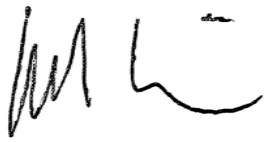
Aberdeen Freight Distribution Strategy



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Aberdeen Freight Distribution Strategy

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Capabilities on project:
Transportation

1 Introduction

1.1 Introduction

AECOM, on behalf of Aberdeen City Council and Nestrans, has been commissioned to undertake a study to consider how retail freight distribution within Aberdeen's Air Quality Management Area (AQMA) could be made more efficient, reducing associated air quality and carbon emissions. This element of work forms part of the Aberdeen City Council/Nestrans/Robert Gordon University CARE North Project. The work is required to be co-ordinated with other freight development work being undertaken by Nestrans, as well as the Aberdeenshire/Nestrans/EU supported GreCOR multi-modal freight development project.

This report has been developed to detail the results of work undertaken by AECOM towards developing a Freight Distribution Strategy for Aberdeen City Centre.

1.2 Background

Aberdeen City Council, together with partners Nestrans (the North East Regional Transport Partnership) and the Robert Gordon University, is currently involved in the European Interreg IVB CARE North Project (Carbon Responsible Transport for the North Sea Region).

The aim of CARE North is to develop a comprehensive, strategic and practical approach to urban and regional transport/accessibility in the North Sea Region (NSR) in the context of climate change and declining oil supplies.

CARE North has developed, and proposes to implement, innovative carbon reduction strategies for urban and regional transport to maintain and improve accessibility in a more carbon-responsible way.

Aberdeen has a significant air quality problem, primarily due to vehicle emissions, and central areas of the City have been declared as Air Quality Management Areas (AQMAs) due to high concentrations of NOx and PM10. This has led to interest in the declaration of a Low Emission Zone (LEZ) within the centre of Aberdeen, where the most polluting vehicles could be restricted, deterred or discouraged from access to a geographically defined area, with the principal aim of improving air quality. Elements of the LEZ currently being considered include a focus on buses (covering the city centre AQMA or all routes within the City), and also a focus on delivery vehicles within the AQMA. These will include Goods vehicles servicing the city centre (the focus of this study), but also HGVs servicing the Harbour, which is located adjacent to the City Centre / AQMA.

The funding provided by CARE North has also enabled the Council and its partners to undertake a number of projects to explore potential complementary options for the LEZ which could form a package of measures. These have included:

- An off-bus ticketing study to determine whether the installation of on-street ticket machines can speed up bus boarding times and, as a result, reduce the amount of times buses are stationary at bus stops – outcomes from this study concluded that the cost of this initiative was not necessarily proportionate to the benefits that it would achieve;

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- A feasibility study into the adoption of a Car Club in Aberdeen, which has resulted in the successful establishment of a scheme in the City;
- Consideration of options for differential parking policies and charges, related to vehicle type; and
- Work to explore the potential for introducing anti-idling zones in the City Centre, which has led to the introduction of awareness raising through a leaflet and poster campaign.

Work on a Freight Distribution Strategy for Aberdeen City Centre will also feed into wider work being undertaken on the GreCOR (Green Corridor in the North Sea Region) project. This is an Interreg IVB North Sea Region project being progressed by Aberdeenshire Council and Nestrans, a focus of which is multi-modal freight development.

1.3 Freight Distribution Strategy Objectives

The following key objectives have been established to facilitate development of a Freight Distribution Strategy for Aberdeen City Centre.

- Understand the pattern of deliveries within the city and edge of centre area. This includes location, vehicle type, timings of deliveries, frequencies, load types and sizes.
- Understand the key factors that determine this pattern of deliveries, such as business need, haulier requirements, or external factors such as loading restrictions.
- Determine the principal problems and opportunities that arise from the pattern of deliveries.
- With the aim of seeking to reduce air pollution and carbon emissions, assess options to improve the efficiency of these deliveries, and reducing any adverse impacts. Assessment to include feasibility, cost, and impact against economic and environmental criteria.
- Recommend a range of policy measures and specific implementation actions that could be undertaken to improve the efficiency, and reduce the environmental impacts of deliveries in the city centre, and edge of city centre.
- Develop specific proposals such that they may be included in future bids for Scottish Government air quality funding.

1.4 Structure of Report

The structure of the report is as follows:

- Chapter 2 – Methodology;
- Chapter 3 – Background Review;
- Chapter 4 – Potential Measures – Long List;
- Chapter 5 – Supporting Survey Work;
- Chapter 6 – Option Generation and Appraisal;
- Chapter 7 – Proposals for Short Term Actions;
- Chapter 8 – Recommendations – Long Term Actions;
- Chapter 9 – Conclusion and Next Steps;
- Appendix A – Union Street Loading and Frontage Survey; and
- Appendix B – Retail Centres Survey.

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2 Methodology

2.1 Introduction

This section details the methodology employed in developing the study. Figure 2.1 demonstrates how the strategy was developed.

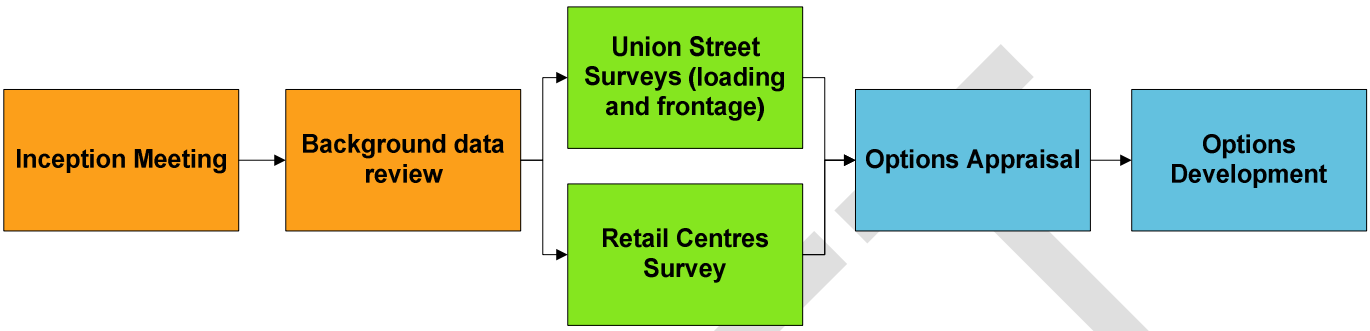

Figure 2.1: Methodology Flowchart

The following tasks were undertaken to develop the project:

2.1.1 Task 1 – Inception

An inception meeting was held at the outset of the project to agree the project outputs, timescales and highlight any potential issues or challenges that may arise.

2.1.2 Task 2 – Background Review

This task was focussed on undertaking a review of current loading policy and practice, and possible future developments within Aberdeen City Centre to inform the study recommendations. In addition, a review of Best Practice elsewhere, including city centre freight delivery strategies, was undertaken to identify any lessons that may be applicable to Aberdeen.

2.1.3 Task 3 – Union Street Surveys (Loading and Frontage)

This task was undertaken to establish a pattern of deliveries based on the results of a survey undertaken on Union Street, and previous questionnaire responses. It also involved a possible follow-up consultation with frontage premises to understand key factors determining the observed pattern of deliveries. This has allowed assessment of the impacts of loading on Union Street on traffic flows and bus congestion.

2.1.4 Task 4 – Union Square / Bon Accord Centre / St Nicholas Centre (Retail Centres) Survey

In addition to the loading and frontage surveys undertaken on Union Street, surveys were undertaken at Union Square, Bon Accord and St Nicholas Centre shopping centres to establish the pattern of deliveries based on surveys at loading areas.

2.1.5 Task 5 – Appraisal of Options

Once the background data and survey work was collated and analysed, this was used to produce a long list of potential options related to improving freight distribution in Aberdeen City Centre. The long list of options was distilled into a short list of possible interventions, based on an analysis of existing problems and opportunities, as well as best practice examples elsewhere. These included policy options as well as practical initiatives such as consolidation centres.

2.1.6 Task 6 – Option Development

The options taken forward for development were agreed at a workshop held with Aberdeen City Council officers on 31 October 2012. These were then developed to an appropriate level of detail for further consideration such that they may be included in future bids for Scottish Government air quality funding.

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Capabilities on project:
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Section 3 reviews current loading policy and practice, and future possible developments within Aberdeen City Centre to inform the study recommendations.

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3 Background Review

3.1 Introduction

This task was focussed on undertaking a review of current loading policy and practice, and future possible developments within Aberdeen City Centre to inform the study recommendations. In addition, a review of Best Practice elsewhere, including city centre freight delivery strategies, was undertaken to identify any lessons that may be applicable to Aberdeen.

3.2 Freight Deliveries in Aberdeen

The principle areas for retail and office freight deliveries within the centre of Aberdeen are along Union Street, and to the three covered shopping centres – Union Square; Bon Accord/St Nicholas; and The Mall Trinity. Core retail activity is increasingly now provided within the shopping centres, with Union Street providing a range of offices, bars/pubs/restaurants, convenience food retail, and smaller independent, charity and specialist shops.

3.3 Loading and Unloading

Loading restrictions are used to control loading and unloading activity on any particular stretch of road. Introduced, and made legally enforceable by Traffic Regulation Orders, loading restrictions are defined separately from Parking and Waiting Restrictions, and restrictions associated by Bus Lanes.

The presence of loading restrictions are indicated by kerb “blip” markings. The absence of kerb blips confirms that there are no restrictions. If there are no kerb blips, you can load and unload on a single or double yellow line for a maximum period of 40 minutes at any time.

If there is a single blip marking, you may not load or unload during the time the restriction is in force but outside the time of restriction you can load and unload for a maximum period of 40 minutes. The times of the loading restriction are shown by the black on white plate signs and also by kerb markings. The times of the loading and unloading restriction may not necessarily be the same as the parking restriction for that road.

If there are double blip markings, then loading and unloading is restricted at all times. ;

Any vehicle, including those showing a Disabled Person’s Blue Badge, may be issued with a Penalty Charge Notice if parked in a loading or unloading restricted area during the time of a restriction or at any time if there is an ‘at any time’ restriction in force.

Loading restrictions on a particular section of a road prohibit parking even for loading or unloading.

Loading and unloading should be a continuous operation. It should be obvious to a Civil Enforcement Officer that the vehicle is engaged in legitimate loading and unloading and that the goods are either too big or too heavy to be carried for any distance. If a car is being used and not a vehicle specifically constructed to carry goods, then the loading must be necessary and not convenient and the goods must be too large to carry.

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3.4 Loading Restrictions on Union Street

Union Street is a major thoroughfare through Aberdeen City Centre fronted by numerous shops and offices. It experiences high traffic flows throughout the day and is also a major bus route, with bus lanes in place serving buses travelling in both directions.

Loading restrictions in place on Union Street have been imposed in order to support the operation of Bus Lanes on Union Street, and to support the free flow of traffic during peak periods. Loading restrictions are typically imposed as follows:

- Monday – Friday – 8.00am – 9.30am;
- Monday – Friday – 12.30pm – 2.30pm;
- Monday – Friday – 4,00pm – 6.00pm

However, some inconsistency in the loading restriction plates has been revealed during work undertaken for this study (shown in Figure 3.1). A further wider variation has also been revealed on side streets.

Aberdeen City Council operates a Decriminalised Parking Zone, and accordingly, parking and loading restrictions are enforced by the Authority's team of Street Wardens.

The most commonly observed plate in place on Union Street is shown in the figure on the left of Figure 3.1 below.

Figure 3.1: Restrictions in place on Union Street

Further discussion of the extent to which the loading restrictions are adhered to can be found in Section 5, however in general terms, they are largely observed, with the time period with the most contraventions happening during the midday/early afternoon restriction.

3.5 Shopping Centre Loading Arrangements

Each of three shopping centres have dedicated off-street loading bays. During the operational hours of these shopping centres, no loading restrictions are typically imposed.

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3.6 Planning Restrictions

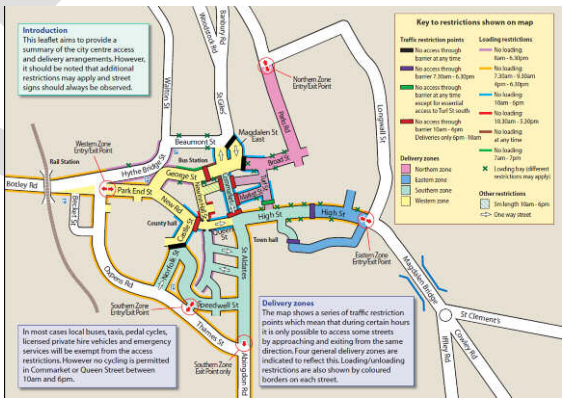
Early morning and late night loading restrictions are also typically imposed as a condition of planning consent on commercial premises operating on Union Street, that have been subject to the planning process. These are applied to restrict noise affecting the many residential properties and flats that are occupied above the shops on Union Street.

3.7 Other City Centre Freight Delivery Strategies

As discussed, loading and unloading can have a significant effect on the continuous flow of traffic in urban areas. In addition, the noise and disruption caused by the loading and unloading process can affect those living and working in the immediate area.

The ability of vehicles to easily service businesses in urban areas is vital to their economic viability and competitiveness. City authorities around the world have looked to manage the competing demands on highway space in urban centres by introducing freight delivery strategies. Some examples of this are set out below.

3.7.1 Oxford



The historic city centre of Oxford is a popular tourist and shopping destination, with limited highway space for loading and unloading. In order to ensure that the city is serviced adequately and that loading activity does not adversely affect others in the city centre, an access and delivery strategy has been developed.

The city centre has been split into four different delivery zones in which different access and loading restrictions apply.

The initiative ensures that delivery zones can only be accessed by one or two access points, which are restricted by barriers outside of delivery times (generally restricted between 10am-6pm). This ensures that delivery vehicles do not travel through the city centre at peak times and can only load and unload when the impact on the surrounding area is lessened.

Due to the nature of Aberdeen, restricting access to certain parts of the city centre using barriers etc is not possible. However, the concept of defining different zones, each with their own consistent set of loading restrictions, could be applicable to Aberdeen.

3.7.2 Dublin – Restricted on-street deliveries

This plan included time-of-day restrictions on commercial deliveries, and designated “clearways”, where on-street deliveries were prohibited between 7:00 and 10:00, and between 12:30 and 19:00. Deliveries are still permitted for indented loading bays and designated commercial vehicle parking areas. The impact of the restrictions was to push many deliveries to earlier in the morning. While the programme was considered a success, Dublin recognised that the restrictions caused many stores to incur significant additional costs related to opening earlier and coordinating

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deliveries during off-peak hours. It is estimated that about a quarter of food deliveries in Dublin's city centre now occur during off-peak periods. [1]

For Aberdeen, the concept of imposing more restrictive loading bans, alongside the identification of loading bays that could be used at all times, may be an option worthy of further consideration.

3.7.3 New York – Graduated rate structure

New York City has, in the past, reserved a number of parking spaces in Midtown Manhattan for deliveries between 7:00 and 18:00. Limited loading space and vehicles using existing loading bays for long periods of time in Manhattan led to many delivery vehicles double parking, contributing to congestion. In response to this challenge, New York City's Commercial Vehicle Parking Plan added loading bays and implemented a graduated rate structure (using parking meters dispensing prepaid tickets) in a pilot area of Midtown. The pricing plan included a rate of $2 for one hour, $5 for two hours, and $9 for three hours. New York City Department of Transport's evaluation found that kerb occupancy dropped from 140% to 95% and the typical occupancy time has fallen from 160 minutes to 45 minutes. Only 25% of commercial vehicles stay for more than 60 minutes.[2]

Within Aberdeen's central area, there are no identified loading bays, and no charges are due for loading/unloading.

3.7.4 Bordeaux – 'Nearby delivery areas'

Bordeaux has created dedicated 'nearby delivery areas' through collaboration between the Chamber of Commerce, freight carriers, and the metropolitan government. The goal was to ease delivery to the central city, and to reduce traffic, noise, and pollution. The facility consists of a reserved area of the street about 30 metres in width that is used to unload shipments to nearby stores, which accommodates up to five delivery vehicles. It is open and has dedicated staff available to load and unload goods Monday through Saturday.

Goods are unloaded from delivery trucks and loaded onto smaller trucks, carts, and dollies and moved the 'last mile' by business owners. The system has been regarded as a success by all of its major stakeholders, and additional delivery areas were establish in 2005 and 2006. Other French cities, including Rouen, have followed with their own versions of this concept.

Due to the current highway layout in Aberdeen, and location of the main retail centre, it is initially difficult to identify where such a "nearby delivery area" could be established. However, this potential option may have some merit when considering future options for the development of the city centre.

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[1] "Best Practice Handbook Theme 3: Control and Enforcement in Urban Freight Transport Theme 4: City Access Restriction Schemes," Best Urban Freight Solutions (BESTUFS), 2006.
[2] "Urban Freight Case Studies: New York," U.S. Department of Transportation, Federal Highway Administration Office of Freight Management and Operations, 2009.

3.8 Future Developments

3.8.1 The Aberdeen Western Peripheral Route (AWPR)[3]

The Aberdeen Western Peripheral Route (AWPR) is a new road being developed to improve travel in and around Aberdeen and the North East of Scotland. When completed, it is anticipated that it will bring many benefits to the area – economic, environmental and road safety.

Construction of the AWPR is anticipated to start in 2014, with completion by 2018 and it is anticipated that cross-city travel will also be improved, with heavy traffic removed from congested city routes and unsuitable rural roads. Journey times are expected to be reduced by up to 46% on certain origin-destination pairs.

Overall, it is anticipated that more than 55,000 properties will benefit from improved air quality as a result of the AWPR. This is achieved by taking slow-moving traffic away from city streets and cutting vehicle build-up at junctions.

However, construction of the AWPR will not necessarily affect city centre freight deliveries directly, although some general through traffic may be removed from the city centre. HGVs will still be required to use city centre routes to access the Harbour.

3.8.2 Union Street Pedestrianisation

The City Council continue to maintain aspirations to pedestrianise part of Union Street, particularly the stretch between Market Street and Bridge Street.

Current issues of concern, as identified by the Aberdeen City Council website, include:

- High concentration of pedestrians, yet very narrow footways;
- Concentration of bus stops conflicts with the demand to create greater opportunities to cross;
- Largest concentration of accidents in the city centre;
- The "feel good factor" experienced here is poorer than that of many other cities; and
- Any restriction of traffic on Union Street creates problems with displaced traffic causing delays on alternative routes.

A Scottish Transport Appraisal Guidance (STAG) analysis suggested that the economic impact of the pedestrianisation of Union Street is likely to be positive and several hundred new jobs will be created in the retail and hospitality sectors. The Economic Activity Location Impact (EALI) study estimates the direct benefits as being 410 new full time equivalent jobs and £22m increased turnover for City Centre businesses.

Aberdeen City Council has recently consulted on a City Centre Transport Masterplan, part of which includes proposals for the pedestrianisation of Union Street.

The AWPR is also envisaged to support pedestrianisation of Union Street by reducing traffic levels by 5%.

[3] www.awpr.gov.uk Aberdeen Western Peripheral Route Website

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3.8.3 Low Emission Zone

Feasibility work has already been undertaken by AECOM with regard to the introduction a Low Emission Zone (LEZ) in Aberdeen to address the poor air quality previously discussed.

A Phase 1 Scoping Report was completed in 2010, to determine the most viable options for an LEZ in Aberdeen. Through an initial analysis of available information, the report outlined the most promising options for an LEZ, and the anticipated potential benefits in terms of emissions reductions. The outcome of this work was to place an emphasis on buses in the city centre AQMA, and HGVs on the Market Street / Virginia Street / Commerce Street route, as tackling these issues would produce the most efficient and effective means of making significant improvements in local air quality.

The purpose of a feasibility stage report (Phase 2) was to further develop and model these most promising options, and then identify the best options to take forward, taking account of the costs and benefits of that option. A number of elements of the work on this phase have been progressed, including stakeholder consultation, enforcement options, and consideration of possible complementary measures.

Following the designation of several Air Quality Management Areas (AQMAs), in recognition of elevated pollutant concentrations, the Council has formulated an Air Quality Action Plan which details measures that will be taken to improve air quality. An LEZ, in some shape or form, was recognised in the Plan as potentially being capable of delivering significant air quality improvements.

3.9 Summary

This section has reviewed current loading policy and practice within Aberdeen City Centre and future possible developments. A review of other freight delivery strategies was also undertaken to assess whether any principles could be applied to this work for Aberdeen.

The completion of the AWPR, the confirmation of a city centre masterplan, present particular opportunities to introduce measures to improve freight delivery efficiency, and reduce adverse impacts associated with this activity. However, long term and continuing trends affecting the nature of retail activity on Union Street must also be considered, particularly in the instance of increased office and residential land use at the top of Union Street.

Chapter 4 sets out a long list of potential measures.

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4 Potential Measures – Long List

4.1 Introduction

This section reviews UK and wider best practice with respect to city centre deliveries, and generates a long list of possible policy and project interventions that could be applied to Aberdeen, specifically the city centre (AQMA). A total of 16 candidate measures are discussed in this section, as follows:

- Low Carbon Vehicles;
- Urban Delivery Centres;
- Smaller Sized Vehicles;
- Out of hours Deliveries;
- Intelligant Loading Bays;
- Telematics;
- Computerised Vehicle Routing and Scheduling;
- Goods Vehicle Routing Strategy and Priority;
- Low Emission Zones;
- Transport Collaboration;
- Congestion Charging;
- Lorry Control Scheme;
- Delivery and Servicing Plans;
- Construction and Logistics Plans;
- Vehicle Fleet Accreditation Scheme; and
- Anti-Idling Zones.

These measures are discussed individually in more detail and for each measure a summary table of associated impacts and risks is provided. This information has been used alongside outcomes from stakeholder discussions and survey information to identify a short-list of options for further development.

4.2 Low Carbon Vehicles

Low carbon vehicles, such as electric vehicles, can have a positive impact on air quality, as localised emissions are negligible. In addition, electric vehicles often operate at lower speeds (although acceleration can be quicker) and thus can be considered safer than those powered by conventional fuel. However, as electric vehicles are very quiet there are safety concerns over pedestrians not hearing the vehicles. Running costs may be lower, as it is generally more economical to charge the associated battery than to fill a conventional fuel tank.

However, while it is anticipated that the initial cost of an electric van will fall over time as production levels increase, there is still a high capital cost associated with electric vehicles. Currently, one of the most significant barriers to uptake of electric vehicles is 'range anxiety'. Maximum distances for electric vehicles, whilst rising, fall short of their conventional fuel-powered counterparts. In addition there is limited charging infrastructure currently in place and installation costs are high. However, it should be noted that the number of charging points available across the UK is increasing, following initiatives such as Plugged in Places in the North East, Milton Keynes and London and Transport for London's Source programme. The relatively untested nature of the technology also means lifecycle costs are uncertain. However, some of the major post and parcel companies are using electric vehicles in cities such as Bristol and Edinburgh, mostly from a marketing perspective to demonstrate green environmental credentials, and this is something that could be investigated in Aberdeen.

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Given the air quality issues currently experienced in parts of Aberdeen, the historic highway layout and potential for linking with any future UDC, then the potential for low carbon vehicles to be introduced in Aberdeen appears high.

Low Carbon Vehicles	
Impacts	**Risks**
Positive Impact on air quality	Distance anxiety associated with vehicle range
Reduced noise pollution	Uncertain lifecycle costs
Encourages take up of low carbon technology and associated infrastructure	Expensive capital costs
Improved ability to navigate city streets	Lack of associated infrastructure

4.3 Cycle Couriers

It should be noted that 'low carbon' does not necessarily mean electric. Cycle couriers and deliverers using conventional bicycles or motor-assisted bicycles can also play a significant role in reducing congestion and improving air quality, depending on the extent of their take up. Cycle couriers are often better placed to navigate city streets, take up less kerb space, and this can result in favourable journey times across shorter distances (for example from an Urban Delivery Centre (UDC) – see below – to the City Centre).

Cycle Couriers	
Impacts	**Risks**
Improved air quality	A novel concept – may not be viewed as a "serious" option by business.
Reduced noise pollution	Needs to demonstrate cost savings to both operators and to end users
For small parcel delivery, can be more efficient and quicker than other options.	May become more competitive in the event of increased restrictions on vans – perhaps following pedestrianisation.
Potential for reduced impact on traffic flow.	Viabilty depends on whether there is a critical mass of small parcels delivery in the central area – this may increase with more office centrally located office developments.

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4.4 Urban Delivery Centres (UDCs)

UDCs or Consolidation Centres are best described as a logistics handling facility that is located in relatively close proximity to the geographic area that it serves but the facility is often located on the primary route network on the outskirts of the city. The area may be a city centre, an entire town or a specific site (e.g. shopping centre or construction site), from which consolidated deliveries are carried out within that area. Consolidation Centres are transport hubs where goods are consolidated and transported efficiently by receiving deliveries from several logistics companies destined for the urban area or site. They are able to transfer and sometimes store their loads at the Consolidation Centre and thereby avoid entering the congested area with large articulated vehicles. In addition, companies transporting smaller loads are able to deliver to the Consolidation Centre where loads can be combined for more efficient onward delivery.

The freight industry faces a number of challenges in attempting to increase operational efficiency whilst reducing costs and the environmental impact of urban deliveries. A Consolidation Centre is ideally operated by a single logistics company who sorts and consolidates the loads from a number of logistics companies and delivers them more efficiently, often on environmentally friendly vehicles, to an agreed delivery pattern.

UDCs have often been considered as a 'holy grail' by local government but to date have consistently under delivered. The traditional model often adds cost, time and product security worries for users. The 'go' factors for the public sector have been special regulatory environments (such as Heathrow Airport) or historic city centres, La Rochelle or Berwick-upon-Tweed. In addition, long term subsidies such as that applied to a facility at Bristol, or one off special projects such as the London Construction Consolidation Centre are two methods of ensuring that a consolidation centre works. The Meadowhall Centre run by Clipper Logistics has won awards for its environmental performance and has reportedly broke even financially after two years, something that is not mirrored by many other examples. The Norwich Consolidation Centre now only serves one retailer which was far from the original concept.

The key potential benefits and drawbacks derived from a Consolidation Centre to retailers and operators are shown below:

UDCs	
Impacts	**Risks**
Reduced congestion on the Road Network	High set up or operational costs
Reduced cost of deliveries by the reduction of delivery trips to urban areas	Added cost of double handling goods
Reduced congestion in urban areas by the consolidation of loads onto fewer vehicles	Risk of incurring damage during double handling process

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Reduced disruption in urban areas through the use of more appropriate vehicles to deliver to urban centres	Cost of returned goods
Improved air quality and lower CO_2 emissions	May have negative consequences in an area where much of the freight is already consolidated at company level
Potential for other value added activities such as seasonal stock buffering and pre-retail activities	The difficulty associated with a single centre handling a wide range of goods moving in and out of an urban area, due to differing requirements
Reduced conflict between vehicles in loading areas and delivery bays	Loss of direct interaction between suppliers and customers
Reliable and punctual supply chain/improved sales for retailers	Potential to create monopolies and kill competition with perhaps attendant legal issues
Potential to free up shop floor space currently used for storage	Existing commitments by customers and retailers can limit the effectiveness of a freight Consolidation Centre
More efficient use of staff resources due to consolidation of deliveries to each store	Increased volume of goods vehicles in the area immediately surrounding the Consolidation Centre
Potential for improved stock management	
Quicker turnaround time for suppliers	
Can be use to promote night-time trucking operations when trunking is disconnected from urban delivery	
Can be use to promote use of multi-modal operations	
Potential to manage reverse logistics and waste streams. This could also lead to consolidation of primary trunking	

4.5 Smaller Sized Vehicles

The dimensions of the largest Heavy Goods Vehicles (HGVs) mean they are often amongst the heaviest, highest and longest vehicles on the road. As a result, the engines required to power them often use more fuel and are often more polluting. The dimensions of many historic city centres are such that larger vehicles find it difficult to navigate around and space for loading and unloading is at a premium.

The use of smaller vehicles as an alternative is one method of addressing some of the issues described above. Smaller vehicles are better suited to narrow and congested city streets, are often less

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polluting and require less space for loading and unloading.

Naturally, smaller vehicles have a lower capacity than HGVs and therefore may have to undertake multiple trips from a depot or consolidation centre to transport the same consignment as a single HGV. This in turn can make freight less efficient, increase congestion and could even result in greater emissions due to multiple trips being undertaken. It is likely that the utilisation of smaller vehicles would represent the 'last-leg' of a consignment's journey and may require the introduction of a facility such as a UDC to be viable.

Smaller vehicles are best utilised in circumstances where larger vehicles are not being filled to capacity and where there are particular difficulties relating to congestion, highway layout or loading and unloading.

Smaller Sized Vehicles	
Impacts	**Risks**
Less polluting than larger vehicles	Lower vehicle capacity/maximum payload
Can better navigate city streets	Increased congestion if multiple trips required
Takes up less space than HGV when loading and unloading	May require introduction of a UDC
More fuel efficient than larger vehicles	Higher emissions related to additional journeys into city centre

4.6 Out-of-hours Deliveries

Naturally, delivering during the working day is more challenging than out-of-hours given the higher traffic volumes, on-street parking and general activity that occurs at this time. This can lead to difficulties in accessing loading bays, journey times being affected (and resultant idling when sat in traffic which affects air quality) and conflict with businesses and residents in the city centre.

Delivering out-of-hours enables operators to schedule their deliveries for times where traffic volumes are lower and street activity is reduced. This can result in more efficient operations with shorter delivery times, easier loading and unloading and (to an extent) less conflict with street activity.

