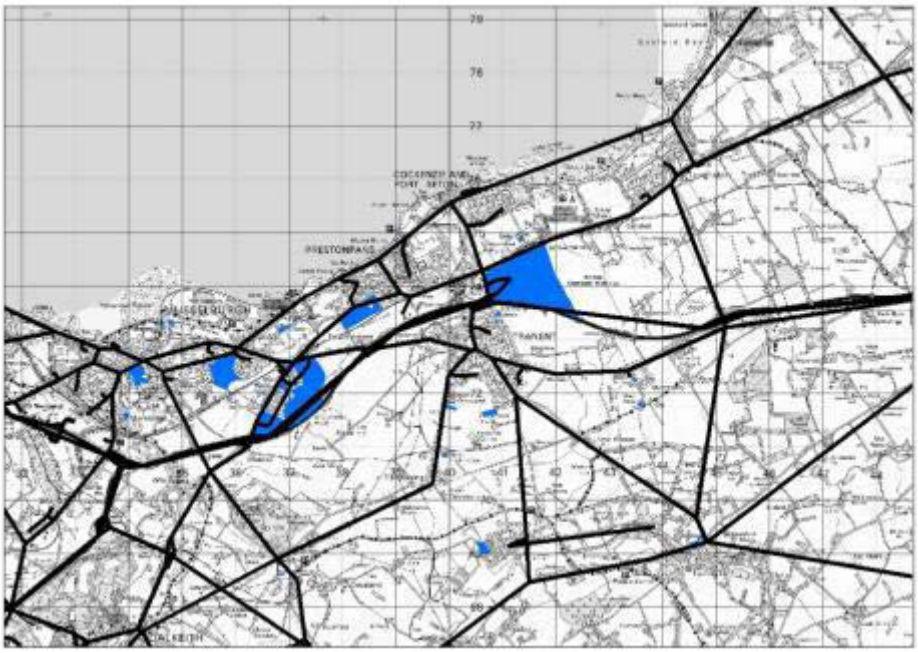

Figure 11. East Lothian Test 2 Development (West)

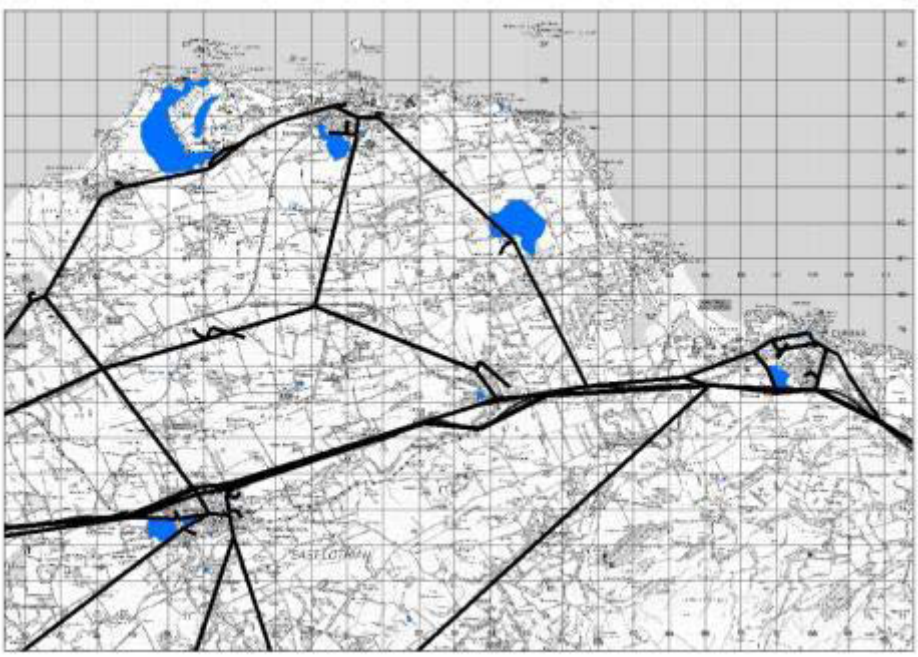

Figure 12. East Lothian Test 2 Development (East)

7.3.2 The difference in AM average delay per vehicle at each junction in the 2024 Reference Case (Test 2) compared to the 2010 model (Test 1) is displayed in Figures 13, 14 and 15, the relative change in the AM average queue lengths on each link are displayed in Figures 16, 17 and 18. These figures indicate that the increase in average delay per vehicle at each junction in Test 2 relative to Test 1 is less than 10 seconds per vehicle at most locations; and the majority of the queue lengths are predicted to increase by less than 2.5 PCUs.

7.3.3 However, there are a number of junctions where a significant increase in delay is predicted. At Old Craighall, the average delay per vehicle at the diverge stoplines is predicted to increase by approximately one minute in Test 2. The delay on the A720 City of Edinburgh Bypass approach is predicted to increase by approximately 17 seconds per vehicle, and the delay on the approach from Musselburgh is predicted to increase by approximately 22 seconds per vehicle. The queue lengths are predicted to increase significantly here – an increase of over 25 PCUs is predicted on both the A720 City of Edinburgh Bypass approach and the approach from Musselburgh which is related to the various developments in close proximity to Musselburgh (approximately 700 units).

7.3.4 The Tranent Roundabouts indicate a predicted average delay increase of between 11 and 21 seconds per vehicle, with the largest delay predicted to occur on the northbound approach (Church Street) of the southern roundabout.

7.3.5 Furthermore, it is predicted that the average delay at the A198 / B1361 / B6371 junction (Meadowmill Roundabout) will increase by approximately 40 seconds between Test 1 and Test 2. This is due to the junction operating as a roundabout in 2010 and as a signalised crossroads in the 2024 tests.

Key Issues: Significant increases in delays at Old Craighall and the A198 / B1361 / B6371 junction.

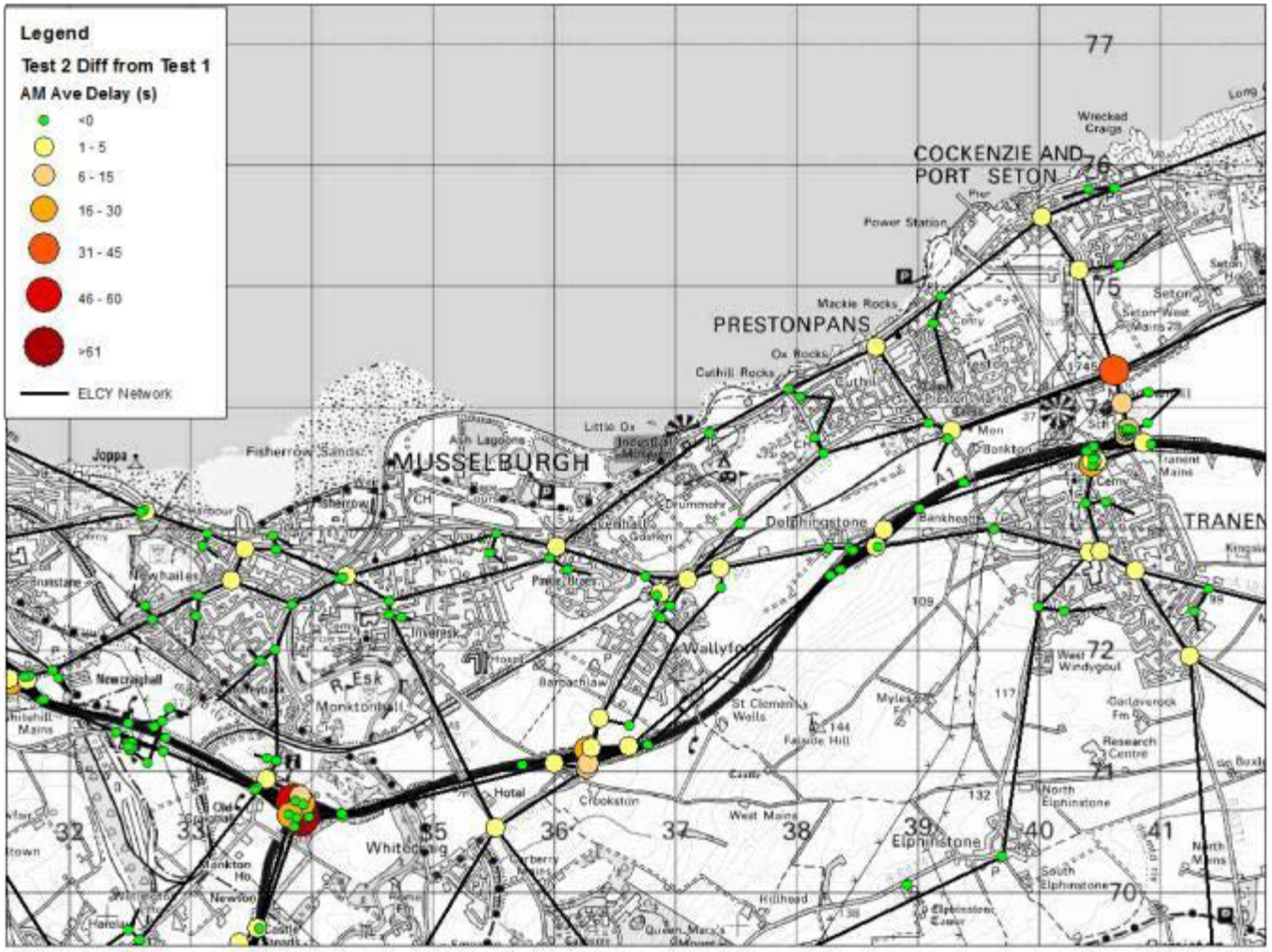

Figure 13. Test 2 vs Test 1 Junction Delay – West (average seconds delay per vehicle)

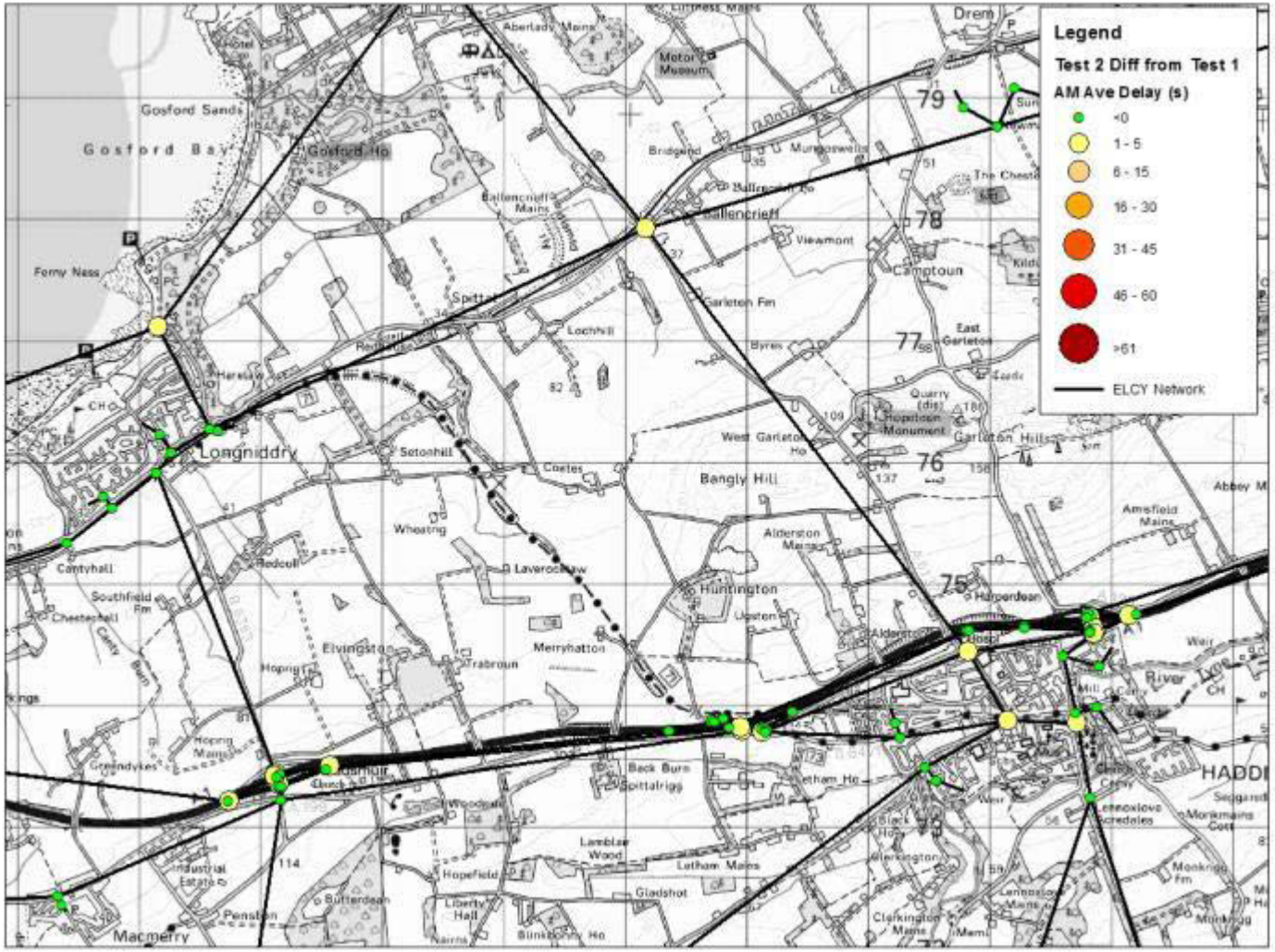

Figure 14. Test 2 vs Test 1 Junction Delay – Mid (average seconds delay per vehicle)

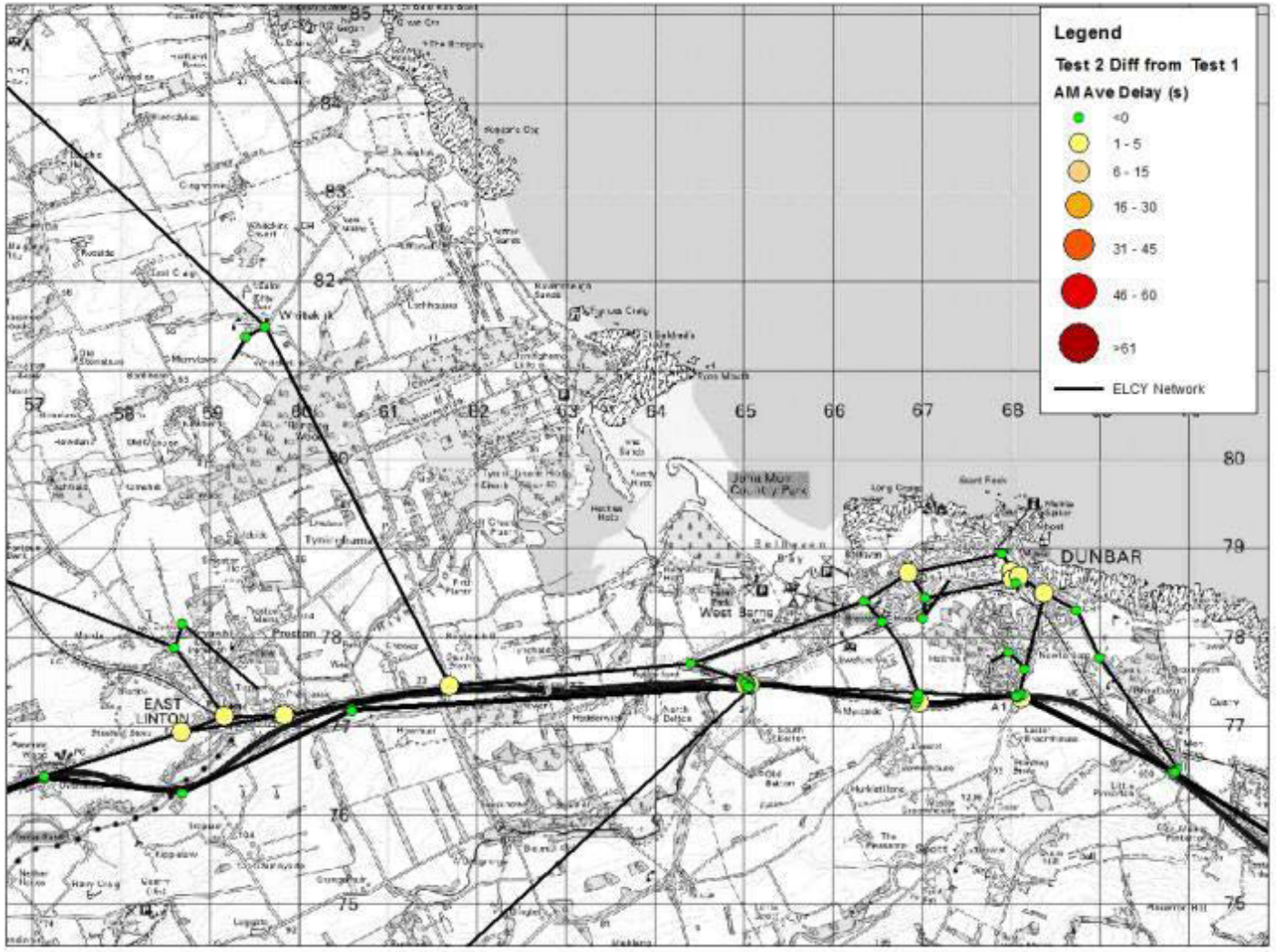

Figure 15. Test 2 vs Test 1 Junction Delay – East (average seconds delay per vehicle)

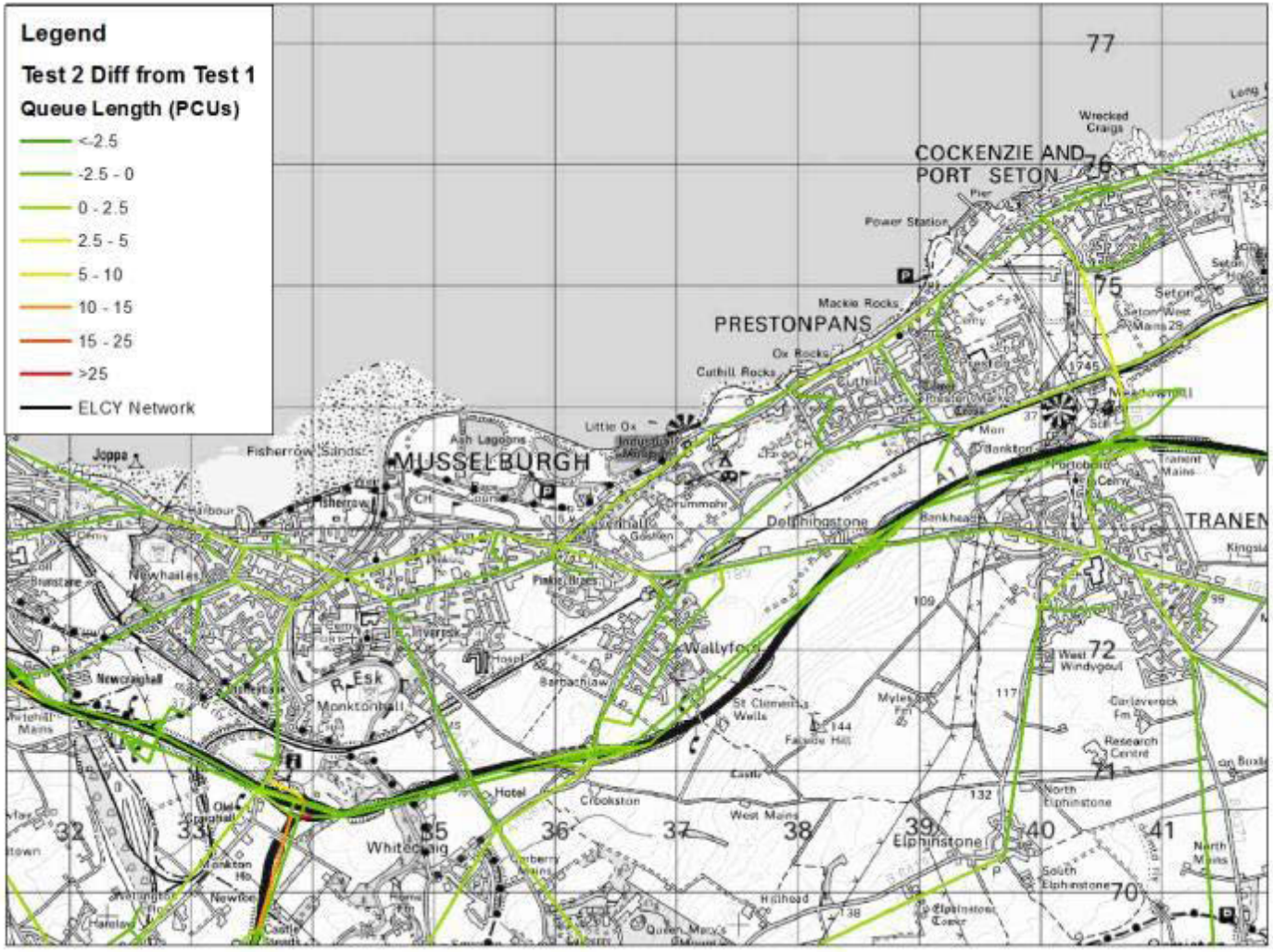

Figure 16. Test 2 vs Test 1 Queue Lengths – West

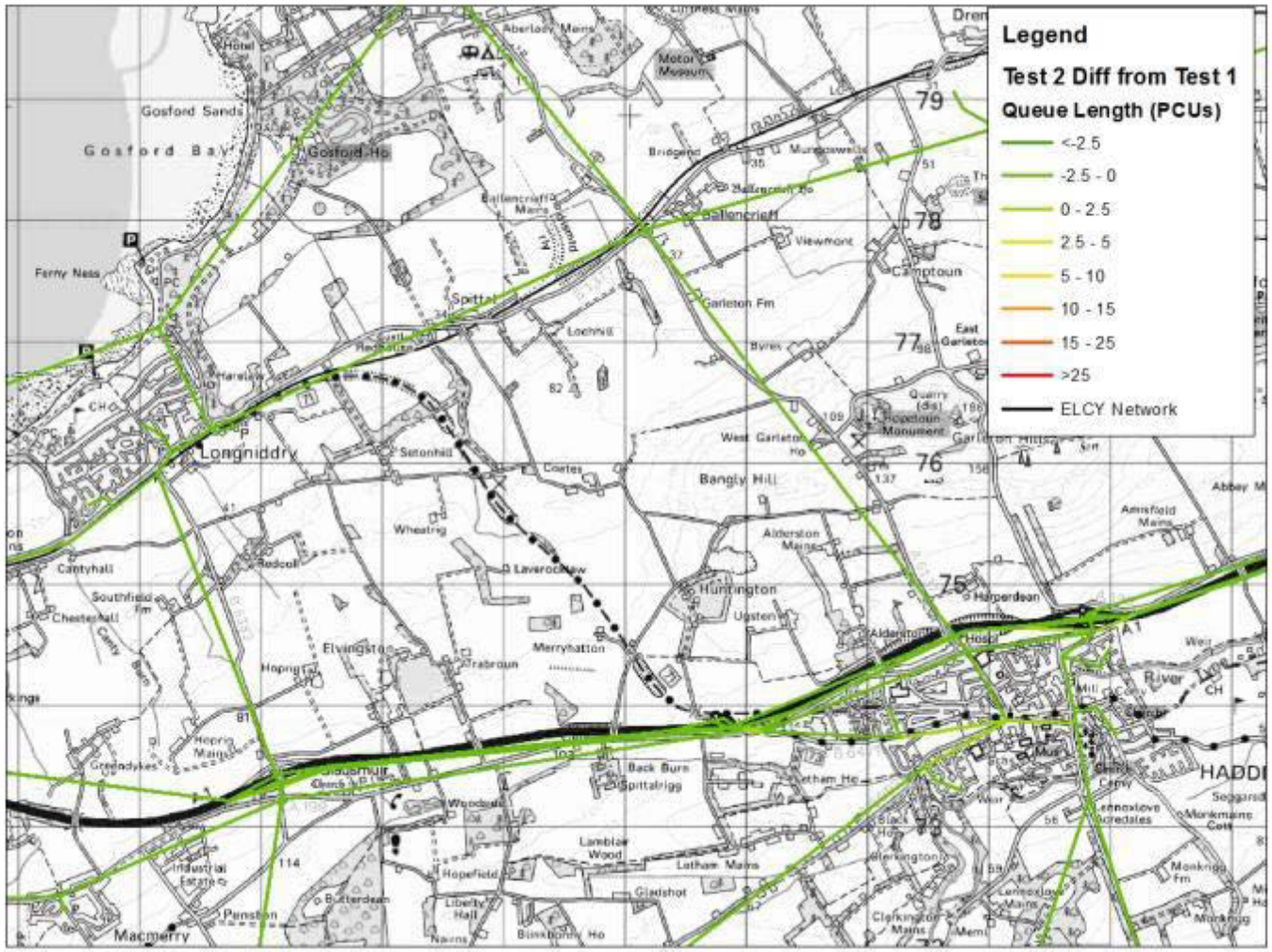

Figure 17. Test 2 vs Test 1 Queue Lengths – Mid

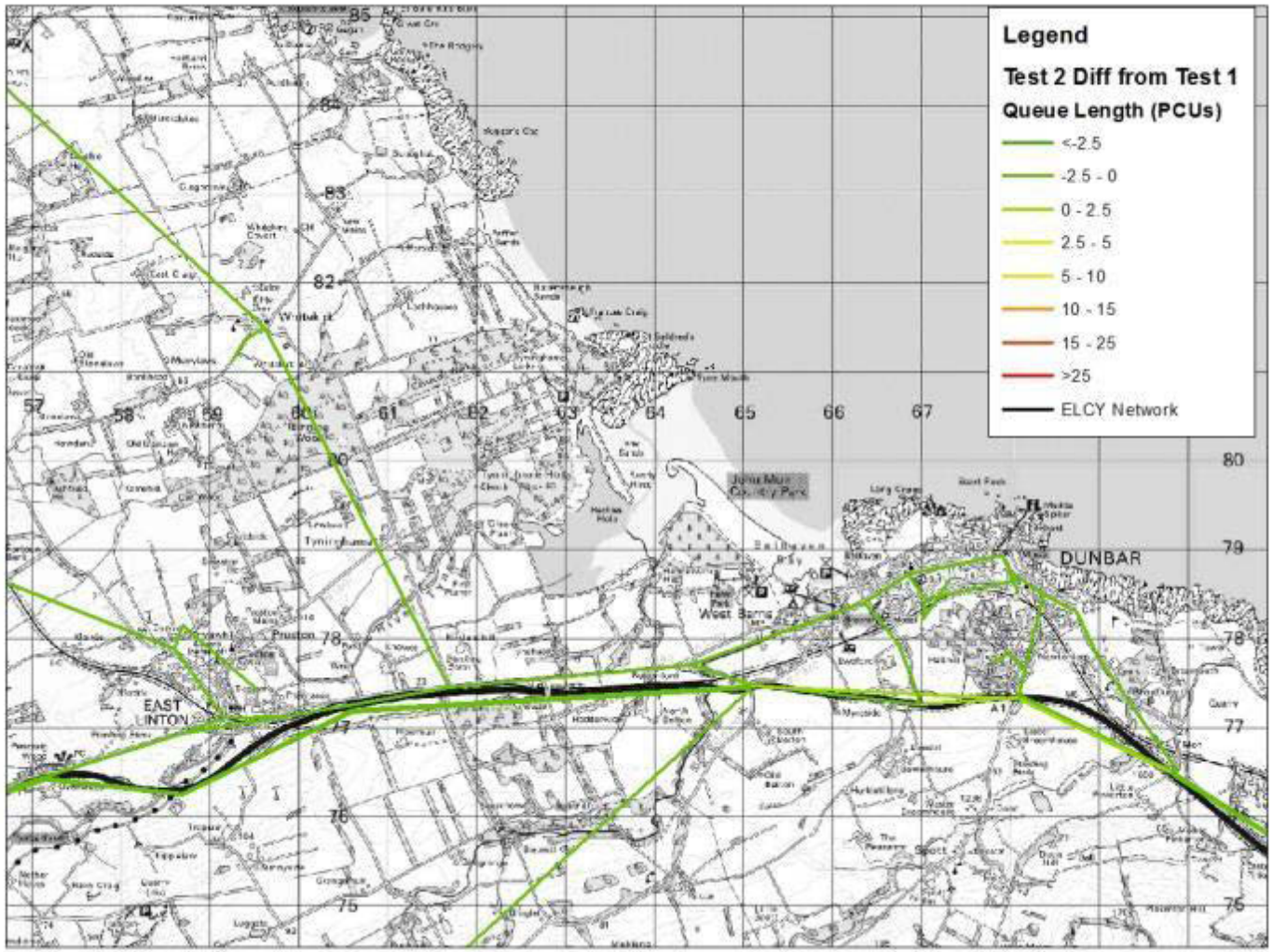

Figure 18. Test 2 vs Test 1 Queue Lengths – East

7.4 Test 3 – the 'average' forecast scenario

7.4.1 The planning data locations for Test 3 are mapped in Figure 19 and Figure 20. The difference in AM average delay per vehicle at each junction in Test 3 compared to the 2024 Reference Case (Test 2) is displayed in Figures 21, 22 and 23. The change in AM average queue lengths on each link is displayed in Figures 24, 25 and 26.

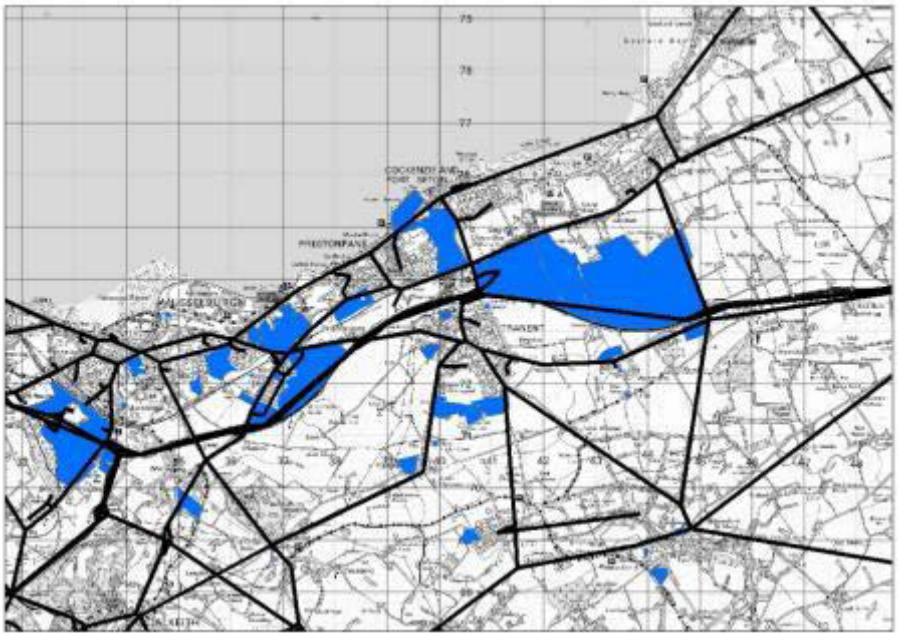

Figure 19. East Lothian Test 3 Development (West)

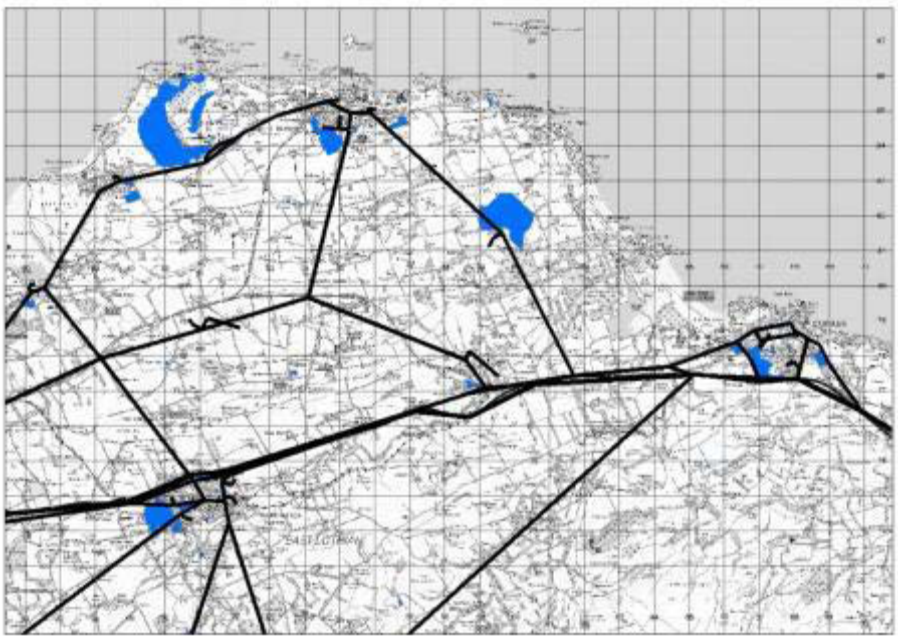

Figure 20. East Lothian Test 3 Development (East)

7.4.2 Modelling the average forecast scenario indicates that the increase in average delay per vehicle at each junction in Test 3 relative to Test 2 would be less than 10 seconds at most locations.

