

Transport and Environment Committee

10.00am, Thursday, 5 December 2019

Kirkliston and Queensferry Traffic and Active Travel Study

Executive/routine	Executive
Wards	1 - Almond
Council Commitments	

1. Recommendations

- 1.1 To note the completion of the traffic survey in June 2018 and the content of the final Consultant's Report dated October 2019.
- 1.2 To note the detailed results of the survey with particular reference to Kirkliston Town Centre and the primary Queensferry routes.
- 1.3 To note the recommendations contained in the report and acknowledge that further consideration is given to transport interventions and active travel improvements.

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Executive Director of Place

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Kirkliston and Queensferry Traffic and Active Travel Study

2. Executive Summary

- 2.1 The traffic study above was originally requested by Councillors Young and Lang at the June 2017 Council meeting. This report makes reference to a detailed Automatic Number Plate Recognition (ANPR) traffic survey undertaken in June 2018 in the Kirkliston and Queensferry study area after the opening of the Queensferry Crossing (See appendix 1). The study results identify current route choices in the area and recommends transport and active travel interventions that could increase mobility and reduce the impact of traffic on key routes and junctions. The conclusions suggest there is some evidence of through traffic movements at particular locations, however the majority of traffic appears to be locally generated. Intervention recommendations in the report make reference to active travel infrastructure improvements, possible junction changes at the Kirkliston crossroads and suggested changes to the access arrangements in the Queensferry area.

3. Background

- 3.1 The traffic study was requested at the Council meeting in [June 2017](#). Following a scoping meeting in December 2017 a procurement exercise was undertaken.
- 3.2 A Stakeholder working group is made up of the following representatives, and have met to discuss the findings and recommendations:

Stakeholder representation

- Local Ward Councillors;
- Representatives from the Kirkliston Community Council; and
- Representatives from the Queensferry & District Community Council.

Key dates

- 28 November 2018 First Stakeholders meeting
- 4 April 2019 Draft report issued to Steering Group members
- 9 October 2019 Second Stakeholders meeting
- 15 November 2019 revised Report issued to Steering Group members

4. Main report

- 4.1 The purpose of the study was to consider travel patterns within and through the Kirkliston and Queensferry study, area and gather necessary evidence of travel patterns to understand the origin and destination (O/D) movements.
- 4.2 The traffic survey data has provided factual baseline information to consider current trip choices and can inform future decisions or interventions with respect to transport network changes, active travel investment or development led transport appraisals.
- 4.3 The report focused on the following elements:
- Data collection;
 - Data analysis;
 - Outcomes and issues;
 - Interventions; and
 - Summary and conclusions.
- 4.4 Survey data was collected between Tuesday 26 June 2018 and Friday 29 June 2018 at 16 ANPR camera points across the study area, between 07:00 and 19:00. The survey was undertaken by an independent company with specialist equipment to read number plates from passing vehicles. For the purpose of the study, vehicles have were classified as either Car, Light Goods Vehicle (LGV), Heavy Goods Vehicle (HGV) or Bus/Coach.
- 4.5 The camera locations were located to establish a cordon around the study area with additional intermediate survey points to capture further information regarding route choices. Information regarding daily trip movements and specific trip routing can be seen in the report (Section 2 of Appendix 1).
- 4.6 In discussion with the Stakeholder Group initial data analysis is focused on the impact of traffic at the main Kirkliston Crossroads and the key access routes in the Queensferry area. The purpose of this specific interrogation is to understand the traffic movements at key junctions / routes and more importantly establish the origin and destination of internal and through journeys.
- 4.7 As a function of the traffic study the Consultant has developed an interactive tool for Stakeholders use. The purpose of this dashboard was to allow officers and local stakeholders an opportunity to consider volumetric and origin/destination

information for individual or paired sites. Unfortunately, to date the Dashboard has not been totally functional due to internal Firewall issues, however, efforts will be taken to try and resolve the issue for external email accounts.

- 4.8 Study Outcomes: the survey data suggests that the majority of traffic movements are attributable to trips starting or ending in the local area. However, it should be noted that specific routes in the study area are subject to considerable through traffic from the West Lothian area. New local and regional housing developments are likely to have an impact in traffic levels and route choices in the future. Proposed infrastructure changes on the adjacent Trunk Road network, in particular the Winchburgh M9 access are likely to have an impact on traffic movements, however, these are not quantified in the study.
- 4.9 Kirkliston Crossroads: following discussions with the Stakeholders Group and with consideration of the traffic flows the volumetric and O/D data has been interrogated in detail to understand the nature of journeys passing through the junction. Further analysis and design would be required to consider whether this junction could be improved to increase traffic flows, or completely redesigned to improve the local environment for residents. By revising local priorities in favour of pedestrians it may be possible to discourage through journeys and focus on walking, cycling and public transport journey options.
- 4.10 M90 Queensferry Crossing Junction/Builyeon Road: while there are transport planning discussions ongoing regarding the proposed development it is clear the characteristics of the existing road is in the favour of vehicles. Drawings contained in the report suggest varying levels of intervention to redress the balance towards active travel infrastructure.
- 4.11 Station Road and B924 Dalmeny Corridor: although not articulated in the report the survey data has identified a significant change in route choices following the opening of the Queensferry Crossing. Clearly in the past the majority of traffic entering and leaving the Queensferry area would make use of the Echline Junction (above the old A90 Forth Road Bridge approach). Following the closure of this junction to general traffic, the majority of journeys into and out of Queensferry now appear to use resident streets either to the east or west of the town.
- 4.12 It is also recognised that Town Centre improvement works due to commence on the Queensferry High Street early in 2020 will have an impact on through routes in the Queensferry area. Although not included in this traffic study, the new High Street layout will physically restrict traffic movements and the promotion of an Environmental Order on the High Street will restrict vehicles over 7.5 tonnes (with an early morning servicing window proposed).
- 4.13 A90 Slip Roads (Transport Scotland): a recommendation in the report makes reference to local part time access on the new A90 public transport slip roads. These new links clearly provide a dedicated network for public transport vehicles, however, the use of these links could be explored with Transport Scotland to offer part time access to and from South Queensferry to reduce traffic volumes on local residential streets and through Kirkliston.

- 4.14 Active Travel Audit: the audit was undertaken to consider in more detail infrastructure improvements that would provide local residents and visitors an opportunity to consider active travel options for trips within the study area or improving connections to other strategic active travel networks or public transport interchanges. The study has identified gaps in the active travel network and suggested routes and junctions that would benefit from improvements and strategic investment.
- 4.15 Summary: this traffic and active travel study has identified factual evidence regarding volumetric and O/D traffic flows in the study area. This data can be used to inform transport and mobility related decisions in the future. Suggested interventions and investment proposals are noted in Section 5 of this report.

5. Next Steps

- 5.1 Conclusions and next steps: the data and report have identified the scale of vehicle movements and routing within and through the study area. The overall findings suggest that certain routes are subject to significant through movements (generally East/West Kirkliston movements), however, overall the scale of most journeys relative to local generated flows are considered to be minimal.
- 5.2 The data gathered and journey modelling would suggest that local congestion and delays are linked to an increasing background demand from the existing population.
- 5.3 The Consultant's report has identified a range of interventions which are generally based on reducing car use (80% of all vehicle trips in the study area). In line with strategic priorities the report has made reference to active travel improvements that could offer realistic alternative options for local trips.
- 5.4 Considering the significant scale of future housing development in the immediate area and region the study has focused on interventions to manage traffic demand rather than attempting to increase road space or capacity.
- 5.5 Further consideration of the traffic data and recommendations could be undertaken to determine if future projects and investment would be beneficial and deliverable.

5.6 Table 1 – Intervention Recommendations:

Intervention Timeline	Recommendation	Action owner
Short Term	Local Active Travel improvements: Signs and local infrastructure changes	Active Travel
	Kirkliston Crossroads: Junction efficiency assessment and Section 75 investment.	Transport Network and Enforcement Team (ITS)
	Queensferry High Street Town Centre Improvement project: Expected start date Spring 2020	North West Locality team
	Queensferry – Station Road Corridor: Installation of local traffic calming	North West Locality team
Longer Term	Local & Strategic Active Travel investment: Consider projects in line with city wide 2020 Active Travel Action Plan.	Active Travel Team
	Kirkliston Town Centre: Crossroads junction reconfiguration	Strategic Transport Team (Road Safety/Active Travel Team)
	A90 Slip Road local access trial with Transport Scotland	Transport Network and Enforcement Team (ITS)

5.7 Further work will be undertaken to scope the interventions for delivery.

6. Financial impact

- 6.1 The cost of the Consultants study including the ANPR traffic survey, preparation of the report and facilitating stakeholder group meetings was £74,180. The cost of the traffic study was contained in the 2018/2019 and 2019/2020 North West Locality Roads Maintenance Budget.
- 6.2 The traffic study was procured as a competitive tender.
- 6.3 The costs of progressing the intervention recommendations is still to be determined.

7. Stakeholder/Community Impact

- 7.1 As part of the engagement process associated with the study a small stakeholder group has been created to consider the findings and recommendations. At the last meeting on 9 October 2019 Elected Members were keen to complete the study and present the report to the Committee as a matter of urgency.
- 7.2 Clearly, any future interventions or projects associated with the study should maintain a point of reference with local Councillors and Community Councils regardless of delivery team.
- 7.3 All the measures in this report endeavour to reduce vehicle dependency, traffic volumes in residential areas and the resultant emissions. The active travel proposals are designed to promote sustainable transport and improve local mobility.

8. Background reading/external references

- 8.1 [West Edinburgh Transport Appraisal Refresh Report – December 2016](#)
- 8.2 [City Mobility Plan – City of Edinburgh Council website update](#)
- 8.3 [Investing in Active Travel and in People Friendly Streets Report](#)

9. Appendices

- 9.1 Appendix 1 – Arup Kirkliston and Queensferry Traffic and Active Travel Study Report – draft
- 9.2 Appendix 2 – Map of Study Area
- 9.3 Appendix 3 – Data results sample
- 9.4 Appendix 4 - Suggested Kirkliston Crossroads Layout

City of Edinburgh Council
**Kirkliston and South Queensferry
Traffic Study**
Analysis and Outcomes

Issue | 21 November 2019

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 262670-01

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Active Travel Audit

1 Study Background

1.1 Introduction

Ove Arup & Partners Scotland Ltd (Arup) has been commissioned by City of Edinburgh Council (CEC) to undertake a traffic study for the Kirkliston and South Queensferry area, with a view to understanding travel patterns and origin destination trip making within the local area.

We understand that the initial scope for the study was to consider travel patterns within and through Kirkliston, although this scope increased based on local input and concerns around vehicular demand across the local network and in particular through traffic in South Queensferry.

This report outlines the scope of the study, data gathering process and data analysis, with the outcomes utilised to explore opportunities to address concerns or constraints in terms of local network operation.

1.2 Objectives

The key objective of the traffic study is to collate the necessary evidence of travel patterns across the network in order to understand the breakdown of origin destination movements.

Traffic survey data should provide factual evidence to map routes through the network and quantify the impact of through trips relative to local trip making. The general network extent for the traffic study is illustrated in Figure 1a.

Based on the traffic survey findings, and the modelling of origin destination trips, the impact from both committed development and potential future network changes should also be captured in terms of highlighting potential interventions.

1.3 Report Structure

Following this introduction, the report is structured as follows:

Chapter 2	Data Collection
Chapter 3	Data Analytics
Chapter 4	Outcomes and Issues
Chapter 5	Interventions
Chapter 6	Summary & Conclusions

2 Data Collection

2.1 Survey Specification

The original study brief identified the preference for Automatic Number Plate Recognition (ANPR) surveys, to include a full 7-day survey period. Based on local knowledge and experience of ANPR surveys, it was suggested that a 7-day survey would be excessive in terms of data capture and overall cost, where a reduced survey period would still provide sufficient data to inform the traffic study. It was therefore agreed that a 4-day survey be instructed to include a Tuesday, Wednesday, Thursday and Friday during school term dates.

A total of 16 camera locations were identified and agreed with CEC during project inception, these are identified in Figures 2b and 1c shown in the context of the South Queensferry and Kirkliston local road network.

The survey specification was agreed and subsequently informed the survey tendering process, where a preferred supplier was identified based in quality, costs and availability to undertake the survey ahead of the school summer holidays.

Following instruction all cameras were installed in suitable locations, with the surveys taking place during Tuesday 26th, Wednesday 27th, Thursday 28th and Friday 29th June 2018.

2.2 Data Capture

ANPR surveys utilise a series of cameras to record vehicles passing defined locations, in the case of the Kirkliston and South Queensferry traffic study the cameras recorded all vehicle movements between the period 07:00 to 19:00, which is a typical survey period to record AM peak, PM peak and any inter-peak conditions.

The survey was undertaken by an independent traffic survey company who utilised specialist software which can read number plates from passing vehicles and record time of capture but also identify vehicle classification. For the purpose of this traffic study vehicles were classified as either, Car, Light Goods Vehicle (LGV), Heavy Goods Vehicle (HGV) or Bus/Coach.

Once the data from each of the camera locations has been processed, the number plate matching stage can be undertaken.

2.3 Survey Report

In addition to the supply of the data itself, a survey report is prepared by the survey company which outlines conditions at time of survey along with any issues which may impact on the overall results

2.4 Data Processing

The camera locations established a cordon within the study area, recording all main routes in and out of Kirkliston and South Queensferry, with additional intermediate locations to monitor routing through the area. A number of specific routes were identified from the outset, with additional sites based on identifying local and strategic trips.

Once all the data from each camera has been processed through the number plate reader software, it is then possible to start linking the camera data in relation to matching number plates and therefore tracking vehicles within the study area.

In total, during the 4 days of surveys over 200,000 vehicle movements were recorded, this includes all user classes. It is important to note however that this includes multiple vehicle records across the cameras, representing some local trips back and forth during the 12-hour survey period, or trips through the network being picked up at each location.

Table 2.1 – Summary of Trips by hour of day

	Tuesday	Wednesday	Thursday	Friday
07:00 – 08:00	5,853	5,846	5,407	4,924
08:00 – 09:00	5,186	4,910	4,796	4,441
09:00 – 10:00	3,828	3,605	3,628	3,449
10:00 – 11:00	3,106	3,225	3,250	3,382
11:00 – 12:00	3,290	3,480	3,691	3,810
12:00 – 13:00	3,610	3,795	3,870	4,165
13:00 – 14:00	3,576	3,829	3,780	4,212
14:00 – 15:00	3,815	4,068	4,375	4,487
15:00 – 16:00	4,355	4,475	4,709	4,683
16:00 – 17:00	5,434	5,485	5,263	4,798
17:00 – 18:00	5,954	5,774	5,569	4,791
18:00 – 19:00	4,415	4,392	4,324	3,625
12-hour Total	52,422	52,884	52,662	50,767

The daily flows are shown to be relatively consistent, with Tuesday, Wednesday and Thursday trips recorded as approximately 53,000 trips, the Friday data identifies a lower overall total of approximately 50,000 trips with notably lower peak period trips but with higher inter-peak flows between 11:00 and 15:00.

