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Deliverable D3.4
Feasibility and Transferability Analysis of energy-efficient and sustainable freight logistics solutions in Dundee

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1. Aim of the study

The aim of the study is the identification of feasible solutions for local implementation of energy-efficient and sustainable urban logistics measures.

2. City context

Dundee is the fourth largest city in Scotland with a population of 147,800 inhabitants, based on the most recent population estimates for mid-2012. It is situated on the northern shore of the River Tay estuary. The city is almost entirely urban and suburban in character and is a hub for major routes in the east of Scotland. A line of hills bisects Dundee; consequently there are gradients on many of the major roads linking the city centre with the outer suburbs. Road congestion occurs in the peak periods, particularly at key road junctions across the city. Dundee is located on the main east coast railway line connecting Edinburgh with Aberdeen and has a modern deep-water port and large harbour area downstream from the city centre.

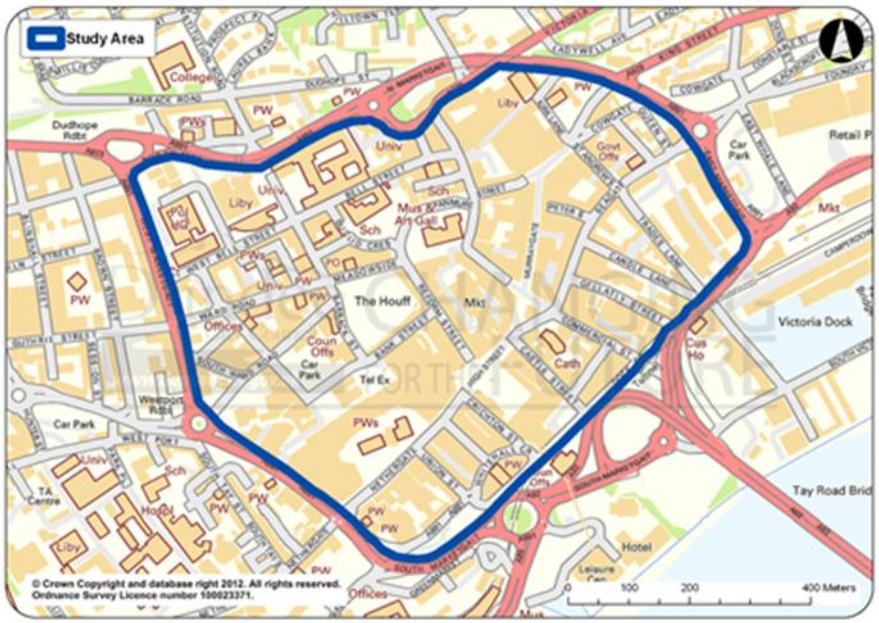
The city of Dundee has evolved from an industrial and manufacturing centre into a modern city with a focus on bio-science, digital media, education, retail and culture and can be considered as a global leader in life sciences.

Air quality is a significant issue in Dundee with EU Limit Values being exceeded for both nitrogen dioxide (NO_2) and particulates (PM10). The main source of air pollution is from road traffic emissions, with additional emissions from industrial sources. An Air Quality Management Area (AQMA), covering the entire city, was declared in 2006 following a review and assessment of air quality. An Air Quality Action Plan (AQAP) has been developed to set out the measures that the City Council intends to introduce to minimise the effects of air pollution on human health.

Dundee is one of the local authority areas which together make up the Tayside and Central Scotland Transport Partnership (Tactran). Tactran's role is to bring together the local authorities and the key stakeholders to take a strategic approach to transport planning and delivery in the region. A Regional Transport Strategy (RTS) has been developed which sets out a Vision and Objectives over a 10-15 year period for meeting the transport needs of people and businesses throughout the region. One of the RTS objectives is to improve the efficiency, reliability and integration of the movement of goods and people.

2.1 Study area

The study area comprises the city centre within the 1960's constructed Inner Ring Road. This includes the Dundee Central Conservation Area which contains the historic heart of the city and provides protection for an area of significant historic and architectural interest.



The study area includes the main retail and commercial centre for Dundee. The shops are divided between two purpose-built shopping centres developed from the 1970s, the Overgate and Wellgate Centres, and those occupying older properties in Murraygate, Seagate, High Street, Nethergate, Commercial Street and Reform Street. There are approximately 400 retailers in the study area. A number of streets are pedestrianised particularly those in the main shopping streets of Murraygate, High Street, Commercial Street and Reform Street.