7.4.3 The Tranent Roundabouts indicate a negligible change in delay between Test 2 and Test 3.

7.4.4 However, there are a number of junctions where a significant increase in delay and in queue lengths is predicted. At Old Craighall, the average delay at the westbound and eastbound diverge stoplines is predicted to increase by approximately 29 and 14 seconds per vehicle in Test 3. The delay on the A720 City of Edinburgh Bypass approach is predicted to increase by approximately 76 seconds per vehicle, and the delay on the approach from Musselburgh is predicted to increase negligibly, although some blocking back of the upstream node is predicted that was not present in Test 2.

7.4.5 In terms of queue lengths at Old Craighall, an increase of approximately 10 and 15 PCUs is predicted on the eastbound and westbound diverges respectively. An increase of over 25 PCUs is predicted on the A720 City of Edinburgh Bypass approach. Due to the blocking back noted above, the approach from Musselburgh indicates an additional queue length of five to 10 PCUs.

7.4.6 Furthermore, it is predicted that the average delay at the High Street / Dalrymple Loan junction in Musselburgh will increase by approximately 50 seconds per vehicle between Test 2 and Test 3. It is also predicted that there will be a significant increase in queuing, with approximately 10 and 20 additional PCUs queuing on Dalrymple Loan and High Street respectively.

Key issues: Significant increases in delays at Old Craighall and at the High Street / Dalrymple Loan junction.

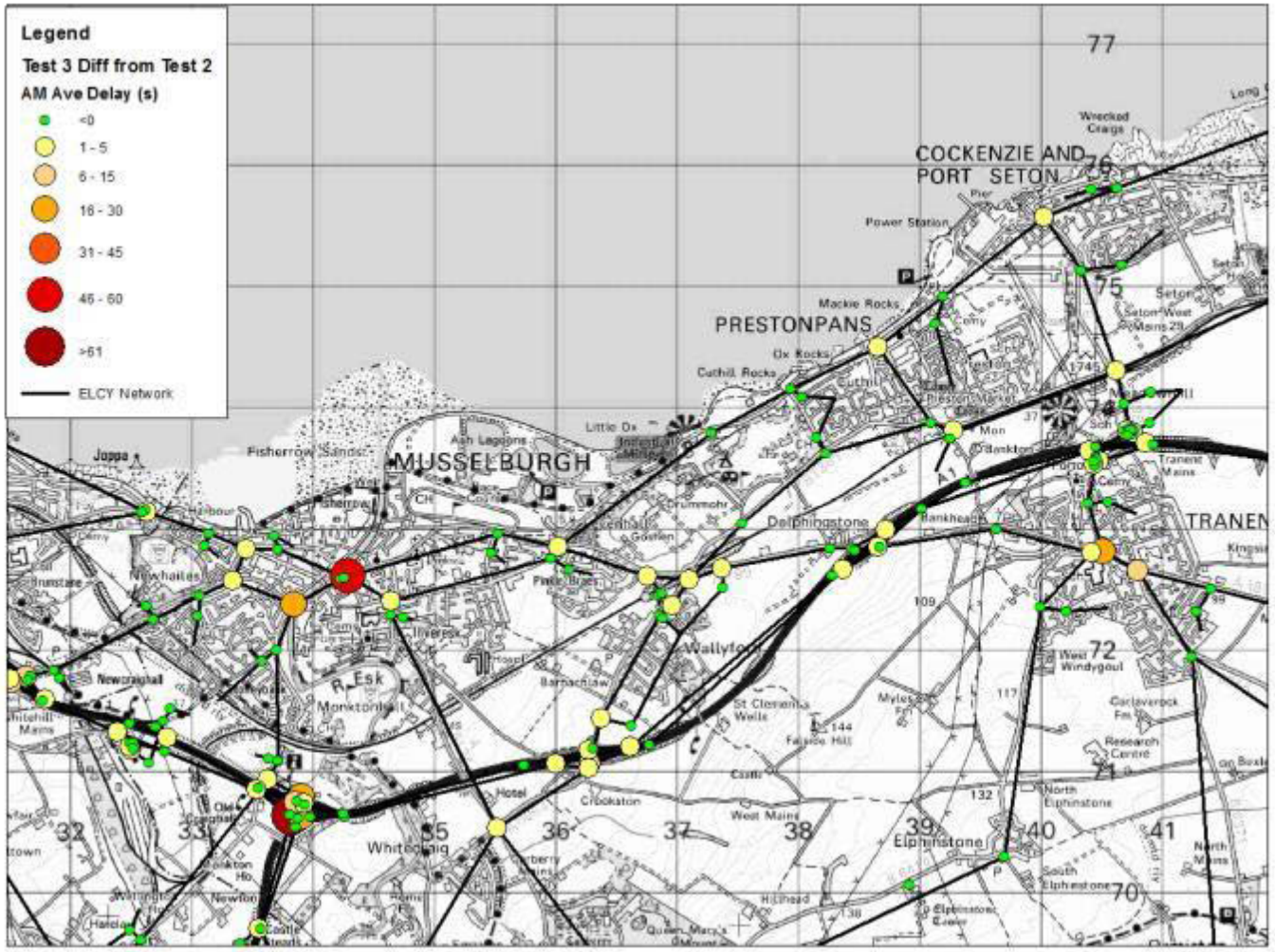

Figure 21. Test 3 vs Test 2 Junction Delay – West (average seconds delay per vehicle)

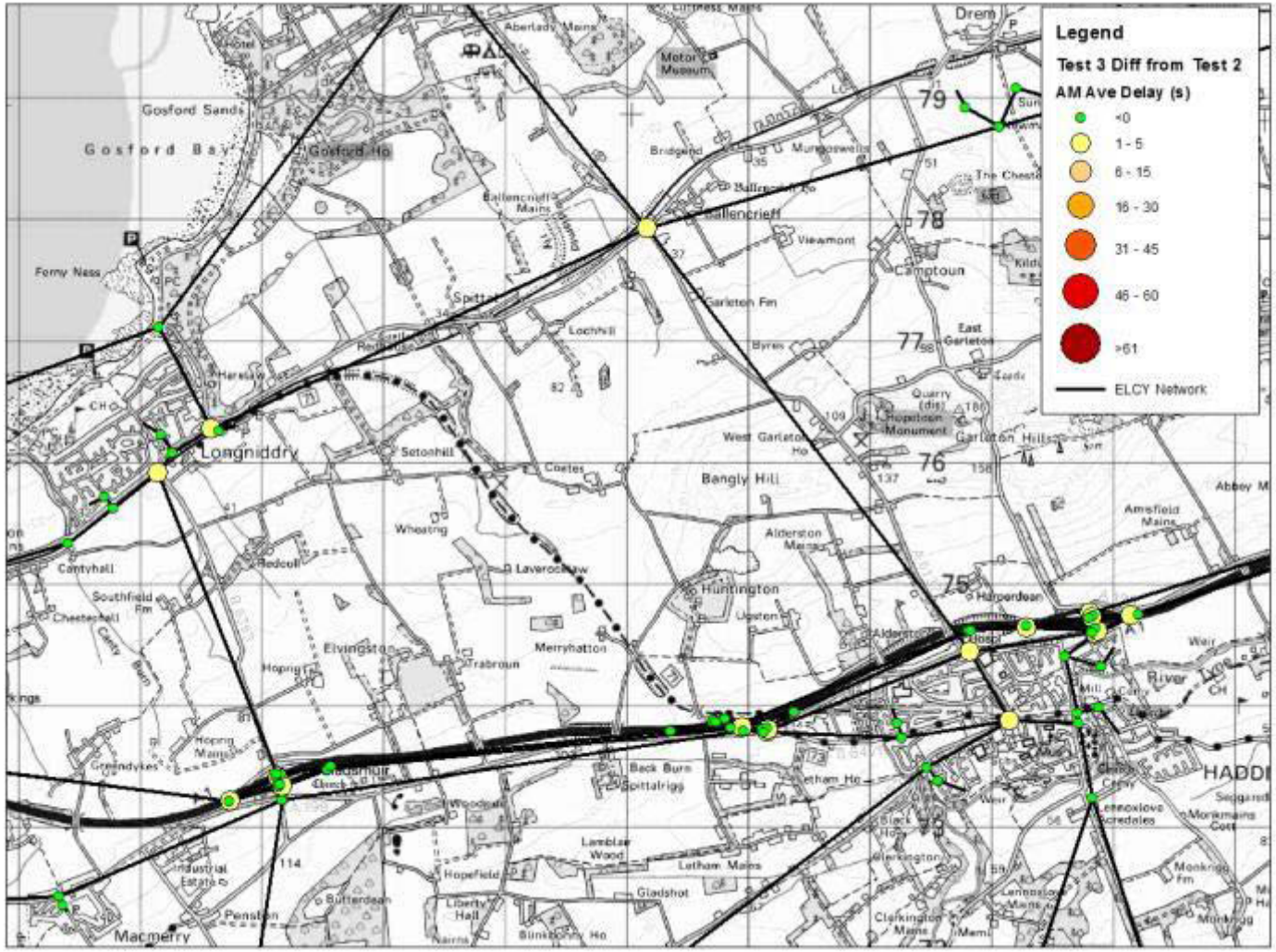

Figure 22. Test 3 vs Test 2 Junction Delay – Mid (average seconds delay per vehicle)

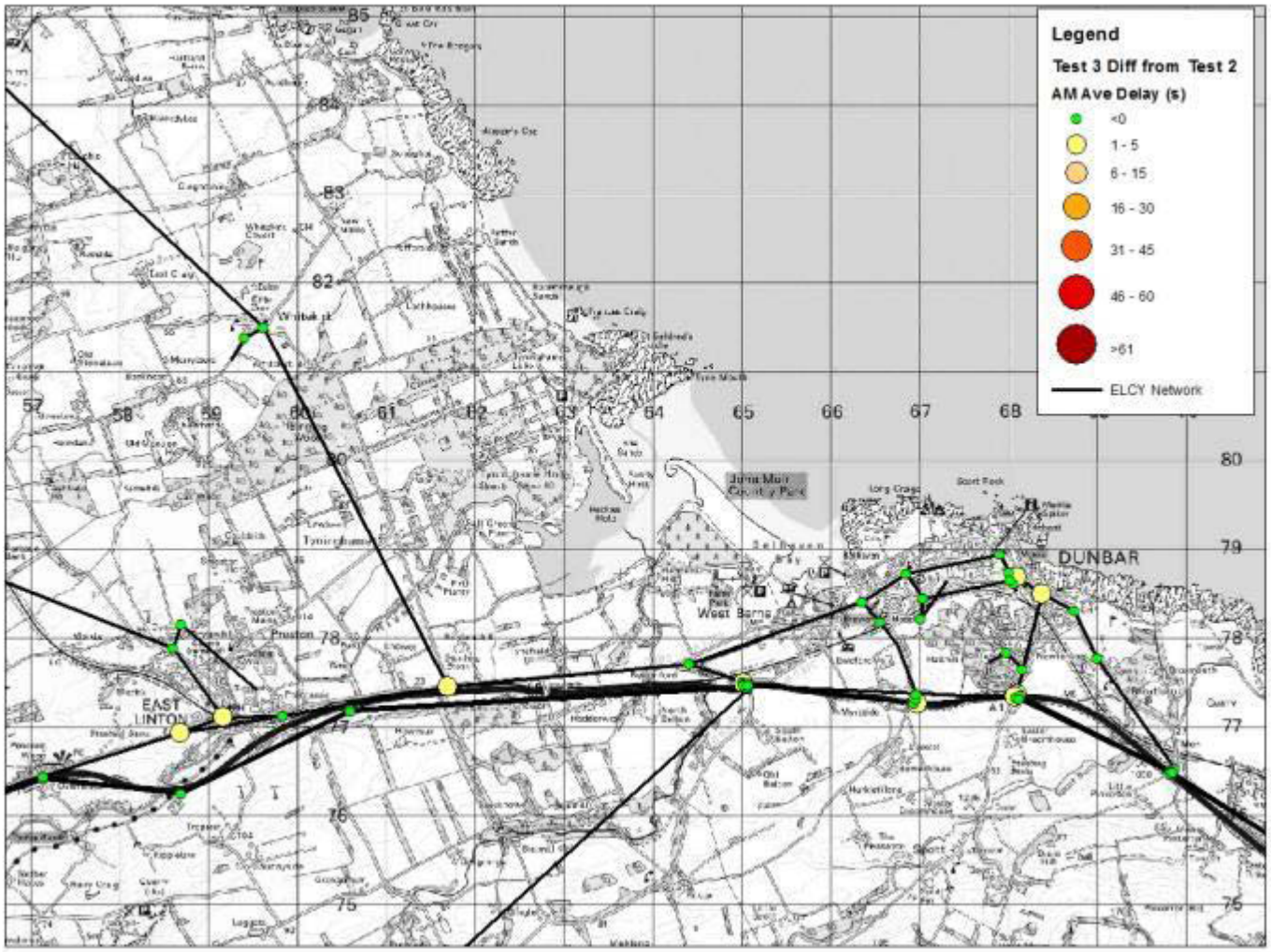

Figure 23. Test 3 vs Test 2 Junction Delay – East (average seconds delay per vehicle)

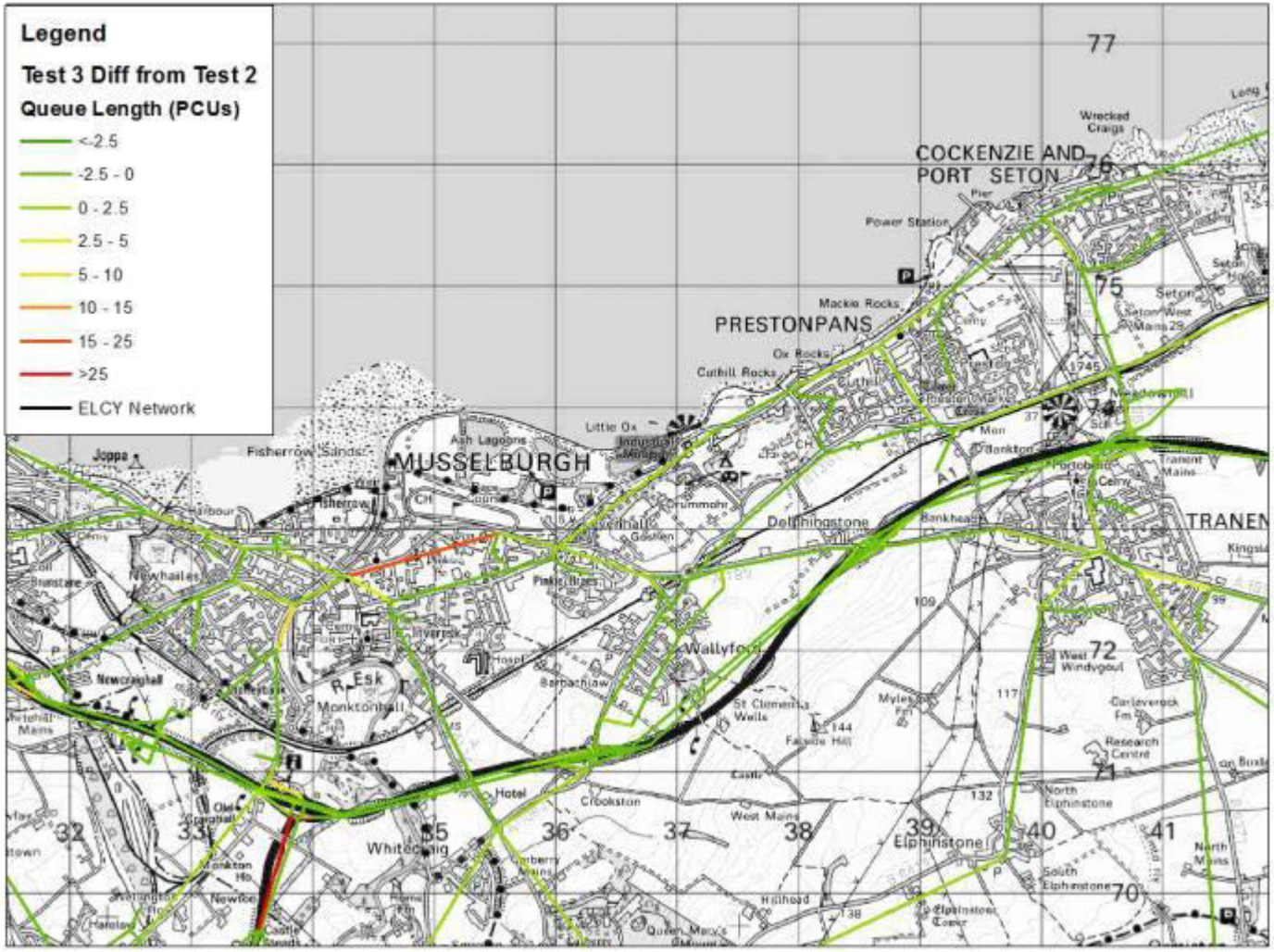

Figure 24. Test 3 vs Test 2 Queue Lengths – West

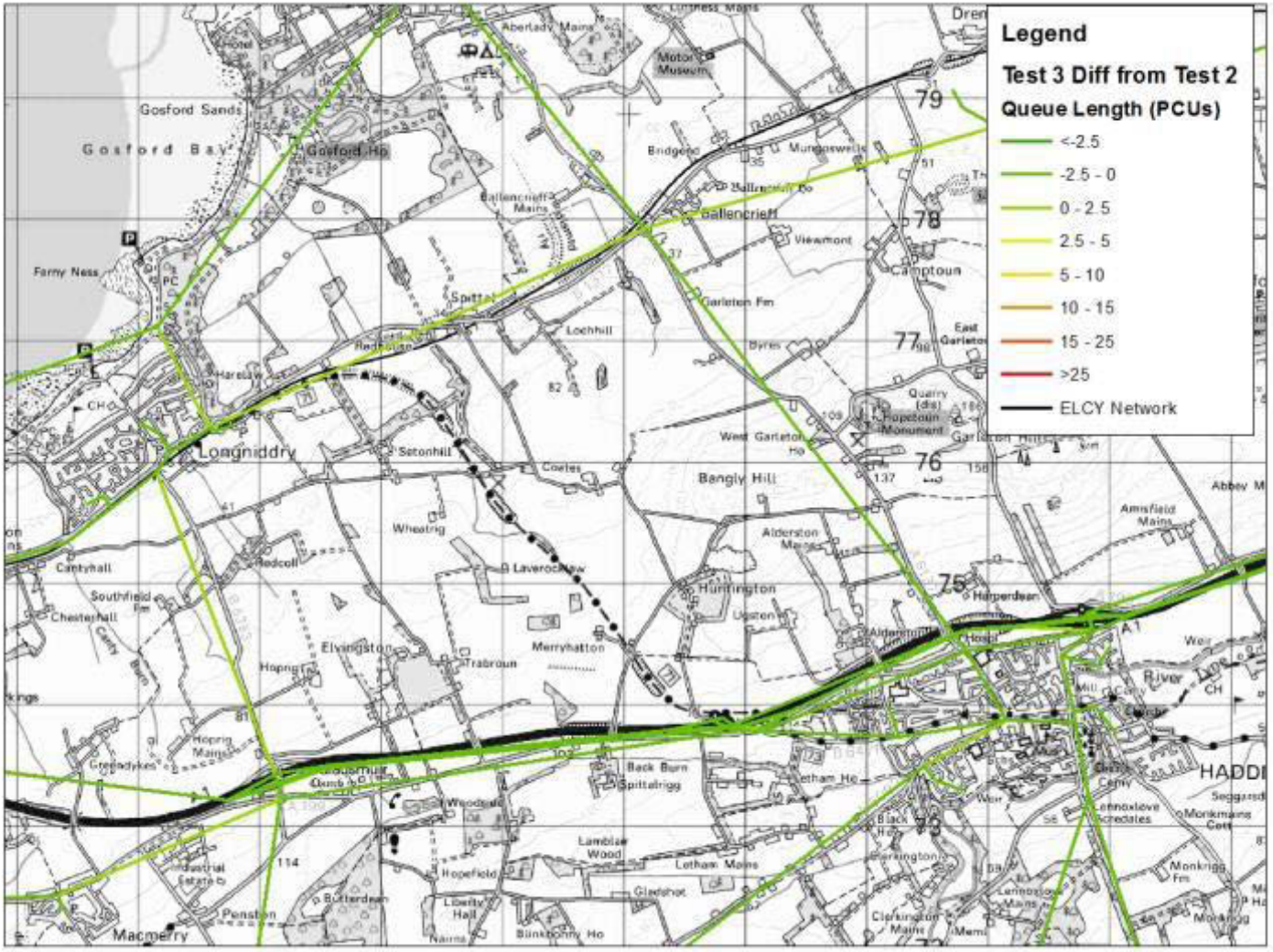

Figure 25. Test 3 vs Test 2 Queue Lengths – Mid

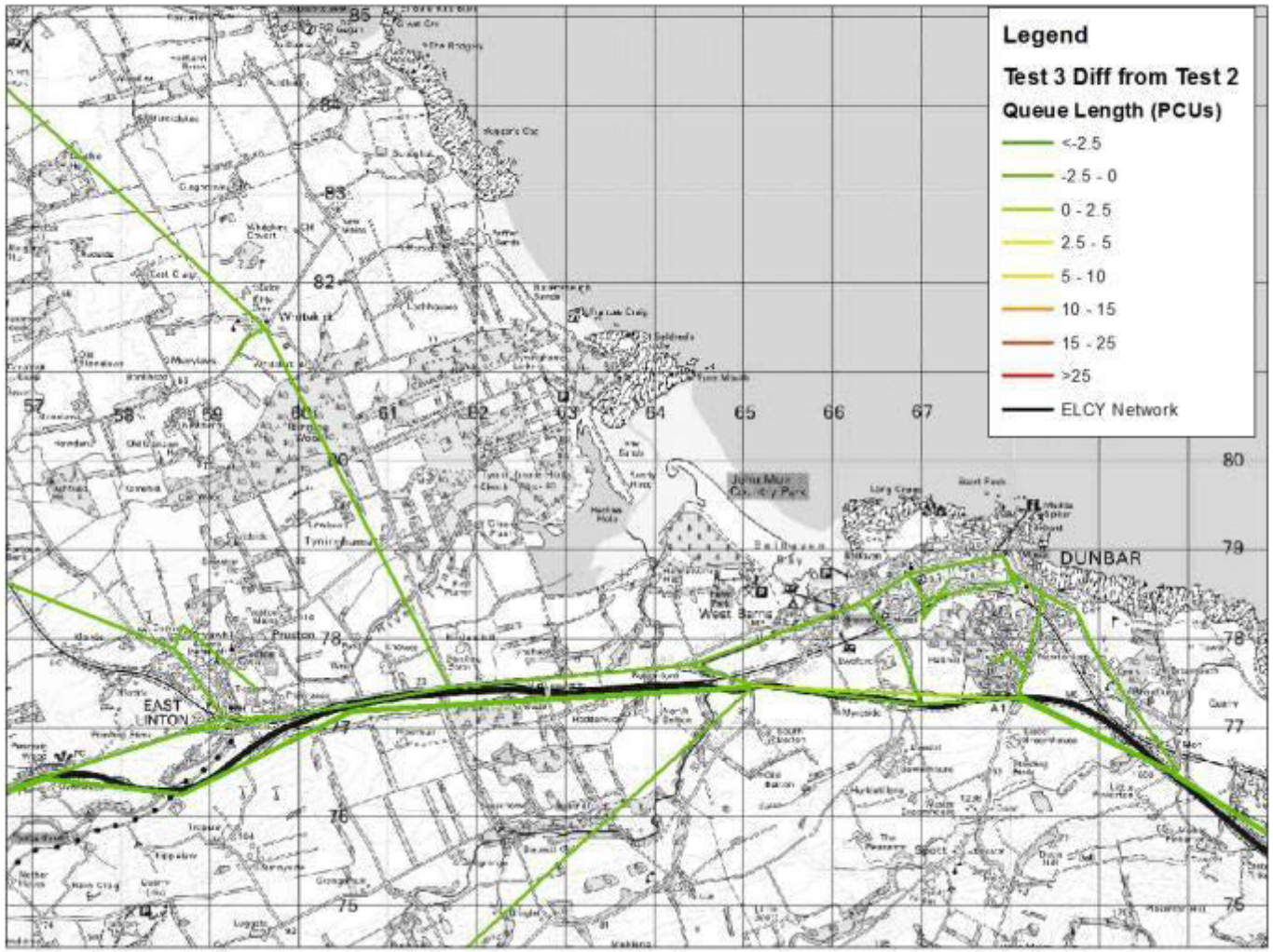

Figure 26. Test 3 vs Test 2 Queue Lengths – East

7.5 Test 9 – includes Tranent Bypass

7.5.1 The planning data locations for Test 3 are mapped in Figure 27 and Figure 28. The difference in AM average delay per vehicle at each junction in Test 9 compared to the 2024 Reference Case (Test 2) is displayed in Figures 29 to 32, below. The change in AM average queue lengths on each link is displayed in Figures 33 to 35.

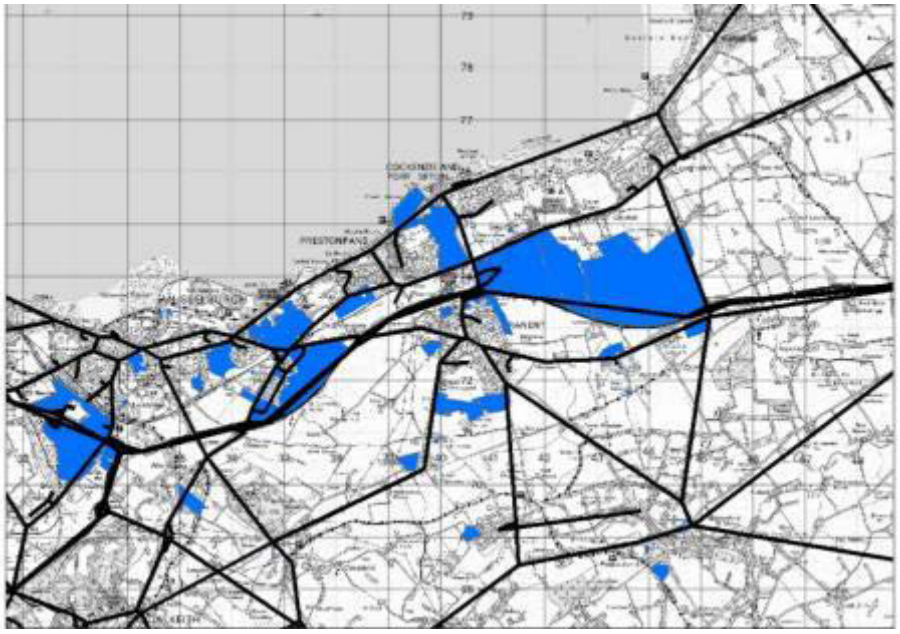

Figure 27. East Lothian Test 9 Development (West)

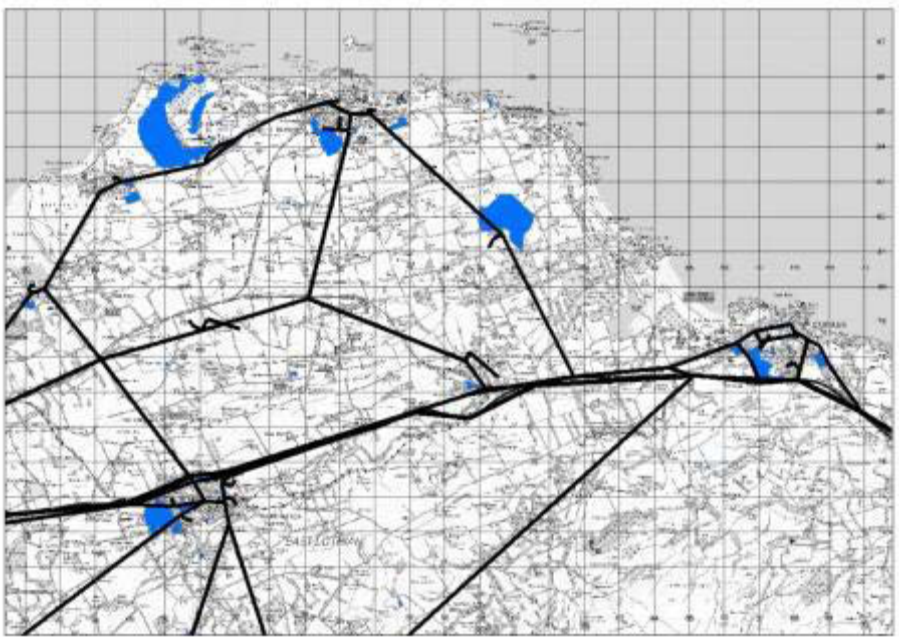

Figure 28. East Lothian Test 9 Development (East)

7.5.2 The model indicates that the increase in average delay per vehicle at each junction in Test 9 relative to Test 2 would be less than 10 seconds at most locations, and the majority of the queue lengths are predicted to increase by less than 2.5 PCUs.

7.5.3 The Tranent Roundabouts indicate a negligible change in delay between Test 2 and Test 9. The increase in delay in Tranent town centre is lower in this scenario due to the Bypass removing traffic from the town centre.

7.5.4 The average delay at the Tranent Bypass roundabouts is predicted to be between 15 and 30 seconds per vehicle at either end of the bypass, and between five and 15 seconds per vehicle at the intermediate three junctions.

7.5.5 The average delay at the B6371 / Bridge Street / High Street junction in Tranent is expected to be reduced by approximately 20 seconds per vehicle due to the provision of the Tranent Bypass, which results in reduced traffic volume travelling through Tranent town centre. The Tranent Bypass is predicted to allow an element of rerouting from east Tranent and Blindwells developments to the B6371 and Tranent Bypass improving traffic conditions within Tranent.

7.5.6 However, there are a number of junctions where a significant increase in delay and queue length is predicted.

7.5.7 At Old Craighall, the average delay at the westbound and eastbound diverge stoplines is predicted to increase by approximately eight and 11 seconds per vehicle in Test 9. The average delay per vehicle on the A720 City of Edinburgh Bypass approach is predicted to increase by approximately 79 seconds. The change in delay on the approach from Musselburgh is predicted negligible, although some blocking back of the upstream node is predicted that was not present in Test 2. The queue lengths are predicted to increase significantly – an increase of approximately 10 and five PCUs is predicted on the eastbound and westbound diverges respectively, and an increase of over 25 PCUs on the A720 City of Edinburgh Bypass approach. Due to the blocking back, the approach from Musselburgh indicates an additional queue length of five to 10 PCUs.