Chart 2.1 Profile of Trips (data tabulated in Table 2.1)

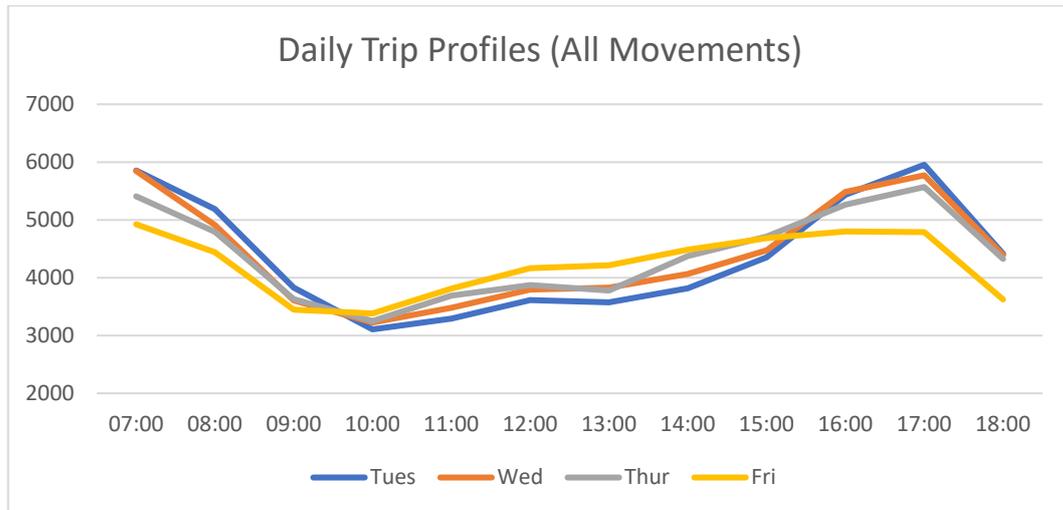
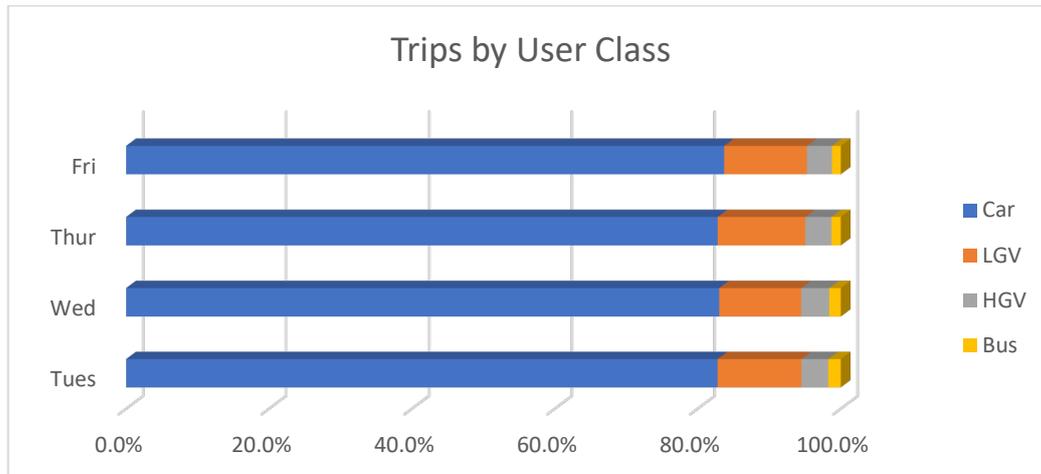


Chart 2.1 illustrates the profile of trips over the course of the 12-hour period, individually showing the profile for each survey day. The AM and PM peak periods are easily identifiable, with 07:00-08:00 representing the AM peak hour, and 17:00-18:00 the PM peak hour. In order to validate the AM peak hour, additional checks were undertaken using speed surveys which includes volumetric counts across a 24-hour periods. This confirmed that 07:00-08:00 flows were general higher than the preceding hourly flows.

Table 2.2 – Summary of Trips by User Class

	Tues		Wed		Thur		Fri	
Car	43,400	82.8%	43,905	83.0%	43,606	82.8%	42,501	83.7%
LGV	6,146	11.7%	6,060	11.5%	6,449	12.2%	5,869	11.6%
HGV	1,960	3.7%	2,068	3.9%	1,922	3.6%	1,770	3.5%
Bus	916	1.7%	851	1.6%	685	1.3%	627	1.2%
	52,422		52,884		52,662		50,767	

Chart 2.2 ANPR Trips by User Class



The majority of trip making within the study area relates to car use (average of 83.1%), with LGV trips accounting for 11.7%, HGV 3.7% and Bus 1.5%.

The Tuesday and Wednesday data identified higher bus based movements, which on further inspection aligned with the arrival/departure of cruise liners at South Queensferry, where passengers are shuttled by bus into Edinburgh. This was also confirmed on inspection of the camera locations where bus movements were recorded, with a higher number of trips travelling through sites in the direction of Edinburgh.

2.5 Trip Routing

One of key deliverables from the ANPR data is the identification of vehicle routing through the local network of Kirkliston and South Queensferry. Based on the 16 camera locations, a number of key routes have been selected to consider the level of potential 'rat-running', particularly on residential routes. The data was also interrogated on the basis of recorded trips at consecutive cameras, taking cognisance of travel time between sites to identify movements which represent a single trip.

The following key routes have been identified through dialogue with CEC and noted during a stakeholder session with community council members. The following sections present a summary of the routes, along with the recorded number of trips by time of day.

2.5.1 South Queensferry & Kirkliston Through Movements

We have split the interrogation of the survey data into sections which best reflect the grouping of routes. This section focuses on the ‘through movements’ which was one of the key objectives of the study, identifying the level of traffic passing through the study area. These are routes where trips could use an alternative, more strategic route.

A904 (1) – Bo’ness Rd (2) – Newhalls Rd (5) – B924/A90 (8)

This route captures trips between Newton and Barnton, passing through South Queensferry using Newhalls Rd (High Street).

Eastbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	22	20	13	9
0800-0900	8	10	2	1
16:00-1700	0	4	3	3
17:00-1800	1	1	1	2
Westbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	1	1	0	2
0800-0900	0	1	2	0
16:00-1700	5	4	4	9
17:00-1800	9	4	2	3

A904 (1) – Bo’ness Rd (2) – Station Rd (7) – B924/A90 (8)

Similar to above, the same origin destination with the internal through route via Station Road.

Eastbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	1	2	0
0800-0900	0	0	1	0
16:00-1700	1	0	0	0
17:00-1800	0	0	0	0
Westbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	0	0	0
0800-0900	0	0	0	0
16:00-1700	0	1	1	0
17:00-1800	1	0	0	0

A904 (1) – Builyeon Rd (3) – The Loan (4) – Newhalls Rd (5) – B924/A90 (8)

Again, this route relates to trips between Newton and Barnton, this time passing along Builyeon Rd before heading down The Loan and along Newhalls Road.

Eastbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	1	0	2
0800-0900	1	2	0	1
16:00-1700	0	2	1	0
17:00-1800	0	1	1	1
Westbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	0	0	0
0800-0900	0	0	0	2
16:00-1700	1	0	0	2
17:00-1800	0	0	0	1

A904 (1) – Builyeon Rd (3) – The Loan (4) – Station Rd (7) – B924/A90 (8)

Similar to the above, but travelling along Station Road.

Eastbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	5	7	0	2
0800-0900	3	3	4	0
16:00-1700	1	0	2	0
17:00-1800	0	1	1	4
Westbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	1	0	0	0
0800-0900	0	1	0	0
16:00-1700	3	0	0	2
17:00-1800	3	0	0	2

A904 (1) – Builyeon Rd (3) – B800 (6 & 11) – Path Brae (13) – A89 (15)

This route reflects trips from Newton travelling towards Newbridge and the M8/A89 corridors – with the potential alternative route via the M9 Spur.

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	5	7	5	6
0800-0900	1	1	1	0
16:00-1700	1	1	2	2
17:00-1800	0	2	0	1
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	0	0	2
0800-0900	1	0	1	2
16:00-1700	1	1	0	2
17:00-1800	3	0	0	2

A904 (1) – Builyeon Rd (3) – B800 (6 &11) – Path Brae (13) – Lochend Rd (16)

Similar to the above, but trip using the minor route via Lochend Rd which connects onto the eastbound A89 corridor towards Edinburgh.

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	1	1	0	0
0800-0900	1	0	2	0
16:00-1700	0	0	1	0
17:00-1800	0	0	2	1
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	0	0	0
0800-0900	0	0	0	0
16:00-1700	0	0	0	2
17:00-1800	0	0	0	0

Bo'ness Rd (2) – Builyeon Rd (3) – B800 (6 & 11) – Path Brae (13) – A89 (15)

Trips from South Queensferry exiting via Bo-ness Rd and travelling through Kirkliston to Newbridge, again the alternative route being via the M9 Spur.

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	7	7	3	2
0800-0900	3	3	2	2
16:00-1700	1	0	1	1
17:00-1800	2	0	2	1
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	2	0	0	2
0800-0900	0	0	0	2
16:00-1700	2	0	0	3
17:00-1800	1	0	1	6

Bo'ness Rd (2) – Builyeon Rd (3) – B800 (6 & 11) – Path Brae (13) – Lochend Rd (16)

Similar to the above, but connecting directly to the A89 Eastbound corridor.

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	4	4	2	4
0800-0900	1	1	1	3
16:00-1700	0	0	0	0
17:00-1800	0	0	0	0
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	0	0	0
0800-0900	0	0	0	0
16:00-1700	0	0	0	0
17:00-1800	0	0	0	0

B924/A90 (8) – Station Rd (7) – The Loan (4) – B800 (6 & 11) – Main St (12)

This route represents Barnton trips travelling through South Queensferry with an origin destination to the west of Kirkliston.

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	0	0	0
0800-0900	0	0	0	0
16:00-1700	3	2	3	2
17:00-1800	1	1	1	0
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	2	0	1
0800-0900	0	1	0	0
16:00-1700	0	0	1	0
17:00-1800	1	0	0	1

B924/A90 (8) – Station Rd (7) – The Loan (4) – B800 (6 & 11) – Path Brae (13)

Similar to above but with an origin destination south of Kirkliston.

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	0	1	0	0
0800-0900	1	2	2	0
16:00-1700	1	0	0	1
17:00-1800	1	1	2	0
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	1	1	0	2
0800-0900	0	0	0	4
16:00-1700	0	0	0	2
17:00-1800	1	0	0	0

The above list of routes is not exhaustive, where Chapter 3 explores additional data analytical work which has been undertaken to model the ANPR data in an interactive and dynamic dashboard.

Based on the trips presented in the above tables, which focus on the external to external movements, while there is evidence of through movements being made during the peak periods, the overall scale of the issue is minor relative to background traffic flows.

The route which illustrated the highest through movement was eastbound from Newton, travelling along Bo-ness Road and onto Newhalls Road (High Street) before continuing onto the B924/A90 toward Edinburgh. The survey identified approximately 20 trips during the AM peak hour making this journey. While not ideal, this level of trip making is negligible in terms of impact on the local road network.

2.5.2 Local Routes and Trips

Building on section 2.5.1, the following tables summarise key movements within the study area, which represent journeys between local traffic generators and attractors. The focus for these routes is the B800 north of Kirkliston, showing trips through a sequence of ANPR camera, to/from South Queensferry.

B800 (11 & 6) – Builyeon Rd (3) – A904 (1)

Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	2	7	0	7
0800-0900	5	4	3	5
16:00-1700	7	2	0	8
17:00-1800	3	1	0	6
Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	8	9	7	8
0800-0900	6	3	6	5
16:00-1700	6	6	6	4
17:00-1800	9	9	7	6

Across all four survey days, and each of the peak periods, there was minimal through movements travelling between North Kirkliston and Newton.

B800 (11 & 6) – Builyeon Rd (3)

Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	34	46	0	57
0800-0900	43	34	11	47
16:00-1700	74	15	5	164
17:00-1800	56	13	16	172
Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	152	171	141	129
0800-0900	100	109	114	100
16:00-1700	52	68	69	59
17:00-1800	57	61	76	57

Consistently across each day, there are a reasonable number of trips travelling southbound from Builyeon Rd through Kirkliston during the AM peak. The reverse movement is less evident across the Tuesday, Wednesday and Thursday survey, however during the Friday PM peak the number of northbound trips increases.

B800 (11 & 6) – The Loan (4)

Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	34	35	3	54
0800-0900	50	57	12	57
16:00-1700	76	68	63	113
17:00-1800	95	77	81	91
Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	48	55	2	49
0800-0900	68	63	39	55
16:00-1700	52	50	60	61
17:00-1800	63	60	48	55

Trips between the B800 and The Loan are generally consistent across the 4 survey days, the Thursday AM peak flows are notably low which may be due to issues with the camera which was damaged during Wednesday evening. Ignoring the Thursday data, the tidal nature of northbound and southbound flows during the AM and PM peak would suggest that many trips are commuter based.

B800 (11 & 6)

Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	101	117	14	159
0800-0900	137	118	49	151
16:00-1700	236	235	243	410
17:00-1800	237	241	265	368
Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	271	296	239	240
0800-0900	217	224	240	201
16:00-1700	155	164	184	188
17:00-1800	190	211	187	165

The Northbound flows during the Friday PM peak were notably higher than the other survey day.

Similar to the above, the following tables summarise trips with an origin destination in South Queensferry, and therefore represent local based travel within and through the study area.

The Loan (4) - B800 (6 & 11) – Main Street (12)

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	8	11	0	5
0800-0900	16	18	14	15
16:00-1700	16	15	20	15
17:00-1800	27	20	15	13
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	8	10	1	9
0800-0900	12	18	4	17
16:00-1700	24	15	17	18
17:00-1800	31	25	28	19

The Loan (4) - B800 (6 & 11) – Path Brae (13)

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	36	41	2	42
0800-0900	11	38	20	29
16:00-1700	30	29	31	38
17:00-1800	28	34	30	29
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	20	22	0	38
0800-0900	0	32	7	34
16:00-1700	43	43	40	84
17:00-1800	55	42	43	64

The Loan (4) - B800 (6 & 11) – Path Brae (13) – A89 (15)

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	14	20	1	18
0800-0900	16	15	8	10
16:00-1700	11	9	9	11
17:00-1800	3	10	6	9
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	8	12	0	22
0800-0900	12	10	2	16
16:00-1700	30	18	25	61
17:00-1800	26	26	27	27

A small number of trips are recorded between The Loan and the various routes through Kirkliston. There are some balanced movements between routes during the AM and PM peak, although overall the PM Peak movements are higher in the northbound direction.

The Loan (4) - B800 (6 & 11) – Path Brae (13) – Lochend Rd (16)

Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	9	12	1	11
0800-0900	11	7	0	11
16:00-1700	9	5	4	6
17:00-1800	8	5	3	6
Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	1	1	0	0
0800-0900	0	0	0	0
16:00-1700	1	4	2	2
17:00-1800	0	0	2	2

Only a small number of trips are shown to travel between The Loan and the A89 via Lochend Road, of the trips recorded there were more southbound than northbound movements

3 Data Analytics

3.1 Introduction

During a subsequent meeting with community council stakeholders, additional details of trips passing through ANPR site 3 (Builyeon Road) was sought, in terms of capturing trips exiting the strategic network at the new Echline Roundabout and travelling toward/through South Queensferry and Kirkliston.