There a number of office buildings within the study area including the headquarters of Dundee City Council and Tayside Police. The main buildings of Abertay University are also included in this area.

2.2 Policy context

Air Quality Action Plan (AQAP) and City Council freight initiatives

Dundee City Council published its AQAP in January 2011. The key objective is to address air quality issues and environmental targets in Dundee. Within the study area air quality exceedances are focussed in three localities, namely Nethergate/Union Street/Whitehall Street, Meadowside and Seagate/lower Commercial Street.
Freight related measures within the AQAP are:

- Freight Quality Partnership
- Freight Retail Consolidation Centre
- improve emissions from Council Fleet.

The Council is also considering other actions and issues relating to freight, though no definite plans have been formulated at this stage, these are:

- traffic management for freight
- electric vehicles.

The Council has constructed an improved access to the Port of Dundee including interventions that will support road freight movements and its connections to the Trunk Road network.

Tactran freight initiatives

Tactran established a Freight Quality Partnership (FQP) in 2008. This brings together at a regional level stakeholders with an interest in freight movements, comprising both public and private sector organisations. A key role for the FQP is to contribute to the development and delivery of freight initiatives.

Tactran has investigated the feasibility of a freight consolidation centre to serve both Dundee and the neighbouring city of Perth, approximately 30 kilometres to the west, and a road/rail freight facility based at the port of Dundee. Freight information has been included in the Tactran's travel and transport information website www.tactranconnect.com.

Mobility approach and regulation in the study area

All kerbside road space in the study area is regulated by means of Traffic Regulation Orders (TRO), drawn up by the City Council under the auspices of national legislation and is subject to enforcement by City Council-employed Parking Assistants. The TROs define the times that parking or loading/unloading are permitted or restricted and the types of vehicles that can park or load/unload there. These are backed up by traffic signs and lines to guide and inform motorists.

Through traffic movement is restricted in the study area which is divided into four traffic zones. Vehicles can access a group of streets, or zone, from a small number of access points on the Inner Ring Road. Movement between the zones is permitted only for buses.

The main retail streets are pedestrianised with restrictions on access for vehicles and are landscaped to restrict vehicle speeds and discourage general traffic use. In Murraygate for example, nineteenth century cobbles and tramlines have been exposed which also enhance the quality of the streetscape.

The retail businesses on the pedestrianised streets are dependent on front-door deliveries with time restrictions in place from 11.00 till 16.00. The Overgate and Wellgate Centres have off-street servicing areas which can be accessed without time restriction. Elsewhere in the city centre designated loading bays provide kerbside access for retail and office properties.

Intelligent Transport Systems (ITS) have been applied in Dundee through Urban Traffic Management and Control (UTMC) which controls the city's traffic signals, including bus priority, variable message car park signs, CCTV and Real Time Bus Passenger Information ensuring the efficient movement of traffic and the provision of transport information within the city.

3. General logistics context

Specific regulations for commercial and freight vehicle circulation

There are no specific regulations governing commercial and freight vehicle circulation in the study area. These vehicles are subject to the small regulations outlined above that apply to all vehicles except buses. They do however, benefit from designated loading bays. These are lengths of kerbside space that are available only for vehicles loading and unloading, and are defined in TROs. Enforcement of the loading bays is provided by Dundee City Council employed Parking Attendants who issue Penalty Charge Notices (PCN) to vehicles contravening the regulations. There are 36 loading bays in the study area which are highlighted in Appendix 1, or can be accessed at www.dundeecity.gov.uk/forms/parking.php.

Overview of main types of logistics flows

Traffic counts were undertaken during September to December 2012 to determine the number of commercial vehicles entering the study area during a weekday (Monday to Friday). The total number of commercial vehicles entering and leaving the study area is 2,007. 83% of these vehicles are light vans (LGV). The peak time of movements is 08.30-10.30 when 449 vehicles entered the study area. This corresponds with the opening time for most shops until the start of restrictions on vehicle access to the pedestrianised streets. A steady flow of vehicles was evident for the rest of the day from 10.30 till the closing time of most shops at 17.30.