Transport for London (TfL) has produced a code of practice publication with the Freight Transport Association and the Noise Abatement Society for businesses and operators to refer to for ways to reduce disturbance to local residents. The document contains simple and practical guidance on how to minimise noise from out-of-hours deliveries.

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However, it may not be convenient for either those receiving the consignment or the operator to deliver during these times. In addition, the noise associated with loading and unloading deliveries may disturb local residents. If there is a vibrant night-time economy in the area, then loading and unloading may conflict with that activity.

Out-of-hours Deliveries	
Impacts	**Risks**
Improved journey times	Create disturbance for local residents
Less idling	Less convenient
Less conflict with working day street activity	Could conflict with night-time economy
Easier to load/unload	

4.7 Intelligent Loading Bays

An intelligent loading bay allows the user to book kerb-space online for loading and unloading at a particular time and place. This pre-booked space becomes a 'Virtual Loading Bay'. This allows drivers to load and unload in close proximity to their delivery point without causing congestion and without the risk of receiving a Penalty Charge Notice (PCN) in urban locations.

Intelligent loading bays save time and fuel by enabling efficient delivery at pre-allocated bays on routes which may usually prohibit any type of stopping and loading/unloading. They can facilitate rapid loading/unloading by ensuring that each vehicle is confident of securing a space and reduces time spent searching for a space, reducing congestion and driver stress on roads through improved traffic management.

Intelligent loading bays enable key routes to be kept clear at peak hours resulting in improved conditions for commuting and public transport. It can also help reduce costs associated with administering PCNs for transport operators.

However, there are costs associated with setting up and administering such a system to enable Intelligent Loading Bays. In addition, it relies on there being a sufficient amount of available parking space and for spaces to be located in areas which are appropriate for loading and unloading i.e. in close proximity to the desired end delivery point.

Intelligent Loading Bays	
Impacts	**Risks**
Improved confidence in locating space for loading/unloading	Costs associated with administration and set up
Additional available loading space	May not have sufficient convenient parking spaces available to introduce scheme
Reduced driver stress	
Reduced amount of time spent searching for a space	

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Reduced PCNs	

4.8 Telematics

Telematic devices can be fitted to HGVs to provide information on a variety of outputs associated with how the vehicle is being driven. Information relating to outputs such as fuel consumption, idling time, over-speeding and harsh braking are all able to be audited by the device and the results can be used to benchmark drivers and depots within a transport operator's organisation.

For example, the output of the telematic device could identify a driver who has a driving style resulting in a higher fuel consumption rate than his or her colleagues. The driver could be provided with the requisite training or information to correct their driving, with resultant positive environmental impacts. Alternatively, drivers taking a certain route may experience a lower average speed. Using the telematic device outputs this can be identified and an alternative routing can be developed, which results in shorter delivery times and less idling, again with positive environmental impacts.

However it must be noted that there are initial capital and ongoing administrative costs associated with using a telematic device and interpreting the data and setting targets can all take time. Retrofitting a device to older vehicles may also affect a vehicle's warranty. Also, correlating data produced by a telematic device with localised air quality issues such as those experienced in the Aberdeen AQMA may prove difficult.

Telematics	
Impacts	**Risks**
Provides detailed outputs at a vehicle/driver level	Set up and ongoing administration costs
Enables effective internal benchmarking	Retrofit may affect vehicle's warranty
Flags up specific issues that may affect air quality	Difficult to apply telematic outputs in assessing vehicle impact on specific area

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4.9 Computerised Vehicle Routing and Scheduling (CVRS)

Computerised vehicle routing and scheduling (CVRS) systems are highly sophisticated software packages that are used to generate and optimise routes and schedules for transport operations. In addition to holding a digital map of the road network, these systems also hold information concerning customer locations, delivery and collection windows, quantities and types of goods to be delivered or collected, vehicle availability, capacities and driver-shift patterns. Customer orders are inputted into the system, which then generates the optimum set of routes that meets the delivery requirement.

The powerful capabilities of the software include the ability to:

- Reduce operational costs by minimising resource requirements i.e. the number of vehicles and drivers for a given workload
- Determine the most appropriate depot from which to schedule specific calls
- Observe all customer access constraints e.g. closed days, vehicle size and type restrictions, delivery time windows and pre-booked times
- Reduce loaded and empty mileage
- Accommodate collections and deliveries en-route without exceeding payload tonnes, available load space or drivers' hours limits

Naturally, any efficiencies relating to routing and payload will have knock-on environmental benefits through a reduced number of trips and increased maximised use of vehicle space.

Vehicle routing and scheduling systems are generally used by organisations operating fleets of ten or more vehicles, particularly for multi-drop work, where the scheduling task is complex. Systems will also bring real benefits where only limited time is available for planning.

CVRS	
Impacts	**Risks**
Reduce operational costs	Not suitable for smaller operators
Determine the most appropriate depot	Systems will also bring real benefits where only limited time is available for planning.
Observe all customer access constraints	
Reduce loaded and empty mileage	
Accommodate collections and deliveries en route without exceeding payload tonnes, available load space or drivers' hours limits	

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4.10 Goods Vehicle Routing Strategy and Priority

Road congestion in urban areas affects all traffic types including goods vehicles. Goods vehicles also have many problems gaining access to loading/unloading locations to complete essential deliveries. It may therefore be of benefit to introduce a well publicised HGV routing strategy, supported by signage and promotional material, with support from the highway authority.

The benefits of a priority routing strategy are that HGVs are focused on the most suitable routes, with sensitive areas such as residential areas avoided. Such a strategy would not physically restrict vehicles from using certain routes, but promote more suitable ones.

In some instances it may be feasible to allow goods vehicles to use priority lanes to encourage them to use certain routes, however such a measure is likely to prove controversial, unless restricted to low carbon or low emission vehicles. In addition, the lack of physical restrictions to support a priority routing strategy may result in drivers simply ignoring it in favour of their preferred route.

Goods Vehicle Routing Strategy and Priority	
Impacts	**Risks**
Goods vehicles utilise more appropriate roads	Drivers may ignore routing strategy
Encourage uptake of low carbon vehicles if able to use priority lanes	Lack of political support for priority lanes for goods vehicles
Improved delivery times for goods vehicles	

4.11 Low Emission Zones

A Low Emission Zone (LEZ) is a geographically defined area which seeks to restrict or deter access by specific polluting vehicles or only allow low emitting vehicles, (e.g. according to the Euro Engine type) such as regular or plug-in hybrids, or zero-emission vehicles, such as all-electric vehicles, with the aim of improving the air quality of the affected area.

High profile LEZs include the London LEZ, one of the largest in the world. The zone is monitored using Automated Number Plate Recognition (ANPR) cameras to record number plates and those vehicles which exceed emissions standards are required to pay a fine. The LEZ has the effect of encouraging operators to upgrade (either retrofit or replace) their vehicles to reduce emissions, reroute their vehicles or prioritise those vehicles which meet those requirements for deliveries into the city.

LEZs can be controversial, as they place an additional cost burden on operators both in relation to the required vehicle upgrades and associated fines for non-compliance. In addition, there are associated start-up and administrative costs associated with introducing such a scheme.

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LEZ	
Impacts	**Risks**
Reduced emissions in affected areas	Costs incurred on freight industry
Wider benefits associated with fleet upgrades	Start up and administration costs
Encourage uptake of new technology	

4.12 Transport Collaboration - Improving Vehicle Utilisation and Load Fill

Empty running and under-utilised vehicles represent inefficiencies in the supply chain, costing operators money and increasing the number of trips that are required to deliver goods to a particular area. Transport Collaboration involves companies working together to optimise HGV loads.

The benefits derived from Transport Collaboration are the same for competitive rivals as for the more traditional collaborators. In using a common distribution facility to ship goods to common or overlapping destinations, the collaborators will realise synergies, economies of scale, and cost savings in storage, staging, handling, and shipping the goods.

Transport Collaboration also yields additional benefits, including:

- More efficient inventory management;
- Reduced transport costs;
- Increased frequency of deliveries;
- Economies of scale to small- and medium-sized businesses; and
- Enhanced corporate responsibility by reducing carbon emissions.

However, confidentiality and security requirements are also primary concerns for companies considering whether to collaborate with their competitive rivals. Indeed, the natural mistrust that exists between rival business enterprises makes collaboration a difficult proposition to many companies, especially in view of the mistrust that already exists within a company's own supply chain because of the lack of transparency of cost savings.

Consequently, Transport Collaboration when feasible rarely involves the whole supply chain and is confined mostly to those portions of the supply chain where sufficient control and transparency are possible.[4] UDCs often require reconfiguration to support a collaborative approach.

[4] Transport Collaboration in Europe, ProLogis Research, 2011

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Transport Collaboration	
Impacts	**Risks**
More efficient inventory management	Confidentiality and security requirements
Reduced transport costs	Rarely involves the whole supply chain
Increased frequency of deliveries	May require configuration of UDC
Economies of scale to small- and medium-sized businesses	
Enhanced corporate responsibility by reducing carbon emissions	

4.13 Congestion Charging

Congestion charging is a method of discouraging travel by road into a certain area by introducing a charge for vehicles to enter the affected zone. This can be applied at certain times of the day (such as morning and evening peak time) or operate throughout the day. Charges can be tailored, for example to omit low emission vehicles or residents located within the charging zone.

The benefits of congestion charging can include a reduction in the number of vehicles entering the affected area (and thus reduced congestion and improved air quality) and the raising of funds which can be used to support further measures such as those aimed at encouraging sustainable transport or low carbon vehicles. It can also help to foster greater efficiencies in the freight sector by encouraging activities such as Transport Collaboration to minimise the number of deliveries taking place in the affected area.

However, the setting up of a congestion charging zone often requires a significant amount of preliminary consultation, infrastructure and administration. A smaller congestion charging zone, such as the Durham City Centre congestion zone, operates by way of a barrier which raises once the tariff has been paid. In contrast, The London Congestion Charging Zone operates by way of a large number of Automated Number Plate Recognition (ANPR) cameras.

There are also concerns that congestion charging affects the economic competiveness of affected areas when compared to those without a charging scheme. A charge places further financial burdens on the freight industry which either have to be borne by the operator or passed on to the customer by way of higher rates. In terms of

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revenue, a significant proportion of the revenues raised can be used in administering the scheme (enforcement, maintenance etc).[5]

Congestion Charging	
Impacts	**Risks**
Reduced Congestion	Potentially costly set up and administration
Improved air quality	Economic impact on affected area
Encourage greater efficiencies in the freight and logistics sector	Financial burden on transport operators
Revenue Raising	Politically difficult to progress, strong public and stakeholder opposistion.

4.14 Lorry Control Scheme (LCS)

Noise pollution can be a significant nuisance for affected residents and businesses. It is felt particularly keenly at night. HGVs create more noise than general traffic and as such their contribution to levels of noise pollution can be significant. As a result, a number of areas have introduced schemes to limit the level of HGV-related noise pollution.

The Greater London (Restriction of Goods Vehicles) Traffic Order 1985 applies in all 32 London boroughs and the City of London. It allows for the control of heavy goods vehicle movement at night and at week-ends: 9pm to 7am every night, Monday evening to Saturday morning. Then from 1pm Saturday, through the whole of Sunday, to 7am again on Monday.

The Traffic Order is designed to ensure that goods vehicles above 18 tonnes Gross Vehicle Weight (GVW) cannot use the restricted roads controlled by the Order during the prescribed hours without valid exemption. However, it specifies a network of, usually, main roads and access roads to industrial estates that are excluded from the Order.

The benefit of such a scheme is primarily a reduction of noise pollution during unsociable hours. It also encourages the use of smaller vehicles, which may in turn be less polluting. Again, there will be set up, administration and enforcement costs associated with the scheme.

The introduction of a lorry control scheme may also have the effect of increasing delivery times, consolidating HGVs onto a small number of roads (with resultant congestion and air quality issues) or further burdening operators with increased costs associated with longer routes and tariffs. In addition, a lorry control scheme of this nature may discourage out-of-hours deliveries, exacerbating congestion at peak times.

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[5] ^ Transport for London (April 2007). "Annual Report and Statement of Accounts 2006/07" (PDF). Mayor of London. p. Note 26. http://www.tfl.gov.uk/assets/downloads/corporate/annual-report-and-statement-of-accounts-06-07.pdf.

LCS	
Impacts	**Risks**
Noise reduction in sensitive areas during unsociable hours	May consolidate HGV traffic onto exempt roads or those outside of the scheme with resultant air quality and congestion issues
Could promote use of smaller, quieter vehicles	Increased delivery routes and times
Possible Knock-on effect of reduced emissions in affected areas	Increased financial burden on transport operators due to re-routing
Possible reduction in overnight parking	Less out-of-hours deliveries exacerbating congestion at peak times

4.15 Delivery and Servicing Plans (DSP)

A DSP gives an organisation a framework to make sure that freight vehicle activity to and from their building is working effectively. A DSP will help an organisation:

- Manage deliveries to reduce the number of trips, particularly during peak hours;
- Identify where safe and legal loading can take place; and
- Commission delivery companies who can demonstrate their commitment to best practice.

As well as benefiting an organisation, a DSP has advantages for suppliers and the local community. They can help:

- Save time and money;
- Reduce the environmental impact of an organisation;
- Improve the safety of delivery and servicing activity at a site;
- Cut congestion in the local area; and
- Ensure an organisation is reliably supplied during planned events.

When larger retail and commercial premises coordinate procurement deliveries, significant benefits can arise both in terms of delivery efficiency, cost to consumer and impact on traffic levels. These largely voluntary schemes have shown benefits based on mutual public and private sector benefit.

Given the large number of retail outlets in Aberdeen City Centre, which all require delivery and servicing arrangements to be put in place, the promotion of DSPs could have a significant positive impact on congestion and air pollution in the city.

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DSPs	
Impacts	**Risks**
Improved delivery and servicing arrangements	Plans fall into abeyance
Reduced impact on surrounding area in terms of noise, disruption	Staff unwilling to record associated information
Improved safety at depots	Lack of resources to collate information
Reduce congestion	
Improved efficiencies	
Ensure an organisation is reliably supplied during planned events	

4.16 Construction and Logistics Plans (CLPs)

Construction and Logistics Plans (CLPs) aim to reduce the impact of construction sites on the surrounding area, and the wider highway network. They set out a series of actions and associated objectives to help manage deliveries to building sites more effectively. Actions can include consolidating deliveries, scheduling deliveries to avoid peak times, identification of loading bays and use of more appropriate vehicles where feasible to reduce noise and intrusion. CLPs can be introduced by an organisation at any time, however they often help to fulfil a planning condition or form part of a transport assessment.

CLPs can benefit both operators and the local community. The advantages include:

- Reduced delivery costs and improved security;
- More reliable deliveries = less disruption to the business day;
- Time saved as unnecessary deliveries are identified;
- Less noise and intrusion; and
- Opportunity to feed into a corporate social responsibility (CSR) programme and ensure freight operators comply with health and safety legislation.

A CLP also benefits a freight operator:

- Legal loading areas mean less risk of them receiving Penalty Charge Notices;
- They can save fuel through reduced, re-timed or consolidated deliveries; and
- They can use vehicles more efficiently as greater delivery reliability will help them plan better.

It should be noted that the introduction of a CLP does not necessarily result in the desired impact if key actions are not carried out or enforced by the organisation. It is important to ensure that the CLP is fully adhered to at all stages of the construction project.

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CLPs	
Impacts	**Risks**
Reduced delivery costs and improved security	Actions may not be carried out
More reliable deliveries	Difficult to enforce
Time saved as unnecessary deliveries are identified	
Less noise and intrusion	
Opportunity to feed into a corporate social responsibility (CSR) programme	

4.17 Vehicle Fleet Accreditation Scheme

Fleet Accreditation schemes, which reward responsible operators, can result in significant benefits, mainly in vehicle safety standards and driver training. Schemes such as the Fleet Operator Recognition Scheme (FORS) (administered by Transport for London and AECOM) have proven successful in raising standards and providing a method by which operators can demonstrate to customers that they are responsible lawfully compliant operators.

The benefits of improved safety standards and driver training enhance the reputation of the freight industry, encouraging more efficient working (e.g. lower fuel consumption due to improved driver training) and fewer accidents.

However, the relatively small size of the Aberdeen area means that such a scheme may be difficult to set in motion in isolation, particularly if initial interest levels are low. It is therefore most likely that Aberdeen would benefit from a national roll-out of a scheme such as FORS.

Vehicle Fleet Accreditation Scheme	
Impacts	**Risks**
Improved standards in freight sector	Lack of funding
Better training for drivers	Difficult to self-finance
Hauliers able to evidence to customers that they are responsible operators	Can be difficult to build momentum for initiative

4.18 Anti Idling Zones

Idling, in respect to fumes and noise created, can be considered an offence under Section 80 of the Environmental Protection Act 1990. The Highway Code also states ‘If you have to stop on the roadside you MUST switch off the

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engine, headlights and fog lights'. Some Local Authorities have even introduced penalties of up to £80 for excessive vehicle idling, especially where an AQMA (Air Quality Management Area) is in place.

As well as one of the main sources of fuel wastage, engine idling also generates emissions, such as Particulate Matter (PM), which are harmful to health. Elevated levels of PM are a major concern in many areas as PM is linked with increased risk of asthma and heart disease.

Anti-Idling Zones are areas for which enforcement of idling is focused and would be subject to more regular enforcement activity. It is likely that these areas are subject to the highest levels of pollution, particularly where it can be demonstrated that HGVs are contributing to this pollution through engine idling. This is likely to be at locations such as loading bays, lorry parks and busy junctions where traffic is queuing for prolonged periods. A time limit is usually set by which the driver of a vehicle must turn off the engine whilst it is stationary.

Naturally, there are associated enforcement and administration costs, and it may be difficult to determine with confidence how long a vehicle has had its engine idling for. In addition, in locations such as lorry parks, engines are used to power on-board equipment where there is no electrical power available and engines may be used to power hydraulic equipment.

Anti Idling Zones	
Impacts	**Risks**
Improved air quality	Difficulties enforcing anti-idling zones
Reduced fuel consumption	May not be appropriate where engines are required to power on-board equipment.

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4.19 Summary

This section has aimed to detail 16 policy measures and specific implementation actions that could be undertaken to improve the efficiency, and reduce the environmental impacts of, deliveries in Aberdeen City Centre, and on the edge of the city centre. It is anticipated that a range of the options described above could be introduced, as the majority are not mutually exclusive.

These options have been selected as they are able to be introduced at a local level, with attributable impacts within the AQMA, although it is anticipated that many also potentially have wider benefits. They have been developed with a view to minimising on-street congestion, improved air quality, and potential efficiency gains for hauliers.

The next section presents the findings of the supporting survey work that has been undertaken in Aberdeen City Centre.

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5 Supporting Survey Work

5.1 Introduction

This section presents the key outcomes of surveys that were undertaken to provide a more detailed understanding of the nature of loading activity on Union Street, Market Street and at the Bon Accord/St Nicholas Trinity Centre and Union Square retail centres. A full breakdown of the findings can be found in Appendices A and B.

5.2 Union Street Loading Survey

As part of the requirement of the Union Street task, a loading survey was undertaken on Union Street between the hours of 0600 and 1900 on Tuesday 13 March 2012, with a view to establishing patterns of deliveries. For the loading survey, the Union Street area was 'zoned' to facilitate the collection of information as follows:

- King St to Broad Street;
- Broad St to Market St;
- Market St to Back Wynd;
- Back Wynd to Bridge St;
- Bridge St to Crown St;
- Crown St to Bon Accord St;
- Bon Accord St to Bon Accord Terrace;
- Bon Accord Terrace to Holburn Junction; and
- Market St (Union St to Guild St).

Figure 5.1: Union Street Area (Source: Aberdeen City Council Interactive Mapping Service)

Surveyors were positioned along each of the above sections with handheld tablet computers and where loading/unloading was observed, recorded the following information:

- Location;
- Arrival and departure time of each delivery vehicle;
- Vehicle type as per following classification (Van, OGV1 (Rigid vehicle over 7.5 tonnes), OGV2 (articulated vehicle over 7.5 tonnes));
- Any Dominant Vehicle Markings;
- Type of Delivery, as per the following classification; Small Parcels; Construction Activities; Food Retail; Non-Food Retail; Other (specify); Unknown; and
- Vehicle Registration Plate Details.

5.2.1 Key Findings – Union Street Loading Survey

Survey Element	Key Finding	Key Issues/Opportunities
Distribution of Activity	• The results show that no one area of Union Street has a significantly higher level of loading than another. • The majority of activity is undertaken in the morning between 0930 and Midday, with 48% of all vehicles recorded in the survey observed during this period.	Loading activity is distributed relatively evenly along Union Street, which means that addressing specific areas is unlikely to have a significant impact. Were loading activity to be concentrated at specific points, then a solution may look to focus on those areas.
Freight Vehicle Types	• Small vans undertake the majority of deliveries on Union Street, and accounted for 68% of all vehicles observed during the survey. • The distribution of vans across the survey area is relatively uniform, with no obvious clusters of activity compared with others. • There were more OGV1s than OGV2s observed during the survey, with only 16 of the latter vehicle type recorded.	The common use of vans as a means of delivering consignments to Union Street means that there is scope for the introduction of electric vehicles. Were delivery vehicles generally larger then it would be less likely that a low emission vehicle affording the same dimensions could be introduced. However, there are a number of electric/hybrid vans on the market that could be used to support the introduction of a Low Emission Zone.
Delivery Types	• The type of deliveries observed during the survey coincides with the observations made with respect to freight vehicle types above. Small	Small parcels form a significant proportion of all delivery types. As it is unlikely that this type of

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Survey Element	Key Finding	Key Issues/Opportunities
	parcels accounted for 39% of all delivery types. • There would appear to be some evidence of a relationship between OGV2s and "Food Retail" type deliveries.	consignment will require specialised storage and transport, there would appear to be few barriers to introducing a Transport Collaboration exercise in this respect, or potential future introduction of a cycle courier scheme.
Loading Characteristics	• It would appear that there is no obvious or set pattern apparent with respect to loading/unloading on Union Street. Most vehicles found to be loading/unloading were found to arrive and depart within a five minute timeframe on Union Street. • Vehicles in the east section of Union Street stop for slightly longer than those in the west section, but they are fewer in number. • The pattern of turnover is consistent across the survey area.	The short amount of time spent undertaking each delivery is likely to affect the ability of efforts to affect instances of excessive engine idling and effective enforcement of restrictions although most van drivers turn engines off and lock vans when making deliveries for security reasons, hence it is thought anti-idling may be less prevalent in urban streets than in certain other places.
Loading Restrictions	• The results suggest that the loading restrictions on Union Street are typically adhered to, with 90% of the vehicles observed during the survey found to be loading/unloading outwith the three designated periods (0800-0930, 1230-1430; and 1630-1800). • There is less compliance with the middle restriction period (1230-1430) than the morning and evening periods, where it was found that this accounted for 65% of the total vehicles (35 in total) observed during periods where loading was restricted.	Consideration could be given to reviewing the loading restrictions currently in place on Union Street to determine their value, particularly the middle restriction period.
Vehicle Engines	• Most vehicles accessing the city centre area (at least on the day of the survey) date from no earlier than 2007 onwards and are thus typically of EURO IV or EURO V standard.	It is encouraging that the majority of vehicles which deliver to Union Street are relatively new, with a resultant positive impact on air quality in the area. It also presents an opportunity to limit access to the most polluting vehicles without significantly affecting the ability of Union Street to receive deliveries.
Multi-Drops and Repeating Vehicles	• Most vehicles observed performing multiple drops were delivering small parcels. • Most delivery vehicles performing multiple drops were vans.	Those vehicles which most regularly deliver to Union Street are vans transporting small parcels. If the focus of a Transport Collaboration exercise were on this sector, then this sector would appear to offer optimum benefits. This also supports opportunities for cycle couriers.

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Survey Element	Key Finding	Key Issues/Opportunities
Market Street	• There is little difference in the nature of loading between Union Street and Market Street, despite stakeholders reporting that loading causing more disruption at the latter location.	It would appear that the differing highway layout has a particular impact on Market Street.

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5.3 Union Street Frontage Premises Delivery Survey

Following the Union Street Loading Survey, a further survey of frontage premises on Union Street was undertaken in May 2012 to determine delivery patterns and highlight any problems or issues experienced by local businesses.

5.3.1 Methodology

For the frontage premises delivery survey, a questionnaire was prepared to seek input from businesses in the local area in seeking to understand the pattern of freight deliveries and distribution on Union Street. The questionnaire was designed to obtain information on:

- The nature of the business completing the form;
- The location for deliveries;
- The frequency of deliveries;
- The timing of deliveries;
- Responsibility for, and factors affecting, the setting of delivery times;
- The characteristics of deliveries (vehicle type and the form goods are received in); and
- Refuse collection arrangements.

A full breakdown of the survey results can be found in Appendix A.

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5.3.2 Emerging Findings – Union Street Frontage Premises Delivery Survey

Survey element	Key Finding	Key Issues/Opportunities
Business Types	• More than half of the questionnaires were completed by retail outlets.	A concentration of similar business types can offer opportunities for a Transport Collaboration initiative delivering similar products with consistent storage requirements.
Delivery Locations	• Union Street is the primary location for deliveries. • Union Street is likely to be the preferred unloading location for deliveries given the relatively easier and more efficient access at the frontage of properties than on surrounding streets, and one-way systems • This may be despite the availability of rear accesses.	Loading directly on Union Street causes some disruption to traffic flows, alongside bus congestion at bus stops, and impact of parked cars.
Delivery Frequency	• The majority of businesses surveyed regularly receive deliveries. • Almost half of those businesses surveyed receive deliveries at least once a day.	Air quality in the area is poor, and vehicles entering the city centre contribute to overall emissions, affecting the AQMA. Any measures to reduce the number of delivery vehicles and their emissions should contribute to alleviating the extent of localised pollution.
Delivery Times	• 44% of respondents to the questionnaire stated that their deliveries, on average, take place between 0930 and Midday. This demonstrates clear parallels with the findings of the Union Street Loading Survey, which demonstrated that the majority of observed vehicles were loading or unloading when no restriction was in effect. • Delivery times for a number of businesses vary, and may not be specific to a certain time every day/week/month.	The majority of loading takes place in the morning, with loading restricted at certain times of the day. The effect of loading restrictions could be investigated to determine if any changes could improve the spread of deliveries throughout the day.

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Survey element	Key Finding	Key Issues/Opportunities
Delivery Characteristics	• Responsibility for setting delivery times typically appears to lie with the delivering haulier/courier or the premises/company, rather than Aberdeen City Council. • Businesses stated that delivery times are determined by the schedule/itinerary of the haulier/courier, and their other delivery requirements; and are bound by the restrictions on loading on Union Street. • A number of businesses also specified that deliveries must take place outwith their opening hours (i.e. to minimise disruption), or conversely within their hours of operation.	The requirement for deliveries during normal hours of operation precludes the promotion of night deliveries, however the ability of the haulier/courier to dictate when deliveries takes place enables greater control over delivery times by the freight industry.
Delivery Types	• Nearly half of the businesses surveyed reported that their deliveries are made by small vans. This is generally consistent with the findings of the Loading Survey. • As might be expected from deliveries which are predominately made by smaller vehicles such as vans, the vast majority of businesses receive their goods in boxes (i.e. hand delivered).	The common use of vans as a means of delivering consignments to Union Street means that there is scope for the introduction of electric vehicles. Were delivery vehicles generally larger then it would be less likely that a low emission vehicle affording the same dimensions could be introduced. However, there are a number of electric/hybrid vans on the market that could be used to support the introduction of a Low Emission Zone.
Refuse Collection	• The majority of frontage premises on Union Street have their refuse collected by the local authority (ACC). • There are similarities in the patterns of delivery times and refuse collection times, with Morning (between 0930 and Midday) the most common period for refuse collection. This amounted to 48% of all businesses surveyed.	Given that the majority of businesses have their refuse collected by ACC, consideration could be given to liaising with the authority to revise collections away from peak times (if it were considered to be contributing to the issue).

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5.4 Retail Centre Loading Surveys

This section presents the key outcomes of surveys of freight distribution at the principal retail centres in Aberdeen: Union Square, Bon Accord/St Nicholas; and the Trinity Centre. This task aimed to:

- Establish pattern of deliveries based on surveys at delivery entrances;
- Undertake follow-up consultation with premises, and delivery companies;
- Assess the impact of these deliveries on traffic flow;
- Undertake a review of any regulatory restrictions – planning, Environmental Health, traffic; and
- Assess possible impact of future developments – expansion of stores, changes to traffic management etc and the impact of a potential Low Emission Zone (LEZ) in the city centre.

In progressing this element of the study, surveys to examine loading patterns and characteristics at Union Square, Bon Accord/St Nicholas Shopping Centres and the Trinity Centre were undertaken in July 2012.

This section presents the key outcomes of these surveys. A full breakdown of the data is provided in Appendix B.

5.4.1 Survey Approach

Prior to the surveys being undertaken, AECOM met with the managers of each of the shopping centres to introduce the study and to obtain permission to conduct a survey of the loading bays at each centre. The following information was targeted for collection:

- Survey of arrival/departure time;
- Vehicle type as per following classification (LGV, OGV1, OGV2);
- Any Dominant Vehicle Markings;
- Type of Delivery;
- Vehicle Registration Plate Details; and
- When safe to undertake, a short interview with drivers on-site using a pre-prepared list of questions provided by AECOM, a copy of which is provided within Appendix B to this report.