7.5.8 Furthermore, it is predicted that the average delay at the High Street / Dalrymple Loan junction in Musselburgh will increase by approximately 50 seconds between Test 2 and Test 9. It is also predicted that there will be a significant increase in queuing, with approximately 10 and 20 additional PCUs queuing on Dalrymple Loan and High Street respectively.

7.5.9 The effect of the Tranent Bypass in terms of overall network performance is negligible, however it significantly improves the following junctions in Tranent:

- B6371 / Haddington Road;
- B6371 / Bridge Street / High Street; and
- Bridge Street / New Road.

Key Issues: Significant increase in delays and queue lengths at Old Craighall and the High Street / Dalrymple Loan junction in Musselburgh.

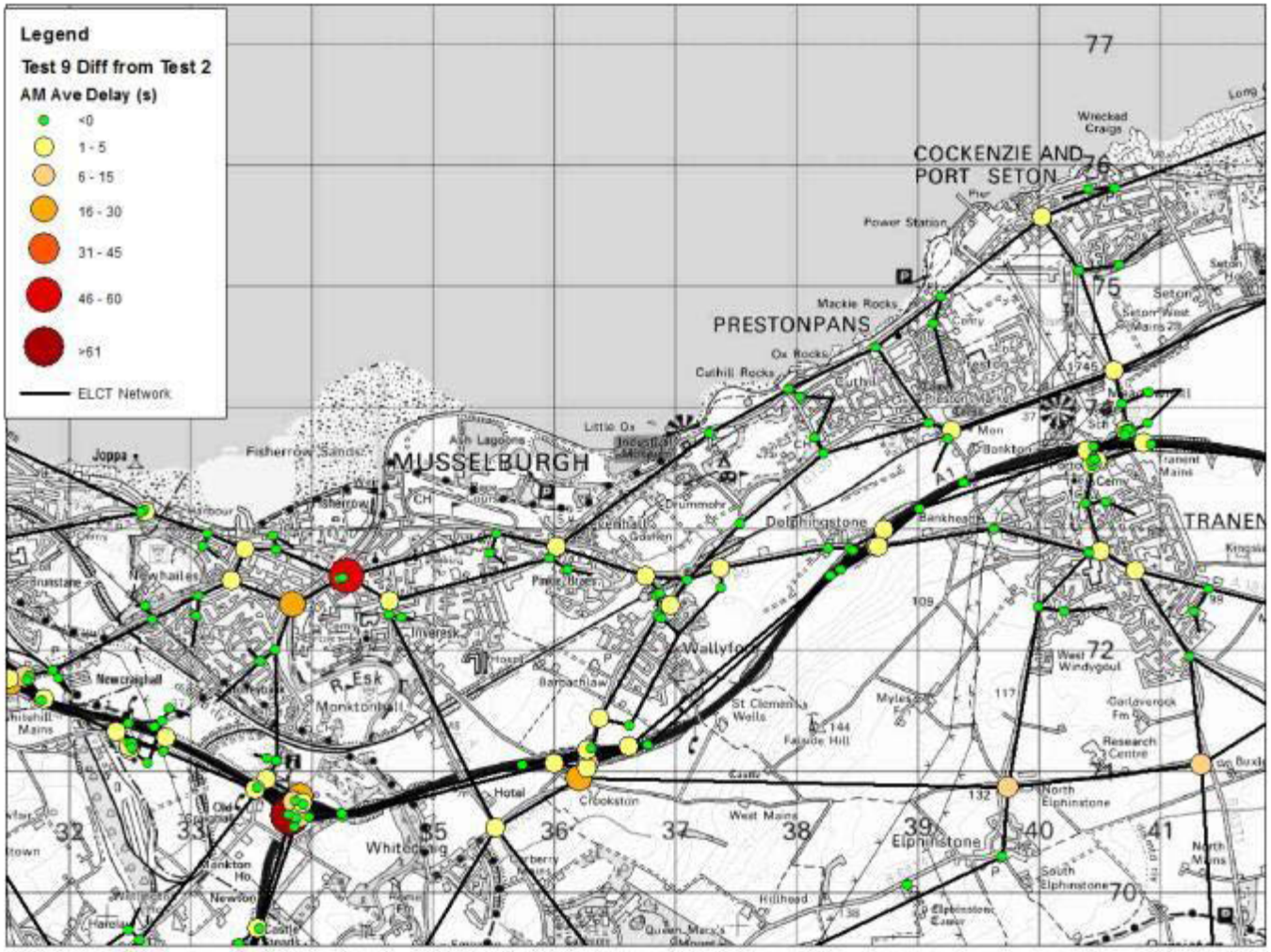

Figure 29. Test 9 vs Test 2 Junction Delay – West (average seconds delay per vehicle)

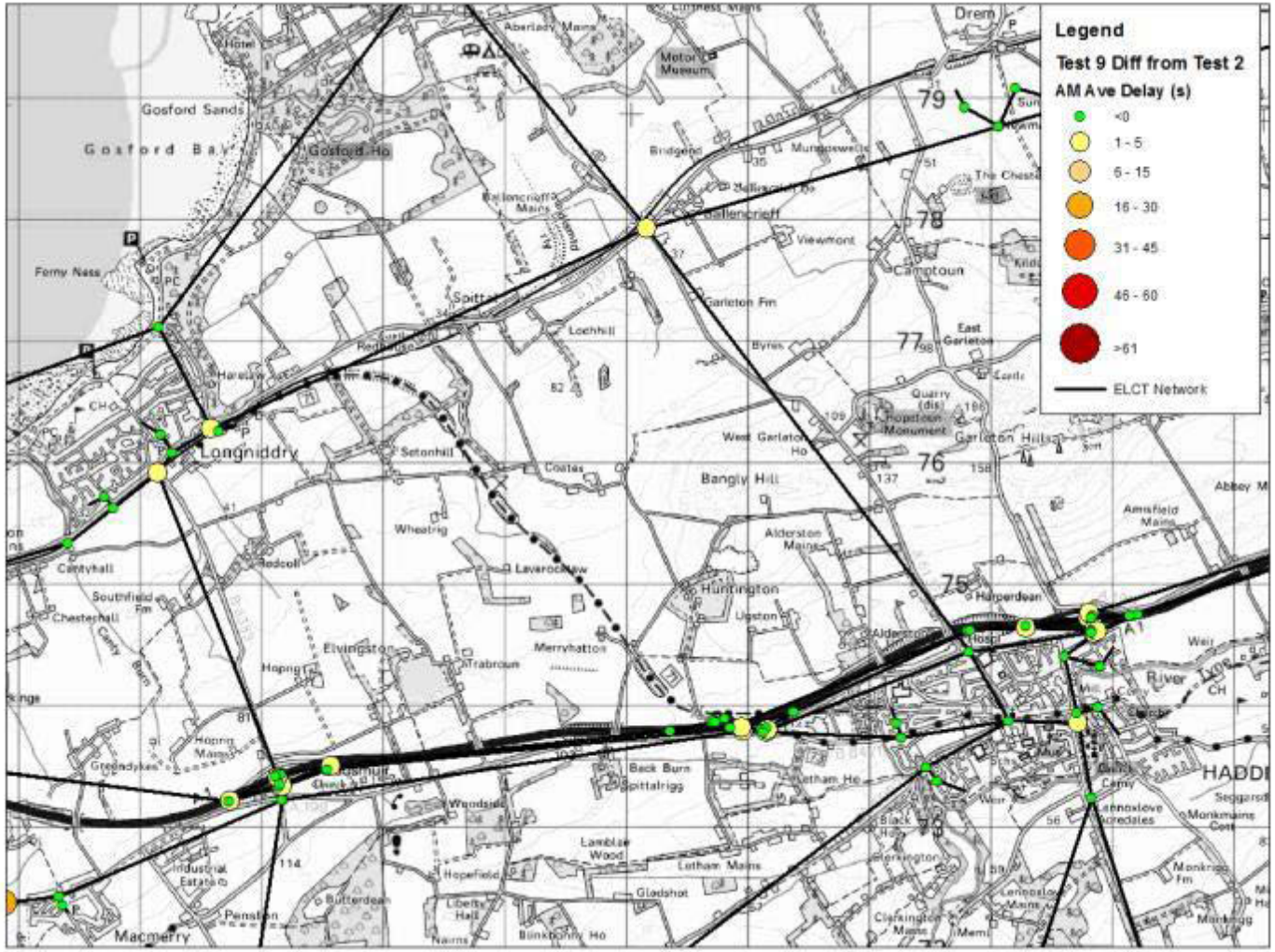

Figure 30. Test 9 vs Test 2 Junction Delay – Mid (average seconds delay per vehicle)

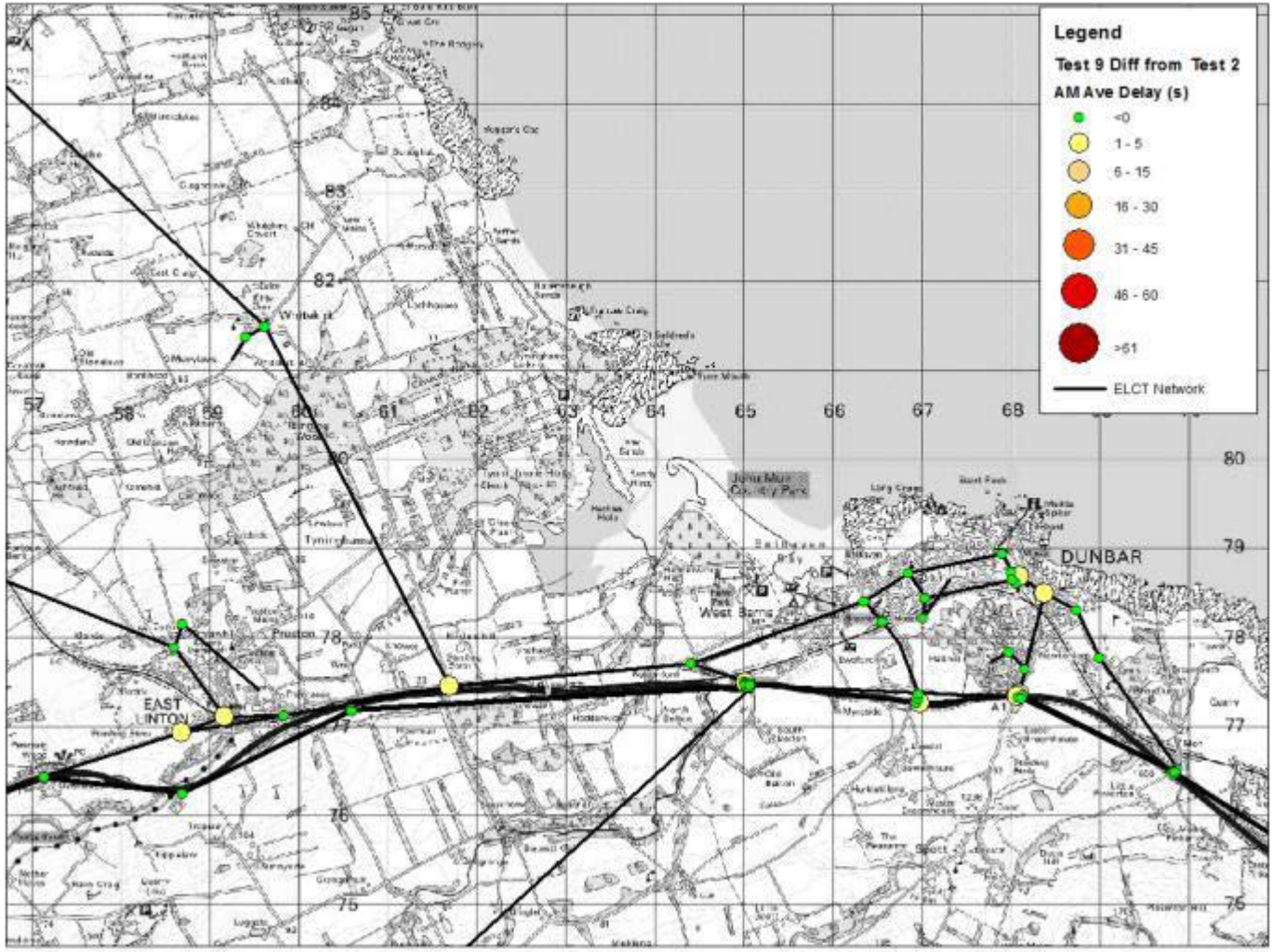

Figure 31. Test 9 vs Test 2 Junction Delay – East (average seconds delay per vehicle)

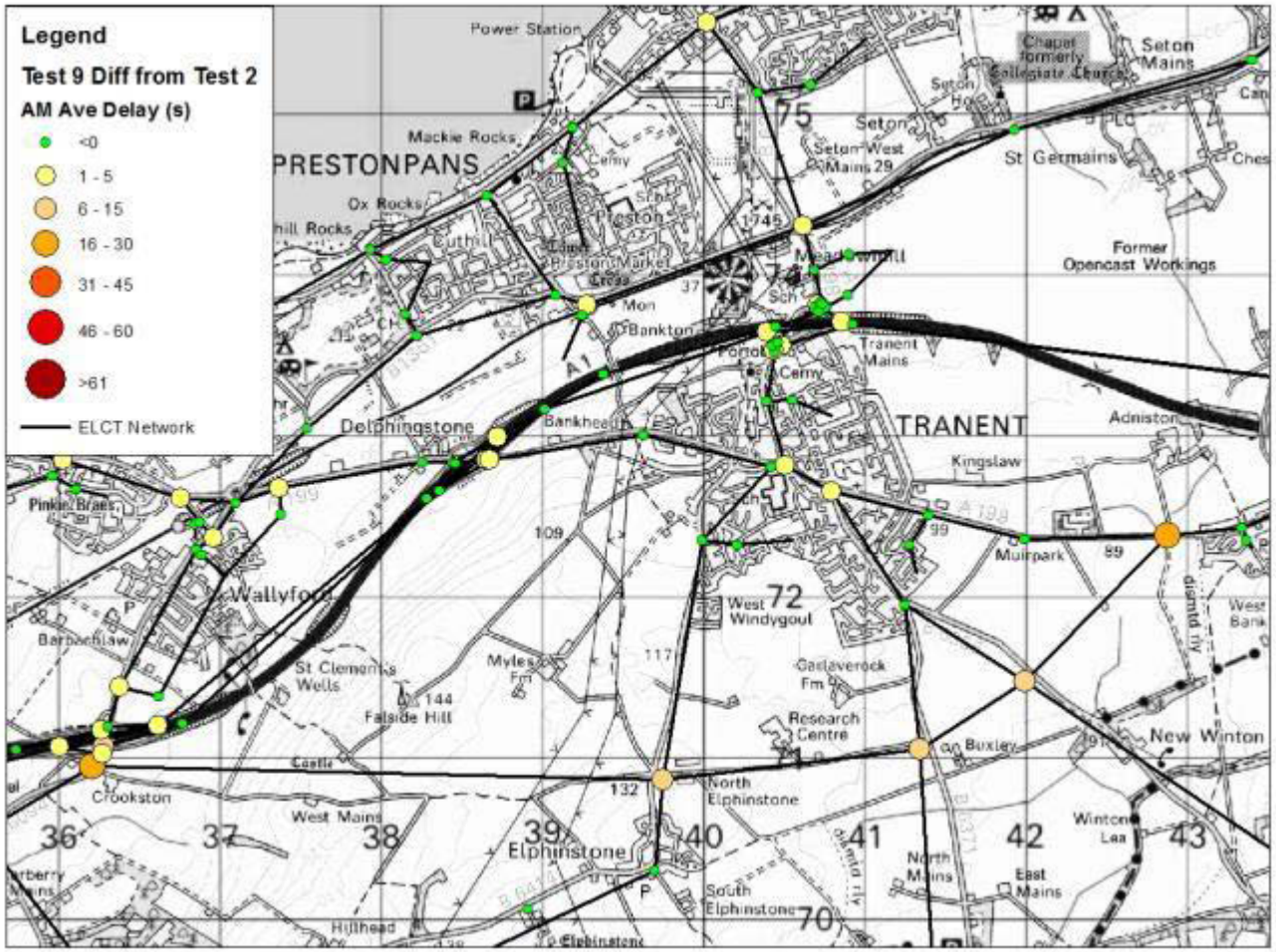

Figure 32. Test 9 vs Test 2 Junction Delay – Tranent Bypass (average seconds delay per vehicle)

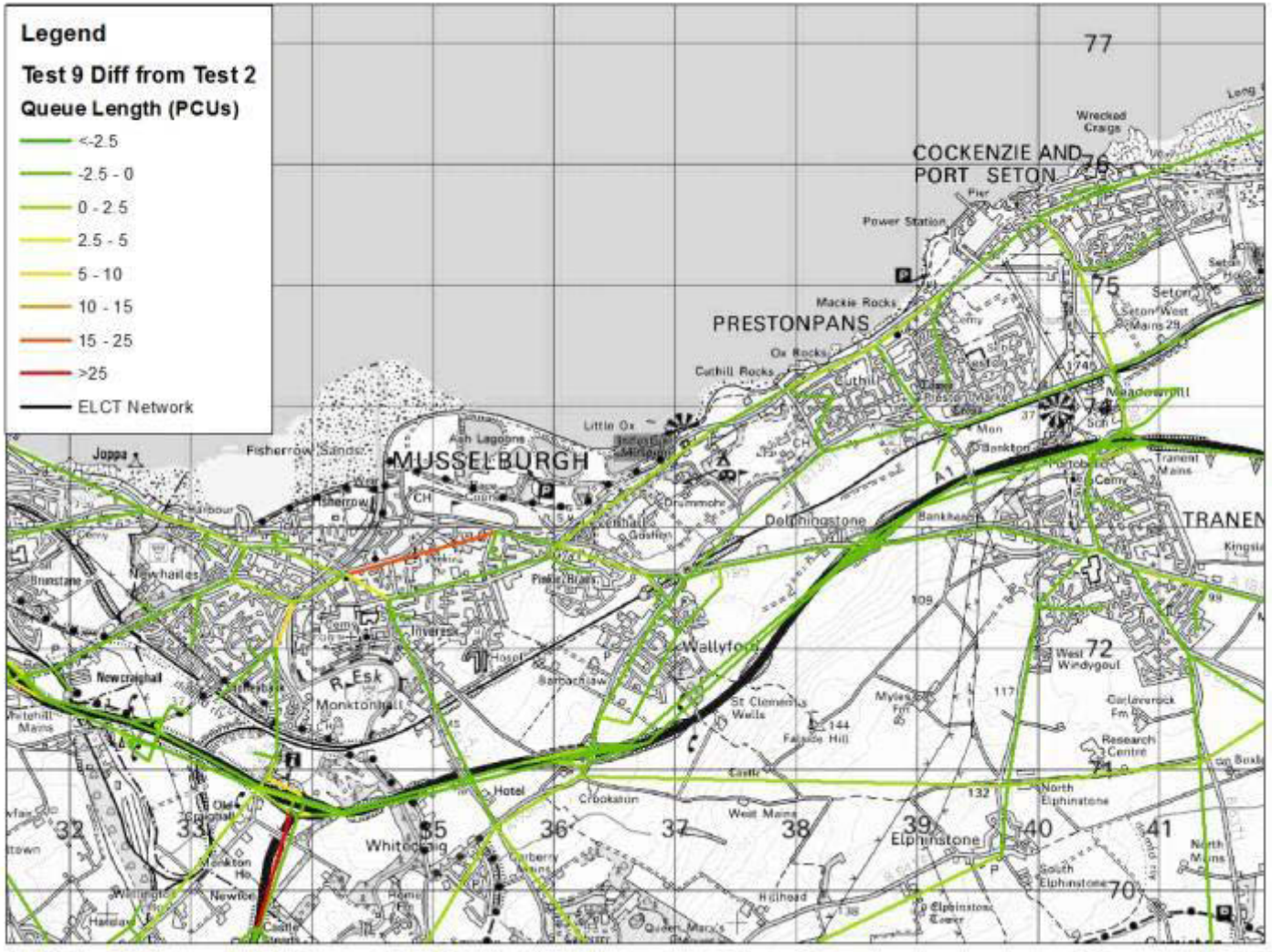

Figure 33. Test 9 vs Test 2 Queue Lengths – West

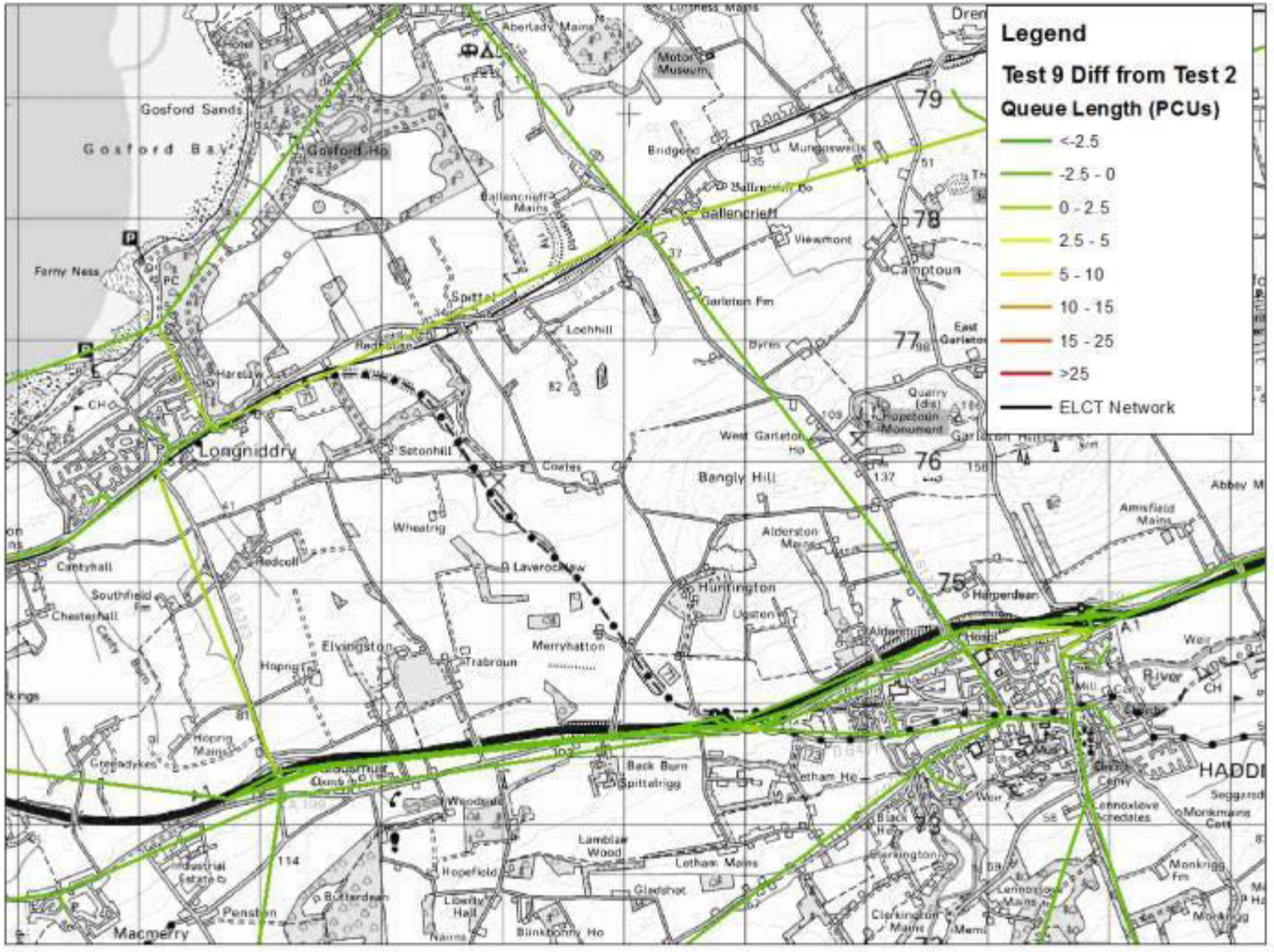

Figure 34. Test 9 vs Test 2 Queue Lengths – Mid

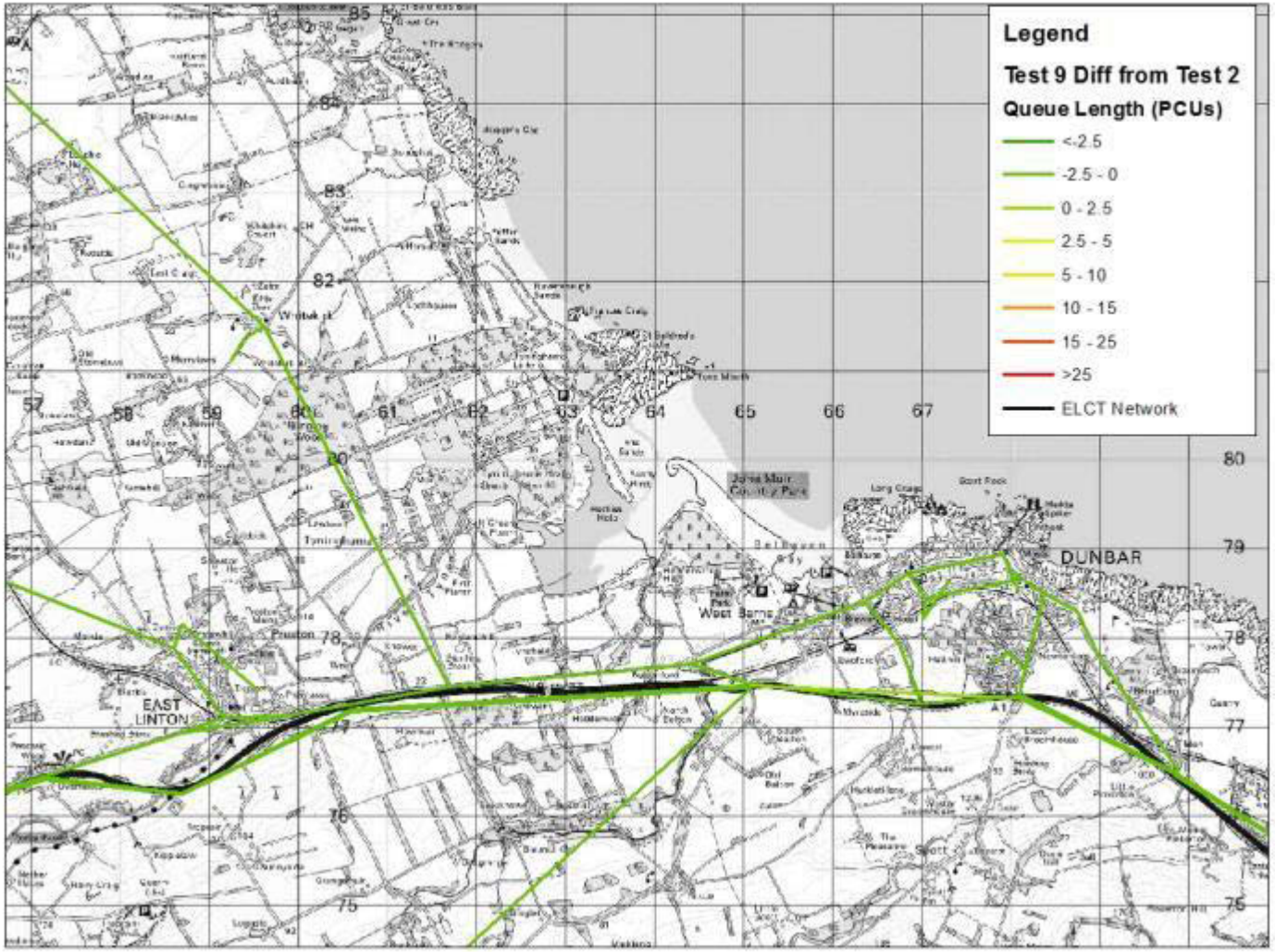

Figure 35. Test 9 vs Test 2 Queue Lengths – East

7.6 Test 11 - inclusion of a Millerhill to QMU link road

7.6.1 The planning data locations for Test 3 are mapped in Figure 36 and Figure 37. The difference in AM average delay per vehicle at each junction in Test 11 compared to the 2024 Reference Case (Test 2) is displayed in Figures 38 – 40, below. The change in AM average queue lengths on each link is displayed in Figures 41 - 43.

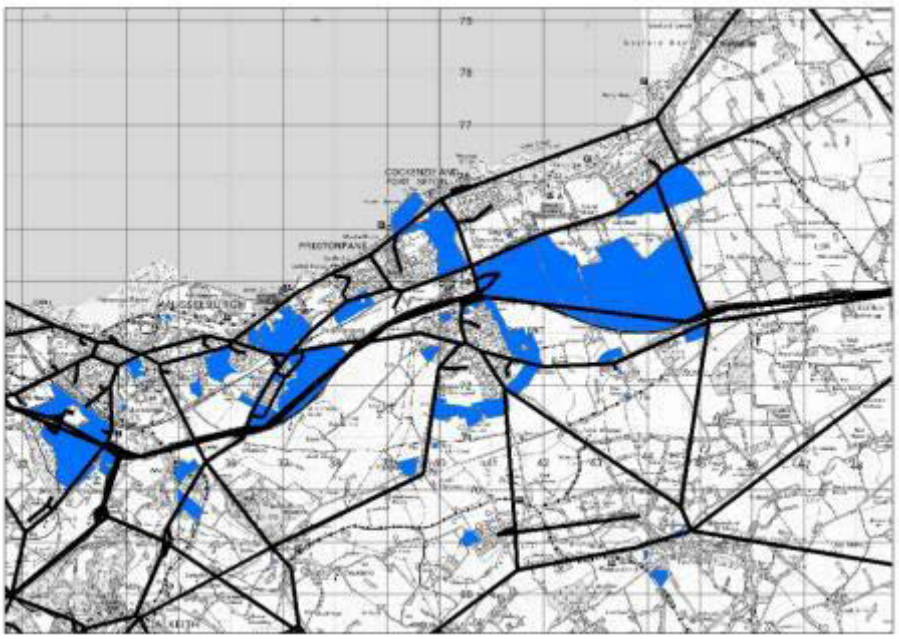

Figure 36. East Lothian Test 11 Development (West)

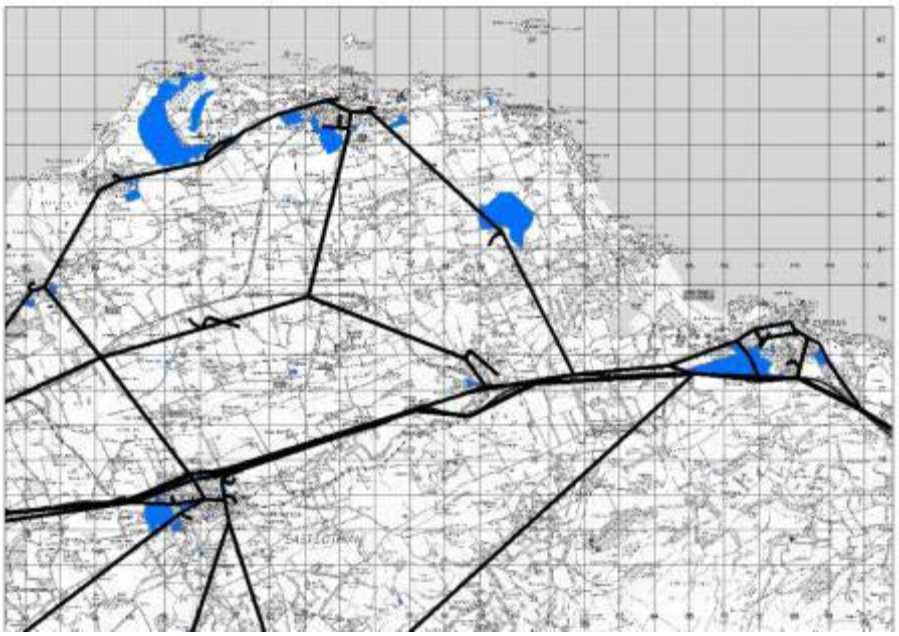

Figure 37. East Lothian Test 11 Development (East)

7.6.2 The model indicates that the increase in average delay per vehicle at each junction would be less than 10 seconds per vehicle at most locations; and the majority of the queue lengths are predicted to increase by less than 2.5 PCUs.