From surveys of retailers it is apparent that 92% of deliveries involve deliveries to more than one shop. Responsibility for organisation of deliveries is generally through company head offices, in the case of 76% of shops, while 15% are arranged by the retailers themselves or through an employee. The majority of retailers (77%) indicated that deliveries are made to a regular schedule, while 13% receive deliveries on an ad hoc basis and 10% on a mixture of regular and ad hoc. The main delivery areas used are split between through the customer entrance (26%), on street (24%) and delivery bays within the premises (33%).

4. Setting logistics baseline

Traffic counts were undertaken during September to December 2012 to determine the number of commercial vehicles entering the study area during a weekday (Monday to Friday). Commercial vehicles were classified by three types, as follows:

LGV – light goods vehicles – comprising car derived vans and goods vehicles up to 3.5 tonnes Gross Vehicle Weight (GVW) (typically Ford Transit type vehicles)
OGV1 – 2 and 3 axle rigid vehicles over 3.5 tones GVW
OGV2 – 4 axle rigid and articulated and drawbar vehicles

The counts were made for 5 minute periods over a 12 hour day from 07.00 to 19.00. The breakdown by half-hourly periods is as follows:

Time period	Number of vehicles			
	LGV	OGV1	OGV2	Total
07.00-07.30	34	5	1	40
07.30-08.00	63	18	3	84
08.00-08.30	78	19	1	98
08.30-09.00	88	28	2	118
09.00-09.30	85	21	1	107
09.30-10.00	94	21	0	115
10.00-10.30	84	24	1	109
10.30-11.00	75	18	2	95
11.30-12.00	80	20	0	100
12.00-12.30	87	10	1	98
12.30-13.00	77	17	0	94
13.00-13.30	68	10	0	78
13.30-14.00	74	11	0	85
14.00-14.30	71	15	4	90
14.30-15.00	76	13	0	89
15.00-15.30	90	12	0	102
15.30-16.00	66	15	2	83
16.00-16.30	76	16	0	92
16.30-17.00	69	11	2	82
17.00-17.30	73	5	2	80
17.30-18.00	54	2	0	56
18.00-18.30	45	5	0	50
18.30-19.00	35	3	0	38
Total	1666	319	22	2007

The total number of commercial vehicles entering and leaving the study area is 2,007. 83% of these vehicles are light vans (LGV). The peak time of movements is 08.30-10.30 when 449 vehicles entered the study area. This corresponds with the opening time for most shops until the start of restrictions on vehicle access to the pedestrianised streets. A steady flow of vehicles was evident for the rest of the day from 10.30 till the closing time of most shops at 17.30.

During 2012 three air monitoring sites located in the study area recorded air pollution levels in excess of the Air Quality Standards (Scotland) Regulations which put into effect the EU Air Quality Framework Directive. Nitrogen dioxide levels in Meadowside and Seagate exceeded air quality standards while particulate levels exceeded air quality standards in Meadowside and Union Street. All three locations have significant flows of buses as well as commercial vehicles.

Pollutant	Concentration	Measured as	Results of monitoring - 2012		
			Air monitoring site		
			Meadowside	Seagate	Union Street
Nitrogen Dioxide	200 µg m^{-3} not to be exceeded more than 18 times a year	1 Hour mean	0 exceedances	0 exceedances	0 exceedances
	40 µg m^{-3} not to be exceeded	Annual mean	54	48	32
Particles (PM10)	50 µg m^{-3} not to be exceeded	24 Hour mean	4 exceedances	0 exceedance	2 exceedances
	18 µg m^{-3} not to be exceeded	Annual mean	19	14	15

Analysis was undertaken of CCTV coverage of loading bays on Tuesday 23 April 2013. This noted the extent of illegal parking, parking taking place legally for loading and unloading and the amount of vacant space. The results indicate that generally there is space available for vehicles wishing to load or unload. However 12% of space is taken up by illegally parked vehicles. At times this could cause a delivery vehicle to have to circulate round the area waiting for the illegal parking to cease and be able to pull into the loading bay.

