UNIVERSITY OF WESTMINSTER

A framework for considering policies to encourage sustainable urban freight traffic and goods/service flows

Report 2:
Current goods and service operations in urban areas

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The views expressed in the report are entirely those of the authors.

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 March 2000

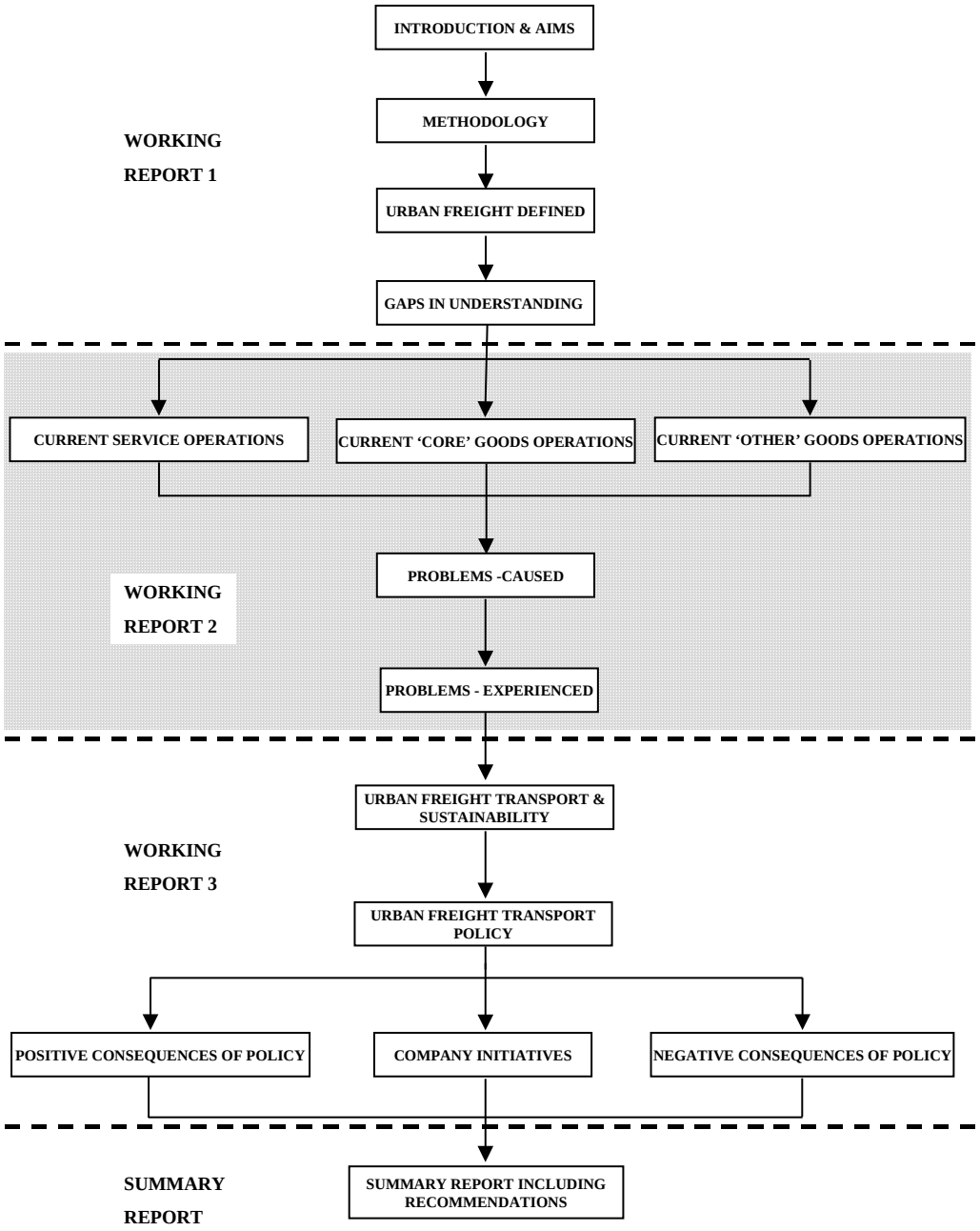
Contents

Figures and Tables

1. Current core goods operations, drawing on research in Norwich and London

The research carried out during the project has been written up in three working reports, of which this is the second. Figure 1 shows how the complete set of reports is structured and the topics covered by each report.

Figure 1: Layout of Working Reports



This report covers the following aspects of the research:
- Current "core" goods operations.
- Other type of goods trips.
- Vehicle trips for service and other commercial activities.
- The problems and negative impacts caused by urban freight transport.
- Problems experienced by goods and service vehicles in urban areas.

This first chapter of the report presents the patterns of goods flow and transport activity that supports goods flows at the urban premises studied in the project. These findings are derived from the face-to-face interviews with owners and managers of premises and freight transport companies and from vehicle logs and manifests completed by freight transport companies. There is a significant amount of data in this chapter which reflects many aspects of goods flow and vehicle activity. There is no attempt in the chapter to compare the findings in this project with the results of other studies.

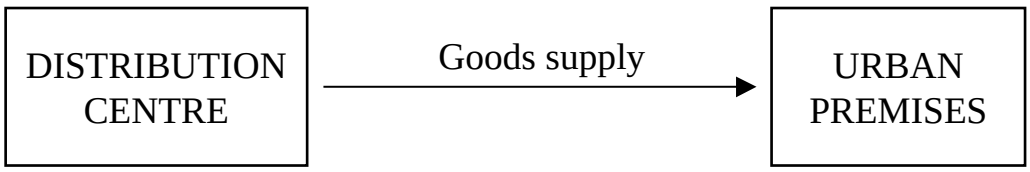
Chapter one addresses the goods vehicle deliveries and collections of "core" goods at urban premises ("core" goods are those goods that are of primary importance to the premises and do not include ancillary goods deliveries, waste collections, banking deliveries and collections, home deliveries made from the premises and service trips (which are dealt with in Chapters 2 and 3, respectively). In the case of a shop for instance, the core goods comprise all the goods the shop actually sells, but excludes those ancillary goods such as till rolls, plastic bags and paperwork, which are required by the shop but not sold on).

1.1 Goods supply systems used by urban premises

The pattern of goods flows in an urban area is strongly influenced by the marketing channel/goods supply systems used by each of the premises in the area and the organisation of the physical distribution systems used to transport goods to and from the premises. In the case of an urban premises that primarily receives goods rather than despatches them (such as shops, restaurants, leisure facilities etc.), the marketing/physical distribution channels used by that premises will determine the number of different final supply points from which core goods are despatched to that premises. Within the research conducted we have identified three types of goods supply systems used by the premises studied:

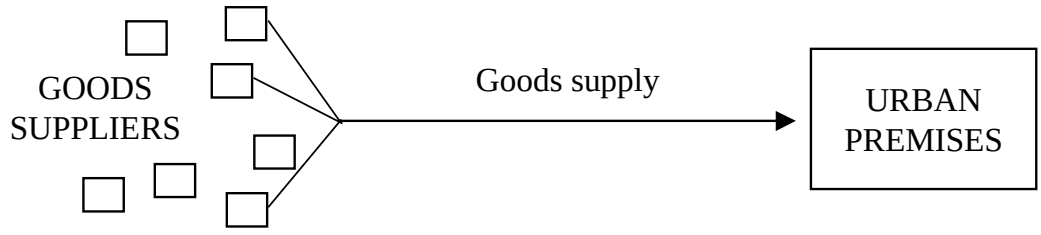
i. those premises that receive all their goods from a single final point of despatch (which we have referred to as a *centralised system of goods supply*). See Figure 2.

Figure 2: Goods supply system - centralised



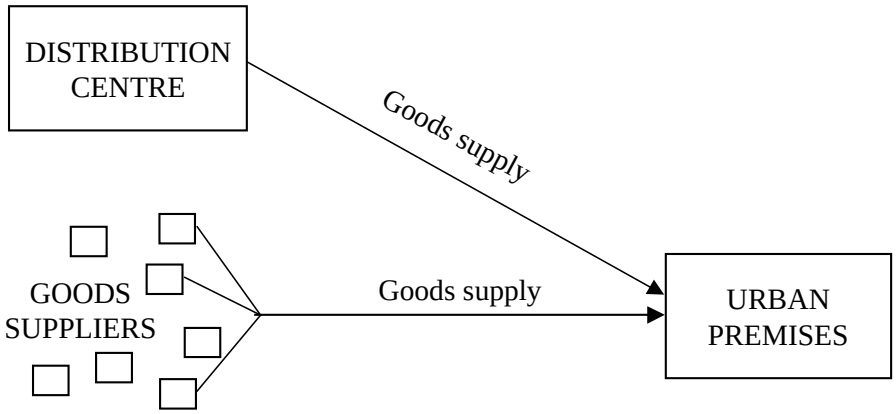
ii. those premises that receive goods from several or many final points of despatch with different vehicles delivering goods to the premises from each final point of despatch (which we have referred to as a *decentralised system of goods supply*). See Figure 3.

Figure 3: Goods supply system - decentralised



iii. those premises which receive a significant proportion of their goods from one final point of despatch and the rest of their goods from a number of different final points of despatch (which we have referred to as a *hybrid system of goods supply*). See Figure 4.

Figure 4: Goods supply system - hybrid



In order to receive core goods/delivery vehicles from only one final point of despatch the premises has to be part of a supply system with one of the following features:

- the premises is part of a larger company/group that has its own distribution network so that goods are despatched to the premises from the company's/group's own national or regional distribution centre. (We have referred to this as an *internally centralised system of goods supply*).
- the premises obtains all of its goods either: (i) via one wholesaler who is capable of providing the full range of goods required by the premises, or (ii) all suppliers sending goods to the premises use the same freight transport company which operates its own depot network so that all the goods destined for the premises can be consolidated onto a single vehicle at the depot which is despatched to the premises. (We have referred to this as an *externally centralised system of goods supply*).
- the premises requires a very limited range of goods and obtains these from one supplier.
- it is also possible to achieve a supply system in which premises receive all their goods requirements from one point of despatch by establishing some form of transhipment centre in, on the edge of, or close to, the city in which the premises is located (be it a physical transhipment centre or a virtual transhipment system based an collaboration between transport companies). However, this system did not exist among those premises studied during the research.

The types of goods supply system used by a range of those premises studied is shown in Tables 1 to 3, together with key indicators of the type, size and ownership of business.

Table 1: Centralised systems of goods supply

Type of premises	Ownership	Size of premises	Number of points from which goods are despatched to premises	Internally or externally centralised
Florist	Independent	Small	1	Externally
Shoe shop	Multiple	Medium	1	Internally
Clothes shop	Multiple	Medium	1	Internally
Clothes shop	Multiple	Medium	1	Internally
Fast food restaurant	Multiple	Medium	1	Externally
Pizza restaurant	Multiple	Medium	1	Internally
Department store	Multiple	Large	1	Internally
Variety store	Multiple	Medium	1	Internally
Furniture shop	Multiple	Medium	1	Internally
Gift shop	Multiple	Medium	1	Internally
Travel agent	Multiple	Small	1	Externally
Dry cleaning shop	Multiple	Small	1	Internally

Table 2: Decentralised systems of goods supply

Type of premises	Ownership	Size of premises	Number of points from which goods are despatched to premises
Florist	Independent	Small	6
Shoe shop	Independent	Small	Approx. 15 regularly
Book shop	Independent	Small	Approx. 50 regularly
Public house	Independent	Medium	12
Printing/photocopy shop	Franchise	Small	3-4
Clothes shop	Independent	Small	5-10
Furniture and carpet shop	Independent	Medium	20 regularly
Gift shop	Independent	Small	50 regularly
Hardware shop	Independent	Medium	50 regularly
Builders merchant	Independent	Large	30 regularly

Table 3: Hybrid systems of goods supply

Type of premises	Ownership	Size of premises	Number of points from which goods are despatched to premises	Internally or externally centralised
Off-licence	Multiple	Small	6	Internally
Chemist	Multiple	Medium	3	Internally
Stationers/office supplies	Multiple	Medium	5	Internally
Public house	Multiple	Medium	7	Internally
Convenience grocer	Multiple	Medium	Approx. 30	Internally
Convenience grocer	Independent	Small	6	Externally
Supermarket	Multiple	Large	7	Internally
Pizza restaurant	Multiple	Medium	9	Internally
Chemist	Independent	Small	40	Externally
Book shop	Multiple	Large	Approx. 7 regularly	Externally
Newsagent	Independent	Small	11	Externally
Furniture and carpet shop	Multiple	Large	50 regularly	Internally

Tables 1 to 3 show that, of those premises studied, only multiple retailers have their own internally centralised goods supply systems. This is to be expected given the cost associated with such facilities and the scale required for them to prove beneficial.

A number of the multiple retailers interviewed make use of a hybrid goods supply system. The majority of multiple retailers interviewed that take this approach operated an internally rather than externally centralised system of goods supply. Of those independent retailers operating a hybrid system of goods supply, they all make use of externally centralised goods supply systems.

Only one independent retailer interviewed makes exclusive use of an externally centralised system of goods supply. The other independent businesses either received goods via a decentralised or hybrid system of goods supply.

In the case of premises with a hybrid goods supply system, the interviewee was usually not able to tell us the proportion of goods that were supplied by the centralised system compared with the decentralised system.

From the interviews conducted it is possible to state that:

- only one independently-owned premises receive all of its goods supply from a single point of despatch (i.e. use a centralised goods supply system) and no independently-owned premises have an internally centralised goods supply system
- a sizeable proportion of independently-owned premises receive goods via a decentralised system of goods supply
- some premises that are owned by companies with many other premises (such as multiple retailers) receive all their goods supply from a single point of despatch (i.e. they use a centralised goods supply system)

- none of the premises that are owned by large companies with many other premises use a decentralised system of goods supply (instead they use either a centralised or hybrid goods supply system)

1.2 Times of goods vehicle operation in the urban area

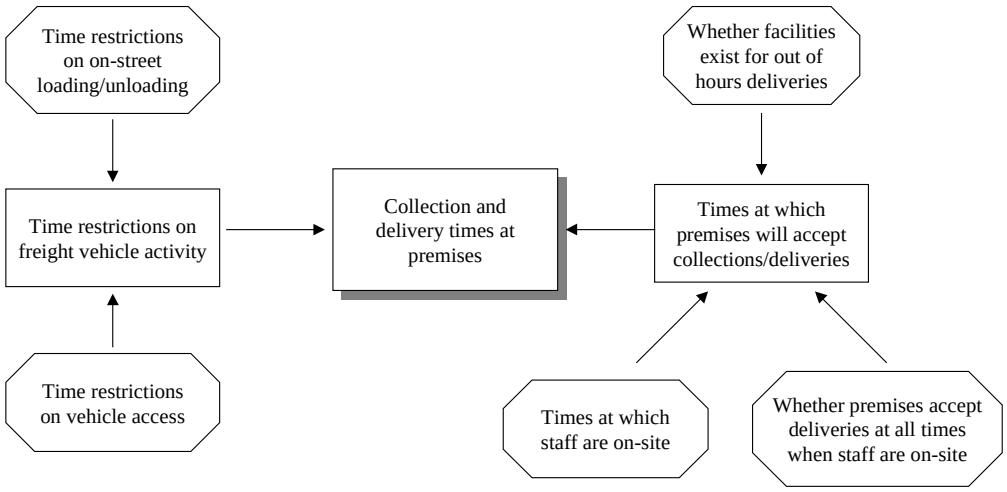
This section considers the times at which goods vehicles operate in urban areas, using the findings from the research carried out in Norwich and parts of London. The times at which goods flows, and hence vehicle activity, take place is of importance to the vehicle operators, the shippers and receivers of the goods, residents and policy makers.

Two key factors determine the times at which collection and delivery work is carried out in the urban area: (i) the time restrictions on vehicle activity at the location where the premises is located, and (ii) the times at which premises are prepared to accept vehicle collections and deliveries. In the case of the former, there are two types of time restriction that can affect delivery and collection operations:

- time restrictions on vehicle activity (i.e. restrictions on driving the vehicle along the road in question);
- time restrictions on vehicle loading and unloading (this only applies to premises with no off-street loading area/bay).

The factors that influence the collection and delivery time at premises are shown in Figure 5.

Figure 5: Collections and deliveries times at premises in the urban area



The latter depends on a number of issues including:

- the times at which staff are on-site at the premises to receive deliveries;
- whether the premises accepts deliveries at all times during the working day;
- whether the premises allows deliveries/collections to take place when staff are not present.

Deliveries/collections when staff are not present at a premises can take place in a number of ways:

- deliverer can access premises (has keys etc.);
- there is some secure place adjacent to the premises where collections/deliveries can be left (storeroom, secure locker etc.);
- leave goods on street or at back door.

1.2.1 Delivery times at premises studied

Table 4 shows the delivery times at premises studied. It shows that the vast majority of deliveries take place during the working day (i.e. between 8 am and 5 pm). Only two premises receive deliveries during the night.

Table 4: Delivery times

Time of delivery	Number of respondents
All deliveries AM	23
Most deliveries AM, others PM	7
Deliveries at lunchtime	2
All deliveries PM	1
Most deliveries PM, others AM	1
Anytime during working day	22
Night	2

While 22 out of 58 of the premises receive goods at anytime throughout the working day, a similar number receive all their deliveries in the morning. There is a marked preference for morning deliveries among many of the respondents. They like to receive goods at or close to the start of the working day so that: (i) they receive the deliveries as soon as possible after placing an order (reducing the time their customers have to wait for goods in the case of a shop, or the time they have to wait for products that they need to work with/require in the case of a factory or office); and (ii) so that they can begin their working day by unpacking and sorting deliveries while the premises are relatively quiet.

Many express and parcels companies (which are responsible for many urban deliveries to retailers and other premises) have organised that their operation so that deliveries are completed by lunchtime and therefore even some premises that have not specifically requested a morning delivery will receive goods before lunch.

Those premises receiving deliveries throughout the working day tend to fall into one of three categories:

- an independently-owned premises receiving deliveries from many different suppliers;
- a non-retail site (industrial or office);
- a retail site which is located outside the city centre.

There are a range of reasons why firms receiving deliveries may be unaware of precise delivery times (see Box 1).

Box 1: Reasons for receivers' lack of certainty about delivery times

i. some premises do not know what goods deliveries are expected to be made on a given day or what time they are expected to take place;
ii. some premises do not know what goods deliveries are expected to be made on a given day but know approximately what time they are expected take place if there are any;
iii. some premises know what goods deliveries are expected to be made on a given day, but not what time they will take place;
iv. some premises know what goods deliveries are expected to be made on a given day, and only know approximately what time they are expected to take place.

Few of the premises in the survey have prearranged delivery times with the deliverer. Those premises that do have prearranged delivery times are all large, multiple companies with their own internal centralised distribution centre.

Many premises receive deliveries from a particular deliverer at approximately the same time each time they deliver, so know approximately what time to expect the delivery. However this delivery time has not been prearranged between the deliverer and the premises in the strict sense, and the premises has little opportunity to request a different delivery time in many such cases (their ability to renegotiate delivery time is related to their importance to the deliverer as a customer (or the importance of the supplier if the supplier arranges and pays for the delivery).

1.2.2 Arranging the delivery time

In an internally centralised goods supply system the company has greater control over the collection or delivery of goods to their premises and are therefore able to organise vehicle arrival times that suit the needs of the premises. This will typically be arranged between the staff at the premises and the distribution centre staff.

In the case of externally centralised or decentralised goods supply systems, the premises receiving vehicle collections or deliveries tend to have less control over the time of vehicle arrival. In the interviews carried out as part of the research, premises in these categories tended to have a better idea of expected vehicle arrival time for vehicles visiting them regularly for collection and delivery work (as, in many cases, the vehicle would arrive at the premises at a similar time on each occasion it visited be it daily, twice weekly, fortnightly or monthly) than they did for vehicles that only visited their premises occasionally (e.g. premises placing an order for goods with fluctuating frequency).

If the delivery to the premises is made by a third party freight transport company (e.g. an express or parcels company or a general haulage firm) on behalf of the supplier or wholesaler there tends to be less, if any, negotiation between the premises and the transport company about the delivery time preferences of the premises. This is due to the fact that the transport company's customer is in fact the sender rather than the receiver of the goods. Of the premises studied, it is the sender that is typically paying for the transport work and entering into a contract with the transport company. Therefore communication between the transport company and the receiving premises tend to be limited, if not non-existent. If any communications about preferred delivery times for the customer do take place this tends to be at the outset of the contract between the supplier/wholesaler and customer, with the supplier/wholesaler then checking with the transport company to establish whether such a delivery time is possible.

Express and parcels companies sell a range of guaranteed delivery services to their customers. Therefore any goods sent by a supplier/wholesaler to a customer via an express or parcels company will have a time by which the goods are guaranteed to be delivered to the receiver's premises. In these circumstances the receiving staff at premises often know the latest time they should receive the delivery, as long as the supplier has informed them about the timed service for which they have paid.

For premises in externally centralised goods supply systems, which receive deliveries of a product on a regular basis, there is often an opportunity for the premises to negotiate a delivery time that suits them at the point at which they initially negotiate a contract with the supplier or wholesaler. If the supplier/wholesaler is operating the vehicles making deliveries to customers themselves, they will attempt to meet their customers' preferred delivery times. However, this can be difficult to achieve as many customers require similar or the same delivery time (typically early morning, in the case of shops, using either prior to opening, or just after opening). It is not possible for the supplier/wholesaler to meet a large number of very similar or identical delivery times without employing a larger than otherwise necessary vehicle fleet and workforce. Therefore in most cases the

supplier/wholesaler will negotiate with the customer to provide a delivery time as close to their requirement as possible so that the delivery that can be built into the existing vehicle operations.

In practice, premises receiving goods from the same companies on a regular basis tend, in many cases, to receive these deliveries at approximately the same time on each occasion. This is due to the company delivering the goods (either the supplier/wholesaler or the freight transport company) organising the delivery into their regular, planned workload. Many of the deliveries to premises that were interviewed in the study, were made as part of a multi-drop round by the deliverer. From the discussion we learnt that, companies making multi-drop deliveries try to keep delivery rounds as constant as possible from day-to-day and week-to-week, in order to reduce the need to continually replan and reschedule transport operations and to ensure that drivers have equal, balanced workloads.

As previously mentioned, in the case of externally centralised goods supply systems, the premises' staff interviewed tended to have far less knowledge of expected delivery times for vehicles delivering goods to their premises on an occasional basis. Many of the premises studied knew only the expected *day* of delivery and not the *time* of delivery, and in some cases not even the day of delivery was known in advance.

Therefore, currently, a significant proportion of urban goods deliveries take place during the morning at the premises studied. Although some of this distribution work takes place during the very early morning before the morning traffic peak and in the later morning after the morning traffic peak has subsided, undoubtedly a sizeable amount of this work does coincide with the morning traffic peaks. This has been reflected in the discussion groups and interviews with suppliers, wholesalers, receivers, freight transport companies and their drivers carried out during the project. By operating during the morning traffic peak, these distribution operations are both adding to the traffic problem and subject to its negative effects. The efficiency of these operations is hampered by the slow average urban traffic speeds during peak times. However, these operations take place at this time due to the requirements of receivers who want to receive goods at the start of their day and it is also due to vehicle operating restriction. The scope to alter these delivery times is discussed in the third working report of this series, which entitled: *Working Report 3 - Making urban goods and service operations more sustainable: Policy and company initiatives*.

1.2.3 Time that staff are at premises to receive/despatch goods

Of the shops and leisure premises (i.e. pubs, cinema, restaurants) included in the interviews many accepted deliveries just prior to opening their premises to their customers in the morning. At many of these premises staff are on-site at the time these deliveries take place as part of their working hours and the firm does not incur additional labour costs. In some cases it is necessary for staff to come to work at an agreed time early in the morning to receive these deliveries, but once at the premises the staff (usually only one or two are required) can be productively employed on other tasks around the premises. They can also unpack deliveries and put stock on display, so that their presence at the premises to receive the delivery is not viewed by the owner/company as an additional cost. These premises surveyed were keen to receive goods early in the day and in some cases were located on streets with vehicle access restrictions after a certain time in the morning (10 or 11 am in many such cases). They tended to therefore view early morning deliveries as preferable to afternoon/early evening deliveries.

When the possibility of evening and night deliveries was discussed, owners and managers of premises were not generally very keen. This is due to the fact that they perceive the need to have staff on-site to receive deliveries and would not be able to get sufficient productivity from these staff at this time of day to justify it.

1.2.4 Whether goods can be received/despatched when staff are not present at the premises

In the research, we found that in the vast majority of cases, premises only accepted deliveries when staff were present on-site to receive them. Only at three premises out of the 58 interviewed did collection/delivery work take place when staff from the premises were not present. One of these premises was a multiple retailer and the delivery driver had keys in order to access the shop. The other two cases were both newsagents, with newspapers delivered on-street outside the front door of the shops before the owner and staff arrived on-site.

There appears to be scope for more delivery work to take place during the night and early morning, and this issue is returned to in Working Report 3.

1.2.5 Vehicle access time restrictions and loading/unloading time

If streets are subject to loading/unloading time restrictions this limits the times at which deliveries can be made to premises on that street if the premises has to delivered to from on-street (i.e. if there is no off-street loading/unloading facility at the premises). In Norwich, for example, the following loading/unloading restrictions have been observed for on-street deliveries on different streets:

- No loading/unloading Monday to Saturday 7.30-9.30 am and 4.30-6.30 pm
- No loading/unloading Monday to Saturday 8.30-10.30 am and 3.30-6.30 pm
- No loading/unloading Monday to Saturday 9.30 am-1.00 pm and 3.00-6.30 pm
- No loading/unloading at any time

As well as legal restrictions on the times at which it is permitted for goods vehicles to dwell at the roadside while making collections and deliveries to premises, entry to streets or areas can also be prohibited, either at specific times or at all times for any purpose. In Norwich, for example, the pedestrianised zone in the city centre is closed to all vehicles from 11 am to 4 pm (Monday to Friday) and from 10 am to 5 pm (Saturday). The only vehicles permitted to enter the pedestrianised zone at these times are those with green badges that gives them exemption or vehicles with permission to enter the zone by the police for a specific journey. Exemptions are not granted to goods vehicles making deliveries during the times that the vehicle ban is in force.

Streets can also be either closed to through traffic either on a permanent basis or at certain times. An example of this type of restriction is Castle Mall in Norwich, which is permanently closed to all through traffic, with the exception of buses. However goods vehicles are allowed to use the road for access purposes in order to make deliveries to and collections from premises located on the road.

From the earlier discussion of current delivery times at premises, it can be seen that the times at which loading restrictions are applied to streets during the morning in a city such as Norwich can conflict with the times at which the premises would like to receive deliveries.

Loading/unloading restrictions and pedestrianised zones can in themselves increase the number of vehicle trips and vehicle kilometres necessary to deliver goods to receivers' premises, as well as increasing the number of goods vehicles making deliveries on a particular street at any one time. For example, during the research we spoke to an express company which, in order to fulfil its guaranteed deliveries in an urban high street that is closed to all motor traffic after 10 am, has to despatch two drivers and vehicles so that all deliveries can be made before the 10 am deadline. This delivery had previously been carried out by one vehicle and driver before the imposition of the 10 am vehicle restriction. By reducing the number of hours in the day available for collection and delivery work, and thereby squeezing this work into a shorter amount of time, this can thereby potentially:

- increase the number of goods vehicles present at permitted times potentially causing a greater hazard to pedestrians and other road users at these times;

- increase the total number of vehicle trips and vehicle kilometres necessary to carry out this distribution work (and thereby fuel use, pollutant emissions and other environmental impacts);
- result in the transporter having to acquire more vehicles and drivers to perform all their work in the available time;
- reduce vehicle utilisation - if the transporter has to acquire more vehicles that operate over a shorter permissible working day it is likely that vehicle productivity will fall, with each vehicle being used less intensively, vehicle load factors falling (as the number of deliveries possible with each vehicle may fall given the reduced operating hours) and empty running increasing (with vehicles unable, due to time constraints, to pick up return loads).

As already discussed, some receiving premises also impose time constraints upon the transporter, by requesting deliveries and collections to be made at specific times. When transporters are faced with both local authority-imposed time constraints and having to meet receivers' specified delivery times this can make their operations difficult to perform. Vehicle use can become inefficient, the work can become increasingly stressful (affecting driver behaviour) and, in some cases, makes it impossible for the transporter to make a delivery at the time requested by the receiver with the existing transport resource (i.e. existing vehicle fleet and drivers).

Negotiation and communication between local authorities, receiving premises and transport companies is therefore required if the distribution operations necessary in an urban area are to be performed in the most efficient manner and with the smallest possible impact upon the environment.

1.3 Number of "core" goods collection and deliveries at different premises

From the interviews several key factors emerged that had an important bearing upon the number of goods deliveries at premises. These included:

1. Type of land use.
2. The size of premises.
3. The type of goods supply system used by the premises.
4. The range and variety of products used/sold at the premises.

Each of these is considered in turn below.

1.3.1 Type of land use

The type of land use influences the number of goods vehicle movements at a particular premises. The number of vehicle deliveries and collections of core goods at the premises with different land uses surveyed in Norwich and London are shown in Table 5.

Table 5: Core goods vehicle movements at different land uses

Type of land use	Number of core goods deliveries & collections per week	Number of respondents
Retail	1-190	44
Cafes and restaurants	3-17	3
Public houses	13-26	3
Hotels	50	1
Cinema	12	1
Office	50-80	2
Warehousing	150	1
Industrial	87-400	3

Among the premises with different land uses that we surveyed, industrial land uses tended to generate more core goods vehicle collections and deliveries than most retail premises. As would be expected the one warehouse studied also generated a relatively high number of goods movements. The two offices that were surveyed (which were admittedly large offices) also generated more vehicle collections and deliveries of core goods (50 vehicle movements per week in one case and 80 movements in the other) than many retail premises but not as many as the industrial premises.

There was marked variability in the number of collections and deliveries of core goods received by retail premises. Some of this variation is due to land use, but it cannot be explained by land use alone.

1.3.2 Size of premises

As can be seen from the Table 6, the size of premises can, in some cases, partially help to explain the number of vehicle collections and deliveries of core goods at premises studied.

Table 6: Size of premises

Size of premises	Number of core goods deliveries and collections per week	Median
Very small - Less than 500 square feet	10-36	11
Small - Between 500 and 999 square feet	1-50	6
Medium - Between 1,000 and 4,999 square feet	1-159	13
Medium/large - Between 5,000 and 9,999 square feet	1-10	2
Large - Between 10,000 and 19,999 square feet	3-80	18
Very large - More than 20,000 square feet	12-400	46

Some of the very large premises did receive large numbers of collections and deliveries. However, many small and very small premises received as many deliveries as far larger premises. For example:

- a market stall interviewed received three times as many goods vehicle deliveries per week than a very large clothing, furnishings and food retailer
- a small florist received more goods vehicle deliveries per week than an out-of-town electrical and electronic superstore.
- a small chemist shop received more goods vehicle deliveries than a large purpose-built office block.

1.3.3 Type of goods supply system used

The type of goods supply system that the premises uses will also affect the number of goods vehicle deliveries and collections generated for the core goods flows to and from the premises (see Section 1.1 for further explanation of different types of goods supply systems identified in the research). We previously distinguished between three types of systems:

i. those premises which receive all their goods from a single final point of despatch (which we have referred to as a *centralised goods supply system*).
ii. those premises which receive goods from several different final points of despatch with different vehicles delivering goods to the premises from each final point of despatch (which we have referred to as a *decentralised goods supply system*).
iii. those premises which receive a significant proportion of their goods from one final point of despatch and the rest of their goods from a number of different final points of despatch (which we have referred to as a *hybrid goods supply system*).

As previously discussed, it is generally only premises owned by large companies with multiple premises that are capable of organising their supply system so that all core goods are despatched from one final geographical point to the premises. Table 7 shows how many of the premises studied used each of these goods supply systems.

Table 7: Goods supply systems used by premises

Type of goods supply system for core goods used by the premises	Number of premises studied using this supply system
Internally centralised	9
Externally centralised	3
Decentralised	16
Hybrid (int. centralised and decentralised)	23
Hybrid (ext. centralised and decentralised)	7

Tables 8 to 11 below show the number of vehicle collections and deliveries required per week in order to achieve all the core goods flows to and from a range of different types of premises studied.

Table 8: Vehicle movements for core goods at premises with centralised goods supply systems

Type of premises	Ownership	Number of points from which goods are despatched to premises	Number of vehicle collections and deliveries for core goods per week
Dry cleaning shop	Multiple	1	1
Furniture shop	Multiple	1	1
Gift shop	Multiple	1	1
Clothes shop	Multiple	1	2
Clothes shop	Multiple	1	2
Travel agent	Multiple	1	2
Fast food restaurant	Multiple	1	3
Pizza restaurant	Multiple	1	3
Florist	Independent	1	6
Shoe shop	Multiple	1	6
Department store	Multiple	1	12
Variety store	Multiple	1	15

Table 9: Vehicle movements for core goods at premises with decentralised goods supply systems

Type of premises	Ownership	Number of points from which goods are despatched to premises	Number of vehicle collections and deliveries for core goods per week
Gift shop	Independent	50 regularly	3
Clothes shop	Independent	5-10	4
Shoe shop	Independent	Approx. 15 regularly	5
Printing/photocopy shop	Franchise	3-4	6
Furniture & carpet shop	Independent	20 regularly	10
Florist	Independent	6	10
Hardware shop	Independent	50 regularly	18
Book shop	Independent	Approx. 50 regularly	25
Public house	Independent	12	26
Builders merchant	Independent	30 regularly	35

Table 10: Vehicle movements for core goods at premises with hybrid goods supply systems

Type of premises	Ownership	Number of points from which goods are despatched to premises	Number of vehicle collections and deliveries for core goods per week
Off-licence	Multiple	6	3
Stationers/office supplies shop	Multiple	5	9
Public house	Multiple	7	13
Pizza restaurant	Multiple	9	17
Chemist	Multiple	3	24
Newsagent	Independent	11	25
Convenience grocer	Independent	6	26
Book shop	Multiple	Approx. 50 regularly	40
Furniture and carpet shop	Multiple	50 regularly	46
Chemist	Independent	40	50
Supermarket	Multiple	7	60
Convenience grocer	Multiple	Approx. 30	159

Table 11: Relationship between goods supply system and vehicle collections/deliveries

Number of points of despatch from which core goods are received at premises studied	Number of collections and deliveries of core goods at premises studied (vehicle trips per week)
1	1-15
2-5	2-24
6-10	4-60
11-25	5-400
26-50	11-159
More than 50	18-190

The findings suggest that the degree of centralisation in the supply of goods to the premises does influence the number of vehicle deliveries and collections of core goods at the premises. It is important to note that centralised goods supply systems tend to generate fewer goods vehicle collections and deliveries at premises compared with decentralised and hybrid supply systems. This has highlighted the scope for reducing the number of urban goods vehicle trips by altering the goods supply systems used by urban premises.

However it should be recognised that our research shows that there are instances in which a premises that received goods from fewer points of despatch, did in fact generate more core goods vehicle collections and deliveries per week. Therefore, the degree of centralisation in the goods supply system only offers a partial explanation of vehicle trip generation for core goods and it is also necessary to consider other product and organisational factors.

1.3.4 Range and variety of products used/sold

The range and variety of products used or sold by the premises is another factor that plays a part in explaining the number of core goods vehicle collections and deliveries to the premises.

The term "product range" is used in this context to mean the number of completely different categories of product used by the premises. Examples of different categories of product include distinct products such as books, clothes, food, compact discs, electrical equipment etc. The greater the product range, the greater the number of different manufacturing sectors from which goods are sourced.

The term "product variety" is used in this context to mean the number of different types of product lines within any one product category used/sold by a premises. For example, newspapers are a product category, and there are a number of different *varieties* of newspaper available in most newsagents such as The Times, The Independent, The Sun, The Mirror etc. Similarly, within the product category of shoes, there is a often a wide range of shapes, styles, colours and sizes available in many high street shoe shops. It usually follows that the greater the product variety, the greater the number of different suppliers within that manufacturing sector, from which goods are sourced.

It is important to make this distinction between "product range" and "product variety" because it is often assumed that a small product range implies relatively simple purchasing and logistical operations. However this is not necessarily the case if the product variety within that small product range is large. For instance, in the case of a book shop, it may only sell one main category of products, namely books. It could easily be assumed and often is that, as all the products flowing to and from the shop fall into one product category and are therefore relatively similar in shape and size, the logistical arrangements are also relatively simple to organise and operate. However, this point of view ignores the fact that the book shop may have in stock as many as 150,000 different book titles at any time (as well as several different editions of a single title in the case of popular titles), that it can order books not in stock from a list of books currently in print that extends to several million different titles, and that these books are published by thousands of different national and international publishers. By comparison a supermarket may sell 30,000 different product items in total. These factors result in the logistical arrangements being anything but simple for a book shop.

The product range and variety can therefore have a bearing on:

- the total number of different suppliers from which a company has to purchase its total goods requirement;
- the number of orders that need to be placed by a company in order to purchase its total goods requirement;
- the total number of goods vehicle deliveries that will be made to the company's premises in order to deliver its total goods requirement;

- the potential to consolidate the goods being delivered to the company's premises.

1.3.5 Combined collections and deliveries at the premises

If the delivery vehicle that delivers core goods to the premises also collects any goods that need to be transported back to its depot at the same (whether it comes from the company's own distribution centre or from a wholesaler or supplier), this helps to reduce the total number of vehicle collection and deliveries for core goods necessary at the premises. However, by making collections at the premises, as well as deliveries, this increases the time taken at each premises and can reduce the number of deliveries a vehicle is capable of making.

Most of the retail premises studied return relatively few core goods to the point of supply. Most of the retailers interviewed only return damaged stock on a regular basis, and this does not tend to involve large quantities. Retailers that sell seasonal stock (such as styles of clothing in a clothes shop) will return entire lines to distribution centres, but this tends to take place on one day in one vehicle trip.

The majority of premises studied do not therefore require separate vehicle trips for the purpose of collecting core goods on a regular basis as this is dealt with by the delivery vehicles. This is shown in Table 12.

Table 12: Whether core goods deliveries and collections are combined at premises studied

Collection and delivery arrangements for core goods	Number of premises
All delivery vehicle/s also collect core goods	35
Some delivery vehicle/s also collect core goods	6
All collection and delivery trips are separate	17

There were several reasons as to why core goods deliveries and collections were carried out as separate vehicle trips at 17 of the premises studied:

- goods are delivered to premises as part of multi-drop round by transport company, which operates separate collection rounds;
- goods are delivered to premises on behalf of supplier by transport company - to return goods the premises has to organise collection by a transport company;
- suppliers only make deliveries to premises on very infrequent basis, and goods need to be returned before the date of their next delivery;
- goods that need repairing and hence despatching from premises have to be sent to a different location to that where delivery vehicles operate from and to;
- destination of goods despatched from premises is not the same location to which delivery vehicles are returning.