In order to explore these and other movements and routing of local trips which may be contributing to the local network issues, a deeper dive spreadsheet model has been developed to map all origin destinations and routes within the study area. This exercise was aimed at developing an interactive tool which could be shared and explored with stakeholders, and allowing options to be informed by a contemporary understanding of the network.

This chapter presents the data modelling process and the development of the interactive transport model, and how this information has been applied in the development of interventions.

3.2 Data Modelling

Reg	Class	Route	Origin Time	OriginSite	Destination Time	DestinationSite	Duration	Time 1	Site1	Time2	Site2	Time3	Site3	Time4	Site4	Time5	Site5	Time6	Site6	Time7
148RM	1	-	-	-	-	-	-	17:57:50	2NBD	-	-	-	-	-	-	-	-	-	-	-
148MM	1	45BD-3WBD	14:18:56	45BD	14:22:48	3WBD	00:03:52	14:18:56	45BD	14:22:48	3WBD	-	-	-	-	-	-	-	-	-
150ULB	1	9EBD-7WBD	08:16:43	9EBD	08:21:13	7WBD	00:04:30	08:16:43	9EBD	08:21:13	7WBD	-	-	-	-	-	-	-	-	-
150ULB	1	45BD-65BD	18:26:21	45BD	18:27:22	65BD	00:01:01	18:26:21	45BD	18:27:22	65BD	-	-	-	-	-	-	-	-	-
15NGB	1	-	-	-	-	-	-	11:38:76	45BD	-	-	-	-	-	-	-	-	-	-	-
170CYD	1	1EBD-12WBD	15:54:59	1EBD	16:46:28	12WBD	00:51:29	15:54:59	1EBD	15:56:14	2NBD	16:04:30	5EBD	16:31:37	5WBD	16:33:53	45BD	16:41:11	65BD	16:43:29
171D10250	1	15WBD-11NEC	12:43:05	15WBD	12:47:33	11NBD	00:04:28	12:43:05	15WBD	12:45:53	13NBD	12:47:33	11NBD	-	-	-	-	-	-	-
171D36803	2	3FRD-3FRD	18:05:06	3FRD	18:14:46	3FRD	00:09:40	18:05:06	3FRD	18:14:46	3FRD	-	-	-	-	-	-	-	-	-
171WH448	2	-	-	-	-	-	-	17:13:40	15WBD	-	-	-	-	-	-	-	-	-	-	-
181D31743	2	-	-	-	-	-	-	17:57:52	1WBD	-	-	-	-	-	-	-	-	-	-	-
182DFC	1	15WBD-15EBD	11:12:55	15WBD	11:40:28	15EBD	00:27:33	11:12:55	15WBD	11:40:28	15EBD	-	-	-	-	-	-	-	-	-
181CK	1	-	-	-	-	-	-	15:33:14	15FRD	-	-	-	-	-	-	-	-	-	-	-
1908D9P	1	-	-	-	-	-	-	11:54:03	25BD	-	-	-	-	-	-	-	-	-	-	-
19825W	1	-	-	-	-	-	-	18:02:41	1WBD	-	-	-	-	-	-	-	-	-	-	-
1987BM	1	2NBD-25BD	15:19:27	2NBD	15:35:53	25BD	00:16:26	15:19:27	2NBD	15:35:53	25BD	-	-	-	-	-	-	-	-	-
199XR1	1	8WBD-8FRD	10:06:45	8WBD	10:34:17	8FRD	00:27:32	10:06:45	8WBD	10:34:17	8FRD	-	-	-	-	-	-	-	-	-
1CLV	1	-	-	-	-	-	-	16:55:20	8EBD	-	-	-	-	-	-	-	-	-	-	-
1ENR	1	-	-	-	-	-	-	07:46:28	10EBD	-	-	-	-	-	-	-	-	-	-	-
1ERR	1	10WBD-12FRD	13:27:50	10WBD	14:05:51	12FRD	00:38:01	13:27:50	10WBD	13:31:10	14WBD	13:45:40	12FRD	13:48:21	14FRD	13:56:23	14WBD	14:05:51	12FRD	-
1HH4ND	2	-	-	-	-	-	-	10:05:56	1WBD	-	-	-	-	-	-	-	-	-	-	-
11VK	1	14WBD-14EBD	17:31:04	14WBD	17:55:30	14EBD	00:24:26	17:31:04	14WBD	17:36:28	12WBD	17:52:34	12EBD	17:55:30	14EBD	-	-	-	-	-
11L6UJW	1	-	-	-	-	-	-	18:30:12	1WBD	-	-	-	-	-	-	-	-	-	-	-
11WVWVW	1	-	-	-	-	-	-	17:10:41	1FRD	-	-	-	-	-	-	-	-	-	-	-

The data was provided in the format illustrated above which disaggregated trips by vehicle registration and provided an entire trip chain for the survey period for each vehicle. This took the form of:

REGISTRATION - TIME 1 - SITE 1 - TIME 2 - SITE 2 - TIME 3 - SITE 3 etc.

However, these trip chains were often made up of multiple trips, such as a commute to and from work. Therefore, this dataset was consolidated into two more manageable datasets for input in to Microsoft Power BI.

- 1) A total volumetric flow dataset
- 2) An origin-destination matrix

3.2.1 Total Volume Data

The raw data was reformatted so that there was no disaggregation by registration and all instances where vehicles were picked up by cameras were listed one after another (see Figure 3.1). This served as the database for the total volumetric dashboard to be created. This allowed for total vehicle volumes to be shown with the ability to filter by day, time, site location and vehicle class.

Class	Time	Site	Site Code	Direction	Location	Lat	Long	Time Range	Day
1	15:01:33	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	10:37:40	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	18:03:15	1 EBD	1	Eastbound	1 A904 Newton Eastbound	55.984668	-3.424623	Off Peak	2
1	11:49:19	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	13:25:03	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
3	16:58:23	3 WBD	3	Westbound	3 A904 Echline R'bt Westbound	55.983827	-3.405228	PM Peak [16:00 - 17:00]	2
1	10:45:24	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	08:30:59	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	AM Peak [08:00 - 09:00]	2
1	11:16:59	15 EBD	15	Eastbound	15 A89 Eastbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	13:43:51	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	13:07:47	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
1	16:10:22	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	PM Peak [16:00 - 17:00]	2
1	11:08:07	11 NBD	11	Northbound	11 Queensferry Rd Northbound	55.957406	-3.402832	Inter Peak [09:00 - 16:00]	2
1	14:41:06	3 WBD	3	Westbound	3 A904 Echline R'bt Westbound	55.983827	-3.405228	Inter Peak [09:00 - 16:00]	2
1	17:26:13	3 WBD	3	Westbound	3 A904 Echline R'bt Westbound	55.983827	-3.405228	PM Peak [17:00 - 18:00]	2
1	17:45:51	3 WBD	3	Westbound	3 A904 Echline R'bt Westbound	55.983827	-3.405228	PM Peak [17:00 - 18:00]	2
1	08:35:10	11 SBD	11	Southbound	11 Queensferry Rd Southbound	55.957406	-3.402832	AM Peak [08:00 - 09:00]	2
1	07:23:34	15 EBD	15	Eastbound	15 A89 Eastbound	55.940829	-3.409721	AM Peak [07:00 - 08:00]	2
1	15:03:42	10 WBD	10	Westbound	10 Craigie's Farm Westbound	55.96878	-3.344229	Inter Peak [09:00 - 16:00]	2
1	14:45:00	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2
2	13:46:26	3 WBD	3	Westbound	3 A904 Echline R'bt Westbound	55.983827	-3.405228	Inter Peak [09:00 - 16:00]	2
1	07:22:58	15 EBD	15	Eastbound	15 A89 Eastbound	55.940829	-3.409721	AM Peak [07:00 - 08:00]	2
1	09:30:56	10 WBD	10	Westbound	10 Craigie's Farm Westbound	55.96878	-3.344229	Inter Peak [09:00 - 16:00]	2
1	11:30:06	15 WBD	15	Westbound	15 A89 Westbound	55.940829	-3.409721	Inter Peak [09:00 - 16:00]	2

Figure 3.1 – Extract from Spreadsheet showing individual ANPR Data

3.2.2 Origin-Destination Data

Index	Reg	Class	OriginTime	OriginSite	DestinationTime	DestinationSite	Origin Time	Origin Site	Dest Time	Dest Site	Olocation	Dlocation	Time Period	Day
1	22290	1-	-	-	-	-	14:11:58	15EBD			15	N/A	14:00 - 15:00	1
2	42615	1-	-	-	-	-	11:21:21	15EBD			15	N/A	11:00 - 12:00	1
3	42615	1-	-	-	-	-	14:20:24	15EBD			15	N/A	14:00 - 15:00	1
4	48802	1-	-	-	-	-	11:33:05	15WBD			15	N/A	11:00 - 12:00	1
5	54836	1-	-	-	-	-	08:35:24	15EBD			15	N/A	08:00 - 09:00	1
6	54839	1-	-	-	-	-	10:24:40	1EBD			1	N/A	10:00 - 11:00	1
7	79097	2-	-	-	-	-	09:58:31	15WBD			15	N/A	09:00 - 10:00	1
8	83095	1-	-	-	-	-	12:34:09	15WBD			15	N/A	12:00 - 13:00	1
9	###0FRL	1-	-	-	-	-	11:50:45	15EBD			15	N/A	11:00 - 12:00	1
10	###0GAO	1-	-	-	-	-	07:23:30	15EBD			15	N/A	07:00 - 08:00	1
11	###10YB	1-	-	-	-	-	10:14:52	2NBD			2	N/A	10:00 - 11:00	1
12	###2AZC	1-	-	-	-	-	08:12:35	15WBD			15	N/A	08:00 - 09:00	1
13	###3LUB	3-	-	-	-	-	11:04:35	11SBD			11	N/A	11:00 - 12:00	1
14	###3YEZ	1-	-	-	-	-	08:10:44	8EBD			8	N/A	08:00 - 09:00	1
15	###4PHP	1-	-	-	-	-	16:21:32	15WBD			15	N/A	16:00 - 17:00	1
16	###5CEV	1-	-	-	-	-	14:17:49	15EBD			15	N/A	14:00 - 15:00	1
17	###5EFB	1-	-	-	-	-	10:35:01	2NBD			2	N/A	10:00 - 11:00	1
18	###5KCC	1-	-	-	-	-	08:55:06	15WBD			15	N/A	08:00 - 09:00	1
19	###5MCU	1-	-	-	-	-	16:54:08	15WBD			15	N/A	16:00 - 17:00	1
20	###5MHO	2-	-	-	-	-	08:18:04	16SBD			16	N/A	08:00 - 09:00	1
21	###5LUX	1-	-	-	-	-	07:23:36	15EBD			15	N/A	07:00 - 08:00	1
22	###6BKL	1-	-	-	-	-	13:23:28	15WBD			15	N/A	13:00 - 14:00	1

Index	Reg	Class	OriginTime	OriginSite	DestinationTime	DestinationSite	Origin Time	Origin Site	Dest Time	Dest Site	Olocation	Dlocation	Time Period	Day
47393	SK15FGZ	1	07:01:33	13NBD	07:54:30	6SBD	07:01:33	13NBD	07:03:24	12WBD	13	12	07:00 - 08:00	1
47393	SK15FGZ	1	07:01:33	13NBD	07:54:30	6SBD	07:03:24	12WBD	07:29:00	6NBD	12	6	07:00 - 08:00	1
47393	SK15FGZ	1	07:01:33	13NBD	07:54:30	6SBD	07:29:00	6NBD	07:54:30	6SBD	6	6	07:00 - 08:00	1
47394	SK15PGE	1	13:24:23	10WBD	13:46:50	15EBD	13:24:23	10WBD	13:29:13	14WBD	10	14	13:00 - 14:00	1
47394	SK15PGE	1	13:24:23	10WBD	13:46:50	15EBD	13:29:13	14WBD	13:33:14	13SBD	14	13	13:00 - 14:00	1
47394	SK15PGE	1	13:24:23	10WBD	13:46:50	15EBD	13:33:14	13SBD	13:46:50	15EBD	13	15	13:00 - 14:00	1
47395	SK15SFX	1	08:39:44	7WBD	08:50:25	1WBD	08:39:44	7WBD	08:43:22	4SBD	7	4	08:00 - 09:00	1
47395	SK15SFX	1	08:39:44	7WBD	08:50:25	1WBD	08:43:22	4SBD	08:49:43	3WBD	4	3	08:00 - 09:00	1
47395	SK15SFX	1	08:39:44	7WBD	08:50:25	1WBD	08:49:43	3WBD	08:50:25	1WBD	3	1	08:00 - 09:00	1
47396	SK15SFX	1	17:48:49	1EBD	17:56:27	7EBD	17:48:49	1EBD	17:51:16	3EBD	1	3	17:00 - 18:00	1
47396	SK15SFX	1	17:48:49	1EBD	17:56:27	7EBD	17:51:16	3EBD	17:52:37	4NBD	3	4	17:00 - 18:00	1
47396	SK15SFX	1	17:48:49	1EBD	17:56:27	7EBD	17:52:37	4NBD	17:56:27	7EBD	4	7	17:00 - 18:00	1
47397	SK15ULH	1	12:48:13	8WBD	13:22:49	8EBD	12:48:13	8WBD	12:50:03	7WBD	8	7	12:00 - 13:00	1
47397	SK15ULH	1	12:48:13	8WBD	13:22:49	8EBD	12:50:03	7WBD	13:19:30	7EBD	7	7	12:00 - 13:00	1
47397	SK15ULH	1	12:48:13	8WBD	13:22:49	8EBD	13:19:30	7EBD	13:22:49	8EBD	7	8	13:00 - 14:00	1
47398	SK15URY	1	15:11:12	3EBD	15:29:42	8EBD	15:11:12	3EBD	15:12:18	4NBD	3	4	15:00 - 16:00	1
47398	SK15URY	1	15:11:12	3EBD	15:29:42	8EBD	15:12:18	4NBD	15:22:52	5EBD	4	5	15:00 - 16:00	1
47398	SK15URY	1	15:11:12	3EBD	15:29:42	8EBD	15:22:52	5EBD	15:29:42	8EBD	5	8	15:00 - 16:00	1
47399	SK15VYA	1	12:39:10	8WBD	12:49:21	3WBD	12:39:10	8WBD	12:44:02	5WBD	8	5	12:00 - 13:00	1
47399	SK15VYA	1	12:39:10	8WBD	12:49:21	3WBD	12:44:02	5WBD	12:45:27	4SBD	5	4	12:00 - 13:00	1
47399	SK15VYA	1	12:39:10	8WBD	12:49:21	3WBD	12:45:27	4SBD	12:49:21	3WBD	4	3	12:00 - 13:00	1
47400	SK15XCU	1	14:21:39	3EBD	15:20:08	3WBD	14:21:39	3EBD	14:22:42	4NBD	3	4	14:00 - 15:00	1

Table 3.2 – Extract from Spreadsheet Model showing Origin Destination Data

The origin destination dashboard was created by taking each trip chain and dividing it up into individual origin destination pairs as seen in Figure 3.4. For example, if a particular car had been picked up at several cameras in one day then that trip would be reformatted as follows:

Reg	Origin Time	Origin Site	Dest Time	Dest Site
EG REG	Time 1	Site 1	Time 2	Site 2
EG REG	Time 2	Site 2	Time 3	Site 3
EG REG	Time 3	Site 3	Time 4	Site 4

3.3 Presentation of Data

Microsoft Power Bi was used to present the data in a dashboard format. The first of these used the total volume data in section 3.2.1 to create the dashboard shown in Figure 3.3. This allows users to interact with charts and filters to examine the data and calculate the total volume of vehicles passing a point for a particular day and time frame.