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Survey element	Key Finding	Key Issues/Opportunities
Distribution of Activity	• The majority of vehicles (117) were recorded at Union Square. • The Bon Accord Centre was the next busiest retail hub, with less vehicles again recorded at the St Nicholas and Trinity Centres.	Union Square is the busiest retail hub of the retail centres surveyed. However, centre management and delivery drivers reported few problems with access for freight deliveries at this location.
Vehicle Engines	• Most observed vehicles appear to be falling within the higher Euro standards, with the majority being Euro V.	It is encouraging that the majority of vehicles which deliver to retail centres are relatively new, with a resultant positive impact on air quality in the area. It also presents an opportunity to limit access to the most polluting vehicles without significantly affecting the ability of the retail centres to receive deliveries.
Delivery Times	• 35% (89) of vehicles were observed in the morning between 0930 and Midday. There would appear to be some similarity between periods of activity in the retail centre survey and the survey undertaken on Union Street in March 2012, which showed that 48% of the vehicles observed in this survey were also recorded between 0930 and Midday.	Unlike Union Street, the retail centres do not restrict when vehicles can load and unload. Despite this, loading activity is similar to that of Union Street, where restrictions are in place. This suggests that even if the restrictions were altered on Union Street, then the pattern of deliveries is unlikely to change.
Multi-Drops and Repeating Vehicles	• A total of 77 'Repeat' vehicles (those tagged at least twice) were recorded during the survey. • Many of the 'repeat' vehicles were tagged again at the same location of Union Square. • A number of other vehicles made trips to more than one retail hub in the city centre, with vehicle drops at Bon Accord/St Nicholas and Union Square and Bon Accord/St Nicholas, Trinity Centre and Union Square typically the most common, totalling 22 of the recorded 'repeat' vehicles. • There was a relatively even split between 'repeat' vehicles tagged on the same day (42) and those tagged on more than day (35). • Vehicles performing multiple drops usually undertake these	Those vehicles which most regularly deliver to retail centres are vans transporting small parcels and supplies for food outlets. If the focus of a Transport Collaboration exercise were on these sectors, then this sector would appear to offer optimum benefits.

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Survey element	Key Finding	Key Issues/Opportunities
	tasks in Aberdeen.	
Origin/Destination Distribution	• The majority of movements (where origins and destinations were able to be recorded) are local within Aberdeen City and Aberdeenshire. • The majority of trips with an origin in Aberdeen City/Aberdeenshire also have a destination within this area. • The results also suggest that deliveries at retail centres in Aberdeen City only formed part of a trip, with a total of 30 drivers stating their trip would both start and finish at another location in Scotland.	The fact that the majority of trips have origins and destinations in the local area improves the feasibility of a Transport Collaboration exercise, as consignments can be more easily consolidated if they are not being delivered from dispersed areas.

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Capabilities on project:
Transportation

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6 Assessment of Problems and Opportunities

6.1 Introduction

This section identifies the specific problems and opportunities that have been identified from the survey work, and stakeholder discussions undertaken for the study.

6.2 Union Street

6.2.1 Impact of Loading on Traffic Flow

Loading. and unloading activity affects traffic flow when it occurs at specific locations. These were identified at the following specific locations:

- Union Street, between Holburn Junction and
- Union Street , on Union Bridge
- Market Street – particularly when near to the Union Street, and the Guild Street junctions

The current peak period restrictions on loading, aligned with bus lane operations, seeks to ensure that loading and unloading activity is undertaken outwith peak traffic periods.

6.2.2 Air Quality

Previous work has highlighted that emissions from buses and large vehicles are the biggest contributors to poor air quality, particularly when these vehicles are held up in congestion. Air quality modelling work is currently being refreshed, informed by up to date city centre traffic surveys and freight information. This work will provide further evidence of the current and future contribution to the air quality problem of specific vehicle types.

6.2.3 Loading Restrictions

Survey work has revealed an apparent inconsistency in the application of loading restriction in the central area. This is probably due to historic and incremental application of traffic regulations. The development of a city centre master-plan provides an opportunity to review some of the periods of restrictions to provide a more consistent pattern of restrictions.

6.3 Retail Centres

Interviews with centre managers revealed few problems with freight deliveries, although the following were highlighted.

6.3.1 Union Square

Overall, few problems with deliveries were identified at this location. The centre benefits from modern loading bays, each of which are adequately sized, providing 24 hour access if required. It was noted that a majority of deliveries avoided peak congestion periods on the adjacent Market Street. Many deliveries were required to be made to both loading bays at Union Square (accessed from Palmerston, the other from Market Street).

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6.3.2 Trinity Centre

Air quality can be a problem in the loading area – fumes from Denburn underpass, and adjacent train station are trapped under the shopping centre. It was also reported that drivers unfamiliar with the location of the loading bay entrance can have problems finding its location. The loading area is relatively small, although it was noted that one of the three loading bays is occupied by skips etc, suggesting that the facility is adequate for current levels of loading activity.

6.3.3 Bon Accord/St Nicholas –

Few operational problems were have been identified, although the issue of way finding was also highlighted during discussions with the centre manager, particularly for drivers unfamiliar with the city.

6.4 Opportunities

A number of opportunities are also apparent, alongside the specific range of problems.

6.4.1 Collaboration

Relatively few deliveries to retail centres and Union Street come direct from the central belt, which is recognised as the key warehousing hub for Scotland. Only the largest stores, and supermarkets, were likely to trunk direct from the central belt direct to their stores, and may make several deliveries during their trip.

The majority of retail units are serviced by small HGVs and Vans, many of which originate in units located in the Altens/Tullos areas of the city. In turn, these units would be fed by deliveries, predominantly from the central belt. This pattern highlights an existing pattern of multiple distribution centres already in place, although run on a commercial, competitive basis, and probably specialising in specific loads (eg parcels, catering supplies, fresh products for supermarkets, retail distribution, office supplies).

Consideration of consolidation opportunities in this geographic location may provide opportunities for improved business efficiency, as well as reduced transport and environmental impacts.

6.4.2 Revised City Centre Proposals

Aberdeen City Council are currently considering options planning and transport options for the city centre, many of which may be able to be realised through the construction of the AWPR, and the reduction of city centre traffic flows which may arise. Consideration of efficient freight servicing is an important element of ensuring that the city centre can be a sustainable and functional space for Aberdeen.

The following chapter considers potential options to address these problems and opportunities.

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7 Option Generation and Appraisal

7.1 Introduction

This section sets out the generation and appraisal of options which could be applied to Aberdeen, specifically the city centre (AQMA). A total of 19 measures were initially considered as having the potential to improve freight distribution in Aberdeen City Centre. The measures were classified as either those which could be led or be directly influenced by Aberdeen City Council (orange boxes in Figure 7.1) or initiatives which would most likely be delivered by the freight industry (green box in Figure 7.1).

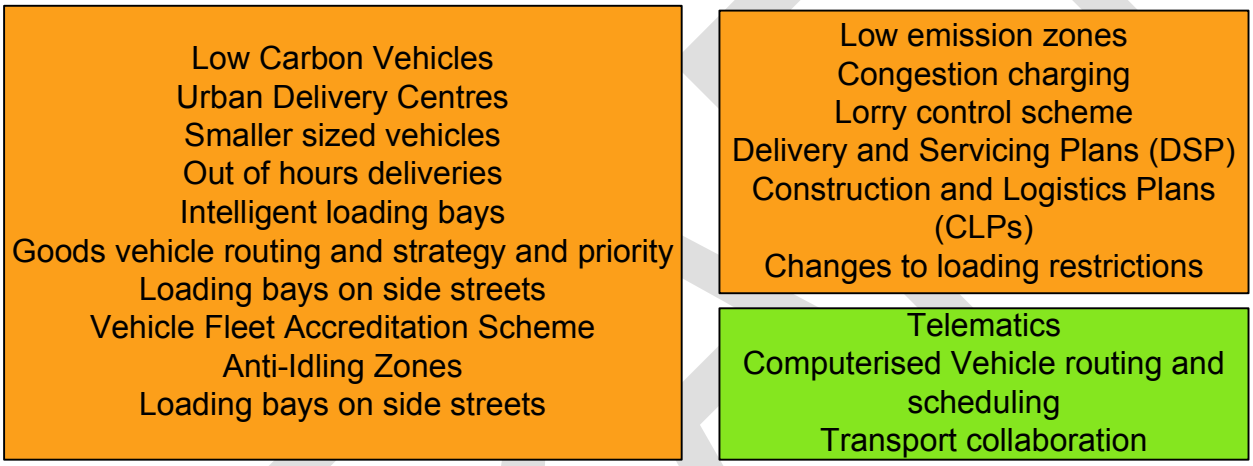

Figure 7.1: Long list of potential options

Figure 7.2 demonstrates the approach used in finessing this long list of options down to a focused set of options to be developed into specific proposals such that they may be included in future bids for Scottish Government air quality funding.

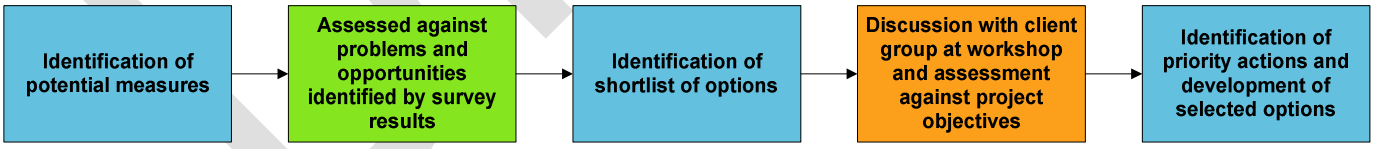

Figure 7.2: Process for prioritising and appraising options

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7.2 Assessment against Background Research and Loading Surveys

Following internal discussions, the long list of options was revised to identify a smaller number of priority actions. The survey work and background research undertaken as part of this study and previous work and communications with Aberdeen City Council and Nestrans resulted in a number of options being rejected. Table 7.1 demonstrates the rationale behind the rejection of some of the options proposed.

Option Rejected	Rationale
Promotion of smaller sized vehicles	• Significant proportion of vehicles servicing the city centre are already vans.
Promotion of out of hours deliveries	• Conflict with local residents. • Conflict with night time economy. • Difficulties in ensuring staff member is there to receive consignment.
Introduction of Intelligent loading bays	• Lack of defined loading bays in place. • Short time period spent loading – high turnover of vehicles.
Congestion Charging	• Politically difficult to introduce.
Lorry Control Scheme	• Lack of night running.
Vehicle Fleet Accreditation Scheme	- Funding difficulties. - Scant enthusisam shown amongst freigth forum at present - Oil sector already has its own scheme operating in the Aberdeen area.

Table 7.1: Rationale for rejecting long list options

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7.3 Options Discussed at Workshop

The shortlist of options was then presented at a workshop undertaken in October 2012 with Aberdeen City Council officers and individuals associated with the GreCOR project and Aberdeen City Centre management. Table 7.2 provides a summary of the discussions related to each option.

Option	Key Discussion Points
Low Emission Zone	Ongoing development of LEZ feasibility. It is noted that there has been recent clarification of DEFRA emissions forecasts which has enabled previous modelling work to recommence. Recent freight survey work and also recent city wide updating of the city centre model could also feed into this work.
Goods Vehicle Routing Strategy and Priority	The group did not feel that this option was an immediate prioirty to be taken forward. However, with a change in strategic routing antcipated following construction of the AWPR, a revised signing strategy for goods vehicles could be devloped and applied.
Delivery and Servicing and Construction and Logistics Plans	It was noted that the promotion of Delivery and Servicing Plans and Construction and Logistics Plans would place an additional burden on planners and could be difficult to enforce. However, for any large construction project undertaken in the City, and any future large city centre office development, the wider benefits could outweigh these potential disadvantages.
Low Carbon Vehicles	Options for the procurement of a low carbon vehicle could also be explored, perhaps Council operated (litter bin van) – this would be very visible, and acts as a demonstrator. Key areas for consideration would be lease cost and availability of supporting infrastructure.
Anti-Idling Zones	It was felt that a greater understanding of the degree of idling taking place should be established before progressing with extended anti-idling measures, over and above current initiatives.
Loading Bays on Side Streets	Investigation of benefit in having dedicated loading bays on some of the side streets – this would need to consider locations, relevance, potential knock-on impacts, relationship to frontagers which have / do not have alternative access. It would also have to be developed as part of a consistent approach to the restrictions.
Reviewing Loading Restriction / Bus Lane Timings	Linked to the issue above, there was some interest in further analysis on the Union Street issues, with perhaps an emerging recommendation based around the revalidation of the case for the lunch time restriction – this would be based around traffic flows; bus flows; bus PAX flows; bus delays and potential impact on loading patterns. Looking at where loading is best achieved on Union Street, or perhaps (other side of the coin) locations where it really should not be tolerated – links to TROs and enforcement. There appeared to be support for a Publicity Approach, perhaps along with a period of higher profile enforcement on Union Street.
Consolidation Centre	Consolidation opportunities – probably not a “physical centre”, but achieved through encouraging commercial collaboration.

Table 7.2 Workshop Options Disucssion Summary

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Following these discussions a series of short term and longer term actions has been developed.

Measure	Short/Longer term action	Next Steps
Review appropriateness of loading restrictions on Union Street.	Short	Undertake exercise considering whether current loading restrictions are optimum, proposing a strategic approach for the Central Area.
Investigation of benefit in having dedicated loading bays on some side streets.	Short	Undertake exercise looking at alternative locations for loading away from Union Street.
Develop understanding of anti-idling measures.	Short	Undertake exercise to determine extent of idling currently occurring on Union Street and Retail Centre loading bays.
Awareness raising and enforcement of existing loading restrictions.	Short	Undertake marketing campaign.
Options for the procurement of a low carbon vehicle could also be explored.	Short	ACC to work with relevant departments to assess feasibility of procuring electric vehicle (and associated infrastructure).
Ongoing development of LEZ feasibility.	Longer	Further develop recommendations.
Transport Collaboration.	Longer	Contact potential project partners to gauge interest. May need to develop detailed development of associated incentives first.

Proposals for the short term actions specified above are set out in the next section.

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8 Proposals for Short Term Actions

8.1 Introduction

This section sets out proposals for the short term actions that have been identified.

8.2 Publicity Campaign and Enhanced Enforcement

The survey information and stakeholder feedback demonstrated that loading can cause disruption on specific sections of Union Street and Market Street. The loading survey demonstrated that there were instances of loading during the restricted periods, particularly the early afternoon restrictions.

A short term, 'quick win' initiative aimed at reducing the extent of loading during restricted periods is that of a publicity campaign followed by enforcement action. Notices, leaflets and a press campaign could be developed to alert those servicing Union Street that an enforcement campaign is imminent and highlighting why the restrictions are so important. This could also be tied into the continued promotion of an anti-idling campaign to enhance air quality in the area.

A marketing campaign is always derived from the task objectives. Firstly the task objective should be established, in this instance a reduction in congestion and disruption on Union Street caused by loading during restricted times, and loading in inappropriate locations (eg in close vicinity to traffic signal stop lines). This should then be translated into a measurable marketing objective.

In this instance the objective could be to decrease the number of vehicles observed (or fined) loading during restricted periods b (as an example) 25%.

8.2.1 Tactics

Effective marketing need not be a costly exercise, and it is acknowledged that the budget for this initiative is likely to be constrained by the budgetary pressures affecting all local authorities. However, by employing a variety of marketing 'tactics' or selecting a single approach deemed to be particularly effective in reaching the target audience, a positive campaign can be developed.

One of the key elements of determining marketing tactics is understanding who the target audience is. In this instance, the background survey work has shown that the target audience is a) freight operators servicing Union Street, b) predominantly related to parcel delivery companies and the food and drink industry and c) van drivers.

The second element is determining how best to reach those most likely to be loading illegally. The majority of visitors to Aberdeen are unlikely to wish to park or load on Union Street or Market Street, however those who do may not necessarily originate from the city. Therefore, it is recommended that the marketing campaign is focused on those areas and users directly. This could include:

- Signs attached to street furniture immediately in the vicinity of targeted loading restrictions;
- Contact via the North East Scotland Freight Forum;
- Leaflet drop at Altens Industrial Estate;
- E-mail and telephone awareness campaign focused on observed companies;

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- Marketing material left with affected businesses for dissemination to suppliers;
- Leaflet vehicles parking in those streets in the fortnight before the new regulations start; and
- Public awareness feature article and notices in local media,

All of the above need not be costly, with minor resource and capital costs to produce and disseminate the material.

The third crucial element of the campaign is the message. It should be clear that restrictions are in place for justified reasons and delivered in a succinct, informative and eye-catching way. They could allude to the impending enforcement activity but primarily they should focus on the potential impact that loading during peak times (restricted periods) can have on:

- Congestion, and emissions;
- Bus journey times; and
- Perception of operator by general public.

8.2.2 Enforcement campaign

Following the dissemination of the material and sufficient time for operators to digest and respond has elapsed (a minimum of a month is recommended) then an enforcement campaign should be introduced to support the marketing campaign with sufficient resources allocated to ensure the majority of those contravening the Traffic Regulation Orders are addressed. This could take place over a number of days to ensure all those likely to contravene the restrictions in place observe the parking enforcement officers at work.

8.2.3 Evaluation

Following the campaign, work should be undertaken to ascertain its success. A comparison between the number of vehicles contravening the loading restrictions before and after the campaign/enforcement would indicate the level of impact it has had, and highlight any lessons for the future.

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8.3 Low Carbon Vehicle for Servicing Union Street

The promotion of a low carbon vehicle by Aberdeen City Council is likely to have a positive impact on air quality on Union Street, supporting the aims of the AQMA.

Whilst this initiative is likely to have a token impact on air quality it will serve as an example of good practice to other freight operators (and the general public) and highlight the feasibility of operating an electric/low carbon vehicle on a commercial basis in the city. Supporting infrastructure (e.g. charging points) could be utilised by other organisations wishing to use low carbon vehicles, further strengthening the business case for their deployment.

It is recommended that Aberdeen City Council considers investment in a low carbon (hydrogen/hybrid/electric) vehicle that is clearly identified as such and is able to perform regular journeys into central areas of Aberdeen. The measure should be introduced in tandem with a publicity campaign including media coverage to ensure that the venture is advertised to the general public.

When considering the type of low carbon vehicle to be introduced, thought should be given to the infrastructure required. If it not feasible or cost effective to introduce such infrastructure (e.g. hydrogen refuelling stations or charging points) then consideration could be given to more established technology, such as hybrid vehicles.

The promotion and use of low carbon and electric vehicles would support the introduction of a LEZ, as it is likely that an LEZ would provide dispensation for the least polluting vehicles.

8.3.1 Electric Vehicles

Electric vehicles use an on-board battery supply to power an electric motor for propulsion. Unlike diesel and hybrid vehicles, they rely entirely on mains electricity to charge batteries to power the motor. Current technology restricts battery charging of electric delivery vehicles to industrial three-phase supply, which makes them unsuitable for charging at a domestic property. Future designs may allow vehicles to be charged by plugging in to a conventional 240 volt socket.

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As an electric vehicle brakes energy can be passed back to the battery (known as 'regenerative braking'). This is done alongside normal service brakes. With an electric motor there is no need to change gear – the harder the driver presses the pedal the faster the motor turns, driving the vehicle forward.

Due to the high torque of an electric motor, electric delivery vehicles accelerate faster than diesel vehicles, even at maximum weight. This, combined with the removal of gear changes, ensures that operation in the urban environment is comparable and at times even better than diesel equivalents. Overnight charging of these vehicles ensures that they are ready for a full 10-hour working day. Electric vehicles being used in current delivery applications are able to achieve up to 100 miles before requiring recharge. Moving from diesel vehicles to electric vehicles requires some changes to operational practices. The key operational changes are outlined below.

- Zero Vehicle Excise Duty (VED);
- No requirement for yearly MOT, Tachograph or Operating Licence for 7.5t GVW;
- Fuel cost approximately 20% of diesel equivalent;
- Potential for reduced maintenance through fewer mechanical parts; and
- Charging.

Battery-powered electric vehicles need to be at a standstill to be charged, which means that the 'downtime' of vehicles needs to be planned into a full 24-hour day. Charging can be done overnight. Vehicle parking facilities at depots may need to be adapted, with the installation of charging equipment in order that each vehicle has a re-charging point.

Whilst previous generations of electric vehicles may not have been able to meet the needs of modern multi-drop operations, the present generation of vehicles can operate at speeds of up to 70 miles per hour and with up to a 100-mile range between charges. This means that they are ideally suited to working in an urban environment, but may not be suited to inter-urban working. The main benefits are:

- Faster acceleration in traffic;
- No gear changes — perfect for stop-start applications, fewer gear changes and clutch movements equals less stress and fatigue for drivers;
- Ideal for multi-drop use — range up to 100 miles;
- Zero emissions at point of use;
- Lower total CO_2 emissions overall – electricity from the National Grid has a cleaner make-up;
- Many components are 100% recyclable; and
- Quiet running vehicles – which may benefit operation in noise sensitive environments.

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Table 8.1 below compares electric vehicle operation with a 7.5 tonne Diesel vehicle equivalent.

	TNT Electric Vehicle	7.5 tonne Diesel Equivalent
Vehicle Excise Duty	Nil	£165 / year
Weekly Fuel Cost	£30 off-peak electricity	£150 diesel
Maximum Speed	50mph	56mph (limited)
Range	85 miles	250+ miles
Tachograph Exempt	Yes	No
Gear Changes	None	Up to 400 per day
Driver Comfort	Very quiet	Normal operation

Table 8.1: Case Study for Electric Vehicle (Source: Freight Best Practice Guide: The Benefits of Operating and Electric Vehicle in an Urban Environment.

Electric vehicles have many advantages for operating in urban environments and they are becoming a viable solution in urban areas to the problems faced by the freight transport sector, such as:

- Volatile fuel prices;
- Carbon emissions associated with operations; and
- Concerns of long term supply of fossil fuel.

The benefits of an electric vehicle can include a reduction in delivery point emissions, potentially lower fuel running costs, reduced administration, and exemption from Vehicle Excise Duty (VED). The drawbacks include the higher purchase cost of electric vehicles than their diesel counterparts, and the uncertainty over residual values of vehicles.

The design and efficiency of electric vehicles continues to improve. They have advantages and disadvantages when used as low-mileage urban delivery vehicles, but have sufficient potential to now be integrated into the fleets of some large transport operators such as TNT.

8.3.2 Hydrogen Vehicles

Hydrogen and fuel cell vehicles are those which run through a fuel cell powered by hydrogen. There are several types of fuel cells currently available. The main advantage of fuel cell vehicles are their fuel efficiency, especially if combined with regenerative braking.

Hydrogen vehicles are still some way from mass market deployment as methods for the bulk production of hydrogen power are yet to be developed. Hydrogen fuel presents itself as the ultimate green fuel, burning virtually pollution free by producing water and electricity when combined with oxygen.

Hydrogen vehicles drive in a similar manner to their conventional equivalents and can achieve a similar range. A key barrier to the use of hydrogen is the production process of the hydrogen itself, which can result in higher carbon

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dioxide emissions through production than with petrol or diesel. Furthermore, hydrogen requires large storage tanks and there is little infrastructure available to support hydrogen refuelling.

Nevertheless, hydrogen vehicles are being introduced throughout the UK. New buses powered by hydrogen fuel joined London's fleet in 2011. They are currently running on route RV1 between Covent Garden and Tower Gateway Station. In August 2012 the Scottish Government gave the green light for a pioneering clean energy hub in Scotland, including Europe's largest hydrogen bus fleet, with funding of up to £3.3 million for the EU-backed project.

The Scottish Government and Scottish Enterprise funding will enable Aberdeen City Council, supported by Aberdeen Renewable Energy Group, to start the project's first phase with an order for 10 hydrogen fuel-cell buses. There may be potential for a hydrogen public service vehicle to be introduced that could take advantage of the infrastructure provided.

8.3.3 Hybrid Electric

Hybrid electric vehicles are becoming increasingly common, with bus operators and major manufacturers such as Optare, Alexander Dennis and Volvo Wright on the bus side and Toyota on the goods side operating and producing such vehicles on a commercial scale. They run initially on battery power engaging the petrol or diesel engine when required.

Given that electric hybrids can generally only operate on the electric component on lower speeds, they are well suited for city driving and no specific infrastructure is required.

8.3.4 Natural Gas and LPG

Natural gas and LPG fuelled engines produce lower emissions than conventional fuel, particularly the particulate emissions and nitrous oxide emissions that can adversely affect local air quality. Both types of vehicle drive in a similar way to those powered by conventional fuels. However, filling stations that provide natural gas and LPG are less common, particularly for natural gas.

8.3.5 Process for determining purchase of low emission vehicle

The first stage of the process is determining which type of vehicle would be most suitable for replacement with a low emission vehicle. Consideration needs to be given to the following:

- Range of vehicles;
- Storage requirements;
- Nature of use (mileage, daily range); and
- 'Visibility' of vehicle (will it often be observed in operation and act as a promotional initiative for use of low emission vehicles?).

Once decided, the type of fuel that powers the vehicle should be determined. This should be based on the available infrastructure (e.g. charging points/hydrogen fuelling stations), the type of low carbon vehicles Aberdeen City Council would wish to promote most and the total lifecycle costs of each option.

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A business case should then be developed to ensure that the cost of running a low emission vehicle in comparison with that powered by a conventional engine are not too onerous. This should include an appreciation of the social costs of carbon emissions associated with conventional fuels.

Should the decision to introduce a low emission vehicle be reached then it is vital that the initiative is well publicised, with the vehicle livery clearly indicating that that it is low emission, and operated by the Council. The environmental and economic benefits of the vehicle should be clearly publicised on the Council website.

Naturally, the introduction of an electric vehicle would support the objectives of an AQMA and any prospective LEZ.

8.4 Review of Existing Traffic Regulation Orders on Union Street and Market Street

Commonly, bus lanes across the UK are in operation only during those times of the day where traffic volumes are at their peak. This is usually in the morning and evening 'rush hours' where traffic volumes are highest due in part to commuters travelling to work. Outside of these times general traffic is often able to use bus lanes, increasing road capacity with limited impact on bus journey times.

Union Street differs in that bus lanes (and supporting loading restrictions) are typically also in operation from 1230-1430 (i.e. in the middle of the day, outwith the typical morning and evening peak traffic periods).

However, in planning for the survey work undertaken on Union Street, an initial assessment of bus lane times and loading restrictions on Union Street, key side roads and principal approach roads revealed that there are some inconsistencies with respect to the day and time restrictions are in place on certain sections of road in this area. Noted variations on key side roads and principal approach roads in particular are shown in the table below.

Ref	Location	Restriction Period (Days)	Restriction Period (Hours)	Comment
#1	Alford Place (south side)	Monday-Friday	0830-0930 1230-1430 1630-1800	Morning restriction starts 30 minutes after restriction on north side (at the church, Ref #2A).
#2	Alford Place (north side @ No.6)	Monday-Friday	0830-0930 1230-1430 1630-1800	Morning restriction starts 30 minutes after restriction from the church-Holburn Junction (on the same side of the road, Ref #2A).
#2A	Alford Place (north side @ church)	Monday-Friday	0800-0930 1230-1430	Morning restriction starts 30 minutes earlier from the previous sign at No.6 (Ref #2).

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Ref	Location	Restriction Period (Days)	Restriction Period (Hours)	Comment
			1630-1800	
#3	Holburn Junction (east side)	Monday-Friday	0800-0930 1230-1430 1630-1800	Restriction in the middle of the day only applies on the east side of Holburn Junction.
#4	Holburn Junction (west side)	Monday-Friday	0800-0930 1630-1800	Restriction in the middle of the day is not in force on approach to Union Street from Holburn Junction.
#5	Huntly Street (west side)	Monday-Friday	0800-0930 1230-1430 1630-1800	Some consideration should be given as to the necessity of loading restrictions on Huntly Street.
#6	Bridge Street (east side)	Monday- Saturday	0800-0930 1230-1430 1630-1800	Restrictions also apply on a Saturday.
#7	Bridge Street (west side)	Monday- Saturday	0800-0930 1230-1430 1630-1800	Restrictions also apply on a Saturday.
#8	Market Street (east side)	Monday-Sunday	0800-0930 1600-1800	Market Street is the only location where restrictions apply 7 days of the week. The evening peak restriction commences at 1600, but the mid period (1230-1430) does not apply.
#9	Market Street (west side)	Monday-Sunday	0800-0930 1600-1800	Market Street is the only location where restrictions apply 7 days of the week. The evening peak restriction commences at 1600, but the mid period (1230-1430) does not apply.
#10	King Street/ Castle Street (east side)	Monday-Saturday	0730-0930 1600-1800	There is a lack of consistency between the restrictions at the merger of King St and Castle St and the adoption of restriction periods on Union Street, which commence later (0800) and include the 1230-1430 period, and only apply Monday-Friday.

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Ref	Location	Restriction Period (Days)	Restriction Period (Hours)	Comment
#11	King Street/ Castle Street (west side)	Monday-Saturday	0730-0930 1600-1800	There is a lack of consistency between the restrictions at the merger of King St and Castle St and the adoption of restriction periods on Union Street, which commence later (0800) and include the 1230-1430 period, and only apply Monday-Friday.

Considering the above, the current application of loading restrictions on the key side roads and principal approach roads to Union Street shows inconsistencies both in terms of days of enforcement, and the specific times of day that restrictions are in effect. Overally, there appears to be no clear over-riding consistent strategy being applied to the central area. In particular, it is unclear why Sunday loading restrictions only apply on Market Street, but also why the restrictions in effect are not more restrictive, given the greater sensitivity of this link to loading/unloading activity reported by stakeholders. It is also unclear why restrictions on other key routes such as Bridge Street and King Street/Castle Street extend from Monday – Saturday; when on Union Street (the principal location of loading activity) restrictions only apply between Monday and Friday.