7.6.3 The Tranent Roundabouts indicate a negligible change in delay.

7.6.4 The average delay at the roundabouts connecting the new links to the B6415 is predicted to be between five and 15 seconds per vehicle, with negligible delay at the connections to the existing network.

7.6.5 At Old Craighall, the average delay at the westbound and eastbound diverge stoplines is predicted to improve with the introduction of the Millerhill link to Test 2, due to the new link roads providing an alternative route for traffic in this area. The delay on the A720 City of Edinburgh Bypass approach is also predicted to improve however there is a negative impact on the performance of Musselburgh High Street junctions.

7.6.6 In terms of queue lengths, there is a negligible of improvement to the majority of routes excluding Tranent and Musselburgh High Street.

7.6.7 It is predicted that the average delay per vehicle at the High Street / Dalrymple Loan junction in Musselburgh will increase by over one minute between Test 2 and Test 11. In terms of queue lengths, it is predicted that there will be approximately 10 additional PCUs queuing on Dalrymple Loan and over 25 additional PCUs queuing on High Street.

7.6.8 The effect of the new link road is significant, as it has an effect on a number of key junctions, in particular Old Craighall and the A720/A68 junction.

Key issues: Improvement to Old Craighall traffic conditions. A significant increase of over one minute in average delay is predicted at the High Street / Dalrymple Loan junction and Tranent through movements.

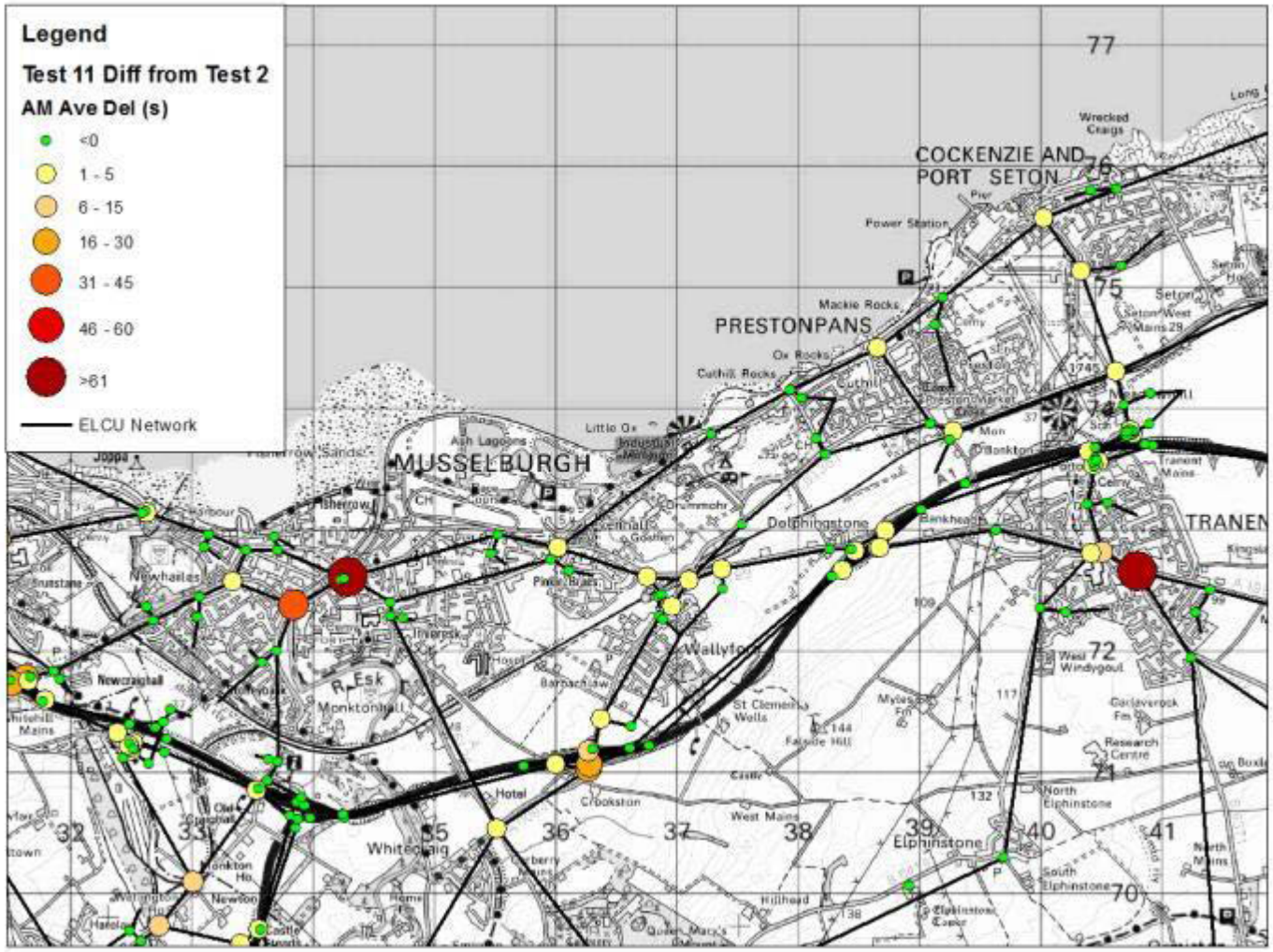

Figure 38. Test 11 vs Test 2 Junction Delay – West (average seconds delay per vehicle)

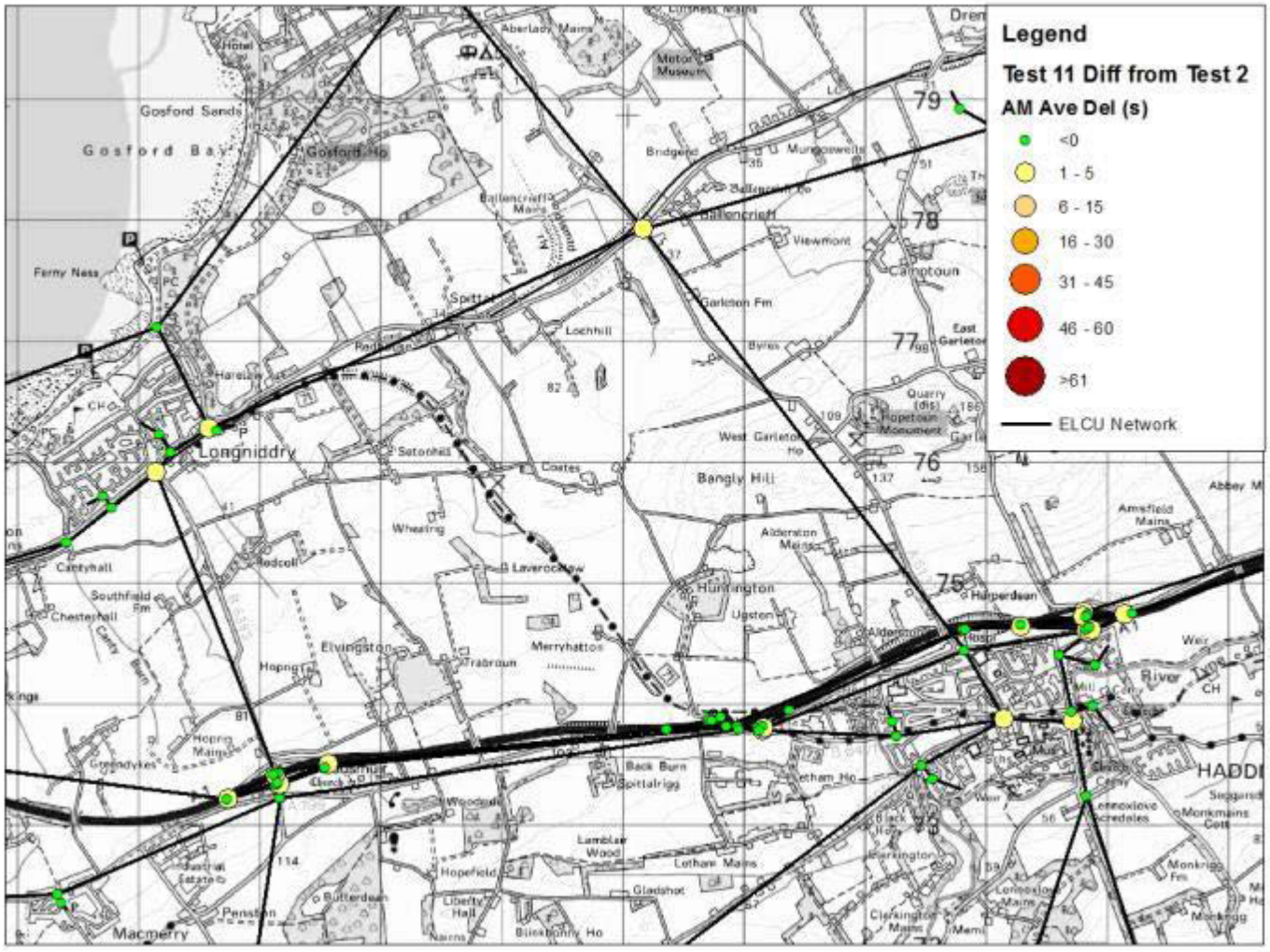

Figure 39. Test 11 vs Test 2 Junction Delay – Mid (average seconds delay per vehicle)

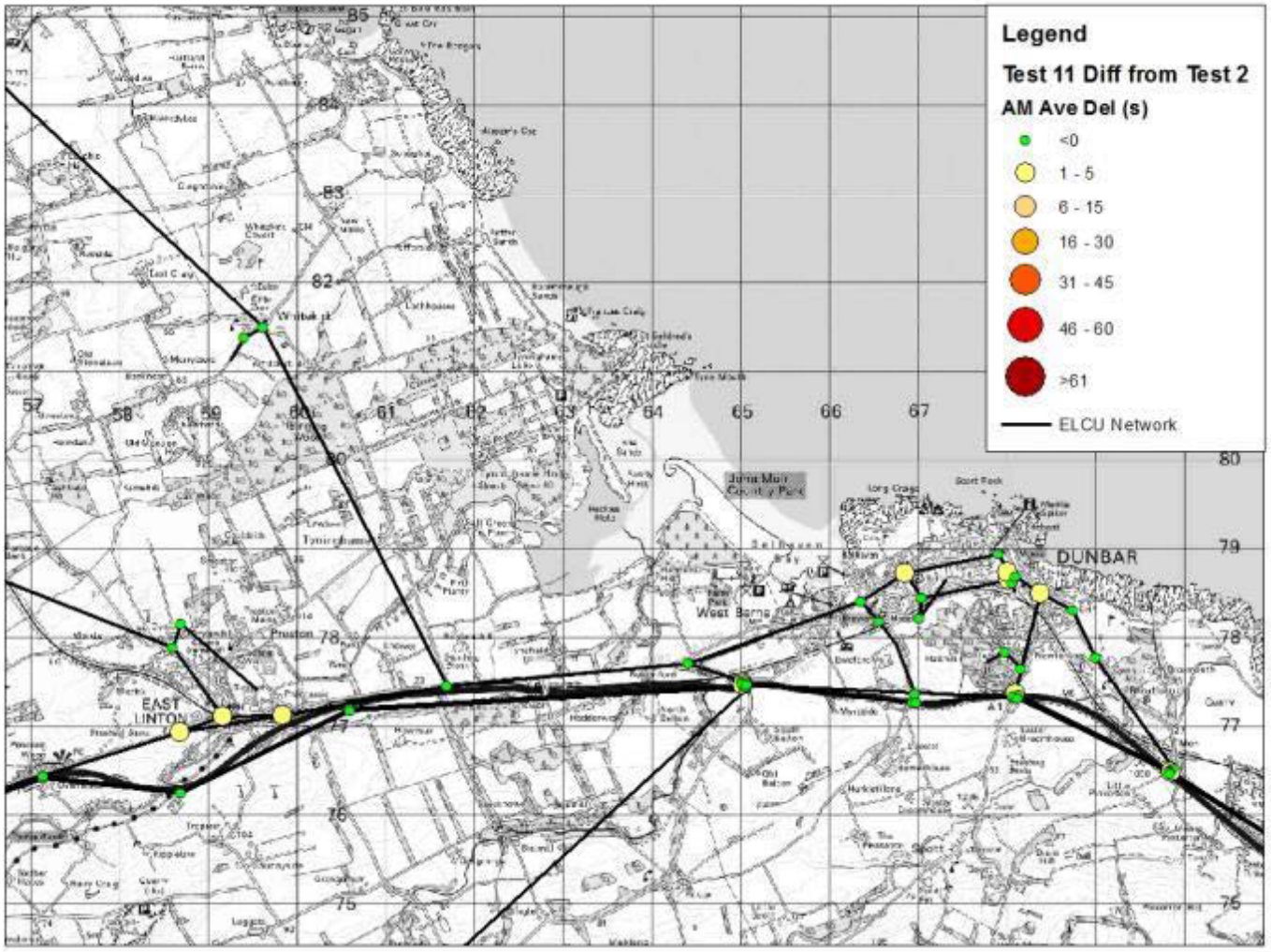

Figure 40. Test 11 vs Test 2 Junction Delay – East (average seconds delay per vehicle)

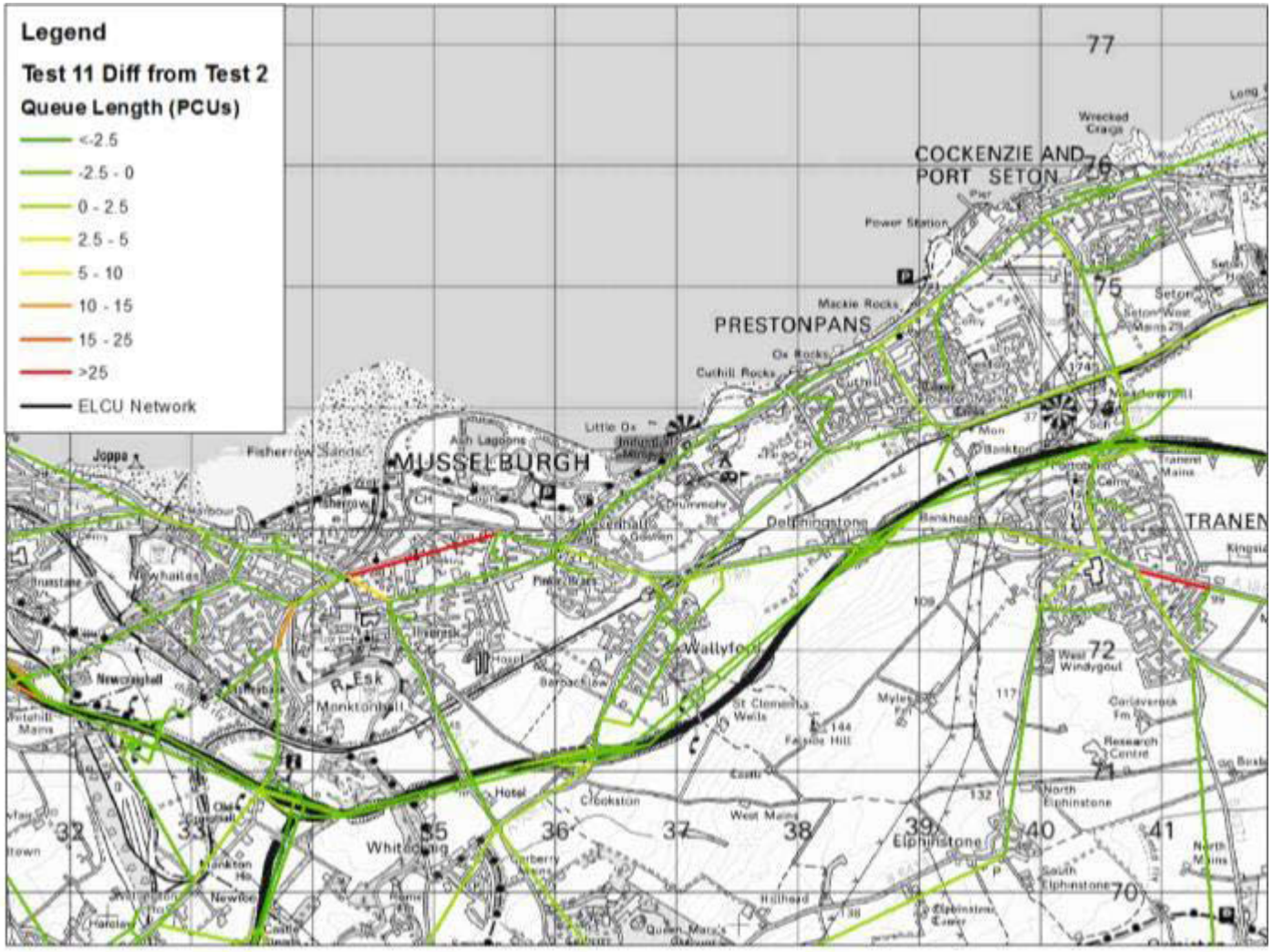

Figure 41. Test 11 vs Test 2 Queue Lengths – West

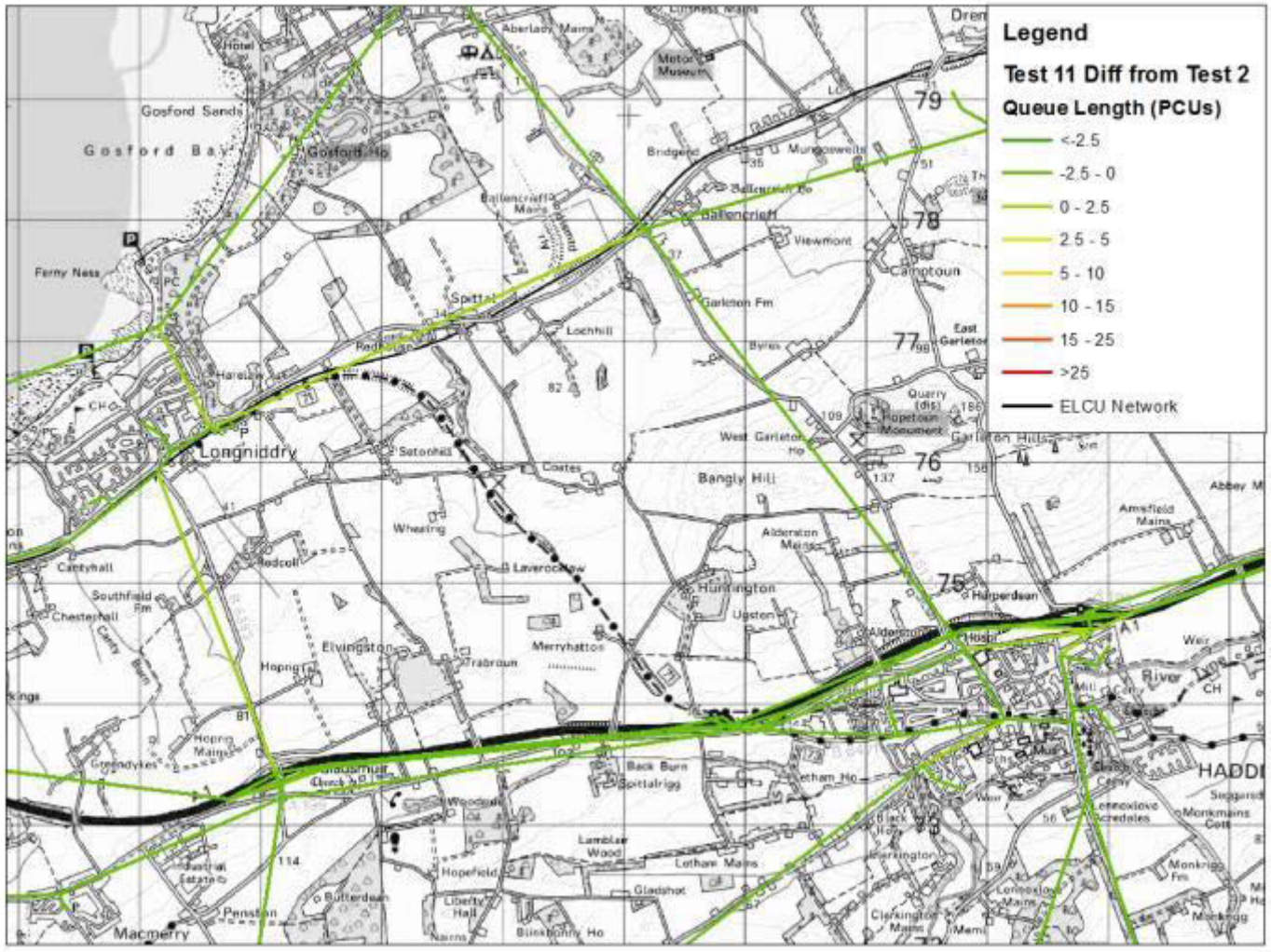

Figure 42. Test 11 vs Test 2 Queue Lengths – Mid

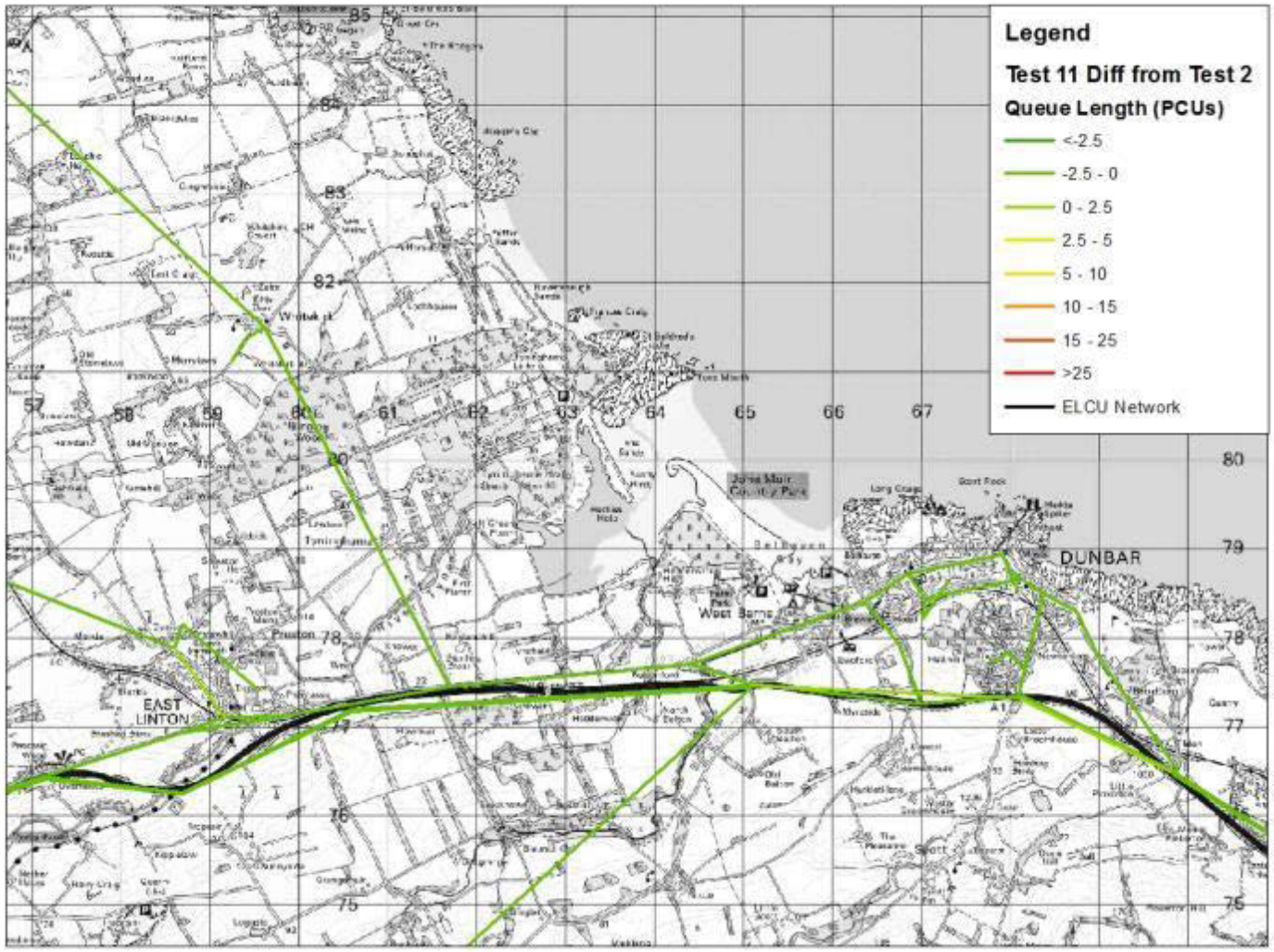

Figure 43. Test 11 vs Test 2 Queue Lengths – East

7.7 Test 12 – highest total number of households

7.7.1 The planning data locations for Test 3 are mapped in Figure 44 and Figure 45. The difference in AM average delay per vehicle at each junction in Test 12 compared to the 2024 Reference Case (Test 2) is displayed in the Figures 46 – 48, below. The change in AM average queue lengths on each link is displayed in Figures 49 - 51.

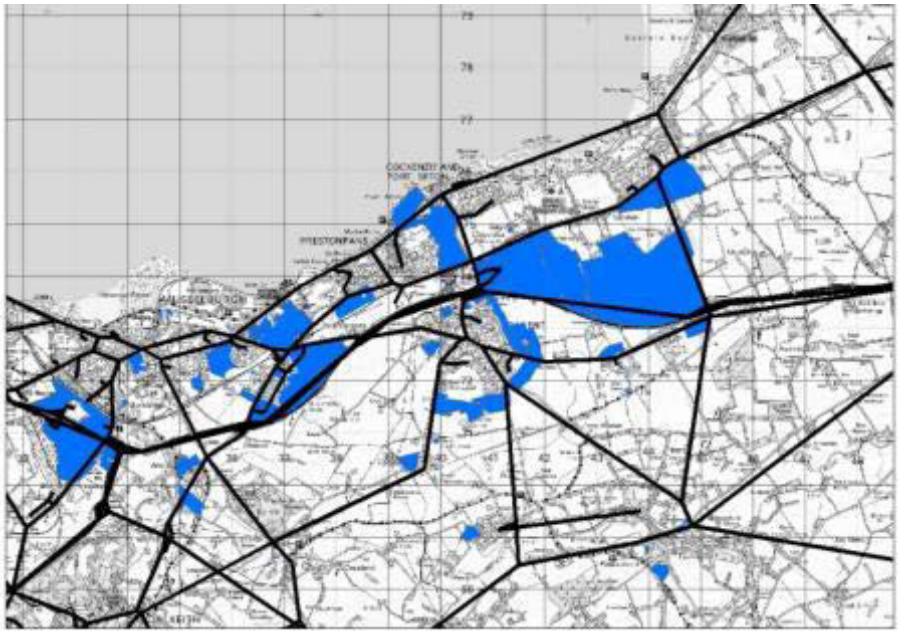

Figure 44. East Lothian Test 11 Development (West)

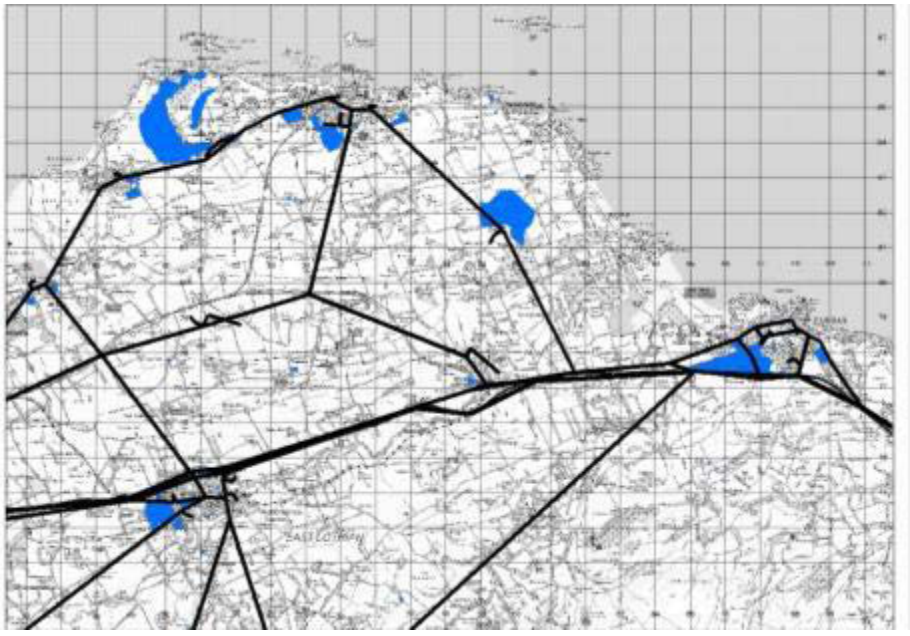

Figure 45. East Lothian Test 11 Development (East)

7.7.2 Modelling indicates that the increase in average delay per vehicle at each junction in Test 12 relative to Test 2 would be less than 10 seconds at most locations; and the majority of the queue lengths are predicted to increase by less than 2.5 PCUs.

7.7.3 The Tranent Roundabouts indicate a negligible change in delay.

7.7.4 At Old Craighall, however, the average delay at the westbound and eastbound diverge stoplines is predicted to increase by approximately 41 and 18 seconds, with queue lengths predicted to increase significantly by approximately 20 and 10 PCUs on the westbound and eastbound diverges respectively. The delay on the A720 City of Edinburgh Bypass approach is predicted to increase by approximately 73 seconds, with an increase of over 25 PCUs. The delay on the approach from Musselburgh is predicted to increase negligibly, although some blocking back of the upstream node is predicted that was not present in Test 2, and this is predicted to give rise to an additional queue length of 5 to 10 PCUs.

7.7.5 Furthermore, it is predicted that the average delay at the High Street / Dalrymple Loan junction in Musselburgh will increase by over one minute, with approximately 10 and 20 additional PCUs queuing on Dalrymple Loan and High Street respectively.

7.7.6 The delay at the High Street / Church Street roundabout in Tranent is predicted to increase by approximately 40 seconds.

Key issues: significant increases in average delays are predicted at the westbound and eastbound diverge stoplines at Old Craighall; at the High Street / Dalrymple Loan junction in Musselburgh; and at the High Street / Church Street roundabout at Tranent.