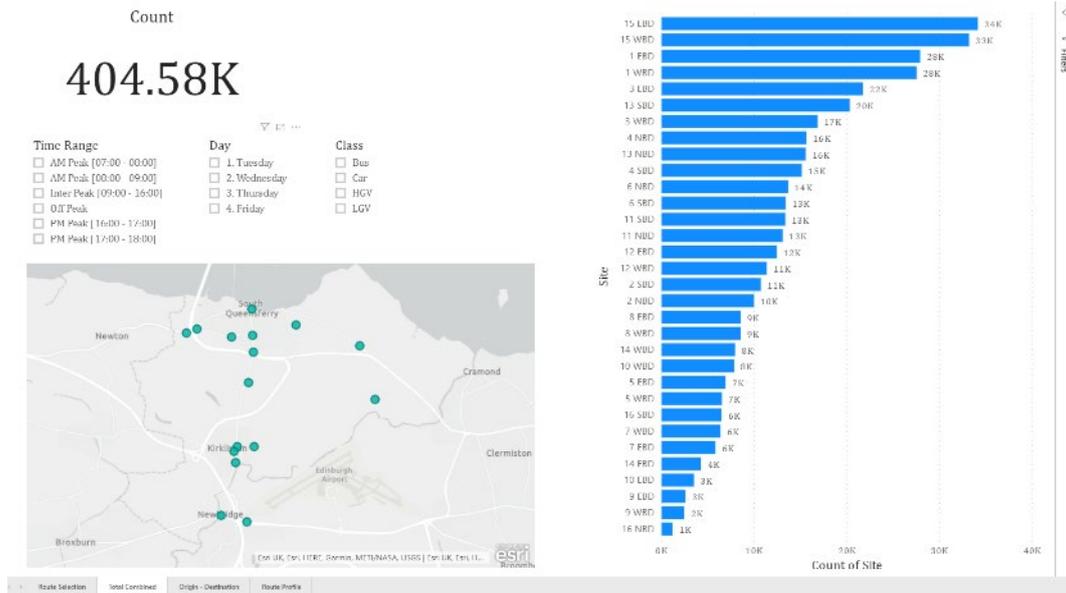


Figure 3.3 – Total Volume Dashboard Screenshot

The second dashboard is connected to the origin destination data and is presented through Microsoft BI as shown in Figure 3.4. This allows users to pick two sites (labelled ‘origin’ and ‘destination’ although they are not necessarily the first and last site in a whole trip chain) and calculate the number of vehicles that make this movement within a certain day and time period. This accounts for all trips on the network over the four days except for trips that were only picked up at one location. If the trip consisted of two sites then the origin destination dashboard will represent that exact trip, if it consisted of three sites then the trip will be split into two origin destination movements, and so on.

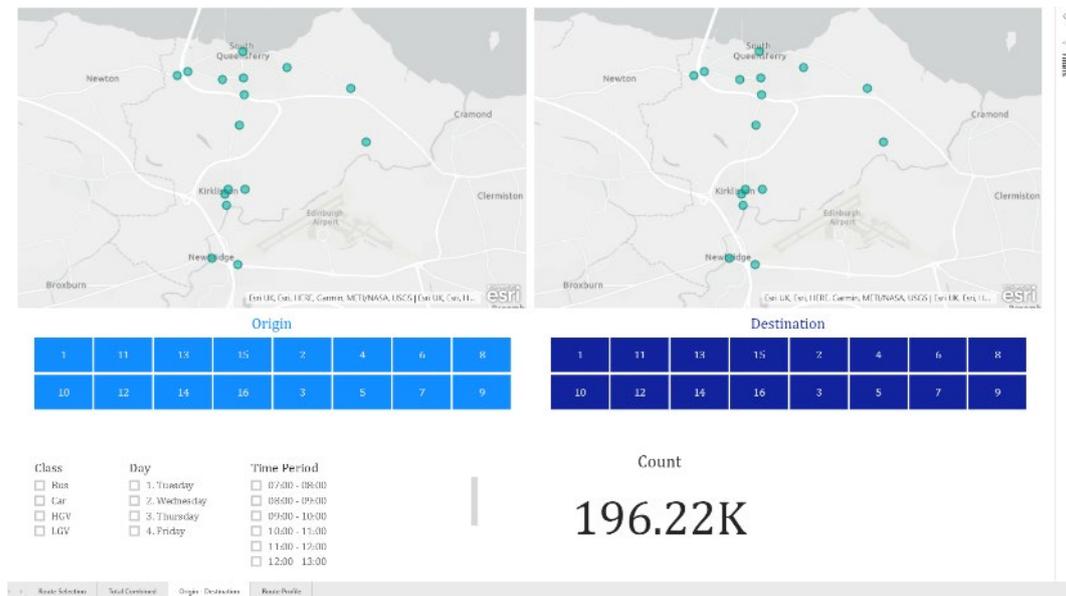


Figure 3.4 – Origin Destination Dashboard Screenshot

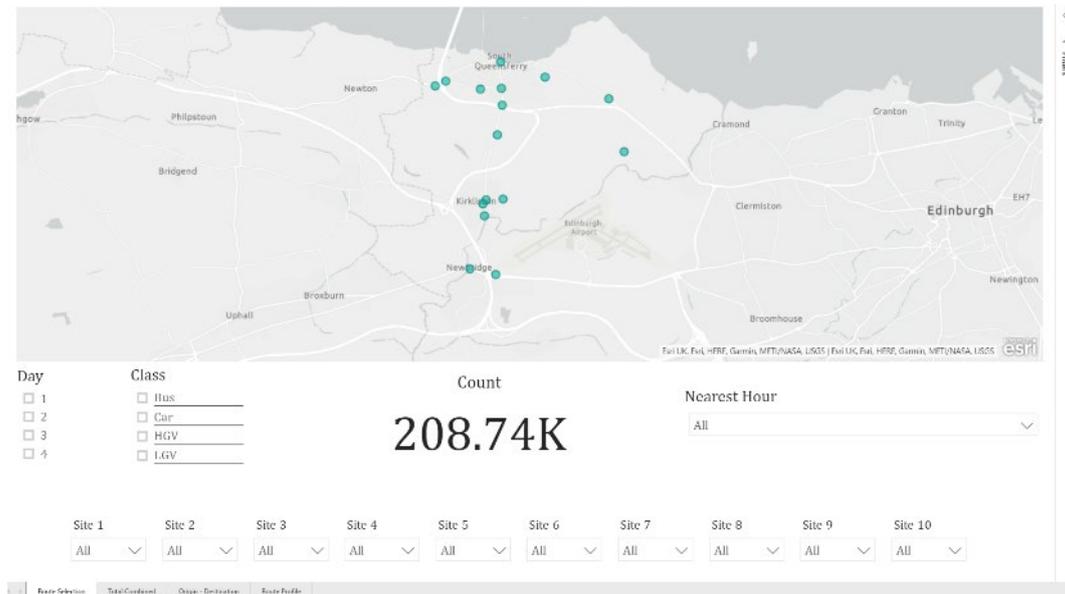


Figure 3.5 – Route Mapping Dashboard Screenshot

3.4 Targeted Routes and Outputs

Based on feedback from stakeholders and community council members, several key routes or areas of interest were identified for more detail investigation, these included:

- Kirkliston Crossroads Junction – Identify AM and PM peak period flows and percentage of strategic trips (trips which were initially captured on Builyeon Road, ANPR Site 3).
- South Queensferry:
 - Through Movements – Detail of trip origins/destinations for movements on High Street, Station Road/Dalmeny)
 - Inbound – where travelling from;
 - Outbound – where travelling to;
- Lochend Road – Identify AM and PM peak period flows and percentage of strategic trips (trips which were initially captured on Builyeon Road, ANPR Site 3).

3.4.1 Kirkliston Crossroads

The following tables provide a summary of the flows/movements passing through the Kirkliston Crossroad junction, along with the percentage of trips which have been identified as passing through ANPR site 3 on Builyeon Road.

Taking into consideration the location of the ANPR cameras, it is not feasible to generate all turning movements through the crossroads junction, however the primary focus for this exercise relates to the flow travelling southbound on the B800, approaching the crossroads from the North. By reviewing the ANPR data through consecutive sites, it is possible to show the turning movements and the percentage for the flow which started at Builyeon Road. It is assumed for the purpose of this exercise that all trips which were initially recorded at Builyeon Road (not recorded at Sites 1 or 2 previously), represent trips which exit the strategic network at the new Echline roundabout.

The southbound through movements account for trips recorded at Site 13 only, where some trips will be lost into residential areas and trips heading west into West Lothian – there is some debate on whether these trips should be treated as ‘strategic’ at this location or realistic trips on the local network.

	B800 Southbound right to Main St ←	B800 Southbound to Path Brae ↓	B800 Southbound left to Burnshot Rd →
Cars	621	1,724	115
LGV	55	229	14
HGV	11	43	1
Buses	18	20	0
Total	705	2,015	130
Percent of trips passing through Builyeon Rd	*11.3% (80 vehs)	*21.3% (430 vehs)	*12.3% (16)

B800 Southbound - Daily (4-day average) Flows

**The percentages are calculated only for movements between Builyeon Rd and Kirkliston Crossroad, and is not the proportion of all movements through the junction.*

	B800 Southbound right to Main St ←	B800 Southbound to Path Brae ↓	B800 Southbound left to Burnshot Rd →
Cars	110	653	24
LGV	14	81	3
HGV	3	12	1
Buses	7	6	0
Total	133	752	27
Percent of trips passing through Builyeon Rd	11.3% (15 vehs)	30.2% (227 vehs)	7.4% (2)

B800 Southbound - AM Peak 07:00-10:00 (4-day average) Flows

As illustrated in the above data, a large proportion of the overall southbound trips were record passing through ANPR site 3 before being detected at the Kirkliston crossroads junction. The overall scale of total traffic movements is relatively low, and therefore the percentage is notably high, both in terms of daily (22.5%) and AM Peak (26.8%) periods.

A similar exercise was undertaken for the northbound approach, again the turning movements and percentage of strategic trips, which subsequently travel through site 3 - Builyeon Road, have been identified by daily and in this case the PM Peak period (16:00-19:00) demands.

	Path Brae Northbound left to Main St ←	Path Brae Northbound to B800 ↑	Path Brae Northbound right to Burnshot Rd →
Cars	858	1,503	277
LGV	103	199	35
HGV	24	37	3
Buses	56	16	0
Total	1,041	1,754	315
Percent of trips passing through Builyleon Rd	n/a	13.9% (243 vehs)	n/a

Path Brae Northbound - Daily (4-day average) Flows

	Path Brae Northbound left to Main St ←	Path Brae Northbound to B800 ↑	Path Brae Northbound right to Burnshot Rd →
Cars	124	208	63
LGV	20	52	13
HGV	7	12	1
Buses	15	6	0
Total	166	277	76
Percent of trips passing through Builyleon Rd	n/a	26.7% (74 vehs)	n/a

Path Brae Northbound - PM Peak 16:00-19:00 (4-day average) Flows

In the northbound direction, the ANPR data suggests that approximately 14% of daily movements path through the crossroads junction in a northbound direction before being detected through ANPR Site 3 (discounting trips which subsequently passed through either Site 1 or Site 2). During the PM peak period, the proportion of trips increases to over 26% of movements. As noted for the southbound data, while the percentages are notably high, the overall flows are relatively low in terms of scale of movement. This does however suggest that ‘Strategic’ movements are passing through Kirkliston rather than continuing to use the M90 link between the New Echline Roundabout and Newbridge Roundabout.

3.4.2 South Queensferry Movements

This section considers the findings from the traffic surveys in the context to key roads within the town, as well as identifying the trip origins and destinations to better understand what movements are taking place.

In developing the dashboard of the traffic survey data, additional functionality was included which filter the selection criteria to select ANPR sites and map the movements which contribute to the overall flow. In this section, a number of key sites within South Queensferry have been interrogated in more detail, with the findings summarised below, in each case trips with matching origin and destination sites represent localised movements which never continued on to a subsequent camera:

The following table summarises the distribution of trips immediately before travelling through the High Street (ANPR Site 5), and immediately after. This information provides a breakdown for the flow components and identifies the general direction of trips.

Origin	Destination	4 Day Total	Average Day	%
5 – High St	2 – Bo’ness Rd	1241	310	15%
5 – High St	4 – Kirkliston Rd	2337	584	29%
5 – High St	5 – High St	1536	384	19%
5 – High St	7 – Station Rd	419	105	5%
5 – High St	8 – B924	2111	528	26%
2 – Bo’ness Rd	5 – High St	1471	368	17%
4 – Kirkliston Rd	5 – High St	2457	614	29%
5 – High St	5 – High St	1536	384	18%
7 – Station Rd	5 – High St	310	78	4%
8 – B924	5 – High St	2316	579	27%

ANPR Site 5 – High Street

The outputs illustrate a relatively equal split of trips leaving the High Street and travelling through either Kirkliston Road (leaving South Queensferry) and the B924 travelling towards Edinburgh. There is a similar pattern for trips returning though the High Street ANPR site.

Origin	Destination	4 Day Total	Average Day	%
7 – Station Rd	2 – Bo’ness Rd	274	69	4%
7 – Station Rd	3 – Builyeon Rd	115	29	2%
7 – Station Rd	4 – Kirkliston Rd	1913	478	27%
7 – Station Rd	5 – High Street	310	78	4%
7 – Station Rd	7 – Station Rd	880	220	12%
7 – Station Rd	8 – B924	3095	774	44%
2 – Bo’ness Rd	7 – Station Rd	234	59	3%
3 – Builyeon Rd	7 – Station Rd	164	41	2%
4 – Kirkliston Rd	7 – Station Rd	1415	354	20%
5 – High Street	7 – Station Rd	419	105	6%
7 – Station Rd	7 – Station Rd	880	220	13%
8 – B924	7 – Station Rd	3395	849	49%

ANPR Site 7 – Station Road/Dalmeny

The distribution of trips travelling along Station Road is illustrated above, with a similar pattern identified to site 5 High Street. A high proportion of trip are link to the B924 to and from Edinburgh. These results are not unexpected given the routes available for trips originating in this area and travel either into Edinburgh (East) or west toward Fife or indeed West Lothian.

In addition to the above ‘internal’ sites, stakeholder feedback also sought to understand the trips entering/leaving the town of South Queensferry. Similar to the above data, the component trips which contribute to the flows at each location are summarised below.