Combining collection and delivery trips for core goods, as already practised at 35 of the premises studied, clearly leads to fewer vehicle trips in a given area or over a given period of time.

1.3.6 Observations from our analysis of "core" goods vehicle delivery activity

Many of the premises surveyed do not generate a large number of "core" goods vehicle collections and deliveries. Eighty five per cent of the premises studied generate less than 50 core goods vehicle collection and deliveries per week. These premises with centralised goods supply systems tend to have already significantly reduced the number of goods vehicle deliveries and collections that they receive. At some premises with centralised supply systems, the number of core goods vehicle deliveries and collections are already as low as feasibly possible and could not be reduced any further (i.e. those premises that receive all their goods deliveries from one point of supply in full size vehicles). In the case of these premises at which the number of "core" goods vehicle trips are

relatively low and conducted efficiently, there is little if any need to consider how to reduce these trips yet further, as the scope for more reductions may be negligible.

However, when all the "core" goods vehicle trips to all the premises in the urban area are added together, this number is obviously large, and, at this scale, an argument can be made for attempting to improve the efficiency of goods flows so as to reduce the number of these trips. The total "core" goods vehicle trips in an urban area is dependent upon:

- the total number of premises in the urban area;
- the goods delivery and collection practices at each individual premises.

In order to reduce the total "core" goods vehicle trips in an urban area it is therefore necessary to:

- identify those premises at which the number of "core" goods vehicle trips are relatively high;
- identify the reasons responsible for the number of "core" goods vehicle trips at these premises;
- determine the scope for reducing the number of "core" goods vehicle trips at these premises;
- where appropriate generate strategic or operational initiatives that could help reduce the number of goods trips at these premises.

1.4 Delivery frequency for core goods at premises

The frequency with which any particular core good that is used or sold at a premises is delivered to that premises (i.e. the rate at which the good is replenished) depends upon a number of factors:

1. Time sensitivity of goods received.
2. Turnover of goods (demand/sales level).
3. Stockholding policy and space at the premises.
4. Goods reordering policy/system.

Each of these factors is discussed below.

1.4.1 Time-sensitivity of the goods received

Products that are time-sensitive need to be replenished more frequently than those that are not. Time sensitivity can take two forms:

- goods that physically deteriorate quickly over time (such as food, drink, flowers, chemicals etc.);
- goods that do not necessarily physically deteriorate quickly but which lose their value to customers over time (e.g. newspapers, new releases of music and books, products with a fixed season such as Christmas cakes and clothes and footwear ranges, products with a fixed shelf-life).

Some products fall between these two categories of time-sensitivity. These products have a definite shelf-life before which they must be used but, although this shelf life has not been reached, the customer may demand a fresher one with a longer "use by" date. For example, grocery shoppers tend to choose the freshest bread, milk and eggs available in the shop despite the fact that the less fresh stock on display is still well within its "use by" date.

The more time-sensitive the product, the more frequently replacement stock will needed. Therefore the supply of time-sensitive products to premises tends to generate more frequent goods vehicle deliveries than products which are less time-sensitive.

Also, the more time-sensitive the product, the greater the likelihood that the product will have to either (i) be disposed of as waste in the case of products that physically deteriorate, or (ii) be returned to the supplier in the case of products that quickly lose their value to customers over time. This disposal or return of time-sensitive products also has implications for goods vehicle trip generation rates.

1.4.2 Turnover of goods (sales level/rate of consumption)

The rate at which a premises either sells (in the case of a shop or other premises selling goods) or uses (in the case of an office or factory) core goods also affects the frequency of delivery of goods. For example, if two identical hardware shops each have an identical stock level for a given hammer, but one of the shops sells these hammers at a much faster rate than the other, it will have to reorder and receive deliveries of replacement hammers more frequently, everything else being equal. Therefore the sales level or rate of consumption of a particular product at a premises, will have a bearing on the frequency with which that premises receives goods vehicle deliveries of that product.

1.4.3 Stockholding policy and space at the premises

Stockholding space available at a premises and the stockholding policy adopted at that premises by the management will also have an important bearing on the number of goods vehicle deliveries to that premises.

The greater the quantity of stock of a given product held at the premises, the less frequent the need to place orders for replacement stock of that product. The less frequent the order placement, the less frequent the goods vehicle deliveries.

There is much discussion among logistics commentators about companies making conscious attempts to reduce the quantity of stock that they hold (for example Christopher, 1999; Waters, 1999). Reducing stock levels can lead to a number of financial and operational advantages. The financial advantages of stock reduction include the:

- reduction in the amount of capital tied up in the stock;
- reduction in physical storage costs (the capital and operating costs associated with storage facilities);
- reduction in the amount of depreciation brought about by stock deterioration, theft, damage, change in tastes etc.

Operationally, reducing the amount of space devoted to stockholding at a premises such as a shop increases the space that can be used for retailing and other more productive activities. However in deciding whether and by how much to reduce stockholding levels, shop and other premises have to compare the potential effect of lost sales resulting from having no stock available (and disappointing their customers) with the cost of holding the stock. Table 13 shows the stockholding policy at the retail and leisure premises studied.

Table 13: Stockholding at retail and leisure premises

Does the premises hold stock in addition to those goods on display?	Number of premises
Yes	23
Yes, but not very much	21
No	6

From the interviews conducted it is clear that many of the premises (retail and others) hold relatively little, and in some cases no, stock on-site. The ability to hold stock is obviously dependent upon the space available for storage. From the interviews conducted it is clear that stockholding space available at retail premises has reduced in the last five to ten years at a sizeable proportion of retail premises. Approximately forty percent of all the premises studied had reduced the quantity of the stock held over this period.

Those premises that have reduced stockholding levels tend to have taken steps to help ensure that they do not suffer “stock outs” (i.e. run out of stock). For many of these premises this has involved improving the organisation of their reordering process so that orders can be placed more easily, faster, and more frequently. As well as placing orders more frequently, these orders tend to be

delivered to the premises as soon as they are available rather than being consolidated by the supplier. This has the effect of increasing the frequency of goods vehicle deliveries to the premises.

1.4.4 Goods reordering policy/system

If premises reduce the quantity of stockholding, it is important that when stock replenishment is necessary that this happens as quickly and efficiently as possible after placing an order if the effects of reducing stockholding levels, especially lost sales, at the premises are to be minimised. The time between the placing of an order for goods and the delivery of those goods to the premises is often referred to as "order lead time". The order lead time is dependent upon the speed of four operations (McKinnon, 1989):

- transmission of the order to the supplier;
- order processing;
- physically assembling the goods;
- transporting and delivering the goods to the receiver.

Reordering media

Many of the premises surveyed, which are owned by large companies, have taken steps in recent years to reduce order lead times and thereby get stock to the premises more quickly. One of the ways in which this is being achieved is through the use of high speed media for sending order details from the premises to the supplier. The reordering media used by the premises in the study are shown in Table 14.

Table 14: Reordering media used by the premises

Media used to communicate orders for goods from premises	Number of premises using this media
EPOS*/EDI/computer**	21
EPOS/EDI/computer, telephone and fax	7
Telephone/telesales and/or fax	24
In person and phone/fax	2
Orders also placed via van sales	2
Not known	4

* EPOS - Electronic Point Of Sale
** EDI - Electronic Data Interchange

As can be seen from Table 13, approximately half of the premises studied are using electronic computer-based reordering systems for either all or some of their orders. By using such systems it is possible to reduce the time taken to place orders and also to reduce the number of mistakes that occur when placing orders in writing or when placed over the telephone. From the interviews, the premises making use of computer-based ordering tend to be owned by larger companies with multiple premises. In some cases these reordering systems are automatic and are linked to the point of sales system, so that as goods are sold this information is recorded and then transferred to suppliers (known as electronic point of sales - "EPOS").

From the interviews carried out, there appears to be a relationship between the size of the company and the communication media used. Of the 28 premises using electronic computer-based communication media for some or all of their ordering, only one of these premises is an independent company, all the rest are owned by large companies with multiple outlets/premises. The one independent company that does use electronic computer-based ordering is a book shop and in the retail book sector all shops, even those privately owned, tend to order using a computer clearing system.

Of the twenty four premises solely using telesales/telephone or fax ordering systems (a telesales ordering system is a system whereby the supplier telephones the premises to take the order rather than the staff at the premises having to contact the supplier) eight are owned by large companies and 16 are independently-owned. Of the eight premises owned by large companies they tended not to be high street shops but instead included a cinema, two public houses, two restaurants, a hotel, and a large purpose built office.

Therefore the interview work suggests that premises owned by large companies tend to make greater use of electronic ordering and communication systems than independently-owned premises. These systems have several advantages:

- accuracy of information (less chance of error than telephone (spoken) and fax (often hand-written) ordering;
- speed of transmission;
- automatically transmitted in some cases (removal of order placement task);
- in some cases, can transmit other data as well as product sales data from premises to head offices (including sales revenue and other financial data, stockholding data, operational performance data etc.).

Centralised forecasting and purchasing

Many premises that are part of large companies do not actually place orders with their suppliers direct from the premises. Instead sales data is sent from the premises to the company head office and then head office staff make centralised ordering decisions based on this sales information, together with the use of other trend data and demand forecasting systems. The ordering of goods required by the premises was carried out by head office staff rather than the staff based at the premises at 17 of the premises surveyed (approximately 30%). All but one of these 17 premises were part of large companies with numerous outlets.

The head offices that centrally place orders on their suppliers need to receive accurate sales data from all their premises, often on a frequent basis. Communicating this information from premises to head office by electronic computer-based systems has several advantages over telephone and fax systems as mentioned above, including accuracy and speed of data transfer. In addition the head office staff will often need to work with the data (in forecasting packages etc.) and often submit orders to their suppliers electronically so receiving it in an electronic format from premises is most suitable and takes away the need for large-scale data entry at head office. This is reflected by the results from the premises studied. At 15 of the 17 premises placing orders from head office rather than from the premises itself, the communication of sales data from the premises to the head office was carried out electronically (by EDI, EPOS or other computer-based systems).

Advantages to the company of placing orders from head office rather than from each premises include:

- possible to negotiate bulk order discounts and reduces the staff time and hence cost involved in order placement;
- where sophisticated demand forecasting programmes are being used, which help to balance supply with expected customer demand, it is not usually appropriate to perform this activity at branch level due to its complexity;
- helps to make visible and control stockholding levels at premises across the company;
- can help to match supply and demand;
- facilitates quick response to goods demand/ordering across the entire company. Strategic changes in ordering can be quickly and efficiently implemented;
- provides head office with constant, accurate information about the performance of the premises;
- reduces/removes the ordering task that has to be performed by staff at the premises.

Centralised purchasing also provides larger companies with greater opportunity to reduce the number of suppliers used (by buying more products from each supplier used), and thereby give the potential to achieve greater goods consolidation on vehicle deliveries to the premises, and the need for fewer vehicle deliveries in total.

Order lead time

As already mentioned, if premises hold less stock on-site it is important that they receive goods at the premises as quickly as possible from the time when they place an order so as to minimise the amount of lost sales (in the case of a retail premises) or minimise the disruption to the production process (in the case of a manufacturing site).

Companies placing orders are therefore keen for order lead times to be as short as possible so that the amount of time when the premises is without certain goods can be minimised. As explained in the previous section, using computer-based reordering systems is helping companies to reduce the time taken to place and transmit orders for goods, thereby helping to reduce the order lead time. Table 15 shows the order lead time for a selection of premises studied which order goods directly from suppliers.

Table 15: Order lead time for premises ordering goods direct from suppliers

Type of premises	Lead time from premises placing order to receiving goods
Florist,	Next day
Chemist (drugs and medical), Photocopy and printing shop (paper supplies)	
Fruit and vegetable stall	
Fruit and vegetable shop	
Convenience grocer,	Next day to 2 days
Restaurant	
Hotel	Next day to few days
Pub (drinks),	2 days
Cinema (food and drink),	
Restaurant	
Off-licence,	2-3 days
Stationers	
Newsagent (food and drink)	Few days
Book shop	1 to 2 weeks
Clothes stall in market	
Furniture & carpet shop (carpet)	
Hardware shop	2 days to 6 weeks
Builders merchant	
Furniture & carpet shop (furniture)	6 to 8 weeks
Gift shop (independent)	1 to 3 months
Shoe shop (independent)	2 to 3 months
Designer clothes shop (independent)	6 months

1.4.5 Delivery frequencies at premises surveyed

As discussed, premises can make up for a lack of on-site storage by receiving deliveries of goods on a frequent basis (i.e. a more rapid rate of replenishment). This concept of receiving "little and often" (i.e. small delivery sizes on a regular basis) has become well known and researched in recent years in both manufacturing (where it is often referred to as Just-in-Time distribution) and in retailing (where it is often referred to as Quick Response).

Staff at one in three of the retail premises studied, told us that they had experienced increases in delivery frequency at their premises in the last five years. Some others told us that delivery frequency had remained stable in the last five years, but had increased significantly as long as 5-20 years ago. At some premises delivery frequency had not changed, even in the long-term. It should be noted that many interviewees at premises where delivery frequency had increased were unable to quantify the increase in frequency.

1.5 Size of goods vehicles operating in the urban area

The issues discussed in relation to vehicle size in this section have arisen from the interviews carried out with premises and with freight transport companies. It is important to note that the core goods required by the premises studied were virtually all delivered by conventional goods vehicles and vans. The only exception to this was owners of independent shops who used their own cars to transport core goods from cash and carry wholesalers and other suppliers.

1.5.1 Product carried

The type of product being moved can have a bearing on the size and type of vehicle required for the operation. Examples of vehicle size in the study include:

- building materials: relatively large rigid vehicles;
- furniture and carpets: relatively large rigid and articulated vehicles;
- bulk products (chemicals, flour, sheet metal and glass) - large rigid and articulated vehicles.

1.5.2 Quantity of product carried

In the case of some products it is the quantity of the product(s) carried rather than any special characteristic of the product that has a bearing on vehicle size. The amount to be carried is determined by factors such as: the quantity to be delivered to each receiver, the total number of receivers to be delivered to on a round, the suitability of product mixing on the vehicles, and the opportunity to consolidate loads in the supply chain. Examples from the premises studied include:

- Delivery quantity required by each receiver to be delivered to: multiple chemist shop receiving large deliveries on fully loaded large rigid vehicle compared with small deliveries by van and small lorry to independent chemist.
- Opportunity to consolidate loads in the supply chain: clothes market stall buying direct from suppliers receives deliveries from suppliers on parcels company vans compared with multiple clothing store which receive deliveries from its own regional distribution centre on a large rigid lorry.
- Suitability of products mixing on the vehicles: some products such as chilled and frozen foods and bulk products have special vehicle requirements such as refrigerated vehicles and tanker and tipper bodied vehicles. Fragile products cannot be readily mixed with other goods on a vehicle. Therefore this can reduce the ability to maximise vehicle payload when carrying such products.

1.5.3 Type of land use at origin and destination

The type of land use has a direct bearing on the type of goods that need to be delivered and collected from that premises. During the interviews conducted as part of the study it was possible to collect information about the core goods required at each premises surveyed. In addition it was also possible to discuss the size of vehicles on which these goods were delivered and collected, and the frequency

of these vehicle movements. However it is important to note that the vast majority of respondents were unaware of the gross weight of the vehicles used to collect and deliver to and from their premises and also, in many cases, were not able to distinguish between large rigid and articulated vehicles. This information could only be reliably gathered either by researchers observing the vehicles as they arrive at the premises or by contacting all the companies responsible for making deliveries and collections to the premises (which was not possible within the scope of the project).

It is possible to say with certainty that large articulated vehicles were used at the following premises taking part in the survey:

- multiple supermarket
- multiple clothes shop
- multiple electrical retailer
- computer superstore
- chemicals factory
- double glazing factory
- multiple department store
- multiple builders merchant
- factory-scale bakery
- retailer distribution centre

Goods vehicles described as “large” by staff were used at the following premises studied:

- multiple off-licence
- multiple chemist shop
- multiple stationers
- public house (tied and free house)
- convenience grocer
- chain cinema
- multiple fast food restaurant
- multiple pizza restaurant
- multiple shoe shop
- multiple clothes shop
- multiple variety store
- multiple dry cleaning company
- chain hotel

It is important to note that many premises studied receive goods deliveries and collections in a wide range of different-sized vehicles. Of the 58 premises surveyed, 34 received collections and deliveries in vehicles described as ranging in size from vans to medium-sized and large lorries.

Premises studied that only received goods collections and deliveries by vans were:

- independent florist
- independent chemist shop
- independent book shop
- multiple book shop
- two independent newsagents
- independent shoe shop
- franchise printing and photocopy shop
- independent clothes shop
- independent clothes market stall
- independent gift shop
- multiple travel agent

As can be seen from the above list, the majority of those premises receiving only van traffic for goods collections and deliveries were independently owned. Many of these premises received relatively small average delivery sizes and sourced goods from several different suppliers, each of which either delivered the goods directly themselves or contracted a express/parcels company to make the delivery. Only two multiple retailers were provided with all goods deliveries and collections solely by vans - one of these was a travel agent whose deliveries consisted mainly of brochures (a product suited to van delivery) and the other was a large multiple book shop. With the exception of the multiple book shop, all the premises visited only by vans listed were relatively small shops with small sales areas.

1.5.4 Distance between point of despatch and receipt

There would appear to be a relationship between goods vehicle size and distance between point of despatch and receipt. The vast majority of vans and smaller goods vehicles making collections and deliveries from the premises studied were operating from depots either within the city or just outside. Whereas goods distributed over long distances (either direct from suppliers or from the premises own national or regional distribution centres) tended to be transported in larger vehicles. This trend is to be expected, as transporting goods over long distances in small vehicles would result in substantially higher delivery costs per mile than when using large vehicles.

1.5.5 Vehicle size restrictions

Restrictions on the size and weight of vehicles operated in urban areas also affect the size of vehicle used for a particular distribution operation. Restrictions can come about in two ways:

- bans imposed by the local authority on vehicle size and weight either on a particular street, a specific area or city-wide;
- narrow streets that are unable to accommodate large vehicles (this is especially true of historic cities with old street layouts).

In the case of Norwich, for example, vehicles of more than 7.5 tonne gross vehicle weight are not allowed inside the outer ring road expect for access (i.e. except for when making collections and deliveries at premises in this area - but this restriction is not well enforced). Some particular roads in Norwich city centre also have there own specific size/weight limits for goods vehicles.

The physical dimensions of some streets (such as, for example, the older historic streets in Norwich city centre) do result in companies making deliveries having to use smaller vehicles than they may otherwise have chosen to do so. In some cases this is due to the width of the roads they need to travel along in order to reach the premises, in others it is due to the vehicle manoeuvring that is necessary in order to for the vehicle to access a small loading bay area with a very limited space.

1.5.6 Amount of work that driver can perform in shift

The quantity of goods that a driver is able to deliver or collect in a single shift has an important bearing on the size of vehicle used for a given operation (both the weight and volume of the packaged items are of importance). In a multi-drop operation with many small deliveries, the total quantity of goods that a driver can deliver within his shift, tends to be relatively small due to the time taken for each delivery and therefore a relatively small vehicle would typically be used (see Section 1.6 for more discussion of this). In a multi-drop operation involving relatively few, but large deliveries within the same urban area, the driver would be capable of delivering a far greater quantity of goods during his shift (than if making numerous small deliveries) and therefore a much larger vehicle would be required.

1.6 Trip patterns performed by goods vehicles delivering core goods

1.6.1 Goods vehicle activity

Goods vehicles perform a range of different types of trips in the urban area. Goods vehicle movements in the urban area include the following:

- delivering goods from outside the urban area to a premises in the urban area;
- delivering goods from a premises inside the urban area to another premises in the urban area;
- transporting goods from a premises outside the urban area through the urban area to a premises also outside the urban area;
- going to collect goods from a premises in the urban area that need to be delivered to another premises in the urban area;
- going to collect goods from a premises in the urban area that need to be delivered to a premises outside the urban area;
- going to the next job/base outside the urban area just having made a delivery in the urban area;
- going from base in the urban area to collect goods outside the urban area;
- returning to base in the urban area with goods;
- returning to base in the urban area without goods.

1.6.2 Goods flows on vehicles in urban area

It is important to distinguish between: (i) the ultimate origin and destination of a good, and (ii) the origin and destination of a good on a given vehicle trip.

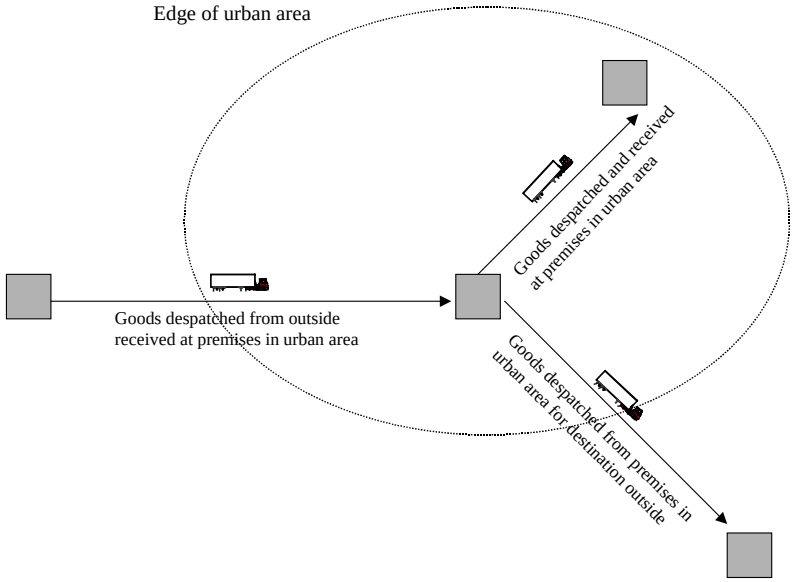
i. The ultimate origin and destination of a good - this refers to the entire journey of the good between the point at which it first originated and the final point to which it will be transported before being consumed or changed into something else. In being moved between its ultimate origin and destination, a good can be handled onto and off of several different vehicles and the entire journey can therefore be made up of several different vehicle trips.
ii. The origin and destination of a good on a given vehicle trip - this refers to the start and finish point of each individual vehicle trip on which the good is transported.

When considering the origin and destination of a good on a given vehicle being transported in the urban area, there are three possible goods flows to/from premises in the urban area:

i. goods despatched & received at premises in the urban area;
ii. goods received at premises in the urban area despatched from origins outside;
iii. goods despatched from premises in the urban area for destinations outside.

These three possibilities are shown in Figure 6.

Figure 6: Possible goods flows to/from premises in the urban area

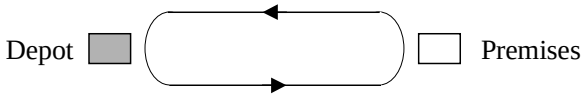


1.6.3 Single-drop or multi-drop goods vehicle operations

Goods vehicles making deliveries in the urban area can either perform *single-drop* or *multi-drop* journeys.

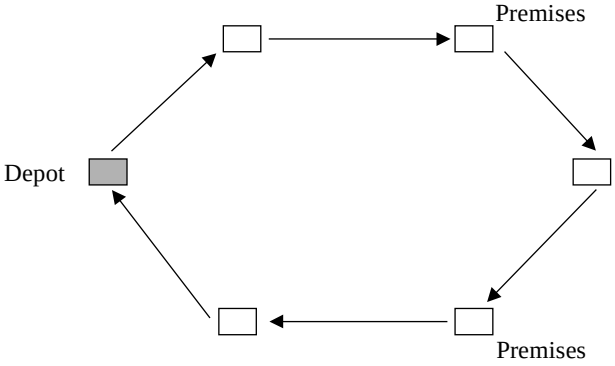
Single-drop journeys (see Figure 7) involve the vehicle collecting a load and then transporting it and delivering it to its destination (i.e. the entire load is destined for one premises). The vehicle then collects another load and delivers it and so on.

Figure 7: Single-drop system



Multi-drop journeys (see Figure 8) involve the vehicle calling AT more than one premises during the delivery round. The vehicle will collect a load and then makes deliveries to several different premises, (i.e. each premises receives part of the vehicle's load). Goods vehicle journeys in which the vehicle calls at more than one premises to deliver goods are usually referred to as *rounds*.

Figure 8: Multi-drop delivery system



Similarly goods collections can be made by either single or multi-pick-up journeys. A single pick-up journey will require a vehicle to call at only one premises to collect its entire load, whereas a multi-

pick-up journey will involve the vehicle in collecting goods from several different premises on the round.

Whether a goods vehicle performs single- or multi-drop journeys is influenced by a number of factors which are discussed below.

1.6.4 The size of each collection and delivery

If the load collected is sufficiently large to constitute a full load for the vehicle (either by weight or volume) then the vehicle will have to deliver this load to its destination before making another collection. If the load collected fills only a small proportion of the vehicle's capacity then the vehicle is likely to make other collections (if there are any scheduled to be made) before making deliveries.

In many urban delivery operations, the goods vehicle will be loaded at its depot with goods to be delivered to premises in the urban area. The vehicle will then leave its depot to make these deliveries. If the average size of deliveries to be made to receivers is relatively small (as a proportion of the vehicle's weight or volume capacity) then, in order to reduce the unit cost of delivery, the vehicle will be loaded with as many different receivers' goods as possible. The driver will then visit each receiver in turn, making all the deliveries before returning to the depot. This type of multi-drop delivery round is common for express and parcels companies, doorstep milk delivery companies, and wholesalers and suppliers delivering to small, independent premises that order relatively small quantities.

In the case of large companies with many large premises, given the quantity of goods that are typically required in any one vehicle delivery to each premises, there is a far greater likelihood that all the goods on the vehicle will be destined for only that premises (i.e. a single-drop journey) than is the case for an independent premises.

1.6.5 Origin and destination of goods on a given vehicle trip

For goods to be delivered to a premises in the urban area, the location from which the goods are despatched on the delivery vehicle will have a bearing on whether the journey performed by the vehicle is a single- or multi-drop journey.

Freight transport costs are related to distance travelled and therefore the greater the distance between the point of despatch and the premises, the greater the total vehicle trip cost. The greater the quantity of goods that are carried on a vehicle, the lower the transport cost per unit carried, as total vehicle trip cost is relatively insensitive to quantity carried. Therefore in order to minimise transport costs, companies making deliveries are typically keen to despatch full vehicle loads. As the distance between point of despatch and delivery increases, the greater the cost penalty for despatching less than full vehicle loads. All other things being equal, for any quantity of goods not constituting a full or near full vehicle load, the likelihood of the goods being delivered as part of a multi-drop round increases with distance (i.e. distance between point of despatch and point of delivery).

In the research we have found instances of vehicles based close to the premises where a delivery is to be made being despatched with very low load factors, but far fewer instances of this taking place over longer distances.

In order to achieve a full vehicle load at the point of despatch it is possible to do two things:

i. Delay sending goods to the premises until there is a quantity of goods equivalent to a full vehicle load to be delivered to the premises. This is unlikely to be acceptable to the premises, unless the quantity of goods needed by the premises is sufficiently large to constitute a full load on a frequent basis, as it would result in a delay in their receiving the goods.
ii. Consolidate the goods destined for the premises with goods destined for other receivers so as to constitute a full load on the vehicle and then deliver these goods on a multi-drop round.

See Section 1.8 for further discussion vehicle load factors.

1.6.6 Time sensitivity of goods collections/deliveries

As mentioned above, if there were no time constraints on carrying out collection and delivery operations, it would be most cost-efficient (in terms of freight transport costs) to postpone them until there was a full vehicle load to deliver to the premises and until the premises had equivalent to a full vehicle load to despatch. This would help to minimise the unit cost of the freight vehicle trip as well as the unit cost of loading and unloading the vehicle.

However, there are a number of other considerations in addition to delivery and collection costs that need to be taken into account when deciding appropriate order lead times such as customer satisfaction, lost sales etc. (see Section 1.4.4 - on order lead time). These factors often prevent it from being commercially viable to delay collection and delivery operations, and instead encourage the use of multi-drop rounds. In addition, it is important that perishable goods are delivered to receivers premises as soon as possible so that they receives them in a fresh condition. It is therefore not possible to delay the delivery of perishable goods.

1.6.7 Degree of centralisation in the goods supply system

The likelihood that a premises will receive goods from vehicles performing full load single-drop deliveries is greater when the premises uses a centralised goods supply system (i.e. with all of its goods need being supplied from one point of despatch) as the goods to be delivered to the premises can easily be consolidated into full vehicle loads for delivery.

Premises using decentralised goods supply systems, in which goods are received from a large number of different points of despatch, are more likely to receive deliveries as part of multi-drop rounds as the quantity of goods they receive in any one delivery is unlikely to constitute a full load.

1.6.8 Size of premises receiving collections and deliveries

The size of the premises from which a vehicle makes a goods collection or delivery also affects whether the collection or delivery is carried out on a single-drop or multi-drop basis. The smaller the premises, the greater the likelihood that it will receive multi-drop collections and deliveries. Only large premises are likely to regularly receive single-drop deliveries.

1.6.9 Size of goods vehicle used

The size of the goods vehicle used for the collection and delivery operations can also influence whether the vehicle performs single- or multi-drop work. In theory, the smaller the vehicle used, the smaller the quantity of goods it can carry and therefore, all other things being equal, the greater the likelihood that the vehicle will perform single-drop deliveries. However, in reality, many small goods vehicles used in urban areas are delivering small quantities of goods to each receiver and can therefore perform multi-drop operations.

The size of the goods vehicle is more likely to affect the pattern of the operation (i.e. whether the vehicle performs single- or multi-drop work) in the case of a general haulage operation involving ad hoc goods movements. In many other, more planned and regular operations it would be the nature of the operation (i.e. whether single- or multi-drop work is performed, and the quantity of goods that a driver can deliver in the course of a shift) that would determine the size of vehicle purchased by the operator, rather than the vehicle size dictating the operating pattern.

1.6.10 Single-drop and multi-drop - findings from the research

The overwhelming majority of premises studied during the research receive their goods deliveries on vehicles performing multi-drop rounds. This is shown in Table 16.

Table 16: Receivers served by single- and multi-drop operations

Type of delivery	Number of premises
Premises receiving all deliveries from vehicles performing multi-drop work	48
Premises receiving all deliveries from vehicles performing single-drop work	8
Premises receiving deliveries from vehicles performing both single- and multi-drop work	2

Of the eight premises receiving goods deliveries from vehicle performing single-drop deliveries, seven are premises owned by large companies with many premises, and are among the largest premises studied. Seven of these premises operate centralised or hybrid goods supply systems and the vehicles delivering to all eight premises carry full vehicle loads (i.e. the vehicles are fully rather than partly loaded). Four of the eight premises are shops, three are factories and one is a distribution centre/warehouse.

The vehicles performing multi-drop deliveries to the 48 premises studied are operated by a range of different types of companies. Some of the delivery operations are carried out by suppliers and wholesalers, some by express/parcels and dedicated distribution companies and some by the company owning the premises themselves.

There is an important distinction between the type of multi-drop rounds being performed by these vehicles. Two distinct types of multi-drop rounds were discovered during the research:

i. multi-drop rounds on which the vehicles visit a number of different premises which have no commercial relationship with each other. We found examples of this type of round being performed by suppliers, wholesalers, express and parcels companies and third party distribution companies. Of the 48 premises receiving multi-drop deliveries, 34 receive their deliveries by this type of multi-drop round.
ii. multi-drop rounds on which the vehicles visit a number of different premises all of which have a commercial relationship with each other. In some cases these premises are all branches of the same company, in other cases these premises are all part of the same group. All the premises receiving goods deliveries from this type of multi-drop round have internally centralised goods supply systems with goods being despatched from their own distribution centres to the premises. We found examples of this type of round being performed by third party distribution companies and by the company owning the premises themselves. Of the 48 premises receiving multi-drop deliveries, 14 receive their deliveries by this type of multi-drop round.

Diagrams illustrating the entire range of trip patterns to and from premises that were identified during the project are given in Appendix A.

1.6.11 Typical multi-drop rounds examined in the research

A number of companies performing multi-drop journeys to deliver goods to urban premises either completed vehicle logs or provided vehicle manifests for a sample of these journeys. Figure 9 shows the Norwich city centre journey pattern for a typical multi-drop journey provided by one such company. Figure 10 shows the chronology for this city centre delivery journey.

Figure 9: Typical morning delivery round in Norwich City Centre for an express parcel company

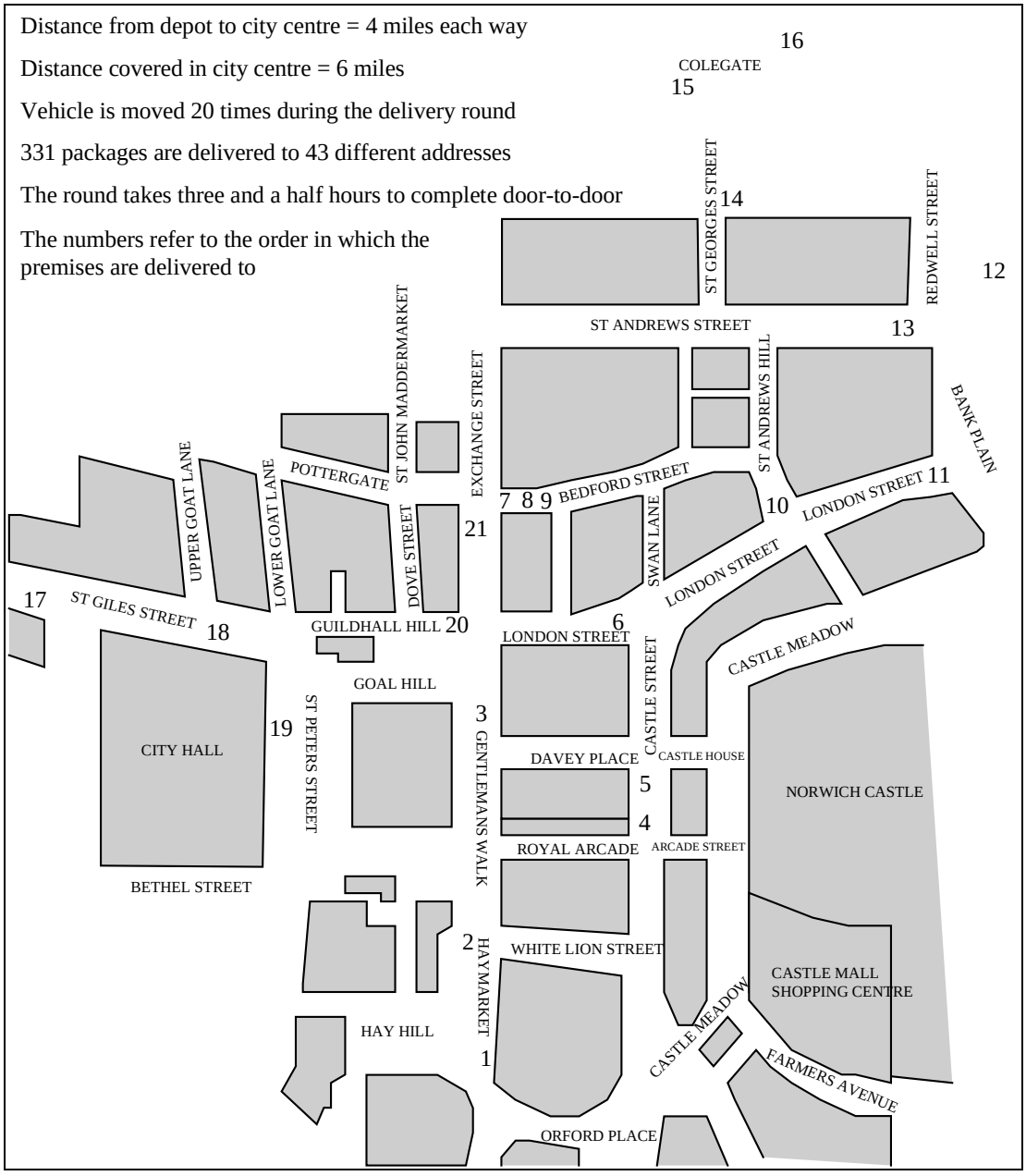
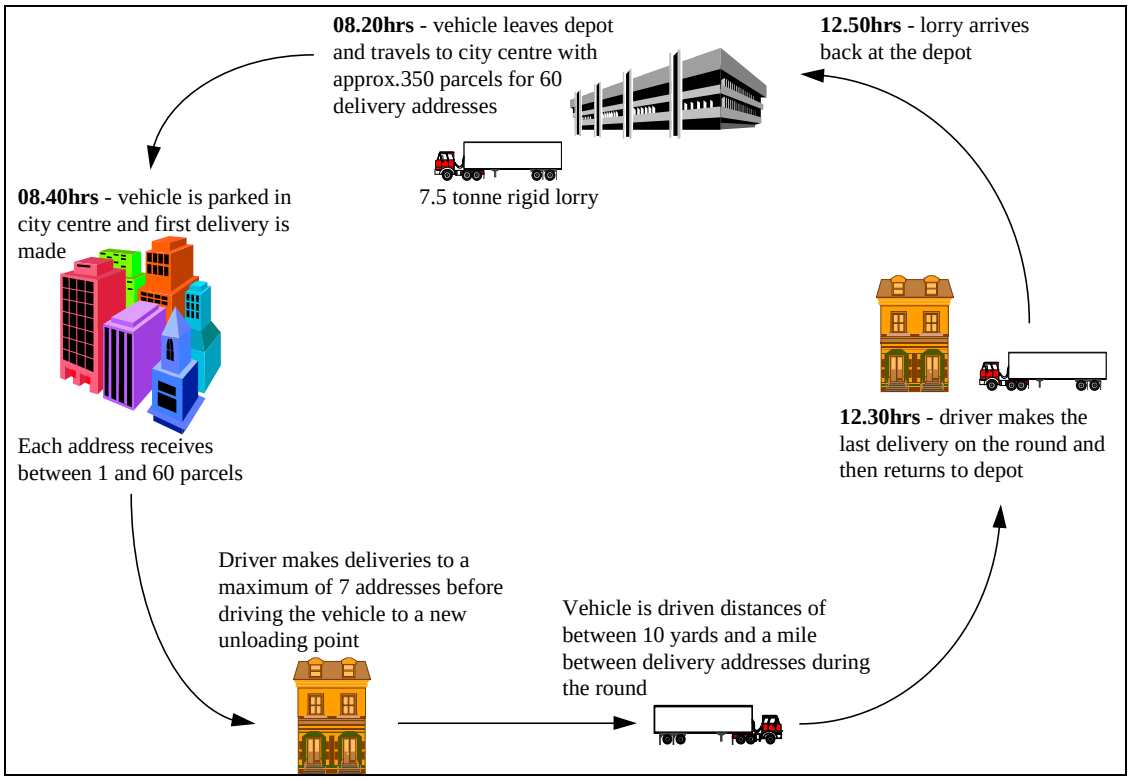


Figure 10: Typical morning delivery round in Norwich City Centre



Details of some of the multi-drop journeys provided by companies during the research can be found in Appendix B.