These inconsistencies are likely to be as a result of the historical and incremental introduction of Traffic Regulation Orders and associated signage relating to loading on and around Union Street. This work highlights that there is an opportunity for a clear and consistent logic to be applied to the specification and communication of loading restrictions in the central areas of Aberdeen City Centre. There is therefore potential, within this central area, to adopt a more standardised and consistent approach to loading restrictions. Furthermore, whilst it is anticipated that there was a robust rationale for the initial introduction of an early afternoon restriction, the current suitability of these restrictions may benefit from review. An alternative approach could be to allow low carbon freight vehicles to use the bus lanes during this time.

However, it is realised that although desirable, the rationalisation of loading restrictions in the central area would require significant resource input. Benefits may only be realised as part of a wider programme of development in the future, such as that currently being explored as part of the Aberdeen City Centre Masterplan, which includes the pedestrianisation of Union Street. It is therefore recommended that standardisation of the current loading restrictions in the City Centre be explored in the future where opportunities to tie this in present themselves.

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8.5 Options for Loading Bays / Parking Restrictions

Considering the information presented above, it is possible to outline options for designated freight loading bays and parking restrictions to support efficient loading and unloading activity in Aberdeen City Centre.

Feedback from the workshop undertaken with Aberdeen City Council officers helped to confirm sensitive locations on Union Street where loading and unloading causes problems. This information, together with the findings of the loading survey and site observations, has helped to identify a list of potential loading bay and parking restriction options, which could be considered for further analysis.

Location	Option	Comment
Alford Place (north and south sides)	Removal of loading restrictions	Under this option, the current loading restrictions on the north and south sides of Alford Place, which vary in their specifications, would be removed to provide further loading opportunities for premises at the far west end of Union Street. A revised Traffic Regulation Order would be required.
Union Street, between Holburn Junction and Summer Street/ Bon Accord Terrace (north and south sides)	07.30 – 18.00 loading restriction	Under this option, loading would be prohibited throughout the day between Holburn Junction and Summer Street/Bon Accord Terrace. This would require to be formalised in a Traffic Regulation Order, which would remove the existing restrictions.
Rose Street (west side)	Provision of loading bay(s)	Under this option, the current double yellow line restriction on the west side of Rose Street between the junction with Union Street and Thistle Street would be replaced with dedicated loading areas. This would be intended to support activity displaced from Union Street between Holburn Junction and Summer Street. A new Traffic Regulation Order would be required.
Bon Accord Terrace (east side)	Provision of loading bay(s)	Under this option, the current double yellow line restriction on the east side of Bon Accord Terrace between the junction with Union Street and Justice Mill Lane would be replaced with dedicated loading areas. This would be intended to support activity displaced from Union Street between Holburn Junction and Bon Accord Terrace. A new Traffic Regulation Order would be required.

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Location	Option	Comment
Huntly Street (west side)	Removal of loading restrictions and provision of loading bay(s)	Under this option, the current loading restrictions (Monday-Friday, 0800-0930, 1230-1430 and 1630-1800) would be removed and dedicated loading areas would be provided. These would provide alternative loading arrangements from premises on the north side of Union Street between Union Row and South Silver Street for using during the periods that the Union Street loading restrictions were in operation. A revised Traffic Regulation Order would be required.
Union Street (Union Bridge)	07.30 – 18.00 Loading restriction	Under this option, loading would be prohibited during the day on Union Bridge. This would require to be formalised in a Traffic Regulation Order, which would remove the existing restrictions. As the Trinity Centre (which is accessed at street level via Union Bridge) has its own arrangements for loading, it is considered that there should be no requirement for loading and unloading to take place on the bridge for deliveries to the units in this centre. It is also understood that the other retail units on the bridge would have alternative access arrangements (at the rear) if loading was to become prohibited on the bridge itself.
Market Street between Guild Street and Shiprow/Trinity Lane (east and west sides)	7.30 – 18.00 Loading restriction	Under this option, loading would be prohibited during the day between Guild Street and Shiprow/Trinity Lane. This would require to be formalised in a Traffic Regulation Order, which would remove the existing restrictions. This would help to improve the flow of traffic on Market Street, particularly in the morning and evening peak periods, and would help to facilitate traffic flows to/from Union Square.

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Location	Option	Comment
Market Street between Union Street and Hadden Street (east side)	7.30 – 18.00 Loading restriction	Under this option, loading would be prohibited during the day between Union Street and Hadden Street, approximately 25m south of the signalised Market Street/Union Street junction. This would require to be formalised in a Traffic Regulation Order, which would remove the existing restrictions. This would help to improve the flow of traffic on Market Street, particularly in the morning and evening peak periods, and would help to facilitate traffic flows to/from Union Square.

The potential options proposed above have been designed to be complementary, and rather than remove loading locations completely, aim to present alternative solutions for how the same patterns the survey work has confirmed can continue to be met. For example, the impact of the 07.30 – 18.00 hour loading ban on Union Street between Holburn Junction and Summer Street/Bon Accord Terrace would be mitigated by removal of existing restrictions on Alford Place and alternative dedicated loading bays located on Rose Street (for loading to north side premises) and Bon Accord Terrace itself (for south side premises). A loading ban on Union Bridge should not cause particular difficulty as the majority of premises at street level already have alternative access at the rear. Finally, the impact of specific loading bans on Market Street would serve to shift any loading activity away from these junctions to the central section of the street, thereby causing little disruption to hauliers/couriers, but helping to facilitate the movement of traffic through the signalised junctions at the north end (Union Street) and the south end (Guild Street). It is recognised that this initial consideration of options would require to be further developed and validated by work which falls outwith the scope of the current commission.

It is considered, as noted above, that the options described above may only be realised as part of a wider programme of development in Aberdeen City Centre in the future.

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8.6 Summary

The table below summarises each of the short term measures, the issues addressed, their resultant potential impact and their ease of introduction.

Short Term Measure	Issues addressed	Potential Impact	Ease of introduction
Publicity campaign and enhanced enforcement	Loading during restricted periods.	Less traffic disruption at peak times and improved air quality.	No significant barriers to introduction. Funding required for promotional campaign and resource implications for enforcement, which may be offset by revenue from Penalty Charge Notices.
Low carbon vehicle for servicing Union Street	Air quality in Aberdeen City Centre.	Improved air quality and create vanguard of low carbon vehicles to support proposed LEZ. Physically demonstrates its feasibility to third parties.	Dependent on nature of low carbon vehicle (e.g. electric or hydrogen). Funding required for capital investment, revenue implications should operation not prove cost effective.
Options for loading bays / parking restrictions	Loading on Union Street one source of disruption to traffic.	Less traffic disruption at peak times and improved air quality.	Level of resource would require to be committed to aid the rationalisation of loading restrictions in the central area. Could be complicated and time consuming. Benefits may be realised as part of a wider programme of development.
Review of existing Traffic Regulation Orders (TROs) on Union Street	Uncertain rationale for early afternoon restrictions.	Potential for loading to be evenly distributed throughout the day.	Would require consultation with affected parties (e.g. bus operators) and frontage premises and revision of TRO.

Section 8 sets out recommendations for the longer term freight distribution options that have been identified.

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9 Recommendations – Long Term Actions

9.1 Introduction

This section sets out proposals for the longer term actions that have been identified.

9.2 Promotion of Collaboration Arrangements

As discussed, the construction of a dedicated consolidation centre requires significant capital investment, with high initial start up costs relating to purchase of an expansive site, construction and ongoing maintenance. There may also be a requirement placed on the developer of a consolidation centre to upgrade highway in the vicinity of a site.

Even when this capital investment is provided, the success of a consolidation centre is not guaranteed. There are significant barriers to the introduction of a successful consolidation centre and in the current economic climate it can be difficult to develop a business case supporting such an investment, which can include ongoing revenue support.

As such it is recommended that Aberdeen City Council, and its partners, encourage formal consolidation arrangements between existing freight operators which regularly deliver to Aberdeen City Centre as opposed to the construction of a bespoke consolidation centre.

Transport Collaboration is not a new phenomenon. Retailers often collaborate with their suppliers; suppliers often collaborate with manufacturers; and retailers, suppliers, and manufacturers sometimes all collaborate together. However, collaboration among competitors providing logistical solutions is very difficult and might not take place at all without support and intervention by the government.[6]

This section focuses on horizontal inter-organisational transportation collaboration. The horizontal concept is relatively new and differs from vertical collaboration in that organisations need to collaborate with their competitors.

9.2.1 How does Transport Collaboration address the issues affecting Aberdeen City Centre?

As identified in this study, poor air quality and some disruption to traffic flows caused by loading vehicles on Union Street are adversely affecting Aberdeen City Centre. Effective Transport Collaboration has the potential to help address both of these issues, as well as improving the efficiency and viability of the logistics sector.

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[6] Transportation Collaboration: Partner Selection Criteria and Inter-Organizational System (IOS) Design Issues for Supporting Trust

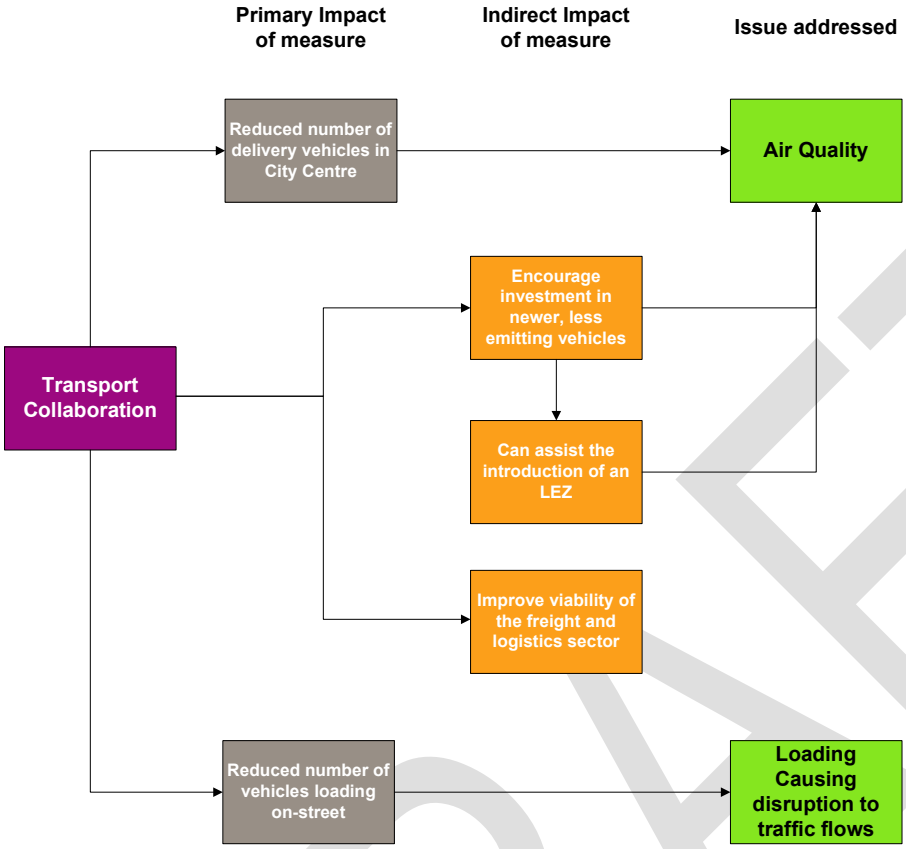

Figure 9.1: Transport Collaboration issue-solution link

Figure 9.1 demonstrates that Transport Collaboration, if successful, can directly address the key issues identified in this study, in addition to delivering other benefits to the wider area and logistics sector.

Transport Collaboration can reduce empty running, reduce the number of vehicles required for delivering goods and consolidate the number of deliveries required to a particular premises or area.

This improves the viability of the logistics sector by reducing fuel, labour, required fleet sizes and vehicle maintenance costs. The social benefits of Transport Collaboration is that those reduced journeys mean reduced traffic flows, congestion, consolidated loading practices, improved air quality from reduced emissions and less idling whilst loading.

The introduction of an effective collaboration arrangement could also support investment in newer, less emitting vehicles with economies of scale brought to bear on procurement of new vans/HGVs. Transport Collaboration could also support and be supported by the introduction of an LEZ as those organisations involved could get preferential rates/dispensation for entering an LEZ, further strengthening the business case for the initiative.

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9.2.2 How could Transport Collaboration be introduced for Aberdeen?

The survey work that has been undertaken as part of this study identified the freight and logistics operators whose vehicles visit Aberdeen City Centre, either on Union Street or the retail centres.

It is anticipated that in order for the issues affecting Aberdeen City Centre to most effectively be addressed, those organisations whose vehicles access Aberdeen most regularly should be initially approached to assess their willingness to be part of a Transport Collaboration venture.

The most regularly observed operators serving shops and offices across the survey were as follows:

- Fedex (Parcel);
- Stewart Transport (General);
- PHS Washrooms (Retail);
- Tufnells Parcel Express (Parcel);
- Menzies Distribution (General);
- Robert Wiseman Dairies (Food);
- UPS (Parcel);
- City Link (Parcel);
- Press and Journal (Newspaper);
- Walkers Crisps (Food) – assumed to be a local food distributor;
- Interlink Express (Parcel); and
- ACC Vehicles (Municipal).

It is noted that there are a high frequency of parcels operations, and food operations

Local authorities can play a significant role in encouraging the creation of a Transport Collaboration enterprise. Indeed, without public sector support and encouragement, it is unlikely that collaboration will occur, given the reluctance of competitors to work together.

The first and most pivotal action is to identify organisations that would be interested in embarking on a Transport Collaboration arrangement. As discussed, this should incorporate the organisations that most regularly deliver to Aberdeen City Centre. Once identified, the benefits of embarking on such an endeavour should be clearly communicated to potential partners.

As the construction of a bespoke consolidation centre is not considered feasible, the collaboration arrangement would need to be coordinated from existing warehousing and distribution centres. This could be a relatively low cost endeavour, with initial start up costs amounting to no more than the time required to set up the arrangement, secure agreements and administer and review its progress.

One of the main reasons for inefficient urban deliveries, characterised by low load factors, a low number of deliveries on delivery tours and long dwell times, is that operators and their customers are not sufficiently incentivised to increase efficiency through transport pricing mechanisms.7

[7] Study on Urban Freight Transport – Final Report, MDS Transmodal (2012)

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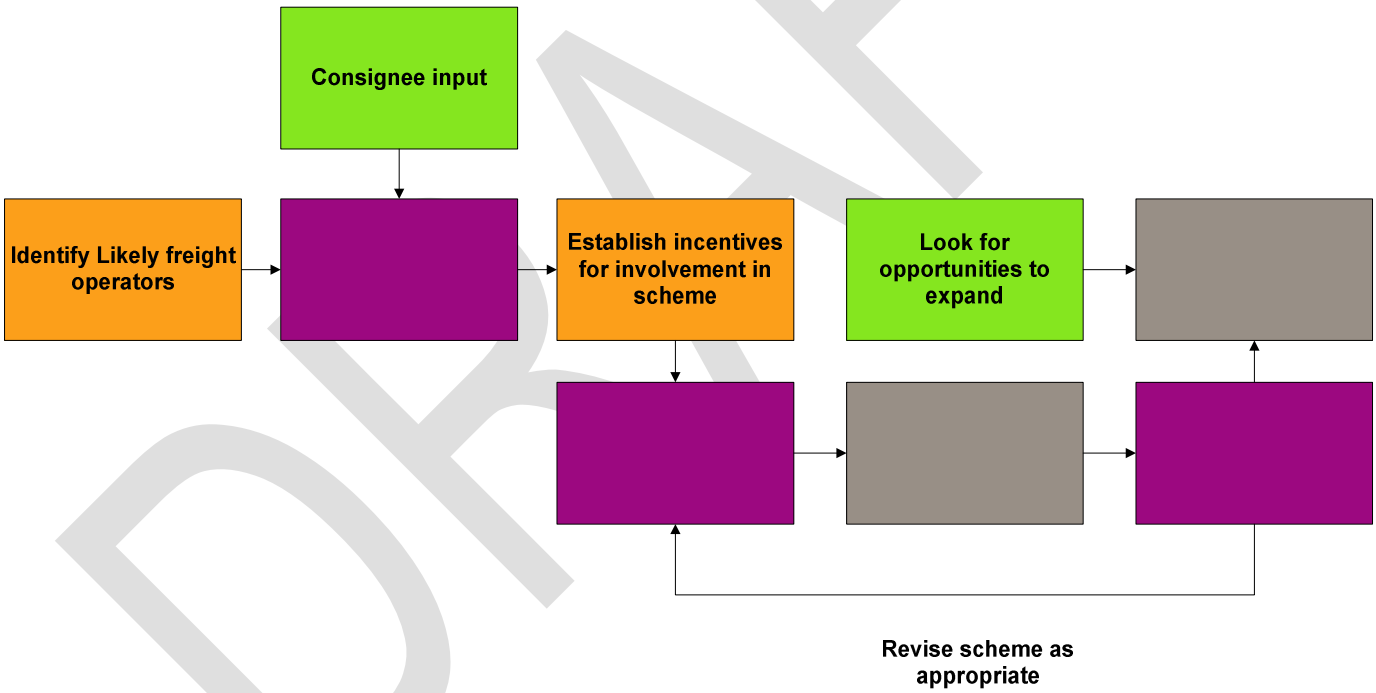
Therefore, if the direct savings costs to each organisation involved in the Transport Collaboration endeavour cannot persuade companies to sign-up to the initiative, then further incentives could be considered. These may include:

- Tying associated companies into an LEZ initiative, including offering preferential rates related to associated tariffs;
- Working with project partners to provide low emission vehicles (e.g. free charge points if Transport Collaboration provides electric vehicles, subsidised purchase costs);
- Permitting associated vehicles to utilise bus lanes, or affording delivery vehicle priority on sections of the highway network;
- Revising loading restrictions for TC associated vehicles; and
- Benefit of being in scheme could be an allocation of loading bays.



Once the partner organisations have been agreed, incentives for participation have been arranged and methods for delivering incentives have been developed, then it will be necessary to finalise arrangements and formalise the scheme contractually, supported by ACC. Clearly defined contractual arrangements will provide comfort to project partners and engender a culture of trust amongst all those involved (Note: contractual arrangements must take care not to contravene competition rules).

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It is recommended that an initial trial of the Transport Collaboration should be for a period of six months, with a break point at three months at which point a decision should be taken to revise, wind down or progress with the initiative. Should the scheme be progressed then opportunities to expand should be continuously assessed. A successful scheme may strengthen the business case for the development of a consolidation centre.

9.2.3 What are the Pitfalls?

There are significant barriers to introducing a collaborative transport arrangement amongst organisations that are often direct competitors.

Confidentiality and security requirements are primary concerns for companies considering whether to collaborate with their competitive rivals. Indeed, the natural mistrust that exists between rival business enterprises makes collaboration a difficult proposition to many companies, especially in view of the mistrust that already exists within a company's own supply chain because of the lack of transparency of cost savings.

Consequently, Transport Collaboration when feasible rarely involves the whole supply chain and is confined mostly to those portions of the supply chain where sufficient control and transparency is possible. If freight is already consolidated at a company level there may be limited scope for collaboration with other organisations.

There is also the potential to create monopolies and kill competition with potential attendant legal issues. Any measures to deliver collaborative working should ensure it does not contravene UK and European competition laws.

Existing commitments by customers and retailers can limit the effectiveness of collaborative working. Particular requirements such as delivery times, required vehicle specifications (e.g. refrigerated) or consignment security considerations may also preclude certain operations from contributing to a Transport Collaboration scheme.

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9.3 Low Emission Zone

As discussed, Aberdeen City Council has a long term aspiration to introduce an LEZ to address the poor air quality present in parts of the city.

A significant amount of work has already been undertaken to determine the extent of the poor air quality in the city, the source of the poor air quality and methods for alleviating the issue. An LEZ would address the affected area, whilst being complimentary to both the AQMA and the Aberdeen Western Peripheral Route. This finding has been corroborated by the background work previously undertaken.

An LEZ is unlikely to be an initiative that affects only freight and therefore further development of this recommendation will be progressed under different work streams, following on from modelling work that is being commissioned.

However, it is apparent that the introduction of an LEZ may have a direct impact on the movement of freight through Aberdeen and operators, suppliers and those receiving goods and services are likely to be affected. Accordingly, scheme development and design needs to be informed both by the air quality requirements, but also considering deliverability, and effectiveness.

9.3.1 Improve Emissions Associated with Freight

Freight vehicles are often amongst the largest and most polluting vehicles on the roads. Any measures to encourage lower emission vehicles could have a significant effect on the type of vehicles travelling within an LEZ. The most likely effect is that national operators would re-allocate their fleet and send Euro 4 and 5 engine vehicles to Aberdeen, assuming these would not be affected by the LEZ scheme.

9.3.2 Improve Efficiencies Associated with Freight Movements through the City

In addition, freight operators may look to consolidate loads to a greater extent to avoid incurring charges associated with freight movements within the LEZ. This could promote Transport Collaboration initiatives or even enhance the business case for a Consolidation Centre. Operators may also revisit (on an individual basis) delivery schedules to reduce the number of trips required into an LEZ, enhancing the efficiency of the supply chain process. This would have the benefit of improving the efficiency of transport operations, reducing emissions in the affected area, reducing congestion and alleviating the issues caused by loading and unloading on-street.

9.3.3 Less Congestion

An LEZ may reduce overall traffic levels, improving journey times for deliveries, improving the efficiency of the supply chain and ensuring more consistent delivery times. A reduced number of vehicles may also mean that the

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impacts of loading and unloading on-street are lessened. However, the precise impact on congestion may be relatively slight.

9.3.4 Introduction of Infrastructure Associated with Low Emission Vehicles

The introduction of an LEZ is likely to encourage a variety of different types of city centre users to switch to less emitting vehicles. A number of these may look to use hydrogen or, more likely, electric vehicles, which are unlikely to be affected by an LEZ. This in turn will bolster the case for the introduction of associated infrastructure such as electric charging points.

The greater the prevalence of infrastructure associated with low emission vehicles, the more likely the freight industry will respond to the facilities on offer. Accessible, well spaced charging stations would reduce some of the range anxiety associated with electric vehicles and encourage their uptake.

9.3.5 Vehicle Routing

An LEZ may have the impact of encouraging through traffic to use the AWPR, including freight traffic, reducing congestion and improving air quality in the worst affected areas. However, it is unlikely that freight movements travelling to and from Aberdeen Harbour will be able to avoid it.

It is important that an LEZ does not constrain economic growth and affect the prosperity of Aberdeen City Centre. The free movement of freight and the ability of businesses and organisations within the city to be adequately served by those delivering and serving their buildings is essential. It is therefore vital that the impact on freight is considered when introducing an LEZ, both positively and negatively.

9.4 Summary

In summary, a range of short term and longer term actions for frieght distribution in Aberdeen City Centre have been developed. The next section provides conclusions and sets out the next steps.

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10 Conclusion and Next Steps

10.1 Introduction

AECOM, on behalf of Aberdeen City Council and Nestrans, was commissioned to undertake a study to consider how freight distribution within Aberdeen's Air Quality Management Area (AQMA) could be made more efficient, reducing associated air quality and carbon emissions. This work forms part of the Aberdeen City Council/Nestrans/Robert Gordon University CARE North Project and is required to be co-ordinated with other freight development work being undertaken by Nestrans, as well as the Aberdeenshire/Nestrans/EU supported GreCOR multi-modal freight development project.

It has focussed on:

- Reviewing current loading policy and practice, and possible future developments within Aberdeen City Centre to inform the study recommendations;
- Loading and frontage surveys undertaken on Union Street and the main retail centres in Aberdeen to establish delivery patterns; and
- Appraisal and development of options related to improving freight distribution in Aberdeen City Centre.

10.2 Conclusion

This study has been able to develop a detailed understanding of the nature of freight deliveries to Aberdeen City Centre and the pattern of deliveries, associated load types and sectors. Consultation with businesses and key stakeholders has lead to an understanding of the key factors that influence freight activity in Aberdeen, including business need, haulier requirements and external factors such as loading restrictions.

From this, the principal problems and opportunities arising from the pattern of deliveries has been identified, particularly the issue of loading on Union Street and Market Street causing disruption to traffic flows. In addition, the report has described the sectors and vehicle types that should be targeted to ensure any proposed initiatives are focused on areas which will deliver optimum benefits relating to reducing congestion and carbon emissions and improving air quality.

A range of policy measures and specific implementation actions has been proposed that could be undertaken to improve the efficiency, and reduce the environmental impacts of deliveries in the city centre, and the edge of the city centre. Specific proposals have been developed such that they may be included in future bids for Scottish Government air quality funding.

This report has aimed to provide a clear narrative and demonstrate strong links between the issues identified in both the surveys and consultation exercise and the proposed initiatives, whilst being mindful of the proposals and existing schemes that could be supported. In summary the list of short and long term actions recommended for further consideration are focused on addressing the issues present in Aberdeen, whilst being realistic, deliverable and demonstrating synergies with existing initiatives.

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10.3 Next Steps

The recommended actions all have associated cost implications, be they resource or capital costs. The next stage is to further develop an action plan for each, with associated budget requirements, projected timescales and tangible objectives and targets.

From this, a robust funding application to the Scottish Government for a Local Authority Air Quality Grant can be made in order to progress the recommended actions.

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Appendices

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Appendix A – Union Street Loading and Frontage Survey

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Appendix A – Union Street Loading and Frontage Survey

Introduction

AECOM, on behalf of Aberdeen City Council and Nestrans, has been commissioned to undertake a study to consider how freight distribution within Aberdeen's Air Quality Management Area (AQMA) could be made more efficient, reducing associated air quality and carbon emissions. This work forms part of the Aberdeen City Council and Nestrans CARE North Project, which is funded by the European Union.

This File Note presents the key outcomes of **Task 3** in the client brief relating to freight distribution on **Union Street** in Aberdeen City Centre. This task aims to:

- Establish pattern of deliveries based on survey results, and previous questionnaire responses (collected by Aberdeen City Council in 2006/2007);
- Undertake possible follow-up consultation with premises, and delivery companies, to understand key factors determining the observed pattern of deliveries;
- Assess the impact of these deliveries on traffic flow, bus congestion; and
- Assess possible impact of future developments, including city centre Masterplan proposals, pedestrianisation, possible future changes to the nature of Union Street area and the impact of a potential Low Emission Zone (LEZ) in the city centre.

In progressing this element of the study, two principal tasks have been undertaken. These are:

- A survey to examine **loading patterns and characteristics** on Union Street; and
- A further survey of **frontage premises** on Union Street to determine delivery patterns and highlight any problems or issues experienced by local businesses.

This file note presents the key outcomes of these surveys.

Union Street Loading Survey

As part of the requirement of the Union Street task, a loading survey was undertaken on Union Street between the hours of 0600 and 1900 on Tuesday 13 March 2012, with a view to establishing patterns of deliveries.

Methodology

For the loading survey, the Union Street area was 'zoned' as follows to facilitate the collection of information as follows:

- King St to Broad Street;
- Broad St to Market St;
- Market St to Back Wynd;
- Back Wynd to Bridge St;
- Bridge St to Crown St;
- Crown St to Bon Accord St;
- Bon Accord St to Bon Accord Terrace;
- Bon Accord Terrace to Holburn Junction; and
- Market St (Union St to Guild St).

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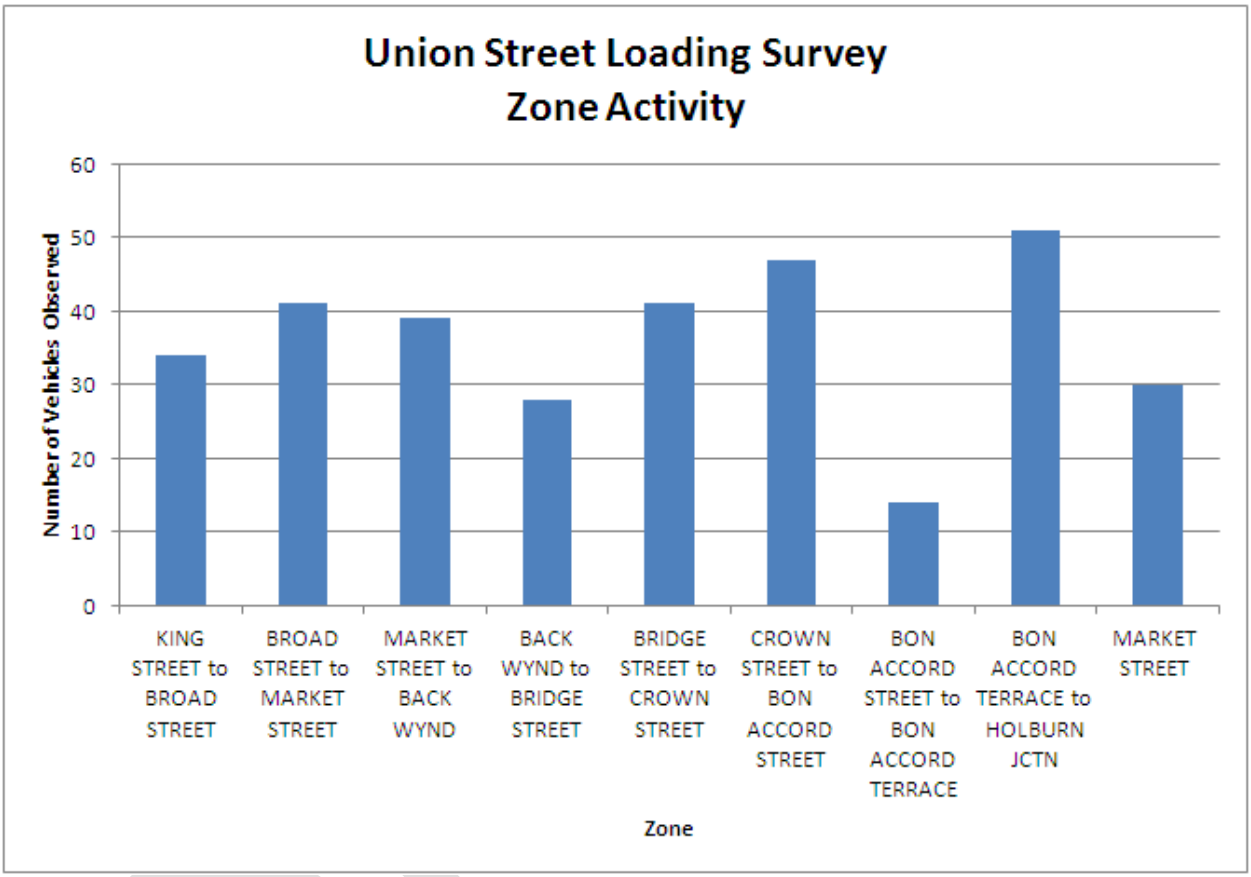
Surveyors were positioned along each of the above sections with handheld tablet computers and where loading/unloading was observed, recorded the following information:

- Location;
- Arrival and departure time of each delivery vehicle;
- Vehicle type as per following classification (Van, OGV1, OGV2);
- Any Dominant Vehicle Markings;
- Type of Delivery, as per the following classification; Small Parcels; Construction Activities; Food Retail; Non-Food Retail; Other (specify); Unknown; and
- Vehicle Registration Plate Details.