Origin	Destination	4 Day Total	Average Day	%
2 – Bo’ness Rd	1 – A904 Newton	2412	603	28%
2 – Bo’ness Rd	2 – Bo’ness Rd	1635	409	19%
2 – Bo’ness Rd	3 – Builyeon Rd	2028	507	24%
2 – Bo’ness Rd	4 – Kirkliston Rd	578	145	7%
2 – Bo’ness Rd	5 – High St	1471	368	17%
2 – Bo’ness Rd	6 – B800	71	18	1%
2 – Bo’ness Rd	7 – Station Rd	234	59	3%
2 – Bo’ness Rd	8 – B924	93	23	1%
1 – A904 Newton	2 – Bo’ness Rd	2754	689	32%
2 – Bo’ness Rd	2 – Bo’ness Rd	1635	409	19%
3 – Builyeon Rd	2 – Bo’ness Rd	1308	327	15%
4 – Kirkliston Rd	2 – Bo’ness Rd	845	211	10%
5 – High St	2 – Bo’ness Rd	1241	310	15%
6 – B800	2 – Bo’ness Rd	255	64	3%
7 – Station Rd	2 – Bo’ness Rd	274	69	3%
8 – B924	2 – Bo’ness Rd	74	19	1%

ANPR Site 2 – Bo-ness Road

Traffic using Bo'ness Road is shown to travel either west toward Newton (28% of trips leaving South Queensferry via Bo'ness Road), or eastbound toward Kirkliston via site 3. A high proportion of trips were identified as having both an origin and destination at Bo'ness Rd, without being picked up at any other ANPR sites. These trips are assumed to represent trips between South Queensferry and the strategic road network, via the new Echline roundabout junction.

The following table presents the data from ANPR site 4, located on Kirkliston Road, immediately north of the Tesco access roundabout on the B800.

Origin	Destination	4 Day Total	Average Day	%
4 – Kirkliston Rd	1 – A904 Newton	561	140	3%
4 – Kirkliston Rd	2 – Bo'ness Rd	845	211	5%
4 – Kirkliston Rd	3 – Builyeon Rd	3802	951	21%
4 – Kirkliston Rd	4 – Kirkliston Rd	5087	1272	28%
4 – Kirkliston Rd	5 – High St	2457	614	13%
4 – Kirkliston Rd	6 – B800	3755	939	20%
4 – Kirkliston Rd	7 – Station Rd	1415	354	8%
4 – Kirkliston Rd	8 – B924	142	36	1%
4 – Kirkliston Rd	11 – Queensferry Rd	233	58	1%
1 – A904 Newton	4 – Kirkliston Rd	163	41	1%
2 – Bo'ness Rd	4 – Kirkliston Rd	578	145	3%
3 – Builyeon Rd	4 – Kirkliston Rd	5534	1384	27%
4 – Kirkliston Rd	4 – Kirkliston Rd	5087	1272	25%
5 – High St	4 – Kirkliston Rd	2337	584	12%
6 – B800	4 – Kirkliston Rd	4005	1001	20%
7 – Station Rd	4 – Kirkliston Rd	1913	478	9%
8 – B924	4 – Kirkliston Rd	149	37	1%
11 – Queensferry Rd	4 – Kirkliston Rd	251	63	1%

ANPR Site 4 – B907 Kirkliston Road

There is a similar split of trips travelling through Kirkliston Road and being detected on Builyeon Road and indeed back through Kirkliston Road, the latter is assumed to represent local trips from South Queensferry and the Tesco store/retail park. There is also a consistent 20% of trips between Kirkliston Road and the B800 ANPR site, in both directions, which is assumed to represent commuter based travel from South Queensferry and Kirkliston (and onwards).

Looking to the east of South Queensferry, the following table presents the distribution of trips through the B924 ANPR camera.

Origin	Destination	4 Day Total	Average Day	%
8 – B924	2 – Bo’ness Rd	74	19	1%
8 – B924	4 – Kirkliston Rd	149	37	2%
8 – B924	5 – High St	2316	579	32%
8 – B924	7 – Station Rd	3395	849	48%
8 – B924	8 – B924	813	203	11%
8 – B924	9 – Milton Farm	62	16	1%
8 – B924	10 – Craigie’s Farm	99	25	1%
8 – B924	15 – A89	65	16	1%
2 – Bo’ness Rd	8 – B924	93	23	1%
4 – Kirkliston Rd	8 – B924	142	36	2%
5 – High St	8 – B924	2111	528	29%
7 – Station Rd	8 – B924	3095	774	43%
8 – B924	8 – B924	813	203	11%
9 – Milton Farm	8 – B924	332	83	5%
10 – Craigie’s Farm	8 – B924	147	37	2%
15 – A89	8 – B924	55	14	1%

ANPR Site 8 – B924 (west of A90 slips roads)

Almost 50% of trips identified passing along the B924 were subsequently detected on Station Road, which is a logical trip chain. While a large proportion of these trips are likely to represent local trips with a destination within the residential zone, the above summary can be interpreted with cognisance of the Station Road data reported previously.

3.4.3 Lochend Road Demands

Based on local knowledge of the network, and feedback from community council members, Lochend Road is noted to facilitate through movements feeding directly onto the A89 corridor. Similar to the above, a more detailed review of the ANPR data at site 16, Lochend Road is presented below, identifying the origins of trips passing through the site during the AM Peak period only.

Origin	Destination	4 Day Total	Average Day	%
16 – Lochend Rd	1 – A904 Newton	24	6	2%
16 – Lochend Rd	3 – Builyeon Rd	35	9	3%
16 – Lochend Rd	10 – Craigie’s Farm	58	15	5%
16 – Lochend Rd	11 – Queensferry Rd	15	4	1%
16 – Lochend Rd	12 – Main St	13	3	1%
16 – Lochend Rd	13 – Path Brae	411	103	32%
16 – Lochend Rd	15 – A89	405	101	31%
16 – Lochend Rd	16 – Lochend Rd	241	60	19%
1 – A904 Newton	16 – Lochend Rd	8	2	0%
3 – Builyeon Rd	16 – Lochend Rd	6	2	0%
10 – Craigie’s Farm	16 – Lochend Rd	2	1	0%
11 – Queensferry Rd	16 – Lochend Rd	118	30	2%
12 – Main St	16 – Lochend Rd	113	28	2%
13 – Path Brae	16 – Lochend Rd	4724	1181	87%
15 – A89	16 – Lochend Rd	196	49	4%
16 – Lochend Rd	16 – Lochend Rd	241	60	4%

ANPR Site 16 – Lochend Road

The daily profile of trips on Lochend Road is shown to split between Path Brae and the A89 (West of Newbridge Roundabout). The A89 trips are likely to represent a mix of return trips and localised circulation.

The majority of traffic detected on Lochend Road were initially detected on Path Brae, south of the Kirkliston Crossroads. The average daily flow between Path Brae and Lochend Road is 1,181 movements, representing 87% of all Lochend Road trips. With reference to the data reported for the Kirkliston Crossroads junction these trips are likely to include a mix of local traffic and trips which were initially detected on Builyeon Road – and for the purpose of this study are referenced as strategic trips.

4 Outcomes & Issues

4.1 Headlines

With reference to the original scope and study objectives, while there is evidence of some through movements which could have been made using the strategic road network, the magnitude of these is not considered to be significant.

Notwithstanding the magnitude of the flows, the proportion of trips using the local network, and specifically passing through the Kirkliston Crossroads junction is notable high, both in terms of daily demand and peak hours. There is also evidence of large movements between South Queensferry and Kirkliston, many of these being tidal in nature between the AM and PM peak periods, and therefore representative of commuter trips.

Given the operational concerns from residents and community groups, the survey data suggests that the majority of traffic movements are attributable to the local area, albeit with a notable contribution from trips strategic trips passing along Builyeon Road before passing straight through the Kirkliston Crossroads junction.

It is also important to note the scale of development and background growth that will be contributing to the observed network issues, where the focus of any intervention needs to reflect the nature of the trips and consider opportunities to encourage alternative modes of travel.

4.2 New Development and Infrastructure

In developing ideas and options for interventions to address current and potential future network issues, cognisance was given to known and committed development plans which may impact current conditions. This includes development within the immediate vicinity of the study area, but also development which may impact travel patterns through the local network.

One of the Core Development Areas (CDA) within West Lothian is around Winchburgh, with significant housing, educational and employment/commercial uses planned over the next 15 years. To support the scale of development, significant changes to the local transport infrastructure have been identified, with a new link road to Broxburn and the A89, new Motorway access to the M9 and plans for a new rail station on the existing Edinburgh – Glasgow line.

The Winchburgh development is anticipated to have a significant impact on Kirkliston and potentially South Queensferry in terms of traffic levels and route choice. With the proposed new infrastructure, vehicular traffic will have a direct access to the strategic road network, which will assist the development traffic but may also attract local trips. The overall balance of additional trips versus reassigned of existing trips is difficult to quantify, however any proposals in terms of Kirkliston and South Queensferry must take cognisance of the potential for considerable change over the longer term. On this basis, the justification and case for significant new infrastructure to assist vehicle movements through Kirkliston and South Queensferry is challenging, where more localised interventions and measures to encourage more sustainable travel would remain favourable.

In addition to the Winchburgh development, there are additional sites within the immediate vicinity of Kirkliston and South Queensferry which will have a direct impact on the current network. With the ongoing drive to satisfy housing demand in the area, the implementation of proposals which can influence mode choice and promote active travel from the outset should also be targeted.

4.3 Network Constraints & Issues

One of the key constraints in terms of delays and congestion during peak periods is the existing signal controlled crossroads junction in Kirkliston. Due to the developed nature of the town, the junction is constrained in terms of scope to increase capacity. The existing layout provides single lane approaches on all arms, with signal phasing having recently been amended to reflect the dominant flows. Both North and South approaches receive a dedicated green phase each, whereas East and West approaches run together. There is an all pedestrian phase, which is called on demand.

In terms of the level of demand and existing delays, there is minimal justification for significant infrastructure provision, to reduce congestion. Based on our own observations, there is considerable daily variation in the levels of queuing and delay at this crossroad junction, which may be a factor of both variation in flow, and frequency of pedestrian crossing use during the peak periods. This variation may also be contributing to local perceptions of the issues at this location, with any delays being judged relative to days when there is minimal queuing and delay for local trips. This variability will also impact journey time reliability, again relative to days when drivers experience minimal delay this may be considered as unacceptable for local trips.

Based on the traffic survey data, there is a notable variation during the Friday PM peak, with higher volumes recorded northbound through the crossroads, in comparison to other weekdays. While no data was available in relation to the operation of the strategic road network during the survey periods, based on local knowledge and site observations there can be higher levels of delay and queuing on the Queensferry Crossing northbound approach during the Friday PM peak. These conditions may be contributing to a variation in some route choice during this time period, again this will influence the 'average' PM peak condition through Kirkliston.

Within South Queensferry The Loan forms the main route into the town centre, which feeds the local road network. Notable routes within the town are Station Road and Newhalls Road, which run east west across the town. Station Road provides access to residential areas, primary schools, and the secondary school, as well as Dalmeny Rail Station. Station Road include traffic calming to enforce the speed limits, particularly in the vicinity of the schools. The car park at Dalmeny station is usually fully occupied during a weekday, and while site observations suggest some overspill parking in the local area, no data was available to confirm the current utilisation and profile of demands associated with the station.

Proposals to improve the circulation and use of Newhalls Road are currently being developed by CEC, with the view to reducing the level of vehicular traffic to the benefit of the urban environment and pedestrians. Any restriction to current

access and routing on Newhalls Road should take into consideration the potential for traffic reassignment, with suitable wayfinding signage to manage access to the waterfront area.

While the survey data suggests a low level of strategic traffic using the local routes through South Queensferry and Kirkliston, the proximity of the strategic network and access/egress opportunities will continue to facilitate such movements. The characteristics of the local network remain relatively car focused, with more emphasis on vehicle infrastructure in comparison to pedestrians and cyclists. In particular, we would highlight the A904 Builyeon Road and the B8000. Both routes provide straight, wide carriageways with narrow footways and poor cycle infrastructure.

Finally, following the opening of the new Queensferry Crossing, the Forth Road Bridge has functioned as a public transport corridor, providing a segregated route for buses, coaches, taxis and cyclists linking to Fife. This is supported by dedicated slip roads to the A90, allowing services to divert from the strategic network and serve the local area, however the service provision remains relatively modest and has limited penetration to the local communities in South Queensferry and Kirkliston.

5 Interventions

5.1 Evidence Based

As noted above, the ANPR survey data has been utilised to identify the scale of movements to, from and through Kirkliston and South Queensferry. While there is evidence of strategic trips passing through the local network the magnitude is not considered to be significant, relative to the overall level of traffic movements on the network. On this basis, the scale and type of interventions discussed in this section are mainly focused on optimising the existing infrastructure to facilitate and encourage more sustainable trips making, particularly journeys which are local to and between Kirkliston and South Queensferry. However, the opportunity to assist with access to the strategic network is also included, which may benefit the existing strategic movements which have been identified within the local network.

5.2 Option Development

5.2.1 Accommodate or Discourage

In the context of the local network operation, and based on the flows identified from the ANPR surveys, the development of interventions must take cognisance of local and national planning and transport policy. Interventions which are intended to accommodate the level of traffic and indeed providing additional road capacity may be contrary to policy and could lead to a release of suppressed demand reducing longer term benefits. The alternative approach is to focus on discouraging car use, both in terms of strategic trips passing through Kirkliston and South Queensferry and local trips which could be undertaken by walking, cycling and public transport. Discouraging car use, and providing better linkages for sustainable travel should be the focus for local authorities and local communities.

5.2.2 Kirkliston Crossroads

The current signal controlled crossroads in Kirkliston is noted to experience varying degrees of congestion and delay during peak periods. The current signal settings have been amended in recent years, however there is minimal scope to introduce additional physical capacity and therefore opportunity for more signal optimisation could provide a 'do-minimum' intervention, exploring the feasibility and potential for MOVA.

A more radical approach, and aligned with the idea of discouraging vehicle movements through Kirkliston, Drawings SK-001 and SK-002 illustrate the concept of removing signal control and returning the layout to a priority based arrangement. These options consider the difference between priority to through movements in either a north-south or east-west direction, while providing greater priority to pedestrians. These options will require more feasibility work to consider deliverability while accommodating public transport and larger goods

vehicles. However, the concept and challenge from these options is around defining an agreed strategy which either accommodates or discourages car use in and through the town.

5.2.3 A904, Builyeon Road

While we understand there is ongoing discussions with the developer of the residential site on Builyeon Road, the characteristics and configuration of this link is again orientated towards car users. There are clear opportunities to incorporate facilities to discourage through trips while facilitating active travel measures. The potential for additional development on the south side of Builyeon Road places further emphasis on the need to change the function of this route.

Drawings SK-003, SK-004 and SK-005 illustrate varying degrees of intervention aimed at discouraging through movements, while incorporating additional pedestrian and cycling infrastructure to rebalance the priority away from private car.

5.2.4 A90 Slip Roads

The bus only links to/from the A90 provide a high-quality experience for bus and coach journeys, however the utilisation of this infrastructure could be explored in the context of local access options. This has the potential to accommodate local trips, avoiding movements passing through Kirkliston and South Queensferry, however it is acknowledged that controlling the attraction of wider trip making should be assessed in the context of reassignment potential.