1.6.12 Discussion of single- versus multi-drop journeys

Research has shown that multi-drop rounds generate fewer vehicle kilometres than direct single-drop deliveries to each receiver (Eilon et al, 1971). This is explained by the fact that although the multi-drop journey takes a less direct route from the depot to each delivery point than the single-drop journey, it does away with the return leg associated with single-drop work. The greater the number of delivery points on the multi-drop journey, the greater the saving in vehicle kilometres travelled compared with a single-drop operation.

However, a full load can be delivered to a premises by a vehicle on a single-drop journey, whereas on a multi-drop journey only a part load can be delivered. Several multi-drop visits can therefore have to be made to a premises in order to provide it with all of its goods needs, whereas a single-drop by a full loaded vehicle may be able to deliver the premise's entire demand in one visit. According to McKinnon (1989), "In practice, the number of vehicle kilometres is usually minimised by direct single-drop deliveries. A system of direct deliveries is more efficient despite the fact that it usually entails more empty running by vehicles. In the course of multi-drop rounds, lorries travel much longer distances only partly loaded".

It is therefore likely that full load single-drop deliveries by large good vehicles are the most commercially and environmentally efficient means of performing urban deliveries.

However, as discussed above, the ability to deliver full loads to premises is often prevented by one or more of the following factors:

- the average quantity of goods required by a premises in a single order is relatively small;
- when the origin and destination of the goods are located a long way from each other;
- the goods are time sensitive and have to be delivered as soon as possible after order placement;

- the receiver of the goods has a decentralised goods supply system.

1.7 Distance travelled by each goods vehicle in the urban area

The pattern of vehicle operation in urban areas affects the distance travelled by goods vehicles within the urban area. The distance travelled has a bearing on the social and environmental impacts of the operation and is therefore an important topic. During the research we discussed the issues of distance travelled in the urban area with companies which carry out goods collections and deliveries. The following influences on distance were noted.

1.7.1 Type of operating pattern the vehicle is performing

The type of operating pattern being carried out by the vehicle affects the distance travelled by the vehicle in the urban area. Vehicles performing multi-drop operations wholly within the city tend to cover greater total distances in the city than vehicles performing multi-drop operations in which only a proportion of that deliveries are in the city, or single-drop operations.

In the case of a multi-drop operation, the location of all the premises in the urban area at which the goods vehicle has to collect or deliver goods will have a important bearing on the distance travelled by the vehicle in the urban area.

Similarly for a single-drop operation, the location at which the collection or delivery has to be made will be important in terms of the distance travelled by the vehicle in the urban area. A vehicle travelling from outside the urban area to make a delivery to a premises at the centre of the urban area is likely to travel a greater distance within the urban area in the course of making the delivery and then leaving the urban area, compared with if the premises is based in the outer part or at the edge of the urban area.

1.7.2 Road infrastructure

The road infrastructure in an urban area also affects distance travelled by goods vehicles in the urban area. For example, the existence of an orbital route outside the city and arterial approach roads leading from this orbital route into the city removes the need for vehicles to travel right through the urban area and city centre to get from one side of the city to the other.

1.7.3 Existence of lorry routes

The implementation of compulsory lorry route/s in an urban area that force vehicles above a certain size/weight to use specified trunk roads through the city can affect the distance travelled in the urban area. Although lorry routes can increase the distance travelled by goods vehicles, such routes do help to restrict these vehicles to roads that are deemed suitable.

1.7.4 Driver's knowledge of urban area

The goods vehicle driver’s knowledge of and familiarity with the urban area can help to reduce the distance travelled by the vehicle in the urban area in the sense that a knowledgeable driver is less likely to perform unnecessary mileage due taking a longer route or becoming lost.

However, a driver’s local knowledge can actually result in the vehicle being driven greater distances within the urban area if the driver attempts to use side roads and rat runs which, although involving greater distance, are less congested and thereby reduce journey time. Local knowledge can also result in goods vehicle drivers using inappropriate roads (such as residential and narrow roads) if they perceive that the use of such a road may help to reduce total distance travelled and hence lead to time savings.

1.7.5 Quality and quantity of road signing

Clear, well positioned and sufficiently abundant road signing can also help to ensure that goods vehicles take the most appropriate routes in urban areas and help prevent drivers unfamiliar with the area from becoming lost and thereby performing unnecessary mileage within the city.

1.7.6 Efficiency of routeing and scheduling

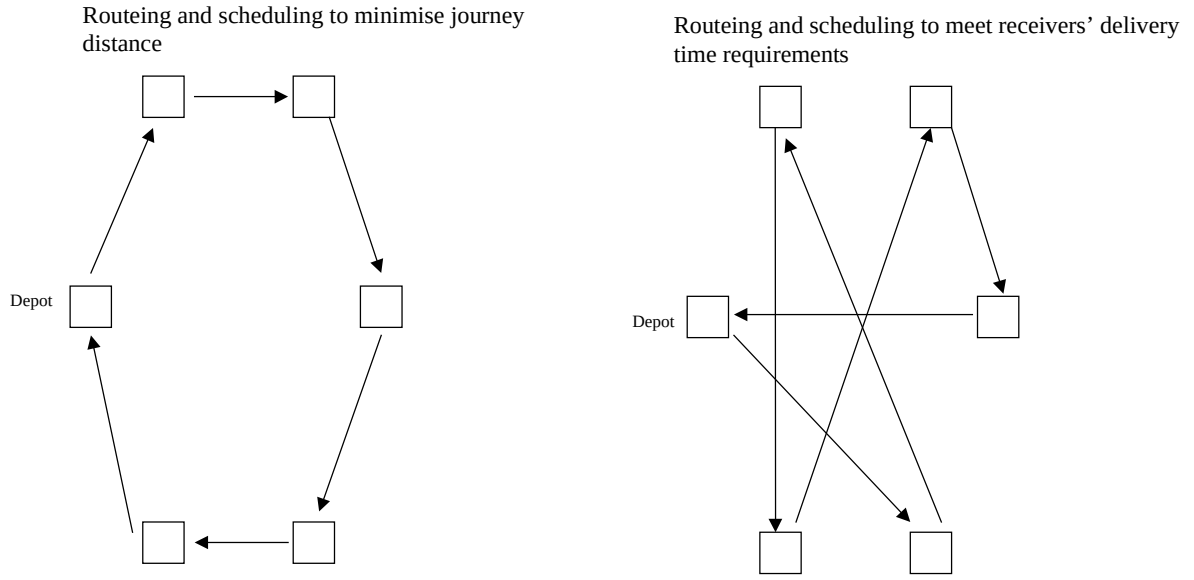
Efficient routeing and scheduling of vehicles can help to minimise the distance they travel in an urban area. This can be achieved either through: (i) drivers having good local knowledge of the urban area and the road system, or (ii) transport managers/planners spending time planning routes for their drivers and arranging for the work to be performed in the most geographically-logical manner (this can either be carried out by the manager/planners manually or using routeing and scheduling software).

Routeing and scheduling can yield greatest benefits in terms of distance travelled in the urban area for multi-drop rounds that have a high proportion of deliveries/collections in the urban area.

1.7.7 Time of collection/delivery at receiver's premises

If the distance that needs to be travelled on multi-drop rounds performed in an urban area is to be minimised, it is also important that the premises to which deliveries/collections are being made by the vehicle are flexible about the time at which the vehicle arrives. If receivers insist on scheduled vehicle arrival times of their choosing then it becomes very difficult, if not impossible, to plan the routeing of the vehicle so as to minimise distance travelled. The potential effect of timed delivery times at receivers' premises on distance travelled is illustrated in Figure 11.

Figure 11: The potential effect of timed deliveries at receivers' premises on distance travelled



1.7.8 Number of one-way streets

One-way streets and one-way systems in urban areas can have an important bearing upon the distance that has to be travelled by goods vehicles on multi-drop rounds performed in an urban area, especially if the receivers on those rounds are not flexible with regard to vehicle arrival times. In this situation, one-way systems can have the effect of causing goods vehicles to travel significant distances around the roads on that system in order to reach premises that were only perhaps only a few metres away from the previous delivery point, but in the direction in which vehicles were not permitted to travel.

1.8 Vehicle load factors

The vehicle load factors (i.e. the proportion of the vehicle's carrying capacity occupied by the goods carried, measured either in terms of weight or volume) is important as the greater the vehicle load factor, the fewer the vehicle trips required to move a given quantity of goods. Fewer vehicle trips lead to less distance travelled and fuel used in delivering goods in the urban area. High vehicle load factors can also reduce the number of vehicles and drivers required by a transport company and their total cost of transport operations. Several issues that were raised during the research as influencing the vehicle load factor are discussed below.

1.8.1 Receiver/dispatcher time windows

The extent to which receivers and dispatchers are flexible about the times at which they receive deliveries or have goods collected at their premises is extremely important in achieving high vehicle load factors on multi-drop rounds. If receivers are prepared to accept collections/deliveries at the time suitable to the transporter then it should make it easier to achieve high vehicle load factors (i.e. make good use of the vehicle's carrying capacity) on the round, and also to perform the round using the most geographically efficient routeing. However unfortunately, from our interviews with transport companies, and suppliers and wholesalers making deliveries, it is apparent that this is often not the case.

Many receivers want to receive their goods deliveries at a time that suits them, and in many cases the preferred time chosen by premises is approximately the same. At its most extreme, if all receivers want their deliveries at the same time, and the transporter were to agree to meet these requests it would involve using a separate vehicle to deliver to each receiver. This would be highly inefficient from a commercial and environmental perspective. Table 17 shows an example of the effects of flexible and inflexible receiver delivery times for a multi-drop round to 50 receivers, each of whom receive 10 parcels using vehicles capable of carrying 500 parcels. In the inflexible scenario (right column) 20% of receivers require the same scheduled delivery time. Although this example is an exaggeration, as transport companies do not in reality operate this number of vehicles and drivers to cope with peak delivery times, it does help to emphasise the impacts of receiver-imposed time constraints on vehicle operations.

Table 17: Effects of delivery time constraints of transport resources and distance travelled

	All receivers prepared to accept deliveries at their premises at any time	**40 receivers prepared to accept delivery at any time and 10 receivers insist on exactly the same delivery time at their premises**
Number of vehicles required	1	11 (1+10)
Number of drivers required	1	11 (1+10)
Number of vehicle journeys performed	1	11 (1+10)
Vehicle load factor	100%	9%
Total distance travelled by vehicles in urban area	45 km	240 km

N.B. Assumes average distance from depot to receiver is 10 km and distance between receivers are located 500 metres from each other.

Table 17 demonstrates that there are significant advantages in commercial terms (to the transporter) and environmental terms (to society) of customer flexibility with regard to goods delivery and collection times.

Other customer-related situations that can lead to poor vehicle load factors on multi-drop rounds include:

- When receivers request prearranged, timed deliveries, but rather than all receivers requesting the same delivery time, they all request different times, but with time gaps between each delivery that are too large for a multi-drop round to be efficiently performed
- When one group of receivers request morning deliveries, another group request afternoon deliveries and another group request night time deliveries. Although it may possible to fulfil these receiver rounds by performing three multi-drop rounds (one in the morning, one in the afternoon and one at night) this will result in a reduction in the quantity of goods delivered on each round and hence is likely to result in poorer vehicle load factors.

Several carriers that we interviewed told us that because they have a low density of relatively small deliveries, their vehicles perform multi-drop journeys over relatively long distances (i.e. the deliveries do not all take place within one town or city, but instead the vehicle travels between several different urban and rural areas in the course of its round). These companies explained that although the vehicle will depart the depot with a relatively high load factor, towards the end of the round the vehicle can be covering relatively large distances in urban and rural areas with very small quantities of goods on-board. It is of course true of any multi-drop operation that as the delivery round progresses the vehicle load factor will fall until the vehicle is ultimately running empty (and vice versa for collection rounds). However when the entire round takes place within a small area (such as one part of a city) this is far less inefficient and environmentally damaging than when the round covers a very large geographic area.

1.8.2 Regulations restricting vehicle operating/unloading time in the urban area

Local authority-imposed vehicle operating and loading/unloading time restrictions can have a similar effect on vehicle load factors, as customer inflexibility about times at which they are prepared to accept goods collections and deliveries. Such restrictions results in the companies that make collections and deliveries having to perform the same quantity of work in less time and this is often only possible by using more vehicles and drivers. In this situation, the load factor of each vehicle falls and the total distance travelled and fossil fuel used increases.

Operating and loading/unloading restrictions have become more common and more stringent as an increasing number of town and city centres in the UK have been pedestrianised and as Red Routes (clear ways) have been introduced.

1.8.3 Time sensitivity of the goods/how quickly premises require goods

If receivers of goods are prepared to order in large quantities infrequently or delay delivery so that their orders can be consolidated together then vehicle load factors could be increased. However our research indicates that in fact the opposite is happening - lead times are falling as premises order goods in smaller quantities on a more frequent basis, and require ever-more frequent deliveries.

For vehicles performing single-drop operations, falling order quantities lead to a direct fall in the vehicle load factor. For vehicles performing multi-drop operations, the impact on vehicle load factors depends on the density of receivers in a given area and the total quantity of goods ordered by those receivers. One company we spoke to, which provides multi-drop deliveries, has managed to increase vehicle load factors, despite experiencing falling consignment sizes, by increasing its customer base.

1.8.4 Evidence of vehicle load factors

Given that one of the factors in freight transport costs is the distance over which goods are transported, it would be expected that the greater the distance over which the goods are transported (i.e. the distance between the point of goods despatch and receipt), the greater the effort made by the transport company to achieve a satisfactory vehicle load factor.

The only examples of very low vehicle load factors that were discovered during the project involved goods that were despatched either from within the city or just outside it to a nearby address; this was usually caused by either: (i) an urgent delivery to a premises of orders placed at short notice, or (ii) the situation in which a small quantity of goods could not be fitted onto a vehicle performing multi-drop deliveries, so they had to be delivered in a separate journey.

Insufficient data was collected in the project to be able to state definitively that goods vehicle making deliveries to the premises studied do not generally operate with low load factors. However, according to those companies interviewed that make goods deliveries, vehicle journeys with low load factors make up a relatively small proportion of their total journeys carried out (for them low load factors tend to be the exception rather than the norm). Some of the companies interviewed were not content about the low load factors achieved on some of their vehicle journeys, however it was difficult for them to avoid this happening when emergency deliveries are requested at very short notice (often within an hour or two of placing the order). In order to meet this demand the transport company/supplier was forced to despatch a vehicle with supplies for in some instances only one, or at best only a few, receivers. It is difficult to see how this can be avoided if receivers' demands and requirements are to be met.

However, although there may be relatively few goods vehicle trips on which the vehicle is very lightly loaded, this is not to say that the load factor on the vast majority of trips is necessarily high and could not be improved. Several companies that make deliveries told us that they are not satisfied with current load factors on the majority of their typical delivery journeys and are trying to improve the load factors on these journeys.

The interviews with premises and companies making deliveries suggest that load factors on vehicles despatched from locations, which are relatively long distances from the receiving premises, tend to be relatively high. Although staff at the premises were unable, in many cases, to quantify vehicle load factors, several of the premises were able to tell us the vehicles were fully loaded (with either all of these goods destined for their premises or for other premises as part of a multi-drop round).

Several respondents also informed us that when purchasing from distant suppliers, the company making the delivery (either a freight transport company or a goods supplier operating their own transport vehicles) would wait until they had several deliveries to make in the area before informing the premises of a delivery/collection date (thereby improving the vehicle load factor on the journey and reducing the number of vehicle journeys necessary).

1.8.5 Taking care about interpreting vehicle load factor information

Care needs to be taken when interpreting vehicle load factor data. The vehicle load factor can be quite misleading as a measure of efficiency. The following example helps to illustrate this.

When a growing number of receivers request vehicle delivery times, which suit them or vehicle operating and loading/unloading time restrictions are increased, companies making deliveries will initially continue to operate with their existing vehicle fleet as well as recruiting additional drivers and obtaining more, probably smaller vehicles. This will result in the vehicle load factor falling in the short term as each vehicle is despatched with fewer goods on-board, as it is now able to deliver fewer goods that it used to on each journey, given the new time constraints.

However, in the longer term if such time constraints continue to exist, when companies come to replace their vehicle fleets they are likely to purchase smaller vehicles that better match the amount of goods that it is possible to deliver on each journey. This reduction in vehicle size immediately results in an increase in vehicle load factors (as the vehicle carrying capacity is now better matched to the quantity of goods carried). This could be taken as implying an increase in the efficiency of urban

goods vehicle operations if the reason for the increase in load factor is not understood. But there has been no conscious attempt by the companies to improve the efficiency of their vehicle operations, other than to buy vehicles of a size better suited to the operation. In fact, the overall short and long-term effect is likely to be an increase in: (i) goods vehicles operating in the urban area during peak delivery times, (ii) goods vehicle trip numbers, (iii) distance travelled, and (iv) fossil fuel consumed and pollutant emissions.

As mentioned in Section 1.6.12, research needs to be carried out into the relationship between different patterns of the single- and multi-drop delivery operations and vehicle load factors.

1.9 Dwell time of vehicle at premises when loading/unloading

Much of the urban freight transport research that has been carried out in the past has tended to concentrate on goods vehicles movement. Far less consideration has been given to goods vehicles while they are stationary, despite this being an essential part of making collections and deliveries. This subject is discussed in some length in this section as it is an important part of urban goods operations for several reasons: (i) the necessity for the driver to find somewhere to park the vehicle, (ii) the time that the vehicle spends stationary can far outweigh the time spent in motion, and (iii) the problems and traffic disruption that stationary goods vehicles can cause (which are dealt with in Chapter 4). The key factors that influence the dwell time of the vehicle in the urban area are considered in turn below.

Table 18 shows how the working time of the drivers of one freight transport company interviewed is split between different activities once they have departed the depot to perform multi-drop journeys. Obviously the time spent on these activities will differ for different types of delivery work, but the table indicates that in this case the vehicle is stationary while delivery operations are carried out for the vast majority of the total time spent on the delivery round.

Table 18: Proportion of time spent by vehicle in different states during typical city centre delivery round

Vehicle Activity	Percentage of delivery round time accounted for by each activity
Travelling on the road	10%
Held up in traffic	2%
Parked at the roadside with driver present (e.g. completing paperwork, sorting deliveries etc.)	1%
Parked at roadside without driver present (i.e. driver away from vehicle making deliveries)	87%
ALL ACTIVITIES	100%

Making a typical delivery to a premises involves the goods vehicle driver in performing a number of activities, these are shown in Box 2.

Box 2: Activities performed by a goods vehicle driver when making a delivery

1. Find somewhere suitable to park the vehicle during the delivery
2. Check on paperwork provided which goods are to be delivered to the premises
3. Enter the premises to ensure that the responsible staff are ready and able to receive a delivery
4. Return to the vehicle and unloading as many goods as can be conveyed from the vehicle to the premises in one movement
5. Close the vehicle doors and locking the vehicle
6. Move the goods from the vehicle to the premises
7. Take the goods into the premises and handing them over to a responsible member of staff
8. Repeat steps 4 to 7 as many times as necessary in order to complete moving all the goods from the vehicle to the premises
9. Wait while staff from the premises check the goods delivered (usually this involves checking the number of boxes, packages, crates etc. delivered rather than the actual goods themselves)
10. Obtain a signature from the member of staff responsible for receiving deliveries at the premises
11. Return to the vehicle and replacing any handling equipment used (e.g. trolley) in the vehicle and tidying the back of the vehicle
12. Drive on to the next premises at which goods are to be delivered and repeating steps 1 to 11.

It is important to note that the vehicle dwell time (i.e. the time the vehicle is stationary while the driver is making deliveries or collections) and the time taken to make a delivery or collection at the premises are not the same. This is because there are several activities carried out by the driver before and after visiting the premises and therefore dwell time of the vehicle exceeds the time taken for delivery/collection at the premises (see Box 2). Also, in instances in which a driver has to make several deliveries to premises that are either collocated or located close to each other, it is usual for the driver to perform all of these deliveries without moving the vehicle (i.e. to leave the vehicle in the same stationary position). This is most common in city centre locations where there is most likely to be a high density of deliveries, premises are relatively small (so distance between premises is small) and there are few available parking places. For these reasons it is often quickest for the drivers not to move vehicles between deliveries in this situation.

1.9.1 Time taken to find a place to leave the goods vehicle

The more quickly the driver can find a place to park the goods vehicle in order to make the delivery, the faster it will be possible to make the delivery. It is both easier and quicker for the driver to find a suitable place to leave the vehicle when the premises has an off-street loading/unloading facility in comparison with a premises at which the goods vehicle has to be left on-street. When the delivery is made on-street and there is no space near the premises for the vehicle to pull up the driver either has to:

i. park further away from the premises;

ii. drive around the streets and hope that a space becomes available/is found;

iii. go and make another delivery (if it is a multi-drop operation) and then return to the premises later to try to make the delivery again;

iv. violate parking/traffic regulations (could include double parking, parking where loading is not permitted, parking on the pavement etc.).

The first 3 options will all result in an increase in the time taken to make a delivery to the premises.

1.9.2 Size of delivery

Generally, the larger the quantity of goods to be unloaded and delivered, or collected and loaded onto the vehicle by the vehicle driver, the longer the time taken for the delivery or collection. All other things being equal, delivering, say, one pallet of drink to an off-licence will take less time than delivering three pallets.

The larger the size of the delivery, the greater the number of trips that the driver may have to make from vehicle to premises and back again in order to deliver all the goods to the premises.

1.9.3 Type of product

The type of product also has a bearing on the time taken to make a delivery or collection; some products can be delivered or collected faster than others. For instance, fragile goods or awkwardly shaped goods tend to take longer to deliver than others as the driver needs to take greater care when handling them.

1.9.4 Whether product is unitised

If a product is unitised this also makes it quicker to unload and deliver than a product that is not unitised. The type of unitisation also plays a role: for instance bottles of drink in boxes on a pallet are faster to handle and deliver than bottles of drink in boxes that are not palletised.

1.9.5 Means of getting goods off the goods vehicle

If the vehicle is equipped with a tail-lift or other automated unloading gear this can also help to reduce the time taken to unload the vehicle and make deliveries. In the case of bulky and difficult to handle goods such as building materials other handling equipment such as grabs and cranes can also help to speed up unloading.

1.9.6 Distance from the goods vehicle to the premises

The distance over which the goods have to be moved from the vehicle to the premises will also have a bearing on the total time taken to make a delivery. Obviously, minimising the distance between where the vehicle is parked and the premises will help to reduce the time taken to convey the goods from the vehicle to the premises. If the delivery is made on-street this distance tends to be greater than if it is made off-street, due to prevailing parking situation and loading restrictions on the street in question.

1.9.7 Means of conveying the goods from the vehicle to premises

The driver will be able to move the goods between the vehicle and the premises, or vice versa, more quickly if a suitable piece of handling equipment is used. This could be a hand trolley, a roll cage, a hand pallet truck etc.

1.9.8 On-street conveyance of goods v off-street

Moving the goods between the vehicle and the premises is more difficult and hence time consuming when a delivery is made on-street than when it is made off-street. This is due to the fact that on-street the driver has to contend with many more obstacles including pedestrians, other vehicles, street furniture, broken pavements, small front or side doors on the premises itself etc. Off-street facilities tend to be free of these problems and obstacles.

1.9.9 Closing and locking the vehicle during delivery

If the vehicle is parked on-street then, depending on how far it is parked from the premises where the delivery is being made, it may well be necessary to close the doors on the vehicle and lock it while the goods are conveyed from the vehicle to the premises. The greater the number of trips the driver has to make from vehicle to premises in order to deliver all the goods, the greater the time delay caused by closing and locking the vehicle on each occasion. Central locking systems can help to reduce the time taken to lock the vehicle but represent an additional capital cost.

1.9.10 Number of people performing the delivery

The number of people making the delivery to the premises also affects the time taken for the delivery. For the vast majority of premises and transport companies interviewed during the research the delivery or collection is carried out by only one person (i.e. the driver). However in cases where the delivery is made by two people (driver and assistant/mate) this helps to reduce the time taken for the delivery. Two examples of two people making a delivery were encountered during the research. In one case, namely newspaper deliveries to newsagents, the driver parks the vehicle while the assistant makes the delivery to the premises, thereby significantly speeding up deliveries that are made at a very busy time of day when few parking places are available outside receivers' premises. In the other case the time taken to make a drinks delivery to a public house, which involves the unloading of large quantities of drink from the vehicle, is also significantly reduced as a result of having two people on the vehicle.

The reason for so few operations involving two people travelling on the goods vehicle to the premises to make the delivery is that this adds significantly to the labour costs. Therefore companies tend only to use this approach when there is no alternative (either due: (i) to the weight and quantity of goods to be delivered in a given time, or (ii) because deliveries are carried out at a time of day at which the roads are extremely busy and few parking places are available).

1.9.11 Whether receiver assists with unloading

Although we found few cases in which two people travel in the goods vehicle to the premises to make the delivery, we found several instances in which staff from the premises receiving the goods help the driver with the delivery. This can take several different forms:

i. the driver is responsible for unloading the vehicle and getting goods from the vehicle to the door of the premises or cellar entrance. The staff from the premises take responsibility for moving the goods from this point.
ii. the driver unloads the vehicle and the staff from the premises take responsibility for moving the goods from the vehicle to the premises.
iii. the staff help the driver unload the vehicle and they all move goods from the vehicle to the premises.

Options (ii) and (iii) above result in the greatest reduction in unloading and delivery time.

However we discovered there are many situations in which the driver does not receive any assistance from the staff at the premises and is responsible for unloading the vehicle, moving the goods from the vehicle to a point within the premises where the staff/owner receive the goods. The greater the assistance that the driver receives from the staff at the premises with the delivery or collection, the quicker it is possible to make the delivery/collection.

1.9.12 Ordering system for goods (advance notice *versus* van sales)

In the majority of cases we examined, the premises place an order on the suppliers and then, at a later date, be it the next day or eight weeks later, this order is loaded onto a vehicle and delivered to the premises. The suppliers, the transport company and the premises receiving the goods all know exactly what is to be delivered to the premises before the goods vehicle arrives to make the delivery.

However we discovered some cases in which the premises either: (i) place no order in advance of the arrival of the delivery vehicle at the premises, or (ii) place a base order in advance of the delivery vehicle leaving its depot, but are free to change or add to the order when the vehicle arrives at their premises. This type of ordering and delivery arrangement is referred to as *"van sales"*. It is usually offered by suppliers and wholesalers supplying food and drink whose customers are small and medium-sized independent shops, especially shops such as grocers and newsagents. The delivery vehicle will typically carry a wide range of goods that can be supplied to the premises, which, rather

than being picked and packed in advance at the warehouse for each customer (as is the norm for most delivery operations) will be unsorted.

When the driver arrives at the premises and finds somewhere to park the vehicle, the first thing that they will do is to enter the premises and take or confirm the order with the owner/staff. The drivers in these operations are more like sales people rather than other goods vehicle drivers and are usually paid commission on what they sell. They also sometimes receive a bonus if they can sell more than a certain quantity of goods on a round. They will therefore usually spend some time trying to persuade the owner/staff to buy goods. The driver then returns to the vehicle and picks the goods in accordance with the customer's order. The goods are then conveyed from the vehicle to the premises as with any "normal" goods delivery. The driver also usually has to produce an order form of all the products purchased by the customer (either by hand or using an on-board computer) which the customer has to sign, so that when an invoice is raised for the goods at a later date there will be no disagreements between supplier and customer about the type and quantity of goods provided.

The additional driver activities associated with van sales operations adds considerably to the time taken to make each delivery.

1.9.13 Other deliveries not sorted for delivery at the warehouse

There are other types of deliveries in addition to van sales (see Section 1.9.12), which are not sorted for delivery at the warehouse prior to the vehicle's despatch. These deliveries are pre-picked at the warehouse (i.e. goods are pre-order by customers and are the only goods loaded onto the vehicle - unlike van sales operations). However because of the nature of the goods involved they cannot be conveniently packaged or unitised for delivery and cannot necessarily be loaded onto the vehicle in the appropriate manner for the sequence in which deliveries have to take place.

This problem is common to awkwardly-sized goods that have to be loaded onto the vehicle in a particular order so as to fit (which may not match the sequence of deliveries) and fragile goods that have to be positioned on top of heavy goods to prevent them being damaged during transit. When making a delivery at a premises on a multi-drop round this can result in the need to unload goods not intended for delivery at this premises in order to get at and unload other goods requiring delivery, with the initially unloaded goods having to be reloaded onto the vehicle.

To give an example, we interviewed a company delivering building materials to building sites and commercial and residential premises. As some materials are very fragile while others are very heavy it is necessary to load the vehicles in a particular way so as to avoid damage to the fragile goods. Where possible the company arranges to deliver the goods to customers in the order that they have to be loaded (which is determined by the type of goods carried on any given day). However in some cases this is not possible, or both heavy and fragile goods are to be delivered to a customer and, in these cases, when the vehicle arrives at the customer to make a delivery it can be necessary to unload fragile goods (not intended for delivery at this premises) from the vehicle in order to access and unload heavy goods to be delivered and then reload the fragile goods.

1.9.14 Extent to which receiver checks goods

The extent to which the receiver checks the goods delivered to their premises also affects the time taken to make a delivery as the driver tends to have to be present while this takes place. The more rigorous the checking procedure used, the longer the driver and goods vehicle are likely to be detained at the premises. The following approaches to checking were operated by staff at the premises we interviewed:

i. the actual goods delivered are checked to ensure their quality and quantity by staff from the premises while the driver is present;

ii. the number of items delivered (e.g. the number of packages, boxes, cartons etc.) are checked for *every* delivery by staff from the premises to ensure the correct quantity of items have been delivered while the driver is present;
iii. the number of items delivered (e.g. the number of packages, boxes, cartons etc.) are checked for *some* deliveries by staff from the premises to ensure the correct quantity of items have been delivered while the driver is present;
iv. no checking of any kind (either the actual goods or the number of items delivered items) is carried out by staff from the premises of any goods delivered while the driver is present.

The time taken for checking the goods depends upon the type of checking that takes place, the size of the delivery and the number of staff that carry out the check. Obviously the checking in approach (i) above takes longer than the checking in (ii) or (iii).

Table 19 shows how many of the premises studied check the number of items delivered by the driver while the driver is still present.

Table 19: Checking of number of goods delivered while driver is still present

Type of delivery checking while driver is present	Number of premises
Number of items delivered checked for every delivery	40
Number of items delivered checked for some deliveries	6
No checking carried out	5
Don't know	7

None of the premises we surveyed check the actual quality and quantity of goods delivered for every delivery while the driver is present; however some did do this on an occasional basis. By far the more common type of checking operated by premises is to check the number of items actually delivered against the number expected or given on the delivery note. As can be seen from the table that staff at the vast majority of premises studied do check the number of items delivered for every delivery they receive.

Most of the eleven premises that either check only some deliveries or none at all receive these deliveries from an internally centralised goods supply system and therefore any errors in the quantity delivered can be easily rectified and will not result in financial disputes at a later date.

However two of the premises at that the owners only check the number of items delivered for some of their deliveries are newsagents. In both cases these shops are staffed by only one person who is often too busy serving customers to be able to check the deliveries.

At many premises a specific member or members of staff are responsible for checking goods that are delivered. It is clear from our interviews that occasionally the person/s responsible for receiving and checking deliveries at the premises is otherwise engaged and not immediately available when the driver makes the delivery. This can cause delays for the goods vehicle driver as, in this situation, they normally have to wait for the person responsible to become free and then carry out the checking procedure.

The checking of goods is still, in the main, a manual process. However, some organisations delivering goods (such as some express and parcels companies) have introduced automation into the process by using bar codes and hand-held scanners. This type of technological innovation can help to reduce the time taken to check the number of items delivered, and that they match the delivery note.

Checking deliveries can prove time consuming for staff at the premises and it would be beneficial to the premises if this was not necessary. However from the interviews it is clear that at most premises, especially those receiving goods direct from suppliers rather than from their own company's distribution centre, that it is viewed as essential so that problems and disagreements do not take place at a later date about incorrect delivery quantity, and in some cases quality, of goods. Removing the need to check delivered while the goods vehicle driver is present at the premises would reduce the time taken for the delivery and thereby increase the productivity of the driver.

1.9.15 Whether the driver requires signature for delivery

As well as staff from the premises often checking the number of items delivered while the driver is present, the driver also often has to obtain a signature from a responsible member of staff to prove the delivery has been made. By obtaining a signature the organisation making the delivery (be it a supplier, wholesaler or transport company) are able to prove that the staff at the premises are in agreement that the correct goods were delivered on a given date. This helps to reduce problems that could otherwise develop at a later date if the premises were to deny ever having received the delivery at all or the precise composition of the delivery. Table 20 shows the whether the driver has to obtain signatures for goods deliveries to the premises studied.

Table 20: Whether the driver has to obtain signatures for goods deliveries at premises studied

Do goods have to be signed for by staff at your premises when receiving deliveries?	Number of premises
Yes	41
Some	5
No	4
Don't know	8

As with the checking of the delivery, a specific member of staff at the premises is often responsible for signing for deliveries. Obtaining a signature from this person for can prove difficult; they may be engaged in another activity at the time the driver makes a delivery and in these circumstances the driver has to wait until they are available to provide their signature.

Even if it is not necessary for the driver to obtain the signature of a specific member of staff at the receiver's premises when making a delivery and instead any member of staff can sign for it, this can also prove difficult. In some situations staff can be extremely reticent about signing as they do not want to be held responsible if a problem concerning the delivery manifests itself later.

Therefore, as with checking the goods before the driver departs, signing for the delivery is an important activity that helps to prevent difficulties occurring later. However it also has the effect of increasing the time taken for each delivery and thereby reducing the number of deliveries that a driver can make in a given period of time.

Virtually all of the premises that we interviewed where checking of, and signing for, goods delivered is necessary told us that these activities take relatively little time to perform and are not thought of as a problem or something that needs to be altered to make it more efficient.

However the interviews with suppliers, wholesalers and transport companies provide a different perspective with several of these organisations viewing the checking and signing procedure as inefficient and time consuming but necessary. Many could tell us of specific receivers who insisted on spending a significant amount of time checking goods before they were prepared to provide a signature. The difference in perspective between staff at the premises and the deliverer of the goods is probably due to the following factors:

- The premises may receive only one or two deliveries per day that need to checked and signed for and therefore the staff at the premises view this as a minor part of their daily work. The staff may in some cases even view receiving and checking a delivery as an interesting diversion from their other tasks.
- For the driver waiting while goods are checked and signed for, this is likely to constitute a far more significant proportion of their working day than for the staff at the premises
- Drivers are often working within very tight time constraints due to vehicle operating and loading time restrictions and receivers' specified delivery times. They are therefore extremely aware of how any delay will impact on their ability to make subsequent deliveries on time. Shop staff are often unaware of the time pressures the driver is working under (and probably uninterested even if they were aware).

1.9.16 Other deliveries/collections taking place at the same time

The delivery drivers can also find that other goods deliveries or collections are taking place at the premises when they arrive. This situation can result in delays for a number of reasons:

- on or off-street loading space is occupied by other vehicle/s;
- goods vehicle queuing can occur at premises receiving large numbers of deliveries/collections and time delays can be significant;
- the driver has to wait until staff at the premises have finished dealing with this other delivery/collection work.

1.9.17 Extent to which driver has to speak to receiver

The time taken by the driver speaking to staff at the premises also has a bearing on the time taken for deliveries. Sometimes this conversation is business-related and extremely necessary, such as in the van sales services described earlier, but in other cases it can be purely social. Staff at some of the premises studied told us that on occasions they spent quite some time chatting to the driver socially once the delivery had been made.

The extent to which the driver has the opportunity to have social conversations with staff at the premises (which can be important in terms of building up understanding and customer loyalty) varies from one delivery operation to another, and depends on the time constraints the driver is under on a given day.

1.9.18 Time taken to make a delivery at some premises surveyed

Table 21 shows the estimated average time taken to make a delivery at a range of the premises studied, together with the average size of delivery where this information was available. The data in the table was provided by staff at the premises and therefore refers to the time from when the driver makes themselves apparent to the staff until they depart the premises. As previously discussed the total time taken for a delivery is likely to exceed this as: (i) prior to entering the premises, the driver may spend some time in the parked vehicle organising paperwork and the load to be delivered, and (ii) after leaving the premises on foot, the driver may spend some time in the vehicle before driving away from the premises in the vehicle.

Staff at many of the premises studied informed us that because: (i) delivery size varied significantly at their premises, and (ii) they received different types of goods from different suppliers, the time taken for different deliveries varied greatly. This is reflected in Table 21.

Table 21: Average time taken for deliveries and delivery quantities for a range of premises surveyed

Type of premises	Average time taken for delivery at premises (minutes)	Average quantity delivered (or range)
Florist	15	Full van load
Off-licence	120-180	6 pallets (440-600 cases)
Off-licence	30-60	3-4 pallets
Chemist	Few minutes	Variable
Chemist	30	7-8 roll cages & 12 plastic cartons
Book shop	5-60	1-30 boxes
Book shop	10-15	1-150 boxes
Stationers	30	3 roll cages
Newsagent	Few minutes	1-5 boxes
Pub (Drink delivery) **(Food delivery)**	15-30 5	10-12 kegs & 12-15 cases
Pub (Drink delivery) **(Food delivery)**	30-120 5	Variable, tanker pumps beer in
Convenience grocer	2-15	1-40 boxes to 5-10 roll cages
Convenience grocer	5-30	Variable, but small number of boxes
Convenience grocer	15	15-26 roll cages
Supermarket	45-60 (deliveries from dist'n centre)	N/K
Shoe shop	Few	2 boxes - 12 cartons (12-18 pairs per carton)
Pizza restaurant	30	30-40 boxes
Pizza restaurant	30	6+ roll cages
Fast food restaurant	30-120	4-15 pallets
Printer and photocopier	Few-30	5-6 boxes
Clothes shop	30	20-120 crates
Clothes shop	15-30	1500 items (80% hanging, 20% boxed)
Clothes stall in market	5-10	1-many boxes
Clothing/food shop	30-45	Full articulated lorry load
Furniture shop	5-60	1 chair to 20 dining suites
Furniture shop	5-120	1 cabinet to 50 three piece suites
Gift shop	5-10	1-40 boxes
Dry cleaning shop	15	Varies
Fruit & veg shop	2-15	Varies
Hardware shop	5-30	Varies
Electrical shop	15-30	Varies
Record/CD shop	5-10	Few-50 boxes
Large office	5-10	Few boxes
Computer shop	Up to 30	Up to few pallets
Builders merchant	Few-30	Couple of boxes to few pallets
Chemical factory	Few minutes to couple of hours	Few boxes to full tanker
Hotel	5-15	Varies

2. Other goods vehicle trips at premises

The project examined all the goods flows into and out of the premises surveyed. Therefore in addition to the flow of "core" goods (see Chapter 1), the following types of goods flows and the transport activity that facilitates them were studied:

1. Core goods transfers between premises
2. Ancillary goods deliveries to premises
3. Money collection and delivery
4. Waste collections from premises
5. Postal collection and delivery by Royal Mail
6. Other goods collected from premises
7. Home deliveries (goods despatched from premises to customers)

In the case of core goods flows to and from urban premises, virtually all goods collections and deliveries at the surveyed premises are carried out by traditional goods vehicles (either lorries or vans). However, as shall be seen in this chapter, the flows of "other" goods are sometimes achieved by other types of road vehicles and occasionally by foot at some of the premises studied.