	Legal use	Illegal Use	Vacant Space	Total Hours
Seagate East	5:08:41	5:26:30	21:03:33	31:38:44
Seagate East 2	2:40:43	9:23:44	23:21:39	35:26:06
Bank Street	4:15:35	3:43:28	15:54:56	23:53:59
Seagate West	1:53:05	0:55:30	33:02:23	35:50:58
Seagate West 2	0:26:51	0:12:50	23:20:19	24:00:00
Seagate West 3	0:36:26	1:09:53	22:13:41	24:00:00
Gellatly Street	8:30:58	6:04:20	33:27:16	48:02:34
Castle Street	6:09:13	4:46:29	19:08:35	30:04:17
Castle Street 2	6:23:32	2:49:44	25:30:13	34:43:29
Total	36:05:04	34:32:28	217:02:35	287:40:07
Percentage	12.5%	12.0%	75.4%	

5. "Candidate Measures" identification

In addition to traffic management controls in the study area, two initiatives have been implemented specifically to improve energy-efficient and sustainable urban logistics. These comprise:

- introduction of ECOStars environmental fleet recognition scheme for vans, lorries, buses and coaches. The continuation of this scheme is dependent on future budgetary allocations which cannot be guaranteed at this time
- development of web-based information on lorry routing.

Two soft measures have been identified for application in the Dundee study area in the short term. These are:

- enhanced enforcement of loading bays
- increased use of electric powered Dundee City Council vehicles.

In the medium/long term a range of measures are feasible which are considered in some detail in the following section.

6. "Candidate Measures" analysis and assessment

6.1 "Soft Measures" - Enhanced enforcement of loading bays

Requirements/ICT support systems/organisational dimensions

The enhanced enforcement of loading bays will be undertaken by Dundee City Council Parking Attendants. This will be achieved through redeployment of existing staff from

enforcement activity elsewhere in the City Council area. The frequency of Parking Attendants monitoring loading bays will be increased to ensure that they are not abused by non freight vehicles. Existing ICT and other support systems will be used. Staff will continue to work within existing legal and organisational systems.

Key stakeholders

Dundee City Council controls parking enforcement in the city and therefore this measure can be implemented without the need for other stakeholder involvement.

Cost and impact

The redeployment of staff will not have a significant impact on costs. Any additional costs of the extra enforcement levels in the city centre will be offset against revenue from additional PCNs issued and will be contained within Dundee City Council existing budgets.

There may be additional costs associated with the monitoring its implementation this will be approximately £2-3,000.

As this is a 'soft' measure it is inherently difficult to measure its effectiveness in terms of CO_2, NO_2, and PM10. However, as a proxy it can be considered that the reduced illegal use of the loading bays should indicate that freight distribution is more effective, therefore minimising delays and congestion, and reducing unnecessary mileage incurred by delivery vehicles circulating trying to find a vacant bay.

"Before" loading bay survey data have been collected and collated. These data will form baseline information to gauge the change in illegal parking in loading bays.

Choice of measure

The study area loading bays support the needs of retail and commercial businesses, however, they are used by vehicles for purposes other than freight distribution. These vehicles are using the parking bays inappropriately or illegally which is a detriment to businesses and impacts on traffic flow and road safety. Freight vehicles can find it difficult to find a suitable location to stop and offload their goods due to illegally parked cars. Consequently they have to double park or park illegally elsewhere, causing obstruction to other vehicles; or circulate round the study area till a space in a loading bay is vacated, thus increasing fuel use and boosting emissions.

The surveys of retailers indicated that although most deliveries do not suffer from any access problems, 20% of premises had difficulties due to delivery vehicles being blocked by other vehicles. This measure will ensure that the availability of loading bays are maximized so that freight distribution is undertaken efficiently and has a minimum impact on general traffic flow. This measure will reduce the need for freight vehicles searching or waiting for available

locations to deposit their goods. It should reduce mileage and help decrease CO_2 and other emissions. It will also prevent freight vehicles double parking and causing traffic congestion. Increased enforcement levels can also prevent vehicles entering certain locations as it acts as a deterrent and can bring associated road safety benefits.

6.2 "Soft Measures" - Increased use of electric powered Dundee City Council vehicles

Requirements/infrastructure/support systems/organisational dimensions

Dundee City Council has one of the largest vehicle fleets in the Tayside region with over 600 vehicles. The vast majority of these vehicles have either petrol or diesel engines which emit CO_2, NO_2 and PM10. As part of the Enclose Project the Council has procured 29 electric vehicles as replacements for existing petrol or diesel powered vehicles. This measure will assist the Council in meeting its environmental objectives as electric vehicles do not produce any harmful emissions. There are also reductions in CO_2 emissions from electric vehicles. Dundee City Council is a very compact area and electric vehicles are particularly useful to the Council as travel distances tend to be relatively low compared with other local authority areas.