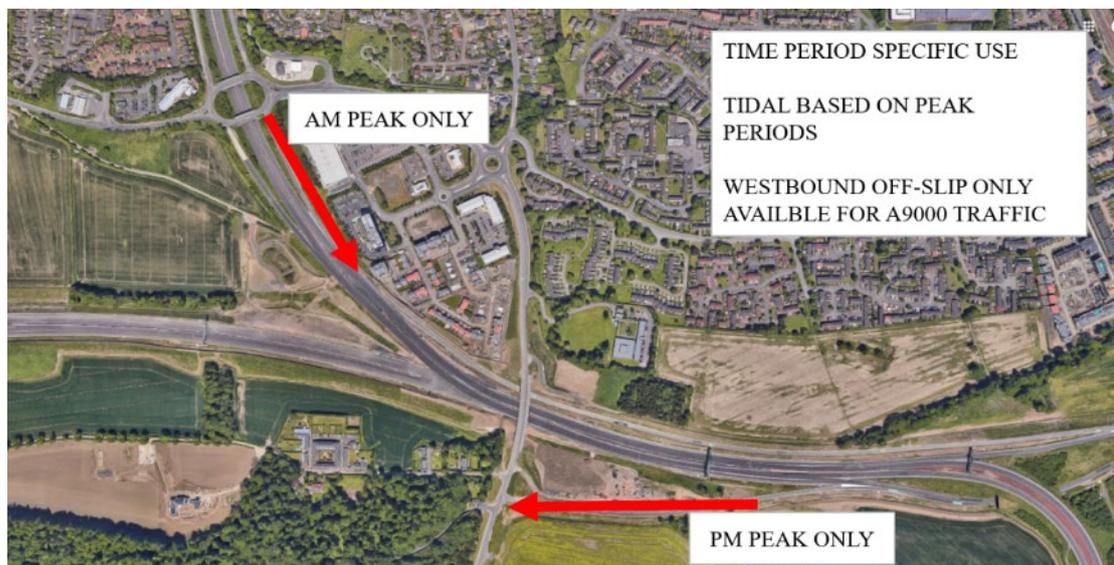


Figure 5.1 – A90 Slip Road Utilisation Option

5.2.5 Active Travel Provision

The offices of Arup are located at Scotstoun House, South Queensferry, with staff making use of the local transport network. Taking into consideration the local use and knowledge of the available transport network, the offices are considered to be limited in terms of connectivity and access to high quality walking and cycling routes between the office and surrounding amenities and facilities. This is deemed to reflect the wider community, where the lack of active travel provision is likely to influence mode of travel.

To fully appreciate the opportunity for active travel provision, an initial active travel audit was undertaken to assess current provision and identify areas where pedestrian and cyclists could be better facilitated, linking communities and key origins destinations across Kirkliston and South Queensferry. The active travel review report is included in Appendix A, highlighting several locations where current walking and cycling routes could be improved or enhanced, for both commuter and leisure based trip making.

6 Summary & Conclusions

6.1 Summary

The initial scope of this study was to consider travel patterns within and through Kirkliston, although this scope increased based on local input and concerns around vehicular demand across the wider local network and in particular through traffic in South Queensferry.

A key objective of this traffic study was to collate the necessary evidence of travel patterns across the network in order to understand the breakdown of origin destination movements.

Traffic survey data should provide factual evidence to map routes through the network and quantify the impact of through trips relative to local trip making.

Based on the traffic survey findings, and the modelling of origin destination trips, the impact from both committed development and potential future network changes should also be captured in terms of highlighting potential scope for interventions.

6.2 Conclusions

The survey data has highlighted the scale of trip making and routing of movements across the network, presenting initial outputs in terms of local origin destination trips and potential strategic trips passing through the study area. The overall findings suggest that there is evidence of some through movements which could be deemed as strategic, and while the scale of movement is relatively low, this does represent a notable proportion of the overall trips.

Based on the outputs, while there are some significant demands within the study area, the majority of these movements are local based. This would suggest that the local congestion and delays reported by local residents and discussed with the community council is linked with increased background demands, reflecting the additional housing and development within the local area.

This project has identified potential interventions, which are primarily aimed at reducing car use and encouraging shorter trip making by more sustainable modes, ideally walking and cycling within the local area where possible.

Given the scale of potential development within the surrounding area, this traffic study suggests that the focus for interventions should be on influencing and controlling demands within and through Kirkliston and South Queensferry, rather than increasing capacity through additional new infrastructure provision.

Figures



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

PI	12-06-18	AM	GM	GM
Issue	Date	By	Chkd	Appd

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Scale	
1:10,000	1:25,000
Edinburgh Council	
Job Title	
Kirkliston and Queensferry Traffic Study	

Queensferry to Newbridge Overview	
Scale at A1	
1:10,000	
Job No	Drawing Status
72229-01	Issue
Drawing No	Issue
72229-01	Issue

Figure 1a



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Client
Edinburgh Council

Job Title
**Kirkliston and Queensferry
Traffic Survey**

**Queensferry
ANPR Locations**

Scale at A1

Job No.	262670-00	Drawing Status	Issue
Drawing No.	Figure 2b	Issue	P1



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Job Title
**Kirkliston and Queensferry
Traffic Survey**

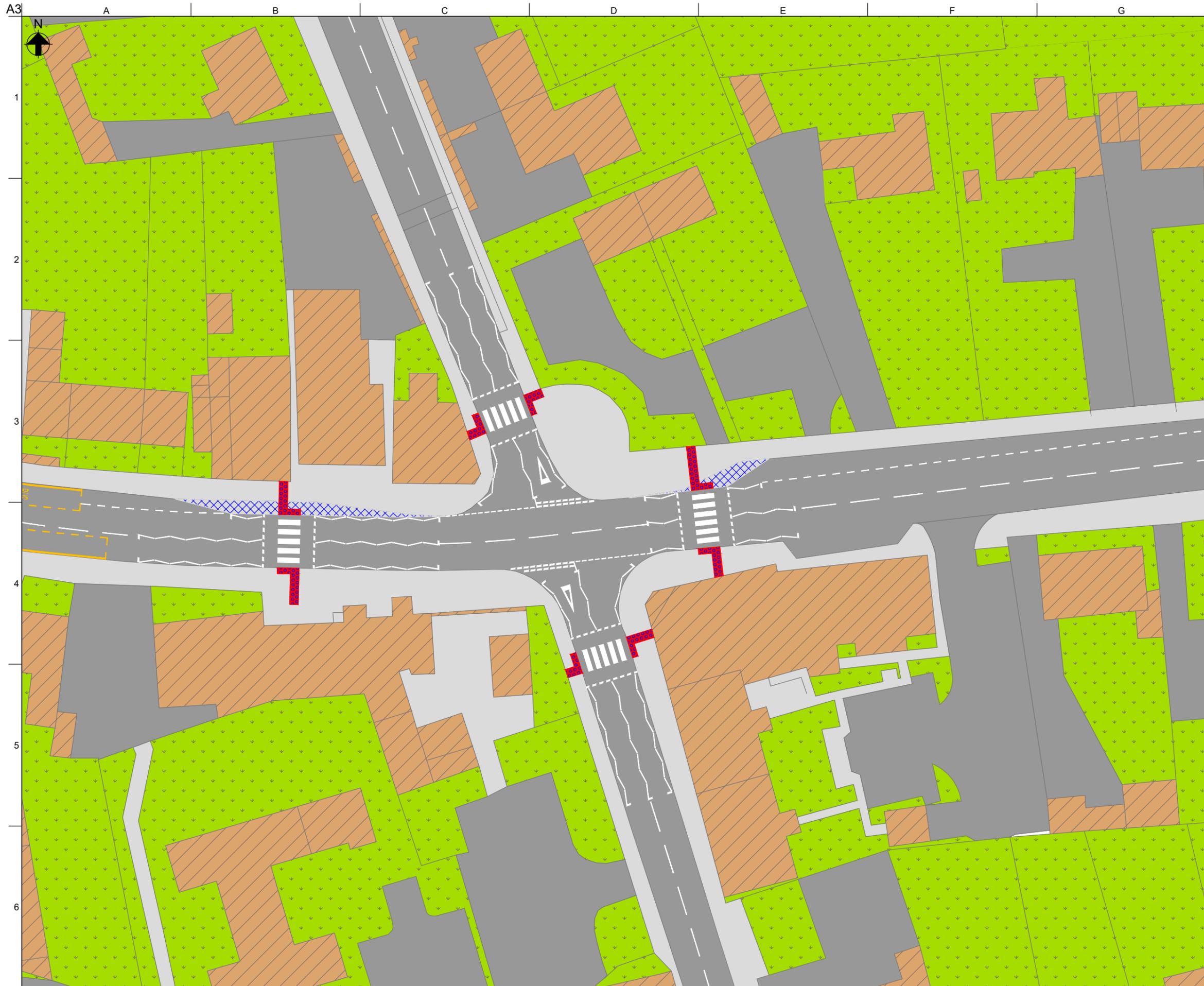
**Kirkliston and Newbridge
ANPR Locations**

Scale at A1
1:5,000

Job No.	Drawing Status
262670-00	Issue

Drawing No. **Figure 1c** P1

Drawings



Notes

- The OS background was received from City of Edinburgh Council on 19-11-2018.

Legend

-  Existing carriageway
-  Existing footway
-  Proposed footway
-  Existing buildings
-  Tactile paving

I1	21/11/18	AM	DM	GM
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Client
City of Edinburgh Council

Project Title
Kirkliston and Queensferry
Traffic Study

Drawing Title
Kirkliston Junction Arrangement
Option 1

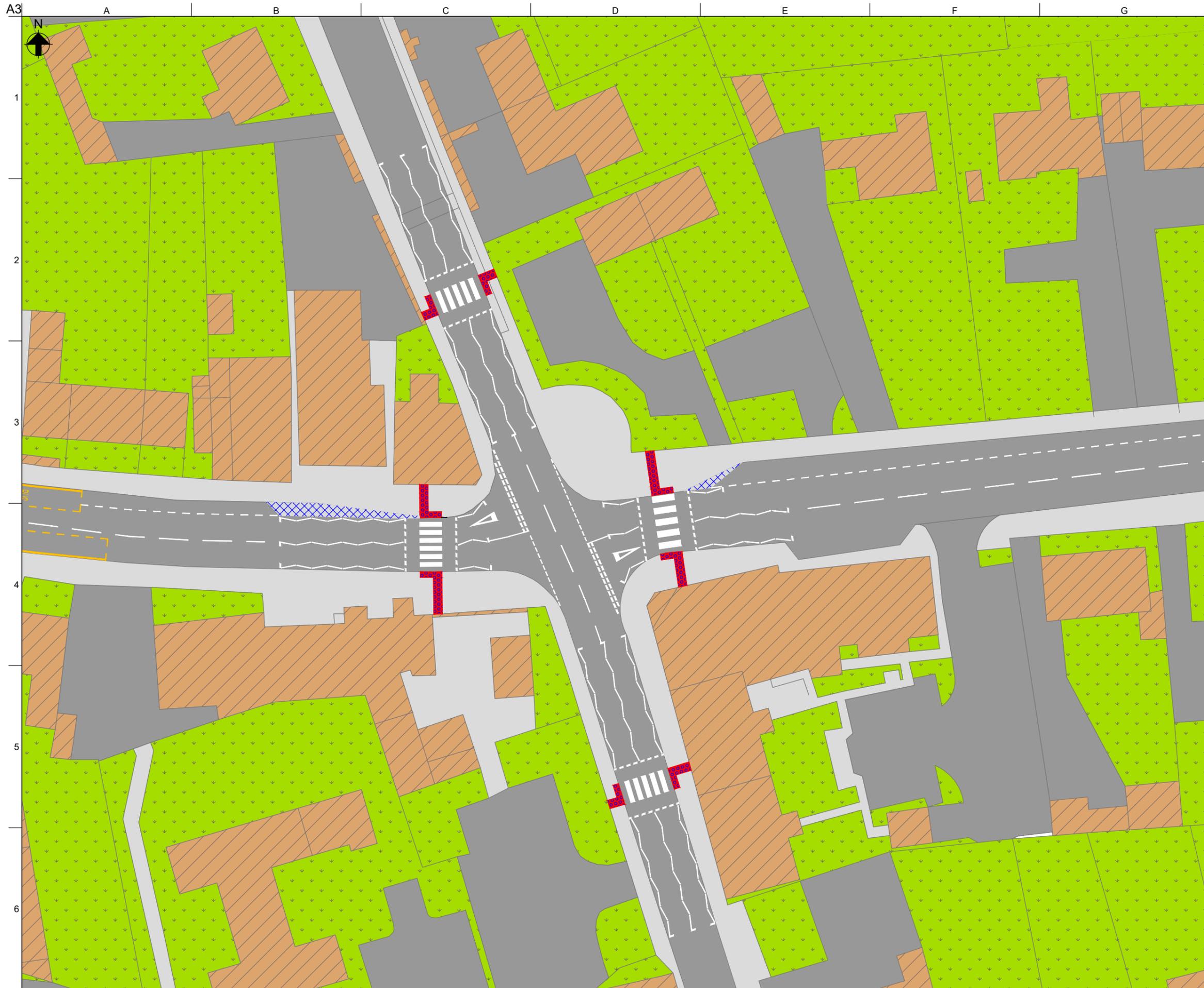
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1:500

Role
Civil

Suitability
Information

Arup Job No 264022-00	Rev I1
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Drawing No
262670-ARP-SK-001



Notes

- The OS background was received from City of Edinburgh Council on 19-11-2018.

Legend

-  Existing carriageway
-  Existing footway
-  Proposed footway
-  Existing buildings
-  Tactile paving

I1	21/11/18	AM	DM	GM
Issued for Information				
Rev	Date	By	Chkd	Appd

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Client
City of Edinburgh Council

Project Title
Kirkliston and Queensferry
Traffic Study

Drawing Title
Kirkliston Junction Arrangement
Option 2

Scale at A3
1:500

Role
Civil

Suitability
Information

Arup Job No 264022-00	Rev I1
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Drawing No
262670-ARP-SK-002



Notes

- The OS background was received from City of Edinburgh Council on 19-11-2018.
- All dimensions are in metres unless specified otherwise.