2.1 Core goods transfers between premises

Some retail and office premises that are part of larger companies transfer core goods (and in some cases ancillary goods) between their premises and other similar premises owned by the company. The purpose of these transfers is to acquire goods that are required at the premises but which the premises has run out of, without having to obtain these from upstream in the supply chain (i.e. from suppliers, wholesalers or distribution centres). Instead these transfers are movements of goods between premises that carry out the same function (e.g. from one retail outlet to another, or one office to another). These transfers are, of course, only possible in companies with more than one premises carry out a similar function. Therefore independent retailers with only one shop are, by definition, are not in a position to make horizontal transfers of goods between retail outlets.

Where goods transfers between premises with the same function are taking place they are organised in one or more of the following ways:

- goods are taken from the premises by the goods vehicle making core goods deliveries/collections and then transported to the other premises when making a core goods collection/delivery to that premises;
- member of staff from one of the premises delivering/collecting the goods in person (either using company vehicle based at premises, their own car, taxi or on foot);
- use of an express/parcels company on an ad hoc or regular contractual basis;
- goods sent by post.

In total, all except six of the premises owned by large companies with multiple premises, who were able to provide information about this issue. Therefore most companies with two or more similar premises do have the facility to perform goods transfers when necessary. Of the 31 premises that do perform goods transfers, 15 transferred goods between themselves and other branches in their company on a regular basis, while 16 make transfers on an occasional basis.

The method by which these goods transfers are carried out vary between premises surveyed, as shown in Table 22. As can be seen from the table, at six of the premises studied the goods to be transferred are loaded onto a vehicle making a core goods collection or delivery at the premises that will be either be visiting the premises to which the goods need to be transported or will return to its

depot and the goods will be taken to the premises on another vehicle going to the premises to make a core goods delivery. Transfers carried out in this way are efficient in economic and environmental terms as they do not generate additional vehicle trips.

Table 22: Main method of transferring goods between similar premises at premises surveyed

Method of transferring goods between premises	Number of respondents
On core goods vehicle collecting or delivering to premises	6
Additional trip by goods vehicle based at one of the premises	13
Additional trip by goods vehicle not based at either premises	8
By post	1
By staff on foot	3

Most of the 13 premises at which goods transfers are carried out by vehicles based at the premises (which include home delivery vans, mopeds and staff cars at the premises studied) attempt to achieve a two-way flow of goods. Therefore if, for example, staff at another shop in the company based in a nearby town or city contacts them and asks if they can collect a particular goods that a customer has requested, but that is out of stock, the shop being asked to supply the goods will check whether there any goods which it requires which the other shop may be able to supply. Therefore although transfers conducted in this way generate additional vehicle trips, they often involve goods flowing in both directions between premises. This is more efficient in vehicle trip generation terms than the goods transfer system used at 8 premises studied, in which a goods vehicle not based at either premises, will drive to one premises, collect the goods and then deliver these to the second premises and then return to its depot (at the premises surveyed this was performed by either a vehicle owned by the company but which is not based at either of the premises concerned, by an express/parcels company on either an ad hoc or regular basis, by a general haulage company, or by a member of staff using a taxi).

The frequency with which goods transfers take place varied at different premises. Sixteen premises indicated that goods transfers only take place on an occasional basis, but were unable to tell us how frequently this happened. Even at those 15 premises at which goods transfers take place regularly, some respondents told us that it was not possible to provide details of the frequency of goods transfers as it was extremely variable. Table 23 shows the frequency with which goods transfer trips take place at a selection of those premises where the goods transfer generates additional vehicle trips.

Table 23: Frequency of goods transfers between premises where these transfers generate additional vehicle trips

Premises	Number of goods transfer vehicle trips per week
Florist	10
Off-licence	10
Pizza restaurant	10
Office	5
Computer shop	3
Convenience grocer	1

2.2 Ancillary goods deliveries to premises

"Ancillary" goods are those goods required by the premises in order to function on a day-to-day basis, but which are not the "core" goods connected with the premises (i.e. not goods to be sold to customers in the case of a retail premises, or goods to be used in the production process in the case of a factory). Ancillary goods include items such as till rolls, stationery, plastic and paper bags, printer cartridges, display material, light bulbs, cleaning materials, in-house and customer magazines, publicity material, product information, and paperwork and administration sent from head office.

As can be seen from Table 24, a majority of premises do receive separate vehicle deliveries specifically for ancillary goods. Of the 12 premises that do not receive separate ancillary goods deliveries, these premises receive all their ancillary goods on vehicles delivering core goods. Of the 35 premises receiving separate ancillary goods deliveries from suppliers, 7 receive additional ancillary goods on vehicles making their core goods deliveries.

Table 24: Whether premises receive separate deliveries of ancillary goods or combined deliveries of core and ancillary goods

	Number of respondents
Receive all ancillary goods on separate vehicle deliveries from suppliers	28
Receive separate ancillary goods deliveries from suppliers as well as ancillary goods with core goods vehicle deliveries	7
Receive ancillary goods with core goods vehicle deliveries	12
Collect ancillary goods themselves using own vehicle	3
Not known	8

Nineteen of the premises receive either some or all of their ancillary goods on vehicles making core goods deliveries. Of these 19 premises, only 2 are independently-owned and 17 of them are multiples. All the 17 multiple premises receive either some or all of their core goods from their own distribution centres (i.e. they have either fully or partially centralised goods supply systems). Receiving ancillary goods with core goods can obviously help to reduce the total number of vehicle deliveries made to a premises and help to reduce the cost of purchasing and receiving ancillary goods. However, as the results indicate and would be expected, this is easier to for large companies operating their own goods distribution systems organise.

Table 25 shows the frequency of vehicle deliveries of ancillary goods at premises which receive separate ancillary goods deliveries. The table shows that the number of ancillary goods deliveries tend to be relatively small at most premises interviewed. However, 10 premises are receiving 1 to 4 deliveries of ancillary goods per week.

Table 25: Frequency of ancillary goods vehicle deliveries at those premises receiving separate ancillary goods deliveries

Number of ancillary goods deliveries at the premises	Number of premises
1-4 per week	10
1-3 per month	14
1-11 per year	11

2.3 Money collection and delivery

Some premises are visited by specialist money collection and delivery vehicles in order to safely remove money from the premises and to provide the premises with a float. The premises found to be generating these specialist money collection and delivery vehicle trips were all part of large companies, with all branches in the company receiving this service. No independent premises studied received visits from money collection/delivery vehicles.

In total, 17 of the 58 premises studied did receive regular visits from money collection and delivery vehicles; all these 17 premises were part of large companies with multiple premises (15 shops, one hotel and one cinema). At all 17 premises these visits by a money collection and delivery vehicles

take place on a daily basis. Interviewees were, not unexpectedly, reluctant to discuss the time of day at which these vehicles visit their premises. From observation in shopping streets, these trips typically take place at shops in the late afternoon when the shop has as close to a full days takings as possible, but before the shops close. In this way the money taken at the shop is not left on the premises overnight. Some premises also require foreign currency collection and delivery services (e.g. banks, travel agents and hotels). These services are also performed in the course of the money collection and delivery trips discussed above.

The other premises that require to either deposit or withdraw money, all do so by a member of staff walking to the bank.

2.4 Waste collections from premises

All of the premises studied required some form of waste to be collected with a range of different waste collection services being used by the premises:

- general refuse collection services (provided by either the local authority or a private waste firm)
- specialist waste collection (e.g. chemicals, medical waste etc.)
- recycling collection services (e.g. for paper, cardboard, glass etc.)

The number of different waste collection services used by premises studied is shown in Table 26. All the premises that provided details of waste collection services use a general refuse collection service. Some premises also use specialist waste collection and recycling collection services.

Table 26: Number of waste collection services used by premises surveyed

Number of waste collection services used	Number of premises
1	38
2	13
3	1
Not known	6

Separation of certain types of waste for recycling took place at 19 of the 52 premises that provided details of waste disposal. At nine of these 19 premises, packaging waste to be recycled were removed from the premises by the core goods delivery vehicle, which transported these materials back to the distribution centre. This is an efficient use of the vehicle as it prevents it from travelling empty on the return journey to the distribution centre, and also helps to reduce the number of waste collection trips that are necessary at the premises. Of the 19 premises at which waste is collected for recycling, 16 are multiples and only 3 are independently owned premises.

The time at which vehicles visit the premises to collect waste varies between premises. At most of the premises studied waste collection takes place outside normal working hours, this can be either in the early evening, during the night or in the early morning. Table 27 shows the frequency of waste collection vehicle trips to the premises surveyed which were able to supply details.

Table 27: Number of vehicle trips per week to the premises to collect waste

Number of waste collection vehicle visits to the premises	Number of premises
1 trip or less per week	12
2-5 trips per week	13
6-10 trips per week	20
More than 10 trips per week	2
Not known	11

General refuse is collected on a daily or more frequent basis from 24 of the premises studied. Obviously some of this waste is perishable and must be removed on such a frequent basis for hygiene reasons, but at some premises there is no health-related reason for having to collect waste so frequently. The factor that prevents waste collection happening less frequently at these premises is that they do not have an appropriate place to store the waste. Some premises have invested in compaction equipment to reduce the volume of the waste and make storage easier, but this tends to have only happened at the larger premises surveyed. Specialist waste is usually stored in a container or receptacle until collection, which tend to take place far less frequently (e.g. once a month) than general refuse collection services.

There appears to be little relationship between the size of the premises and the frequency of waste collection at the premises. In fact, some of the larger retail premises studied have far less frequent waste collections (in some cases only twice per week) than many smaller premises. In many cases the relatively high frequency of waste collection at smaller premises would appear to be related to their limited waste storage capacity.

A range of different companies are used by all the premises studied to collect waste. This results in many different waste vehicles operating within the city during the course of a day. It is possible that this waste collection work, especially the collection of general refuse, could be carried out by fewer vehicles if there were not so many waste companies competing for business.

2.5 Postal collection and delivery by Royal Mail

Every premises studied in the research received post from the Royal Mail on at least five days per week and on six days per week in some cases. The vast majority of premises receive their post from postmen/women visiting the premises on foot. However in some cases (especially larger premises) the post is delivered directly by van into the premises if it has off-street delivery facilities and receives/sends large quantities of post.

In talking to The Royal Mail it is been possible to establish that, when making deliveries to commercial addresses, the postman/woman delivering post typically drive a post van from the depot to the location of their delivery round and then park the vehicle and make deliveries on foot to several closely located premises. They will then return to the vehicle to collect more post and make further deliveries on foot. When they have delivered to all premises in that location they will drive the vehicle a short distance to other receiver's premises which are generally located closely together in an urban area.

The Royal Mail does collect the outgoing post from customers requiring this service. These customers tend to be larger premises, and those generating a significant quantity of post. Few of the premises that we studied in the project have post collected from their premises by the Royal Mail. Instead, one of the staff from the premises will usually take the post to a post box or post office themselves on foot.

2.6 Other goods collected from premises (in addition to core goods, waste and Royal Mail post)

Some premises despatch paperwork and other items from their premises either to head office (in the case of those premises which are part of a larger company) or to customers. Depending on the type of business, the quantity of items to be despatched and the frequency with which these items need to be despatched, this is accomplished in one of the following ways by the premises surveyed:

- by a courier company collecting the items from the premises;
- by an employee taking the items to the post office;
- by the post office collecting the items from the premises;

- by the driver/vehicle making core goods deliveries to the premises (i.e. the item/s are transported by the vehicle on its return journey);
- if the premises is visited by a vehicle collecting money from the premises, these vehicles sometimes also collect paperwork and other items.

Some banks, none of which were interviewed as part of this study, also require the collection of paperwork from their premises, which tends to be collected from the premises by a vehicle and driver either close to the end of the working day or during the evening or night (in which case the driver has access to that part of the premises where the items have been left).

2.7 Home deliveries (goods despatched from premises to customers)

Deliveries of goods purchased in shops to customer's homes (referred to as home shopping or home delivery services) have become more frequent in recent years and forecasts suggest that they will continue to increase rapidly in popularity in the coming years.

It should be noted that home delivery services have been offered by some companies for many years. For instance when buying bulky white goods such as freezers and washing machines from some large, multiple retailer, these goods have been delivered direct from the distribution centre to the customer's home to avoid having to hold large stock at the shop. Similarly many multiple off-licences have for a long time delivered large orders to customer's homes. Florists have also offered home delivery services either to customers' homes or direct to special occasions such as parties, weddings and funerals for a long period of time.

In home shopping/delivery services, customer purchasing can happen in two very different ways, both of which have different implications for the future need for retail premises in towns and cities:

i. customer places order at shop in person and goods are then delivered to customer's home;
ii. customer places order by telephone/computer/fax (without visiting shop) and goods are then delivered to customer's home.

If approach (i) above is widely offered by companies and used by customers then there is likely to be a continued need for retail premises in towns and cities. Approach (i) is the method that has traditionally been used for most home delivery services offered by shop retailers in Britain. However if approach (ii) becomes the more significant form of home shopping/delivery then the demand for retail premises urban areas is likely to diminish in future, as companies will be able to take orders from customers at warehouse or office premises rather than having to operate expensive high street retail premises.

Another important distinction in home shopping/delivery services is where the goods are supplied from to the customer's home. Two different systems are currently being operated by retailers offering home shopping:

i. goods are delivered to customer's home from shops operated by the company.
ii. goods are delivered to customer's homes from distribution centres operated by the company.

This distinction about where the goods are supplied to the customer from will have an important bearing upon goods vehicle movements at retail premises in urban areas. In system (i), the goods are delivered to the shop in the normal manner and are then transported from the shop to the customer's home. This delivery from the shop to the customer will be organised by the shop. In this system goods vehicle movements generated by retail premises are likely to increase with the advent of home shopping.

In system (ii) above, the goods are delivered to the customer's home direct from a distribution centre rather than from a shop. This operation will be organised by non-shop staff. In this system goods

vehicle movements generated by retail premises are likely to remain the same or decrease with the introduction of home shopping.

Table 28 shows the number of premises studied that offer home delivery services from their shop to customers' homes or premises.

Table 28: Does the shop offer a home delivery service in which goods are delivered to the customers from the shop?

Home delivery service offered?	Number of premises
Yes (official service)	24
Yes (unofficial service)*	1
No, but will post goods to customer if requested	5
No, but may do soon	16
No	2

N.B. * - unofficial in the sense that this shop is part of multiple retailers who have not implemented this as a standard service, but the shop staff are personally prepared to offer this service.

As can be seen from Table 28, approximately half of all premises studied to which home shopping/delivery is applicable already offer delivery services to customer's homes from the shop. As already mentioned, these home shopping systems may result in an increase in the goods vehicle trips generated by shops.

Eleven of the shops interviewed currently offer home delivery services in which the goods are delivered to the customer's home from a distribution centre (goods are either purchased in the shop or direct from the distribution centre/head office). Four of these 11 premises offer home deliveries from the shop and from the distribution centre (with the shop responsible for small and medium-sized items and the distribution centre responsible for delivering large, heavy, bulky goods. However the other 7 retailers which offer deliveries to customer's homes from distribution centres do not offer home deliveries from the shop as well.

The potential transport advantage of home shopping and delivery services is that it could reduce the number of car trips made by customers to shops. If the customer orders by telephone, computer or fax then all that is required is a delivery to the customer's home (this replacing a trip to and from the shop by the customer in traditional shopping). If the customer still visits the shop to make the purchase and the goods are then delivered to the customer's home, it is hoped that the customer could make this trip by a mode other than car (i.e. public transport, bicycle or on foot) as they do not have to transport the goods home themselves.

Table 29 shows the method by which goods are transported from the 30 premises surveyed which currently offer home shopping/delivery to customer's homes/premises. As can be seen from the table, the majority of premises only use a vehicle/driver for delivering goods to premises, although other transport methods are used by some other premises. Of the 23 premises that either only use a vehicle or use a vehicle and other transport methods for home deliveries, 17 of these premises used a vehicle based at the premises, while the other six buy in this transport service.

Table 29: Method by which goods are transported from the shops interviewed to customer's homes/premises

Transport method	Number of premises
Vehicle (either lorry, van, moped or car)	18
Post	5
Vehicle and staff on foot	3
Vehicle and post	2
Post and staff on foot	2

Table 30 shows the frequency of home delivery vehicle trips made by those premises that provided data. Several premises could not provide accurate information about the number of home delivery trips they made because the number of trips fluctuated significantly.

Table 30: Home delivery vehicle trips made from the premises

Type of premises	Number of home delivery vehicle trips per week made from the premises
Florist	20 delivery rounds to 350 customers per week
Off-licence	20 delivery rounds per week to 100 customers plus deliveries on-foot
Pizza Restaurant	400 deliveries to customers per week
Printing and photocopying shop	15 delivery rounds per week
Variety store	Deliveries to 50-100 customers per week
Furniture shop	Deliveries to 75 customers per week
Builders merchant	55 delivery rounds per week

2.8 Comparison of core goods trips and other goods trips at the premises

Table 31 shows the total number of goods vehicle movements at the urban premises surveyed in a typical week. It provides an opportunity to compare the number of core goods movements with other types of goods movements. As can be seen from the table, at some premises, the other goods movements are significantly greater than the core goods movements, thereby illustrating the importance of studying all goods movements if a better understanding of goods trip generation is to be achieved.

Table 31: Total number of goods vehicle movements in a typical week at urban premises surveyed (sorted by total of vehicle trips)

Type of premises	Ownership	Number of core goods vehicle collections and deliveries per week	Number of goods vehicle transfers with horizontal premises per week	Number of ancillary goods vehicle deliveries per week	Number of waste vehicle collections per week	Number of money collections & deliveries per week	Number of home delivery vehicle trips from premises per week	Total number of goods vehicle trips at premises per week
Bakery	Multiple	400	N/K	N/K	N/K	0	0	400
Pizza restaurant	Multiple	3	10	1	6	0	300 deliv. & rounds	320
Department store	Multiple	190	0	N/K	N/K	6	100 deliveries (15 rounds)	211
Convenience grocer	Multiple	159	1	1	13	7	0	182
Builders merchant	Multiple	100	N/K	N/K	N/K	7	55 rounds	162
Retail warehouse	Multiple	150	N/K	N/K	N/K	0	0	150
Furniture & carpets	Multiple	46	0	1	1	0	75 deliveries (40 rounds)	88
Chemical factory	Multiple	87	0	N/K	N/K	0	0	87
Large office	Multiple	80	N/K	N/K	N/K	0	0	80
Supermarket	Multiple	60	0	0	2	0	0	62
Large office	Multiple	50	5	N/K	5	0	0	60
Hotel	Multiple	50	0	N/K	3	7	0	60
Book shop	Multiple	40	0	4	8	7	0	59
Chemist	Independent	50	0	2	4	0	2 deliv. & rounds	58
Builders merchant	Independent	35	N/K	0	1	0	15 rounds	51
Record & CD shop	Multiple	30	5	0	6	7	0	48
Florist	Independent	6	10	0	6	0	20 rounds	42
Chemist	Multiple	24	0	0	12	6	0	42
Fruit & veg stall	Independent	36	0	N/K	6	0	0	42
Off-licence	Multiple	2	10	1	6	0	20 rounds	39
Book shop	Independent	25	10	1	3	0	0	39
Pub	Independent	26	0	1	2	0	6 deliv. & rounds	35
Computer shop	Multiple	18	3	1	2	7	3 deliv & rounds	34
Variety store	Multiple	15	N/K	N/K	2	6	75 deliv. (10 rounds)	33
Florist	Independent	10	0	1	1	0	20 rounds	32
Newsagents	Independent	25	0	1	6	0	0	32

Newsagents	Independent	25	0	1	6	0	0	32
Off-licence	Multiple	3	1	0	6	0	20 rounds	30
Convenience grocer	Independent	26	0	1	1	0	0	28
Baker	Independent	10	12	0	6	0	0	28
Hardware shop	Independent	18	0	1	N/K	0	8 deliv & rounds	27
Cinema	Multiple	12	0	1	6	7	0	26
Department store	Multiple	12	0	0	7	7	0	26
Convenience grocer	Multiple	15	0	0	2	7	0	24
Pizza restaurant	Multiple	17	1	3	3	0	0	24
Pub	Multiple	16	0	1	6	0	0	23
Electrical shop	Multiple	6	0	0	6	6	5 deliv. & rounds	23
Print/photocopy shop	Multiple	6	0	0	1	0	15 rounds	22
Stationers	Multiple	9	5	1	6	0	0	21
Furniture & carpets	Independent	10	0	N/K	1	0	25 deliveries (10 rounds)	21
Pub	Multiple	13	0	1	6	0	0	20
Off-licence	Multiple	2	5	0	2	0	10 rounds	19
Clothes shop	Multiple	2	1	1	6	6	3 deliv. & rounds	19
Double glazing factory	Multiple	18	N/K	N/K	N/K	0	0	18
Clothes stall	Independent	11	0	N/K	6	0	0	17
Electrical shop	Multiple	9	0	0	1	7	N/K	17
Shoe shop	Multiple	6	1	0	2	6	0	15
Clothes shop	Multiple	2	0	0	6	6	0	14
Gift shop	Independent	3	0	1	6	0	2 deliv. & rounds	12
Fruit & veg shop	Independent	7	0	1	1	0	3 deliv & rounds	12
Electrical shop	Multiple	4	N/K	0	1	7	N/K	12
Fast food restaur.	Multiple	3	N/K	N/K	6	0	0	9
Travel agent	Multiple	2	0	N/K	N/K	6	0	8
Shoe shop	Independent	5	0	1	1	0	0	7
Gift shop	Multiple	1	0	0	5	0	0	6
Clothes Shop	Independent	4	0	N/K	N/K	0	0	4
Furniture shop	Multiple	1	0	0	1	0	0	2
Dry cleaning shop	Multiple	1	0	0	1	0	0	2

N.B. N/K - not known (premises unable to provide data).

For home delivery vehicle trips column - “deliveries” are the number of premises delivered to, and “rounds” are the number of vehicle delivery rounds carried out from the premises (with each round representing one vehicle trip from the premises). Where the number of home deliveries and rounds are the same, each customer delivery is carried out as a separate single drop journey.

The table only includes goods trips made by vehicle, not good trips made by foot.

Each goods collection or delivery at the premises is counted as a single trip even though the vehicle makes a trip to and a trip from the premises as part of the collection or delivery. Similarly in the case of home delivery vehicle trips, each delivery round performed from the premises is counted as a single vehicle trip at the premises even if the vehicle departs the premises at the start of the round and then returns at the end.

3. Vehicle trips for service and other commercial activities

3.1 Vehicle trips for service activities

Many service trips involve the driver/engineer who provides the service to the premises taking "goods" into the premises. These trips could therefore be categorised as goods trips. However, for the purposes of the project we decided that it was important to distinguish goods trips from service trips because:

i. The servicing activities performed at the premises performed by the driver/engineer from the service company tends to be very different in nature and duration to a goods delivery/collection.
ii. The way in which service operations and service vehicle trips are organised tends to be different to goods vehicle trips and a significant proportion of service activities have to be provided to premises at very short notice.
iii. From talking to service companies it is clear that the transport problems they face are often different to those experienced by companies that only deliver and collect goods.

In the project, service trips were defined as those trips in which the main purpose of the trip is to perform a servicing activity at the premises rather than solely deliver or collect goods. These servicing activities involve the service vehicle driver/engineer carrying out some task/s at the premises rather than simply handing over or collecting goods at the front or back door. Examples of service activities include photocopier servicing, security and fire alarms servicing, lift and escalator servicing, air conditioning servicing, drain cleaning, pest control and general cleaning services.

Many service providers have to take equipment and tools into the premises where the service is to be provided. As mentioned above, these service trips can also involve the person who is providing the service taking goods to or from the premises where the service is performed (such as parts for machinery that is being repaired or new plants in the case of a plant care service company). However, this is not the primary purpose of the trip.

Vehicle trips for service activities in the urban area have been largely neglected from urban freight research. However, the research carried out in this project indicates that these vehicle trips are important in several senses:

- the provision of services can be equally or even more important to a premises in the urban area than the receiving and dispatching of goods;
- vehicle trips for service activities form an important part of the total commercial vehicle traffic in urban areas;
- several factors exist that could potentially increase the number of vehicle trips for service activities performed in urban areas (including the introduction of new equipment and technology in premises to support tasks that were formally carried out manually, the growth in outsourcing of servicing functions, and the level of service and hence speed of response being offered by some service companies).

The following sections present the project findings obtained from interviews with premises about their service requirements and how this is provided for, and from interviews with service company managers, team leader and engineers/drivers.

3.1.1 Types of services required by premises

Premises in urban areas can require a wide range of different types of services to be performed at them and these can generate vehicle trips they include (all the following were identified by premises which were interviewed in the project):

- Computer equipment servicing

- Photocopier servicing
- Cash registers and tills servicing
- Security and fire alarms servicing
- Lift/escalator servicing
- Air conditioning servicing
- Warm air hand drier servicing
- Other equipment servicing (such as refrigeration equipment, cooking equipment, heating equipment)
- Drain cleaning
- Public utilities (i.e. services connected with telephones, gas, electricity, water)
- Window cleaning
- Pest control services
- Plant care (of the floral kind)
- Laundry/dry cleaning services
- Towels/linen supplies
- Industrial cleaning (floor, carpets etc.)
- Vending machine supplies and servicing
- Ready-prepared food catering

In the project we were interested in those services that resulted in additional vehicle trips being generated at the premises (i.e. trips in addition to the goods trips described in Chapters 1 and 2). We were therefore not interested in services performed by staff employed on-site as this does not generate additional vehicle trips, only their daily trips to and from work (which were not included in the project).

Some of the service trips are similar to the delivery of ancillary goods. We distinguished between these service trips and ancillary goods trips in the following way: if the goods provided by the trip are completely consumed at the premises we treated them as ancillary goods trips (e.g. till rolls, plastic bags, light bulbs etc.), while if the goods provided by the trip are not disposable and are instead serviced by the provider we treated them as ancillary goods trips (e.g. towels which are cleaned and returned by a laundry, dry cleaning of staff uniforms etc.). Applying this distinction, the following supplies and the trips they generate were not included in the above list of services as they were deemed to be ancillary goods trips:

- office stationery supplies & sundries;
- printed material supplies;
- unprepared foods for an on-site kitchen;
- deliveries of freshly cut flowers by a florist.

The research has indicated that there are several key factors that influence the number of vehicle trips for service activities made to the premises surveyed. These include:

- the type of land use at the premises;
- the size of the premises;
- the type and quantity of equipment used at the premises;
- the extent of service outsourcing at the premises;
- the extent of servicing carried out in-person (as opposed to remote servicing);
- customer service levels provided by the service company.

3.1.2 Category of vehicle trips for service activities

From the interviews carried out with premises, it has been possible to identify four categories of vehicle trips made to premises in order to carry out service activities:

i. quotation - trips to customers' and potential customers' premises to assess their equipment and servicing requirements and to then produce a quotation for this work;
ii. installation - this refers to when equipment (such as computers, photocopiers, cash tills, air conditioning systems, security systems, roller towels, warm air hand driers etc.) are first installed by the service company at the premises;
iii. planned servicing/maintenance - this refers to trips to the premises to either check and service equipment, or to replenish equipment (such as roller towels, or linen) at a predetermined frequency (e.g. every fortnight, or every six months);
iv. ad-hoc servicing/emergency maintenance - when equipment fails to function or to function properly and the service company have to make an unplanned trip to the premises, usually at relatively short notice. The speed with which the service company have to make a trip to the premises to rectify the problem depends upon the time sensitivity of the equipment/service in question (see Section 3.1.3). More than one trip can be necessary to rectify equipment failures of this type if the engineer has difficulties diagnosing the problem or does not have the necessary spare part(s) in their vehicle.

In some service companies each of these four categories of service trips are carried out by the same service engineers/providers and vehicles, but in other service companies different staff and vehicle fleets are responsible for each category of service trip. From our interviews it would appear that the size of the service company and the time sensitivity of the equipment/service concerned have an important bearing on whether the service company has different staff and vehicles for each category of service trip. Generally, the larger the service company and the more time sensitive the equipment/service, the greater the likelihood that the service company will organise itself into separate divisions for each category of service trip.

Most service vehicles tend to operate in a similar pattern to multi-drop goods vehicles. The service engineer/providers will visit each customer in turn, driving directly from one to the next. In some service companies, the service engineer/provider will be issued with a list of customers to visit at the start of their working day, but in other companies the engineer/provider is only informed of which customers to visit during the course of the working day.

Whether it is possible for the service company to provide the engineer/service provider with a list of their entire day's work at the start of the day depends on the time-sensitivity of the service being offered. In the case of engineers performing planned maintenance and periodic service check on customers' equipment (e.g. boilers, air conditioning, telephones, lifts/escalators, gardening/plants etc.) it is possible for the service company to plan and sequence these jobs into the engineer's/service provider's work schedule at the beginning of the day (or even earlier) as these servicing tasks are not time sensitive.

However in the case of ad-hoc maintenance and problems experienced by customers that require a visit from an engineer/service provider at short notice, it is not always possible to produce a list containing the day's work and the sequence in which it is to be carried out for the engineer provider. Examples of such time sensitive services include photocopier, computer system and telephone breakdowns, severe drain blockages and burst pipes, and security system failures.

Some companies using computer-based scheduling systems prefer to issue even planned jobs to their engineers during the day rather than informing the engineers of their entire work at the start of the day. In this way they hope to be able to allocate the workload between their employees more efficiently.

Although engineers/providers tend to carry a certain quantity of key parts in their vehicles at all times, in these ad-hoc maintenance trips it is can be the case that the engineer will not have the parts on-board that are required in order to wholly rectify the problem and they therefore have to obtain these required parts at very short notice. Service companies tend to use a range of different systems for getting parts to customer's premises at short notice (see Section 3.1.8 for a fuller discussion of this topic).

Some of the premises surveyed choose not to have their equipment and infrastructure (i.e. air conditioning) routinely serviced and instead just call a service company and request an engineer to be sent to their premises when something goes wrong. This could either be due to: (i) equipment becoming more reliable so that there is not the same need for routine servicing that there used to be, or (ii) that the premises do not want to have to afford regular servicing and therefore only ever react to equipment problems rather than attempt to prevent them.

Therefore some service activities are provided on an ad hoc rather than a regular, planned basis. These ad hoc service trips tend to be of an emergency nature.

3.1.3 Time-sensitivity of ad-hoc servicing/emergency maintenance

Like goods collections and deliveries, ad-hoc/emergency servicing tasks vary in their time-sensitivity (i.e. how quickly a service-related problem at the premises, such as equipment breakdown, needs to be dealt with). Some ad-hoc services are relatively non-time sensitive (in that the premises can continue to function for several days or weeks without the problem being rectified), while others are highly time-sensitive (as they are extremely critical to the functioning of the premises).

During our interviews with premises about their servicing needs it became apparent that for some premises, certain servicing needs are more time-sensitive than any of their goods collections and deliveries. For example, several managers of large retail outlets using highly automated stock control and checkout systems informed us that if these computerised systems fail it is necessary for them to close their shops immediately as they are unable to function without them. It is therefore imperative to these retailers that the systems are repaired as quickly as possible once a fault manifests itself. Similarly, a fast food restaurant has to close its premises if its refrigeration systems fail and it too requires immediate response from service engineers when such a problem is encountered.

The level of customer service being offered by many service companies is continually rising. One aspect of this improving customer service is that the service company will enter into increasingly rapid response time agreements in their customer contracts, thereby promising to respond to a customer's service problems in an ever-shorter period of time. If the service company fails to get a service engineer/provider to the customer's premises within this agreed response time then, under the terms of the contract, the service company can have to make a compensatory financial payment to the customer.

During the research we spoke to a national photocopier servicing company which has recently implemented a two-hour emergency response time for its customers. Under the conditions of the agreement this means that the engineer must arrive at the customer's premises within two hours of the problem being reported by the customer not that he must arrive within two hours of when he said he would arrive. One of their engineers told us that,

> "By hook or by crook I've got to get there.....It's hard enough anyway because we cover the whole of Norfolk, the distances involved are quite difficult.....you get into Norwich and then you have to fight for somewhere even to stop or to park. Because it doesn't matter as long as you stop, go inside and say `hello I'm here I'm going to drop off this case and park' you've arrived and you don't have to pay".

Another engineer told us,

> "This is where the competitive edge is coming into a lot of the service industries. You all compete on price. The one thing you can and have to offer is this premium type service. So the pressure really is there".

Penalty clauses of this kind are a reflection of the intensity of competition that exists between service providers in some sectors. Customers are being offered ever-increasing levels of service, and this is putting service engineers/providers under ever more stringent time constraints, and thereby reducing the amount of time they have to travel to the customer's premises and find somewhere to park their vehicle.

3.1.4 Types of service vehicles used

Among the service companies interviewed during the research, the following types of vehicles are used by engineers/service providers to supply services to customer's premises:

- cars;
- vans (all types of vans from transit vans through to car-derived vans);
- small lorries (3.5 - 7.5 tonnes gross vehicle weight).

The only regular servicing provided to premises on foot identified during the project was window cleaning. All other service providers/engineers travelled to the premises using motorised road vehicles. The interviewees at premises were far less capable of describing the types and sizes of vehicles used by people supplying services to the premises, and also the frequency with which services were supplied, than they were with goods collections/deliveries and goods vehicles. It would appear that a number of factors contribute to this situation:

- Many of the service personnel providing services to the premises are unable to park outside or even near to the building so the vehicle is often not visible to the staff at the premises while servicing is carried out;
- The frequency with which many services are supplied to the premises tends to be less than goods deliveries and collections, so premises have fewer opportunities to see the vehicles;
- some services are only requested by a premises when something goes wrong (i.e. there is no regular servicing);
- Staff at the premises tend to have a lack of appreciation of vehicle type/size/weight (which is also true of goods vehicles).

If the interviews and discussion group sessions with service companies are representative of the service industry, it would appear that unliveried cars are used by many service engineers/providers. At four of the eight services companies that participated in the study, service engineers/providers use ordinary cars in the course of the work. One of the main reasons cited for this situation is the anonymity ordinary cars provide, because engineers need to carry expensive parts and tools and unliveried cars do not attract unwanted attention.

3.1.5 Time/day of servicing activities at premises surveyed

The majority of the premises studied only accepted visits by service engineers/providers on normal working days and during normal working hours. This was due to them: (i) not wanting to provide unattended access to the premises to service engineers/providers, and (ii) not wanting to have to organise their own staff to be on-site outside normal working days/hours as this would have labour cost implications.

However, a few of the premises we interviewed did accept out of hours servicing as they have very busy shops and this is the only time that service activities can take place safely and without affecting customers. At a fast food restaurant interviewed most equipment servicing (e.g. fridges, freezers, cooking equipment, security alarms etc.) takes place early in the morning when staff are on the

premises, but before the shop opens (the shop doesn't open until 10 am but staff are usually on the premises from 6 or 7 am).

At a department store that was interviewed, regular servicing is restricted to out-of-hours (either in the evening after the shop has closed, in the early morning before the shop opens, or on a Sunday (when the shop is currently shut). Obviously when emergencies occur this requires daytime servicing, but this is avoided wherever possible at the department store.

For those few premises that we interviewed that currently organise servicing activities to take place either in the evening, early morning or on Sunday, staff at these premises are concerned that the introduction of longer opening hours at the end of the day, and Sunday opening will remove the possibility of organising servicing tasks to take place at these times. Instead they feel that they will have to organise servicing tasks during the evening and night when their premises are closed, but this will have cost implications both in terms of them having to have their own staff on-site to oversee the work and provide security, and also in terms of the price they will be charged by service companies for night working.

The only types of premises serviced during the night by the service companies that we interviewed tended to be at factories, hospitals and other premises where this was the only practical time for servicing to be carried out. Most of the service companies that we spoke to are not keen on providing services during the night as their staff do not want to work at this time, they will request higher rates of pay, it could well increase the total numbers of engineers employed and service vehicles operated and, an important point, they prefer the customer to be present in order to define the exact nature of any problem.

3.1.6 Number and type of vehicle trips for service activities at premises surveyed

Table 32 shows the extent to which a range of different services activities that generate vehicle trips are used by the premises surveyed and the frequency of planned service vehicle trips.

Table 32: Vehicle trips for servicing activities made to premises surveyed

Type of service	Whether service vehicle trips are made to premises (% of premises surveyed)	Where premises receive service trips: planned or ad hoc basis (% of premises surveyed)	Average number of planned vehicle trips for those premises using service (per year)
Computer equipment	56%	Planned: 32% Ad hoc: 64%	2 per year
Photocopier	30%	Planned: 81% Ad hoc: 19%	44 per year
Cash register/tills	63%	Planned: 10% Ad hoc: 90%	1 per year
Security/fire alarms	92%	Planned: 76% Ad hoc: 24%	6 per year
Lift/escalator	23%	Planned: 83% Ad hoc: 17%	7 per year
Air conditioning	42%	Planned: 64% Ad hoc: 26%	4 per year
Vending machines	26%	Planned: 85% Ad hoc: 15%	44 per year
Warm air hand driers	21%	Planned: 18% Ad hoc: 82%	2 per year
Window cleaning	72%	Planned: 100% Ad hoc: 0%	79 per year
Telephones	92%	Planned: 2% Ad hoc: 98%	2 per year
Florist/plant care	8%	Planned: 100% Ad hoc: 0%	240 per year
Ready prepared food catering	4%	Planned: 100% Ad hoc: 0%	260 per year
Laundry/dry cleaning	10%	Planned: 100% Ad hoc: 0%	346 per year
Towel/linen supplies	8%	Planned: 100% Ad hoc: 0%	156 per year
Pest control	25%	Planned: 91% Ad hoc: 9%	11 per year

3.1.7 Service vehicle parking

Few of the premises studied have any off-street facilities for goods vehicles making deliveries or service vehicles providing a service to the premises. Of the premises that do have off-street facilities, these tend to be used for the parking of employees' cars and for goods vehicle unloading. But, other than in the case of premises with extremely large off-street facilities, there tends to be no parking provision made for service vehicles visiting the premises.