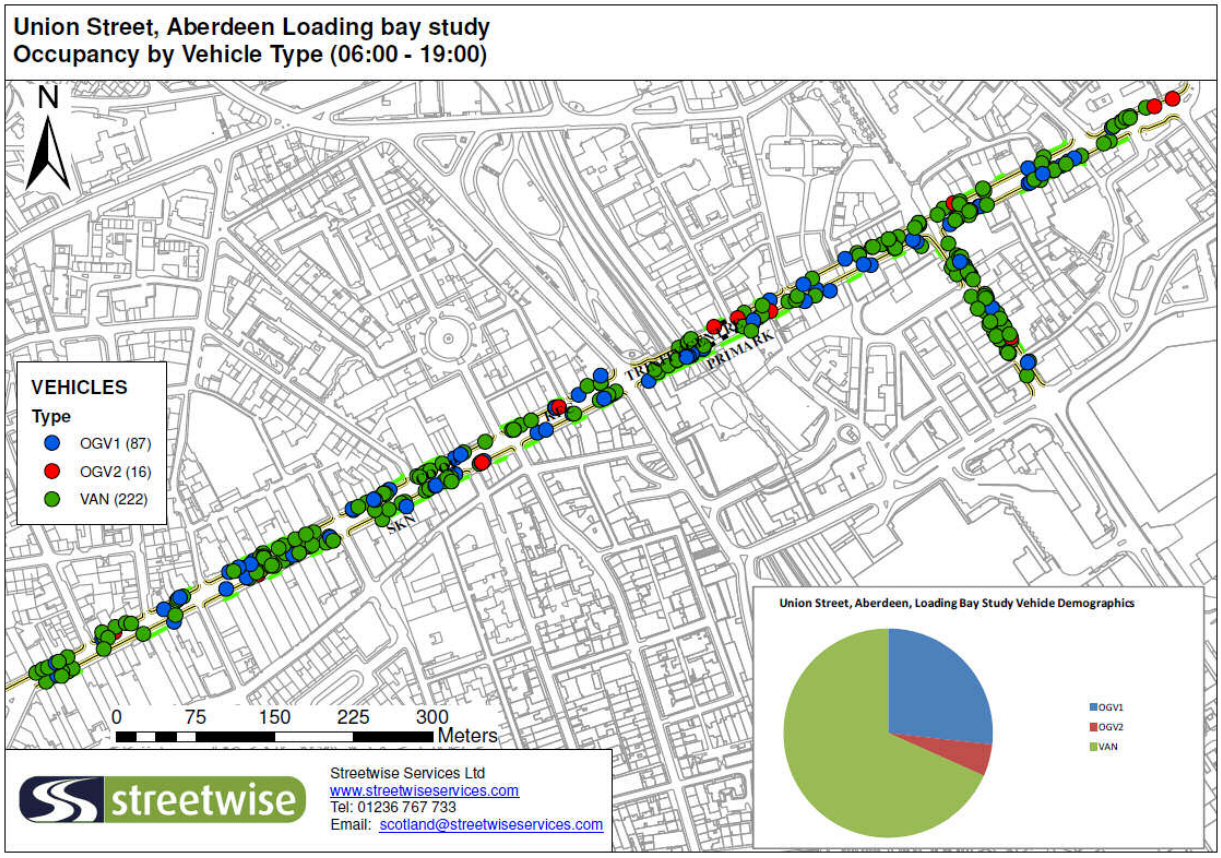
Results

Over the course of the loading survey, a total of 325 vehicles were observed. As the graph below highlights, there was a general spread of activity across the Union Street area, although a higher number of vehicles (47) was observed between Crown Street and Bon Accord Street, with only 14 observed between Bon Accord Street and Bon Accord Terrace. It is, however, noted that in the case of the latter, this section is shorter than some of the other sections that were surveyed.



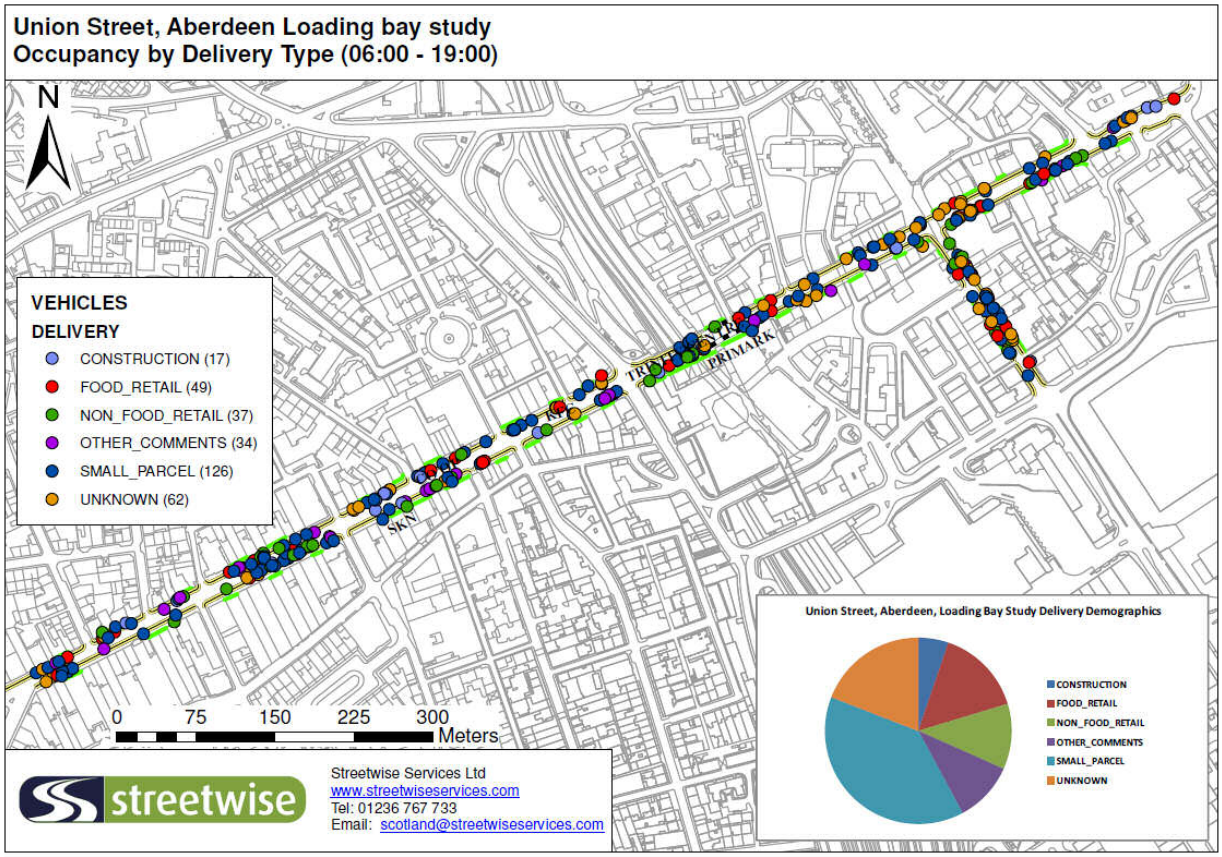
Occupancy by Vehicle Type and Delivery Type

The figure below shows the distribution of different **vehicle types** (according to the pre-defined classifications) that were identified over the course of the survey.



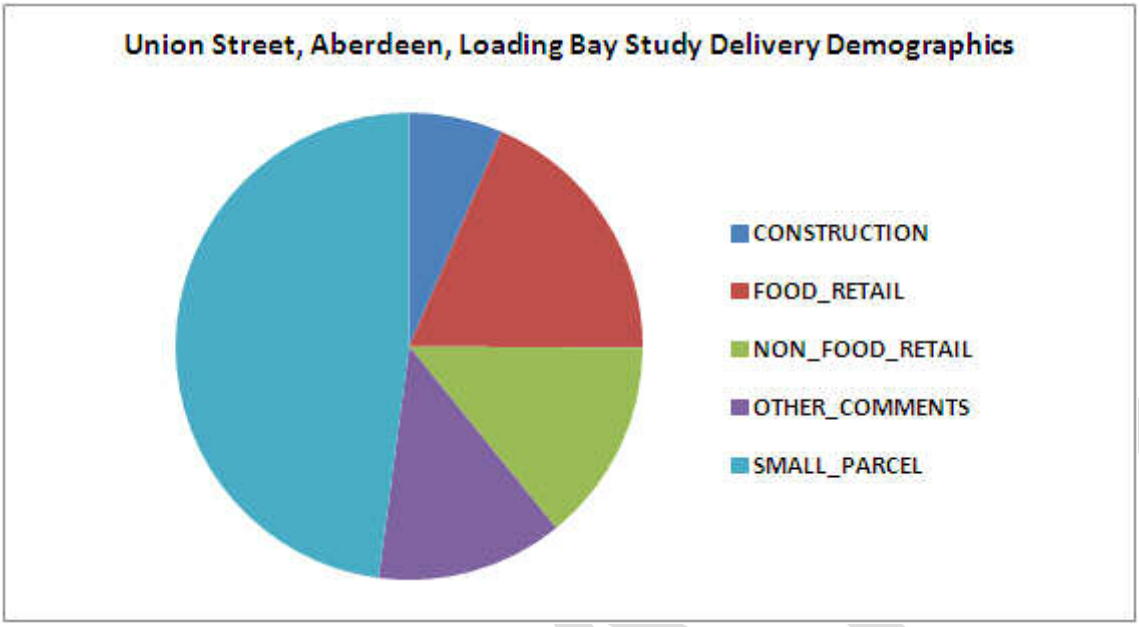
Overall, the majority of vehicles observed loading/unloading on Union Street were vans (222, or 68% of the 325 vehicles). The distribution of vans across the survey area is relatively uniform, with no obvious clusters of activity compared with others. The same can be said for both OGV1s and OGV2s, although the numbers of these larger vehicle types are considerably lower. Further anecdotal feedback from the survey team noted the extent of smaller vehicle (van) observations.

As noted in the methodology above, the survey team also recorded the **type of delivery** that observed vehicles were making.



As the figure demonstrates, small parcels were the most frequently observed delivery type on Union Street, accounting for 126 (39%) of all delivery types. However, half as many as this were unknown (62 or 19%).

If ‘Unknown’ delivery types are removed from the analysis, the extent of small parcels as the main delivery type becomes even more apparent (increasing to a 48% share of all confirmed delivery types).



It is perhaps unsurprising that the majority of deliveries involved a small parcel given that most of the vehicles observed were small vans, and it would be expected that bigger loads would be moved by a larger freight vehicle (such as an OGV2). This is perhaps strengthened when noting that of the 16 OGV2s observed, nine were confirmed as ‘Food_Retail’, where it can be asserted that these vehicles are serving the various “mini” supermarket stores located on Union Street such as the Cooperative and Sainsbury’s.

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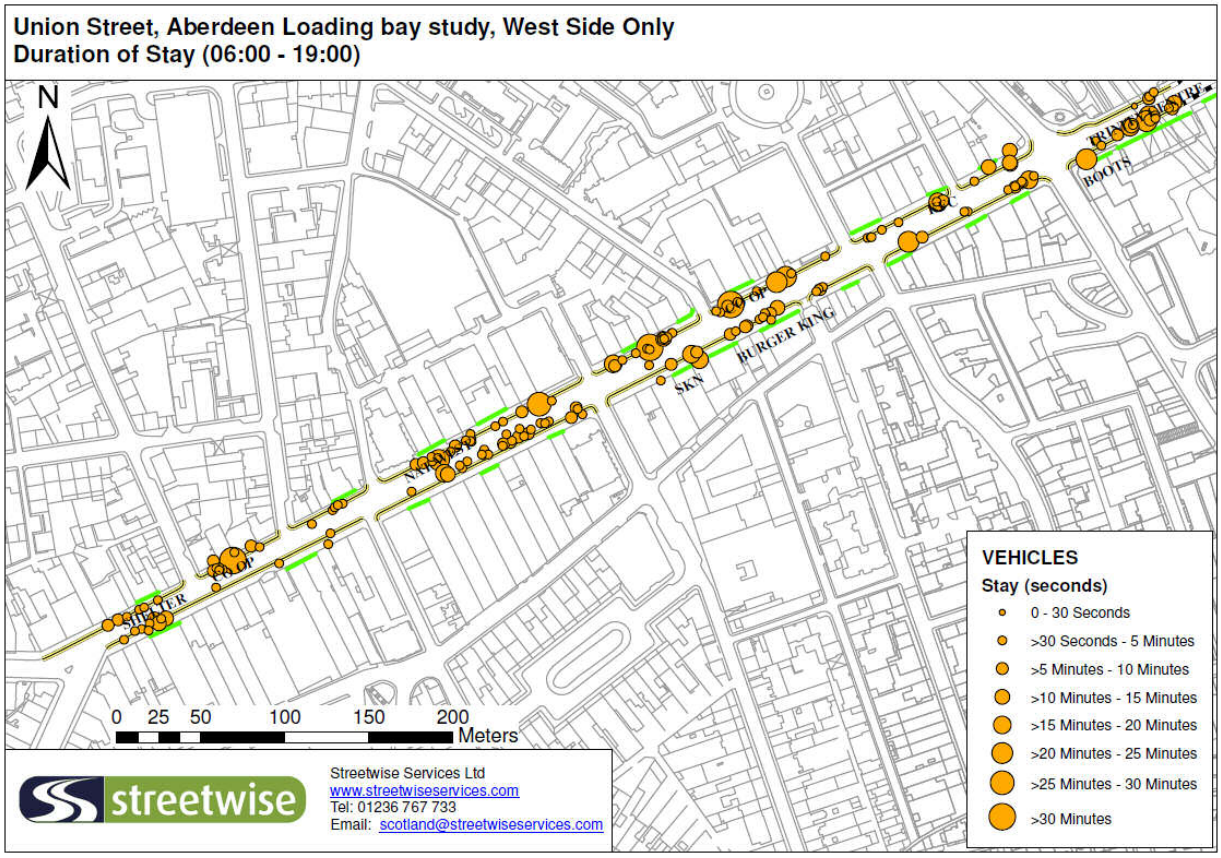
Parking Duration (West Side)

The figure below shows the locations of loading vehicles on the **west** side of Union Street, and the duration of stay of these vehicles (in seconds/minutes).



It is clear from the above that the majority of the vehicles observed along this section of Union Street load/unload and depart within a five minute timeframe. A smaller number of vehicles were observed staying for a longer period, but this appears to be geographically dispersed and not particularly confined to a specific area which may have indicated an issue.

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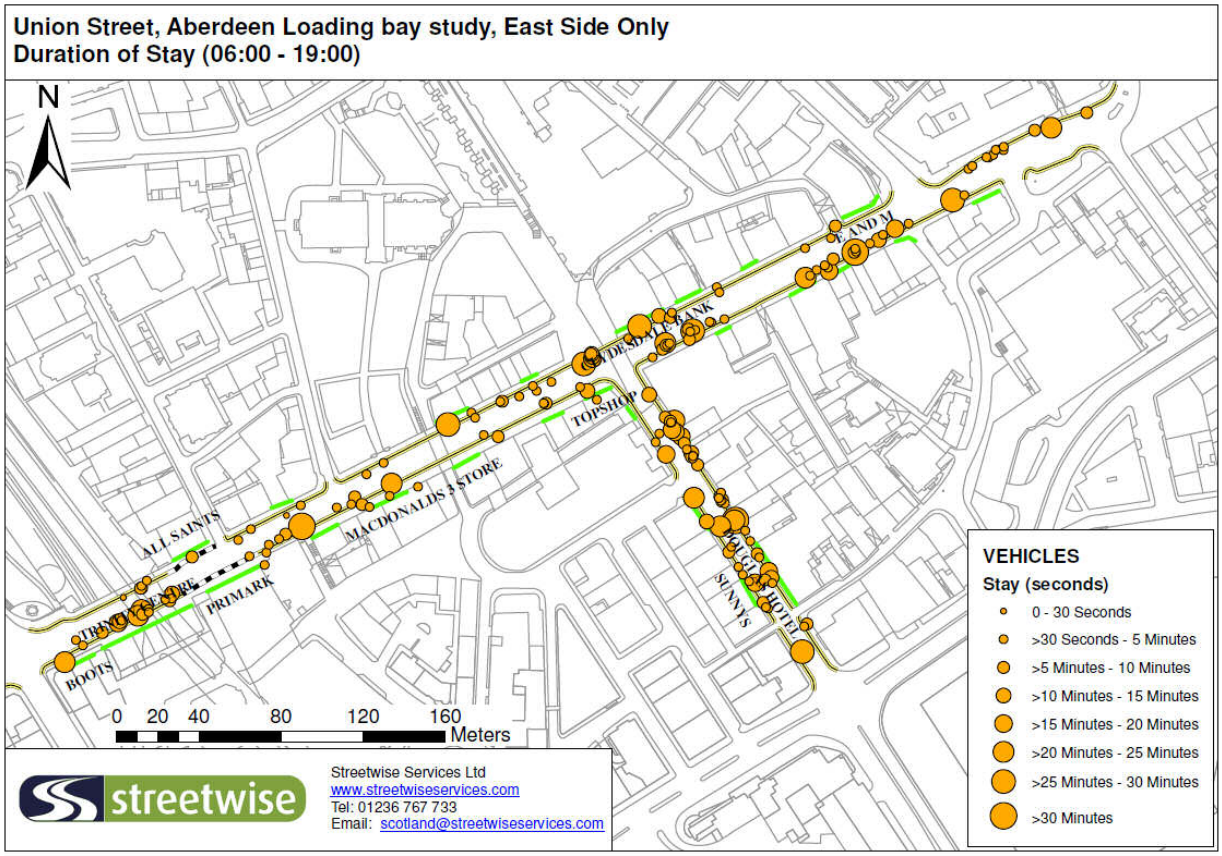
Parking Duration (East Side)

The figure below shows the locations of loading vehicles on the **east** side of Union Street, and the duration of stay of these vehicles (in seconds/minutes).

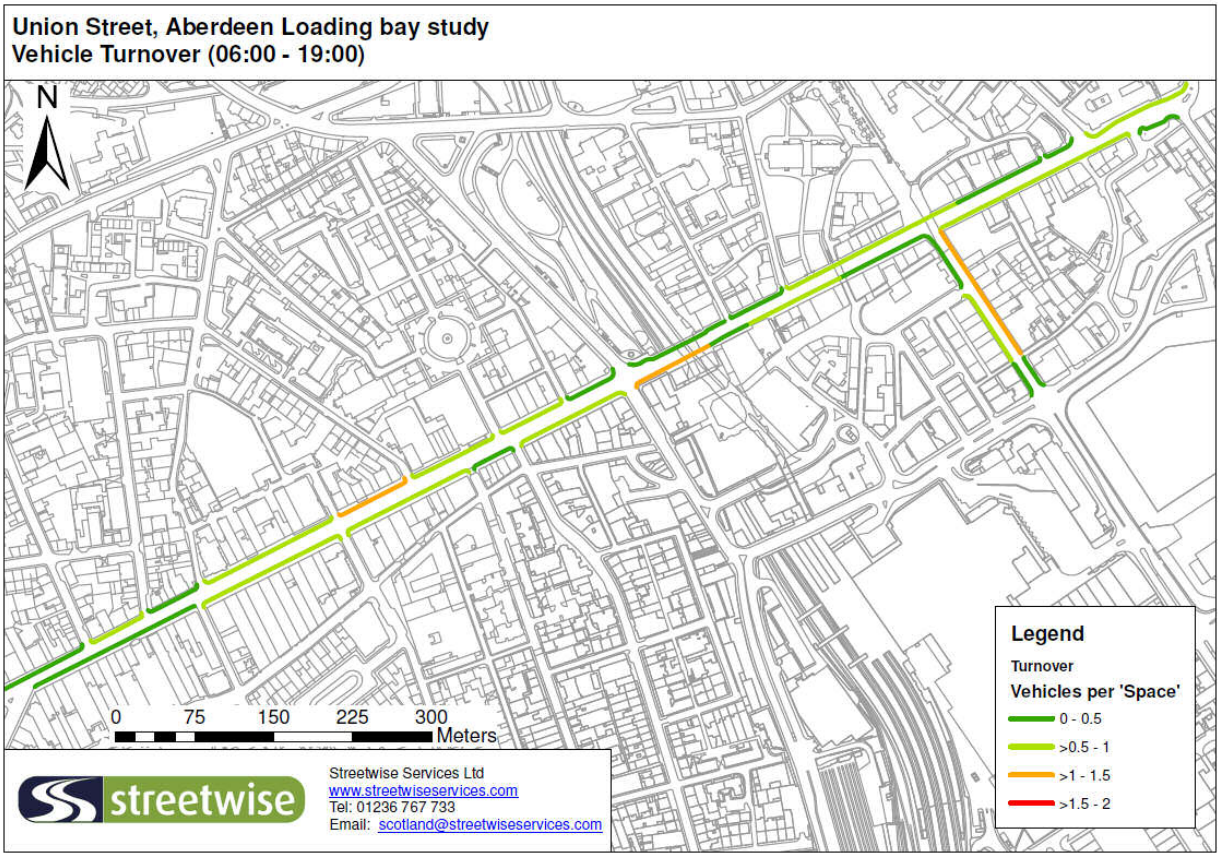


As was observed on the west section of Union Street, it appears that the majority of the vehicles observed load/unload and depart within a five minute timeframe. While again vehicles staying longer were typically geographically dispersed, the length of the longest stays in the east section appears to exceed those in the west section, with a number stopping for between 20 and 30 minutes.

Although the proportion of very short stays to longer stays is high on Union Street, the split between shorter and longer stays on Market Street was shown to be more balanced, suggesting that vehicles are loading/unloading for a longer time at this location. This could be attributed to a number of reasons, including the loading restrictions in operation on Union Street and the practicalities of vehicles stopping in bus lanes, etc.

Turnover

The figure below shows the turnover of loading vehicles on Union Street across the survey period.



As the figure demonstrates, there is a relatively consistent pattern of turnover across the survey area. Turnover is slightly higher on the east side of Market Street, on the stretch of Union Bridge between Boots and Waterstones, and on Union Street between Union Row and Huntly Street.

Currently, loading restrictions operate on Union Street at the following times:

- 0800-0930;
- 1230-1430; and
- 1630-1800.

For each of the observed loadings, both arrival and departure times were analysed to determine whether any fell within these periods of restriction.

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As the chart above shows, 89% (264) of the 295 observed vehicles on Union Street were not loading or unloading either completely, or partially, within one of the loading restriction periods that are in effect on Union Street.

Further interrogation of the Loading Survey data has also been undertaken to assess the distribution of observed vehicles across the day within the defined restriction periods.

*arrival time (4 vehicles arrived before restriction came into force)

As the above chart shows, the 1230-1430 restriction experiences the highest level of loading by delivery vehicles observed by the survey, with 65% of the total observed loading during restriction periods observed during this time.

The table below shows that the majority of vehicles that contravened the loading restrictions arrived whilst the restriction was in place and left before it ended. Only 5 vehicles observed contravening loading restrictions overlapped between those times loading was restricted and those times loading was permitted. This is due in part to the relatively short time spent loading by each vehicle (often under 5 minutes), which meant that the majority of vehicles do not inadvertently stay long enough for restrictions to come into effect whilst they are on Union Street.

When vehicle arrived/left	No of vehicles
Arrived before restriction and left whilst restriction in force	4
Arrived during restriction and left whilst restriction still in force	30
Arrived during restriction and left after restriction had ended	1

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*Union Street only

As the chart above shows, 54% (159) of vehicles were observed between 0930 and 1230. Referring to the analysis above, it can therefore be deduced that almost half of the vehicles observed load/unload when there are no morning restrictions in place on Union Street. There were also 68 loadings between 0600 and 0800, falling to 7 between 0800 and 0930, as the early morning peak restriction is applied. In the afternoon, the total number of observed vehicles is much lower than in the morning, with very little activity observed after 1630 when the afternoon peak loading restriction is in effect (with only 4 vehicles observed up to 1800).

This pattern of activity has been analysed further with respect to the number of vehicles arriving on Union Street per hour between 0600-0700, and so on, until 1900.

*Not Market Street

As demonstrated earlier, the majority of observed vehicles are stopping in the morning period between 0930 and Midday (i.e. outwith a formal restriction period, which comes into effect at 1230). The chart above shows that the majority of activity within this period is clustered between 1000 and 1200.

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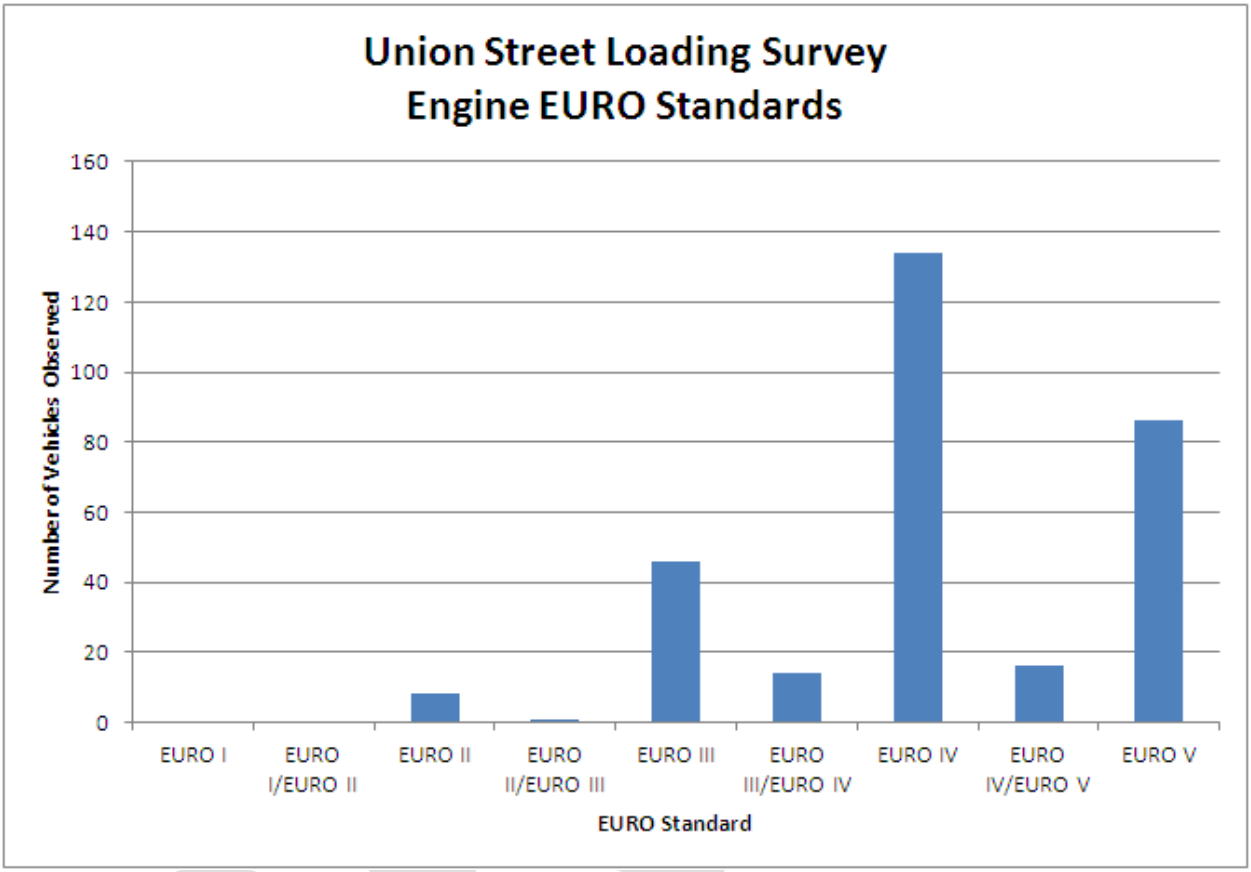
EURO Standard of Observed Vehicles

The loading survey also captured vehicle registration details, which have been analysed to determine the EURO emission standard of the engines of the observed vehicles. In total, it was possible to determine the standard of 305 of the 325 vehicles observed. The remaining 20 vehicles were classed as 'Unknown', typically due to the presence of personalised registration plates or rarer instances where it was not possible to capture this information.