Legend

	Existing carriageway
	Existing footway
	Existing buildings
	Existing road markings
	Proposed road markings

	Proposed speed cushion
--	------------------------

Rev	Date	By	Chkd	Appd
I1	22/11/18	AM	DM	GM

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Project Title
Kirkliston and Queensferry
Traffic Study

Drawing Title
A904 Traffic Calming
Option 1 - Speed Cushions

Scale at A1	1:1250
Role	Civil
Suitability	Information
Arup Job No	262670-00
Name	262670-ARP-SK-003
Rev	I1

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Notes

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Legend

	Existing carriageway		Existing road markings
	Existing footway		Proposed road markings
	Proposed footway		
	Existing buildings		

Rev	Date	By	Chkd	Appd
I1	22/11/18	AM	DM	GM

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Traffic Study

Drawing Title
A904 Traffic Calming
Option 2 - Road Narrowing

Scale at A1	1:1250
Role	Civil
Suitability	Information
Arup Job No	262670-00
Name	262670-ARP-SK-004
Rev	I1



Notes

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Legend

	Existing carriageway		Existing road markings
	Proposed carriageway		Proposed road markings
	Existing footway		
	Proposed footway		
	Existing buildings		

Rev	Date	By	Chkd	Appd
I1	22/11/18	AM	DM	GM

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Traffic Study

Drawing Title
A904 Traffic Calming
Option 3 - Road Re-Alignment

Scale at A1 1:1250

Role	Civil
Suitability	Information
Arup Job No	262670-00
Name	262670-ARP-SK-005
Rev	I1

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Appendix A

Active Travel Audit

City of Edinburgh Council
South Queensferry/Kirkliston
Active Travel Study

Draft 1 | 21 January 2019

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 262670-01

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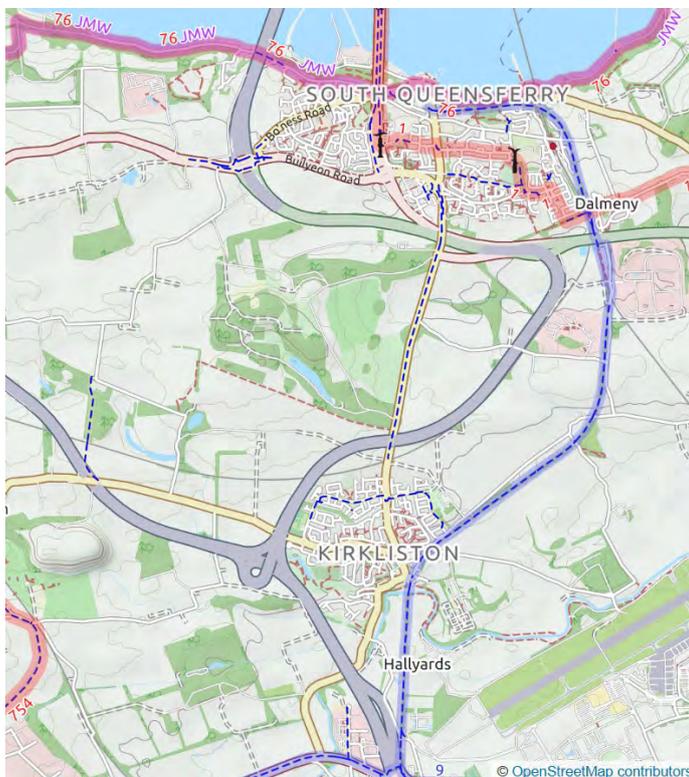
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1 Introduction

1.1 Background

Ove Arup & Partners Scotland Ltd (Arup) has been commissioned by City of Edinburgh Council (CEC) to undertake a traffic study within the Kirkliston and South Queensferry area. Part of this work has involved reviewing current active travel provision, with a view of identifying measures/interventions for encouraging active travel as a main mode of travel for short, everyday journeys. The area investigated is illustrated in Figure 1.

Figure 1 – Study area location



As highlighted in the traffic study report, there appears to be more local trips taking place than there are strategic trips, further details on this are provided in Section 1.2.

This report outlines where vehicle dependant local journeys could be reduced as a result of improved active travel provision within, as well as surrounding, Kirkliston and South Queensferry. The report structure is as follows:

- Chapter 2 - Traffic Study Results
- Chapter 3 – Identified Gaps in Active Travel
- Chapter 4 – Proposed Improvements with Examples
- Chapter 5 – Summary and Conclusions

2 Traffic Study Results

The Traffic Study Report identifies concerns and constraints in terms of the local road network operation and explores opportunities where these can be addressed. The traffic study concluded that more local trips than strategic trips take place in this area. An example of a strategic journey through South Queensferry can be seen in Figure 2 and Table 1 compared to a local journey via the B8000 in Figure 3 and Table 2.

Table 1 – Strategic journey vehicle trip count

Eastbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	22	20	13	9
0800-0900	8	10	2	1
16:00-1700	0	4	3	3
17:00-1800	1	1	1	2
Westbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	1	1	0	2
0800-0900	0	1	2	0
16:00-1700	5	4	4	9
17:00-1800	9	4	2	3

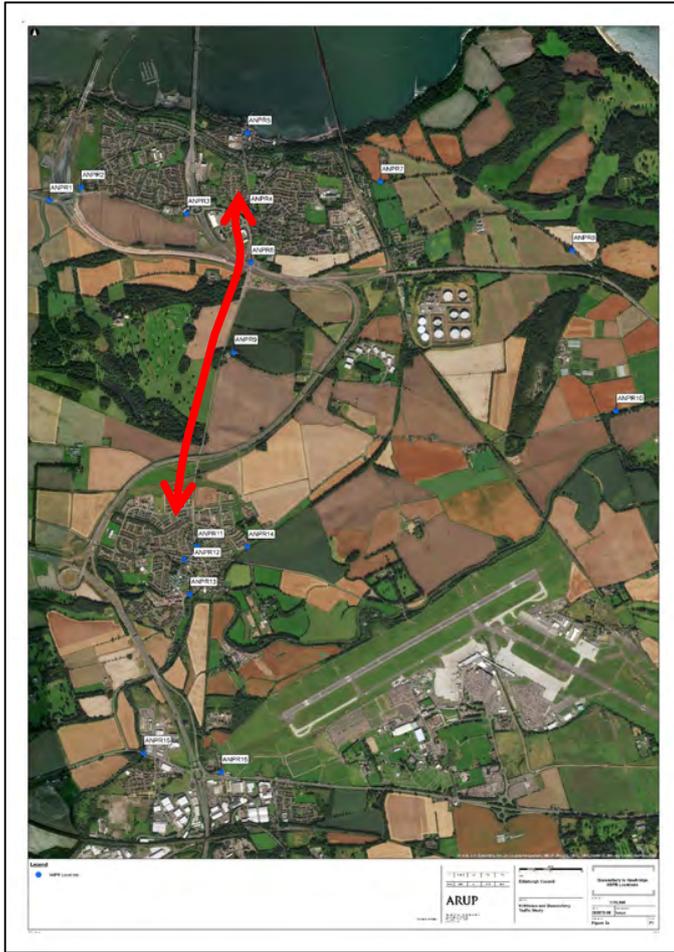
Figure 2 – Strategic trip route



Table 3 – Local journey vehicle trip count

Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	34	35	3	54
0800-0900	50	57	12	57
16:00-1700	76	68	63	113
17:00-1800	95	77	81	91
Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	48	55	2	49
0800-0900	68	63	39	55
16:00-1700	52	50	60	61
17:00-1800	63	60	48	55

Figure 3 – Local trip route



3 Identified Gaps in Active Travel

While the main traffic study identify the key movements and scale of trip making by private car, one of the key outcomes was the scope for promoting more active travel, particularly between the communities of South Queensferry and Kirkliston. Based on these initial findings, it was agreed that Arup undertake a review of current active travel infrastructure and explore opportunities to deliver improvements to facilitate walking and cycling trips. Following a site walkover the following six locations were identified as potential areas for improvement in terms of active travel provision, to encourage more residents and visitors to travel actively for short journeys. Figures 4 and 5 exhibit the areas identified as requiring improvements in active travel infrastructure.

Figure 4 – Proposed areas of active travel infrastructure improvements in Kirkliston

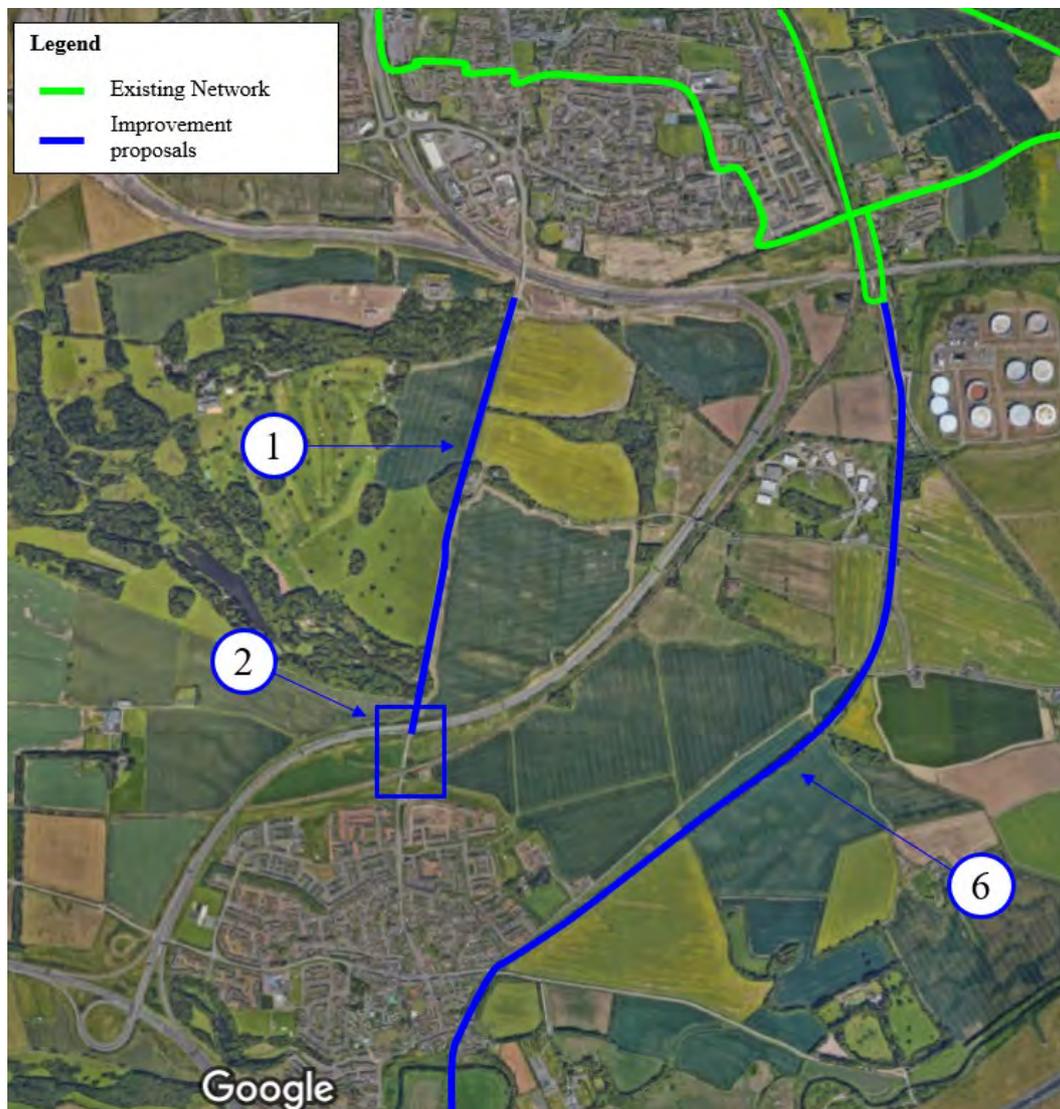
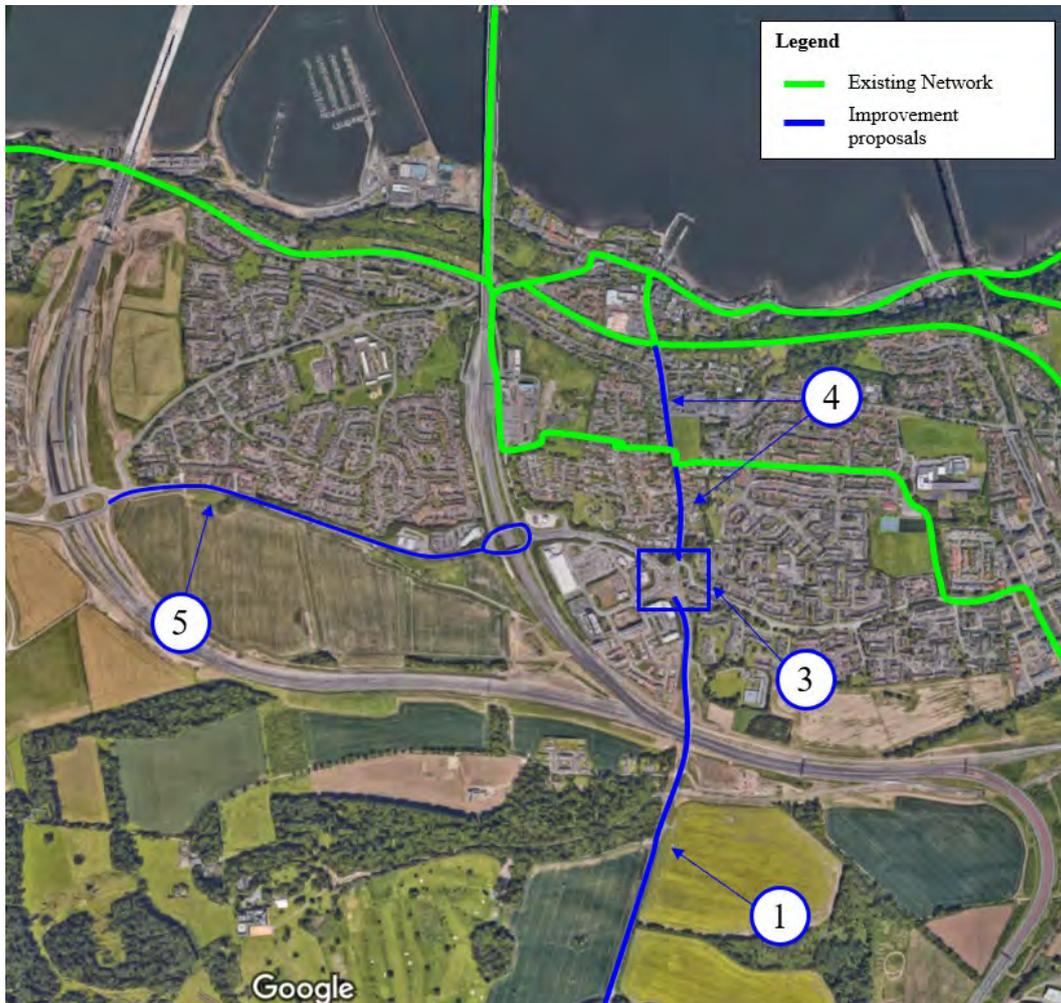


Figure 5 - Proposed areas of active travel infrastructure improvements in South Queensferry



With reference to Figure 4 and 5, the following six locations have been highlighted:

- 1- B800 between Kirkliston and South Queensferry
- 2- Northern Access to Kirkliston
- 3- B8000 / B907 / Ferrymuir Roundabout
- 4- South Queensferry Centre via B907
- 5- A904 Builyeon Road
- 6- Dalmeny to Newbridge Cycle Route

Each of these locations are discussed in more detail within the Section 3.1 – 3.6, detailing some of the constraints to active travel.

3.1 B8000 between South Queensferry and Kirkliston

The B8000 has a shared footway/cycleway running along the western side of the road between South Queensferry and Kirkliston. This route could be improved substantially in terms of signage and linage. The journey time between the north of Kirkliston and south of South Queensferry is approximately 9 minutes cycling and less than 30 minutes walking, which is a feasible journey for most abilities.

As can be seen in Figure 6 below, cyclists must dismount the kerb when approaching Kirkliston, leaving them to continue their journey on the main road. This may discourage individuals to use this route. As is also evidenced in Figure 6, the linage for cyclists is currently worn and could therefore create confusion for users.

Figure 7 shows the shared footway/cycleway with a view toward Kirkliston. It is evident that the path would benefit from improvements to make it more attractive to users of all abilities.

Figure 6 – Worn markings on B8000



Figure 7 – B8000 looking south to Kirkliston



3.2 Northern Access to Kirkliston

When entering Kirkliston, there is minimal active travel provision in place, particularly for cyclists. There is no infrastructure to link the shared footway/cycleway on the B8000 with the existing on-road cycle lanes heading towards Kirkliston town centre, as can be seen in Figure 8.