From our interviews with service companies, their engineers/drivers typically have to park their vehicles on-street when visiting customers' premises to carry out servicing tasks. Finding a place to park a service vehicle on-street is even more difficult than finding a place to pull up on-street in a goods vehicle to make a delivery or collection for several reasons:

- Service vehicles parked on-street while service engineers/providers are working in the premises are not covered by the loading and unloading allowances given to goods vehicles making deliveries to the premises, because of the time taken to perform the service activity and the fact that it does not constitute continuous loading/unloading. Instead they are treated in the same way as private cars and other motor vehicles. This reduces the number of places service vehicles can be parked in comparison with where goods vehicles can be left when unloading. It also tends to result in service vehicles being parked further from the customer's premises than goods vehicles. The engineer/provider then needs to walk further to and from the premises. This is time consuming and can be difficult or impossible if the engineer/provider requires tools and other heavy equipment in order to carry out the servicing.
- Some service tasks take longer to perform than goods delivery and collection. Therefore the service vehicle will have to be parked for longer than the goods vehicle. This can further reduce the number of places where a service vehicle can be parked.
- In some cases it is difficult for the service engineer/provider to estimate how long it will take to perform the servicing task at the premises. If the vehicle is parked in a place where parking time is limited or a parking meter has to be used, it can sometimes be necessary for the service engineer/provider to return to the vehicle and move it to another parking place during the course of the servicing work at the premises.
- It has been argued by some of the service companies interviewed that service vehicles are more harshly treated than goods vehicles by traffic wardens and the police force. If true this could be due to the difficulty in distinguishing some service vehicles from private cars, and also the lack of appreciation of the importance of service tasks by wardens and the police.

The service response times that some service companies have promised to their customers can result in their engineers/providers having to park illegally in order to arrive at the customer's premises in time to avoid a penalty clause in the contract.

3.1.8 Service engineer's equipment and parts requirements

Many service engineers require parts in order to be able to repair and service equipment and infrastructure at customers’ premises. Through the interviews we have been able to identify several ways in which engineers obtain these parts, these are shown in Box 3.

In many service operations, especially those involved with high technology equipment such as computers and security equipment, getting the necessary parts to the customer’s premises in a short space of time is essential. Given that equipment and machines can have thousands of different parts, some of which are extremely expensive, it is not generally possible for engineers to carry all the parts that they may require in their own vehicles at all times. For these service companies, in order to meet the stringent response times that they are often bound to, this therefore requires getting both: (i) the engineer, and (ii) the spare parts to the customer’s premises in a very short space of time.

Box 3: Ways in which service engineers obtain parts

- the engineer has a stock of certain parts in his vehicle at all times;
- another engineer who works in the same or an adjacent catchment area who happens to have the part required by the engineer in their vehicle will drive to the customer's premises or an agreed meeting point to give the part to the engineer;
- the engineer drives to a parts supplier to pick up parts;
- the engineer drives to his own company's warehouse (which can be a significant distance from where he is working, and the customer's premises) to pick up parts;
- the engineer drives to a satellite store that is located in his customer catchment area to pick up parts (this can either be a facility operated by his company or a store operated and used by another company whom his company pays to hold their stock as well);
- parts are sent to engineer's home by express company (either from his company's warehouse or direct from supplier) to arrive before he leaves home in the morning so that he can drive directly to the customer's premises with the part;
- parts are sent to the customer's premises by express company (either from his company's warehouse or direct from supplier) so that they are either already there when the engineer arrives or sent same day while the engineer does other work and then returns to the customer's premises when they have arrived.

3.1.9 How service requirements are changing over time

It would appear from interviews with service companies working in high technology sectors (such as computing, photocopying, security and fire detection) that operational and technology-related factors are having an important bearing upon the total number of vehicle trips for service activities made to customers' premises:

i. The development of more technology and equipment for an ever-increasing range of tasks: as the range of equipment available has expanded and companies have employed this technology, this has generated a need for the installation, planned and emergency maintenance of this equipment.

ii. Equipment has become more reliable over time as the technology becomes more mature: as the technology has improved so too has the reliability of the equipment therefore reducing the need for emergency servicing of equipment, and hence emergency vehicle trips for service activities.

iii. Some servicing of high-tech equipment can now be carried out remotely (several retail premises studied that were part of companies with branches all over the country have their computer/stock control, and telephone systems serviced remotely by it personnel based at other sites, with service engineers only visiting the premises in the case of equipment failure).

iv. In the last ten years many companies have significantly reduced the service personnel that they employ (especially those based at the premises) and to compensate for this have increased the extent to which they contract specialist service companies to carry out these service functions at their premises on their behalf. Only two of the 58 premises surveyed during the project have on-site personnel to deal with the vast majority of their servicing requirements. All the other premises receive their servicing needs from service companies who send staff to the premises to carry this out.

v. The time taken to service some high-tech equipment has reduced over time as the diagnostic tools are now far more powerful now. Rather than having to work through every possible problem, which could take a couple of hours (as was necessary in the past), the equipment itself or the engineer's computer can now inform them of the problems in minutes.

The first four of these factors have a bearing on the number of vehicle trips for service activities that have to be performed to any given premises using such technologies and equipment. It is likely that

factor (i) has increased the number of vehicle trips for service activities in urban areas significantly over the past ten to twenty years, as automated and computerised systems have become increasingly prevalent in all sectors. Factor (iv) has also increased service vehicle trip numbers. However factors (ii) and (iii) have the effect of reducing the number of vehicle trips for service activities necessary to premises in the urban area (factor (iii) has only become possible relatively recently and is unlikely to be having a large effect at present, but could well increase over time). It should also be noted that many documents that were previously sent as physical packages and envelopes either by postal services or by courier company are now transmitted by fax and computer (i.e. e-mail), removing the need for physical transportation and vehicle activity. However the actual extent to which electronic transmission has replaced physical transportation is not well understood at present. Factor (v) has helped to increase the number of service jobs an engineer can perform in a working day, and hence increased the total distance travelled by any one engineer in a given period of time, but has reduced the number of engineers and vehicles required.

3.1.10 In-house capability *versus* outsourcing of service activities

Traditionally the vast majority of the service functions required by premises were carried out by employees of the company who were based at the premises. Therefore, apart from the employees journey to and from work, the servicing activity did not in itself generate vehicle trips for service activities. Other service functions (especially those that did not need to be performed very frequently) were, at some premises, carried out by employees of the company that owned the premises, but who were not based at the premises and therefore needed to travel to the premises in order to perform the service. In addition, some of the services required by premises have always been carried out by employees of a service company contracted by the company that owns the premises to carry out the service for them. However, traditionally this latter arrangement was typically only used by premises for the servicing of utilities such as water, gas, electricity, and telephones.

It should be noted that only service activities performed by personnel not based at the premises (who therefore need to travel to the premises in order to perform the service) generate vehicle trips for service activities. These trips can be made either by employees of the company that owns the premises, but who are not permanently based at the premises or by employees of a service company contracted by the company that owns the premises to carry out the service for them.

The service provider usually needs to carry tools, equipment, spare parts, etc. on these trips and therefore, will generally have to use a motorised road vehicle. Service personnel based permanently at the premises do not need to carry tools and parts to and from the premises with them as these are stored at the premises and therefore, there is a far greater potential for their journey to and from work to be performed by public transport.

In the last ten years many companies have significantly reduced the service personnel that they employ (especially those based at the premises) and to compensate for this have increased the number of service functions that are contracted out. This can prove beneficial to the company for a range of reasons including:

- the specialist management skills and operational experience offered by third party service companies may result in improved services at lower costs;
- it allows the company to concentrate capital investment in their core businesses and to pay for service requirements on a current cost basis;
- averts need for investment in new equipment and tools required by service personnel;
- can help to overcome internal industrial relations problems;
- it is one less business variable to worry about. By subcontracting service activities and ensuring that acceptable standards are built into the contract, senior management can focus their attention elsewhere.

The vast majority of these contracted-out service activities are only provided to premises by the service company on a temporary basis when the activity needs to be performed. In this situation a service provider/engineer from the service company will make a vehicle trip to the premises to carry out the service. Only in the case of very large premises with a high level of demand (for example, in the research, a large office which has computer service engineers from a service company permanently based in the office alongside employees) or for services that are required by the premises on an almost continual basis (such as security staff guarding the premises outside normal working hours) are employees of the service company permanently based at the premises. The trend towards the contracting out of service functions at premises has therefore tended to increase the number of vehicle trips for service activities to and from premises in urban areas.

Only two of the 58 premises surveyed during the project still had on-site personnel to deal with the vast majority of their servicing requirements. These were both among the largest premises studied, and both had a high level of demand for these services and could therefore felt justified in having on-site personnel. One of these two premises has kept servicing in-house and employs all of its service personnel itself, while the other has contracted out several of its service needs such as computer support, telephone engineer and general maintenance and therefore has a mix of employees and service company implants working at the premises. Even at these two premises it is necessary to call in service companies if a problem is encountered that is beyond the capability of the on-site staff. The other 56 premises studied contract-out the majority of the service activities that they require and this generates service vehicle trips to and from these premises.

3.1.11 Organisation of the service contract

Premises that contract out either some or all of their service requirements (which in our research are the overwhelming majority of premises) can organise the outsourcing of these service activities in one of two ways:

i. the service contractors are selected by the owner/manager of the premises at which the service is to be performed (we have referred to this as a *decentralised service contracting policy*)
ii. the service contractors are selected by a single person at the head office of the company that owns the premises at which the service is to be performed, and this service company provide this service to all premises owned by the company (we have referred to this as a *centralised service contracting policy*)

Companies with several or many premises can have either a decentralised or centralised service contracting policy. The approach used by the company will depend on company strategy and organisation, and the extent to which managers of individual premises are expected to organise the requirements of their premises.

In the interviews with managers/owners of premises we found that in most premises that are part of large companies, national service contracts tend to be organised by a central buyer at head office service for servicing equipment such as computer, photocopiers, equipment and plant maintenance, and tills and cash registers.

Large companies with many premises, each of which require the same service, can enjoy several advantages from a centralised service contracting policy including:

- they can negotiate a “bulk” discount with the service company;
- they can negotiate a single service level with the service company that will appertain to all their premises (in terms of issues such as response time, repair time etc.) and help them to operate a similar service standard themselves at each premises;
- having a single contract with one company for the provision of a service at all premises in the company helps to reduce the time and resource required for service contract negotiations;

- organising service contracts centrally removes this task from managers of the premises and allows them to concentrate their efforts of the core business of the premises be it retailing, manufacturing, etc.;
- large companies prefer to work with other similarly large companies rather than many small companies (for cultural and organisational issues).

Therefore there are several commercial benefits for companies organising their service contracts nationally. However national service contracts can result in service vehicles being driven greater distances, on average, to customers' premises than when local service companies are used. Therefore national service contracts can result in greater total distances being performed in service vehicles as each engineer can be responsible for extremely large catchment areas. However this additional distance will be travelled on inter-urban roads rather than within the urban area (as local service engineers would also have to travel similar distances between customers within the urban area). It does not therefore necessarily impose an additional traffic or environmental impact in the urban area, but does on the roads and through the areas on which the vehicle travels in order to reach the urban area in which the customer is located.

At those premises studied whose companies had organised national service contracts on their behalf, some of the premises communicate directly with the service company when they require service activities to be performed, while others report any servicing requirements to their personnel at their head offices and head office is responsible for communicating the service contractor to organise these servicing activities at the premises.

If the premises is a single entity (i.e. there are no other premises in the company) then all service companies used will obviously have to be selected by the owner/manager of the premises, and will according to our definition, operate a decentralised service contracting policy.

3.1.12 Case studies of customer service and transport activity of several service companies surveyed

Office machinery servicing company

An office machinery supply/service company interviewed during the research has to service each of the 10,000 machines that it is responsible for in East Anglia, on average every 40 days (however this can vary widely between models, with small, basic machines usually requiring servicing twice per year and some large machines require servicing every day). The company's engineers carry out approximately 90,000 vehicle trips per year to service machines in East Anglia.

Customers contact the service company's call centre to arrange servicing and report problems. Service jobs are manually assigned to engineers. The assignment of jobs to engineers is based on several criteria:

- service response time necessary
- skills required to carry out service/repair
- estimated time to repair/service machine
- location (try to allocate jobs to nearest engineer where possible)
- current work load already allocated to engineer

Each engineer has their own company car for travelling between jobs and in which to carry their tools, equipment and spare parts. They carry out between 1 and 10 servicing jobs at customers' premises per day within their catchment area (the average is 4 to 5 jobs per day). Distance travelled between jobs can be significant. The average annual mileage per engineer is 27,000 miles.

Engineers carry 85% of the spare parts they require, other parts are stored by a retail/wholesaling company, which has shops all around the country, and has been contracted by the office machinery service company to operate a parts store for them. The engineer can check the availability of parts using the laptop computers and modems that they are all issued with. The laptops can also be used to interrogate and diagnose problems with more advanced office machinery; 20% of problems are now solved in this manner. Engineers are responsible for replenishing the parts carried in their vehicles on a weekly basis from the parts store.

If the engineer requires a part that he does not have in his vehicle he can decide to either pick it up from this parts store in person or have it couriered to the customer's premises. A few, large customers hold their own stock of parts at their premises for the engineers to use. In the case of some routine service jobs, which require a courier to deliver a part to the customer's premises, the courier driver now also fits the part rather than simply dropping it off for the engineer to return and fit.

Most servicing is carried out at customers' premises during normal working hours when the customer is on-site to provide access and explain the problem.

Telephone installation and servicing company

The service manager of a telecommunications service provider interviewed during the research (with responsibility for servicing in the Central London area) explained that their customer response times are five hours for problems reported by business customers and nine hours for domestic customers.

Each of the company's engineers works from home and is issued with a transit van to carry their tools and parts. Each engineer manages their own stock of parts. As well as carrying part in the vans parts are also: (i) couriered to home or job address, or (ii) delivered to storage points in the engineers catchment area.

Customers contact the service company's call centre to report problems and arrange servicing. The call centre carries out remote tests to establish if it is necessary for an engineer to visit the premises. If an engineer visit is required, a dynamic computer scheduling package is used to allocate jobs to engineers. The package takes into account the following factors in allocating jobs:

- the skills of the engineers
- engineer availability
- service response time necessary
- travel time to the customer's premises
- current work load already allocated to engineer

Engineers are issued with hand held computers and mobile phones to keep in touch with the call centre and customers. Each engineer carries out approximately three to four service jobs per day on average (but this can vary between 1 and 10 jobs depending upon scale and complexity of each job). The engineers carry out approximately 6000 service jobs per month in the centre of London area (and hence 6000 vehicle trips to customers' premises). The engineers working day runs from 7.30 am to 8.00 pm with most service work carried out between 8.00 am and 5.30 pm).

Fire and security alarm servicing company

The service centre interviewed provides service cover in three counties in East Anglia and offers 24 hour service cover to its customers. The company offers customers a same day, within working hours response time for problems reported during working hours and a four hour response time during the night.

The company has a national call centre that deals with all customer calls to report problems. Information about these jobs is relayed from the call centre to the regional service centres by

computer. The regional service manager then allocates jobs to engineers. The computer programme used shows the manager the customer details, the name of the person reporting the problem and their description of the problem. He passes this information to the engineer so that they have an idea of the problem before arrival at the premises. Engineers carry pagers and some also have mobile phones.

Installation engineers use either a car or a van, but it is their own vehicle not the company's. Service engineers use estate cars that are company-owned vehicles. The engineers carry a large number of parts and components with them in their vehicles. Parts that engineers require to carry out a service, but which they do not have in their vehicles, are either sent to the customer's premises by courier or are collected by the engineer from the company's office/storeroom if in stock.

Service engineers make 4.6 calls on average per day. The time spent at a site can vary from 15 minutes for a false alarm to a couple of hours for a major problem. It is quicker for engineers to service equipment than it was in the past as the equipment itself now assists with diagnosing the problem. In the past the engineer had to work through every possibility in trying to find a problem which could take a couple of hours.

3.2 Vehicle trips for other commercial purposes

This section is concerned with vehicle trips for other commercial purposes to the premises that are not to do with delivering or collecting goods to/from the premises or providing a service to the premises. These vehicle trips for other commercial purposes made to the premises studied on a regular basis are:

- vehicle trips made by sales representatives from suppliers and wholesalers
- vehicle trips made by employees of the company visiting the premises (such as Area and Regional Managers).

Table 33 shows that the majority of premises studied do receive work-related visits for these purposes and that these trips are usually made to the premises by car or van.

Table 33: Visits made to the premises by car by sales reps or company staff

Are regular visits by car made to the premises by sales reps or company staff?	Number of premises
Yes	44
No	9
Not known	5

Table 34 shows the frequency of trips by sales representatives by car to the premises surveyed where information was available. On average, premises visited by sales representatives received seven such trips per week.

Table 34: Frequency of trips by sales representatives to premises surveyed

Frequency of visits to premises	Number of premises
A few per year	5
1-4 trips per week	10
5-10 trips per week	9
11-20 trips per week	5
21-50 trips per week	1
100 trips per week	1

These trips all take place during the normal working day at the premises surveyed. Some sales representatives visit premises at approximately the same time on the same day each week, others

book an appointment in advance of their arrival and others simply turn up without notifying the premises and wait until the person they want to see becomes available if necessary.

As already mentioned (see Section 1.9.12) some premises purchase goods from suppliers or wholesalers operating van sales operations. In these operations the goods vehicle driver also performs the role of a sales representative.

Where premises do not have off-street parking space, sales representatives and company staff visiting the premises have to find on-street parking facilities for themselves. This can be difficult according to some of the premises studied and can result in lost time and lengthy walks to the premises. One premises in Norwich informed us that their Area Manager parked on the outer ring road and caught a taxi to their premises in the city centre as finding a parking space (even in a car park) was difficult, time consuming and stressful.

The reasons for sales representatives visiting the premises studied include:

- to take the premises' orders for goods
- to encourage premises to increase orders for a particular product
- to make premises aware of special offers and promotions
- to make premises aware of, demonstrate and encourage them to buy new products
- to check the premises are happy with the goods supplied
- to deal with any problems the premises has experienced with goods supplied
- to replenish stock at the premises

Some sales representatives dealing with small products carry some stock with them in their vehicles, so that if they find the premises is out of stock or about to run out of stock they can provide them with a replenishment there and then.

Premises with internally centralised goods supply systems do not tend to receive visits from sales representatives as this interface between the premises' company and their suppliers takes place further up the supply chain usually involving head office staff.

4. The problems and negative impacts caused by urban freight transport

Urban freight transport operations have a number of negative impacts of the urban environment and those people living and working within it. The impacts can emanate from vehicle operations, warehousing and distribution centre operations and from delivery and collection activities at premises receiving goods deliveries or services. The UK Round Table on Sustainable Development has grouped these negative impacts into three categories: environmental, social and economic impacts (UK Round Table on Sustainable Development, 1996). To this can be added a fourth category of negative impacts that has been identified during our research: negative operational impacts. The impacts that fall within each of these categories are shown below:

1. Negative environmental impacts

i. Non-renewable energy use
ii. Air pollution from emissions such as carbon monoxide, nitrous oxides, sulphur dioxide, volatile organic compounds and particulates
iii. Emissions of primary greenhouse gases
iv. Waste such as tyres, oil, vehicles, and other materials

2. Negative social impacts

i. Deaths, illness and threats to public health from air pollution
ii. Vehicle accidents with other road users and pedestrians causing injury and death
iii. Vehicle and distribution centre/freight activity noise
iv. Vibrations caused by vehicles which can result in disturbance and damage to roads, buildings and pavements
v. Physical intimidation/apparent threat caused by vehicles
vi. Visual intrusion and community severance caused by vehicle, transport infrastructure and buildings
vii. Other quality of life issues such as loss of greenfield sites and open space in urban areas as a result of new transport infrastructure and related development

3. Negative economic impacts

i. Contribution to urban road congestion made by goods vehicles
ii. Impact on individual business and local economy of freight inefficiencies
iii. Costs of negative social and environmental impacts of freight transport

4. Negative operational impacts

i. Congestion and traffic disruption caused by goods and service vehicles which are loading, unloading, parked, turning, manoeuvring on-street
ii. Congestion and traffic disruption caused by goods vehicles entering or leaving off-street sites
iii. Obstruction to pedestrians and cyclists caused by goods and service vehicles which are loading, unloading, parked, turning, manoeuvring on-street
iv. Operational impact on businesses and other premises of unreliable or missed or delayed goods delivery or service vehicle trip

As the UK Round Table on Sustainable Development (1996) has identified “these impacts do not occur spontaneously. They are the result of public and private sector influences”. The influences include:

- government policy, tax and public expenditure decisions;
- lifestyle changes due to rising living standards and consumer expectations;
- demand from industry;
- commercial investment and development;
- transport and environmental regulations and restrictions;
- land-use planning;
- vehicle and equipment technology;

- driver behaviour.

Policy makers consulted during the research told us that many of the complaints that they receive about goods vehicles are that these vehicles are preventing people from travelling in their cars as fast as they would like rather than citing negative environmental impacts. However, according to these policy makers the impacts most commonly identified by those complaining about goods vehicles are the visual impacts of the vehicle and smoke and fumes that they emit. The threat to the community (which may be real or perceived) is also frequently mentioned.

Investigation of the negative impacts of urban freight operations was not explicitly one of the objectives of the project. The views and attitudes towards urban freight operations and negative impacts of those who live and work in urban areas, and environmental and community groups were not sought as part of the study. However, although not directly asked about it, several comments about the negative impacts of commercial transport in urban areas were made by those participating in the interviews with freight companies, service companies, premises receiving goods and services and in the discussion group sessions with managers, drivers and engineers. The key points raised about the negative impacts of urban goods and service vehicle operations by those premises receiving these vehicle trips are shown below:

> "If I put my private person's hat on I like the idea of small and quieter vehicles".
>
> *(Retailer)*

> "In some situations if you've got an arctic parked outside your shop for half an hour because it's delivering to other shops as well as you, then this is not very nice for your trade. Sometimes it's only ten feet away from the shop and restrict people being able to see the shop. So there is definitely a preference for smaller vehicles which are not parked there so long".
>
> *(Retailer)*

> "There is nothing worse a company than a member of the public seeing a vehicle climb the pavement and go down a pedestrianised area. It looks very aggressive. Now (company name) vehicles have to go into pedestrianised areas at times when restrictions are in place to collect cash from customers and that actually looks very aggressive when the public are all milling around. You've got a potential image problem there, so you have to choose the right sort of vehicle to operate in a pedestrianised area if you are going to relax restrictions in pedestrianised areas. If the approach was to go to, say, electric vehicles then those types of buggies they use around Gatwick Airport would be more attractive to the public than seeing a transit or a 7.5 tonner climbing the pavement and going through the bollards because it doesn't look very good. If I see a vehicle in a pedestrianised area when it shouldn't be there, I'll go and tell it to get out".
>
> *(Freight transport company manager)*

> "I have a go at some of our guys 'cos they park on a double yellow line because it's right outside the customer's door. I would turn round and say to the warden let him have it, give him the ticket, because if he was in his own car he wouldn't have parked there. That's taking liberties".
>
> *(Service engineer)*

> "I do rat-running that's just bloody ridiculous to think about....there I am going down narrow streets with kids going to school, trying to cross the road, over speed ramps..it's just crazy."
>
> *(Freight transport driver)*

> "Undoubtedly if the (goods) vehicles weren't there, there wouldn't be some of the congestion, but I think the congestion is there primarily (because of cars) and the lorries are just adding to this rather than creating it".
>
> *(Retailer)*

4.1 Traffic congestion and pedestrian disruption caused by goods vehicles performing deliveries and collections

Goods vehicles can cause traffic congestion and pedestrian disruption in a number of ways:

- on their journey to/from the premises
- while driving around trying to find an on-street parking space near the premises
- while manoeuvring into a parking space or turn into an off-street unloading facility
- while stationary during the delivery/collection (especially if illegally/double parked)
- while manoeuvring out of a parking space or turn out of an off-street unloading facility

While carrying out research into goods vehicle operations in urban areas it was possible to also investigate the traffic congestion and pedestrian disruption caused by goods vehicles while stationary when performing deliveries and collections at premises. The factors that cause this disruption are discussed below.

4.1.1 Whether delivery is made on or off-street

If the vehicle has to be parked on-street during the delivery to the premises it is likely to cause more disruption to other road users and pedestrians than if the premises has an off-street loading/unloading facility. Table 35 below shows how many of the premises studied had off-street loading/unloading facilities for goods vehicle.

Table 35: Where goods vehicles are parked while delivering/collecting at premises

Where goods vehicles have to be parked while performing collections/deliveries at the premises	Number of premises
On-street	35
Off-street	20
On & off-street - depends on vehicle size	3

As Table 35 indicates, approximately 60% of the premises interviewed do not have off-street loading/unloading facilities for goods vehicles.

4.1.2 Whether on-street parking space is available

If premises has no off-street loading facility and a parking space is not available near the premises the driver has several options:

- park further away from the premises
- drive around the streets and hope that a space becomes available/is found
- go and make another delivery (if it is a multi-drop operation) and then return to the premises later to try to make the delivery again
- violate parking/traffic regulations (could include double parking, parking where loading is not permitted, parking on the pavement etc.)

Each of these options can cause different types of disruption to other traffic and pedestrians.

4.1.3 Location of premises (central-inner *versus* outer-out/edge of town)

Of those premises studied, there would appear to be a relationship between location of the premises and the existence of off-street unloading facilities. The majority of premises in city centre locations

do not have any off-street unloading facilities (or any off-street parking facilities of any kind for that matter). The only premises in city centre locations with off-street unloading facilities interviewed during the study were very large retail premises located in relatively new buildings (i.e. built in the last 40 years), retailers in city centre shopping centres with unloading facilities designed into the centre and relatively new office developments.

However most of the premises studied which are located in outer urban locations do have off-street unloading facilities. These include large out/edge-of-town retailers, factories, distribution centres, offices and builders merchants. The only category of premises included in the study in outer urban locations, which often do not have off-street unloading facilities, are small parades of shops in suburban locations.

4.1.4 Ease of entry and exit from off-street facility

Difficulty of ingress and egress to off-street facilities affects the extent to which the driver has to manoeuvre the vehicle and thereby disrupt the traffic flow and be a potential danger to pedestrians.

4.1.5 Time of day delivery is made

Road traffic levels vary by time of day and day of week. Goods vehicles performing delivery/collection work are most likely to disrupt other road users when road traffic levels are at their greatest. Also, disruption caused to pedestrians is likely to be greatest when the numbers of pedestrians are at a peak (the number of pedestrians varies by time of day and day of week - shopping areas in city centres tend to be very busy with pedestrians on weekdays at lunchtime and all day on Saturdays).

4.1.6 Size of vehicle used

The wider and longer the vehicle the more likely it is to disrupt traffic flow by blocking the road. Large vehicles are liable to cause most traffic disruption in narrow, historic streets that were not designed with goods vehicles in mind.

4.1.7 Presence of loading bay/separate goods reception door

The existence of a separate loading bay or goods reception door at a premises will help to reduce the impact of deliveries on other people trying to access the premises and people inside the premises. In the case of shops it is desirable if goods can be brought in by another route/door other than the front door, as this will potentially obstruct the retailer’s customers both inside and outside the shop.

Seeing a delivery being made through the front door can also have the effect of deterring customers from using the shop as they do not want to wait until there is free passage into the premises. However many premises do not have an alternative route for goods being delivered to and collected from the premises other than through the front door. The way in which goods are taken into and out of the premises among the premises surveyed is shown in Table 36.

Table 36: How goods are delivered into and collected from the premises

How goods are delivered into and collected from the premises	Number of premises
Through front door	25
Through back door	23
Through side door	4
Through front door & cellar	3
Through front and side door	1

4.1.8 Effect of having goods vehicles parked outside premises

From our interview work, it is apparent that some premises, especially shops, are concerned about having goods vehicles (especially large and/or dirty goods vehicles) parked outside their shops for any period of time. They feel that the vehicle can: (i) obscure the shop to potential customers, and (ii) negatively affect the image and appearance of the shop to potential customers. This can have the effect of discouraging customers from entering the shop.

The time spent by a goods vehicle outside any one premises can be considerable as the dwell time of the vehicle can far exceed the time taken to make a delivery to that premises (sees Section 1.9).

4.1.9 Other deliveries/collections taking place at the same time

If a more than one goods vehicle arrives at a premises to perform delivery/collection work at the same time this will delay the time taken for each delivery and can also lead to the following problems:

- goods vehicles double parking/parking on pavement of outside the premises
- goods vehicles queuing outside the premises, or queuing back onto the road in the case of a premises with an off-street loading facility

4.1.10 Time taken for delivery/collection

Given that the vehicle remains stationary while the driver is making delivery, any traffic disruption caused by the stationary vehicle will continue for the duration of the delivery. Therefore the time taken to make the delivery or collection can be an important factor in the extent of traffic disruption caused by the delivery vehicle. See Section 1.9.18 for details of average delivery times at different premises studied.

4.1.11 Dwell time versus unloading time

It is important to note that the vehicle dwell time (the time the vehicle is stationary) and the time taken to make a delivery at the premises are not necessarily the same. Where a driver has to make several deliveries to premises that are either collocated or located close to each other, it is common to perform all of these deliveries without moving the vehicle (i.e. to leave the vehicle in the same stationary position). This is most common in city centre locations where there is most likely to be a high density of deliveries, premises are relatively small (so distance between premises is small) and there are few available parking places available. For these reasons it is often quick for the drivers not to move vehicles between deliveries.

5. Problems experienced by goods and service vehicles in urban areas

5.1 Introduction

The research has attempted to obtain a detailed understanding of the problems experienced by goods and service vehicles in urban areas. From the individual interviews and discussion group sessions that were carried our during the project it has been possible to derive six categories of problems experienced by goods and service vehicle operations:

- Traffic flow/congestion problems
- Transport policy-related problems
- Parking and loading/unloading problems
- Customer/receiver-related problems
- Problems of freight transport and service companies' own making
- Other issues that cause problems

All of these problems have the effect of making goods and service flows in urban areas less efficient. In many cases these flows become less reliable (in terms of actual arrival times as opposed to expected arrival times) as a result of the problem. The effect of these problems on companies moving goods or providing services in urban areas can be to:

- increase the number of drivers/engineers required to perform the same amount of work
- increase the number of vehicles required to perform the same amount of work
- increase the number of vehicle trips required to perform the same amount of work
- increase the number of vehicle kilometres travelled to perform the same amount of work
- increase the quantity of vehicle fuel consumed to perform the same amount of work
- change the size of vehicles required (usually making the vehicle size smaller)
- increase the level of stress for those organising and carrying out freight and service activities

Most of the problems experienced by goods and service vehicle operations in urban areas have cost implications for companies moving goods or providing services. The effect of these problems on the urban premises which requires the goods or service flows can be to:

- lose customer sales to final consumers
- lose contracts with customers
- be unable to carry out a key task (such as manufacturing goods in the case of a factory)
- have to close or relocate the premises

These problems can therefore result in reductions in employment in urban premises. Many of the problems experienced by goods and service vehicle operations in urban areas also have cost and operational implications for the urban premises requiring those goods or services. In some cases a business can cease to be viable if goods and service provision to that premises become too inefficient and unreliable. This can lead to relocation (often to an out-of-town location) or closure of the business (which is often the case for small, independent retailers who experience such supply disruptions). As the distribution manager from one multiple retailer told us:

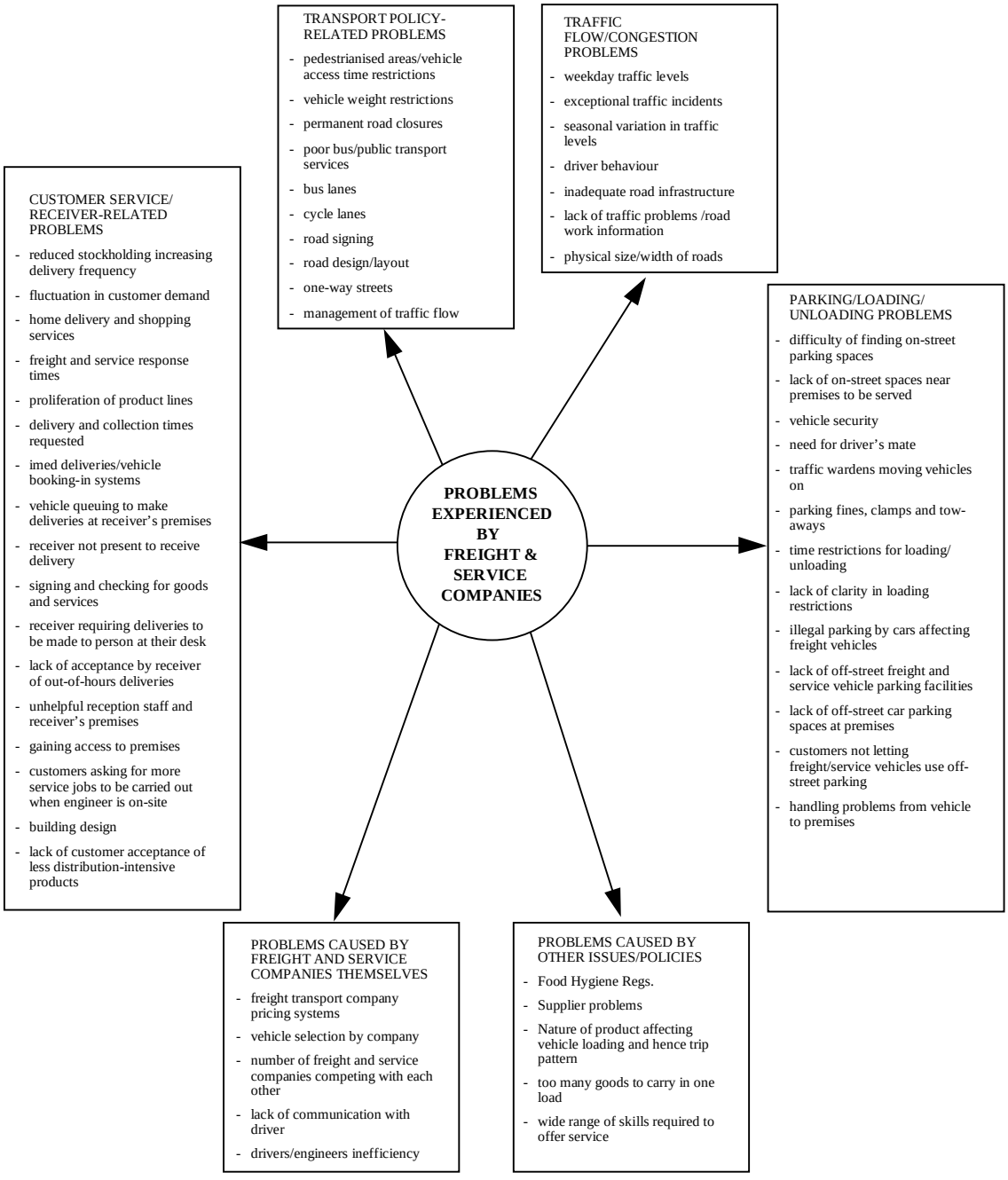
> "The weakest part of our supply chain is rapidly becoming the back door of our store. In supply chain structural terms we can move merchandise from anywhere to anywhere in the country but the increasing volumes of merchandise which has to be handled through those back doors together with an increasing amount of legislation or local enforcement is going to make the delivery to, and servicing of those stores more difficult. And at the same time we are offering more delivery services to customers. So the pressure on the

back door in terms of volume, time and operational constraints are all going to increase. And that's getting to be a serious issue".

The combination the wide range of parking and operating restrictions imposed on freight and service companies: Red Routes, 10 am - 4 pm vehicle restrictions, pedestrianised areas, together with the traffic levels on the roads and the demands and constraints placed on operations by customers are making it more and more difficult for freight transport and service companies to provide goods and services to their customers.

Each of the six categories of problems experienced by goods and service vehicle operations in urban areas is considered in turn in the following sections. Figure 12 shows the problems discussed within each of these categories.

Figure 12: Problems experienced by freight and service vehicle operations



5.2 Traffic flow/congestion problems

Problems experienced while driving freight or service vehicles have been increasing rapidly in recent years as road traffic levels have grown.

The problems raised by participants in the interviews and discussions can be subdivided into the following issues:

- Weekday traffic levels and congestion
- Seasonal variation in traffic levels
- Exceptional traffic incidents
- Driver behaviour
- Lack of information on traffic problems/road works
- Physical size/width of streets

5.2.1 Weekday traffic levels and congestion

Almost every person interviewed and participating in discussion groups mentioned the increase in traffic levels on urban roads as a major problem for their operations. Comments made about traffic levels and congestion problems suggest that the situation in London is far worse than in Norwich. But from comments made the problems faced by operators in Norwich are also severe:

> "It's (central London) close to gridlock, isn't it? Anyone out there knows."
>
> *(Service engineer)*

> "We can't go on with no policy change. We will just gridlock, we already do on certain days in London. And you can't have a commercial market place which expects deliveries within a two hour time window when it takes you an hour to get 300 yards in London....I can't contemplate that it will be allowed to continue as it is. I think that there will be measures put in that will change things."
>
> *(Freight transport manager)*

Comments made about traffic levels and congestion

One Norwich-based transport company informed us that the main problems that they face concern congestion, especially on the Norwich ring road where journeys can take an hour from the main bypass to their depot which is about 2 miles away. In the case of Norwich many respondents told us that the main roads into and out of Norwich pose a far bigger congestion problem to them than travelling on roads within the city centre:

> "I've got a 17 tonne vehicle with a drag on the back which is 63 feet long and its all curtainsider. The earliest I do is normally about 9 o'clock because by the time I start from the depot to get into Norwich, okay the A140 is not too bad, but once you get past the outer ring road whichever way you come in you are chock-a-block with cars. Its 20 minutes to get in whichever way you come through."
>
> *(Goods vehicle driver)*

> "In fairness, I tend to find that when you get into the centre of Norwich itself by quarter to nine, nine o'clock (in the morning) it is fairly free to move around. It's the roads into the city that tend to cause the problems."
>
> *(Goods vehicle driver)*

However from comments made about Norwich there are clearly traffic hot spots within the city centre itself. In Norwich the outer ring road can get extremely busy at peak times and we were informed by several respondents that delays of up to 45 minutes frequently occur:

> "Our main problem is the volumes of traffic at certain times of day. We are based nine miles outside Norwich, for the majority of our routes we need to use the Southern

> Bypass, but the only effective way of reaching the Southern Bypass is to come through Norwich around the ring road or cross-country, but large vehicles on narrow country lanes isn't very acceptable so we come through Norwich. Our drivers have to leave the depot by about 5.30-6 am in order to clear Norwich and get onto the southern Bypass otherwise they lose a good hour of their day.....Out of our six routes every day, four of them need to get onto the southern Bypass to travel in a southerly direction. So that gives you an idea of the problems we have".
>
> *(Manager from wholesaler which makes deliveries to customers)*

According to respondents, traffic levels in Norwich are even greater on Saturdays than they are during the week:

> "A one and a half mile journey to the city centre on a Saturday can take half an hour. You could walk it quicker than this."
>
> *(Retail manager)*

Many respondents expect congestion problems to worsen and pose even greater problems for their freight and servicing operations in the future:

> "My perception is that we are heading for gridlock in the next five years. There are 27 million vehicles on the highways of the UK and the system was built for horse and cart".
>
> *(Retail manager)*

It is important to note that city retailers interviewed during the research are as worried about the effects of congestion on their customers as they are about the effects on freight and service trips to their premises. They are concerned that the traffic levels (and the difficulty of parking) deters people from shopping in the city centre and encourages them to use the out-of-town retail parks.