The vehicles are based at the Council's fleet depot where there are some charging points; though due to the increase in electric vehicle fleet size, there will be a requirement for additional electric charging points. This is to ensure that full use of these vehicles can be achieved as electric vehicles are still limited by the vehicle range due to the capacity of the battery. City Council employees will use the vehicles and training will be required for all electric vehicles. This is being delivered by the Council or the vehicle manufacturer.

Key stakeholders

Dundee City Council manages the fleet that is used by its officials and therefore this measure can be implemented without the need for other stakeholder involvement.

Cost and impact

The purchase price of electric vehicles is greater than for the equivalent petrol and diesel powered vehicles. Evidence to date suggests that over their lifetime electric vehicles are less costly as fuel and maintenance costs are proportionately lower. As the electric vehicles are replacing an equivalent number of existing petrol and diesel powered vehicles it is not anticipated that there will be any significant impact on management costs of the fleet.

A calculation has been made of CO_2 output for the total fleet of 39 electric vehicles and the additional 29 electric vehicles purchased as part of the ENCLOSE project, as follows. Within the Study Area it is forecast that the additional electric vehicles will achieve a saving of 0.45 tonnes of CO2 compared with conventional diesel powered vehicles.

Total Electric Vehicles in Council fleet	39	vehicles
EV's purchased since April 2012 - 5 vans and 24 cars (17 pool cars + 7 dedicated supervisor cars)	29	vehicles
Total Mileage for August 2013 for 39 vehicles	17,214	miles
Projected Annual mileage for 39 vehicles	206,568	miles
Projected Annual km for 39 vehicles	330,509	km
Diesel car emissions (factor of 0.2 kg per km)	66,102	kg CO_2
Estimated Tonnes of CO_2 saved per annum for 39 vehicles	66.10	tonnes CO_2
Estimated Tonnes of CO_2 saved per annum for 29 vehicles	49.15	tonnes CO_2
Area of Dundee City Council*	63,098,070	m^2
City Centre area within Ring Road (ENCLOSE Study Area)*	572,969	m^2
Approximate CO_2 saving in study area per annum (29 vehicles)	0.45	tonnes CO_2

*measured from GIS

Choice of measure

This measure is aimed at improving air quality and reducing CO_2 emissions, while demonstrating the viability of electric vehicles to other fleet operators in Dundee.

6.3 Medium/long term – Consolidation Centre

Requirements/infrastructure/support systems/organisational dimensions

The concept of consolidation is to group individual consignments or part-loads that are intended for the same destination at a logistics facility (consolidation centre) so that fewer and fuller loads are transported to the target destination. A consolidation centre warehouse ideally would be located on the western fringe of Dundee to intercept road freight movements on the A90 from Perth which is the primary access route from distribution centres in the Central Belt, suppliers in central Scotland and England, and the UK's main sea ports. The consolidation process would provide for deliveries in the study area but also potentially other locations in the Dundee urban area, such as Dundee University and NHS

Tayside medical facilities. It would be targeted at retailers that receive a large number of small consignments or part loads, most likely to be small to medium sized retailers. It would aim to provide additional services to users such as collection and recycling of waste and packaging material, provision of off-site storage space for use by retailers and pre-retailing services In order to optimise the environmental benefits electric powered delivery vehicles would be used.

An operator would need to be identified through a tender process to operate the consolidation centre and provide the delivery function. At this stage it is envisaged that the operator would also be responsible for recruiting users.

Key stakeholders

It is envisaged that Dundee City Council would award a contract to a private sector logistics operator to provide the consolidation function. Full discussion would be required with individual prospective users and organisations representing them including the Dundee and Angus Chamber of Commerce. Other stakeholders would be logistics operators in Dundee and national organisations including the Freight Transport Association and Road Haulage Association.