Given there is residential developments being introduced in this area, the area would benefit from improved linkages and crossings to allow pedestrians and cyclists to move safely between residential streets and local facilities.

Figure 8 – Lack of coherence between active travel provision in Kirkliston



3.3 B8000/B907/Ferrymuir Roundabout

There is currently a lack of signage directing pedestrians and cyclists towards national and local cycle routes when approaching the B8000/B907/Ferrymuir roundabout from the south. This may cause a level of uncertainty and could be discourage active travel uptake in this area. A view of what is existing from this approach can be seen in Figure 9.

Figure 9 - B8000 arm approach of B8000/B907/Ferrymuir Roundabout



3.4 South Queensferry Centre via the B907

When approaching South Queensferry town centre via the B907, there is limited signage to direct active travel users towards the National Cycle Route (NCR) 1 or the NCR 76 along the coast (Figure 10). A shared footway/cycleway forms part of the route to a number of local facilities, including Queensferry High School, the library, the local GP and Dalmeny railway station.

At the B907/Rosebery Avenue junction there is NCN signage, although this could create confusion for users as there are a number of junctions approaching this point.

The surface of the shared footway/cycleway on Viewforth Place is of poor quality and may discourage users. There is a toucan crossing on the B907 at this point, however cyclists are directed to use the carriageway, again potentially creating confusion for cyclists.

Figure 10 – B907 towards South Queensferry Figure 11 – B907/Rosebery Avenue



3.5 A904 between Forth Bridge Junctions

At present, there is a footway running along the northern side of Builyeon Road, with no infrastructure in place for cyclists. There is no formal crossing point from this footway to a bus stop located on the southern side of Builyeon Road, seen in Figure 12.

Planning permission has been granted for an 834-unit residential development to the south of Builyeon Road. As part of this development there is a proposed pedestrian/cycle route along Builyeon Road. This provides adequate linkage between residential developments to the west of the A904/B8000 roundabout but also heightens the need for improvements to be made in this area.

Figure 12 – Bus stop on Builyeon Road



3.6 Cycle Link from Dalmeny to Newbridge

There is an informal dirt cycle/footpath connecting Dalmeny to the roundabout at Newbridge. This is unsuitable for year-round usage as it is not well lit, and the surface is poor, making it an undesirable route in its current form.

4 Proposed Improvements with Examples

The following improvements are suggested for the locations identified, examples of these in practice have been given where appropriate.

4.1 B8000 between South Queensferry and Kirkliston

On the northern part of the route from South Queensferry there is a build-out (Figure 13) which has narrowed the road in an effort to reduce traffic speeds on the B800. This could be introduced for the full length of the shared footway/cycleway to create a safer environment for both pedestrians and cyclists.

An example of increased space given to active travel is Bears Way Cycle route in East Dunbartonshire, which follows the B8030 and A81 which have higher traffic flows than the B8000. This example provides evidence that making a route feel safe, through traffic calming measures and user separation, can increase active travel usage. More information can be found here - <https://www.eastdunbarton.gov.uk/bearsway>

Figure 13 – Traffic calming build-out on B8000



4.2 Northern Access to Kirkliston

As discussed in section 2.2, there is a missing link of cycling infrastructure when approaching Kirkliston from the north, between the B800 shared footway/cycleway and on-road cycle lanes. This gap would benefit from improved signage and the addition of on-road cycle lanes as there is insufficient space to build an off-road path. It is proposed that white lining similar to that of Gogar Station Road be

introduced, as displayed in Figure 14. Allocating cyclists their own space may encourage more individuals to cycle and would control vehicle speeds.

Furthermore, introducing a crossing, in the form of a central refuge, on the B8000 at this point will increase the safety of pedestrians.

Figure 14 – Gogar Station Road (Source: Google Maps)



4.3 B800/B907/Ferrymuir Roundabout

Guidance from Sustrans seen in Figure 15 below, supports the application of a raised crossing, this could be introduced on the southern arm (B8000) and will also reduce vehicle speeds on approach to the roundabout.

Figure 15 – Crossing guidance for cyclists from Sustrans

85 th percentile speed	Traffic flow (two way daily)	Type of crossing
< 30 mph	< 2,000	Cyclists have priority at side road - raised crossing
< 30 mph	< 4,000	Cyclists have priority mid-link-raised crossing

4.4 South Queensferry Town Centre via B907

The B907 would benefit from improved signage to better guide active travel users. Signage directing users to the local facilities would be useful for those wishing to travel for short, local journeys.

Improvements to the shared footway/cycleway surface, as well as introducing linage to better guide users may encourage more people to use this route whilst eliminating confusion. Dropped kerbs could be introduced to allow cyclists to join the cycleway to cross at the toucan crossing.

4.5 A904 Between Forth Bridge Junctions

The first proposal would be to widen the footway, creating a shared footway/cycleway along Builyeon Road, with crossing points installed where necessary. This would be the preferred option as both pedestrians and cyclists would be segregated from vehicle traffic, which may encourage more people to travel actively.

Another option would be to have the footway remain as is, with cycle lanes added to the road in both directions, again with crossing points installed where necessary.

4.6 Cycle Link from Dalmeny to Newbridge

This route could be improved by following the example of the Stanstead Cycle Path. This involved resurfacing, erecting new signage, and clearing overhanging vegetation. Further information on the Stanstead Cycle Path can be found here - <https://www.gov.uk/government/news/800k-stansted-cycle-path-upgrade-opens>. With similar improvements, this route could be a key link between South Queensferry, Dalmeny, Kirkliston and Newbridge.

5 Summary and Conclusions

The results of the traffic study report, which Ove Arup & Partners Scotland Ltd (Arup) were commissioned to undertake by the City of Edinburgh, revealed that there are more local trips taking place than there are strategic. In order to reduce the number of vehicles on the road, active travel opportunities require improvement. In this report, existing active travel issues were identified and proposals for improvements put forward..

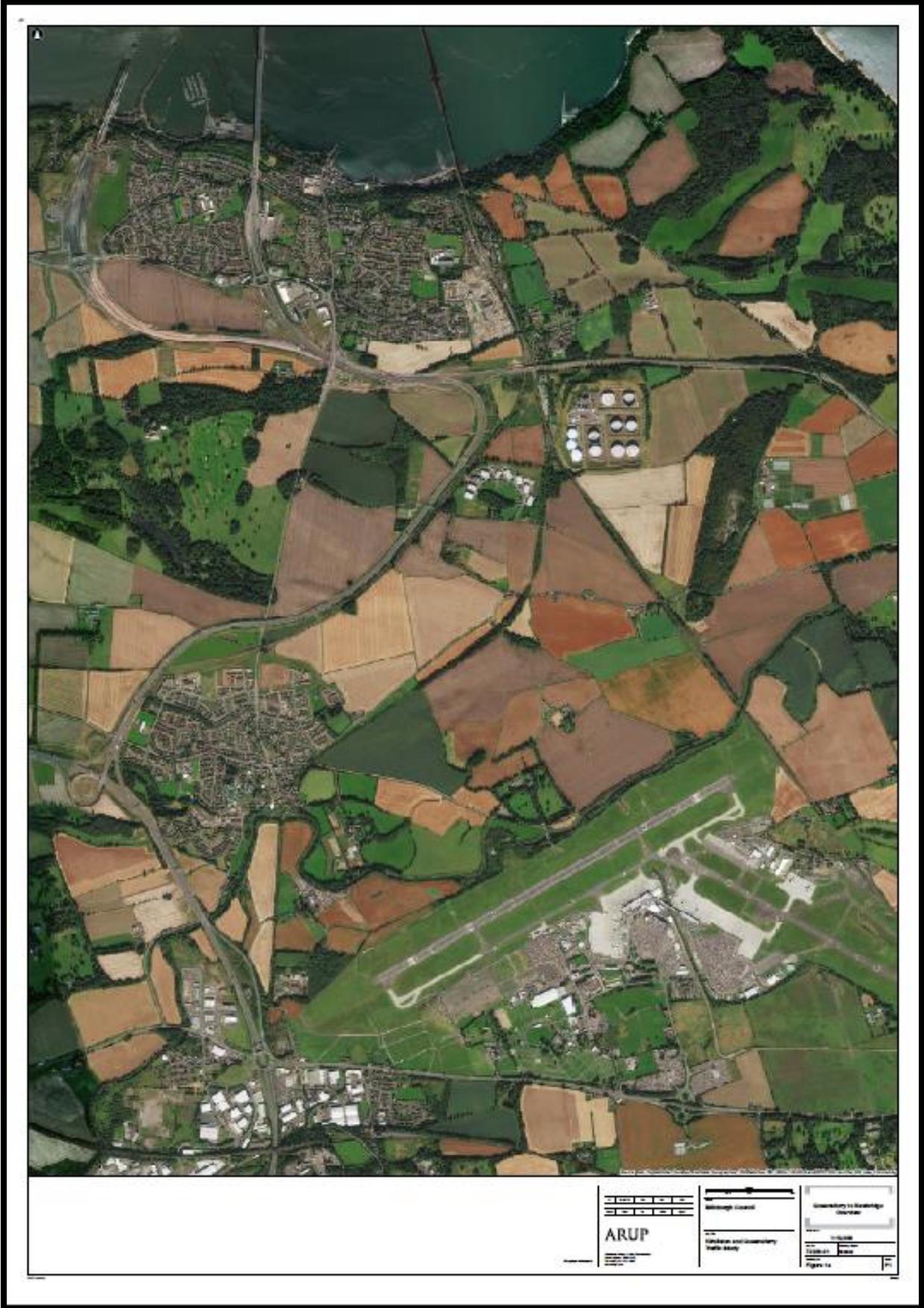
There were six key areas which were identified within South Queensferry, Kirkliston and surrounding areas. These included the following:

- The B8000 between South Queensferry and Kirkliston
- The northern access to Kirkliston
- The B8000/B907/Ferrymuir Roundabout
- South Queensferry Town Centre via the B907
- The A904 Between between Forth Bridge Junctions
- Cycle Link from Dalmeny to Newbridge

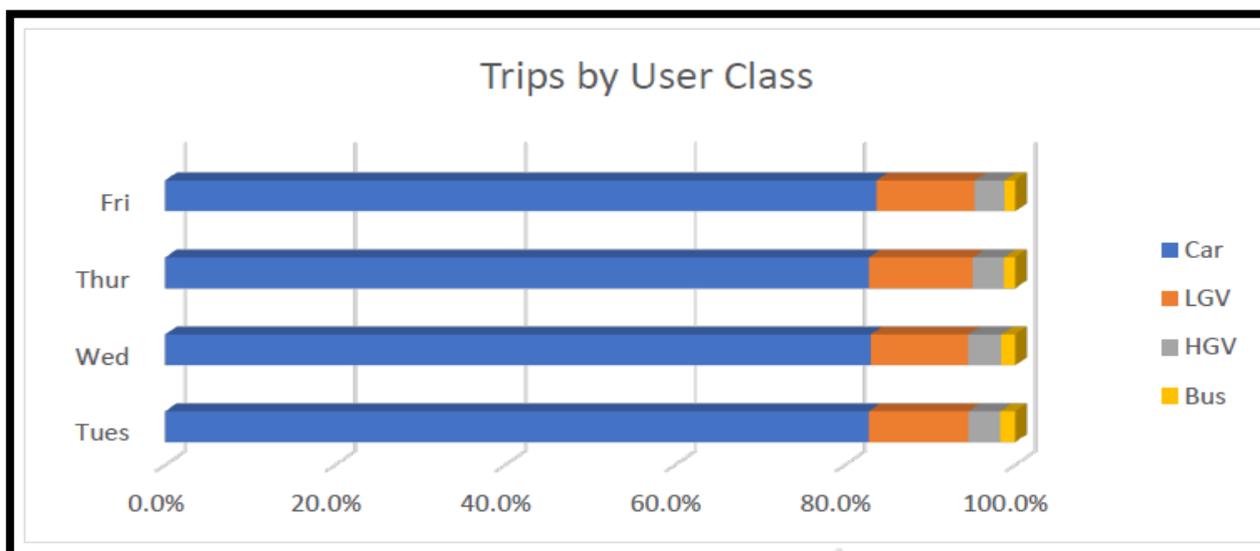
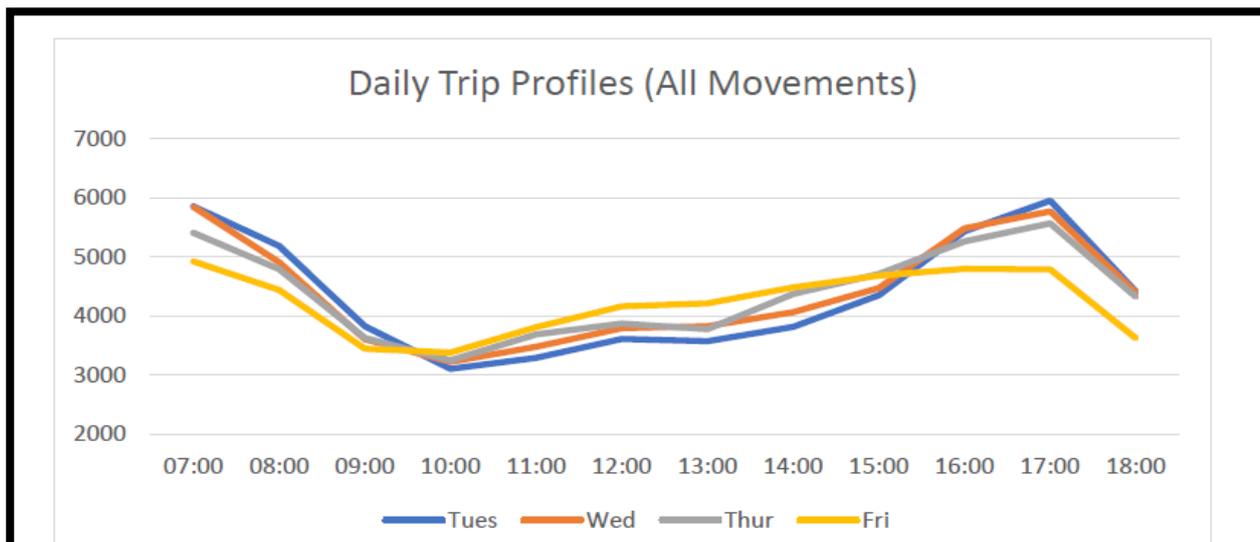
Potential improvements include relatively low-cost changes, such as the addition of signage and signage. However, additional improvements could be made through minimal infrastructure improvements, including a raised crossing and a build-out on the B8000 shared footway/cycleway.

It would be expected that with the proposed changes made that active travel would be a more appealing mode of travel for residents and visitors, thereby reducing vehicle numbers on the road in the immediate vicinity.

Map of study area



Data results sample



B800 (11 & 6)

Northbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	101	117	14	159
0800-0900	137	118	49	151
16:00-1700	236	235	243	410
17:00-1800	237	241	265	368
Southbound Trips				
	Tuesday	Wednesday	Thursday	Friday
0700-0800	271	296	239	240
0800-0900	217	224	240	201
16:00-1700	155	164	184	188
17:00-1800	190	211	187	165

Suggested Kirkliston Crossroads layout