Traffic levels and congestion at different times of day

The following comments were made about traffic peaks in Norwich and London:

> "The morning peak in Norwich is from 7.30-8.45 am. The afternoon peak in Norwich is getting earlier, it starts from 3.30 pm whereas it used to be 4.30-5.30 pm. So you try to avoid these times."
>
> *(Manager from wholesaler which makes deliveries to customers)*

> "Unfortunately when the traffic is all there is when our vehicles have to be in the city (Norwich) making deliveries. Our drivers start delivering from 7.30-8 am, depending on when run sheets have been printed and the vehicles are loaded. Our vehicles have to be the in city at this time, we haven't got a choice."
>
> *(Freight transport manager)*

> "You go down Park Lane (London) between 4.10 and 4.25 pm and you'll go down there as sweet as a nut. But you go down there between 4.50 and 7.00 pm and it hardly moves".
>
> *(Service engineer)*

> "If you're not into London by 6.30 am you're crawling in traffic".
>
> *(Goods vehicle driver)*

Companies performing early morning or night freight rounds suffer far less severely from traffic congestion than those companies that have to operate in the peak hours. While the latter would gladly change their time of operation to the off-peak if they could, they have to carry out their operations during the peak as this is when their customers require collections, deliveries and servicing to take place.

One supplier company we spoke to sends its vehicles into central London early before the morning peak just to avoid the problems of travelling in later even though many of its customers will not accept deliveries at this time:

> "On the M4 where we come into London from, if you're not into London by 6.30 am you're in trouble. But then once you're in then you often can't make any deliveries until 8.30 am."
>
> *(Goods vehicle driver)*

It is very unfortunate that the easiest times for goods and service vehicles to get into London and Norwich tend to be at times when most premises are not prepared to receive them.

Making early morning deliveries helps to reduce the problems caused by heavy traffic flows. Several companies involved in early morning deliveries told us that there is relatively little traffic on the roads before 6.15 am. However, respondents also noted that the traffic peak is spreading (i.e. starting earlier and finishing later, both in the morning and afternoon.

Several freight and service companies mentioned that the daily weekday morning and afternoon car trips taking children to and from schools impact significantly on the traffic levels. However school traffic tends to present more of a problem in the outer area of London and Norwich, and is far less noticeable in the city centre. At school holiday times, especially in Easter and August, respondents said that the roads are noticeably less busy:

> "In the school holidays Chapelfield Road is absolutely clear, the first day those children are back at school and all the way through the school term, Chapelfield is blocked."
>
> *(Goods vehicle driver)*

> "During school holidays the road traffic conditions are much improved. Every day in term time at 3.45 pm you know the school run has started when you see all the 4x4s (i.e. four wheel drive cars such as Range Rover)."
>
> *(Goods vehicle driver)*

Impacts of congestion on freight and service operations

Traffic congestion causes several operational and problems for those interviewed. Its effects are greatest on those goods and service vehicles which have to perform a significant percentage of their work in the urban area.

Many of those who took participated in the study told us that the journey made by their drivers and service engineers to each premises where they make a delivery or perform a service now takes longer than it used to because of the traffic congestion they experience. As a result they are not able to make as many deliveries now as they used to be able to.

Those transport and service companies, which operate relatively fixed rounds, have had to gradually change the number of calls and geography of the rounds to reflect these worsening driving conditions. As already mentioned congestion increases the travel times between jobs but is also make this travel time more unpredictable:

> "We tried to measure the problem. We asked our managers to sit at various points around the City and the West End at certain times on certain days to observe traffic conditions. We found that there was no pattern whatsoever. I tried driving out of central London at 9 am in the morning to see how far I could get in 20 minutes; on one day I nearly got home to east Essex, yet the next day I only get 200 yards down the road".
>
> *(Service company manager)*

For some companies such as express parcels carriers and photocopier and computer service engineers it is an essential part of the service that they offer that they arrive at the premises either at or before an agreed time. These companies tend to find it difficult to always meet these response times to premises, especially those in city centres, if traffic levels are heavy:

> "At 11 o'clock in the morning you do not want to be going up Shaftesbury Avenue (London) to get to a job, to then have to get back to Mayfair to do your next job 'cos you're going to be on the road for an hour and a half. (My company) will send the next available engineer to a job in central London to meet customer response times, but in many cases if the engineer has any distance to travel he won't get to the customers premises in time."
>
> *(Service engineer)*

In the case of several companies we spoke it is specified in their contracts with customers that if they fail to meet the response time or guaranteed delivery time they either do not get paid or in some cases even have to make a penalty payment to the customer.

Several companies told us that despite the worsening traffic conditions they have managed to maintain or even improve their journey reliability and/or response times. This has been achieved through improved management and organisation of their operations and the use of more sophisticated handling and warehousing systems, IT and communication technology. The following comment indicates the type of action some companies have been taking to tackle the problem posed by rising traffic levels:

> "Despite congestion problems on the roads our deliveries are probably more accurate than they were five years ago. Companies like us have to invest in management systems to cope with congestion problems - such as TrafficMaster to help choose routes round the M25 etc. We are having to spend time and money monitoring the traffic system and the monitoring equipment isn't currently very good."
>
> *(Freight transport manager)*

5.2.2 Seasonal variations in traffic levels

Daytime road traffic conditions in London and Norwich get significantly worse at particular times of year. The weeks leading up to Christmas are an extremely busy time on the roads in both cities:

> "By November if you're not parked up by 11 am in the West End (London) you'll sit in traffic forever. There is nowhere to move, let alone anywhere to park"
>
> *(Goods vehicle driver)*

> "We all dread Christmas, it's a nightmare. Burr Street's chock-a, Chapelfield's chock-a."

> "This Xmas traffic wardens were outside the Castle Mall vehicle entrance all day sending away cars which were queuing to enter the car park. When the traffic wardens weren't present there were queues right back through the city. With Castle Meadow shut to cars, the traffic was queuing back from Car Park 2, up Timberhill and St Stephens and as far away as Rampant Horse Street Any delivery driver who encountered this level of traffic and who didn't know Norwich well would be in the queues for a very long time."
>
> *(Retail manager)*

Freight companies also find themselves with greater workloads prior to Christmas, so are very badly affected by the additional traffic on the roads. Many of the premises we studied in the research receive additional deliveries before Christmas. Some freight companies also experience significant increases in business at Easter and the end of the financial year:

> "Seasonality is pronounced in (our company's) business, especially at Easter and in the run up to Christmas. Delivery work can increase by between 10 and 20% at these times".

(Retail manager)

In the Norwich area freight and service companies are also affected by the quantity of tourist traffic on the roads during the summer.

5.2.3 Exceptional traffic incidents

In addition to the daily traffic congestion faced by freight and service drivers in London and Norwich that is caused by the volume of road vehicles operating on the roads, exceptional incidents also take place such as crashes, and vehicle breakdowns which, with the existing traffic levels, can cause chronic congestion on surrounding roads:

> "If you have an incident in Wigmore Street (London), if that isn't cleared within 10 minutes, then an hour later you are chock-a-block in Bond Street, Oxford Street, Regent Street, Great Portland Street, right up to Regents Park, it will just tie up. And it can be anything, the incident can be anything; I'm not talking about an air ambulance coming down. We get a lot of gridlock."
>
> *(Service Manager)*

One respondent who drives in central London told us that he felt that the councils and police were blocking off more roads than they used to when there is a particular incident such as a bomb threat or a demonstration and that this has enormous knock-on effects:

> "A couple of Fridays ago there was a protest at Oxford Circus, and the police closed off Regent Street, Tottenham Court Road, Oxford Street. Can you imagine the problems this caused? Closing Regent Street on its own is bad enough but closing all these roads! Shaftesbury Avenue became unbearable, it was at a standstill. It took me 2 hours to get from SW1 where I had finished a job to Regents Park for the next job. Usually I would expect to do this in about 40 minutes."
>
> *(Service engineer)*

5.2.4 Driver behaviour

As traffic congestion and parking problems worsen in urban areas, driver behaviour appears to be deteriorating according to those interviewed. Car drivers were often identified as the worst offenders by van and lorry drivers (who say they tend to give way to each other and behave considerately). Bus drivers, motorcyclist and cyclists were also identified as inconsiderate road users. This deterioration in driver behaviour takes several forms including aggressive driving, and inconsiderate parking:

> "Everyone is very ill-mannered behind the wheel...they don't let vehicles out, they all want to be in front of the vehicle in front.....god knows why because they must shave all of about 2 seconds off the journey home and about 50 years off their life".
>
> *(Service engineer)*

> "It is the public that couldn't really care less about where they are going to bang their cars, it could be on the corner of a road or double parked, or even loading bays."
>
> *(Goods vehicle driver)*

> "They (bus drivers) just pull out without indication. They have a polite sign on the back of the vehicle, but don't usually thank anyone for letting them go or they just pull out in front of you."
>
> *(Goods vehicle driver)*

> "Motorbike drivers and push bikes are a real problem in terms of their behaviour. These push bike couriers are a real menace. When you're driving a big vehicle you don't see them creep in from round the back".
>
> *(Goods vehicle driver)*

> "At red lights all the bikes pull up in front of you and when the lights turn green you have to wait for them all to pull off again, and then before you can get through it goes red again!"
>
> *(Goods vehicle driver)*

5.2.5 Lack of information on traffic problems/road works

Many of the participants in the research in Norwich identified the lack of information about traffic conditions and road works as a factor that causes them problems in their vehicle operations. In many cases, traffic and road works information currently only reaches the company from their own drivers and engineers who have experienced difficulties. They receive no advance notification of what road works are to be started in and around the city, or how long they will persist for:

> "The office has no details of traffic situations or road works other than what they hear on the radio and this (more information) could be helpful when planning which engineer to send to a job and in informing engineers of places to avoid etc."
>
> *(Freight transport manager)*

In London the perception was slightly different, with those interviewed tending to feel that the traffic situation is already so bad that more traffic and road works information would be of little benefit to them:

> "I don't think there is a way to avoid it (traffic problems)."
>
> *(Service engineer)*

> "Everyone has learned the rat runs and they are chock-a-block."
>
> *(Service engineer)*

> "If everyone has the information from the radio or wherever, they all divert, they all know the same short cuts."
>
> *(Freight transport manager)*

5.2.6 Physical size/width of the streets

In some historic cities such as Norwich and the City of London, the physical layout of the roads and the narrowness of some of these roads can in themselves cause traffic problems. Narrow roads can also force companies that need to access those streets to serve premises to use smaller vehicles than they would otherwise select, so that they are able to manoeuvre around the narrow, old street patterns.

The parking of vehicles on narrow streets can also cause problems for goods vehicles that need to drive through the street:

> "Sheringham High Street is a very narrow single lane road and therefore anyone delivering has to block the street from 8.30 am onwards".
>
> *(Manager from wholesaler that makes deliveries to customers)*

> "On a good day they can be queuing right up (street name). They aren't necessarily all our lorries but lorries trying to make a delivery to our shop prevent other lorries getting past, because the road is very narrow."
>
> *(Service manager for retailer)*

In the case of some very narrow streets in the City of London and Norwich the streets are simply too narrow to permit access to any vehicles at all. If a driver has to make a delivery to any premises on such streets they have to leave the vehicle at one end of the street and then carry the goods to the

premises on foot. This increases the time taken for each delivery and also extends the total dwell time of the vehicle.

5.3 Transport policy-related problems

A wide range of transport policy-related issues were raised as sources of problems by those working for freight and service companies during the research. The issues include:

- Areas with vehicle access time restrictions including pedestrianised areas
- Vehicle weight restrictions
- Permanent road closures
- Poor bus services/public transport service
- Bus lanes
- Cycle lanes
- Road signing
- Road design/layout
- One-way streets
- Management of traffic flow
- Not being able to drive on a royal route with a liveried vehicle

5.3.1 Areas with vehicle access time restrictions including pedestrianised areas

Many comments were made to us by freight transport and service during the research about the negative effects of vehicle access time restrictions on vehicle operations and hence on providing service to their customers.

There has been a significant increase in the number and size of pedestrianised areas in the UK in the last ten years, especially in high streets and retailing areas. Such time restrictions tend to prevent all vehicles (including goods and service vehicles) from entering the area in question for a major part of the working day, often from 10 am to 4 pm. Many of the premises located in these pedestrianised areas have no alternative access facilities so any goods or services that need to be supplied to or collected from the premises must either be provided at the times when vehicles are allowed access or supplied on foot. In the case of freight transport it is not practical (due to time and weight factors) in many instances to park vehicles a long way from a premises and then deliver goods on foot.

Vehicle access time restrictions reduce the times during the day that vehicles can enter designated areas to carry out freight or servicing work. Coupled with the time restrictions imposed by customers and receivers **(**see Section 5.5.2) this can result in freight and service companies having very little time in which to perform their work and placing their operations under significant strain.

> "Norwich has an increasing amount of pedestrianisation and in roads such as the Walk you have to be off of this by 10 am, so this has to be planned into your delivery and collection operation. You sometimes have to make a collection at 11.30 am and this has to be barrowed or walked back to the vehicle."
>
> *(Goods vehicle driver)*

> "We have a working scenario (of vehicle access time bans in central London) in Regent Street where every Christmas the Council put in place a one-way system for pedestrians. You can only walk up one side of Regent St and down the other and its policed. If we need to get into Hamleys we can't park in Regent St so we have to find a side street which means that an engineer has to carry all his tent, gas and equipment all the way up one side of Regent St and down the other to get to Hamleys. It's impossible. So do we say to Hamleys, Warner Bros. "Sorry you can't have that service. No, we don't, because we can't"".
>
> *(Service engineer)*

Freight and service companies told us that vehicle access time bans, especially in large pedestrianised areas, have the following effects on their operations:

- if a freight or service vehicle is delayed by traffic on the way to the area with the vehicle access time restrictions, it can result in the driver or engineer not being able to perform all of their workload and hence some or all of the premises having to go without the goods or services for which they were intended;
- vehicle access time restrictions in city centres have an impact on freight vehicle utilisation and load factors;
- the time restrictions make it very difficult to deliver at the times requested by customers/receivers;
- without these time restrictions, freight and service companies' operations would be simplified and far less pressurised for drivers and engineers serving premises on restricted roads.

Several operators noted that as vehicle access time restrictions are imposed in ever-more towns and cities in the UK this makes it increasingly difficult to service more than one urban area from the same depot. It can make it very difficult to perform all the work with the existing fleet and drivers.

Freight and service companies interviewed are responding to vehicle access time restrictions and pedestrianisation in several ways:

- complete reorganisation of delivery rounds in the restricted area (sometimes this involves reorganising all the other rounds performed as well);
- increasingly complicated route planning to ensure that all premises located in areas with time restrictions are served before the restrictions come into force in the morning;
- the acquisition of more vehicles and drivers to be able to make deliveries to all premises in time restricted areas;
- offering a reduced delivery/collection service to premises located in time restricted areas (e.g. only one delivery per day rather than two);
- refusing to collect from/deliver to/service certain roads (especially in cases where the company would require extra vehicles/drivers to offer the service).

From the interviews and discussion group sessions it is apparent that as vehicle time restrictions become more stringent, it becomes necessary for freight companies to operate a greater number of vehicles, employ more drivers and perform additional vehicle trips and mileage to deliver and collect the same quantity of goods.

5.3.2 Vehicle weight restrictions

Some roads, routes or areas have specific vehicle weight limits imposed on them which prevents vehicles above that weight from operating on them, except for access.

In Norwich, for instance, only vehicles below 7.5 tonnes are allowed to operate freely within the city (larger vehicles are permitted to enter for access purposes). In other cases, such as the London Lorry Ban, the restrictions on vehicles of a given weight only apply at certain times.

These restrictions can result in vehicles having to deviate from their intended routes, journey time increasing, drivers becoming lost, and vehicles performing additional mileage and consuming extra fuel. Of course in some instances, such as in residential areas, these restrictions are there for good reason and are necessary. But in others the reason for the weight restriction can be less clear:

> “When drivers who don't know Norwich come into it the first thing they hit is a 7.5 weight tonne limit and the first thing they do is start wandering around the outer ring road trying to find a way into Norwich. He'd had a planned route into Norwich and

> suddenly he's in a one way system that he knows nothing about and he's going down roads he shouldn't go down and he gets stuck in Term Lane? and places like that".
>
> *(Goods vehicle driver)*

> "We run a night operation and the vehicle from Bristol has to divert right round the M25 because of the London Lorry Ban. Now an arctic (articulated lorry) going right round the M25 at 7-8 miles per gallon can't be sensible in mileage and environmental terms and in terms of journey time it is also ridiculous".
>
> *(Goods vehicle driver)*

> "When you come into London you can't go down Earls Court Road after about 9 o'clock and yet they divert you through the centre of London past Harrods instead. You'd think that going along Earls Court and along the Embankment has got to be better environmentally than going past Harrods. It's crazy".
>
> *(Goods vehicle driver)*

5.3.3 Permanent road closures

Local authorities sometimes choose to close specific city centre roads to certain categories of motorised road traffic or all motorised traffic at all times on a permanent basis in order to either make the road safer for pedestrians, or reduce vehicle noise or pollution levels. In such cases access in usually still permitted to serve premises on the road in question.

An example of this type of measure is Castle Meadow in Norwich, a major street with shops and offices in the city centre that used to be a key route for vehicles travelling around the city but which was closed to most road traffic in 1998. Buses and bicycles are still allowed to use the road at all times but all other categories of motorised road vehicle are permanently banned from using the road, except for access to deliver or collect goods. Therefore vehicles that used to use Castle Meadow to travel around the city now have to use another route.

The feeling among many participants in the study was that the closure of Castle Meadow has had the effect of displacing all the traffic that used to use it onto other routes, and that these other routes have become far more congested as a consequence. Retailers on the street may also suffer from the fact that their customers can no longer pull up outside their premises in their cars; this could have the effect of reducing their business.

It was also suggested to us that as the other roads, offering alternative routes, have become more congested this has worsened travel times to Castle Mall shopping centre and to other parts of the city for shoppers using cars, goods and service vehicles.

Goods vehicle drivers and service engineers that we spoke to did however acknowledge that Castle Meadow had been used as a rat-run by car drivers, with a high potential for accidents with people driving too fast. By closing it to cars and through freight this helped reduce the risk to pedestrians.

However these drivers and engineers felt that if, rather than just allowing buses to use it, goods and service vehicles were allowed to use it then some goods and service vehicles would not be queuing in the alternative one-way system. Additionally, in the one-way system, large goods vehicles have no alternative but to occupy all the lanes when they need to turn right at the bottom of Westlegate and when turning at other junctions. This causes traffic congestion:

> "If goods vehicles could use Castle Meadow for deliveries this would help freight drivers and ease problems elsewhere in the network. But they don't do that, they just shut everything down and just allow a bus."
>
> *(Goods vehicle driver)*

> "By banning cars and commercial vehicles the Council announced they had made Castle Meadow 25% cleaner, so the buses must be creating 75% of the pollution on Castle Meadow! The so-called 25% they took off Castle Meadow is now on Rouen Road and Farmers Avenue".
>
> *(Goods vehicle driver)*

5.3.4 Poor bus services/public transport (that either increase car traffic or discourage people going to city centres)

Many of the city centre retailers that we interviewed in Norwich are concerned that the bus service in Norwich is not offering a sufficiently good service and that this is deterring customers from entering the city centre to do their shopping. Some of their comments are shown below.

> "I think the bus services in Norwich are very poor. The Council is always saying please leave your car at home and come into Norwich on the bus but I do not think the bus services are efficient enough. They don't run to timetable....Now they are talking of cutting bus services as they haven't enough drivers. This encourages more people to use cars and more traffic on the roads."
>
> *(Retailer)*

> "I only live up Silver Road area and I work at Hall Road, but I drive there every day. You can say that I'm adding to the problem which I am, but you tell me how I can get to Hall Road from my house more efficiently. I can't unless I jump on a bike which takes longer and I don't want to do that in the rain 'cos I don't want to get wet. You provide something that's fit for use for me personally and I'll use it. That's the only way it's going to work."
>
> *(Service engineer)*

Park and ride has also been introduced in Norwich in order to try to encourage people out of their cars and onto the buses. However those interviewed were sceptical about its likely success:

> "The park and ride doesn't suit a lot of people as they live within the city boundaries so they would have to drive out to get to the park and ride".
>
> *(Retailer)*

> "If you come into the city on the new piece of dual carriageway on the Southern Bypass, you find that every car in front of you turns into County Hall and yet they have just built a new park and ride at the other end of the road. If they want people to use park and ride they (people employed by the County Council) have to be prepared to use it themselves."
>
> *(Goods vehicle driver)*

> "I delivered to County Hall this morning and at half past nine the car park was completely full. There wasn't a single parking space available."
>
> *(Goods vehicle driver)*

5.3.5 Bus lanes

Dedicated bus lanes are being introduced on an increasing number of roads in towns and cities in the UK in order to give the bus priority and thereby reduce journey times by bus. It is hoped that this will help to improve bus patronage. Bicycles and taxis are also allowed to use bus lanes. In all but a few cases, goods and service vehicles are banned from using bus lanes. Therefore the introduction of a bus lane on a road results in goods and service vehicles having to compete with all the other cars for less road space. This can have a detrimental effect on freight and service vehicle journey time and journey reliability.

The introduction of bus lanes on routes into cities often results in dual carriageways becoming single carriageways. This tends to slow down non-bus vehicle flow into the city.

Many of the freight and service companies that took part in the study felt that bus lanes are under utilised and that the introduction of bus lanes has made their journeys on these roads more difficult and slower and reduce schedule reliability:

> "Our depot is at Bowthorpe and the route into the city (Norwich) is Dereham Road and we've got a wonderful bus lane there. I came in that way this morning at quarter to eight and in the 20 minutes I sat in the correct lane as I always do, not one single bus passed me on the nearside in the bus lane. All that passed me in the bus lane was 1 taxi and 4 private cars. And that tends to rankle a little bit".
>
> *(Goods vehicle driver)*

> "The Dereham Road bus lane is an absolute joke as they haven't even built the park and ride site on that side of the city. So we do find that at any time of the day, it can be worse obviously at 8 am, but I can go there at 11 o'clock to try and go back into the city and I can sit 20 minutes, half and hour, and I may not see anything, I may not even see a private car in the bus lane, let alone a bus. And that to me is a complete and utter nonsense".
>
> *(Goods vehicle driver)*

> "Norwich City Council has got it into its mind that its got to stop cars coming into Norwich and the only way they can do that without banning cars is by narrowing the roads which they are doing (with bus and cycle lanes)."
>
> *(Goods vehicle driver)*

> "You see buses going past you in a bus lane with no-one on-board".
>
> *(Goods vehicle driver)*

> "The restrictions on the M4 with a bus lane is ridiculous with a bus only going along it every 4 minutes. Whose were the brains that designed that! It's not helping."
>
> *(Goods vehicle driver)*

In addition some respondents explained that bus lanes can cause difficulties especially when they prevent the driver stopping directly outside the premises where he is making a delivery. This is especially problematic when the driver is making a large delivery with numerous packages to a premises. In this situation the driver has to park the vehicle a relatively long way from the premises, take a few packages out of the vehicle, locking the vehicle up and carrying these to the premises, then returning to the vehicle, unlocking it and doing the same again. This can cause a significant delay to his round. It isn't usually possible to leave the vehicle open and unlocked when making deliveries anywhere other than directly outside the premises.

Representatives from some companies told us that as the bus lane network is extended, they felt they it would result in their company having to acquire extra vehicles to carry out the same quantity of work. Many respondents feel that goods and service vehicles should be allowed to use the bus lanes, maybe at all times or possibly just at certain times outside the rush hour.

5.3.6 Cycle lanes

Although mentioned less frequently than bus lanes by those interviewed, respondents had similarly negative views about the introduction of cycle lanes in town and cities which are perceived as causing traffic flow and unloading problems:

> "That's what I was going to talk about next, cycle lanes...goh Exchange Street."
>
> *(Goods vehicle driver)*

> "A cycle lane has been put down Exchange Street. There used to be two lanes where you could turn left or right at the bottom. Because of this there is now technically only one lane down Exchange Street from which you turn both left and right. If you have got to deliver in Exchange Street you've got to park in the cycle lane or the proper (car) lane".
>
> *(Goods vehicle driver)*

5.3.7 Road signing

Some respondents felt that road signing is currently quite poor and causes problems for goods and service vehicle drivers not familiar with the Norwich or London urban area:

> "For engineers from outside the catchment road signing is often inadequate".
>
> *(Service engineer)*

> "Signing on the roads in and around Norwich is fairly minimal and could be far better".
>
> *(Freight transport manager)*

5.3.8 Road design/layout

Several comments were made by respondents about road design and layout in Norwich during the course of the research. These tended to be made by managers or drivers operating large goods vehicles who feel that their needs are not sufficiently understood or catered for. Below is a selection of the comments made:

> "Coming down Guardian Road to the roundabout there are two lanes, one for turning left into Dereham Road (or Bowthorpe Lane) and the right one for going straight over the roundabout. But car drivers use the left hand lane to go straight over the roundabout. This is illegal and when a lorry goes over the roundabout there isn't space for a car in the left hand lane and a lorry. There are many accidents on this roundabout as cars don't appreciate the space that a lorry needs to manoeuvre."
>
> *(Goods vehicle driver)*

> "The Council seem to sit on their backside and say `oh right we'll do a width restriction, that'll stop 'em' well it doesn't, the cars still go down it but what it's doing is forcing all the lorries down another road and then you start getting four or five lorries in a tailback and you get all the car drivers saying `oh yeah there was a tailback of lorries sitting on this road and they're all slow, they're big, they need too much space', yet they all want to go to the shops and buy their goods and they want everything to be there and they want everything yesterday".
>
> *(Goods vehicle driver)*

> "Road layout changes in Knightsbridge have made matters worse. It used to all be three lanes. Now the three lanes go down to two so that the Council could get a little traffic island with lamppost in and then it goes back to three lanes again lower down. This causes traffic chaos. And what has it achieved?"
>
> *(Goods vehicle driver)*

5.3.9 Management of traffic flow

Several respondents feel that the approach being taken to traffic management in Norwich is having a detrimental effect on the efficient movement of goods and service vehicles around the city centre:

> "They're slowly shutting Norwich off. But the problem is for us delivery drivers we've got to get there, and the cars ain't gonna stop coming into Norwich and unless you put a total ban on them they ain't never gonna stop coming into Norwich".
>
> *(Goods vehicle driver)*

> "The council talk about wanting to keep traffic flowing, but on Exchange Street they made it single lane near the traffic lights whereas it used to be a double lane. They have given the other lane to cyclists. Very few cyclists use this and the car and goods vehicle traffic is now much worse queuing back up the road. They have created a bottleneck as a result".
>
> *(Retailer)*

Several comments were made about the inefficiency of traffic signal sequencing on the roads in Norwich:

> "Several of our company's drivers who come to the Norwich area from other depots are all amazed by traffic lights in Norwich. Those from the London depot say "we've got so much traffic in London but when the traffic lights stop everywhere is blocked. Here you've got 2 miles of road with 20 traffic lights in it and no cars there because they have all stopped at the individual traffic lights". I think the traffic lights are often set to hinder than help the flow of traffic through them here in Norwich especially on the ring road. You'll sit there at red and there is no traffic crossing from the other directions that have green but they will hold our traffic on red for ages".
>
> *(Freight transport manager)*

> "The traffic lights seem to be on fixed timings rather than relating traffic light changes to the presence of traffic."
>
> *(Service manager for retailer)*

> "At traffic light junctions even slip roads seem to get as long on green as major roads".
>
> *(Manager from wholesaler that makes deliveries to customers)*

> "They've rephased traffic lights in certain places and you just seem to sit for hours at places, don't you, just waiting for lights to change".
>
> *(Freight transport manager)*

> "At many traffic lights you are held at red but there is nothing going across in the direction that is green. It is completely unnecessary - the lights could be changed to reflect the traffic flow. Improvements at some traffic junctions could help traffic flow."
>
> *(Goods vehicle driver)*

Comments were also made about the use of bollards to prevent large vehicles from accessing certain roads or to keep them off the pavement in London and Norwich and the effect that this can have on traffic flow when a large vehicle encounters difficulties:

> "We are finding that where councils are putting concrete pillars on the corners to stop big lorries getting into a particular road. But the lorries still come in and then either get stuck or take a long time going backwards and forwards trying to manoeuvre through. Our engineers are parked up behind the lorry and have to wait 10,15 or 20 minutes for it to get through or sort itself out. In the meantime all the traffic behind the lorry is building up and up".
>
> *(Service company manager)*

> "On Malthouse Road the bollards get in the way of where the drivers need to manoeuvre the vehicles. This results in drivers knocking and damaging them but they are always repaired and painted nicely in bright red again by the local authority".
>
> *(Retailer)*

5.3.10 One-way streets

One-way streets cause problems to freight companies especially those performing multi-drop operations that may have several premises to deliver to on the same street. It can result in the need for a driver to have to go round several times, thereby driving unnecessary mileage and wasting time and effort, in order to make deliveries.

5.3.11 Mix of traffic levels and transport policy

The combination of traffic levels and the transport policy measures discussed above are having a severe effect on freight and service operators' ability to function efficiently. For many it is becoming increasingly difficult to service all customers/receivers with the existing vehicle rounds given all the traffic problems and transport restrictions. The introduction of more constraints is likely to result in the need for extra vehicles and drivers and hence extra vehicle trips and fuel use.

The number of premises that can be serviced on a multi-drop round in an urban area is likely to have fallen significantly over the last few years as a result of traffic levels and transport policy measures. One operator we interviewed in Norwich told us that the driver on their city centre round used to be able to make approximately 90 drops per round and now he can only achieve 50-60 drops (the same man has been doing the round for 25 years). Therefore the number of drivers and vehicles require increases and the number of trips, mileage covered, fuel use and emissions rises.

5.3.12 Not being able to drive on a royal route with a liveried vehicle

Vehicles displaying a livery are not allowed to travel on royal roads, such as on the Mall in London and around Buckingham Palace.

> "If a warden or policeman is standing there you'll get an instant £30 ticket".
>
> *(Service engineer)*

> "Part of our contract is Buckingham Palace and Houses of Parliament and we have to get engineers in there, so we have to use cars".
>
> *(Manager from supplier company that makes deliveries)*

5.4 Loading/Unloading/Parking problems

This section covers a wide range of loading, unloading, parking and handling problems experienced by freight and service companies. The topics covered are:

- Lack of off-street freight and service vehicle parking facilities
- Customers/receivers not letting delivery/service vehicles use off-street facilities
- Lack of sufficient off-street car parking for employees at premises causing delivery problems
- Difficulty finding on-street parking spaces
- Lack of on-street spaces near premises to be served
- Vehicle security
- Need for using driver's mate
- Time restrictions for loading/unloading and parking
- Lack of clarity in loading restrictions
- Traffic wardens moving vehicles on
- Parking fines, clamps and towing-away vehicles
- Illegal parking by cars affecting goods vehicles
- Handling problems from vehicle to premises

5.4.1 Lack of off-street freight and service vehicle parking facilities

The availability of off-street loading and parking facilities at premises that goods vehicle drivers and service engineers visit can obviously help to make the provision of goods and services much easier.

Off-street facilities allow vehicles to be left in a dedicated space, usually well positioned in relation to the premises itself, while the goods loading/unloading or servicing is performed. However the our study (see Section 4.1.1) relatively few urban premises and especially city centre premises have off-street parking and loading facilities for goods and service vehicles. Large establishment such as hotels, offices and factories tend to have off-street unloading and parking facilities, while most shops, cafes and restaurant do not, and goods and service vehicles visiting the premises have to be parked on-street.

Even in cases where premises do have a single off-street loading bay, from the research we have found that the bay may well already be occupied by another vehicle, especially if the premises is in a time restricted area in which all deliveries have to take place within a relatively short period.

According to a few respondents, some off-street loading facilities are very difficult to manoeuvre goods vehicles into and out of due either to the size of vehicles used or the width/positioning of the access from the street.

5.4.2 Customers/receivers not letting delivery/service vehicles use off-street facilities

Even when premises have off-street parking facilities this does not necessarily mean that these facilities are available for use by goods and service vehicles visiting the premises. According to several respondents from freight transport and service companies, off-street facilities at many premises are only for the use of employees for car parking, as the following conversation during a discussion group illustrates:

> "I guess that not many of your customers have off-street parking spaces for themselves let alone for your vehicles?"
>
> *(Facilitator)*

> "Even if they have a car park they won't let you in."
>
> *(Planner from service company)*

> "If it exists, it's just for management."
>
> *(Service engineer)*

> "If they (the premises) physically reorganised the space and their management of it, would it be physically possible for you to get your vehicle in there?"
>
> *(Facilitator)*

> "Yes, but it would be like opening the floodgates. If they let us in there, (name of another company) would want to come in there, then (name of another company) would, then the person with the sandwiches. So instead they don't let anyone in there."
>
> *(Goods vehicle driver)*

5.4.3 Lack of sufficient off-street car parking spaces for employees at premises causing delivery problems

Some goods and service companies also informed us that some premises that have off-street parking facilities for employees do not have sufficient spaces for all their staff. This results in some employees parking their vehicles in such a way as to disrupt goods and service vehicles' ease of access to the premises:

> "The new (company name) offices don't seem to have sufficient parking spaces for the employee's cars so they are all parking on-street. This makes it very difficult to manoeuvre large goods vehicles around there".
>
> *(Goods vehicle driver)*

The sharing of car park and goods and service vehicle entrances at premises, especially large multi-user sites such as shopping centres, can cause a major problem for goods and service vehicles:

> "It is a major problem, because all the traffic has to come up Rose Lane and the traffic stacks back a long way and there are traffic wardens moving people on if they queue back into the traffic grid".
>
> *(Retail manager)*

5.4.4 Difficulty finding on-street parking spaces

If a premises does not have off-street parking and loading facilities for goods and service vehicles then it is necessary for these vehicles to either park on-street or in a car park when visiting the premises. Virtually all of the freight and service companies consulted during the research have told us that they experience problems finding suitable on-street parking spaces. From comments made it would appear that finding suitable spaces has become more difficult over time as traffic levels have increased and loading and parking arrangements and regulations have become more stringent:

> "At a few drops I can use off-street facilities at customer's premises, but usually I have to unload on-street, either on single yellows, doubles or whatever depending on the location and the size of the delivery."
>
> *(Goods vehicle driver)*

Most on-street parking and loading restrictions are only in operation at certain times and days of the week. For those companies, which we spoke to that carry out freight transport or servicing at night or early in the morning, issues such as yellow lines, Red Routes and other parking/loading regulations have little impact upon their parking and loading as the regulations are either not in force at that time or there is no-one around to enforce them.

The following conversation about Red Routes is of interest in the context of parking problems (in this case in London):

> "There aren't as many parking spaces and everyone is fighting for those spaces that there are. All delivery companies want to use the spaces at the same time. We often park round the side streets now rather than in the loading spaces on the Red Routes."
>
> *(Freight transport manager 1)*

> "Red Routes can give compensation in terms of less congestion. But I would think it's probably cost us more time overall with the Red Routes" (i.e. more time is lost making deliveries than saved by gains in flow speeds).
>
> *(Freight transport manager 2)*

> "(With Red Routes) we get there maybe about 5, 10 minutes earlier, but it's taking us maybe 15 minutes longer to make the delivery".
>
> *(Freight transport manager 1)*

> "We're punished by our concentration of drops, because we're so focused in the high street, we're not just going to 2 shops in the high street, we're doing 20 or 30 shops in the high street. So our vehicles are there much longer than our competitors." (And vehicles can only stop in one place on the Red Route for 20 minutes).
>
> *(Freight transport manager 2)*

> "The Traffic Director for London would probably argue that on Red Routes they have set aside more space for loading and unloading than was available before the Red Route."
>
> *(Facilitator)*

> "But it is never near enough to where you want it to be."
>
> *(Freight transport manager 1)*

Typically the closer to the city centre, the more difficult it proves to park or load/unload a vehicle on-street. Delivery companies told us that finding somewhere to stop in order to make a delivery tends not to be so problematic when premises are in suburban locations as there is often more adequate on-street loading facilities and less traffic.

Service companies that participated in the study tended to view finding parking spaces and the problem of parking fines, being clamped and towed away as much more problematic for them than actually driving in urban areas. Freight companies tended to view both driving and parking/loading as equally problematic. This difference between freight and service company perceptions would seem to be due to the times that service companies are operating (usually exclusively during the working day), the amount of time they have to spend in the city centre area (some engineers/service providers work in the centre all day) and the fact that service vehicles are not allowed to park freely near premises in the same way that goods vehicles can for loading/unloading. Also service company trips are more difficult to plan and predict in advance. Whereas freight companies can plan their routes to the most difficult city centre locations first and then work outwards from the centre to less problematic areas as the day progresses, service companies can be called to a city centre premises at very short notice at any time of day, as the following comments illustrate:

> "Parking can be a problem since engineers need to be able to stop fairly close to a site in order to carry equipment and parts. Engineers used to place "(Company name) engineer working on site" sign in the car window and this would usually be respected by traffic wardens. However, since parking enforcement was privatised such signs are no longer valid. Engineers are responsible for paying their own parking fines, which deters them from parking illegally".
>
> *(Service engineer)*

> "Parking is becoming an increasing problem for city centre work where the customer doesn't have off-street parking facilities. Installations take several hours to complete and, especially in Cambridge, it is not unusual for the engineer to park in the park and ride and then ride into town on the bus with the equipment to install as it is so difficult to park in the city" (However it should be noted that in some service operations the vehicle has to be parked close to the premises as the engineer has to carry heavy equipment and tools).
>
> *(Service company manager)*

> "Our contractors just can't park anywhere. Wherever they pull up there's a traffic warden turns up 30 seconds later."
>
> *(Service manager for retailer)*

> "There isn't enough car parking for the number of cars in the city".
>
> *(Retail manager)*

The following conversation with a service company was very interesting in respect of the extent to which parking problems affect their operation:

> "Our main problem is not driving, 'cos we're in here all the time, our main problem is being ticketed, clamped, sometimes lifted. They don't generally lift the big fellas 'cos there's too much weight on them."
>
> *(Service engineer)*

> "Several years ago (name of engineer's company) was prepared to pick up all the fines for parking offences but this is no longer the case. As long as I've parked in a way that is

> acceptable to (name of engineer's company) then they will cover any costs I incur in fines, clamps etc. But if I fail to park in an acceptable way then the costs are my responsibility. (Name of engineer's company) has a set of parking rules that you need to comply with."
>
> *(Service engineer)*

> "Do you mostly park on meters then?"
>
> *(Facilitator)*

> "No, mostly we park on single yellow lines because meters are so much rigmarole. It's 20 pence for 3 minutes, £8 for 2 hours. The engineers haven't got this much change in their pockets."
>
> *(Service engineer)*

From the interviews and discussions it would appear that parking and loading problems are far more acute in London than in Norwich. This is due to two factors:

- the difference in the amount of traffic in Norwich and London looking for parking and loading spaces
- the approach taken by the police, traffic wardens and parking attendants to moving vehicles on, fining, clamping and towing away vehicles (all of which would seem to be pursued far more aggressively in London than in Norwich).