Overall, an overwhelming majority (236 of 305 vehicles observed where it was possible to determine their EURO standard) were at least EURO IV. This suggests that most of the vehicles accessing the city centre area (at least on the day of the survey) date from no earlier than 2007 onwards.

Market Street

Feedback from the workshop undertaken at Aberdeen City Council offices suggested that issues caused by loading vehicles on Market Street were more severe than those experienced on Union Street. Further investigation was undertaken relating to the data collected on Market Street to determine what factors may be causing this disruption.

The graphs below demonstrate that there is little difference in the type of vehicles, nature of loading and length of time vehicles spent loading on both Market Street and Union Street.

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In addition, the table below demonstrates that the intensity of use is less on Market Street (within the survey area) than on Union Street, with more vehicles loading per metre on Union Street than Market Street.

Street	Loading vehicles per metre of kerbside
Union Street	0.24
Market Street	0.17

Therefore the issues experienced on Market Street cannot be attributed to the nature of loading activity alone, as is more likely to be as a result of the differing highway conditions. There are no bus lanes in place on the section of Market Street in the survey area and although wide, traffic is often restricted to a single lane in either a northbound or southbound direction.

In addition, traffic backs up from the junction with Union Street towards Union Square at peak times, whilst the pedestrian crossing introduced to improve access to Union Square also requires traffic to wait when required.

The difference in the layout of the carriageway on Market Street can be attributable in part to the greater disruption caused by loading on Market Street as opposed to Union Street, resulting in it being more sensitive to loading activity.

It should be noted that loading restrictions on Market Street differ from those on Union Street, with loading restricted between 0800-0930 and 1600-1800.

The chart below demonstrates that the majority of deliveries take place late morning to early afternoon, consistent with loading activity on Union Street despite the lack of a midday loading restriction on Market Street.

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Multi-Drops and Repeating Vehicles
Utilising the data generated by the loading survey, it has also been possible to analyse the distribution patterns of vehicles that were recorded on more than one occasion during the survey.

The graph below demonstrates that the most commonly observed vehicles undertaking multiple drop offs were observed twice, however a significant proportion were observed a greater number of times.

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The graph below shows that a clear majority of vehicles observed multiple times were vans, consistent with the proportion of vehicle types observed for all vehicles.

The graph below shows that for vehicles observed undertaking multiple deliveries across the survey day, the most commonly observed sector was that of small parcel deliveries. When considering the potential for Transport Collaboration, this sector should be considered as having the greatest potential for reducing the number of delivery vehicle accessing Aberdeen City Centre.

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The graph below demonstrates the locations on Union Street (and Market Street) where vehicles performing multiple drops were observed. It show that, other than the section of Union Street between Crown Street and Accord Street (which experiences the highest number of visits from vehicles observed performing multiple drops) and between Bon Accord Street and Bon Accord Terrace (which experiences the lowest) the spread of deliveries by vehicles observed multiple times is relatively consistent across Union Street.

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Emerging Findings – Union Street Loading Survey

Key Finding 1 – Distribution of Activity
- The results show that no one area of Union Street has a significantly higher level of loading than another.
- The majority of activity is undertaken in the morning between 0930 and Midday, with 48% of all vehicles recorded in the survey observed during this period.

Key Finding 2 – Freight Vehicle Types
- Small vans undertake the majority of deliveries on Union Street, and accounted for 68% of all vehicles observed during the survey.
- The distribution of vans across the survey area is relatively uniform, with no obvious clusters of activity compared with others.
- There were more OGV1s than OGV2s observed during the survey, with only 16 of the latter vehicle type recorded.

Key Finding 3 – Delivery Types
- The type of deliveries observed during the survey coincides with the observations made with respect to freight vehicle types above. Small parcels accounted for 39% of all delivery types.
- There would appear to be some evidence of a relationship between OGV2s and “Food Retail” type deliveries.

Key Finding 4 – Loading Characteristics
- It would appear that there is no obvious or set pattern apparent with respect to loading/unloading on Union Street. Most vehicles found to be loading/unloading were found to arrive and depart within a five minute timeframe on Union Street.
- Vehicles in the east section of Union Street stop for slightly longer than those in the west section, but they are fewer in number.
- The results suggest that vehicles stopping on Market Street are stopping for a longer duration than on Union Street.
- The pattern of turnover is consistent across the survey area.

Key Finding 5 – Loading Restrictions
- The results suggest that the loading restrictions on Union Street are typically adhered to, with 90% of the vehicles observed during the survey found to be loading/unloading outwith the three designated periods (0800-0930, 1230-1430; and 1630-1800).
- There is less compliance with the middle restriction period (1230-1430) than the morning and evening periods, where it was found that this accounted for 65% of the total vehicles observed during periods where loading was restricted.

Key Finding 6 – Vehicle Engines
- Most vehicles accessing the city centre area (at least on the day of the survey) date from no earlier than 2007 onwards and are thus typically of EURO IV or EURO V standard.

Key Finding 7 – Multi-Drops and Repeating Vehicles
- Most vehicles observed performing multiple drops were delivering small parcels
- Most delivery vehicles performing multiple drops were vans

Key Finding 8 - Market Street

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- Profile of loading on Market Street similar to Union Street, suggesting that other factors maybe causing the congestion on this road.

Union Street Frontage Premises Delivery Survey

Following the Union Street Loading Survey, a further survey of **frontage premises** on Union Street was undertaken in May 2012 to determine delivery patterns and highlight any problems or issues experienced by local businesses.

Methodology

For the frontage premises delivery survey, a questionnaire was prepared to seek input from businesses in the local area in seeking to understand the pattern of freight deliveries and distribution on Union Street. The questionnaire was designed to obtain information on:

- The nature of the business completing the form;
- The location for deliveries;
- The frequency of deliveries;
- The timing of deliveries;
- Responsibility for, and factors affecting, the setting of delivery times;
- The characteristics of deliveries (vehicle type and the form goods are received in); and
- Refuse collection arrangements.

A copy of the questionnaire is enclosed within this Appendix.

A face-to-face dissemination method was chosen as it was considered that this would yield a higher response rate than a postal or e-mail survey. In total, 113 completed questionnaires were collected from businesses throughout Union Street, ensuring good geographic coverage of the area.

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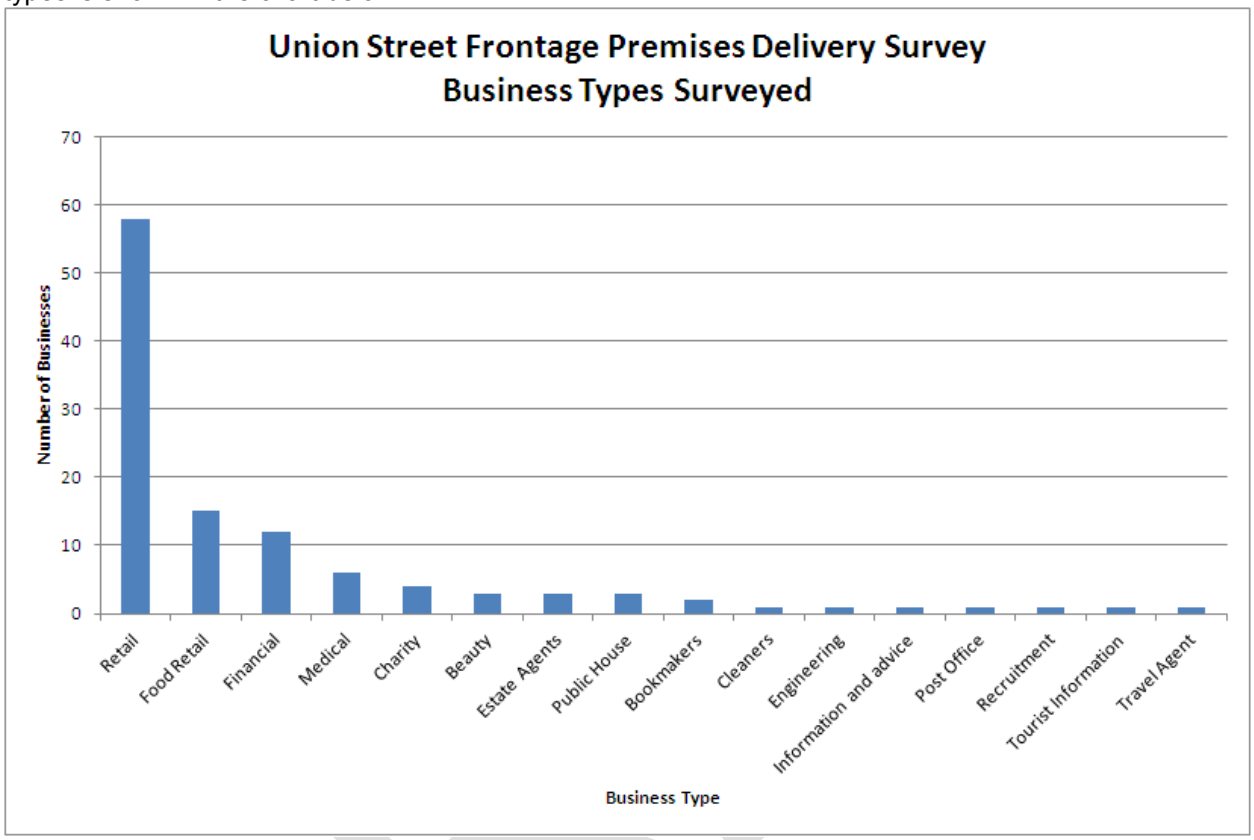
Results

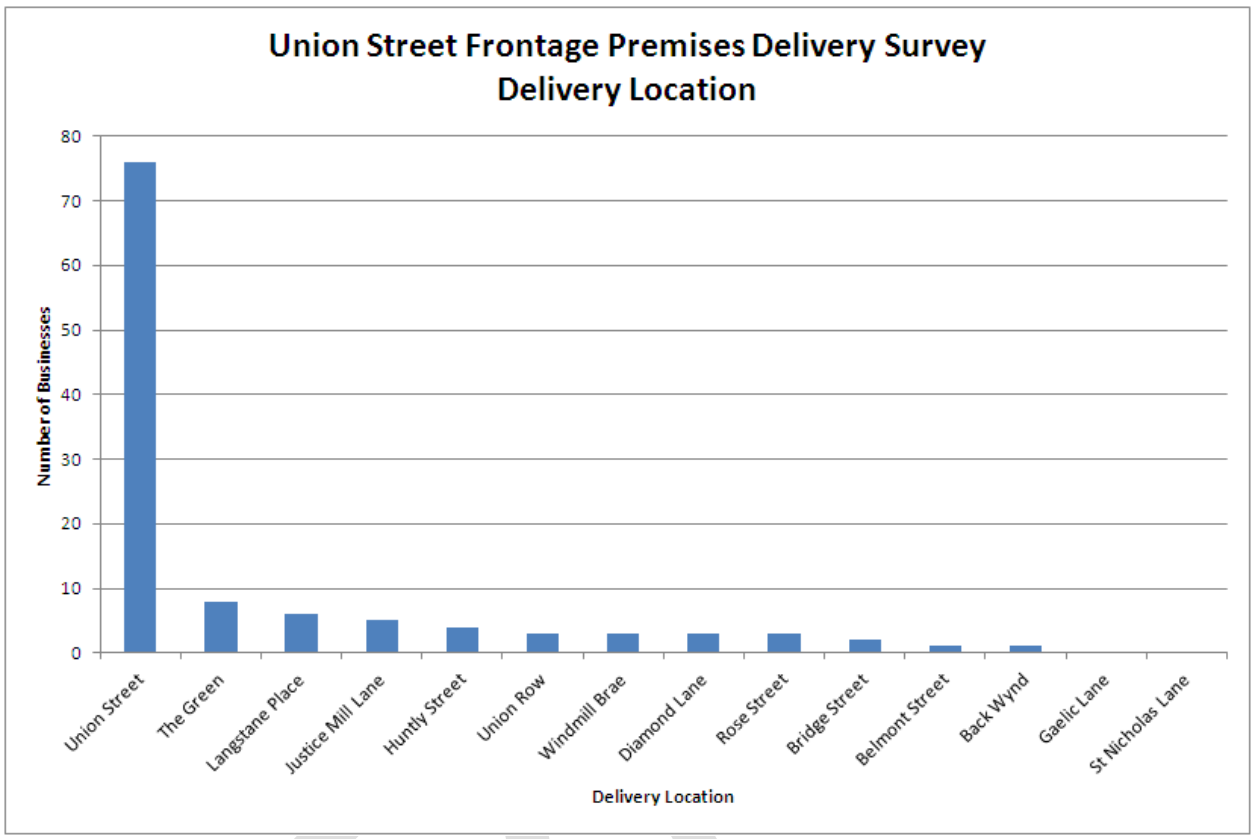
Business Type

The range of business types listed in responses to the questionnaire were collated and standardised. The range of types is shown in the chart below.



As may be expected by the commercial nature of Union Street, more than half (51%) of the 113 questionnaires were completed by retail outlets.

Delivery Location
The questionnaire enabled businesses to select their usual delivery location from the list provided.

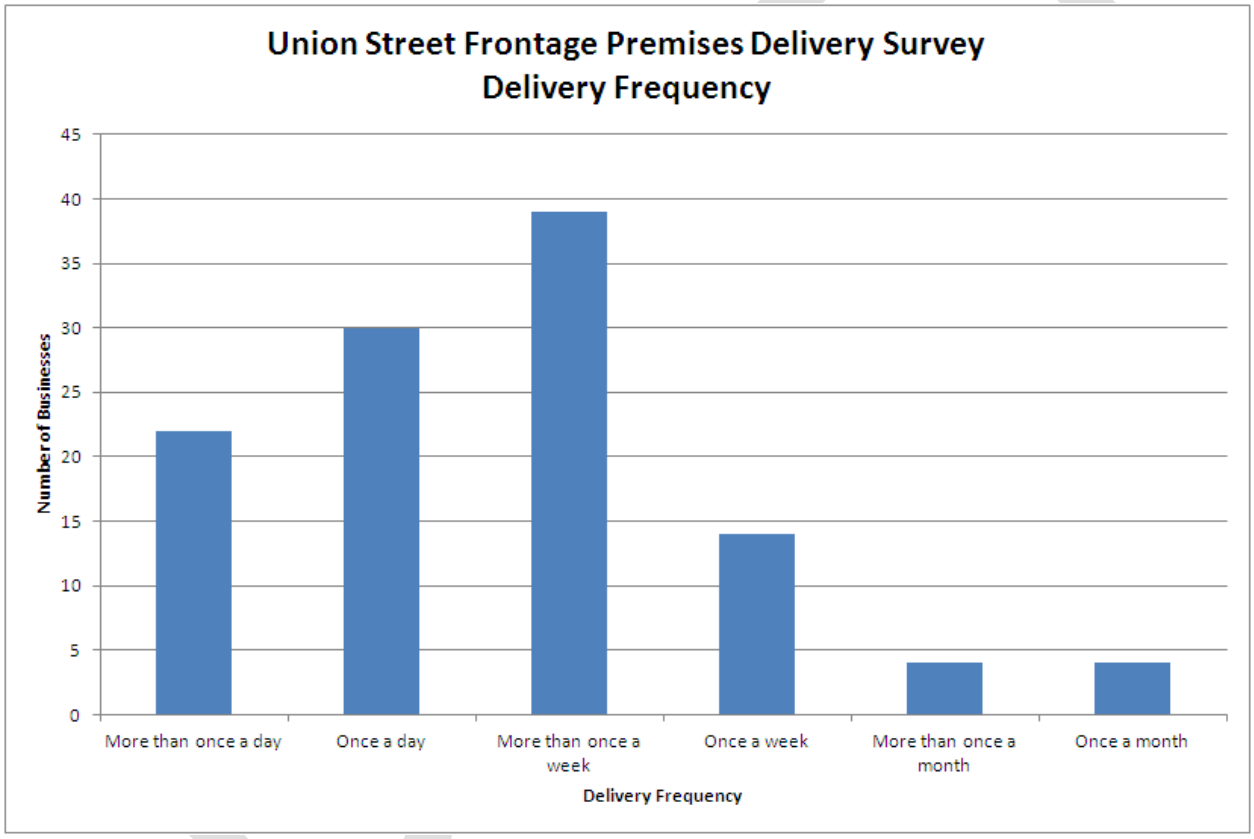


As the chart above shows, of the premises surveyed, the majority receive their deliveries on Union Street. This is unsurprising, given the nature of the survey itself, but it is also to be expected that Union Street is the preferred unloading location for deliveries given the relatively easier and more efficient access at the frontage of properties than on surrounding streets. In addition to the above, several other delivery locations in the city centre were also noted by respondents to the survey. These included:

- Chapel Street;
- Thistle Lane;
- Behind Burger King opposite the Job Centre (Dee Street/Langstane Place);
- Trinity Centre Loading Bay (x3);
- Union Terrace;
- Rear of Marks and Spencer (Flourmill Lane);
- Shiprow;
- Market Street; and
- The Tunnel near the Green.

Delivery Frequency
The following options for delivery frequency were listed in the questionnaire:

- Once a day;
- Once a week;
- Once a month;
- More than once a day;
- More than once a week; and
- More than once a month.

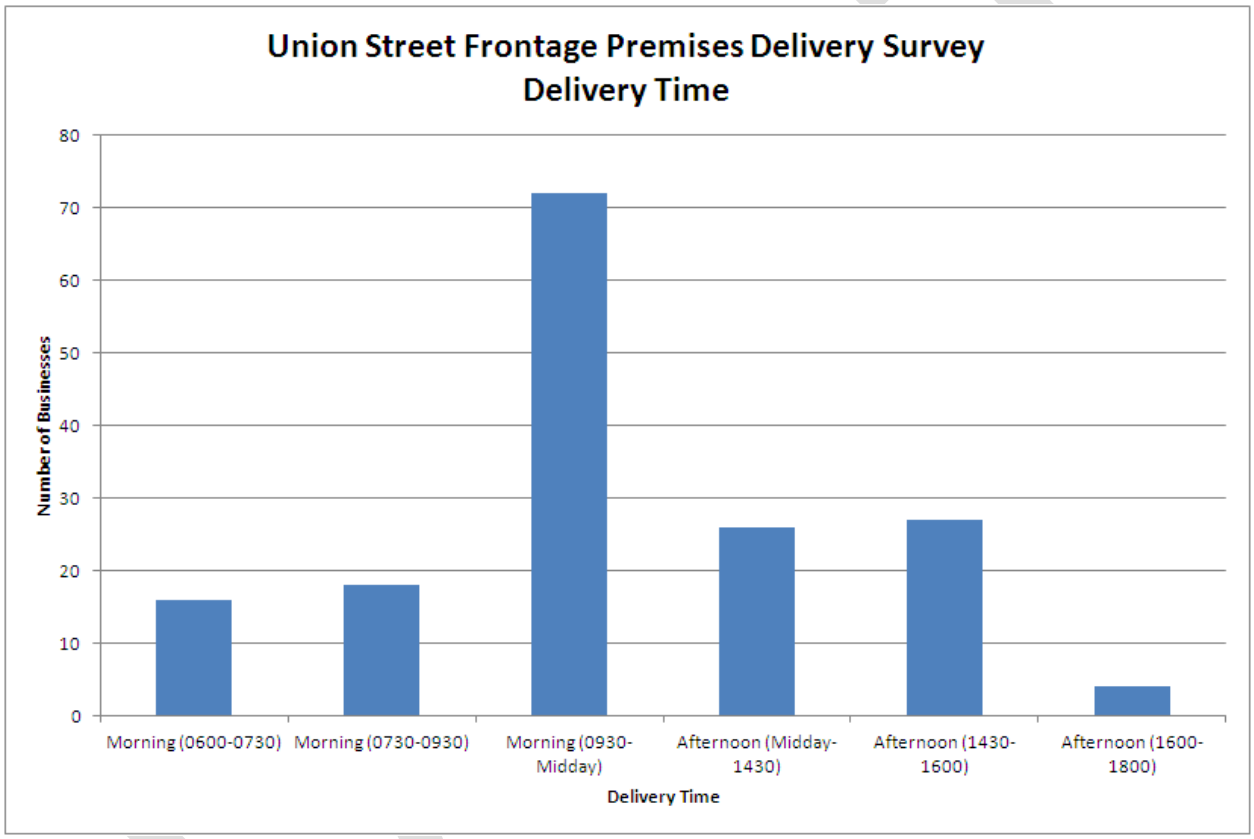


As the chart above demonstrates, the majority of businesses surveyed regularly receive deliveries. A total of 52 businesses (46% of responses) receive deliveries at least once a day with a further total of 53 (47% of responses) receiving deliveries on at least a weekly basis. Only 8 businesses stated that they receive deliveries on a less frequent basis (i.e. once a month or more than once a month).

Delivery Time
Delivery times were separated into morning and afternoon. Within each of these periods, three time slots were presented as options:

- 0600-0730;
- 0730-0930; and
- 0930-Midday.

It should be noted that these times do not exactly match that of the predominant loading restrictions in place on Union Street, but the data mirrors that of the loading survey that was also undertaken.



Analysis of delivery times shows that there is a clear period within which businesses on Union Street receive deliveries. In the morning between 0930 and Midday, 44% of respondents to the questionnaire stated that their deliveries, on average, take place within this period. However, it was also apparent that delivery times for a number of businesses vary, and may not be specific to a certain time every day/week/month – this was specifically stated by nine businesses in the survey.

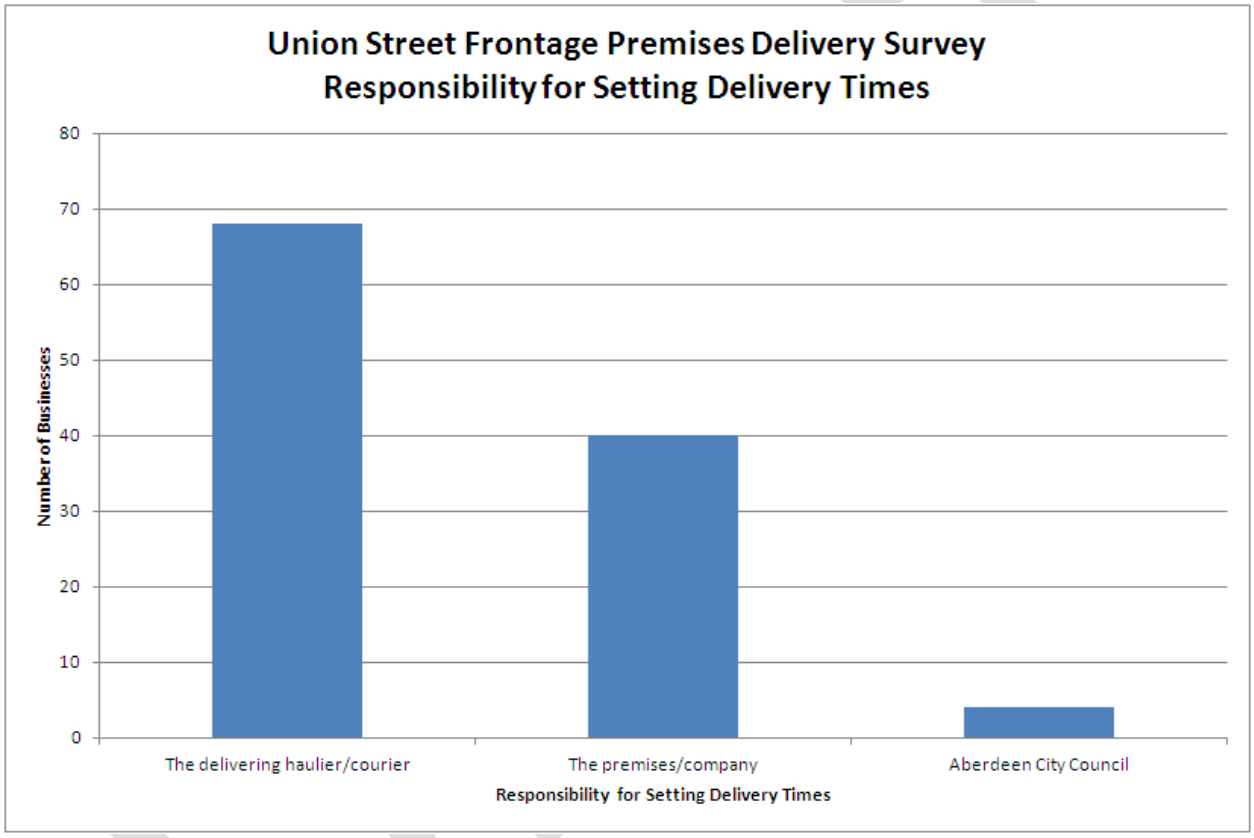
The following other delivery times were specified:

- 0400-0600; and
- 1800-1900.

It is worth noting that the most common period for deliveries (between 0930 and Midday) is outwith a period where loading is restricted on Union Street. This demonstrates clear parallels with the findings of the Loading Survey, which demonstrated that the majority of observed vehicles were loading or unloading when no restriction was in effect.

Responsibility for Setting Delivery Times
Typically, responsibility for setting specific delivery times will lie with either:

- The premises/company;
- The delivering haulier/courier; or
- Aberdeen City Council.



Typically, either the delivering haulier/courier or the premises/company are responsible for setting delivery times. Only four businesses stated that Aberdeen City Council sets their delivery time.

Factors Determining Delivery Times
In addition to confirming who is responsible for setting delivery times, businesses were also asked to state what determines these. A number of responses were received, and these have been collated and analysed to standardise the responses into categories. The main factors emanating from this exercise were that delivery times:

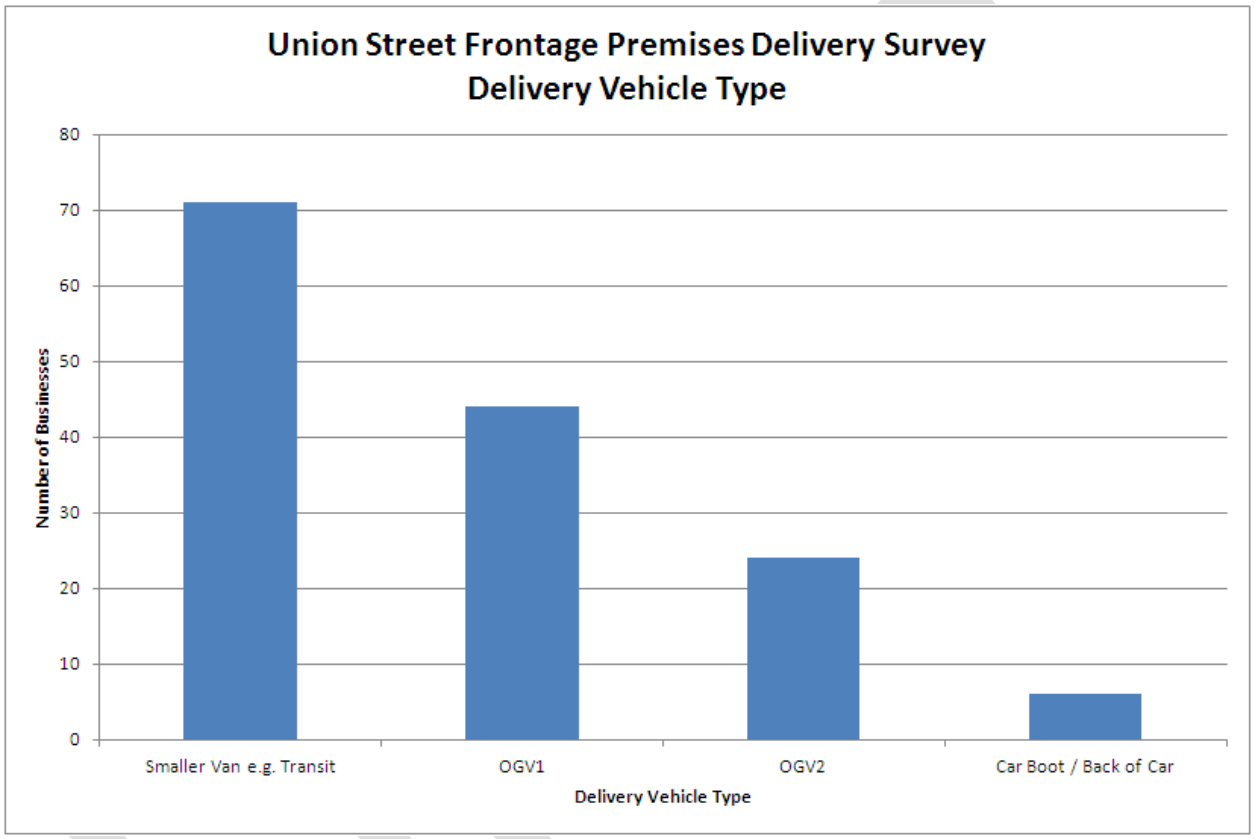
- Are determined by the schedule/itinerary of the haulier/courier, and their other delivery requirements; and
- Are bound by the restrictions on loading on Union Street.

A number of businesses also specified that deliveries must take place outwith their opening hours (i.e. to minimise disruption), or conversely within their hours of operation.

Delivery Vehicle Type
Businesses were asked to select from a list the type of vehicle typically used to deliver their goods. OGV1s and OGV2s were shown in picture form to help identify the specific type of vehicle of used.