Cost and impact

The results of a feasibility study undertaken in 2010/11 provided an indicative cost of operation for a consolidation centre in Perth of between £120,000 and £345,000. This is based on assumptions of utilising existing logistics premises and a single electric delivery vehicle operating four delivery runs per day. The provision of a new-build warehouse would incur significant capital costs. These assumptions would apply equally to a Dundee consolidation centre.

The study modelled the impacts of a consolidation centre serving Dundee and concluded that, with a 20% retailer take-up rate, emissions reductions would be possible up to the following levels:

CO_2	96.1 - 113.6 tonnes per annum	(11.8 - 13.9% reduction)
NOx	555 - 646 kg per annum	(12.5 - 13.2% reduction)
PM10	29.5 - 31.2 kg per annum	(13.3 - 13.4% reduction)

Choice of measure

The adoption of consolidation would offer the prospect of CO_2 savings and improved air quality though at an additional cost which in the medium-long term would have to be absorbed by the users of the consolidation centre.

6.4 Medium/long term – Carriage of customer purchases on Park & Ride buses

Requirements/infrastructure/support systems/organisational dimensions

Tactran, supported by Dundee City Council, has a Park & Ride Strategy which aims to develop and implement proposals for Park & Ride sites on the main approaches to Dundee, with priority being given to south of the Tay Bridge and on the A85 on the west side of Dundee. A lower priority has been attached to sites on the north of Dundee adjacent to the A90 and east of Dundee on the A92. The provision of Park & Ride would enable consideration of the carriage of heavier or bulky goods purchased in shops on Park & Ride buses which would operate primarily to and from the central area. At this stage it is not possible to determine the nature of operation of the Park & Ride services which could be operated commercially by a private sector bus operator or under contract to the City Council following a tender process.

The principal components of this proposal would be to provide carriage from shop units to the Park & Ride bus, provision of secure carrying space on the bus and a means allowing goods to be picked up at the Park & Ride site by the purchasers. Detailed consideration would need to be given as to responsibility for these functions which could be undertaken by the bus operator or a logistics company and the nature of the relationship with the City Council.

Key stakeholders

It is likely that Dundee City Council will operate any Park & Ride sites north of the River Tay. Discussion would be required with bus operators providing the Park & Ride bus services and retailers in the study area that would make use of the delivery service.

Cost and impact

It is not possible to gauge the cost of providing carriage of customer purchases on Park & Ride buses as the detailed operation of Park & Ride services is not known at this time. It is envisaged that the impact would be to reduce the need to drive in to the city centre to collect heavier and bulky goods from city centre stores. It could also have the potential to reduce the need for retailers to make deliveries of heavier and bulky goods from city centre stores to purchasers' home addresses with a net reduction in delivery vehicle mileage. Gauging the impact on delivery vehicle distances in the study area in the absence of a more detailed assessment is not possible.

Choice of measure

The measure has the potential to reduce delivery vehicle mileage but the overall feasibility cannot be considered until such time as more detailed information is available on the operation of the Park & Ride services.

6.5 Medium/long term – Further development of web / app / Sat Nav based information for freight/logistics operators in Dundee

Requirements/infrastructure/support systems/organisational dimensions

Tactran has already developed web-based information on lorry routing. There is potential for this to be developed further to be more interactive and provide a wider range of information for freight and logistics operators in Dundee. This information could include, for example, directional guidance to individual premises, availability of loading/unloading space on- or off-street and real time route guidance to minimise delays due to congestion or road works, etc. This information could be provided by a number of means including websites, mobile phone apps or as input to commercial vehicle Sat Navs. This will require more detailed consideration at the appropriate time to take into account the general ICT advances and development of the UTMC system in Dundee.

Key stakeholders

Key stakeholders will be internet/app developers and Sat Nav information suppliers, the City Council as the Roads Authority and particularly as the operator of Dundee's UTMC, and the freight/logistics sector, in particular the national organisations, the Freight Transport Association and Road Haulage Association. As such developments are unlikely to be "standalone" for Dundee; discussions will also be required through ScotFLAG, the Scottish Freight and Logistics Advisory Group.

Cost and impact

It is not possible to gauge the cost of expanding the existing web-based information. Any impact should be positive in terms of reducing unnecessary vehicle mileage and enabling delivery vehicles to avoid congested road conditions, delays at road works, etc.