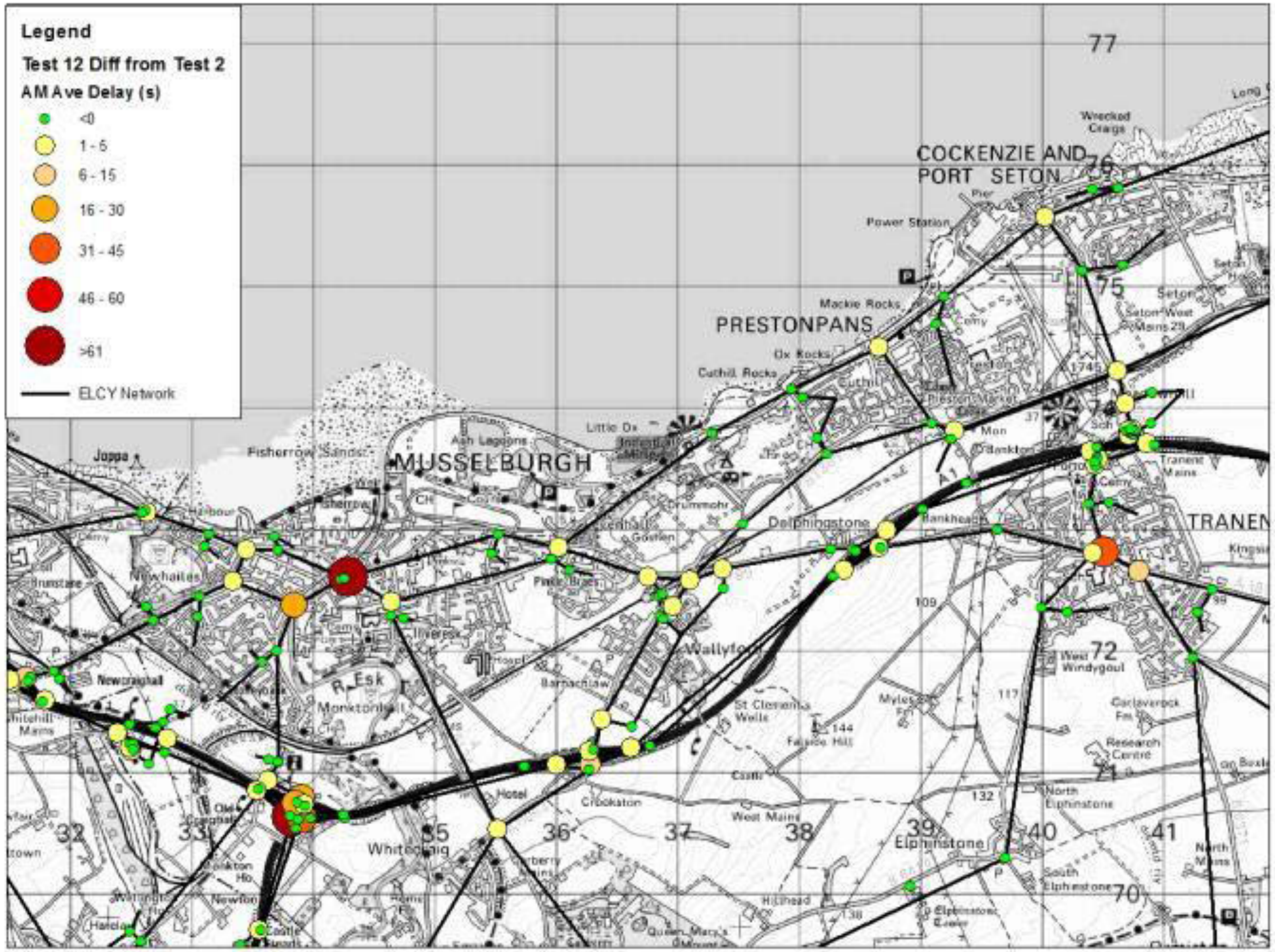

Figure 46. Test 12 vs Test 2 Junction Delay – West (average seconds delay per vehicle)

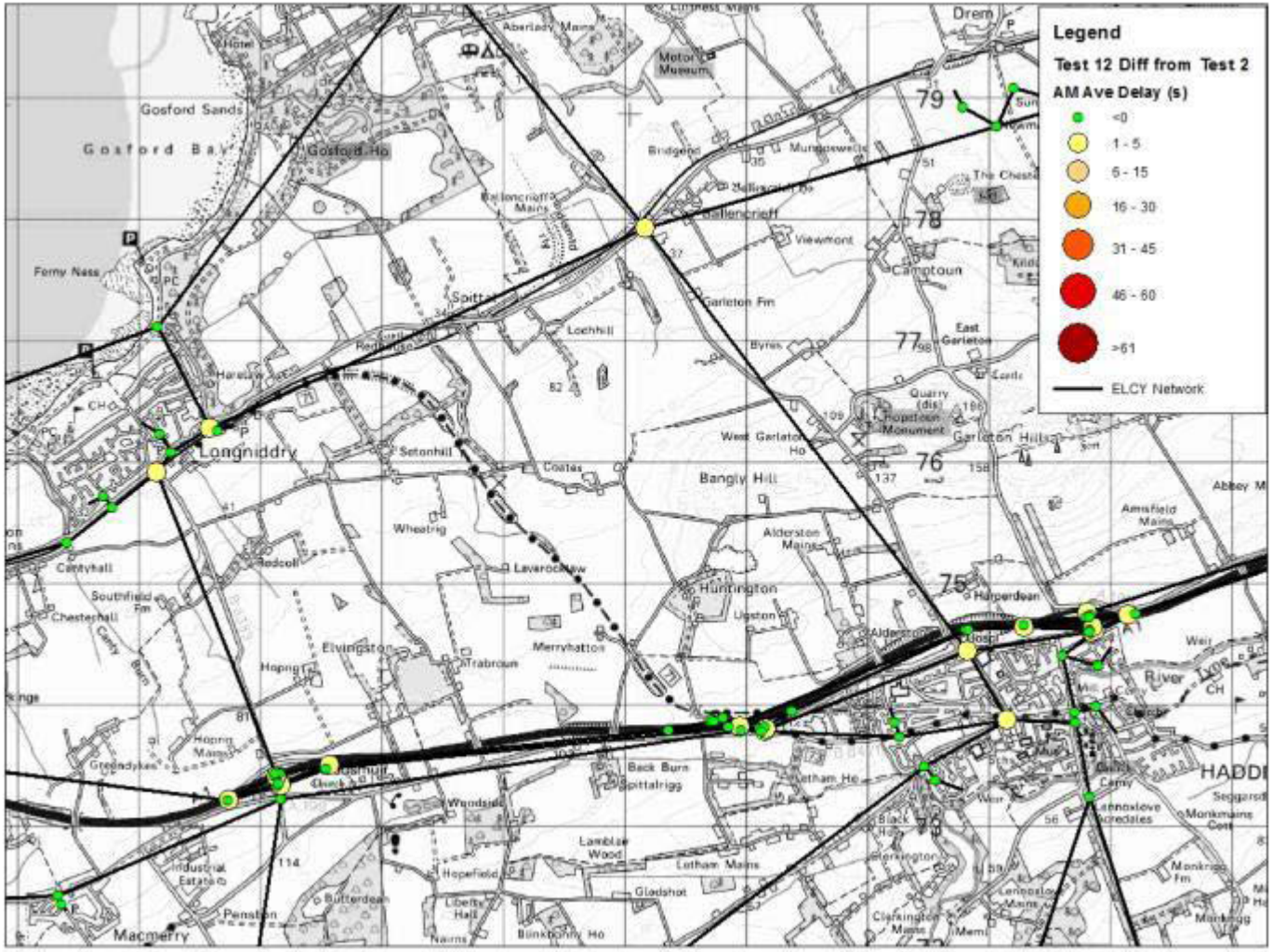

Figure 47. Test 12 vs Test 2 Junction Delay – Mid (average seconds delay per vehicle)

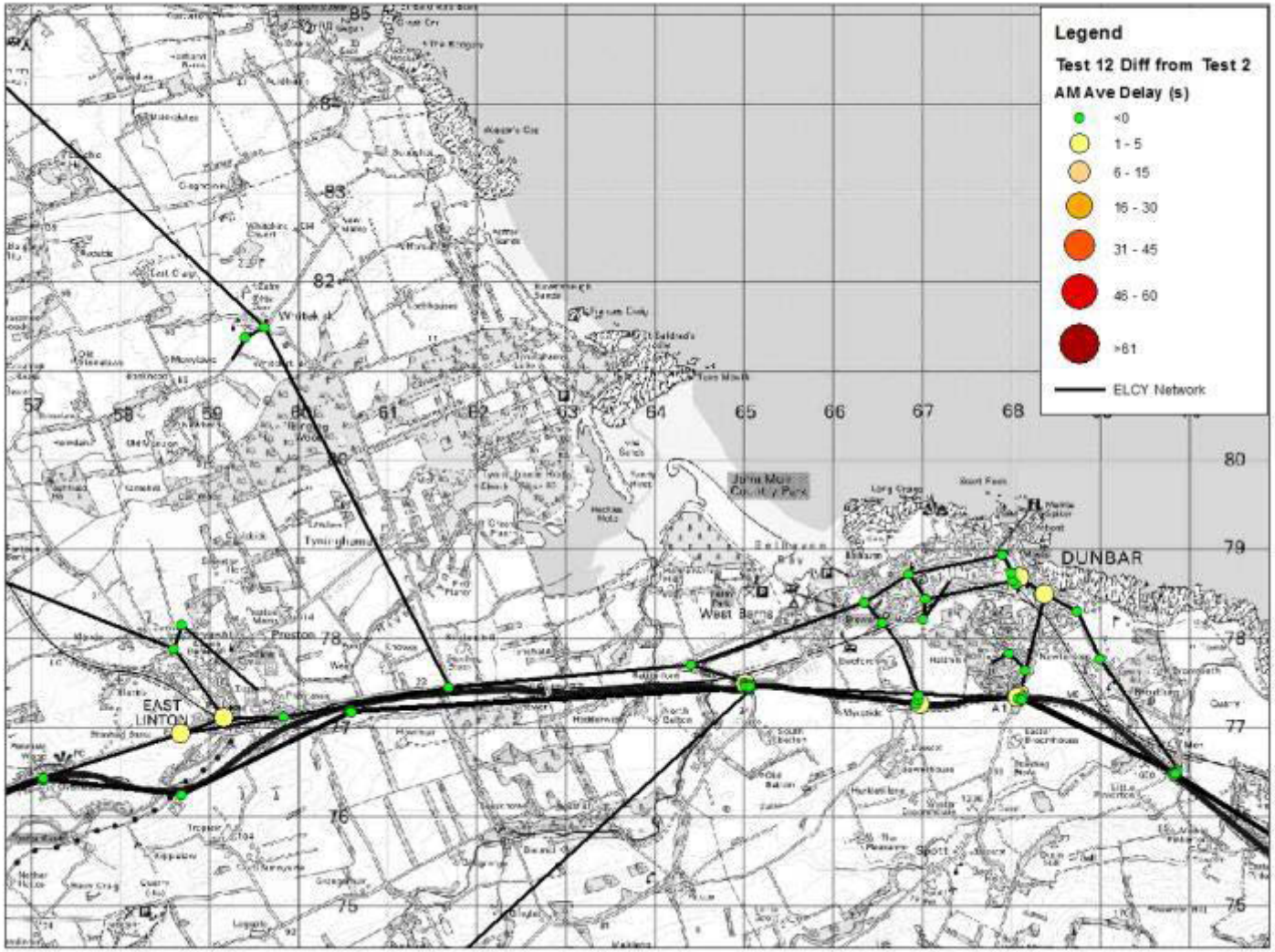

Figure 48. Test 12 vs Test 2 Junction Delay – East (average seconds delay per vehicle)

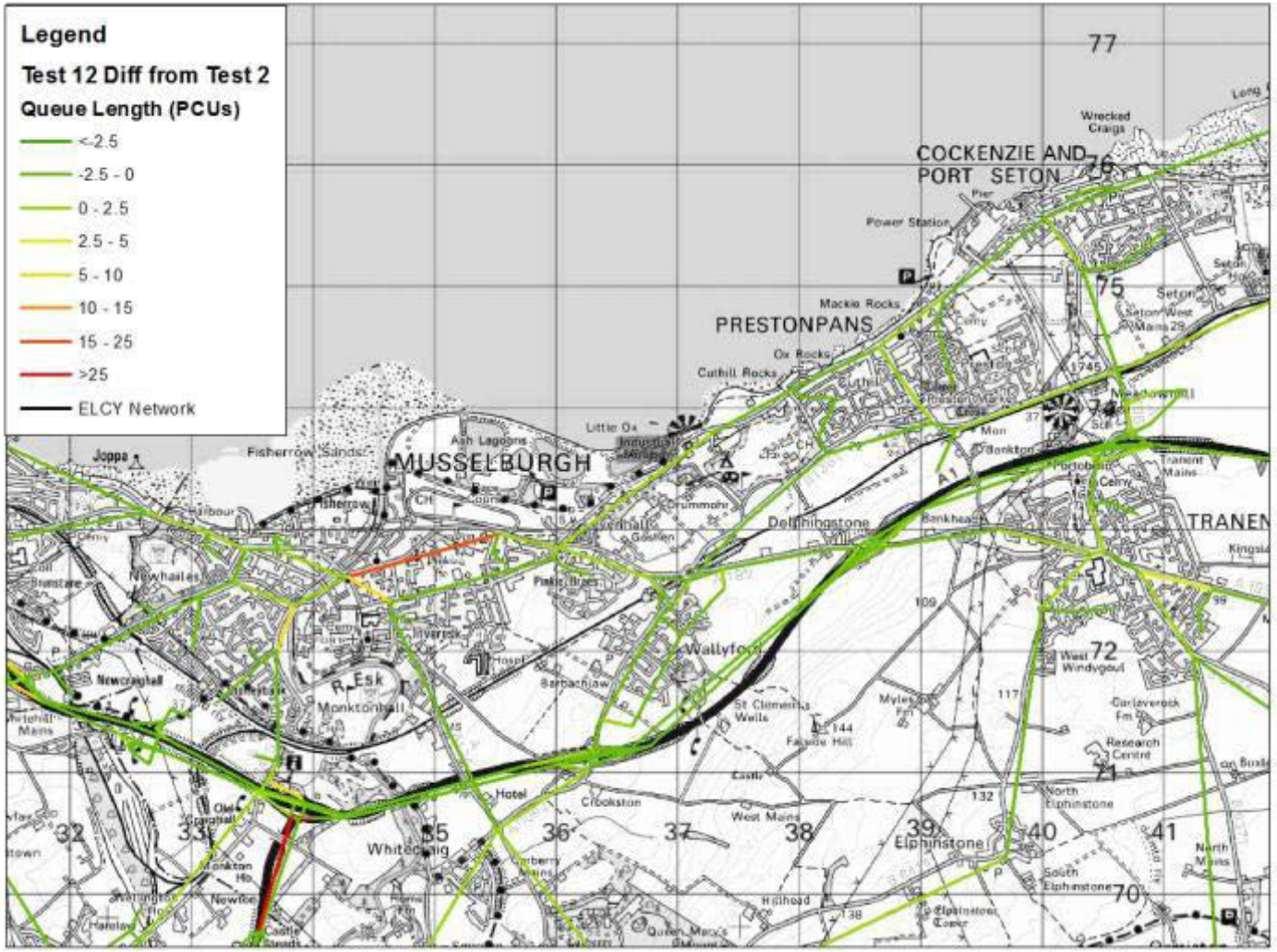

Figure 49. Test 12 vs Test 2 Queue Lengths – West

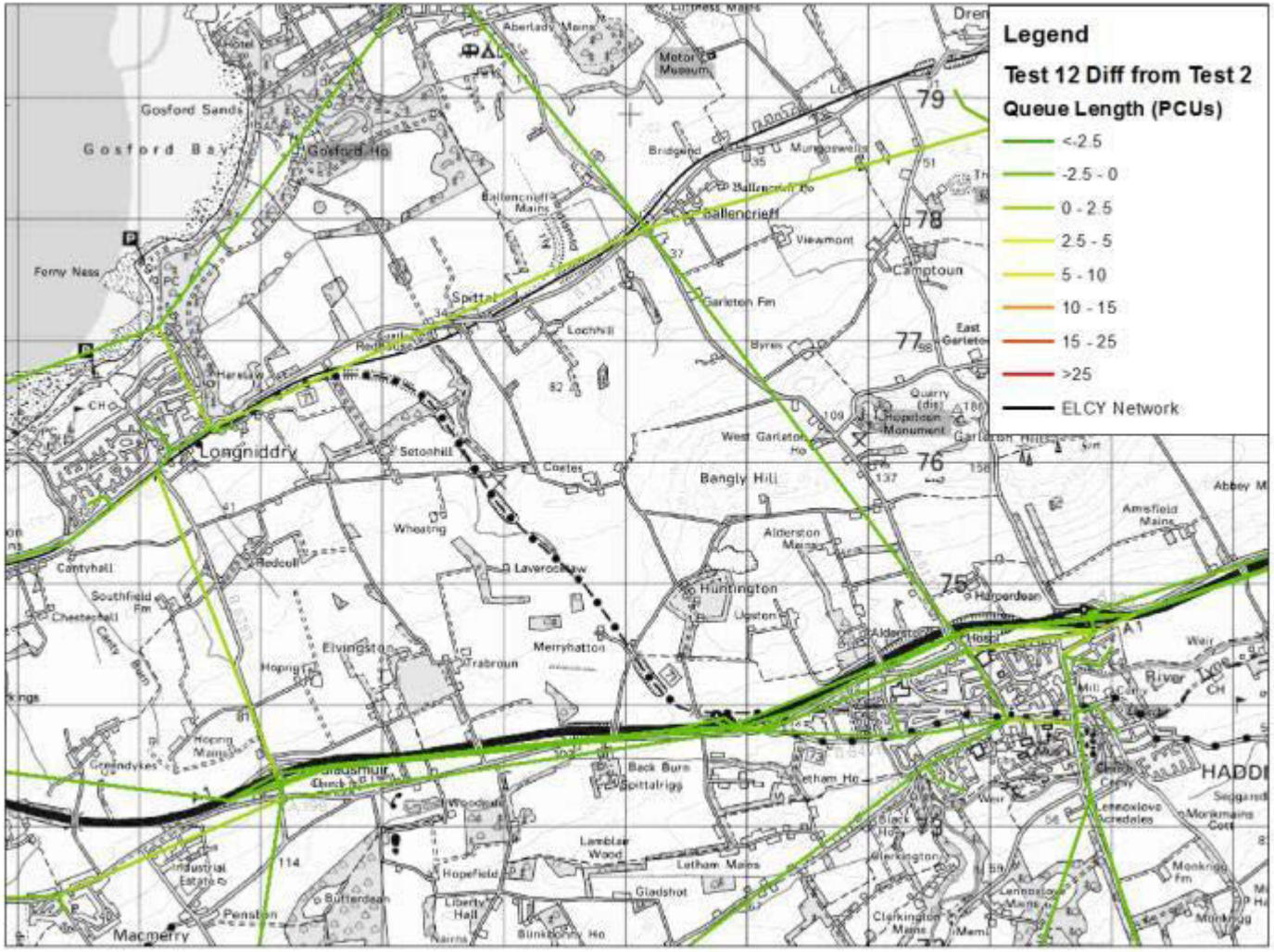

Figure 50. Test 12 vs Test 2 Queue Lengths – Mid

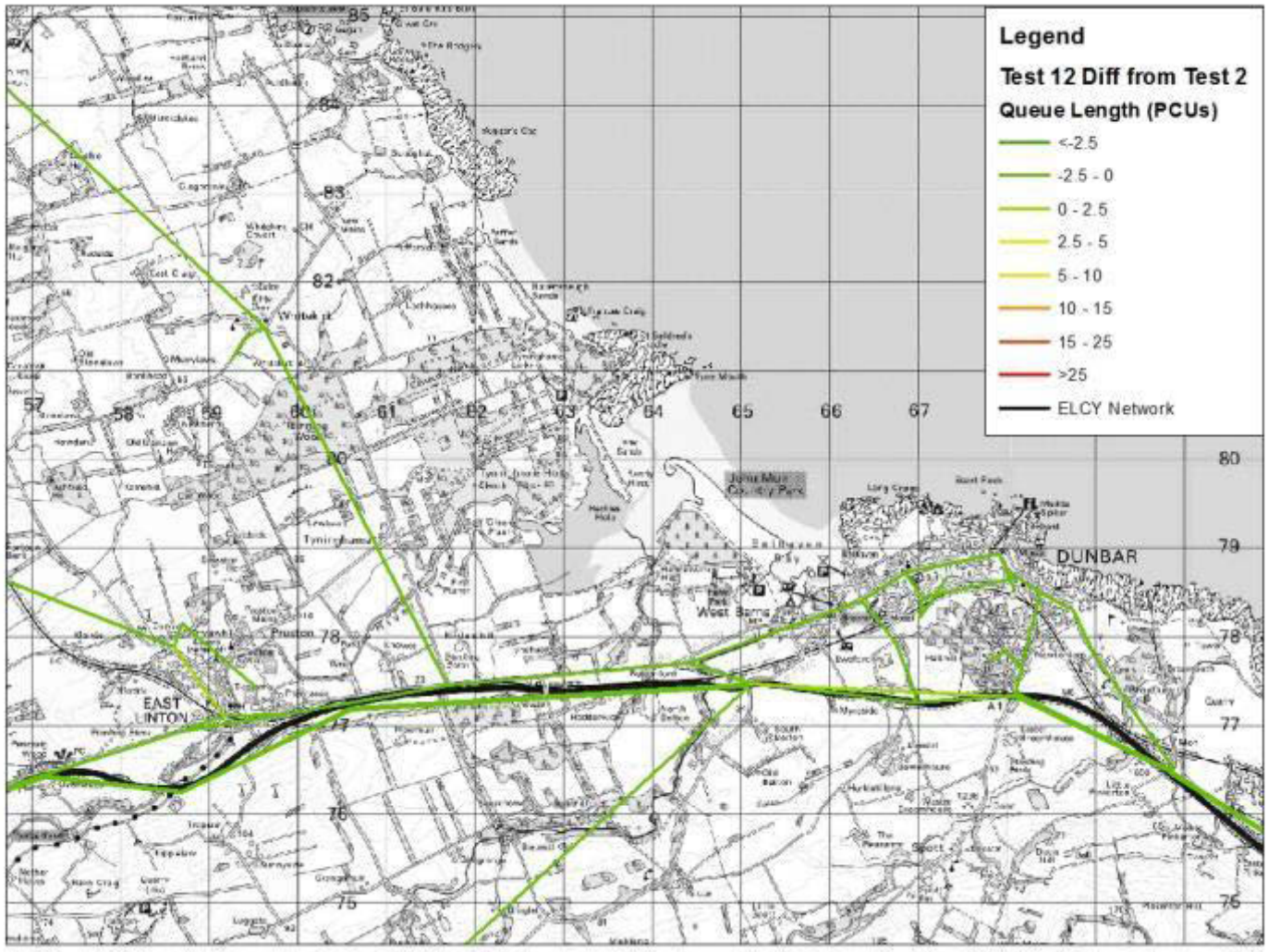

Figure 51. Test 12 vs Test 2 Queue Lengths – East

7.8 Journey Time Analysis

7.8.1 Journey Time analysis has been undertaken between each settlement and the Newcraighall Junction in each direction. The following table displays the journey times for the 2010 model (Test 1), with comparisons made between Test 1 and the 2024 Reference Case (Test 2), and Test 2 and each forecast scenario.

7.8.2 For the purpose of Journey Time assessment, the AM data has been used for the westbound direction. The following figures display the AM journey times (detailed result are in Appendices).

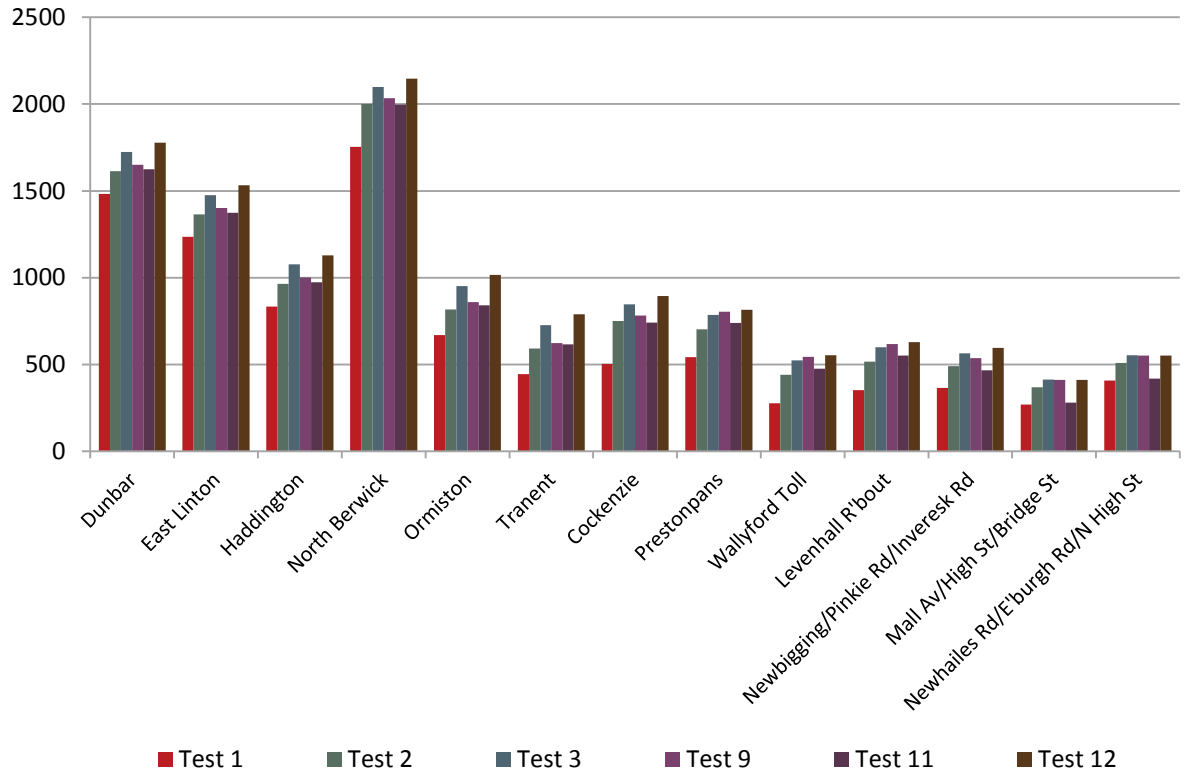

Figure 52. AM WB journey times to A720/A68 junction

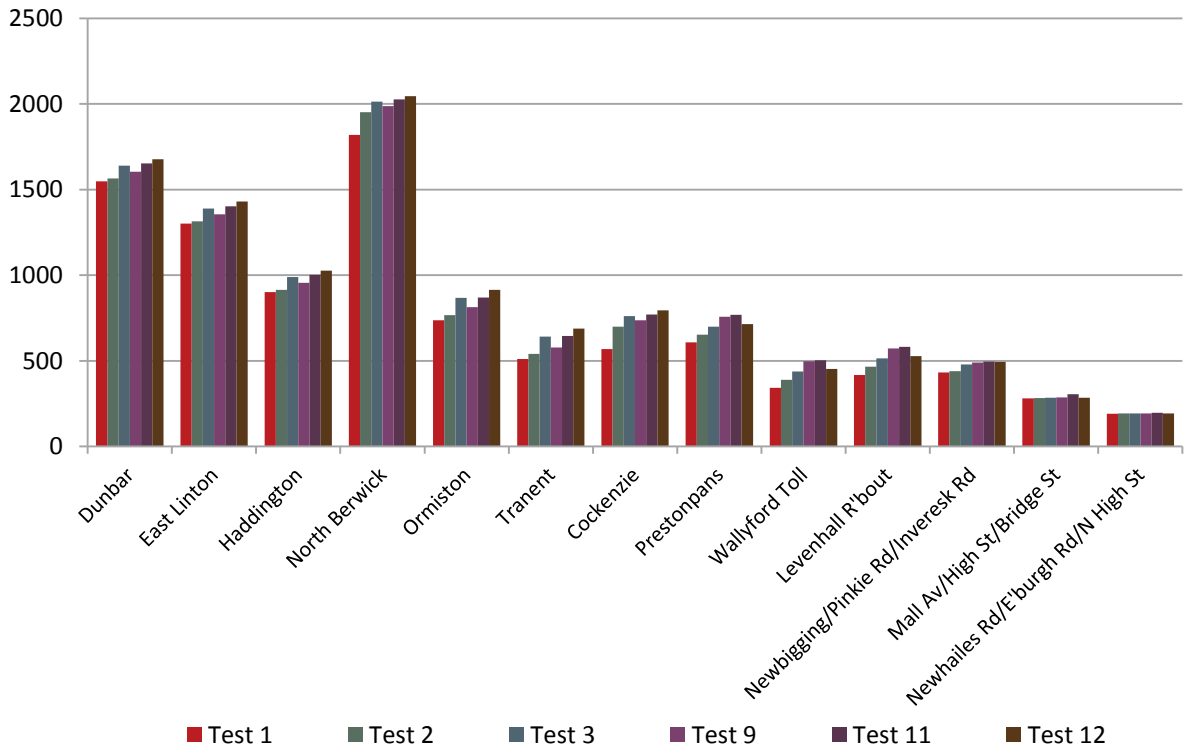

Figure 53. AM WB journey times to Newcraighall

7.8.3 The table above indicates that all the journey times increase between the 2010 model (Test 1) and the 2024 Reference Case (Test 2) for both routes. Some increases are negligible, however there is a significant increase in journey times from Cockenzie and North Berwick to Newcraighall, as a result of the A198 / B1361 / B6371 junction (which traffic from these settlements must either use or bypass) operating as a roundabout in 2010 and as a signalised crossroads in the 2024 tests.

7.8.4 All the journey times increase between the 2024 Reference Case and the 2024 forecast scenarios. Test 12 generally generates the largest predicted journey time increases, which is to be expected as this represents the planning scenario with the highest number of additional households in East Lothian (ELC12).

7.9 Cumulative Distance Travelled

7.9.1 The cumulative distance travelled is measured in PCUkm. The total PCUkm travelled on the East Lothian road network is summarised below, alongside the additional kilometres on the AM network per additional household to indicate the impact the location of the developments has on the PCUkms.

Table 4. Total East Lothian PCUkm

TEST	AM PCUKM	ADDITIONAL KM PER HOUSEHOLD
Test 1 (absolute)	145,376	
Test 2 (vs Test 1)	174,557 (+20%)	3.26
Test 3 (vs Test 2)	193,301 (+11%)	2.28
Test 9 (vs Test 2)	193,249 (+11%)	2.22
Test 11 (vs Test 2)	204,021 (+17%)	2.23
Test 12 (vs Test 2)	201,589 (+15%)	2.14

7.9.2 It can be seen that the 2024 Reference Case (Test 2) has 20% more PCUkm travelled than the 2010 model. This is due to a larger number of households in the model generating more traffic on the network.

7.9.3 Test 11 has the highest amount of PCUkm travelled relative to Test 2. This model has the largest number of households of all the tests, however it is noteworthy that it contains exactly the same number of households as Test 12, yet has approximately 2,500 additional PCUkm travelled. This increase is due to vehicles using the new Millerhill to QMU link roads to avoid the congested Old Craighall junction in Test 11 – this makes the journey slightly longer, but quicker.

7.10 Junction delay – comparison between all tests

7.10.1 The following table displays a summary of the average delay per vehicle (in seconds) at three key locations in East Lothian:

- Old Craighall
- **(A)**;
- B6371 / Bridge Street / High Street junction **(B)** in Tranent; and
- High Street / Dalrymple Loan **(C)** and the adjacent Bridge Street / Mall Avenue / High Street junctions **(D)** in Musselburgh.

Table 5. Average Junction Delay Summary at Key Junctions

JUNCTION	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
A – Old Craighall	7	85	151	142	28	83
B – Tranent	9	9	30	9	24	40
C – Musselburgh 1	15	20	71	69	137	87
D – Musselburgh 2	16	16	16	16	15	16

7.11 Commute Matrix Analysis

7.11.1 The predicted number of AM commute trips into/out of East Lothian from/to Edinburgh, as well as intra-East Lothian trips, has been determined for each scenario. Only Test 2 (Committed Development scenario) values are reported in this document, as all other scenarios indicate a similar profile of movements.

7.11.2 In Test 2, approximately 5,000 AM commute trips are predicted to originate in East Lothian; of these, 57% of the trips are intra-East Lothian, with a further 32% travelling to Edinburgh.

7.11.3 Furthermore, approximately 4,850 AM commute trips are predicted to terminate in East Lothian; of these, 57% of the trips are intra-East Lothian, with a further 19% originating in Edinburgh.

8. MITIGATION MEASURES

8.1.1 The following junctions were identified in the strategic LDP SATURN model test for the East Lothian area as having operational and capacity issues that will require some form of mitigation measures. A number of options are outlined by junction location, as there may be judged to be intermediate steps or a more preferable option over another by ELC.