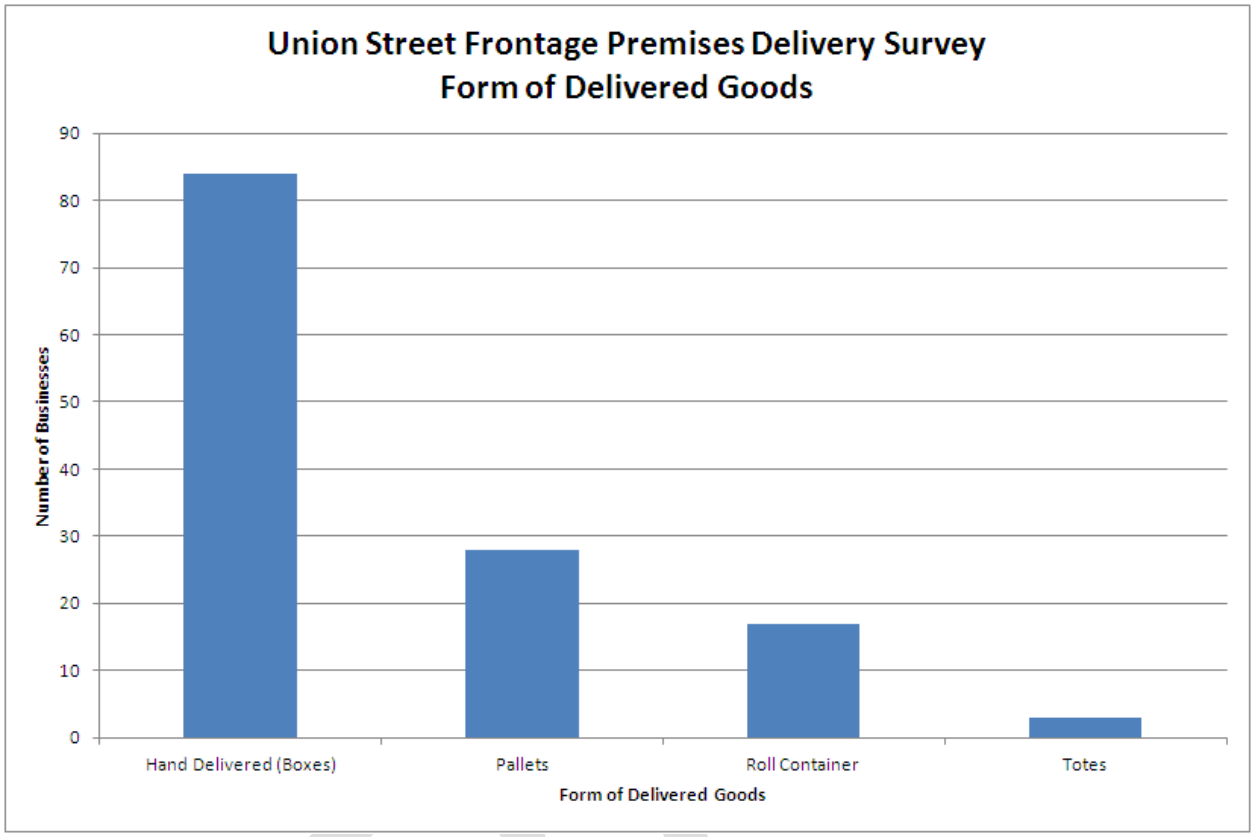
OGV1

OGV2



As the above chart highlights, nearly half (49%) of all deliveries are made by small vans. This is generally consistent with the findings of the Loading Survey, which found that a majority of vehicles observed in this survey (68%) were small vans. In the frontage premises delivery survey, one business also stated that the type of delivery van on site depended on the size of the delivery being received.

Form of Delivered Goods



As might be expected from deliveries which are predominately made by smaller vehicles such as vans, the vast majority of businesses receive their goods in boxes (i.e. hand delivered).

The relative difference in the number of goods provided in pallet form or on roll containers is also consistent with the smaller number of larger freight vehicles such as OGV2s cited as the main delivering vehicle type.

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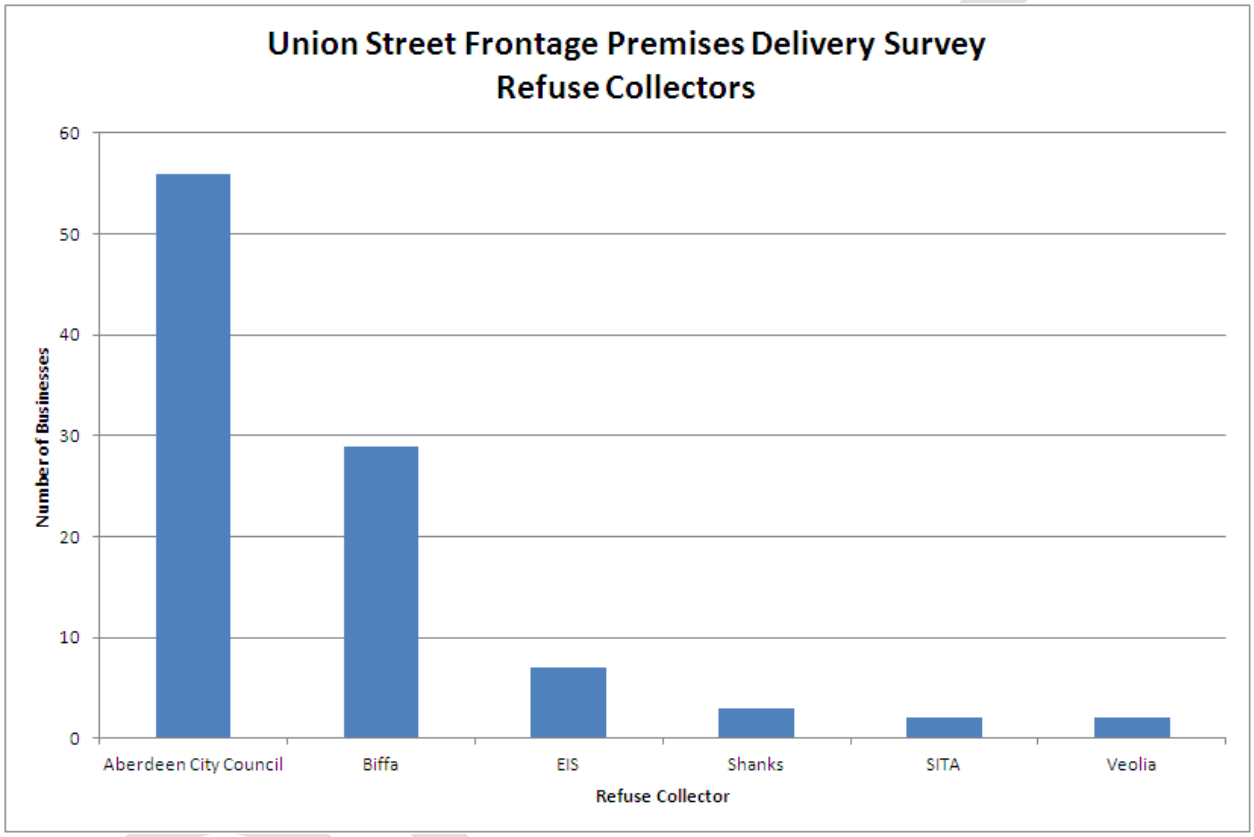
Refuse Collection

As part of the preparatory work for this study, AECOM consulted Tom Moore (Aberdeen City Centre Manager) with regard to the study proposals. This discussion confirmed that refuse collection comprises a large element of freight distribution on Union Street, and it was recommended that questions relating to refuse were incorporated into the frontage survey.

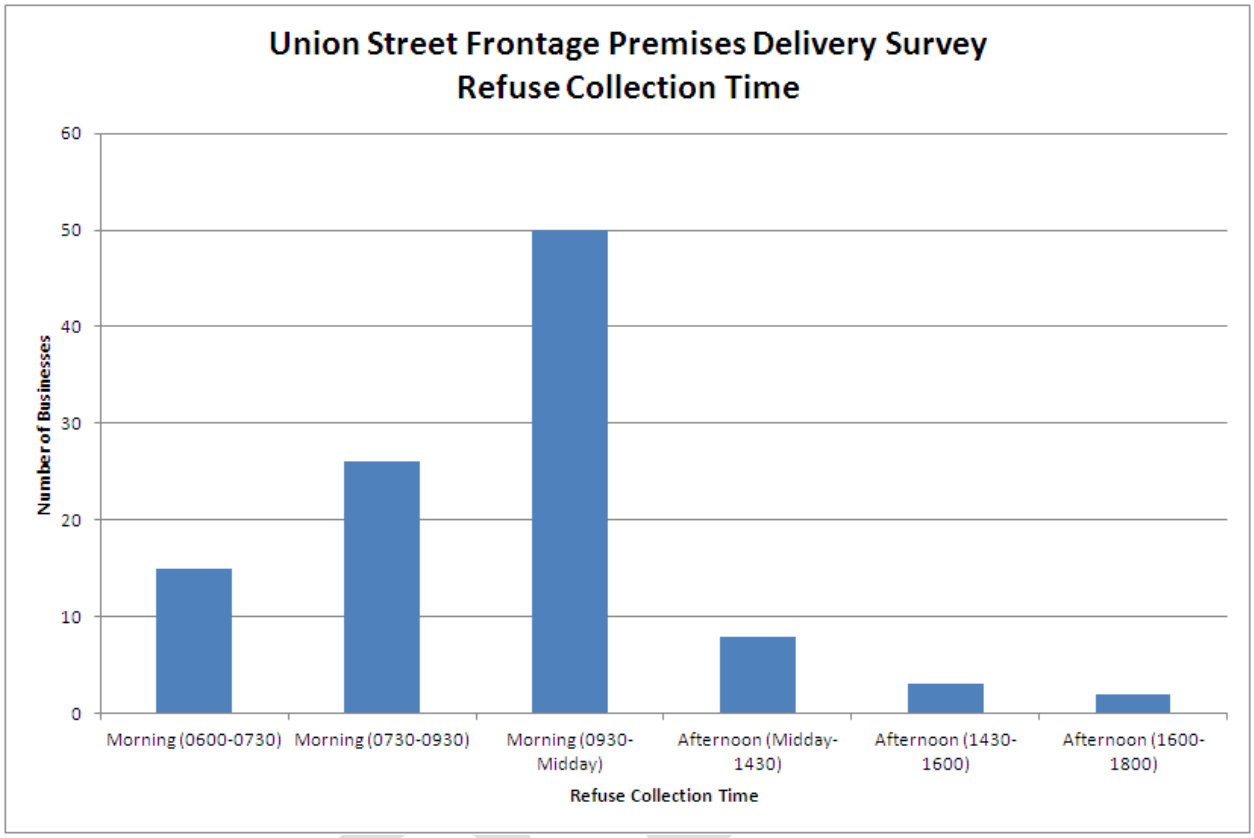
Refuse Collectors



As the chart shows, the majority of frontage premises on Union Street have their refuse collected by the local authority (ACC). The remaining businesses have refuse collected by a private company, with Biffa the most common (29% of responses).

Other responses to this question included that companies remove refuse from their premises themselves.

Refuse Collection Time



There are similarities in the patterns of delivery times and refuse collection times, with Morning (between 0930 and Midday) the most common period for refuse collection. This amounts to 48% of all businesses surveyed.

While the majority of businesses were able to confirm their refuse collection time, some collection times were unknown, while others cited a time not listed as an option.

Other Comments

The final question on the Frontage Premises Delivery Survey form invited any additional comments to be fed back.

Few additional comments were received, although some businesses did cite the restrictions of the Union Street loading times on delivery/refuse collection.

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Emerging Findings – Union Street Frontage Premises Delivery Survey

Key Finding 1 – Business Types
- More than half of the questionnaires were completed by retail outlets.

Key Finding 2 – Delivery Locations
- Union Street is the primary location for deliveries.
- Union Street is likely to be the preferred unloading location for deliveries given the relatively easier and more efficient access at the frontage of properties than on surrounding streets.

Key Finding 3 – Delivery Frequency
- The majority of businesses surveyed regularly receive deliveries.
- Almost half of those businesses surveyed receive deliveries at least once a day.

Key Finding 4 – Delivery Times
- 44% of respondents to the questionnaire stated that their deliveries, on average, take place between 0930 and Midday. This demonstrates clear parallels with the findings of the Union Street Loading Survey, which demonstrated that the majority of observed vehicles were loading or unloading when no restriction was in effect.
- Delivery times for a number of businesses vary, and may not be specific to a certain time every day/week/month.

Key Finding 5 – Delivery Characteristics
- Responsibility for setting delivery times typically appears to lie with the delivering haulier/courier or the premises/company, rather than Aberdeen City Council.
- Businesses stated that delivery times are determined by the schedule/itinerary of the haulier/courier, and their other delivery requirements; and are bound by the restrictions on loading on Union Street.
- A number of businesses also specified that deliveries must take place outwith their opening hours (i.e. to minimise disruption), or conversely within their hours of operation.

Key Finding 6 – Delivery Types
- Nearly half of the businesses surveyed reported that their deliveries are made by small vans. This is generally consistent with the findings of the Loading Survey.
- As might be expected from deliveries which are predominately made by smaller vehicles such as vans, the vast majority of businesses receive their goods in boxes (i.e. hand delivered).

Key Finding 7 – Refuse Collection
- The majority of frontage premises on Union Street have their refuse collected by the local authority (ACC).
- There are similarities in the patterns of delivery times and refuse collection times, with Morning (between 0930 and Midday) the most common period for refuse collection. This amounted to 48% of all businesses surveyed.

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Capabilities on project:
Transportation

Union Street Frontage Premises Delivery Survey Form

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Capabilities on project:
Transportation

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UNION STREET FRONTAGE PREMISES DELIVERY SURVEY

ABERDEEN CITY COUNCIL

Aberdeen City Council is undertaking a study to consider how freight distribution within Aberdeen's Air Quality Management Area (AQMA) could be made more efficient, reducing associated air quality and carbon emissions. We are seeking to understand the pattern of freight deliveries and distribution on Union Street, and are requesting the help of businesses in the local area. Please complete the questions below. The form should only take around 5 minutes to complete. Thank you for your co-operation.

Business Information

1. Organisation Name: _____

2. Address: _____

3. Point of Contact: _____

4. Phone / E-mail Contact: _____

5. Business Type: _____

Delivery Information

1. Are deliveries required for your business? Yes ☐ No ☐

2. Where do these usually take place?

Union Street	☐	*Belmont Street*	☐
Justice Mill Lane	☐	*The Green*	☐
Union Row	☐	*Back Wynd*	☐
Langstane Place	☐	*Gaelic Lane*	☐
Windmill Brae	☐	*St Nicholas Lane*	☐

Other (Specify) _____

3. On average, how often are deliveries received?

Once a day	☐	*More than once a day*	☐
Once a week	☐	*More than once a week*	☐
Once a month	☐	*More than once a month*	☐

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4. On average, at what time do your deliveries take place? *(Include multiple delivery times where appropriate)*

Morning (0600-0730)	☐	*Afternoon (Midday-1430)*	☐
Morning (0730-0930)	☐	*Afternoon (1430-1600)*	☐
Morning (0930-Midday)	☐	*Afternoon (1600-1800)*	☐

Other Time (Specify) _____

5. Who is responsible for setting delivery times?

The premises/company ☐

The delivering haulier/courier ☐

Aberdeen City Council ☐

6. What determines these delivery times?

7. What type of vehicle is typically used to deliver your goods?

☐

☐

Smaller Van e.g. Transit ☐

Car Boot / Back of Car ☐

Other (Specify) _____

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8. In what form are your goods typically received in?

Hand Delivered (Boxes) ☐

Roll Container ☐

Pallets ☐

Other (Specify) _____

9. Who collects refuse from your premises?

Aberdeen City Council ☐

Biffa ☐

Other (Specify) _____

10. When is refuse typically collected?

Morning (0600-0730)	☐	*Afternoon (Midday-1430)*	☐
Morning (0730-0930)	☐	*Afternoon (1430-1600)*	☐
Morning (0930-Midday)	☐	*Afternoon (1600-1800)*	☐

Other Time (Specify) _____

11. If you have any other comments regarding deliveries in this area, please let us know:

Thank you for completing this survey.

Appendix B – Retail Centres Survey

Introduction

AECOM, on behalf of Aberdeen City Council and Nestrans, has been commissioned to undertake a study to consider how freight distribution within Aberdeen's Air Quality Management Area (AQMA) could be made more efficient, reducing associated air quality and carbon emissions. This work forms part of the Aberdeen City Council and Nestrans CARE North Project, which is funded by the European Union.

This File Note presents the key outcomes of **Task 4** in the client brief relating to freight distribution at the principal retail centres in Aberdeen: Union Square, Bon Accord/St Nicholas; and the Trinity Centre. This task aims to:

- Establish pattern of deliveries based on surveys at delivery entrances;
- Undertake follow-up consultation with premises, and delivery companies;
- Assess the impact of these deliveries on traffic flow;
- Undertake a review of any regulatory restrictions – planning, Environmental Health, traffic; and
- Assess possible impact of future developments – expansion of stores, changes to traffic management etc

and the impact of a potential Low Emission Zone (LEZ) in the city centre.

In progressing this element of the study, surveys to examine loading patterns and characteristics at Union Square, Bon Accord/St Nicholas Shopping Centres and the Trinity Centre were undertaken in July 2012.

This file note presents the key outcomes of these surveys.

Survey Approach

Prior to the surveys being undertaken, AECOM met with the managers of each of the shopping centres to introduce the study and to obtain permission to conduct a survey of the loading bays at each centre. The following information was targeted for collection:

1. Survey of arrival/departure time;
2. Vehicle type as per following classification (LGV, OGV1, OGV2);
3. Any Dominant Vehicle Markings;
4. Type of Delivery;
5. Vehicle Registration Plate Details; and
6. When safe to undertake, a short interview with drivers on-site using a pre-prepared list of questions provided by AECOM, a copy of which is provided within this Appendix.

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Day/Time	Centre	Bay Location	Number of Surveyors
Thurs 05/07/12 0600-1700	Union Square	Palmerston Rd side	2
		Market St side	1
Friday 06/07/12 0600-1700	Bon Accord Centre	Loch St side	1
		St Paul St side	1
	Trinity Centre	Off Denburn	1
	St Nicholas Centre	Flourmill Lane x 2	- (Video Survey)
		Correction Wynd	- (Video Survey)

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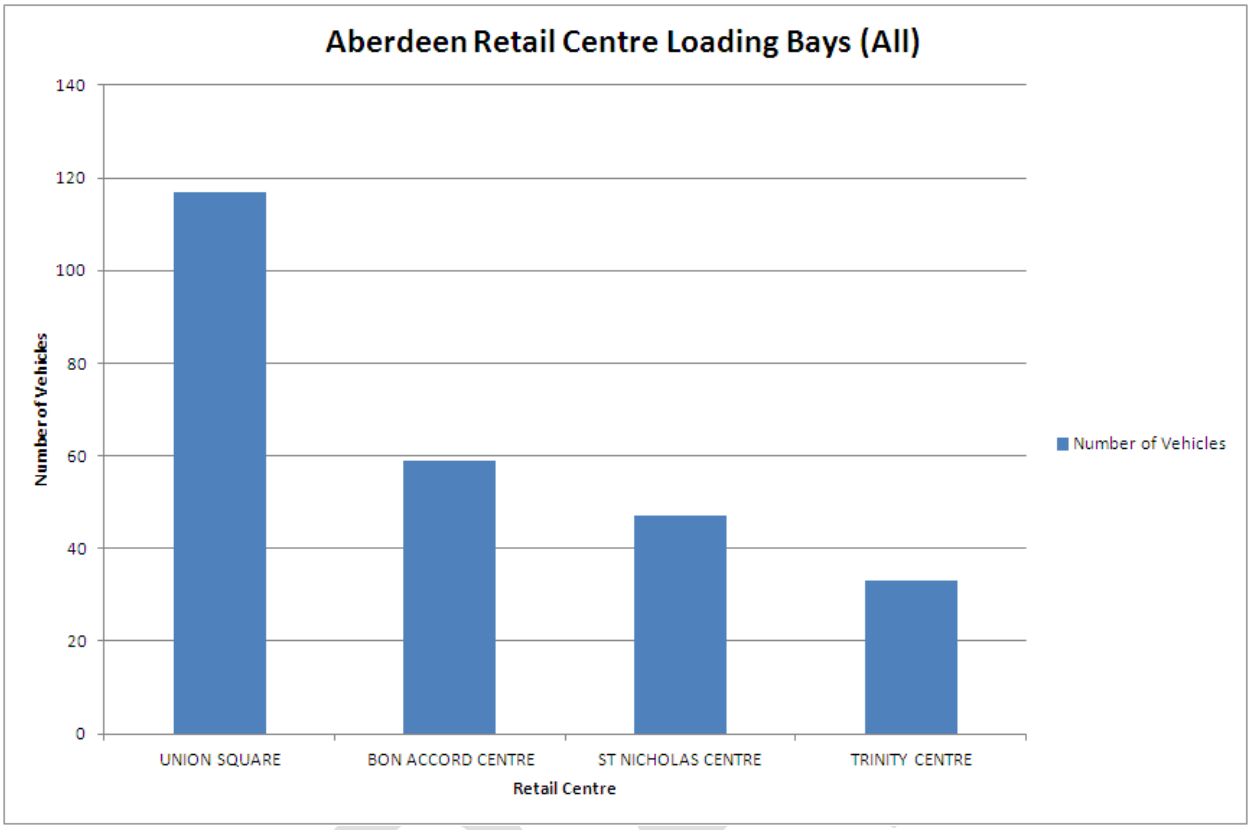
Results

Over the course of the loading surveys at the retail centres, a total of 256 vehicles were observed. The graph below presents the number of vehicles observed at each location.



As the graph above shows, the majority of vehicles (117) were recorded at Union Square, with smaller numbers recorded at each of the other main shopping centres.

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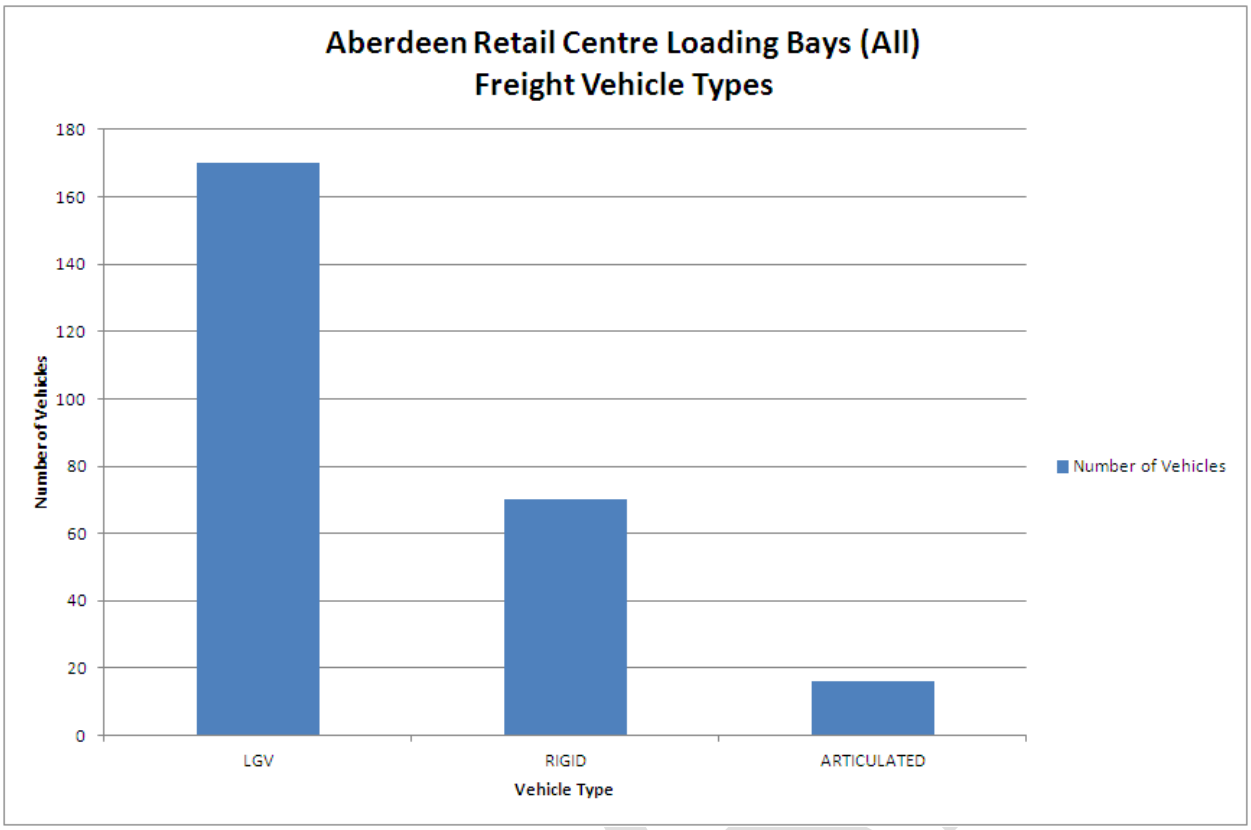
Vehicle Type



The majority of freight vehicles (170 / 66%) observed during the survey were Light Goods Vehicles. This is very similar to the results for the Union Street Loading Survey, which showed that small vans undertake the majority of deliveries on Union Street, totalling 68%.

Only 16 Articulated vehicles were recorded during the survey, and these were typically found to be delivering to larger stores in the shopping centres such as M&S, TX Maxx, Debenhams and Next.

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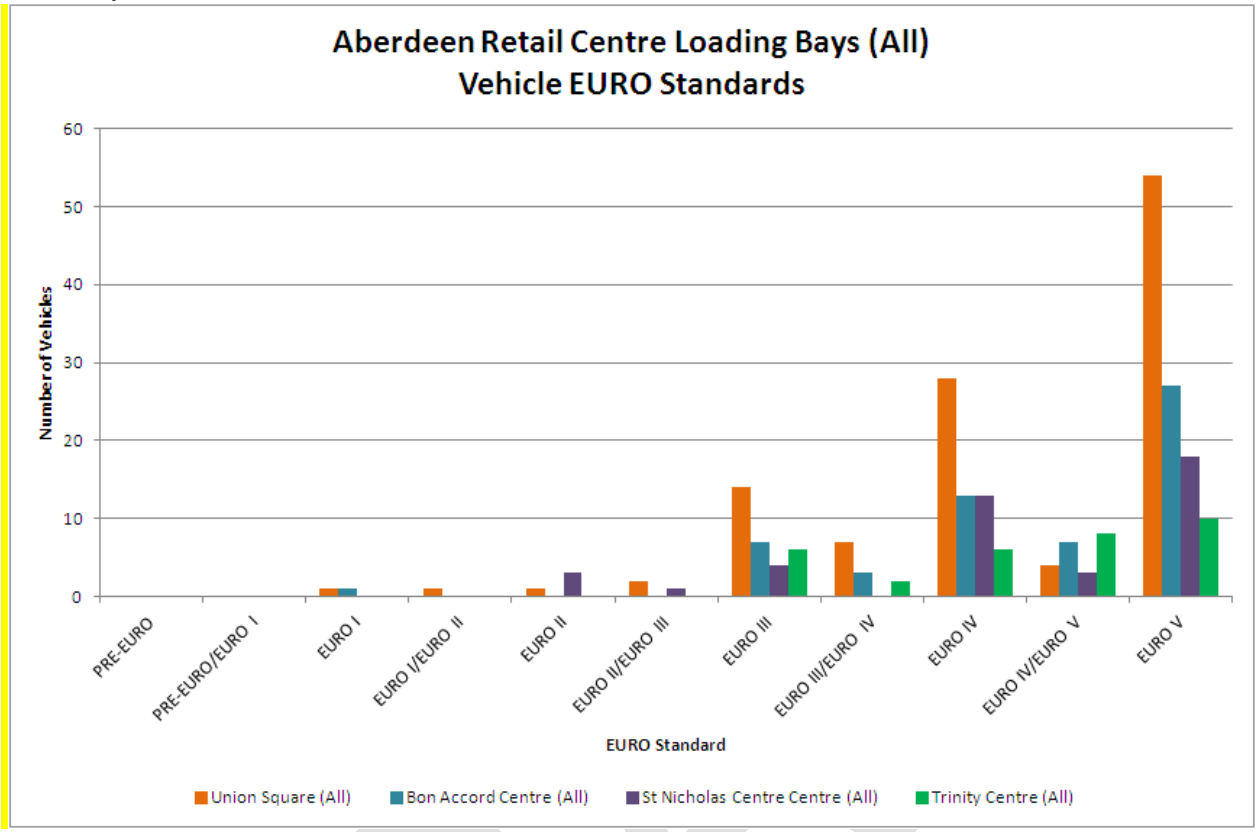
Euro Standard of Observed Vehicles

The figure below shows the distribution of freight vehicle engine types that were identified over the course of the survey.



Most observed vehicles appear to be falling within the higher Euro standards, with the majority being Euro V.