Choice of measure

The measure has the potential to reduce delivery vehicle mileage and delays due to congestion but the overall feasibility cannot be considered until such time as funding is available to enable a more detailed appraisal to be undertaken.

7. Design of selected measures and delivery

7.1 "Soft Measures" - Enhanced enforcement of loading bays

The redeployment of parking enforcement staff to the study area requires little detailed design as the staff, management and support organisation are in place. The cost implications

are largely neutral as the Parking Attendants will continue to issue PCNs which generate revenue albeit in a different location from currently. Implementation is programmed for November 2013. Pressure on parking and loading spaces increases during the period running up to Christmas.

7.2 "Soft Measures" - Increased use of electric powered Dundee City Council vehicles

The procurement and deployment of new electric vehicles in the City Council fleet is the responsibility of the Council's Fleet Manager.

7.3 Medium/long term – Consolidation Centre

A feasibility study has already been undertaken covering Dundee and Perth. Consultation was undertaken with logistics companies and surveys of the retail sector in Perth and Dundee. The retail surveys covered aspects including frequency of deliveries, organisational responsibility for deliveries, location of access point, access problems and origin of deliveries. This allowed an assessment of the suitability of freight consolidation to serve the two city centres to be undertaken. Perth was found to be more appropriate for consolidation due to the presence of smaller retail units and greater preponderance of independent traders.

A series of scenarios were considered. Guiding principles were to serve dominant delivery routes from the west & south and a consolidation centre location on the urban periphery, on an existing industrial estate and located close to an appropriate delivery route to the city centre(s). The scenarios were assessed in terms of the impact on the number of delivery vehicle trips, air quality and operating costs. The preferred scenario was for a consolidation centre based at Inveralmond Industrial Estate on the fringe of Perth serving only Perth city centre.

It is proposed to review the results of the Perth pilot consolidation scheme before considering this proposal further, particularly with regard to effectiveness in reducing vehicle movements and longer term financial viability. It is unlikely, in the current financial situation that Dundee City Council could cover any shortfall in revenue from consolidation operations in the medium-long term and, indeed, it is difficult to identify any suitable sources of funding to provide support for the establishment of a consolidation centre in Dundee.

7.4 Medium/long term – Carriage of customer purchases on Park & Ride buses

The design and delivery of this measure cannot be determined until such time as more detailed information is available on the operation of the Park & Ride services. It is envisaged that the carriage of customer purchases would not be offered until sometime after the start of Park & Ride services. Park & Ride is a concept that has not yet been tried in Dundee and the effectiveness of basic Park & Ride operations need to be reviewed before considering enhancements to them.

7.5 Medium/long term – Further development of web / app / Sat Nav based information for freight/logistics operators in Dundee

The design and delivery of this measure cannot be determined until such time as a more detailed appraisal is undertaken. Developments in this sector are rapid and need to be considered in a national context to ensure full effectiveness.

8. Stakeholder assessment

Discussions have been held with relevant officers within Dundee City Council with regard to the feasibility and design of the chosen "soft measures". The opportunity was taken at the ENCLOSE Project Awareness Raising Event in Dundee on 27 June 2013 to discuss logistics in Dundee and consider in particular the proposed measures. The consensus from the workshop discussions, which included City Council Members and a representative from the Dundee & Angus Chamber of Commerce, is that existing infrastructure and regulations form the basis for good logistics operations in Dundee. In particular, there are no major congestion problems in Dundee which impact unduly on hauliers' operational effectiveness. The inner ring road, with only limited opportunity for vehicle movement within it, is considered to be fit for purpose, providing a good balance of providing ready access to the city centre whilst retaining an attractive urban environment.

The discussion identified that there is misuse of loading bays by other vehicle users, namely indiscriminate parking by shoppers/city centre visitors, local business owners and taxi drivers. It was noted that some delivery drivers have been observed to ignore loading regulations by unloading their deliveries outwith defined bays.

It was noted as well that freight operations contribute to localised air pollution, albeit the contribution to pollution from HGVs and LGVs is low in comparison with that from buses (as the number of freight vehicles at most of the hotspot locations is relatively small). Despite this, with specific pollution hotspots in the city centre it was considered that freight operations should form part of the measures to improve air quality.

Dundee
December 2013

APPENDIX 1

Loading Bays within Dundee study area highlighted in red