8.1.2 In addition to the junctions highlighted below the Meadowmill junction may require further mitigation measures dependent on the scale of development at Blindwells.

8.2 A720 (T) / A1 (T) - Old Craighall Interchange

8.2.1 There are number of potential options that could be considered further to improve operational issues at the junction and improve journey reliability through the junction with improved capacity.

8.2.2 Mitigation Option 1 – Provide a bypass lane between the A720 and the A1 Westbound merge and from the diverge to A720, with appropriate merge and diverge lengths on the A720. This will reduce the amount of traffic on the circulatory section of the roundabout and increase capacity through the junction. A sensitivity test for this option has been undertaken however further investigation would be required.

8.2.3 Mitigation Option 2 – Consideration can be given to partial signalisation of the junction, with the following approaches signalised:

- A1 Westbound diverge;
- A720 Northbound; and
- A1 Eastbound diverge.

8.2.4 Consideration could be given to link MOVA[1] operation which would give a further 15 to 20% improvement in capacity. Alternatively, the junction can be optimised to minimise queue formation on the diverges and the A720 approach through queue detectors. Speed discrimination loops will be required on A720 approach to allow the signals controller to have sufficient information to identify when it is safe to change the stage on the approach.

8.2.5 Mitigation Option 3 – would be combine Options 1 and 2.

8.2.6 Consideration should be given to any improvements on the A720(T) corridor, which would remove bottlenecks and increase the flows at this junction and require the junction to be upgraded, with increase road space on the A720 and A1 approaches to this junction.

[1] MOVA (Microprocessor Optimisation Vehicle Actuation) is designed to cater for the full range of traffic conditions, from very low flows through to a junction that is overloaded. For the major part of the range - before congestion occurs, MOVA operates in a delay minimising mode; if any approach becomes overloaded, the system switches to a capacity maximising procedure. MOVA is also able to operate at a wide range of junctions, from the very simple 'shuttle-working', to large, multi-phase multi-lane sites.

8.3 High St – Dalrymple Loan (Musselburgh)

8.3.1 This junction is currently a signalised T-junction, with a banned right-turn movement out of Dalrymple Loan. There is a pedestrian crossing facility on High Street to the east of Dalrymple Loan and to the west of Bridge Street on Mall Avenue. The issue relates primarily to the road bridge crossing of the River Esk, with Mall Avenue leading from one crossing and Bridge Street being the other crossing that converges at the junction. There are two options which could be considered further to improve the operation and capacity of the junction however there is no clear mitigation for Musselburgh and it would benefit from further investigations using a micro-simulation model with particular reference to the air quality management order in place in Musselburgh. The proposed mitigations are:

- Option 1 – If the junction is to be enhanced in terms of capacity and upgrading the junction, the introduction of a MOVA operation would increase the capacity of the junction by 15 to 20% (if not already in operation).
- Option 2 – Consideration could be given to forming a roundabout at the junction of Mall Avenue / High Street / Bridge Street, with a staggered PUFFIN crossing to the west of this junction. The junction of High Street / Dalrymple Loan would take the form of a ghost island priority junction, with a staggered signalised PUFFIN crossing to the east of this junction. It should be noted the right-turn ban from Dalrymple Loan would be retained in these proposals.

8.4 High St – Church St (Tranent)

8.4.1 This junction is currently a mini-roundabout junction within a tight building frontage, with footway and pedestrian guardrail to inhibit pedestrians crossing at this junction. There is very limited scope to enhance this junction to improve capacity and reduce delays at this junction and further investigation with micro-simulation modelling is recommended. However the following options could be considered.

- Option 1: Signalised MOVA junction – this is the only option which could be considered to minimise the queue and delays at this junction and would facilitate pedestrian movements at this location safely. However, when coming from a free flow junction that is having operational and capacity issues at peak only, it will introduce queues and delays at all times of day. Nevertheless, these would be minimised with MOVA specification.
- Option 2: Consideration could be given to a localised traffic management scheme in which the section of Church Street between High Street and Winton Place is made one way northbound (southbound carriageway being on-street parking) and Winton Place would be one way southbound (as is currently). This would require remodelling the junction of Bridge Street / Church Street as a signalised junction. The junction of the Church Street / Winton Place would be a diverge and would require additional land take. The junction of Winton Place / High Street would be a signalised junction with pedestrian crossing facilities; this junction with a two-lane exit on Winton Place will require less green time and would allow for increased green time to the two-way movement which dominates this area. As before, a linked MOVA operation is recommended. This option would require further investigation.

- Option 3: A further mitigation may include the restrictions relating to the access of future housing developments in Tranent to limit the through traffic in Tranent. An alternative connection to the A1 could be investigated further for Tranent developments.

8.5 Summary

8.5.1 It should be recognised that a more detailed and refined assessment of these junctions will be required to determine the full scale and nature of the proposed junction, as well as ensure that any option can provide the level of capacity required whilst meeting current design standards and safety requirements. Full consideration of the existing site constraints in terms of land ownership, ground conditions, public utilities, existing building and structures and statutory consultation would have to be undertaken. These options should therefore be treated with appropriate level of caution at this stage, with the preferred option being developed to an outline stage for further consideration.

9. CONCLUSIONS

9.1.1 This report analyses six tests in the East Lothian area – a 2010 Base model (Test 1), a 2024 Reference Case (test 2 – Committed Development) and four 2024 development forecast tests. One forecast test modelled the effect of the introduction of a Tranent Bypass (Test 9), and another forecast modelled the effect of a new link between Millerhill and Queen Margaret University (QMU) (Test 11). Two tests were undertaken on the 'standard' future network – one using a planning scenario containing the largest number of additional households (Test 12), and another representing an 'average' future scenario (Test 3).

9.1.2 The results generally indicate that there is an increase in queuing, delays and journey times between the 2010 model and the 2024 Reference case. Furthermore, there is an increase between the 2024 Reference Case and each of the four development forecast scenarios.

9.1.3 In general, Test 12 indicates the largest amount of delay, queuing and the longest journey times of all the modelled, which is to be expected as it contains the largest number of additional households.

9.1.4 There are significant predicted increases in delay and queue lengths at Old Craighall and Musselburgh (High Street / Dalrymple Road) in all the 2024 forecast scenarios relative to the 2024 Reference Case. There is also a slight increase in delay in Tranent, which is reduced by approximately 20 seconds via the introduction of a Tranent Bypass, which removes traffic from Tranent town centre.

9.1.5 The delay and queuing at Old Craighall is predicted to reduce via the introduction of a link between Millerhill and Queen Margaret University (QMU).

9.1.6 A number of mitigation measures have been proposed to alleviate the increase in congestion at Old Craighall, Musselburgh High Street and Tranent High Street. These are discussed in Chapter 7.10.1. Full consideration of the existing site constraints in terms of land ownership, ground conditions, public utilities, existing building and structures and statutory consultation would have to be undertaken before implementing any mitigation strategy.