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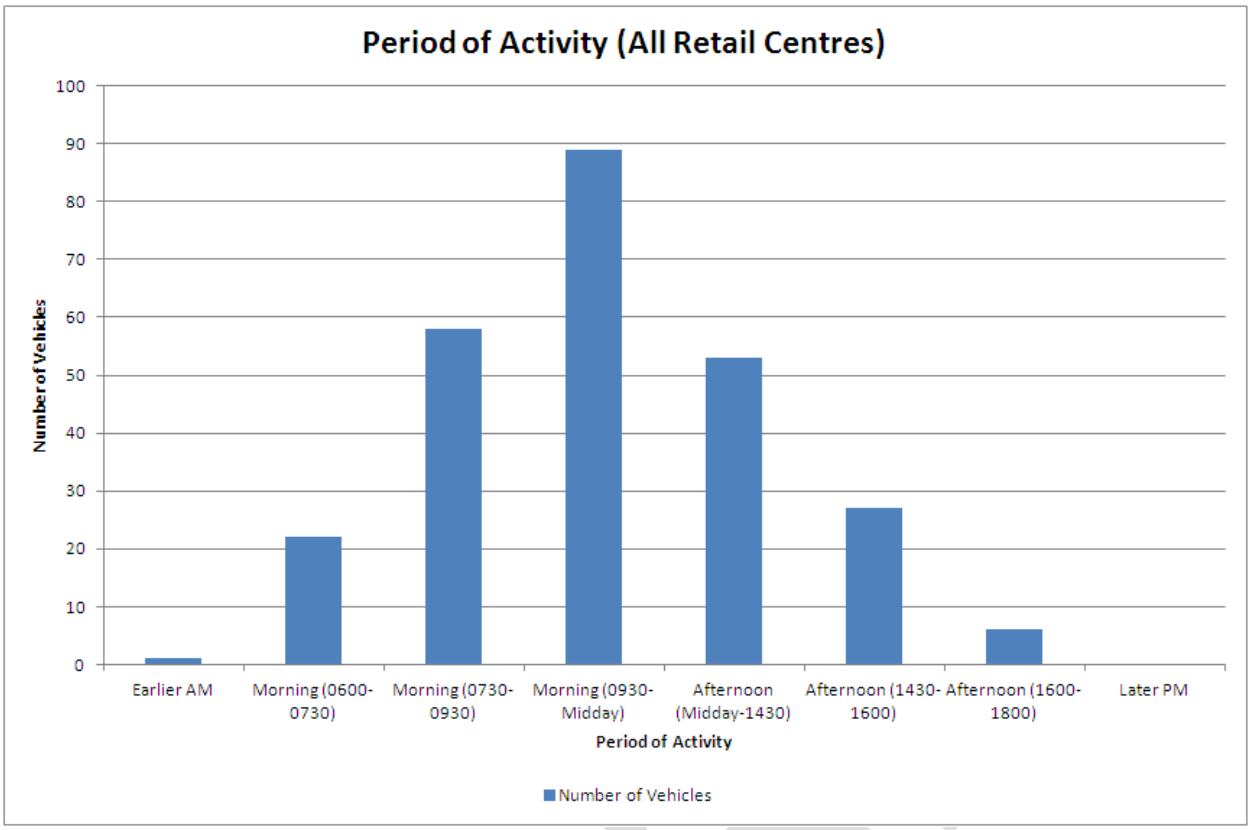
Periods of Activity



As the chart above shows, 35% (89) of vehicles were observed in the morning between 0930 and Midday. There would appear to be some similarity between periods of activity in the retail centre survey and the survey undertaken on Union Street in March 2012, which showed that 48% of the vehicles observed in this survey were also recorded between 0930 and Midday.

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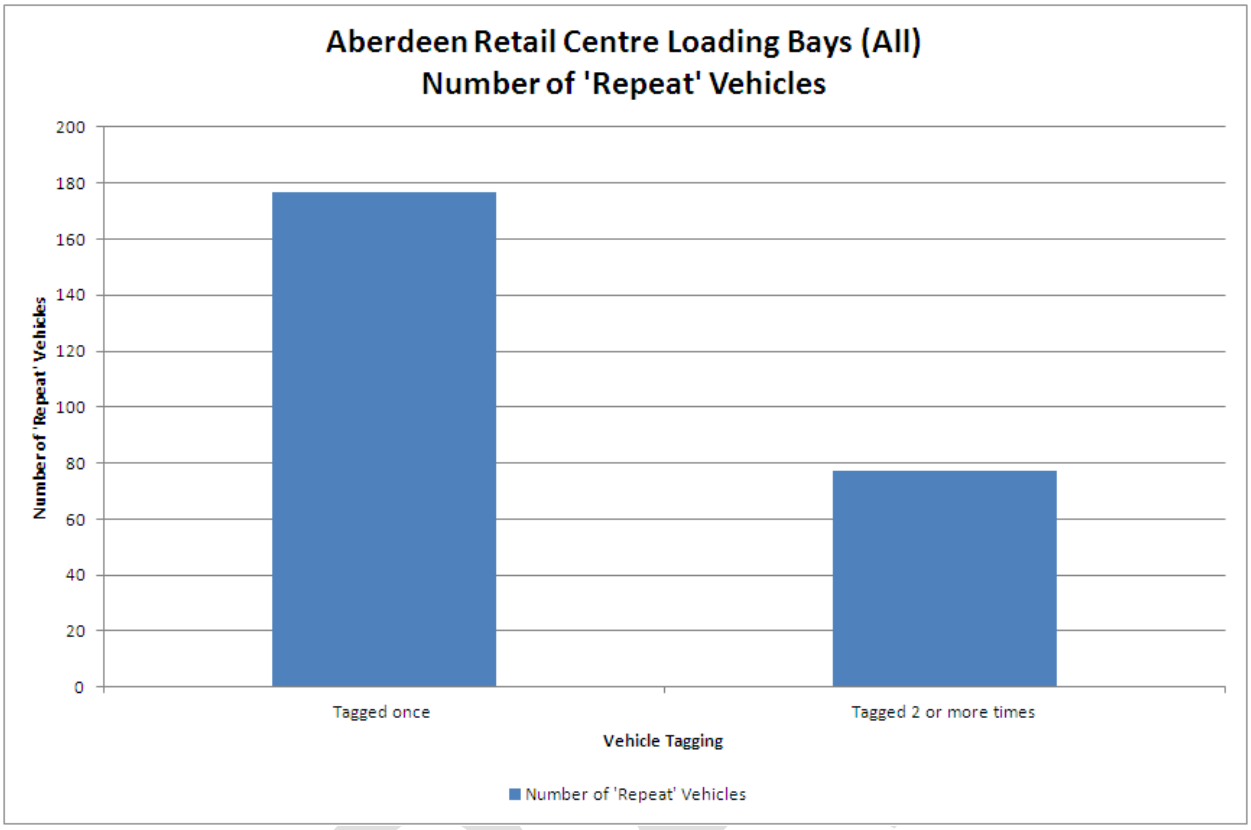
'Repeat' Vehicle Analysis

Using the registration plate information recorded as part of the surveys, it has been possible to identify whether any vehicle was recorded on more than one occasion over the course of the survey programme.



The chart above shows the total number of vehicles tagged during the survey. In total, 77 vehicles were tagged at least twice, and can therefore be classed as 'Repeat' vehicles for the purposes of this analysis.

Further work on the number of 'Repeat' vehicles has been undertaken to determine whether these were recorded on more than one occasion at the same retail centre, or multiple locations over the course of the survey programme.

Of those repeat vehicles which could be classified, the most commonly observed type was that of a LGV.

The table below demonstrates that the most common type of goods transported by repeat vehicles (for those which could be identified) is food and drink, followed by clothes. This differs from the study undertaken on

Union Street where small parcels were the most commonly observed items being transported, reflective of the differing offer at retail centres. Were a Transport Collaboration initiative to be considered for Aberdeen then this sector would appear to offer the most scope for a successful collaborative arrangement.

Sector	Repeat vehicles observed
Food and Drink	15
Clothes	6
Toiletries/Cosmetics	2
Stationary	2
Parcels	2
Other	6

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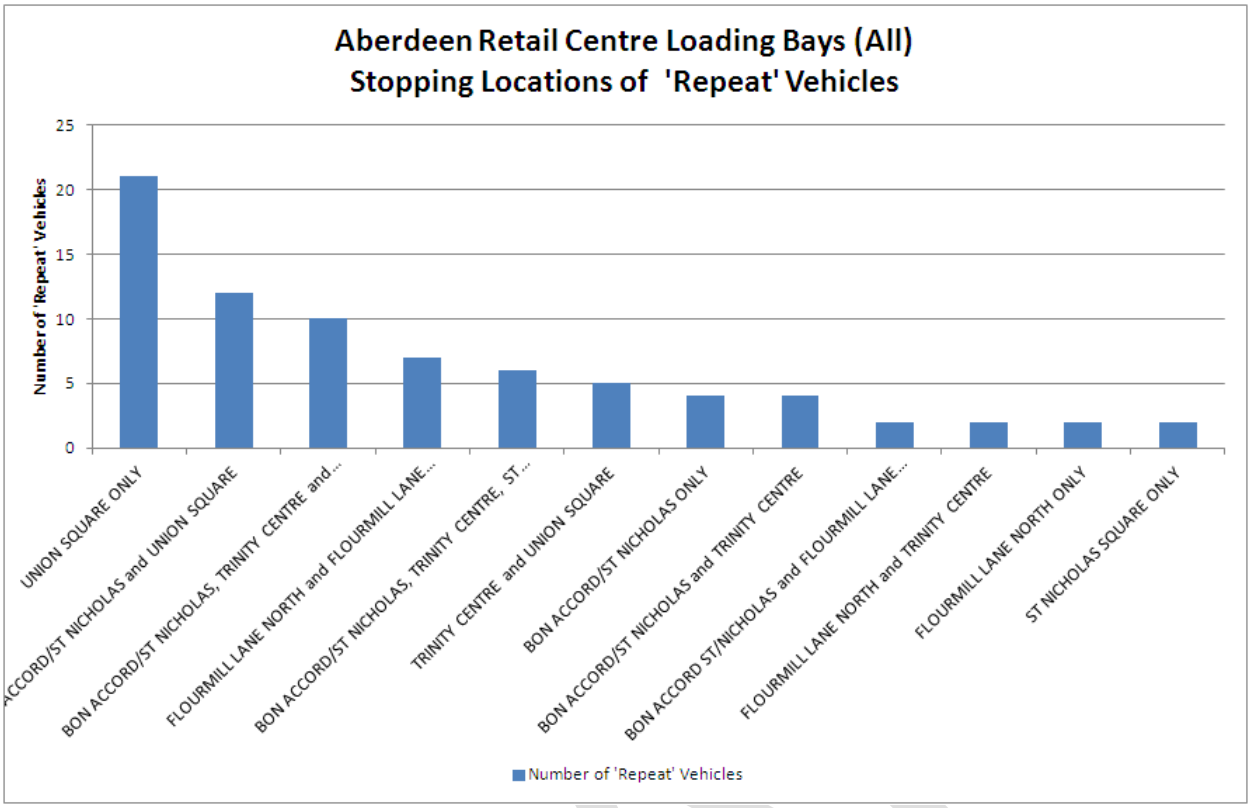

As the chart above demonstrates, many of the ‘repeat’ vehicles (21 in total) were tagged again at the same location of Union Square.

However, it is also evident that a number of other vehicles made trips to more than one retail hub in the city centre, with vehicle drops at Bon Accord/St Nicholas and Union Square and Bon Accord/St Nicholas, Trinity Centre and Union Square typically the most common, totalling 22 of the recorded ‘repeat’ vehicles.

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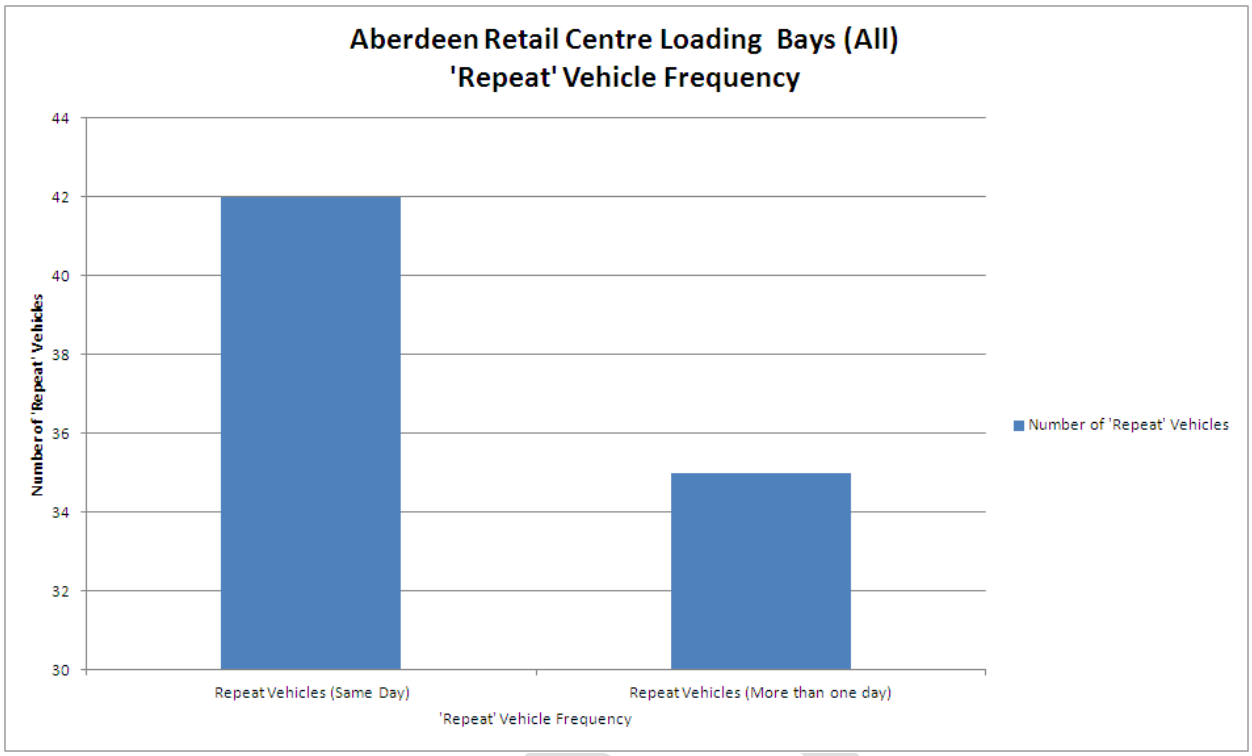
Capabilities on project:
Transportation



There was a relatively even split between ‘repeat’ vehicles tagged on the same day (42) and those tagged on more than day (35).

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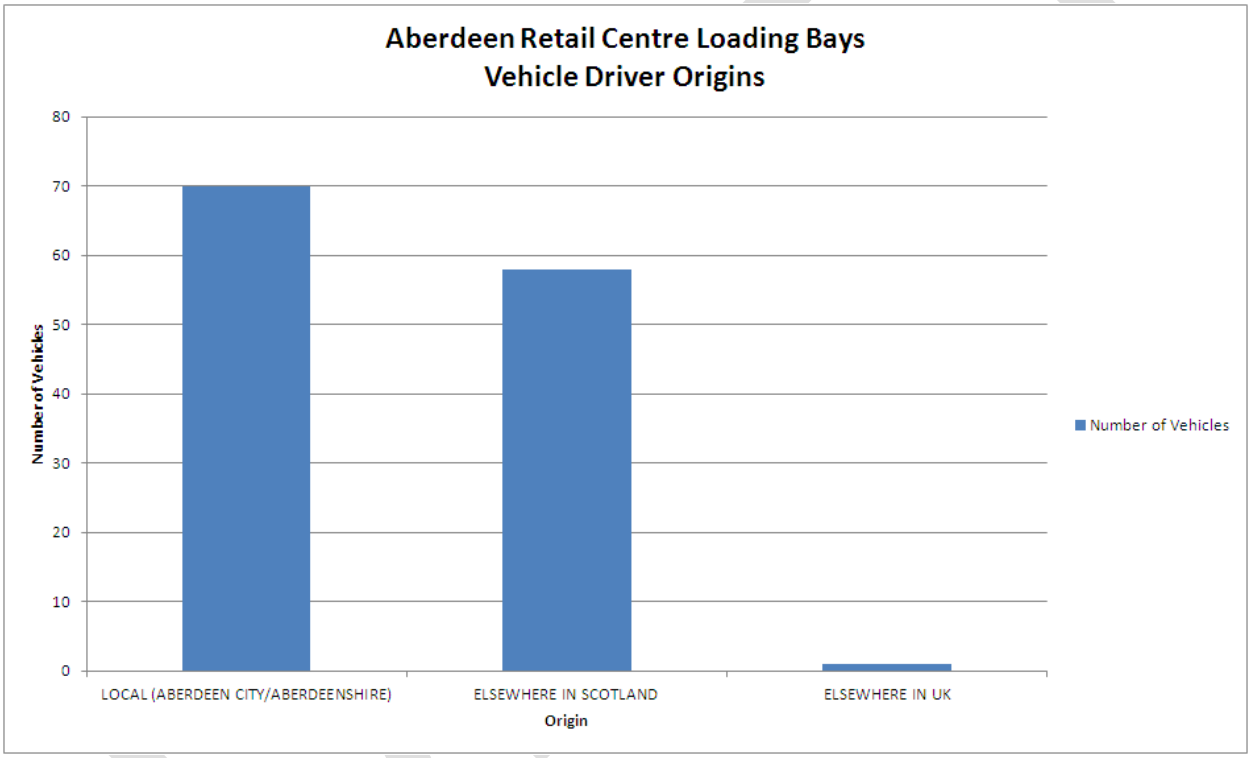
Trip Origins and Destinations
The driver interviews provided the opportunity to explore specific origins and destinations of trips made by the vehicles recorded in the survey.

For the purposes of analysis, vehicle origins/destinations have been categorised as follows:

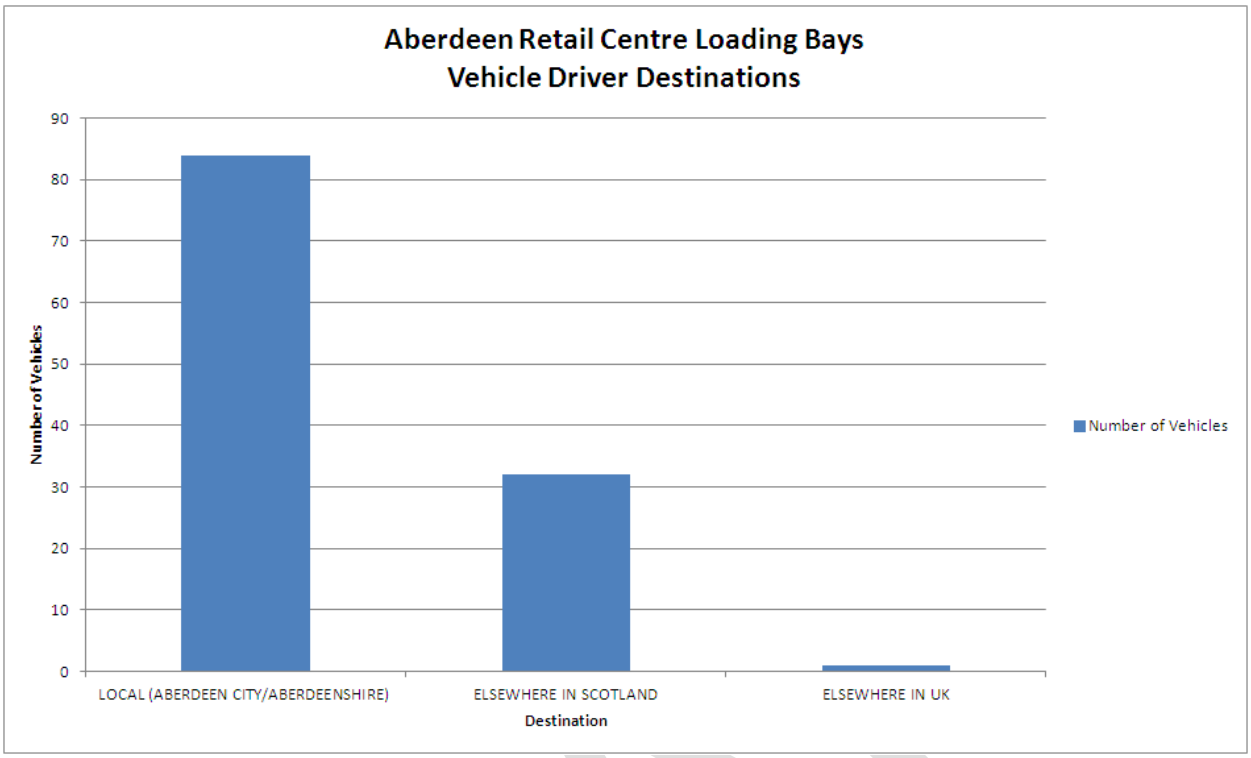
- Local (Aberdeen City/Aberdeenshire);
- Elsewhere in Scotland;
- Elsewhere in UK; and
- Unknown.

Trip origins and destinations which were 'unknown' have not been included in the final analysis. It is noted that in these cases, trip origins and destinations may be unknown because drivers interviewed were unaware or did not offer this information, or in the case of the video survey, were not part of the data collected.

Vehicle Driver Origins



Vehicle Driver Destinations

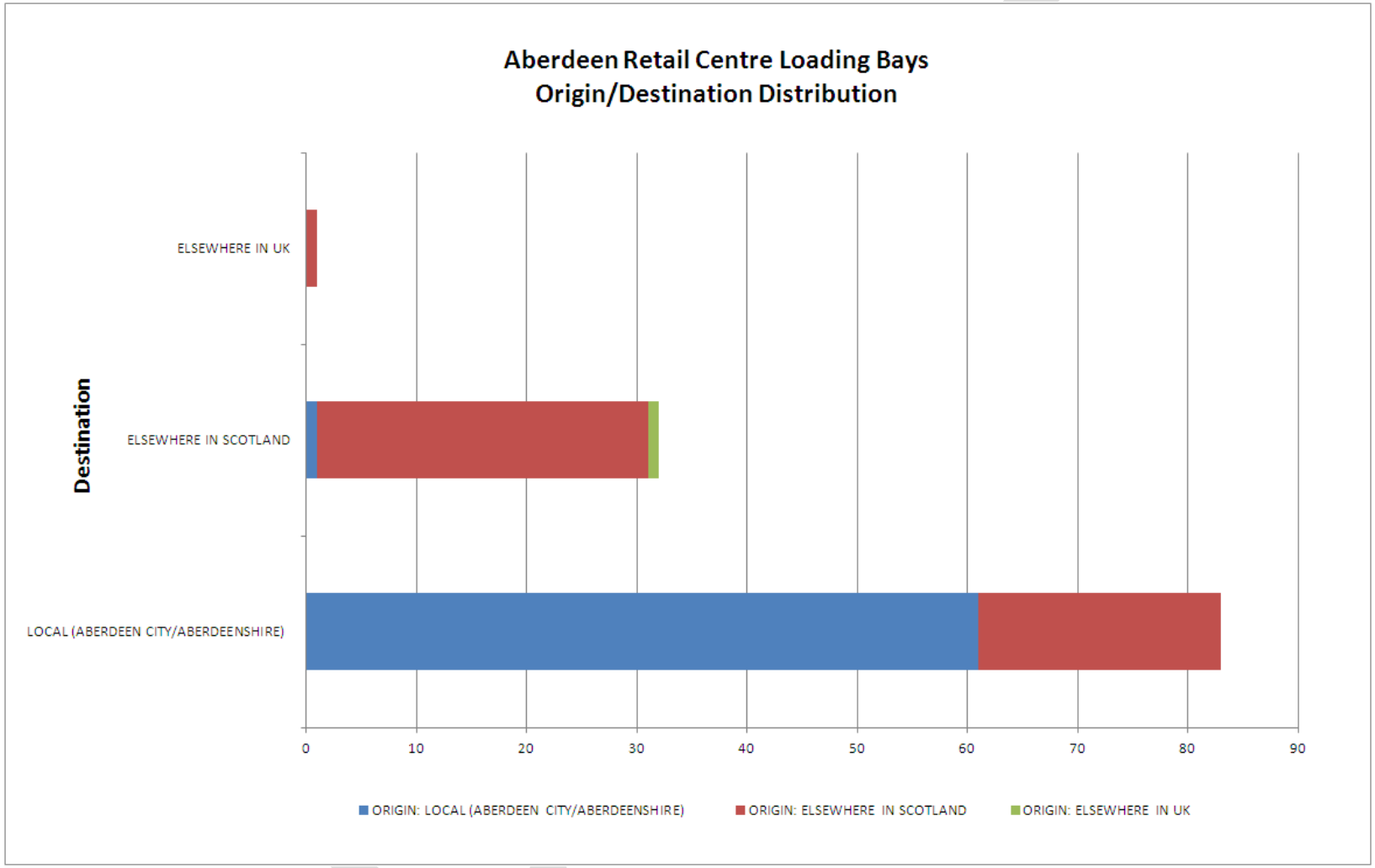


As the vehicle driver origin and destination charts demonstrate, the majority of movements (where origins and destinations were able to be recorded) are local within Aberdeen City and Aberdeenshire.

Further interpretation of the origins/destinations of drivers is shown in the matrix and chart below.

	DESTINATION				
ORIGIN	LOCAL (ABERDEEN	ELSEWHERE IN SC	ELSEWHERE IN UK	UNKNOWN	***ORIGIN TOTAL (check)***
ORIGIN: LOCAL (ABERDEEN CITY/	61	1	0	8	***70***
ORIGIN: ELSEWHERE IN SCOTLAN	22	30	1	5	***58***
ORIGIN: ELSEWHERE IN UK	0	1	0	0	***1***
ORIGIN: UNKNOWN	1	0	0	126	***127***
DESTINATION TOTAL (check)	***84***	***32***	***1***	***139***	

Capabilities on project:
Transportation



As the Origin/Destination distribution shows, the majority of trips with an origin in Aberdeen City/Aberdeenshire also have a destination within this area.

It is also clear from the graph that while some drivers originating from locations elsewhere in Scotland stated a location in Aberdeen City/Aberdeenshire as their destination, the results also suggest that deliveries at retail centres in Aberdeen City only formed part of a trip, with a total of 30 drivers stating their trip would both start and finish at another location in Scotland.

The pie charts below, which provide a further breakdown of origin and destinations demonstrate that a significant proportion of trips originate at Altens Industrial Estate, which could be investigated as a location for a Transport Collaboration exercise.

157 intermediate destinations were also identified (where possible), with the majority of intermediate deliveries taking place within Aberdeen.

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The graph below demonstrates that the number of intermediate deliveries varies, however a significant proportion of those interviewed perform over 5 drop offs as part of a delivery round.

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Driver feedback on comments regarding delivery to survey location, or other locations in Aberdeen city centre

Nine drivers interviewed at Union Square were very positive about the loading facilities at the new development, although two did state that a lack of signage at bays was an issue. Similarly the loading facilities at the Bon Accord Centre received positive feedback from seven drivers. Complaints at this location were few, although two drivers did request that trolleys were provided.

Driver feedback on the Trinity Centre was less positive, which may have been due in part to the lifts being out of order on the day of the survey.

Emerging Findings – Aberdeen Retail Centres Loading Survey

Key Finding 1 – Distribution of Activity
- The majority of vehicles (117) were recorded at Union Square.
- The Bon Accord Centre was the next busiest retail hub, with less vehicles again recorded at the St Nicholas and Trinity Centres.

Key Finding 2 – Vehicle Engines
- Most observed vehicles appear to be falling within the higher Euro standards, with the majority being Euro V.

Key Finding 3 – Delivery Times
- 35% (89) of vehicles were observed in the morning between 0930 and Midday. There would appear to be some similarity between periods of activity in the retail centre survey and the survey undertaken on Union Street in March 2012, which showed that 48% of the vehicles observed in this survey were also recorded between 0930 and Midday.

Key Finding 4 – Multi-Drops and Repeating Vehicles
- A total of 77 'Repeat' vehicles (those tagged at least twice) were recorded during the survey.
- Many of the 'repeat' vehicles were tagged again at the same location of Union Square.
- A number of other vehicles made trips to more than one retail hub in the city centre, with vehicle drops at Bon Accord/St Nicholas and Union Square and Bon Accord/St Nicholas, Trinity Centre and Union Square typically the most common, totalling 22 of the recorded 'repeat' vehicles.
- There was a relatively even split between 'repeat' vehicles tagged on the same day (42) and those tagged on more than day (35).

Key Finding 5 – Origin/Destination Distribution
- The majority of movements (where origins and destinations were able to be recorded) are local within Aberdeen City and Aberdeenshire.
- The majority of trips with an origin in Aberdeen City/Aberdeenshire also have a destination within this area.
- The results also suggest that deliveries at retail centres in Aberdeen City only formed part of a trip, with a total of 30 drivers stating their trip would both start and finish at another location in Scotland.
- Most intermediate destinations are located in Aberdeen.
- Multiple drop delivery rounds were relatively common.

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Capabilities on project:
Transportation

Aberdeen Retail Centres – Driver Interview Form

AECOM

ABERDEEN RETAIL CENTRES – DRIVER INTERVIEW FORM

ABERDEEN CITY COUNCIL

Location: Bon Accord/St Nicholas ☐ Union Square ☐ Trinity Centre ☐

Date:_____ Time:_____ Surveyor:_____

1. What retail unit(s) are you delivering to?_____

2. What is being delivered?_____ Full Load ☐ Part Load ☐

3. Where did this trip start off from?_____ At what time did this trip start?_____

4. Did you have any drops / pick-ups prior to current delivery? Yes ☐ No ☐ How many_____

Where were these made?

1.	5.
2.	6.
3.	7.
4.	8.

5. Do you have any drops / pick-ups following current delivery? Yes ☐ No ☐ How many_____

Where will these be made?

1.	5.
2.	6.
3.	7.
4.	8.

6. Where will this trip finish?_____ At what time do you anticipate this trip will finish?_____

7. What company organises the haulage? (I.e. employs the driver, operates the trucks/vans). Contact info?

_____

8. What company organises the logistics? (I.e. sorts out the loads, schedules and warehousing etc). Contact info?

_____

9. Do you have any comments regarding delivering to this location, or to other locations in Aberdeen City Centre?

Thanks for your time.