The time of day of the vehicle trips has a significant bearing on the difficulty experienced in finding suitable on-street parking. Several freight companies that we spoke to, which make deliveries either at night or during the very early morning, encounter no parking difficulties at these times. Typically traffic flow tends to be far lower at these times, and parking/loading restrictions are either not in force at these times or there is no-one there to enforce them.

5.4.5 Lack of on-street spaces near premises to be served

In practice, only service vehicles in operations that do not involve carrying much equipment can park significant distances away from the premises such as in a car park. For most goods deliveries/collections the driver needs to park as close to the premises as possible for two reasons:

- the goods are too heavy to transport over distances of anything more than a few metres;
- parking close to the premises to be served reduces the time taken to make a delivery/collection - on multi-drop rounds (which are very common in urban areas) the driver has to perform a large number of drops during the round, and therefore in order to make all the drops at a time suitable to receivers has to make each delivery as quickly as possible.

We interviewed companies during the research that require their vehicles to park very close to the premises where deliveries are being made, because of the weight of the goods involved. Such a close on-street space is often not available when the vehicle arrives at the premises. In these cases their drivers often have to drive away and make other deliveries and then return to the premises later to try again.

Even though some service engineers do not have to carry much equipment from their vehicles to the premises they are visiting, and can therefore park further away in car parks, availability of car park spaces can be very limited during the working day:

> "At Christmas time the car parks are all full by ten o'clock in the morning."
>
> *(Retail manager)*

Several freight and service companies told us that it is often necessary for their drivers and engineers to have to park their vehicles some way from the premises they are visiting and then to carry loads (goods, equipment, parts etc.) from the vehicle to the premises.

5.4.6 Vehicle Security

Goods and service vehicles can be carrying very valuable loads. For many companies that cannot park their vehicles close to premises they are visiting it is necessary to purchase vehicles with remote central locking for safety reasons.

Service engineers working in high-tech sectors such as computing, photocopier and cash till repairs often carry extremely expensive parts on-board their vehicles:

> "Apparently if someone pinched the stuff out of it (the vehicle) it's worth thousands".
>
> *(Service engineer)*

5.4.7 Need for using driver's mate

In London we have interviewed freight transport companies that need to send out two people in their vehicles to make deliveries because of the difficulty in finding suitable on-street parking spaces near to premises to be served. In these operations one person makes the delivery while the other stays in the vehicle and keeps the engine running. This type of operation tend to happen in larger cities: (i) in situations where deliveries need to be made during the middle of the day and the deliveries are very time sensitive (such as newspapers), or (ii) there are no on-street loading facilities near the premises and only having one person in the vehicle would invariably result in a parking ticket. From our interviews and discussions it would appear that the traffic/parking situation in Norwich has not yet reached these proportions.

> "We even have to double man our vehicle which delivers to Downing Street and all round Whitehall, so that we don't get so many (parking) tickets".
>
> *(Manager from supplier company which makes deliveries)*

5.4.8 Time restrictions for loading/unloading and parking

There is a problem for freight and service companies regarding the times that local authorities allow them to park vehicles on-street, close to premises that they need to serve, and the times constraints placed on them by customers/receivers requiring their goods and services. In many cases roads adjacent to each other have different unloading/parking time restrictions for no obvious reason. Several respondents during the course of the work have commented that they think the loading/unloading and parking time constraints put in place by local authorities need rethinking. Service vehicles tend to be even worse affected by time restrictions than goods vehicles that are loading/unloading, as the service vehicles are treated in the same way as any other vehicle wanting to park on-street.

Some of the remarks made by respondents during the research include:

> "There are some places in Norwich where you aren't allowed to park until after 9.30 am, but you need to make a delivery by 9 am, so you have to also overcome these restrictions".
>
> *(Goods vehicle driver)*

> "We deliver to (company name) all over the city and we have one driver whose route/work is just to deliver to (company name). We have a problem with their premises at the Tower of London, as the area is all Red-Routed. The driver has to arrive before the Red Route starts at about 7 am so that he can make the delivery and drive away before the restrictions come into force. He can't get signatures for these drops as (company name) staff aren't at work at this time".
>
> *(Manager from supplier company which makes deliveries)*

> "I think Red Routes have been a nightmare for all delivery/service drivers because they will clamp you if you stop for a second, there is no flexibility. At the (company name) building we deliver to on a Red Route, if the gate at the site is locked the driver has to park on the road and run in to get the key to open the gate. However the drivers are sometimes ticketed in the time they spend collecting the key. The warden can see what you are doing, you are off the road out of anyone's way, but the wardens are totally unreasonable about it."
>
> *(Goods vehicle driver)*

> "There are different restrictions on different roads. On Regent Street you won't get a ticket before 10 am, but after 10 am you will. But you cannot guarantee that you will get to Regent Street before 10am because of: (a) the traffic conditions and (b) because of customer timed deliveries (and if the delivery is near to where you just made a drop, you can't drive to another customer further away and then get back to make the timed delivery so there is some unproductive time waiting to make deliveries)."
>
> *(Goods vehicle driver)*

5.4.9 Lack of clarity in loading restrictions

In some specific situations there is a lack of clarity about the loading/unloading restrictions at a particular roadside, or conflicting information.

> "The problem is that every parking warden seems to have a different interpretation of the law."
>
> *(Service company manager)*

5.4.10 Traffic wardens moving vehicles on

There was a major difference in the extent to which goods and service vehicle drivers/managers working in London perceived the issue of traffic wardens/parking attendants and their approach towards loading/unloading and parking compared to goods and service vehicle drivers/managers operating in Norwich.

Many respondents operating vehicles in London believe that since the responsibility for parking enforcement was transferred to local authorities in some towns and cities in the UK in the last 5 years, loading and parking has become even more difficult. Borough/local authority-employed parking attendants are not in a position to use their discretion when faced with a parking infringement by a service vehicle or an unloading infringement by a goods vehicle.

From the respondents' comments it would appear that it is far less common for vehicles that are infringing parking/loading restrictions in London (either in terms of time-based or location-based infringements) to be moved on by traffic wardens/parking attendants than it is in Norwich. Instead, in London vehicle that are loading/unloading or parked illegally tend to be immediately clamped, fined or towed away. Comments made by those operating in Norwich about being moved on by traffic wardens include:

> "Some traffic wardens are understanding when the delivery vehicle is illegally parked, but others are not and move vehicles on".
>
> *(Manager of supplier which makes deliveries to customers)*

> "Drivers do their own routeing and scheduling. They are only really restricted to time limits in the city centre. When the police close a road for them or give them permission to enter the city to deliver or remove, they have to complete the job within the time predicted by the assessor. If they fail to they can be clamped, towed away or have to move the vehicles themselves. If they have to move the vehicle, then they can be walking up to half a mile with barrows and boxes.....When removing in the city centre, the

company will tend to liaise directly with the police who will contact the council and you will get parking authority for the day. The traffic wardens will challenge whether the vehicle has the right to be parked on the street even when you have the parking authority. Even when you show them your authority they still try to get you to move on if you are causing congestion."

(Manager from a removals company)

"Service contractors have to try to find a space in a car park and then walk back to the shop with their equipment and parts etc. If they do park outside the shop, the traffic wardens are not very sympathetic and force them to move on. This can be very problematic for the shop when it has an emergency. There isn't anywhere where service vehicles can stop on an emergency type basis anywhere around there".

(Retail manager)

5.4.11 Parking fines, clamps and towing-away vehicles (cost and operational impacts)

As mentioned above parking/loading fines, clamps and the towing-away of goods and service vehicles would seem to be far more prevalent in London than in Norwich. In the interviews and discussions it emerged that this represents a significant problem for service companies operating vehicles in London, both in terms of the costs of these fines and also in terms of the impact on their operation (it takes a significant amount of time to have a clamp removed or recover a vehicle towed-away to a pound). Below is a comment made about the aggressive stance taken by parking attendants towards service vehicles in London:

"..and as soon as the warden can't see you working (outside the premises) they fine your vehicle".

(Service engineer)

As mentioned earlier, since the change of responsibility for parking was introduced the in London and some other towns and cities in the UK this has resulted in a reduction in the extent to which parking attendants attempt to understand why the vehicle is parked where it is and show any leniency. Instead, the parking attendants now employed by local authorities have no powers of discretion when faced with a parking violation.

Comments made by several managers and engineers from service companies suggest that while they do not hold the parking attendants themselves responsible for this new, far stricter parking regime (as they are simply doing their jobs) they do believe that there is a need for a complete re-think about parking and loading arrangements for goods and service vehicles by the local authorities concerned:

"I am a Customer Service Engineer, I'm the guy who gets the tickets and the clamps trying to deliver service to our customers!"

(Service engineer)

"I'm an engineer. I mainly work in central London and I got a parking ticket yesterday. I get about four in a week".

(Service engineer)

"Our problem is that my boss wants me to do a job in an hour and a half. So when I park the van, pick the tools up and walk into the customer's premises I'm going to be away from that van from an hour. And when I come back to the van I'm coming back to ticket or a clamp. It's as simple as that. And if you're in certain parts such as (name of London borough) they smell you - as soon as you go through that front door and close it, the clamp is on there. You then have to contact the clampers, pay them, the clamper has to come round and take it off, you can't go anywhere because when he takes that clamp off if you're not back there in 20 minutes they'll be another clamp on there. And you're

> manager'll be saying “he's a poor performer”. If you get three clamps in a week you're going to be a poor performer, you're not going to hit your targets. And the world we live in today you need to hit your targets.”
>
> *(Service engineer)*

> “Some of our vehicles are marked and it is clear that we are doing an important job and have to be there, but it doesn't mean a thing to the parking wardens. They just ticket us.”
>
> *(Service company manager)*

> “I've got no problems with traffic wardens. He's coming to work to feed his family and he's going to slap a ticket on wherever he can to hit his target, or he will be out of work. The problem is at the level that's saying “we want the traffic to flow, so if you park on a Red Route we're going to clamp you”. It's not logical, it's just not logical”.
>
> *(Service engineer)*

We spoke to one service company who told us that each of their engineers working in the West End of central London receive 5 parking tickets per month. When the costs of being clamped and towed-away are also taken into account the total costs involved are very significant. Some goods and service companies will pay parking fines, clamping and tow-away charges on behalf of their employees as long as they abide by company parking guidelines, but other companies do not and any fines are the responsibility of the driver/engineer. This tends to determine whether a service engineer/goods vehicle driver will either park illegally, on say a single yellow line, or will find a parking meter or car park.

> “Engineers can't always find a meter to put their vehicles on, our company accepts responsibility if the engineer has to park on a single yellow line, but if they park on a double yellow or a Red Route then any fines are the driver's responsibility.
>
> *(Planner from service company)*

> “We are ticketed, clamped and towed away all the time for parking on single yellow lines.”
>
> *(Service engineer)*

> “Our company will meet any costs incurred using car parks or parking meters. If you get tickets or clamps the engineer has to pay it themselves.”
>
> *(Service company manager)*

> “Our company would rather that you (i.e. the engineer) move the car to somewhere where you are legally parked, even if it takes you all day to do this. That is their attitude. They won't pay out for any of it.”
>
> *(Planner from service company)*

> “On Victoria Street (in London) every day there is a parking attendant every 100 yards ticketing vehicles for parking on single yellow lines and they book you within 30 seconds. You've got to deliver to shops all the way down there, how can you get your work done?”
>
> *(Goods vehicle driver)*

> “About £7000 per year, that's about what I pay on the parking meters”.
>
> *(Service engineer)*

Those companies that participated in the study tended to view the approach of the local authorities that have taken over responsibility for parking systems in London as one of revenue generation, rather than of having taken any consideration of the parking and loading needs of goods and service

vehicles within their urban area if commercial premises are to be efficiently supplied with goods and services (as the following comments reflect):

> "It's excellent revenue for them" (i.e. the local authorities).
>
> *(Service engineer)*

> "But if you were (name of central London Borough) you'd grab it wouldn't you? It's paradise for them isn't it?!"
>
> *(Service engineer)*

> "We're actually got figures to show that since responsibility went from the Metropolitan Police to the Boroughs, our company's tickets have gone up ten-fold.....If you take any five other major cities in the UK and add our ticket fines in those cities together, it doesn't come to as much as any one of those five London boroughs".
>
> *(Service company manager)*

> "And for an ordinary individual who gets clamped at 9.30 am, and wants to leave London at 6.00 pm they won't phone until 4.30 pm to get the clamp taken off. For me, if I get clamped at 9.30 am I have to phone and get the clamp off by 10 am and get to my next job. You could theoretically get four clamps in a day. And don't let's make a mistake, they (the London boroughs) know this. They know (company name) want the clamps off as soon as possible. This represents another opportunity to give us another clamp."
>
> *(Service engineer)*

One service company that we interviewed with large numbers of engineers operating in central London now has to employ a person full-time simply to pick up their engineers and transport them to car pounds to recover their vehicles that have been towed away.

Several service companies that participated have to issue their engineers with a monthly float to cover the cost of parking meters as engineers cannot be expected to use their own money given the costs of meters in central London:

> "The problem with parking meters is that an engineer needs a float of at least £400 per month to cover these costs."
> *(Service engineer)*

As well as the financial costs of parking fines (including vehicles being clamped and towed away), the inconvenience of being clamped or towed away has a significant impact on the operational performance of the service company and the level of service that they are capable of providing to their customers.

One of the large national service providers interviewed has tried to negotiate with some of the London boroughs about the parking requirements of their engineers and the costs that they are incurring as a company as a result of parking fines. They entered into a trial scheme with one London borough in which their engineers were allowed to park on parking meters, residents' parking bays, and single yellow lines without penalty. However, the London borough ended the scheme; the company felt that this was due to parking offence revenue that the borough was losing.

As well as the local authorities' apparent lack of desire to negotiate about parking arrangements, the company concerned has also experienced difficulties caused by the large number of different boroughs that exist in London:

"There is no governing body for London. You get referred to someone in government policy, but all they can do is give guidance to the councils and the councils can choose to ignore this."

(Service company manager)

5.4.12 Illegal parking by cars affecting goods vehicles (affecting unloading and access)

Several respondents who operate goods vehicles mentioned that illegally parked cars cause them difficulties in terms of: (i) manoeuvring their vehicles in urban streets, and (ii) occupying spaces that could be used by goods vehicles for loading/unloading:

"Illegal car parking in unloading spaces is a problem in Norwich."

(Service manager for retailer)

"The fire brigade are always complaining about not being able to get up streets in Norwich because of cars parked that obstruct them."

(Retail manager)

"The double yellow lines, where you could have small delivery or service vehicles unload or parked for a short time, have got cars waiting on them from 7 am in the morning at the moment."

(Freight transport manager)

5.4.13 Handling problems from vehicle to premises

Several freight transport and service companies noted that their drivers and engineers experience problems moving goods, parts and equipment from their vehicles to the premises caused by the fact that the vehicle has had to park on-street a significant distance away from the premises. In some cases, goods or equipment are simply too heavy to carry over anything more than a few metres, so the driver/engineer is unable to serve the premises at that time if a suitable space is not available. In other cases having to move goods over relatively long distances can result in damage to the goods and also increases the amount of time taken for the delivery, thereby potentially delaying subsequent deliveries or calls:

"All type of problems exist: whether you can get down a particular road, whether you can park outside the shop front, we have receivers that forget to tell us they don't have a forklift when the customer has sent them a pallet load and the driver is having to manually unload 90 boxes".

(Freight transport manager)

"The longer unloading times (up to 2 hours) are caused by the delivery being made at a busy time in the shop and the goods can't then be taken in the front door, but instead have to be taken in the side/back of the shop which involves physically carrying pallets of up to half a tonne uphill. Once inside this other entrance the goods then have to be carried either up or downstairs. This takes up to a couple of hours."

(Fast food restaurant manager)

"Some of the equipment is large and I have in the past walked substantial distances with heavy equipment and the beads of sweat are dripping off you because you can't get any closer".

(Service engineer)

"With Red Routes we can have to park maybe 50 to 100 metres away from the premises. So the driver has to wheelbarrow it all in and it takes longer."

(Freight transport manager)

5.5 Customer/receiver-related problems

5.5.1 Reduced stockholding and reduced order lead times leading to more frequent delivery

Many premises are now holding less stock than they used to, in order to reduce inventory holding costs and maximise the space available for the core activities (such as retailing, manufacturing etc.) at their premises. This is affecting the ordering patterns of these premises, they are ordering in smaller quantities more frequently and requiring delivery of the goods more frequently than in the past. Therefore delivery patterns to these premises are also changing, with goods typically being delivered in smaller consignment sizes more frequently. This means that goods vehicles have to visit the premises more often and therefore all the problems experienced by goods vehicles discussed in this chapter are experienced more frequently.

Retailers participating in discussion groups made the following comments about their stockholding policies and product range and variety:

> "We want to offer service to our customers. If we can have goods in stock, offer goods sooner, we want to do that. But we can't store any more in the shop, we don't have any more space."
>
> *(Retail manager)*

> "In some ways we use (supplier's name) as our warehouse. We want stock little and often rather than having to store it ourselves in the shop. This helps with space and also with finance".
>
> *(Retail manager)*

> "...if you've got a very high stockholding it's far more money tied up in stock sat on the shelf. (Company name) has had a policy of increasing the number of lines we sell over the years and to accommodate that stock in the building we keep a lower number of each item in the building but it does mean that we need more frequent replenishment".
>
> *(Retail manager)*

> "At (company name) we put more of a range in as well and our stockholding has dropped tremendously as well, we are working on about one weeks stock and, I think that about three years ago we were working on about two, two and a half weeks stock in the building".
>
> *(Retail manager)*

> "We as a business hold about half a weeks stock in total. The fresh stock that we get delivered will go out by the end of the next working day. So you've not got a lot of window to get those deliveries right. And because you've got those deliveries coming in three times a week and they deliver everything else anyway (all goods delivered on the one vehicle), this is a business decision that you're not going to hold anything else".
>
> *(Fast food restaurant manager)*

Smaller consignment sizes also results in many shippers now despatching in several small boxes what they used to send in one larger package. This can result in the driver having to make more trips to and from the vehicle in making the delivery.

One express carrier told us that in their operation there are currently approximately 2.2 packages per consignment and the average consignment weight is 12 kg. The packages per consignment dealt with by freight transport operators are continually rising and average consignment weights falling:

"We supply 25,000 lines in our catalogue. We expect to carry 95% of these lines in our warehouse at all times. So most products are delivered to the customer in a couple of days from time of order...For us the retail outlet is our shop window. Retail space is increasingly used for marketing and not storage, we sell ourselves as a distributor, who can provide stock quickly to shops, offering regular, frequent deliveries of 25,000 product lines."

(Manager from wholesaler that makes deliveries to customers)

"We stock 160,000 titles and we offer a one stop shop, customers get all their books on one order with only one set of paperwork. We accept orders from customers up 'til 5.30 pm. This order is dealt with and despatched overnight for next morning delivery. Customers therefore order books at the close of their day and then receive them within about an hour of opening the next day, so they are only effectively without the titles for one hour. This is the benefit of using our service. If customers go direct to the publishers they get a slightly bigger discount but they have to deal with all the different publishers individually. We really appeal to smaller high street stores or customers who want their books very quickly. We supply in hours whereas publishers take several days....About 15 years ago our company offered a two to three day service with a midday cut-off for orders. Then it was a midday order for next day delivery. Now it's all 5.30 pm orders for next day delivery or even or same day deliveries (and our next day is next morning rather than just next day). When the carriers got better they didn't want to hold our goods for 2-3 days and we could then offer next day."

(Manager from book wholesaler that makes deliveries to customers)

"A couple of years ago we were distributing on average 3 day turnaround - big orders were being sent out twice per week. This has now been fundamentally changed so that 71% of our customers' orders are sent out within 24 hours of receipt."

(Manager from supplier company)

The following conversation took place during a discussion group considering the book supply chain:

"Can you place an order for a single title?"

(Facilitator)

"You can do. Most suppliers will specify a minimum and surcharge you if you fail to meet this. But in a lot of cases we are sending out orders to suppliers for 50-200 lines per day, but we may only be asking for 1 or 2 lines per day from smaller suppliers, and we are also doing a lot of customer ordering (titles we don't have in stock) and these will often be one offs."

(Regional manager from retailer)

"Presumably such small orders are expensive for somebody in the chain?"

(Facilitator)

"I think it is probably expensive for everybody. The reason this has to happen so much in the book trade is because of the size of the available number of books. The books in print list is round about 1 million titles most of the time. There are very few other retail trades where that would be the case. Even the very largest (name of retailer) cannot contain all the British books you can buy and that's just British books, you just couldn't fit them in. So you know that a proportion of your purchases, and increasingly so as the shops get smaller, are going to be dealt with through orders. And since the customers are used to being able to go into any other store where "what you can see is what you can buy, instant gratification, I want it so I can have it" then they want to apply that to books but it's much more complicated to deliver it for all of us. But as far as the customer's

concerned they want it now. The ultimate customer service is to give them the book they want when they want it."

(Regional manager from retailer)

"This is one of the reasons why the large wholesalers have increased their business. They can offer guaranteed next day delivery. So a lot of people will place a lot of their customer orders in that way because the ordinary suppliers will not be able to guarantee next day delivery."

(Freight transport manager)

The following conversation is also very pertinent as it demonstrates that, in certain circumstances, if a freight transport company is handling sufficient throughput of goods for the receiving premises they can overcome the problem of generating additional vehicle trips when delivery frequency increases:

"I would say it's (delivery frequency) been more frequent over the last 5 years. Whereas 5 years ago you may have made deliveries to a shop perhaps twice a week, you can guarantee that we're now going to the major chains every day and even the independents 3 times a week. Because the customer demands that if there isn't a book on the shelf they'll come in tomorrow and collect it. So you're JIT (just-in-time) delivering."

(Freight transport manager)

"Does this impact on the vehicle load factor?"

(Facilitator)

"It actually helps consolidation rather than worsens it. This is why we can give such competitive rates to the book industry. Even if we go to a store every day, it's with a considerable volume of parcels. It's very rare that we would now go in with one parcel".

(Freight transport manager)

"That's interesting, as the usual expectation is that it is good commercially to send smaller, more frequent deliveries but that it increases total deliveries or worsens vehicle load factor. But what you're saying suggests that if you can consolidate the throughput at the same time as orders become smaller and more frequent it is not necessarily the case that load factors worsen. Instead you may have fuller vehicles."

(Facilitator)

"If you wanted to make vehicles fuller you could have an arrangement that vehicles only deliver only twice a week, say Tuesday and Thursday and consolidate it with larger vehicles and out of hours. But this would delay the service to the customer. The lead time would increase."

(Freight transport manager)

"The two things that we feel we need strongly are fast reaction for our customers so they get what they want when they want it and secondly, just-in-time deliveries are perfect for us as the customer because we're not handling excess stock and the book industry is one where it is very easy to have excess stock because you've got so many product lines."

(Freight transport manager)

5.5.2 Service response times/delivery times

Many shippers sending goods to premises in urban areas are using guaranteed delivery services offered by express and parcels companies. In addition some receiving premises are requesting specific booking-in times for goods deliveries (see Section 5.5.4). This places increased pressure on the goods vehicle operations and can lead to deteriorating vehicle load factors and hence an increasing number of trips to deliver the same quantity of goods. In the case of services, many

customers are requiring rapid response times from certain service providers which place the service provider and their engineers under substantial time pressure.

Most of the service companies interviewed that are responsible for maintaining equipment and facilities at customers' premises told us that their customers are becoming increasingly demanding about response times to carry out installations and repair faults arising. Customer expectation is one of the major pressures on their operations and they are having to continually reconsider how best to meet customer needs and improve service levels.

A photocopier supply and servicing company informed us that the maximum time they offer for domestic service calls is nine hours, and five hours for commercial calls. However, on certain equipment and for certain customers it is not unusual for their engineers to have to respond within two hours (i.e. actually arrive at the customer's premises to carry out servicing within two hours of the customer reporting the problem). This obviously places enormous pressure of the engineers who have to drive to the customer's premises, find somewhere to park and enter the building within the agreed response time.

Another example of rapid response times required by customers is provided below:

> "Some of the work is planned but a lot of the work is responding to problems. If there is a leak it involves turning up within an hour."
>
> *(Plumber)*

Service response times have tended to reduce in recent years and those service companies interviewed to expect that they will have to reduce these response times even further in the coming years. Some service companies that we have spoken to have also introduced clauses into their contracts with customers so that they now compensate their customers if they fail to arriving at the customer's premises within the agreed response time. The following comments reflect this point:

> "Mine is 2 hours. If I'm not there within 2 hours I have to pay the customer. By hook or by crook I've got to get in there, because in the first month of doing it, it has cost us a small fortune. I'm shelling out cheques left, right and centre. It's hard enough anyway because we cover the whole of Norfolk, the distances involved are quite difficult. You're never actually sitting around doing nothing, your always doing something when you get something else to do, but on top of that you get into Norwich and then you have to fight for somewhere even to stop or to park. Because it doesn't matter if you actually stop, go inside and say `hello I'm here I'm going to drop off this case and park' you've arrived and you don't have to pay. This is where the competitive edge is coming into a lot of the service industries. You all compete on price. The one thing you can and have to offer is this premium type service. So the pressure really is there".
>
> *(Service engineer)*

> "We are offering 1 and 2 hour response times to some customers with financial penalties if we fail to meet these, so engineers have to get there very quickly. We can plan workloads and routes to a certain extent for scheduled, planned servicing work but so much of our work is emergency call outs that this makes it very difficult to plan routes and workloads accurately in advance."
>
> *(Planner from service company)*

Conversations with customers of service companies have revealed that receiving some of these services promptly can be viewed as being as importantly as receiving goods deliveries:

> "Service-related problems can be as serious as missed deliveries. In (company name) the EPOS has been known to stop working and it is very difficult to operate a manual back-up mode at all. It's a nightmare scenario actually, we don't like to talk about it very much".

(Retail manager)

> "A couple of times we've lost item movement through the checkouts and that is disastrous. The supermarket usually has to close if the EPOS system fails to work".
>
> *(Supermarket manager)*

> "If one bit of our equipment breaks down you basically have to shut the restaurant, which when it happens you can guarantee is about 1 o'clock on a Saturday lunchtime. Once you have shut the shop you would try to do the repair yourself but if not you need to locate a service engineer as quickly as possible. You're going to want to get that service engineer outside your front door in five minutes flat because its like losing a whole days business in an hour (at lunchtime when the restaurant is very busy."
>
> *(Fast food restaurant manager)*

In the case of goods transport, the majority of packages sent via express companies and parcels carriers are now sent on a next day basis. These packages are delivered by end of the next working day with the majority of deliveries being made during the following morning. Most express companies offer a range of timed next-day services usually offering delivery by as early as 9.00 or 10.00 am the next day. Increasingly, freight transport and especially express companies are offering to make penalty payments to customers if they fail to meet the guaranteed delivery time.

Just about every freight transport company and supplier operating their own transport that participated in the study has told us that their customers and the receiving premises they deliver to are becoming increasingly demanding about wanting goods delivered as quickly as possible.

At the same time that more customers are using the guaranteed delivery time services offered by express companies, traffic levels are rising and parking/unloading is becoming more problematic, so it becoming increasingly difficult to achieve these delivery times:

> "In the mornings for instance we have to send a separate vehicle into the city for timed deliveries. All he will take with him is 9 am and 10.30 am deliveries and we will have a second vehicle, there we go congestion again, following round going down the same roads, same streets, except the Walk of course, delivering to the same place sometimes or the place next door.....Five days a week (Tuesday to Saturday) we have to put separate (additional) vehicles out".
>
> *(Freight transport manager)*

> "Customers are increasingly requesting before 9 am delivery times and the latest possible collection times. This places the (express company name) system under pressure and leaves little room for error, especially in terms of getting goods back to the depot to be sent out on the vehicles to our hub."
>
> *(Freight transport manager)*

Several freight transport companies and goods supplier operating their own delivery vehicles that have participated in the study have said that their delivery times are becoming earlier and earlier in order to meet all customers and receiving premises delivery time requirements and also to avoid delivery time restrictions that come into force during the morning.

Some of these freight transport companies and suppliers are of the opinion that while some customers and receivers clearly do need early deliveries, many ask for very early deliveries when they do not really need to receive them at that time. Several companies have mentioned that they receive complaints from customers about delivery times not suiting them, but it is not possible to make as many early deliveries as are requested by customers. However although many customers and receivers are requiring earlier deliveries relatively few accept deliveries during the night or small

hours of the morning when their staff are not present on the premises to receive the goods. In some cases this is giving freight transport companies and suppliers an extremely small time window for making deliveries.

Several freight transport companies and suppliers operating their own transport operations have also mentioned that delivery rounds were, up until a few years ago, planned and routed so that the vehicle would take the most logical geographical journey to serve customers using the least mileage possible. However as some customers and receivers have become increasingly demanding about receiving early delivery times this has resulted in the need to organise rounds on the basis of customer delivery times, and this has had the effect of increasing the distance travelled by the vehicle during the round:

> "Everybody wants to gets things in as early as possible and out as late as possible and you have this great void in the middle of the day. This is changing rapidly with the activity being squeezed into shorter and shorter periods."
>
> *(Manager from supplier company)*

> "Although it is possible to change the mind set about when shops receive deliveries it is psychologically much better for the retailer to receive their goods early in the day and work on them during that day, rather than having them arrive quite late in the day and then have them sitting there overnight".
>
> *(Retail manager)*

As well as wanting deliveries ever-earlier in the morning, premises are also requiring collections to be made by freight transport companies ever-later in the day:

> "(Name of freight transport company) used to want to pick up our last despatches at 6 pm. Now they collect the last pick up from us at 11 pm. This has been possible as they have become more efficient and have sped the distribution process up."
>
> *(Retail manager)*

Both freight and service companies tended to be of the opinion that their customers are not very understanding about the problems they experience in getting to their premises as a result of traffic levels, and then finding somewhere suitable to park/unload:

> "If you are paying for a service you want that service. It's no good someone saying `sorry I'm two days late but trooping the colour was on' they will respond `so what, I want my service'. It doesn't matter if you're an hour late or two days late, you're late."
>
> *(Service company manager)*

> "The whole of our society, especially business, has become more demanding. I've been a engineer with (company name) for 27 years. The first thing I was asked when I walked into a customer's premises up until 10 years ago was "Tea or coffee?" That's the gospel truth, that was the first thing you were asked.....And the customer, rightly so, is demanding."
>
> *(Service engineer)*

> "The customers pay for our time and expect us to get there and repair whatever has happened and meet their needs".

> "Everything in life is getting faster and faster. Whereas ten years ago you might have said "I'll do it in a weeks time" and that was fine with everyone, now customers are saying "I want it tomorrow, or I want it at a certain time. The pace of life is just farcical".
>
> *(Service engineer)*

> "We offer next day service in order to compete with our competitors. The business is getting more and more competitive".
>
> *(Manager from supplier company that makes deliveries)*

> "Human nature says that if another company offers it at a lower price or a better service then your customers will use them instead."
>
> *(Service company manager)*

> "That's right we're called the services. We are there to serve them. Now I think you're concept (of service companies refusing to service locations where local authorities are uncooperative about parking issues) is perfectly correct if you look at it logically. But people don't look at things logically. They want what they want, and basically "sod the rest of you". It's an auction, the highest bidder gets the work."
>
> *(Service engineer)*

Several retailers told us that the demands they are placing on suppliers and freight transport companies were the result of the demands they face from their own customers as the following conversation implies:

> "As retailers we're not trying to make it difficult for our suppliers, we're obviously responding to customer demand and the trend is that by and large people just want to shop longer and longer hours....I know what you're thinking, in many ways it would be easier for us as retailers to work shorter hours".
>
> *(Retail manager)*

> "In an ideal world customers would be queuing up. It's all backwards isn't it?!"
>
> *(Facilitator)*

> "Yes, and sometimes you feel it would be nice to say "well these are the opening hours of our shop", but of course increasingly our focus is on what the customer wants, the customer drives our business, and they want more and more hours in which to choose when to come and shop".
>
> *(Retail manager)*

> "I think it all comes down to customer service. If there's one shop that says "you can have it next week" and another shop that says "you can have it tomorrow", I'll go to the latter."
>
> *(Freight transport manager)*

> "I think we're already beyond being able to say to our customers "if you want it you'll have to wait to next Wednesday. I think they will just turn round and say sod off"".
>
> *(Retail manager)*

5.5.3 Home delivery and shopping services

Home delivery and home shopping services pose another set of operational problems for freight transport companies. These problems include:

- Having to access residential addresses to make deliveries (which can often have access problems for goods vehicles caused by narrow roads and cars parked on-street).
- Finding somewhere to park and not get fined, clamped or towed away (a driver from one company we spoke to operating a grocery home delivery service within a five mile radius of one of its in London stores received approximately 50 parking tickets in the first week of the service).
- Several operators are having to put two staff in the home delivery vehicle, so that one delivers while the other looks after the vehicle, to remove the need for parking the vehicle properly and

avoiding the problem of receiving parking fines, and being clamped and towed away (as described above) being.

- Being successful in making the delivery (i.e. Finding someone at the home to accept the delivery - this can result in more than one trip being made to deliver goods).
- The small consignment sizes to be delivered to home coupled with the delivery time windows offered by some companies can result in a significant number of freight vehicle trips.
- Dedicated home delivery services with low drop densities can result in substantial vehicle mileage for relatively small total delivery quantities.
- For grocery deliveries the vehicle requirements are stringent because of the health and safety requirements for the storage of food (such as multi-temperate compartmentalised vehicles). In some operations this results in the need for the driver/mate to assemble the delivery on the vehicle which is very time consuming.

These operational problems faced by companies providing home delivery services also have commercial impacts in terms of the cost of providing the service and can also be seen to have negative environmental and social consequences.

Some of the comments made by participants in group discussions about home shopping and delivery services are shown below:

> "Internet purchasing and home shopping for books will create far more traffic on roads as it will involve one book being delivered to one house, not 120 parcels to one shop."
>
> *(Freight transport manager)*

> "People are in to receive home deliveries about 65% of the time. Many drivers would also try knocking on a neighbour's home and leave it with them if the customer permits this. If no-one is in when the driver arrives at the home, he will leave a card asking them to phone the depot. If we haven't heard from the person by the next evening, we will try phoning the person to see when they will be in if we have been supplied with a phone number. Many people are now asking for delivery to their workplace."
>
> *(Freight transport manager)*

> "Some of the new addresses must be difficult to find. They're not always on maps".
>
> *(Facilitator)*

> "And IT (information technology) doesn't help with this. I remember when customers would draw maps of how to get somewhere and attach it to the consignment note but with everything being electronic hand drawn maps can't be supplied."
>
> *(Freight transport manager)*

5.5.4 Vehicle booking-in systems

In addition some receivers are now requesting prearranged delivery times (i.e. delivery vehicles advanced booking-in systems) or delivery time windows for goods deliveries. These booking-in systems are meant to overcome the problem of too many delivery vehicles arriving at a premises at once and also give the premises more control over when they want to receive goods and dedicate their own staff resources to this activity. However booking-in systems can result in vehicle queuing at receivers' premises if the systems are not run efficiently; this has the effect of delaying the goods vehicle and driver. This can affect vehicle load factors and hence the number of trips necessary to deliver the goods. Each of these additional vehicle trips both adds to the congestion and parking difficulties in urban areas and at the same time is subject to the problems experienced by freight companies and their drivers/vehicles in urban areas.

In many cases the desire to introduce timed deliveries would appear to come from the receiver (who wants to have definite arrival times for vehicles with goods and only wants to staff delivery doors at specific times that suit their operation), in some cases it comes from the freight transport company, who want to try to overcome the problem of vehicle queuing.

Freight transport companies and suppliers made the following comments about booking-in systems for deliveries:

> "We notice that booking-in systems are increasing significantly. This is because whereas we used to collect from and deliver to lots of small premises in a company, they now have a few RDCs or fewer premises and have moved to booking in systems due to the increase in the numbers of collections and deliveries."
>
> *(Freight transport manager)*

> "All our deliveries are next day. In addition we also have to offer timed deliveries as some customers will only accept deliveries at a specific time. For instance, the Royal Courts of Justice will only accept deliveries between 2-3 pm because they use porters to carry goods around the building and this is the time the porters are free. We generally know the days on which orders from customers requiring timed deliveries will come in, so we can plan this in advance and build it into the schedule."
>
> *(Manager from supplier company that makes deliveries)*

> "We use allocated booking in slots across the day for goods received. We expect our suppliers delivering to us to phone in to confirm vehicle is coming and is on-time. However if the delivery is late we can't turn the vehicle away as we need the goods on-board."
>
> *(Manager from publishing company)*

> "Timed deliveries to customers reduce the amount of drops that a driver can make in a round because if you have just made a drop to a customer and the next delivery is near to where you have just made this drop, you can't drive right across your delivery catchment to another customer further away and then get back to make the timed delivery so there is some unproductive time waiting to make timed deliveries.
>
> *(Manager from supplier company that makes deliveries)*

> "Booking-in systems are the bane of our life. When for instance there are a couple of artics being unloaded at a premises and our vehicle arrives to make a timed delivery of a couple of boxes, the receiver refuses to receive the goods and insists our driver waits his turn despite the fact that it is already his delivery time. We often have to pull out of that delivery as the vehicle may have another 40 deliveries to make during the morning. If the booking-in times were adhered too it would be fine but they are not. Sales staff at the receiver want the goods but the warehouse staff refuse to take it when the vehicle arrives and insist it queues. Then we have to cancel the delivery and try again the next day - we then get complaints from the sales staff that they didn't receive their goods. This is a communication problem in the receiving company."
>
> *(Freight transport manager)*

> "I think that over the past thirteen years the only distribution problem that has worsened is the booking-in system problem. If we have a good rapport with someone at the back door they will take the delivery when the vehicle arrives but often this isn't the case. There are different types of booking in system: in some cases the customer tells us the time to deliver, in others the customer tells us the receiver has a booking in system and letting us book it in when the freight arrives at the depot."
>
> *(Freight transport manager)*

One freight transport company that we spoke to told us that some of its customers are now requiring timed deliveries and in addition, “we have to phone them up with details of the number of parcels, the information written on the outside of each the cartons, order numbers etc. The retailer then decides which of these deliveries it wants now and which it wants tomorrow, or next week. This is done from the local branch and is becoming more and more common”.

5.5.5 Vehicle queuing to make deliveries at receiver’s premises

Goods vehicle queuing can occur at any premises which receives several vehicle deliveries per day. Queuing is very inefficient from the transporter’s point of view as it is time spent unproductively by the goods vehicle and driver, reduces the amount of work a vehicle is capable of performing in a day and also causes delivery time unreliability for subsequent deliveries. We have spoken to freight transport companies during the course of the research whose vehicles are regularly queuing at receivers’ premises for up to 40 to 50 minutes waiting to make a delivery.