10. APPENDIX 1: DETAILED JUNCTION DIAGRAMS – A1.

10.1 Test 1

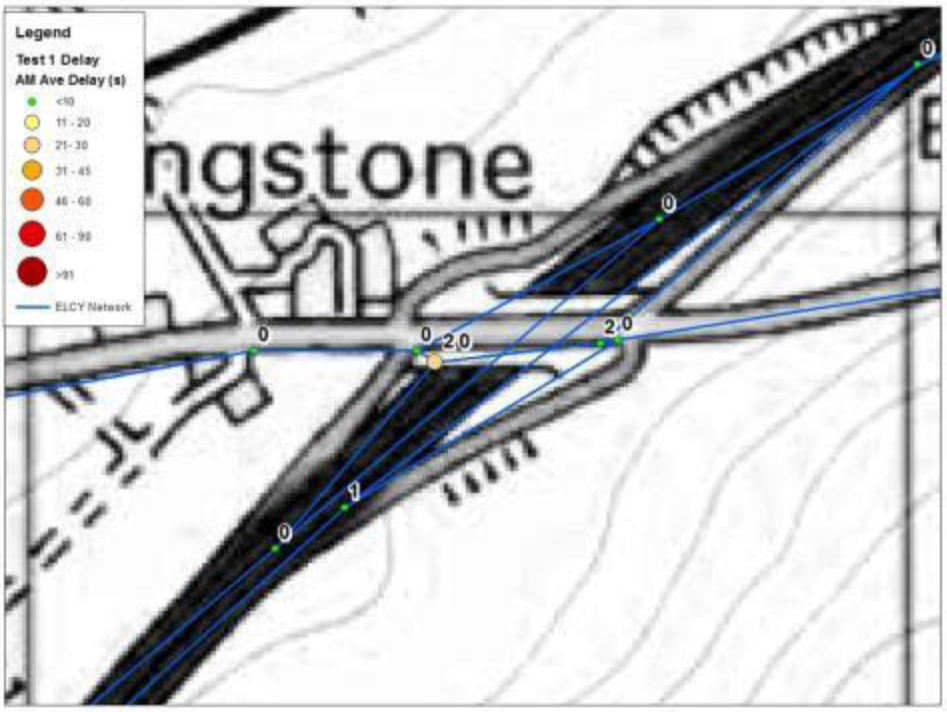

Figure 54. Test 1 junction delay - Dolphingstone

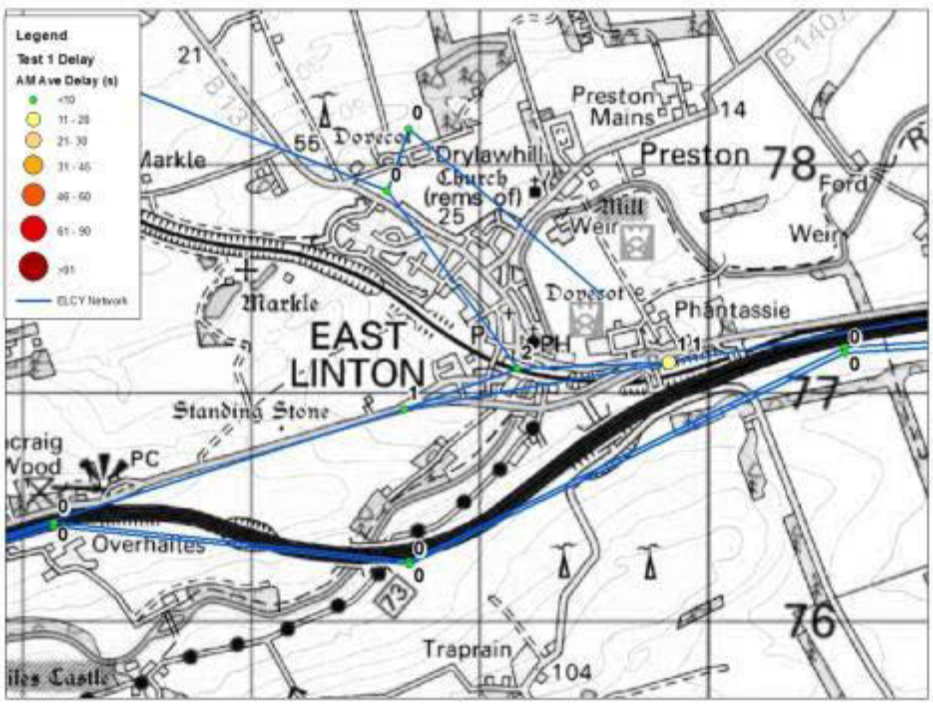

Figure 55. Test 1 junction delay– East Linton

Figure 56. Test 1 junction delay – Gladsmuir

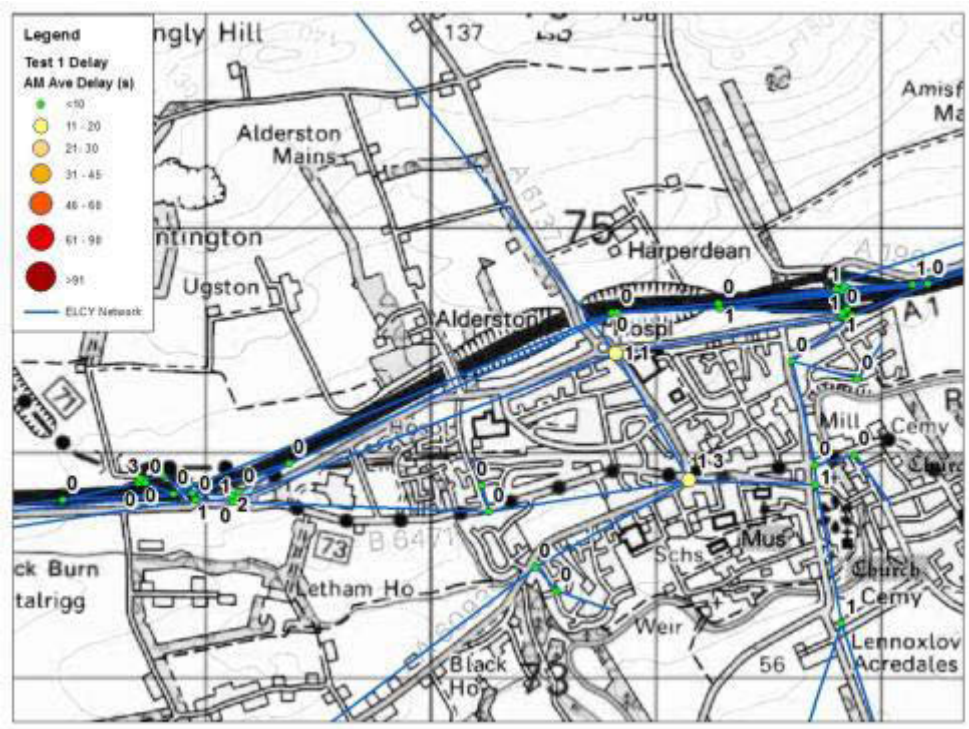

Figure 57. Test 1 junction delay – Haddington

Figure 58. Test 1 Junction Delay – Old Craighall

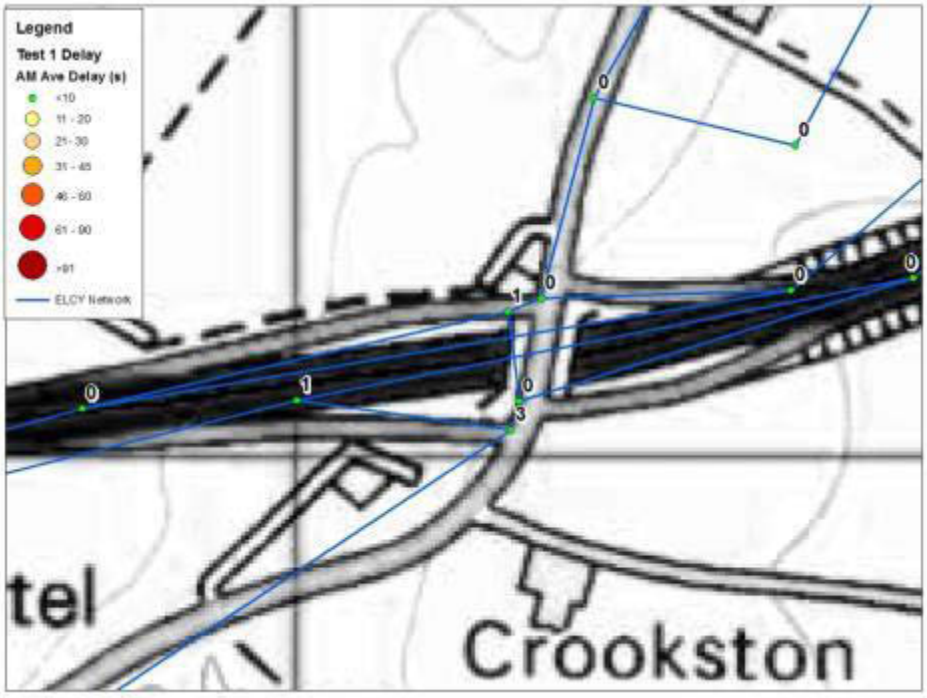

Figure 59. Test 1 junction delay – Salters Road

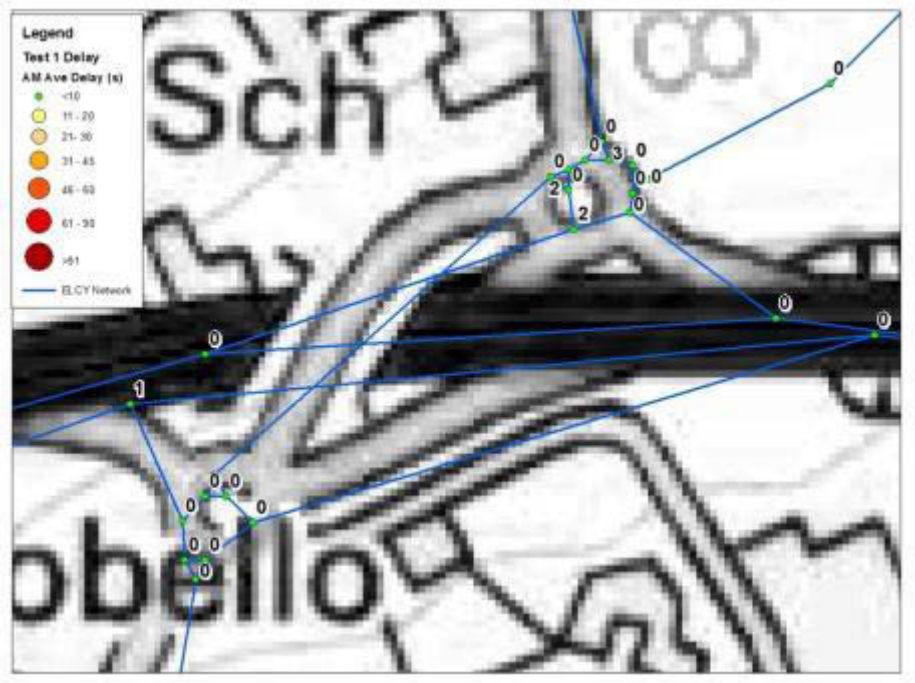

Figure 60. Test 1 junction delay – Tranent

10.2 Test 2

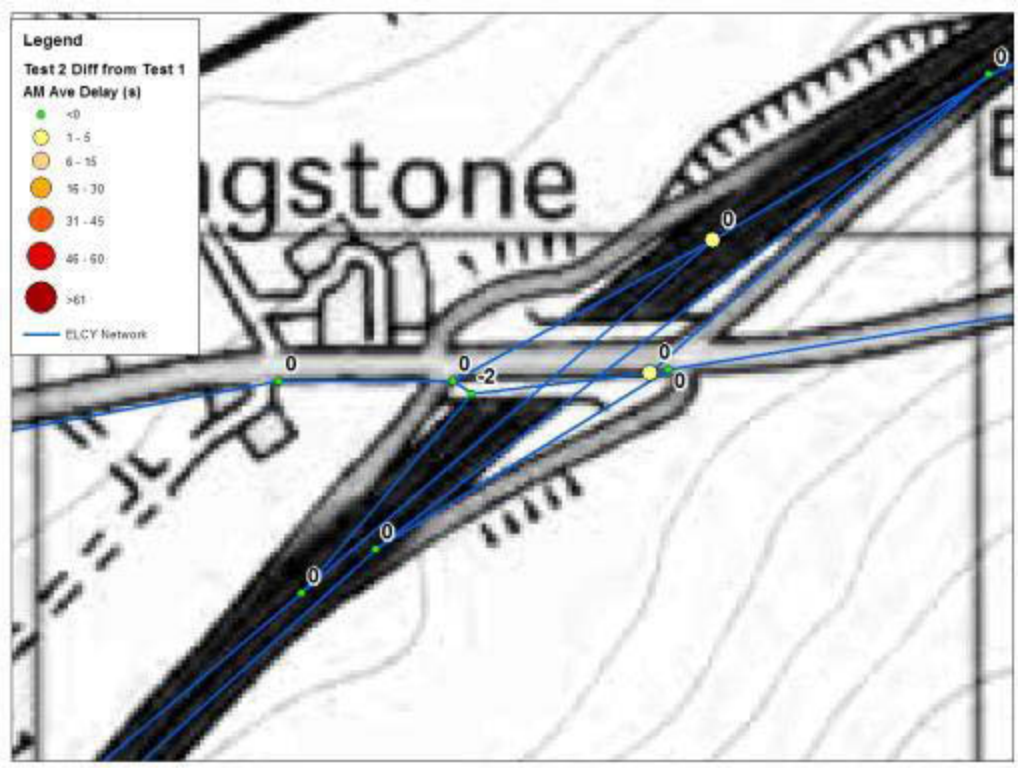

Figure 61. Test 2 vs Test 1 junction delay – Dolphingstone

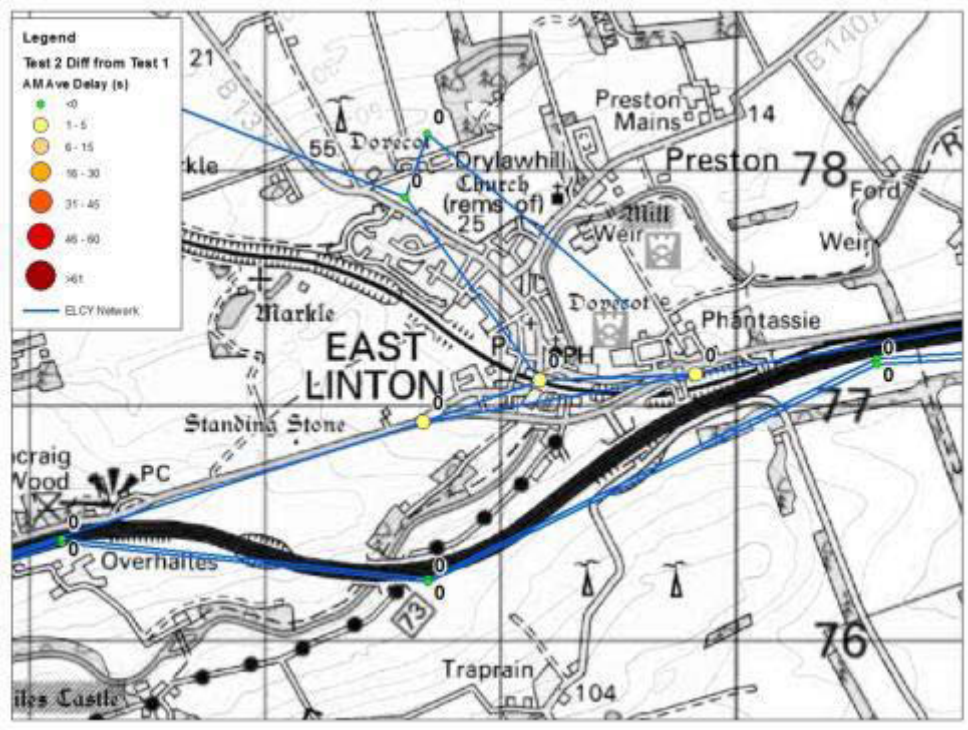

Figure 62. Test 2 vs Test 1 junction delay- East Linton

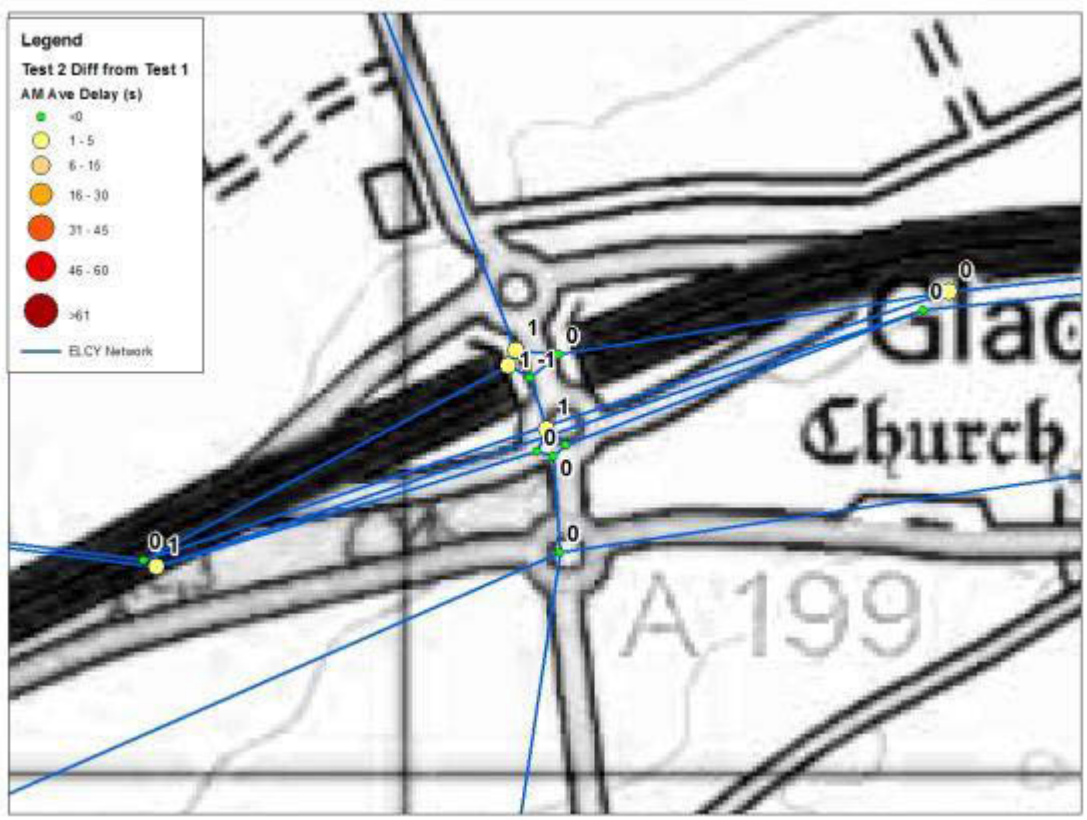

Figure 63. Test 2 vs Test 1 junction delay – Gladsmuir

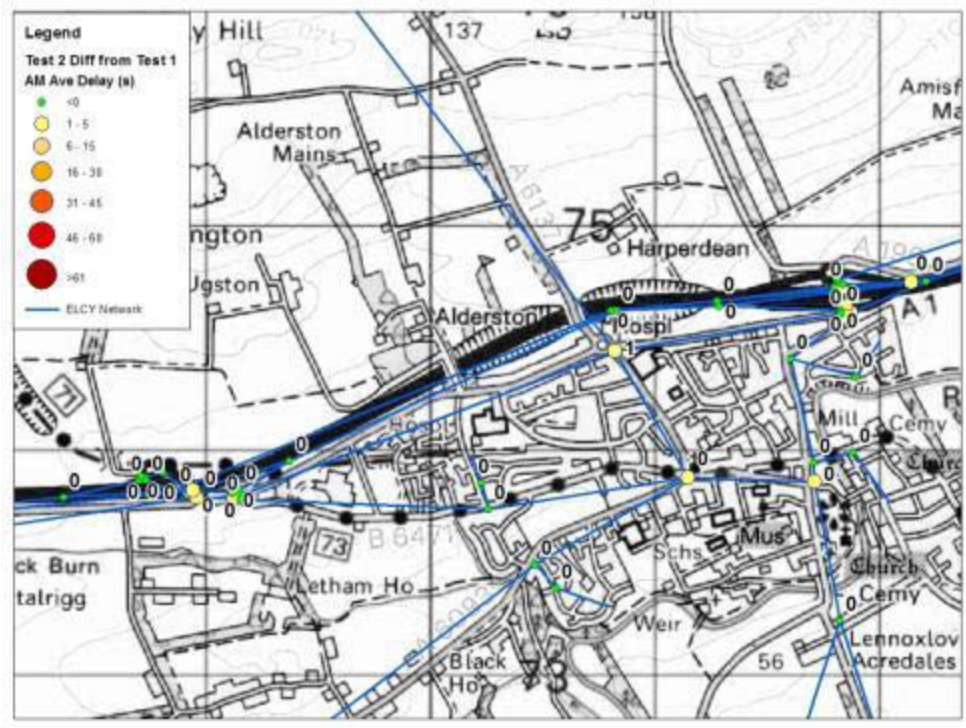

Figure 64. Test 2 vs Test 1 Junction delay - Haddington

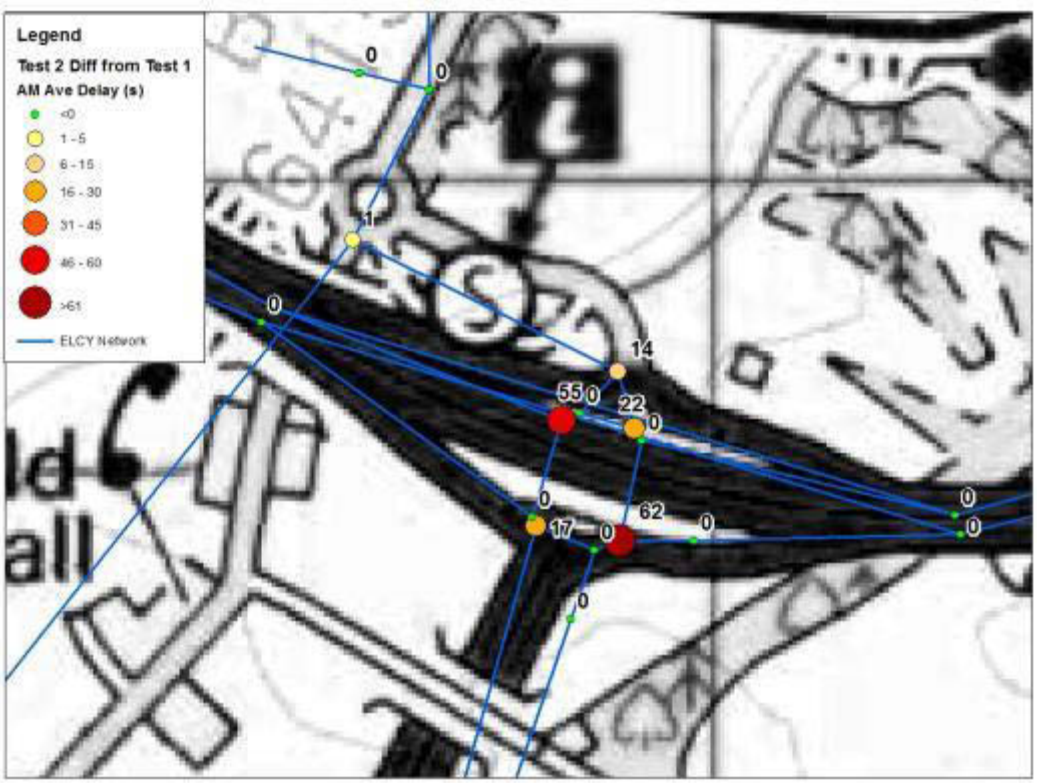

Figure 65. Test 2 vs Test 1 junction elay – Old Craighall

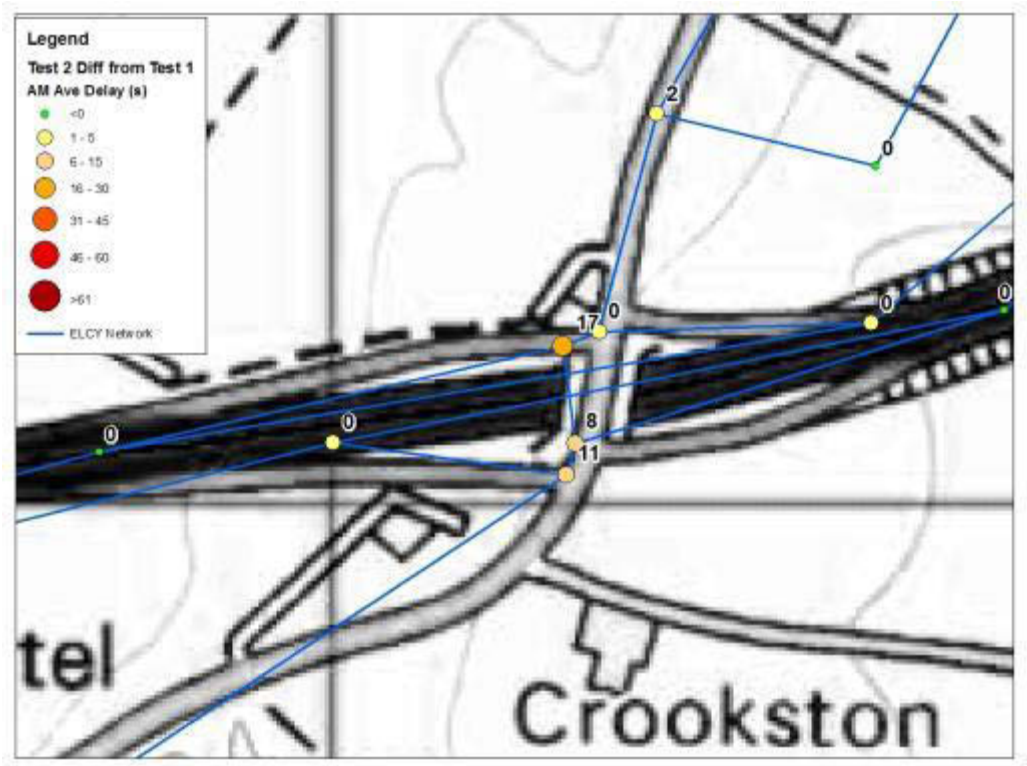

Figure 66. Test 2 vs Test 1 junction delay – Salters Road

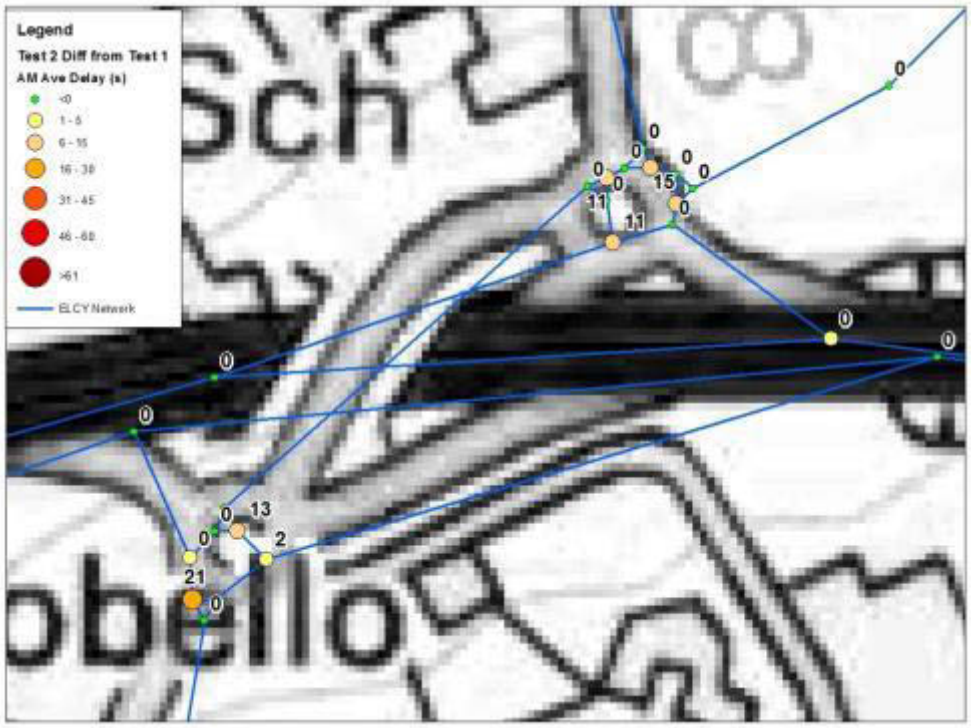

Figure 67. Test 2 vs Test 1 Junction Delay – Tranent

10.3 Test 3

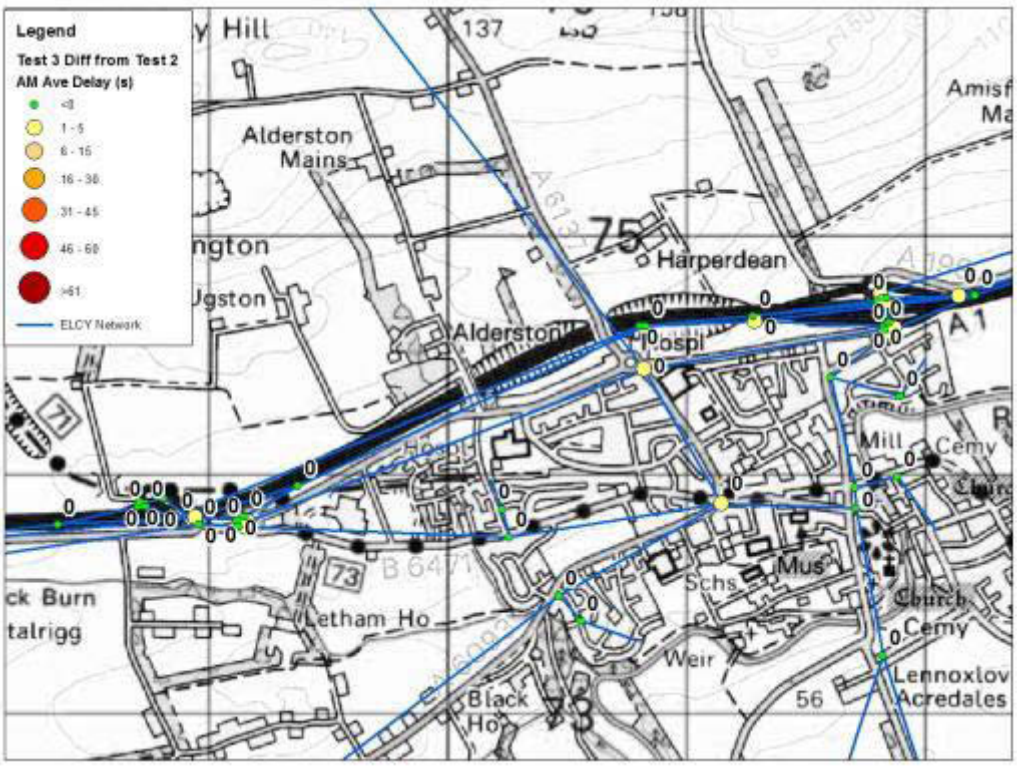

Figure 68. Test 3 vs Test 2 Haddington

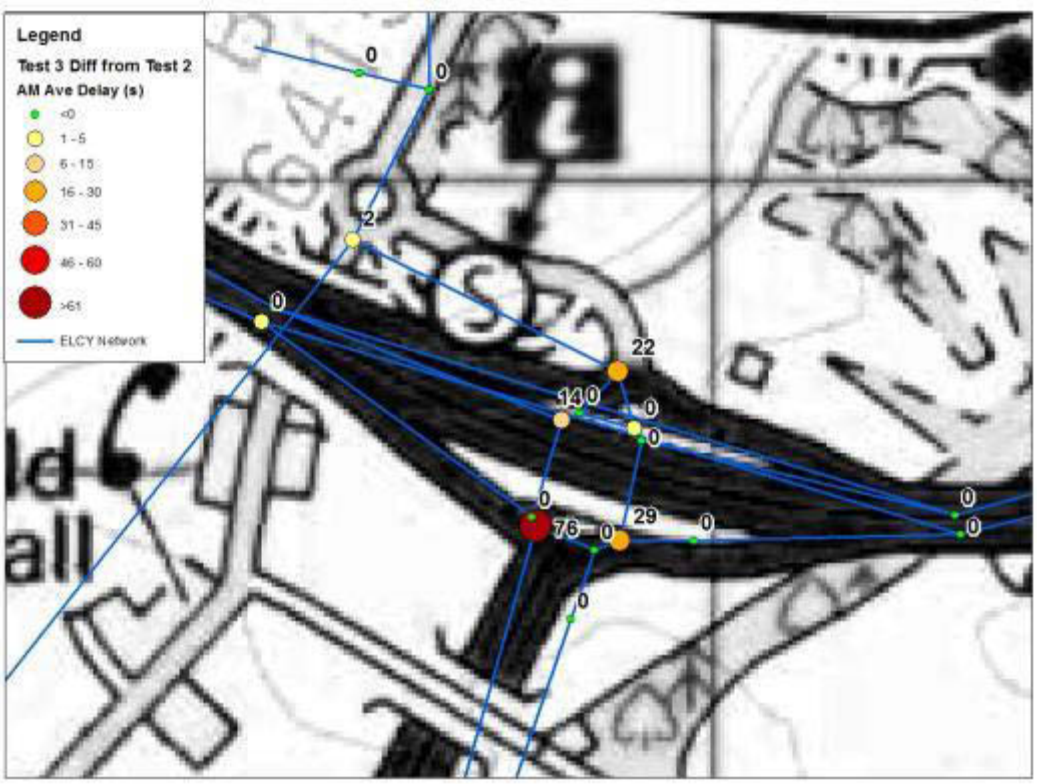

Figure 69. Test 3 vs Test 2 junction delay – Old Craighall

Figure 70. Test 3 vs Test 2 junction delay – Salters Road

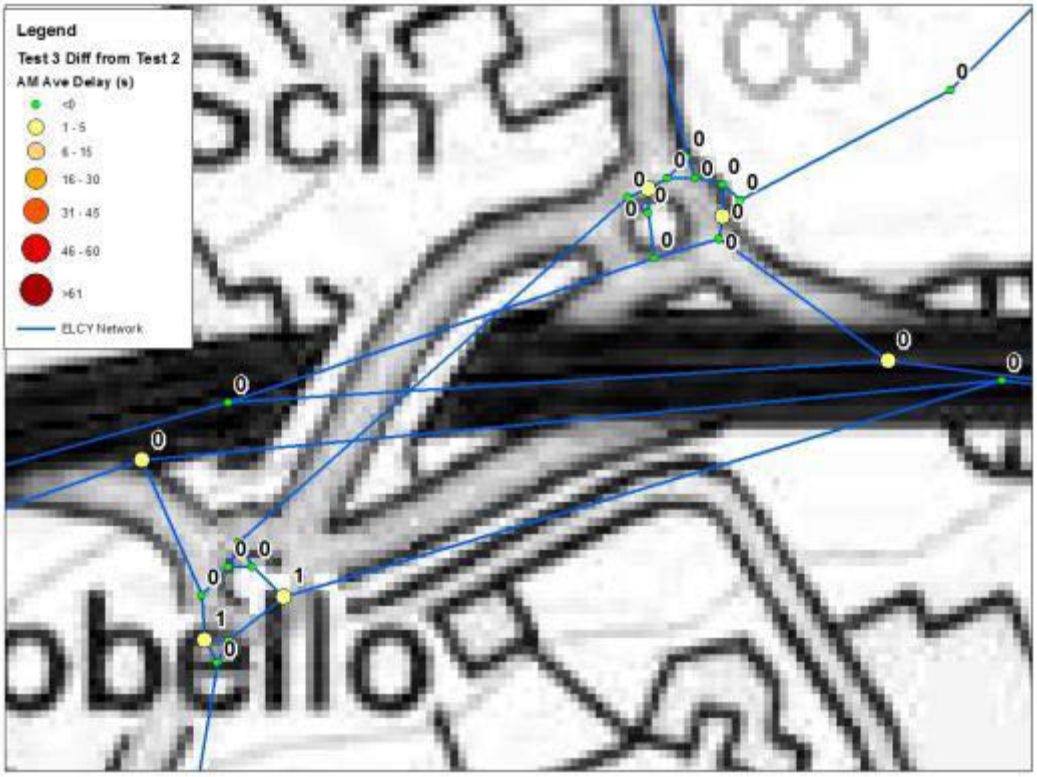

Figure 71. Test 3 vs Test 2 junction delay – Tranent

10.4 Test 9

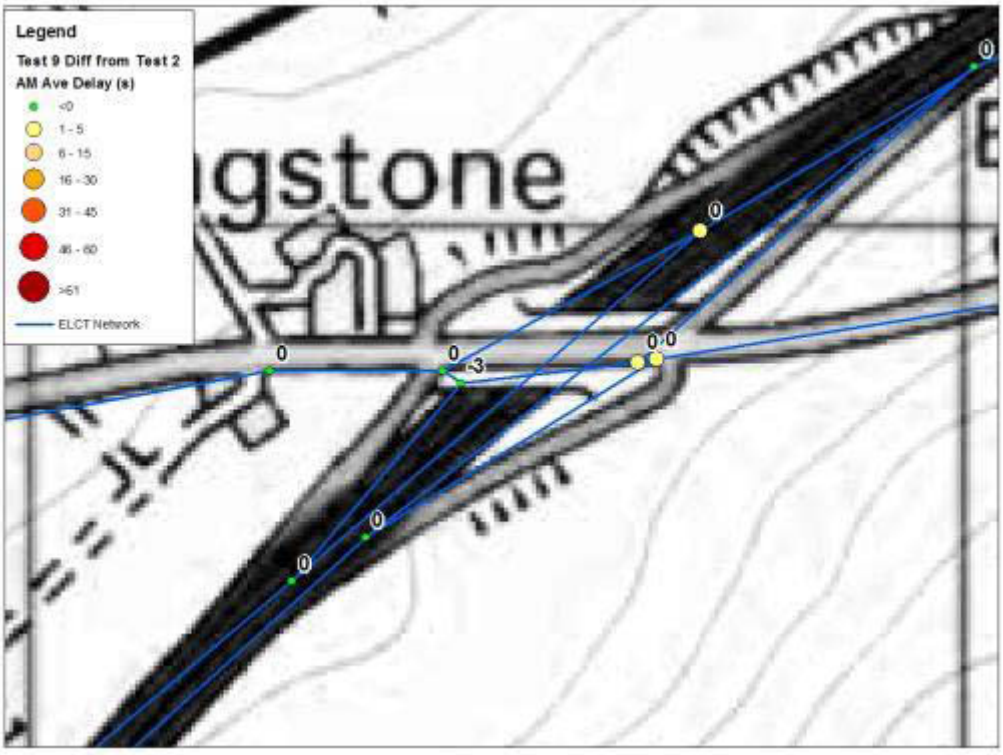

Figure 72. Test 9 vs Test 2 junction delay – Dolphingstone

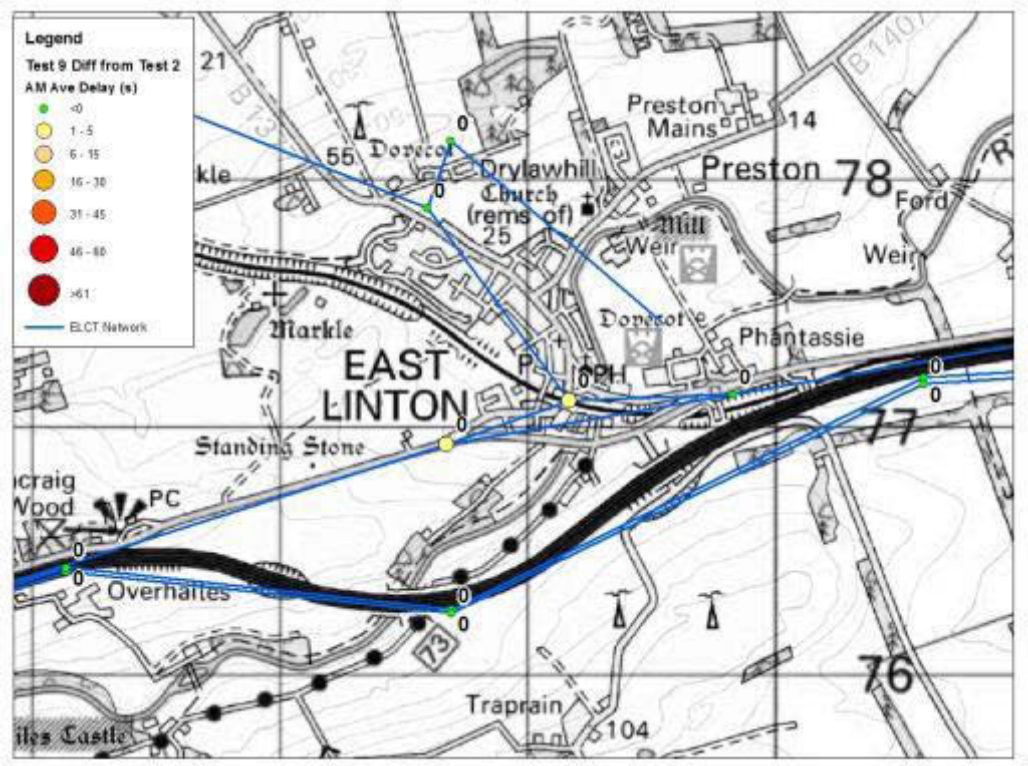

Figure 73. Test 9 vs Test 2 junction delay – East Linton

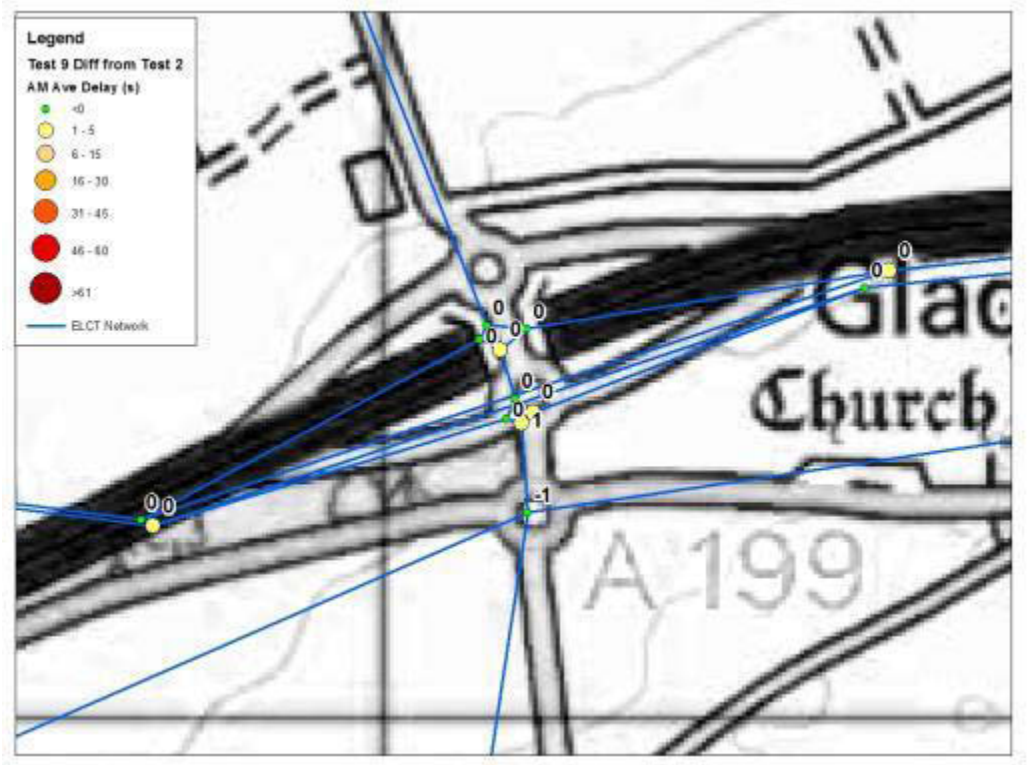

Figure 74. Test 9 vs Test 2 junction delay – Gladsmuir

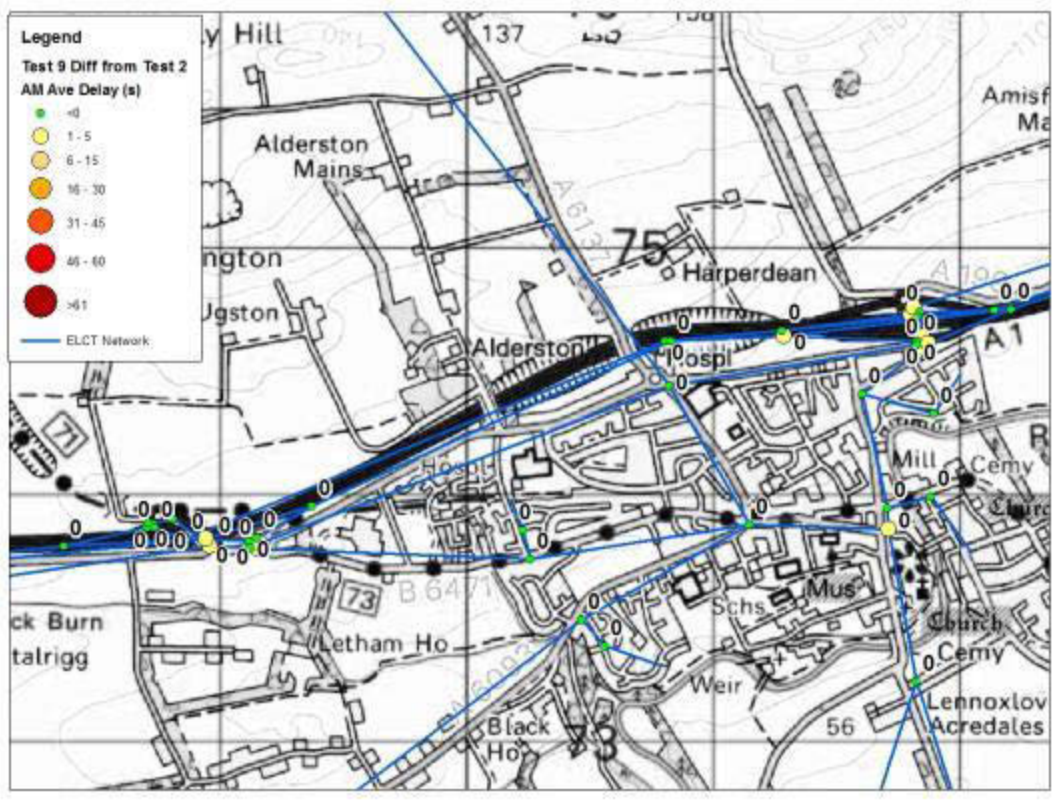

Figure 75. Test 9 vs Test 2 junction delay - Haddington

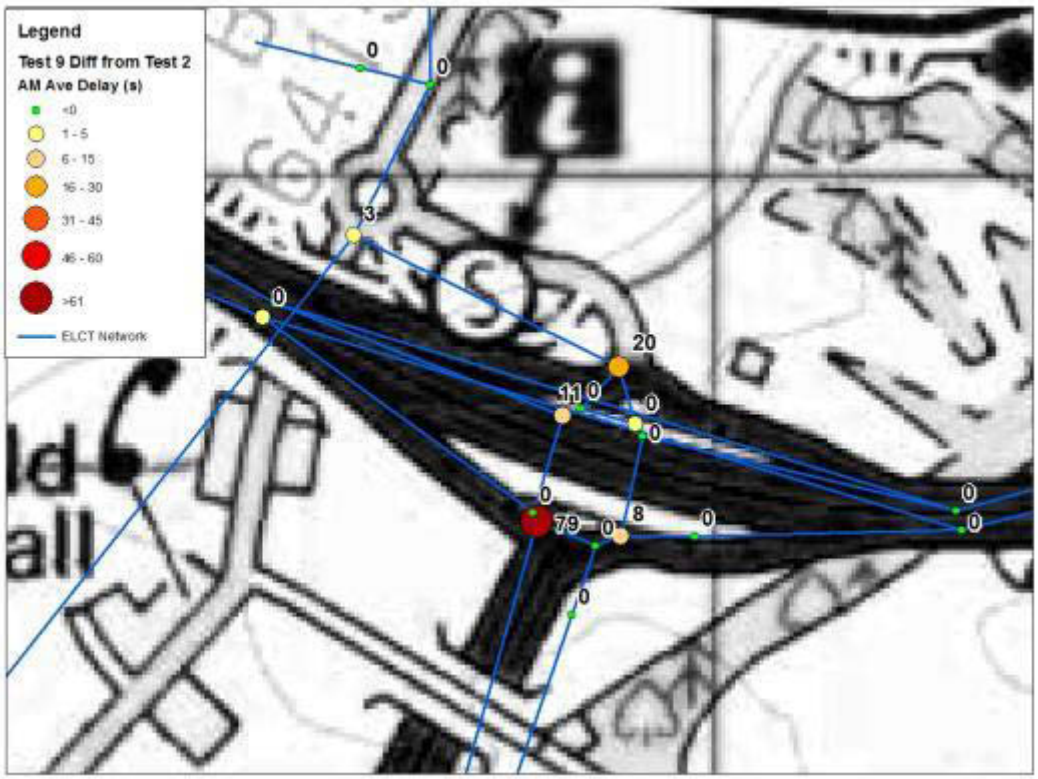

Figure 76. Test 9 vs Test 2 Junction Delay – Old Craighall

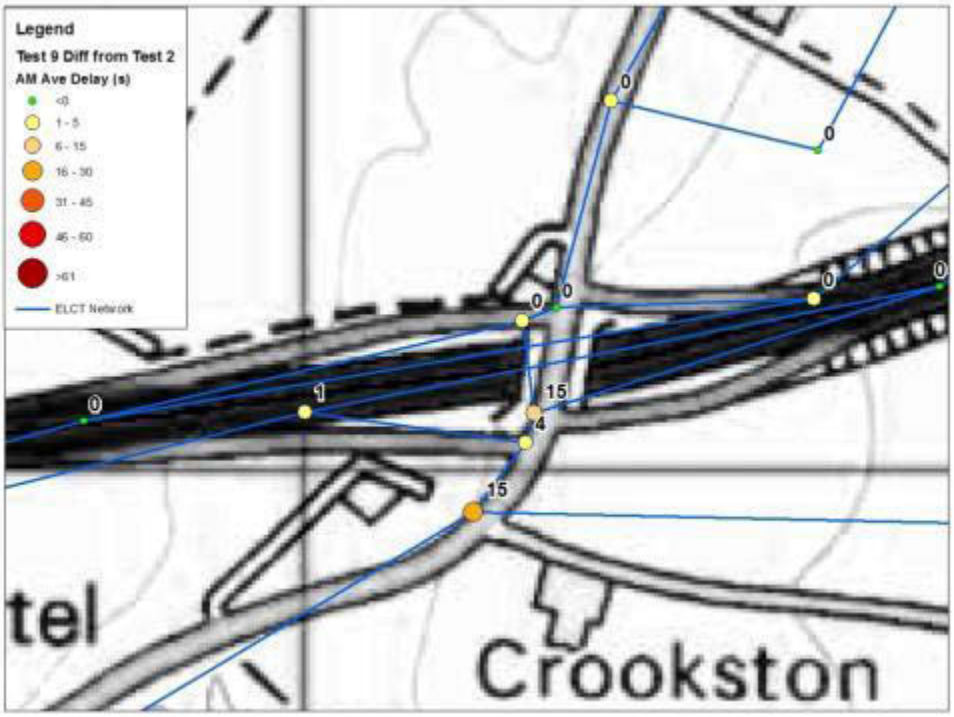

Figure 77. Test 9 vs Test 2 Junction Delay – Salters Road

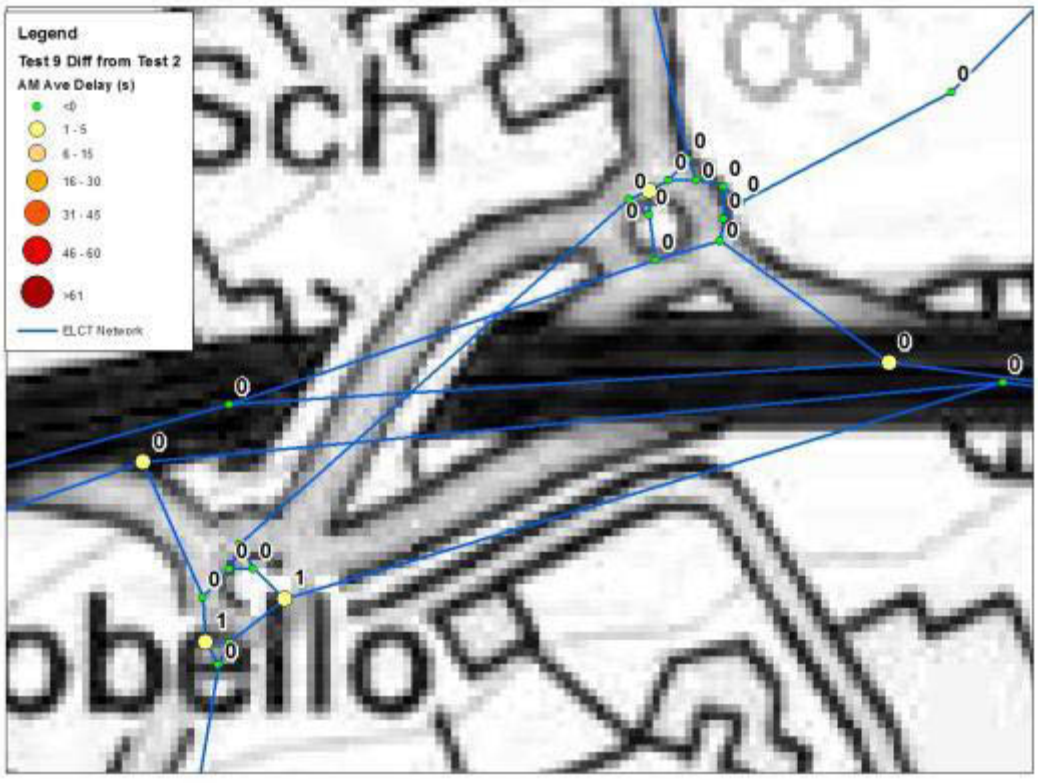

Figure 78. Test 9 vs Test 2 Junction Delay – Tranent

10.5 Test 11

Figure 79. Test 11 vs test 2 junction delays – Dolphingstone

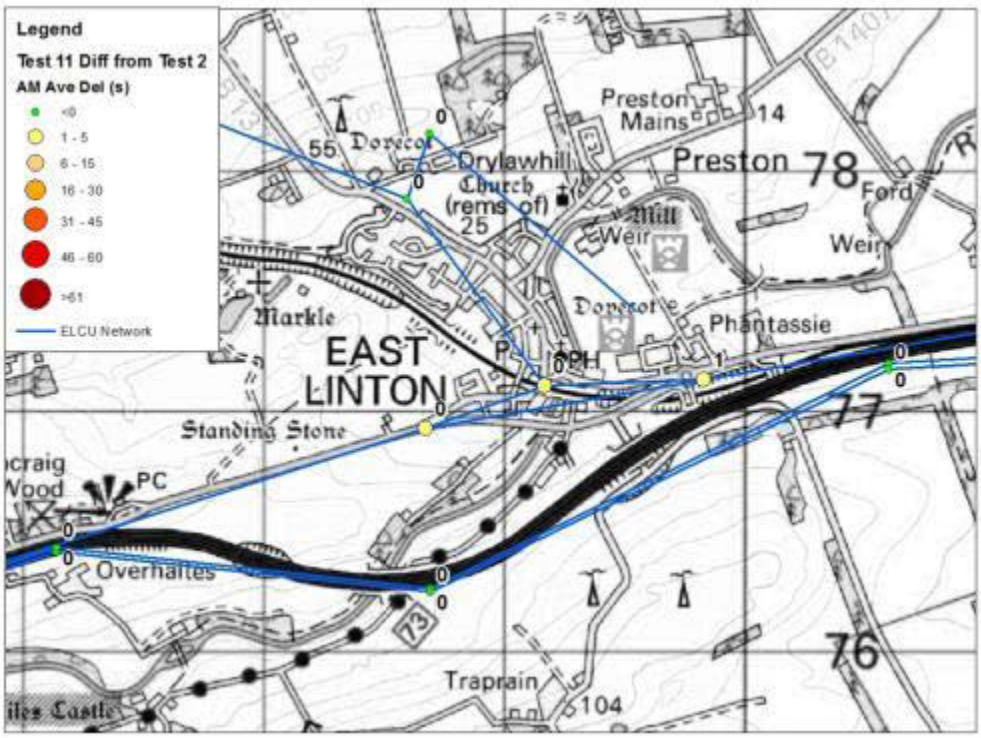

Figure 80. Test 11 vs test 2 junction delays – East Linton

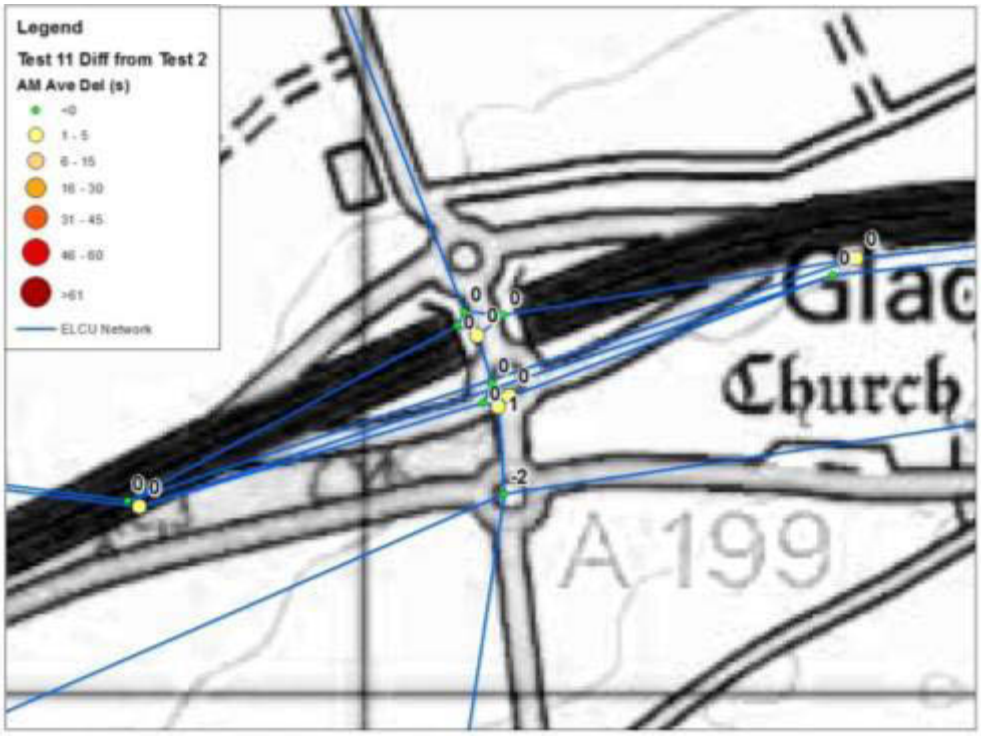

Figure 81. Test 11 vs test 2 junction delays – Gladsmuir

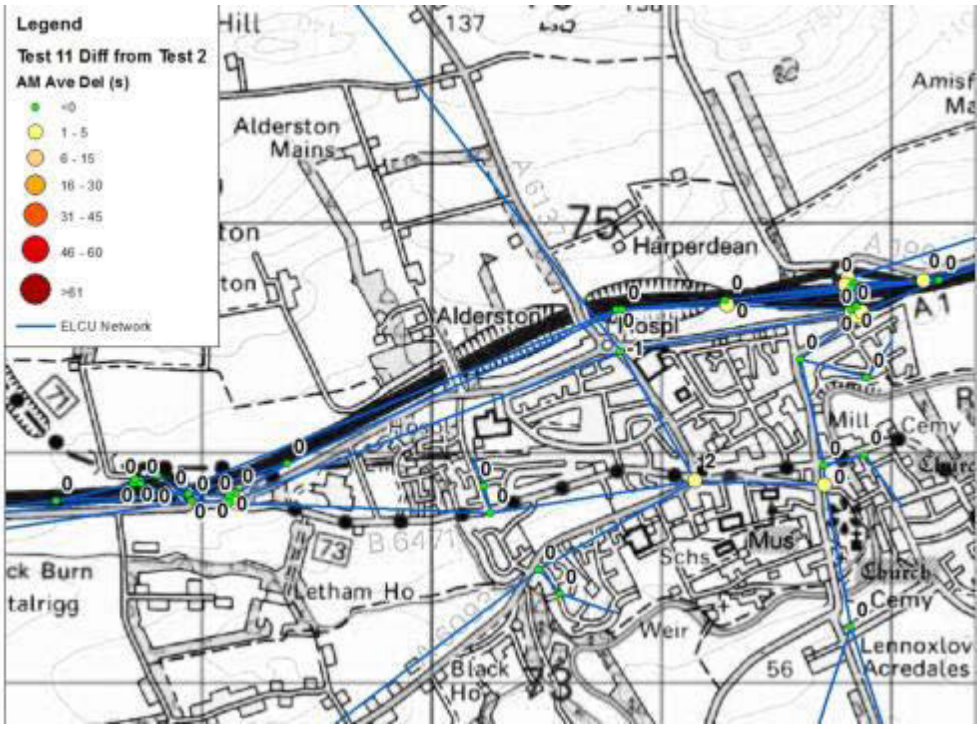

Figure 82. Test 11 vs Test 2 junction delays – Haddington

Figure 83. Test 11 vs Test 2 Junction Delay – Old Craighall

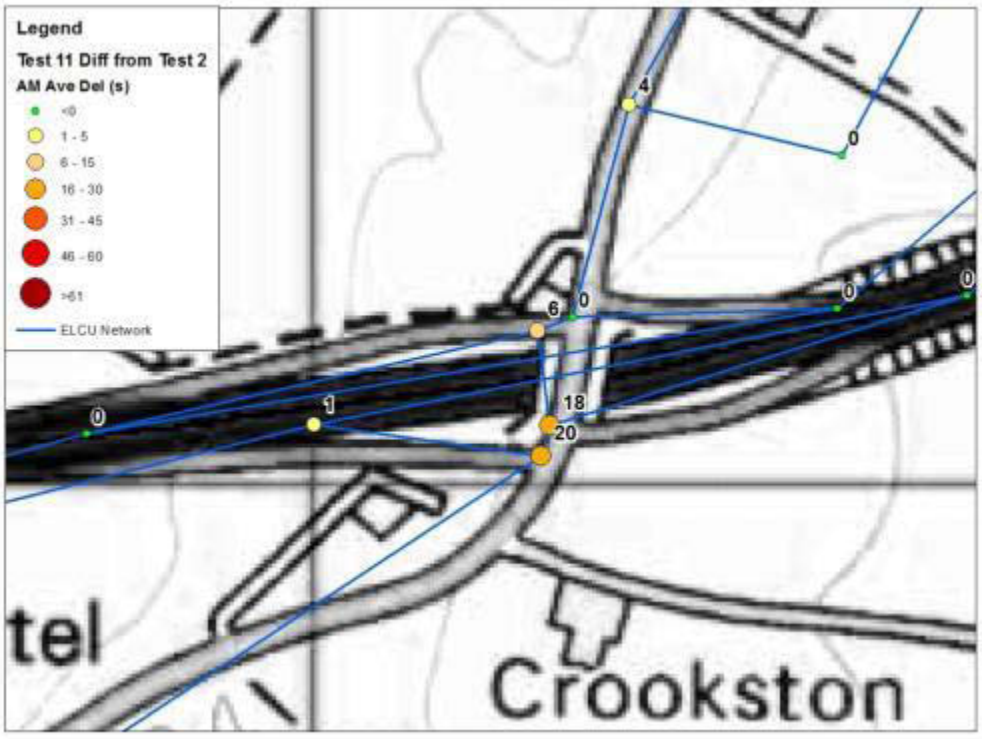

Figure 84. Test 11 vs Test 2 junction delays – Salters Road

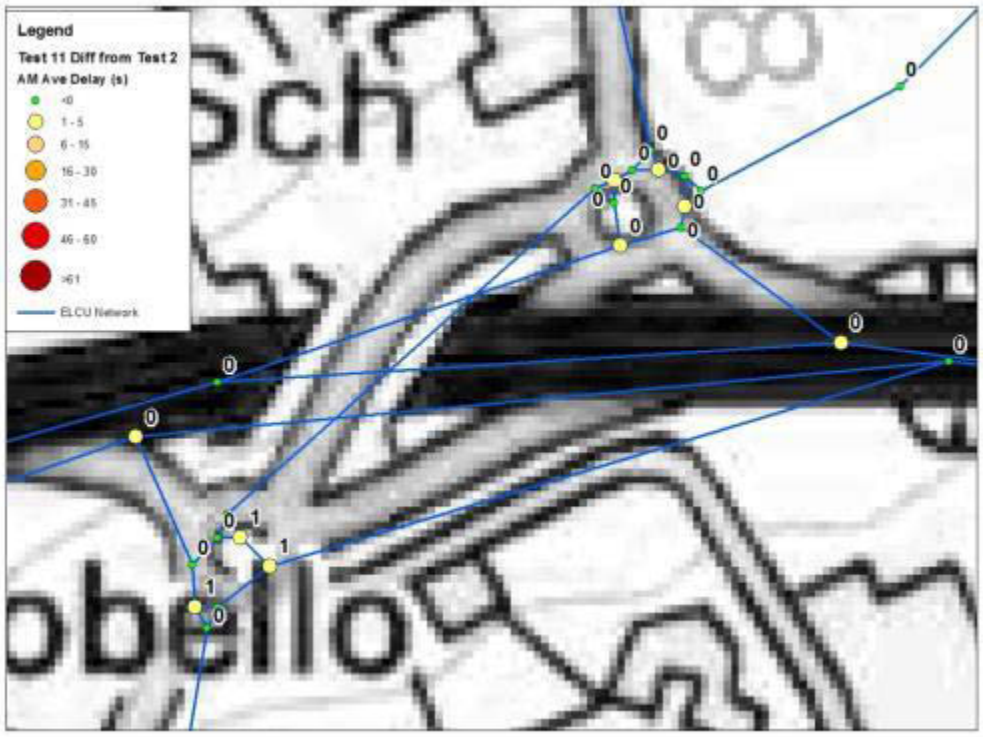

Figure 85. Test 11 vs Test 2 junction delay – Tranent

10.6 Test 12

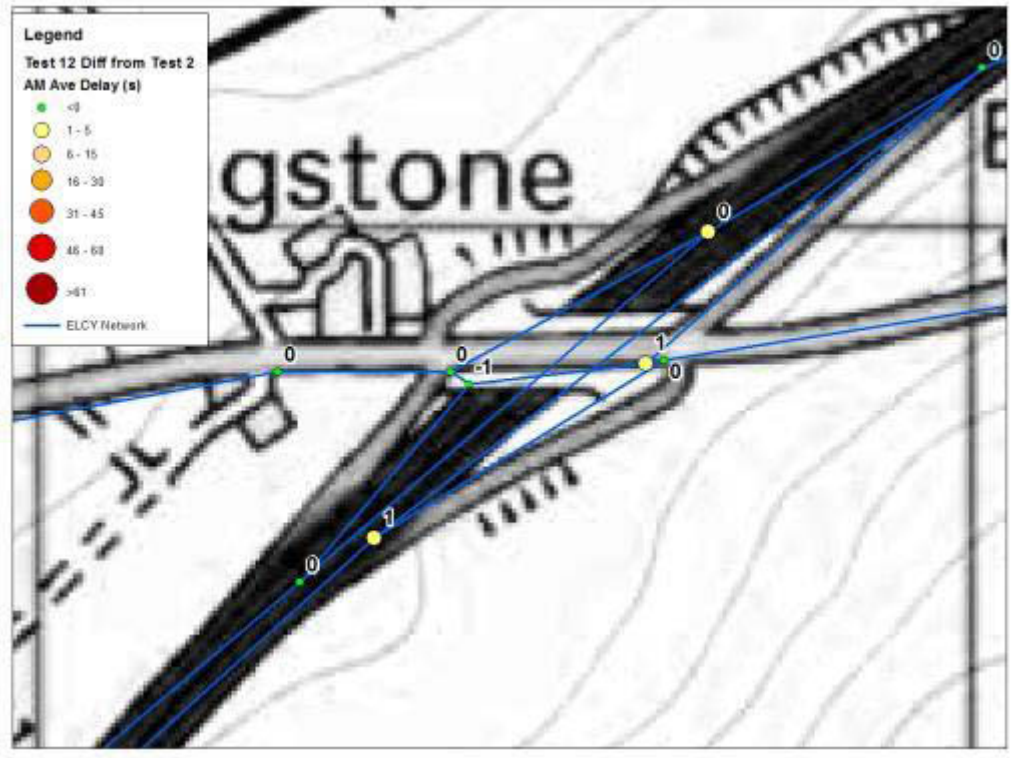

Figure 86. Test 12 vs Test 2 junction delay – Dolphingstone

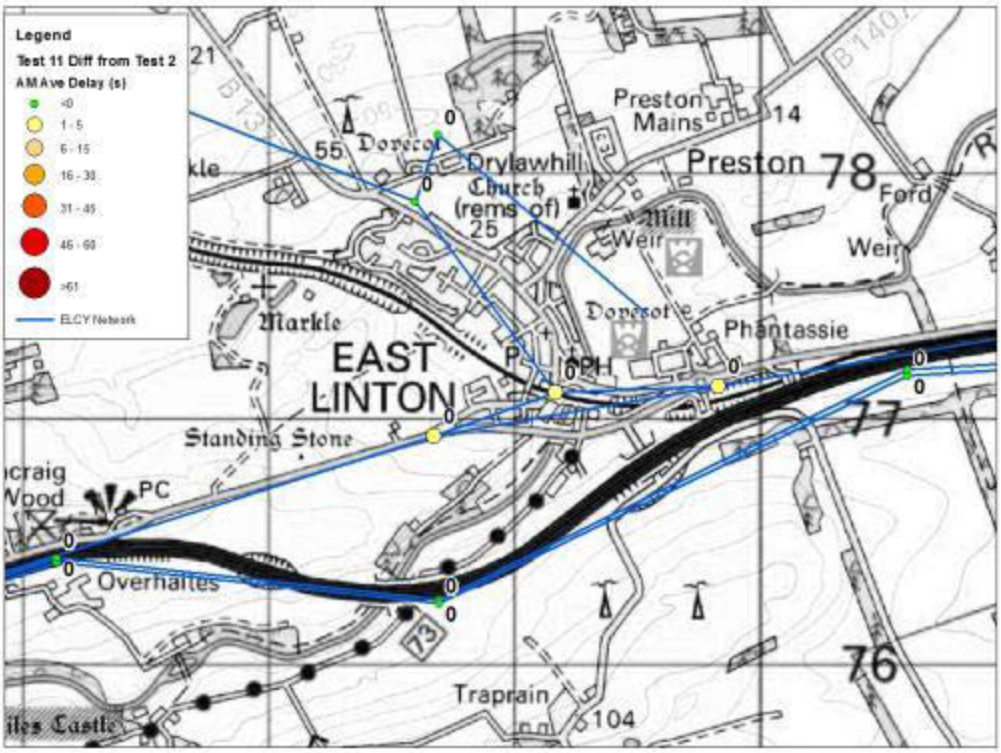

Figure 87. Test 12 vs Test 2 junction delay – East Linton

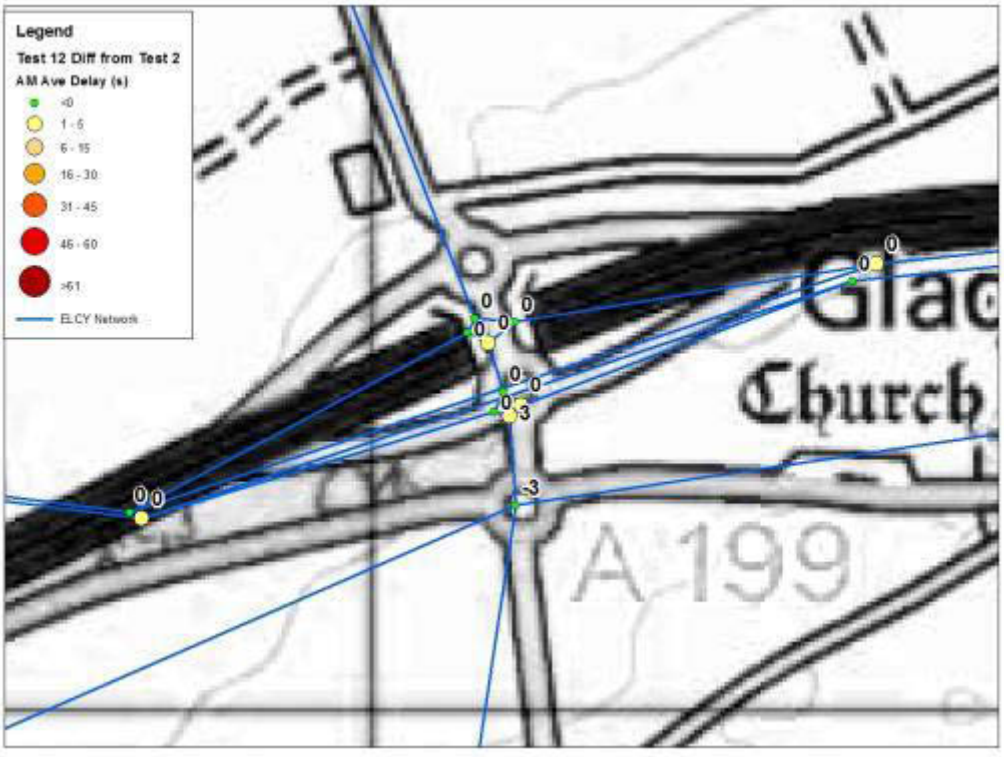

Figure 88. Test 12 vs Test 2 junction delay – Gladsmuir

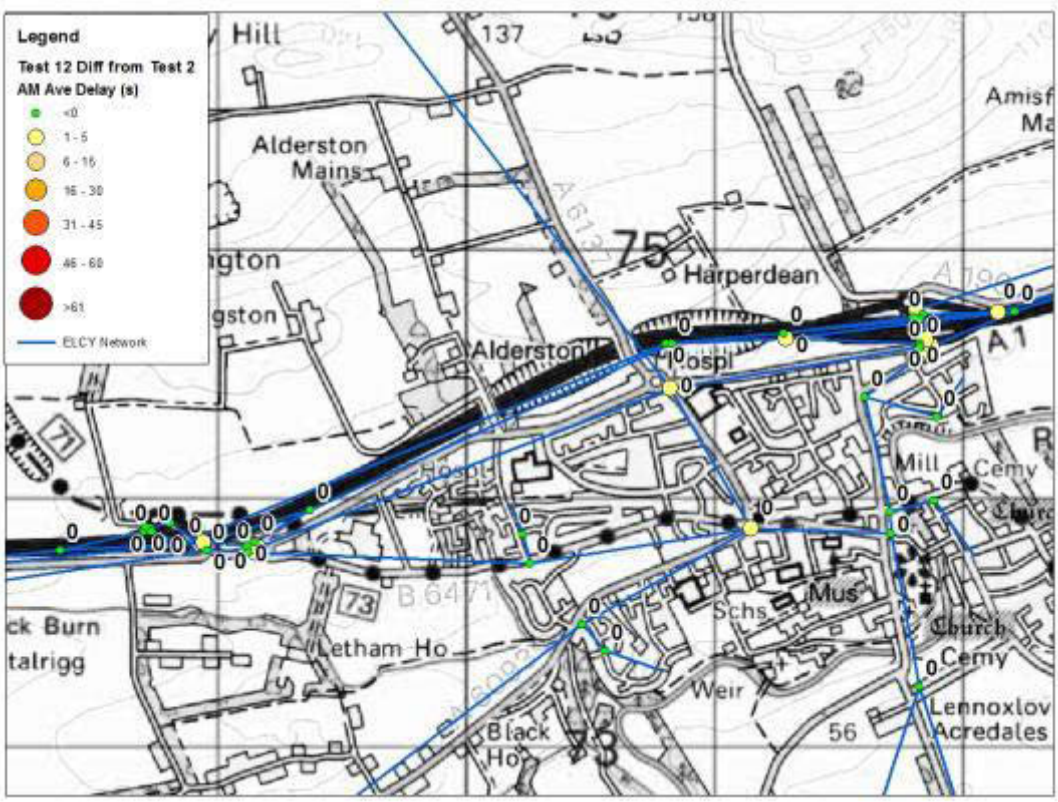

Figure 89. Test 12 vs Test 2 junction delay - Haddington

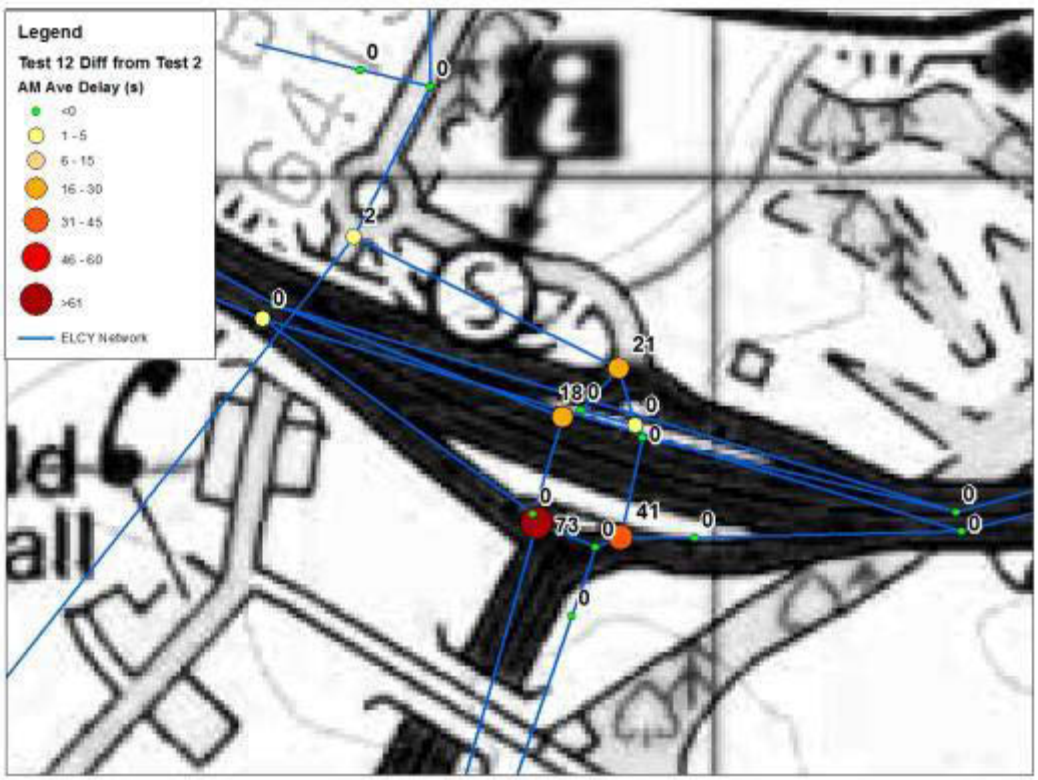

Figure 90. Test 12 vs Test 2 Junction Delay – Old Craighall


Legend
Test 12 Diff from Test 2
AM Ave Delay (s)
<0
1 - 5
6 - 15
16 - 30
31 - 45
46 - 60
>61
ELCY Network
1
0
0
1
0
0
1
6
0
0
tel
Crookston

Figure 91. Test 12 vs Test 2 junction delays – Salters Road

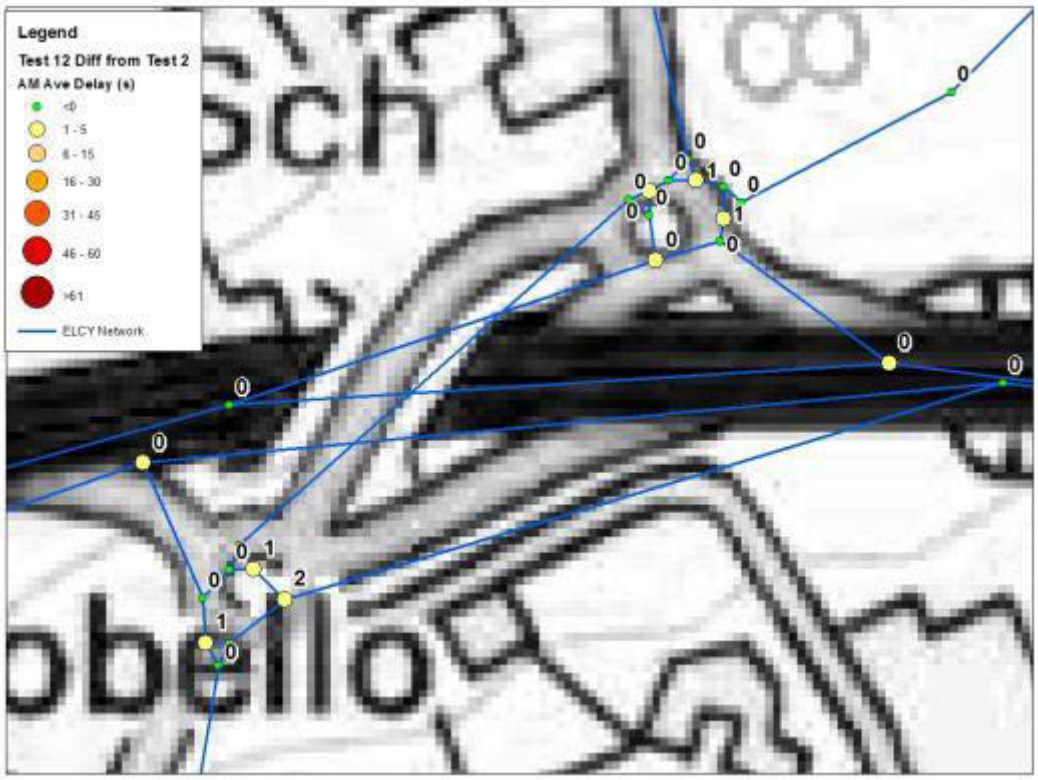

Figure 92. Test 12 vs Test 2 Junction Delay – Tranent

10.7 Journey times

Table 6. AM Westbound Journey Times (seconds)

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
Dunbar High St to Park & Ride - Newcraighall	1549	1564	1640	1605	1652	1677
East Linton High St to Park & Ride - Newcraighall	1302	1315	1390	1355	1403	1431
Haddington High St to Park & Ride - Newcraighall	901	915	990	955	1002	1027
North Berwick High St to Park & Ride - Newcraighall	1820	1951	2014	1988	2026	2046
Ormiston Main St to Park & Ride - Newcraighall	736	766	867	814	870	915
Tranent High St to Park & Ride - Newcraighall	511	541	641	577	645	689

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
Edinburgh Rd, Cockenzie to Park & Ride - Newcraighall	569	699	762	736	771	794
Prestonpans High St to Park & Ride - Newcraighall	608	653	700	758	768	714
Wallyford Toll to Park & Ride - Newcraighall	342	390	438	497	504	452
Levenhall Roundabout to Park & Ride - Newcraighall	418	465	514	572	581	528
Newbigging/Pinkie Rd/Inveresk Rd to Park & Ride - Newcraighall	432	439	479	490	495	494
Mall Avenue/High St/Bridge St to Park & Ride - Newcraighall	280	282	285	286	305	285
Newhailes Rd/Edinburgh Rd/North High St to Park & Ride - Newcraighall	191	192	193	193	196	193

Table 7. PM Eastbound Journey Times (seconds)

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
Park & Ride - Newcraighall to Dunbar High St	1498	1500	1500	1500	1500	1500
Park & Ride - Newcraighall to East Linton High St	1220	1221	1221	1221	1221	1222
Park & Ride - Newcraighall to Haddington High St	867	869	869	869	869	869
Park & Ride - Newcraighall to North Berwick High St	1767	1827	1830	1830	1833	1831
Park & Ride - Newcraighall to Ormiston Main St	722	746	747	755	746	749
Park & Ride - Newcraighall to Tranent High St	498	522	523	521	522	525
Park & Ride - Newcraighall to Edinburgh Rd, Cockenzie	510	570	572	572	573	573

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
Park & Ride - Newcraighall to Prestonpans High St	516	534	536	536	536	536
Park & Ride - Newcraighall to Wallyford Toll	295	312	314	314	313	314
Park & Ride - Newcraighall to Levenhall Roundabout	366	384	386	386	390	386
Park & Ride - Newcraighall to Newbigging/Pinkie Rd/Inveresk Rd	410	442	459	495	482	458
Park & Ride - Newcraighall to Mall Avenue/High St/Bridge St	280	285	285	285	285	285
Park & Ride - Newcraighall to Newhailes Rd/Edinburgh Rd/North High St	190	191	190	190	191	190

Table 8. AM Westbound Journey Times (seconds)

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
Dunbar High St to A720/A68 Junction	1482	1614	1725	1651	1624	1778
East Linton High St to A720/A68 Junction	1235	1365	1476	1402	1374	1532
Haddington High St to A720/A68 Junction	834	965	1076	1001	973	1128
North Berwick High St to A720/A68 Junction	1754	2001	2099	2034	1997	2147
Ormiston Main St to A720/A68 Junction	670	817	952	860	841	1016
Tranent High St to A720/A68 Junction	445	591	726	623	616	790
Edinburgh Rd, Cockenzie to A720/A68 Junction	503	750	847	782	742	895
Prestonpans High St to A720/A68 Junction	542	703	785	804	739	815
Wallyford Toll to A720/A68 Junction	276	440	524	543	475	553

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
Levenhall Roundabout to A720/A68 Junction	352	516	600	618	552	629
Newbigging/Pinkie Rd/Inveresk Rd to A720/A68 Junction	365	490	564	536	466	595
Mall Avenue/High St/Bridge St to A720/A68 Junction	269	368	413	411	280	411
Newhailes Rd/Edinburgh Rd/North High St to A720/A68 Junction	407	508	554	552	419	552

Table 9. PM Eastbound Journey Times (seconds)

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
A720/A68 Junction to Dunbar High St	1506	1480	1495	1485	1515	1504
A720/A68 Junction to East Linton High St	1231	1203	1218	1207	1239	1229
A720/A68 Junction to Haddington High St	874	849	863	853	883	872
A720/A68 Junction to North Berwick High St	1775	1813	1827	1818	1852	1835
A720/A68 Junction to Ormiston Main St	728	727	742	743	780	751
A720/A68 Junction to Tranent High St	504	502	518	509	556	527
A720/A68 Junction to Edinburgh Rd, Cockenzie	519	557	571	561	592	579
A720/A68 Junction to Prestonpans High St	499	511	520	520	546	524
A720/A68 Junction to Wallyford Toll	276	286	294	295	318	298
A720/A68 Junction to Levenhall Roundabout	346	357	366	366	389	370
A720/A68 Junction to Newbigging/Pinkie Rd/Inveresk Rd	387	400	415	470	432	423

ROUTE	TEST 1	TEST 2	TEST 3	TEST 9	TEST 11	TEST 12
A720/A68 Junction to Mall Avenue/High St/Bridge St	302	822	931	948	301	921
A720/A68 Junction to Newhailes Rd/Edinburgh Rd/North High St	426	946	1055	1072	423	1045

APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Laurence Bacon	Senior Consultant	22/09/2014	Draft for client comment
	Checked by	Claire Mackay	Senior Consultant	23/09/2014	
	Approved by	David Connolly	Projects Director	DD/MM/YY	
2	Author	Laurence Bacon	Senior Consultant	29/09/2014	2nd draft for comments
	Checked by	Claire Mackay	Senior Consultant	29/09/2014	
	Approved by			DD/MM/YY	
3	Author	Laurence Bacon	Senior Consultant	02/10/2014	Final report
	Checked by	Claire Mackay	Senior Consultant	03/10/2014	
	Approved by	David Connolly	Projects Directo	03/10/2014	

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