Some transport companies that participated are thinking of introducing vehicle booking-in systems for receivers at whose premises vehicle queuing regularly takes place. They are no longer prepared to continue queuing on a regular basis as this disrupts the rest of their schedule. They are hoping that this will reduce the need for their vehicles to queue and will allow their drivers to leave the premises without making the delivery when an agreed amount of time has expired with no subsequent contractual consequences.

> “We get a lot of delivery vehicles all turning up at out premises at the same time and they have to queue. This usually happens first thing in the morning. We have 3 restaurants in the shop and these require fresh meats, milk, bread etc. all of which has to be delivered in the morning. These deliveries intermingle with other goods deliveries. On a good day they can be queuing right up (name of street). They aren't necessarily all our lorries but lorries trying to make a delivery to our shop prevent other lorries getting past, because the road is very narrow”.
>
> *(Service manager from retail company)*

One multiple food retailer that participated cannot and does not want to receive more than one delivery vehicle at a time at their premises. To prevent this happening the retailer has put in place an agreement with freight transport companies and their drivers, so that the driver will stop their vehicle a few miles before reaching the shop and using radio telephones will telephone their transport company’s depot to tell them that they are close to the shop. The depot then phones the shop to find out if the off-street loading bay is free and then phones the driver back to either tell them to proceed to the shop to make the delivery or wait for an agreed amount of time in a suitable parking space.

5.5.6 Signing and checking for goods and services

Some premises insist on thoroughly checking the goods delivered before allowing the driver to depart. In some cases reported to us only one person on the premises is authorised to check goods and if they are occupied with another task at the time of the delivery then the driver has to wait and this obviously causes delay to the freight operation. In the case of service companies, the engineer/service personnel often require the appropriate person from the premises to show them the problem or work required; if that person is engaged in some other activity when they arrive, or is not on-site at the premises, this can cause them to wait or even sometimes to call back at another time. This can also cause them significant parking problems if their vehicle has a limited time for unloading/parking or is illegally parked. Obtaining signatures for deliveries and servicing performed at the premises can also cause problems for freight vehicle drivers and service staff. In general from the discussions about these matter it would appear that the larger the premises, the greater these problems.

The following comments were made about finding the right person to receive, check and sign for deliveries:

> "On bulk deliveries of, say, 80 parcels there is no time to check everything...Really every parcel/number should be checked by the retailer to make sure that they have signed for the correct number of parcels. The retailer may quickly count the parcels in tens, but any problems are more likely to be reported the following day when the driver comes in. But in some places the shop might insist on counting every single parcel, for example in Enfield we have a customer who counts every single parcel and the driver is there for 1 hour 20 minutes. And not only do they count them they lay them out in consignments (i.e. shipments from different suppliers) and the driver has to be present during this, because the retailer won't sign until they have all been checked."
>
> *(Freight transport manager)*

> "There is sometimes an issue about consignments being split (i.e. receiving an order in different deliveries). This is a real problem for the receiving staff at the shop. We wouldn't lay everything out and count it and delay the driver for hours, but I can understand receivers doing this because if you've signed for it and you don't spot it immediately, by the time you get your claim in (i.e. report the problem) it can be too late and you've taken a loss on product because you never actually received it."
>
> *(Retail manager)*

> "Some people will simply sign for a pallet unchecked but others like to open it all up and check it all and sign for individual items. In some cases you have to transfer everything from one pallet to another for the customer and this may take you an hour or an hour and a half".
>
> *(Freight transport manager)*

> "In the case of (company name) they can request a delivery as an emergency and then when you arrive at their premises you have to wait for up to two hours in a queue to unload, with the queue building up behind you all the time. When you unload they'll check every item and if anything is missing they'll insist you take the entire pallet away. Often customers reject pallets if any goods on it are damaged, but often the damaged has occurred higher up the supply chain by say a fork lift driver and has nothing to do with the driver but the customer still refuses to accept it. This then causes problems for the driver especially if he is on a multi-drop round or making collections as well".
>
> *(Goods vehicle driver)*

Several companies operating freight transport and service vehicles told us that they encounter the problem of no-one being present at the receiver's premises when they arrive whereas they had expected someone to be there to receive the goods and check and sign for them. In most cases this results in the driver/engineer having to return later to try to make the delivery or perform the service again.

The following question and answer demonstrate the time pressures that transport companies performing urban multi-drop rounds are facing:

> "Do you encounter many instances of not being able to make the delivery when the driver/vehicle arrives, because there is no one present to receive it or the timing isn't convenient for the retailer?"
>
> *(Facilitator)*

> "Yes we do. We are on time limits to make deliveries and perform rounds. So if there is any problem with one delivery the driver has to forego the delivery at that premises and drive onto the next delivery. If it is a bulk delivery the driver doesn't really want to take these all back to base and cause an administration nightmare at the base, so the driver

> will usually attempt to make the delivery to the premises again in the afternoon. But this is the exception rather than the norm".
>
> *(Freight transport manager)*

All the transport companies interviewed told us that most receivers will sign without thoroughly checking the packages (they usually count the number of packages and check this against the number on the delivery note). However some receivers, albeit a small number, will want to check each individual package against the delivery note.

The following comments were made about finding the right person to explain servicing requirements and sign for servicing carried out:

> "It can be difficult to actually find the premises. Or when you are on the premises no-one knows about the (servicing) work".
>
> *(Service engineer)*

> "Our customers phone the call centre to report a problem and the centre take the name of the caller so that the engineer knows who to ask for when they arrive to do the work. However they often find that when they arrive at the customer that the person isn't at work on that day and no-one else knows which machine has gone wrong, what's wrong with it etc. and then someone will say, "oh no we haven't had a problem with it today so you say `oh fine thank you very much and you go outside and they've ticketed the car!" This type of confusion can waste a lot of time. The call centre system is a great system if it works but it doesn't always work. The name you are provided with doesn't necessarily get you to the point of contact so you can waste a lot of time faffing about trying to find the person, the machine, whatever. They say time's money, its alright if you've got somewhere to park but if you haven't got somewhere to park you're invariably rushing in and trying to rush something and it doesn't work that way. You end up supposedly repairing it and disappearing and it breaking down fairly swiftly afterwards. From (name of engineer's company) point of view they want you to fix them and they remain fixed but it's not always possible when you're in the city centre where you're on a half hour parking bay and you need the car fairly close to repair the machine".
>
> *(Photocopy engineer)*

> "You often turn up at 8 am and the person you need to speak to doesn't turn up until 9 am. "Leaks are okay 'cos everyone knows about them. But it might be a boiler. There might be three boilers and only one of them is working but nobody knows until the man who actually rung you gets in".
>
> *(Plumber)*

The following exchange took place during a discussion group session held at the University of Westminster:

> "Say when we came to the building this evening. Your doorman made us wait for 10-20 minutes because he didn't know who we were, where we were supposed to be going. We could actually read the letter upside down, back to front on his desk and we were saying we're going to that."
>
> *(Service company manager)*

> "That's what we did as well".
>
> *(Manager from supplier company that makes deliveries)*

> "He made two phone calls and said "they're both on voicemail, I can't get anybody, wait there."
>
> *(Service company manager)*

> "And they were going to do it again when we got there."
>
> *(Service engineer)*

> "Now if my engineers come to do a job not only has he parked his vehicle outside waiting, he also often can't find the person who wants him to do the job at the premises".
>
> *(Service company manager)*

> "It's alright knocking on a little old lady's front door, but come to any large building in the West End or the City and you'll have the same problem."
>
> *(Service engineer)*

Some service companies that we interviewed told us that while finding the person at the customer's premises who reported the service problem can be difficult, their engineers usually have sufficient information to carry on with the job even if they cannot locate this person. Some service companies told us of rare instances when their engineers have carried on with the work despite not being able to locate the person who reported the problem and have ended up performing the service on the wrong piece of equipment or infrastructure. Fortunately this problem does not seem to occur frequently.

5.5.7 Receivers requiring deliveries to be made to named person at their desks

Several transport companies and suppliers operating their own transport vehicles informed us that some of their customers and receivers are now requesting that the driver makes the delivery to the right person in the right department in a premises, rather than simply making the delivery to someone at the back or front door. This can involve the driver in walking around the building trying to find the right person and causes delays.

The following comments were made by a transport manager from a stationery supplier:

> "We operate desk to desk delivery services, whereby we actually deliver to a person in an office at their desk. A driver can be in a single building for as long as couple of hours. We do Universities for instance.....The business is getting more and more competitive. And because of the type of customers we supply we've even got drivers who take stationery out of the boxes and put it on the shelves for the customer. We even have staff working in customers' buildings ordering their stationery for them because they don't have time or want to do it. The customer now is more demanding, they want their goods as soon as possible".

5.5.8 Lack of acceptance of out-of-hours deliveries by receiving premises

As already shown relatively few premises receiving goods and services accept the supply of these services outside of normal working hours at the premises. This reduces the amount of time within which freight transport and service companies have to perform the majority of their work and means that they are trying to travel to and between premises at times of day when the roads are most busy.

In the case of services, it is often necessary for someone to be present at the customer's premises in order to explain the exact nature of the problem as well as to provide access to the premises. For goods collections and deliveries, most receivers do not currently supply keys to the freight transport companies working for them and therefore unless the premises are staffed 24 hours per day this work can only take place during normal working hours. Even if the premises does have staff on site 24 hours per day they still often only accept goods collection and deliveries at set times in the day, as these are dealt with by dedicated staff who are only at work during normal working hours.

> "(My company) will have to think very hard about the times they are prepared to receive deliveries. (My company's) warehouse staff currently work from 9 am to 5.30 pm and they don't currently want anything delivered outside these times. But a lot of the city

centre shops stay open until 8, 9 or 10 pm so there's no real reason why they couldn't receive deliveries at these times."

(Regional manager from retailer)

"Our customers are mostly shops and offices and we have to deliver when they are actually there. There are a few places in London where the premises has security staff present all night and they decide they would prefer deliveries during the night, which we then do for them. And these night deliveries represent no problem to us in terms of traffic and parking".

(Manager from supplier company that makes deliveries)

5.5.9 Gaining access to premises

Some service companies have problem gaining access to the premises to carry out the servicing work. One service company told us that 16% of all trips made to its customers' premises by service engineers resulted in the engineer not being able to gain access. This is often due to the person who knows about the nature of the work to be carried out or the problem not being present on the premises when the engineer arrives. Other reasons for this problem given to us by service companies include: the work to be carried out/problem is reported by a person who permanently works at a different address to the premises where the work is to be carried out and the engineer cannot find anyone who knows about the problem at the premises concerned; people at the premises are on-site, but not ready/available to have engineers there; and no-one is present to let engineer onto the premises. These unsuccessful visits are a waste of resources for the service company, and also increases the number of vehicle trips, mileage, fuel use etc. required per job successfully carried out.

5.5.10 Unhelpful reception staff at receiver's premises

As well as encountering difficulties in locating the right person at the receiving premises, goods vehicle drivers and service engineers sometimes also find that the these staff at the receiving premises are unhelpful and thereby hinder the provision of the goods or service. The following conversation during a discussion group illustrates this point:

"The buyers in the big companies aren't usually the people you're dealing with on the delivery side of things. You deliver to say, a post room or reception area, they just receive. A lot of the people actually receiving are very jobsworthy, and they make you deliver when they want you to, whether it is unreasonable or not. I find some people who receive at our customers very unreasonable."

(Manager from supplier company that makes deliveries)

"Do you mean people in post rooms?"

(Facilitator)

"Yes".

(Manager from supplier company that makes deliveries)

"The people in the post room rule the roost."

(Goods vehicle driver)

5.5.11 Customers asking for more service jobs to be carried out when engineer arrives on-site and consequent trips to vehicle

A couple of service companies mentioned that when their engineers/personnel arrive at a customer's premises to carry out some work, they are asked by the staff at the premises to do other servicing work while they are present. This can result in them having to make additional trips between their vehicle and the premises to get other tools and parts (and the vehicle can be parked some way from premises) and also affects their planned work schedule for the rest of the day.

> "Well the problem with that is they'll place a call on one or two of them and when you get down there you're carrying a case and a computer and a phone. You walk in and you need this bit and that bit so your constantly going backwards and forwards to your car which you parked goodness knows where, retrieving bits which tends to drag your job times out. It would be nice to have the car close because the spares are in the car but invariably you end up parking in a public car park and walking backwards and forwards to get the bits so it does tend to drag the job out".
>
> *(Service engineer)*

5.5.12 Building design and reception facilities

Several building design and goods reception-related issues at receiving premises were identified by freight transport and service companies as causing them difficulties in carrying out their work. These ranged from companies not putting up nameplates at the rear of their premises where goods vehicles access them so that the driver does not know which premises is theirs, to the poor design of shopping centre delivery and service areas resulting in far longer than necessary delivery and travel times from vehicle to premises:

> "Delivering to Castle Mall, which is a brand new area, is an absolute nightmare. If you can find slower lifts anywhere in the country I'd like to see them. The layout is like a rabbit warren with doors and corridors leading to shops and in some cases you have to walk through the pedestrian areas with parcels which doesn't tend to look good. The design is terribly confusing, it's very hard to find your way back to your vehicle if you use the lifts to go up and the stairs to come back down".
>
> *(Goods vehicle driver)*

> "When buildings are designed no-one seems to think about the servicing requirements and the service industry. They design nice offices, nice everything, but they don't think that you're going to need a photocopier, a computer system, and this and that. They don't think about how you're going to get it up five flights of stairs. No-one thinks about these things."
>
> *(Goods vehicle driver)*

> "There aren't forklift trucks at any customer's premises in London you can count those with them on one hand. And the goods need to be taken up ramps kerbs etc. on the way from the vehicle to the customer's premises. You have to use the tail-lift on the vehicle to get the pallet off and then use a pallet truck but you still have to get it up and down ramps, kerbs etc. It's like an obstacle course".
>
> *(Goods vehicle driver)*

> "They slam up these cheap office buildings but they never design them with enough parking space to accommodate the amount of people going there. Well if the people who built these places or the Council who buys them and rents them, stipulates "these are your amount of parking spaces, anybody over this amount of parking spaces is liable for a ticket" and double yellowed the routes completely round the outside you'd solve the problem."
>
> *(Goods vehicle driver)*

Some freight transport companies explained to us that at some premises, one type of delivery has to be made at the backdoor (goods inwards), while another type of delivery at the same premises has to be made at the front door (e.g. a part for the computer in the office). However the driver does not know in advance whether to go to front or back door.

In one discussion group a debate emerged about whether the density of development in central London was simply too high to achieve reliable traffic flow and delivery operations:

> "Why are we still building in central London. Why aren't we building elsewhere instead and sending people out. Why does everyone want to work in London, why are we just clogging the place up? "
>
> *(Goods vehicle driver)*

5.5.13 Lack of customer acceptance of less distribution-intensive products

One bread and confectionery supplier told us that they now have perishable products available that stay fresh for longer due to the development of special packaging and therefore require less frequent replenishment, and therefore less frequent delivery to customer's premises. However they are having trouble persuading their customers (i.e. retailers) to stock these products. Instead their customers prefer to have such products delivered daily to maximise its freshness and so that the product has the maximum possible shelf life (even though these new loaves have a shelf life of up to 10 days). The retailers are apparently aware that their customers tend to pick the freshest product and are therefore concerned that they would be left with the older bread which would become their waste, and hence result in losses for them. Bakers are keen to see this long life bread become popular as it would help reduce the amount of waste, and also reduce transport costs as their customers would not need daily deliveries, but it is proving hard to get customers to change their traditional views about wanting fresh bread.

5.6 Problems of freight transport and service companies' own making

Freight transport and service companies bring several operational problems upon themselves, which cause them to have to work under ever-tighter timescale and constraints, and to have to operate increasing numbers of vehicle trips in the congested urban environment. We have already explored how they tend to offer ever-higher service levels to their customers and receivers so as to retain and increase market share but that this results in increasing pressure on their operations and scheduling. This section examines other problems that are self-imposed.

5.6.1 Pricing systems used by freight transport companies

The pricing systems used by many freight transport companies tend in many cases to reduce the load factors on the vehicles and hence reduce vehicle productivity. This can result in the company needing a greater number of vehicles in their fleet than would be necessary if load factors were higher.

The following pricing strategies and systems offered by some freight transport companies and suppliers operating their own transport vehicles can result in low vehicle load factors:

- Suppliers offering "free" delivery services (i.e. Suppliers not quoting a separate price for transport but simply building this into the price of the product - this hides the transport cost and may encourage customers to order in small quantities as and when needed).
- Suppliers not charging relatively higher prices per unit for small orders and in some cases not imposing minimum order sizes.
- Transport companies and suppliers not charging more for collection and delivery work in very congested urban areas (this would encourage customers to buy their products and transport services more efficiently).
- Suppliers not charging customers penalties for emergency, short notice (usually same day) deliveries (in which the vehicle may have to be despatched with just this order on-board).
- Transport companies and suppliers not charging differential rates for collection and delivery work at different times of day to reflect how difficult it is to perform these services at different times.
- Transport companies and suppliers not reflecting the time taken and difficulty of delivering to a specific premises, street or area into the price charged for transport.
- Transport companies and suppliers not reflecting the distance over which the goods are transported in the price charged (for the transport or the product).

The following comments help to illustrate the problems caused by some pricing policies used:

> "We can pick up a book at (wholesaler in Norwich) and take it to a book shop in Norwich, or we can take it to a book shop in Aberdeen, but it's the same price".
>
> *(Freight transport manager)*

> "The cost of distribution differs in different places but because of the market/pricing systems used this isn't reflected in the price charged for the distribution service. It's an interesting issue because your profitability might be higher in say an airport or a high street mall, or out of town than in a high street store due to distribution costs."
>
> *(Facilitator)*

It is difficult for companies to calculate the actual cost of a particular collection or delivery, and very few if any freight transport operators are able to calculate their costs so as to reflect all the above factors. However by failing to reflect the true cost of collection/delivery work in the price charged, operators are sending out distorted price signals to their customers. This in turn can encourage customers to purchase services that are not economically desirable either to the transport operator or society (or environmentally desirable).

Some service companies are trying to ensure that their service engineers are all multi-skilled so that they can all cope with any type of work they might face. By doing this the number of trips required to successfully complete a job can be reduced (as the first engineer to visit the premises can carry out the work, there is no need to draft in other engineers) and so can the total distance travelled (as the nearest engineer is capable of doing the work). It also gives the service company more flexibility over how they choose to allocate their workforce.

5.6.2 Vehicle fleets selected by companies

Some employees of freight transport companies and suppliers operating their own vehicles for deliveries have informed us that their companies have acquired vehicles that are not ideally suited to the urban transport work they are performing. This has the effect of making the job more difficult and in some cases causing significant delays in making deliveries. Examples of this include using vehicles:

- that are unnecessarily large for the operation and thereby causing drivers problems in terms of manoeuvring and parking;
- that have less than ideal on-board handling equipment which results in longer than necessary unloading times and the potential to drop heavy goods and cause damage and injury.

In such cases, large vehicles are often purchased either so that the company can cope with bigger loads if necessary or, because the purchasing decision is made by a national transport manager who does not fully understand the work that the vehicles have to perform in a specific location and the difficulties and constraints that vehicles face in a particular urban location (such as narrow roads for example).

Having the correct vehicles for the work can help to increase load factors, reduce unloading time, make driving/manoeuvring the vehicle easier (thereby reducing journey time) and can reduce the risk of injury/damage.

5.6.3 Number of freight and service companies competing with each other

It could be argued that the large number of goods suppliers and freight transport companies is an important factor in poor vehicle utilisation and load factors in urban areas. In situations in which many organisations offering similar goods or freight transport services compete for business there is a likelihood that they will all struggle to secure sufficient business to be able to organise efficient delivery patterns with high drop densities. Instead it can result in many vehicles being despatched with less than full loads and performing rounds which involve relatively long distances between each

receiver's premises, thereby resulting in high mileage per tonne delivered, and high fuel consumed per tonne delivered (and other related environmental impacts).

5.6.4 Lack of communication with drivers

A sizeable proportion of the freight transport companies, service companies and suppliers operating their own transport vehicles that participated in the research do not have any means of communicating with the drivers in their vehicles (such as radio or mobile phones, computers etc.). Without such communication it is not possible to reroute vehicles after they have been despatched to make additional collection or deliveries (which if possible can help to reduce necessary trip numbers and improve vehicle load factors), reschedule the planned collection/delivery work if necessary (which can increase the likelihood of vehicle backloading) and can also help to reduce the time taken to perform a delivery or collection round as without in-vehicle communication the driver has to park the vehicle and use a payphone (reducing the time taken to perform the round can help to reduce vehicle fleet requirements).

5.6.5 Drivers/engineers inefficiency

There are instances of the drivers or engineers not working efficiently, and by taking longer than necessary to perform their work this increases the vehicle fleet requirements of the freight transport or service company. One service engineer participating in a group discussion said:

> "We like taking a long time over things anyway. We like to add cogs to the wheel if we possibly can. You get a survey officer going to survey the company, then a planner, then an engineer who'll have a look but who can't do it, then another engineer will have a look but he needs some help. You can keep going back to the same place."
>
> *(Service engineer)*

5.7 Other issues that cause problems

There are several other issues and regulations that also result in freight transport and service companies experiencing transport-related problems.

5.7.1 Food Hygiene and Safety Regulations

Policies and regulations regarding other issues can have an important bearing on the efficiency of freight transport operations. Several companies involved with the food and grocery industry who were interviewed during the research informed us that the Due Diligence regulations have resulted in unloading taking longer than it used to (due to increased checking requirements and the need to close the vehicle doors to maintain temperatures). These regulations also rule out the potential for unattended deliveries (such as night or very early morning deliveries) even if customers wanted it. Also these regulations mean there is little scope for consolidated delivery loads with other products, because certain items cannot be transported on the same vehicle (e.g. eggs and fresh meat) or with other producers' products.

5.7.2 Goods supply problems

Freight transport companies and suppliers performing deliveries also experience problems when those companies supplying products to them or whom they collect from are late in supplying these goods to them. This can lead to delivery vehicles having to be despatched without all the goods required by the receiving premises and then these additional goods having to be delivered to premises later in the day on additional, poorly loaded vehicle rounds.

Also some service companies use courier and express firms to deliver parts to customers' premises. Delays in the delivery of these parts affect the productivity of the engineer if they are waiting at the customer's premises for the delivery, or can lead to unnecessary trips if they return to customer's premises, after having carried out another job, expecting the parts to have been delivered and discover on arrival that they have not yet been delivered.

5.7.3 Nature of products affecting loading and hence trip patterns

Factors such as the fragility of the products to be transported or the risk of contamination from carrying different products can result in the need to perform more vehicle trips than would otherwise have been necessary.

5.7.4 Too much for vehicle to carry in one load

Several freight transport operators have told us that their vehicles perform fixed delivery rounds and, although on most days all the deliveries can be loaded onto the vehicle, there are occasions when the large quantity of goods to be delivered on that day means that it is not possible to get the entire load onto the vehicle. In these instances the vehicle has to return either during or at the end of the round to collect the additional goods, thereby generating an additional, poorly loaded vehicle trip.

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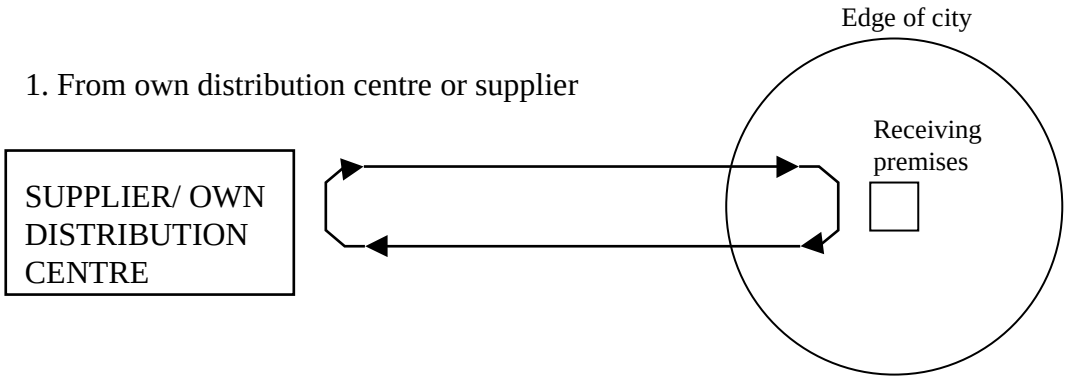
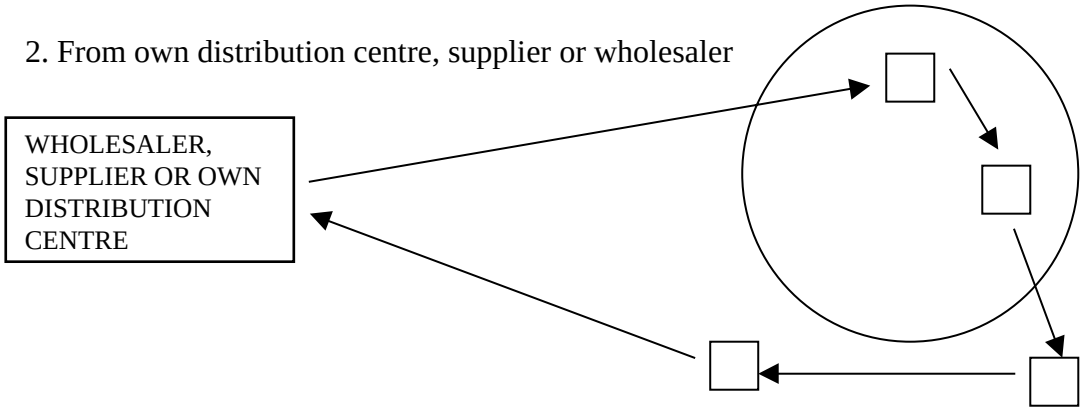
Appendix A: Goods supply trip patterns identified during research

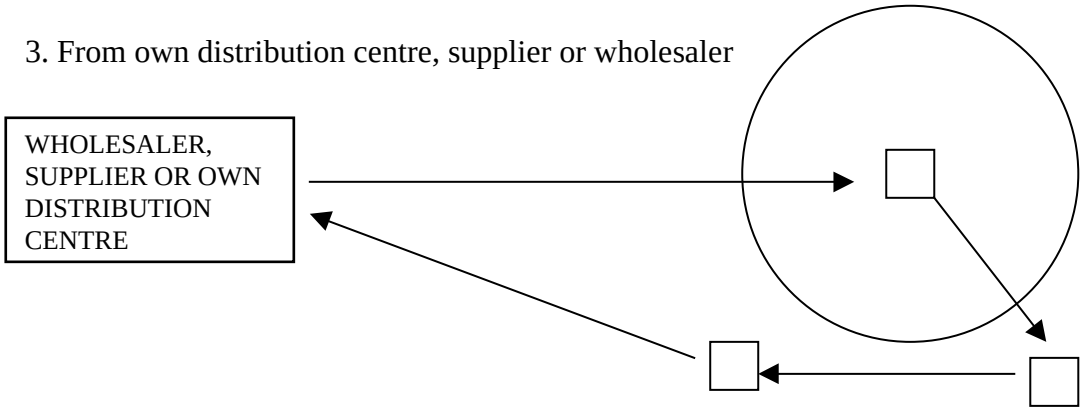
1. From own distribution centre or supplier



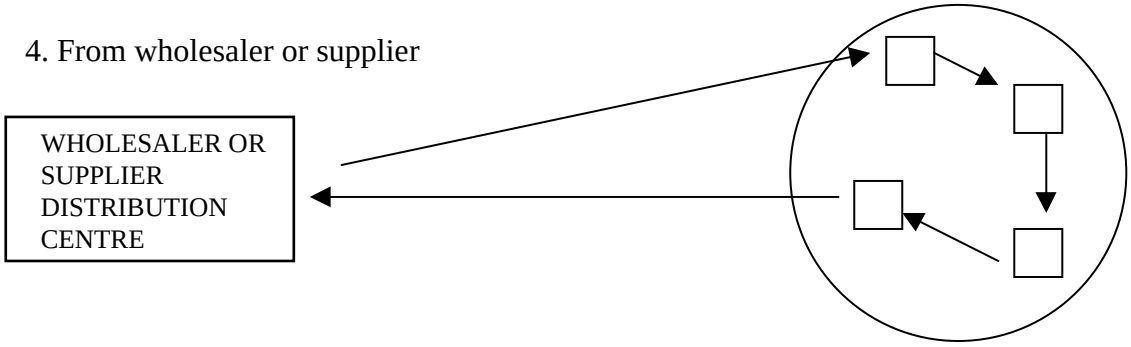
2. From own distribution centre, supplier or wholesaler



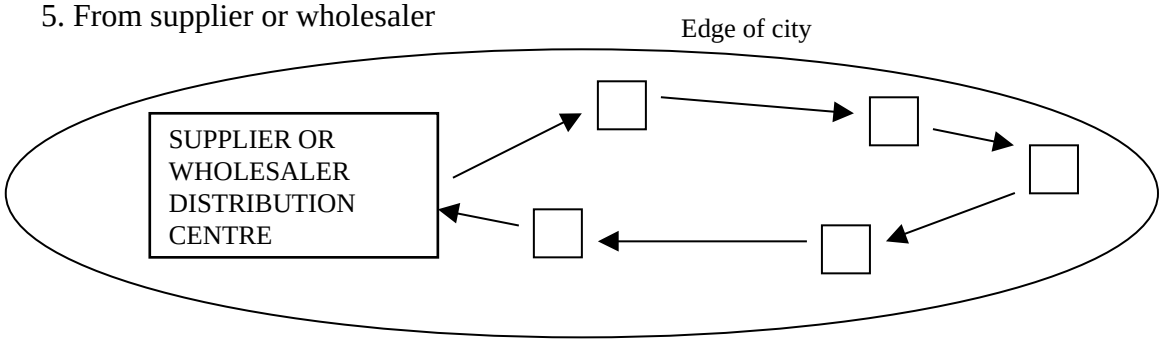
3. From own distribution centre, supplier or wholesaler



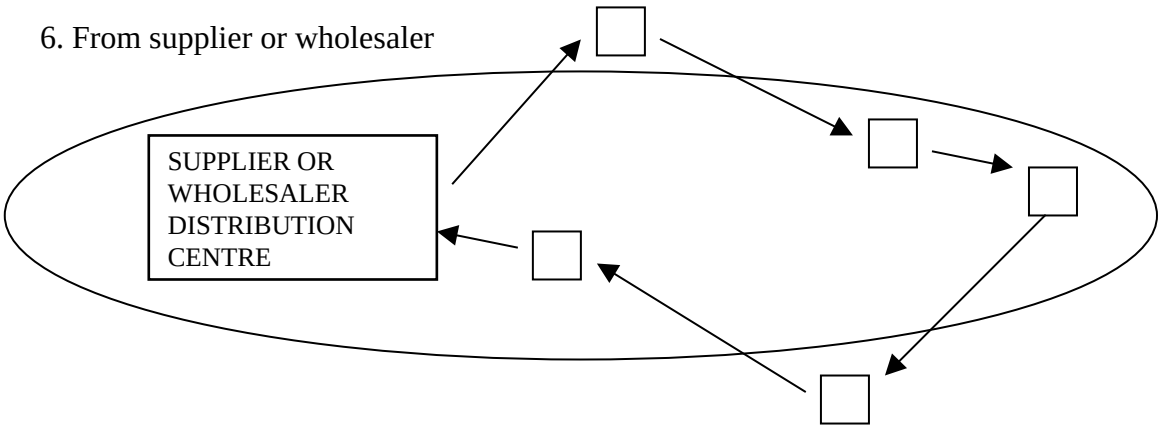
4. From wholesaler or supplier



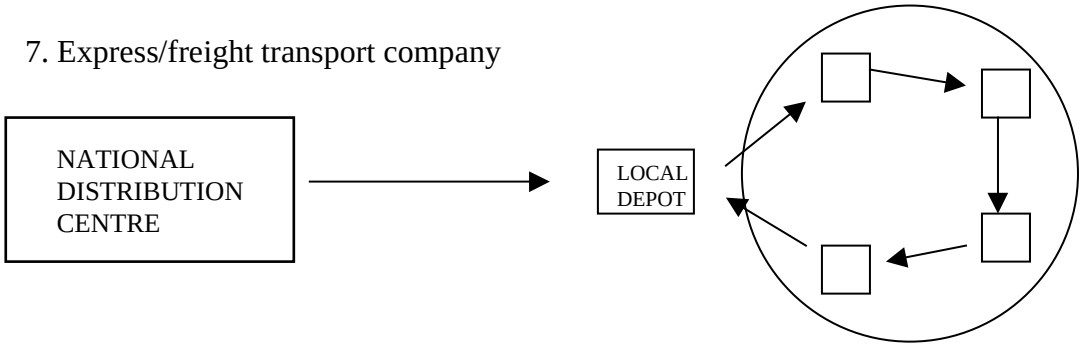
5. From supplier or wholesaler



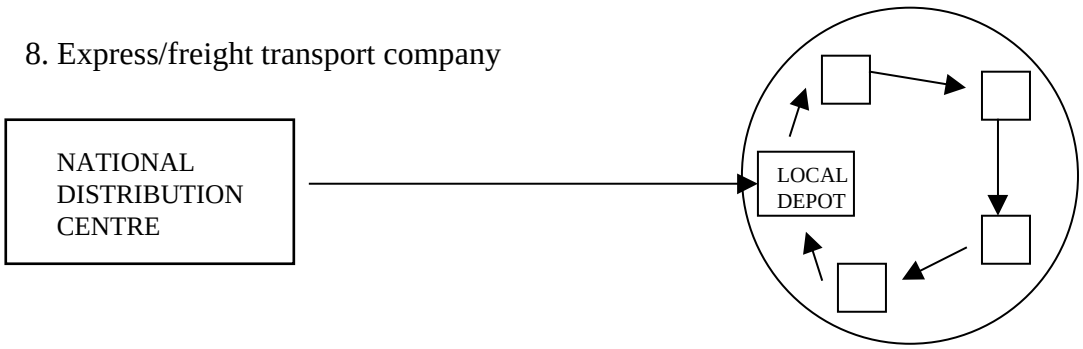
6. From supplier or wholesaler



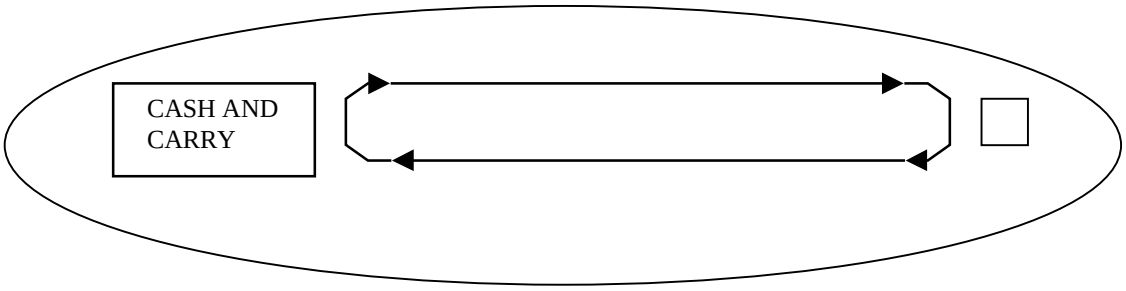
7. Express/freight transport company



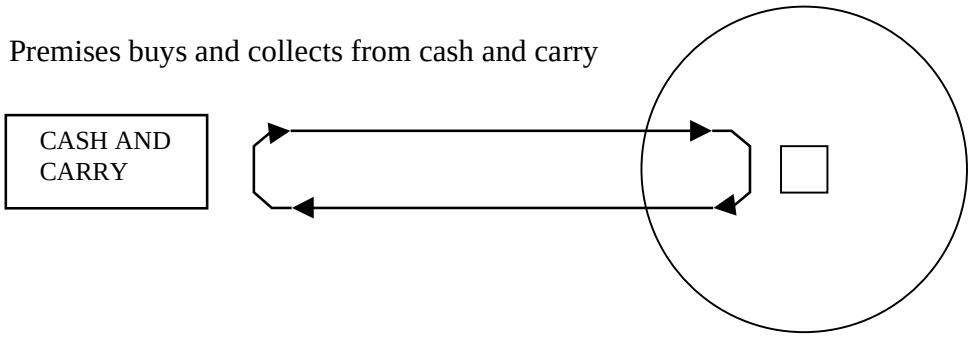
8. Express/freight transport company



9. Premises buys and collects from cash and carry



10. Premises buys and collects from cash and carry



Appendix B: Delivery rounds performed in an urban area.

Newspaper delivery company

Each delivery takes on average 2 minutes to make.

Round 1

Round time: ..... 4.45 am-6.25 am
21 premises delivered to (19 of which were combined collections/deliveries)
(only 4 premises open to receive delivery)
158 parcels delivered, 49 parcels collected
Total round time (time depart depot to return): ..... 109 minutes
Time to drive from depot to first drop: ..... 10 minutes
Time to drive from last drop to depot: ..... 8 minutes
Time elapsed between first and last drop: ..... 91 minutes
Total driving time (inc. to and from depot): ..... 53 minutes
Driving time between first and last drop: ..... 35 minutes
Loading/unloading time at drops: ..... 47 minutes
Total distance travelled: ..... 25 miles

Round 2

Round time: ..... 4.20 am - 6.05 am
16 premises deliveries to (15 of which were combined collections/deliveries)
plus 3 additional collections (only 1 premises open to receive delivery)
135 parcels delivered, 46 parcels collected
Total round time (time depart depot to return): ..... 145 minutes
Time to drive from depot to first drop: ..... 10 minutes
Time to drive from last drop to depot: ..... 20 minutes
Time elapsed between first and last drop: ..... 115 minutes
Total time between first and last drop: ..... 95 minutes
Total distance travelled: ..... 62 miles

Round 3

Round time: ..... 5.10 am - 6.36 am
17 deliveries (15 of which were combined collections/deliveries)
(only 1 premises open to receive delivery)
203 parcels delivered, 45 parcels collected
Total round time (time depart depot to return): ..... 110 minutes
Time to drive from depot to first drop: ..... 1 minutes
Time to drive from last drop to depot: ..... 24 minutes
Time elapsed between first and last drop: ..... 115 minutes
Total driving time (inc. to and from depot): ..... 62 minutes
Driving time between first and last drop: ..... 37 minutes
Loading/unloading time at drops: ..... 25 minutes
Total distance travelled: ..... 29 miles

Express parcel delivery company

City centre delivery round

Round time: ..... 8.20 am-12.50 pm
43 premises delivered to
331 parcels delivered
Vehicle moved 22 times during round (distances ranging from 5 yards to 1 mile)
4 premises have off-street loading bay, 39 made on-street
Total round time (time depart depot to return): ..... 270 minutes
Time to drive from depot to first drop: ..... 20 minutes
Time to drive from last drop to depot: ..... 22 minutes
Time elapsed between first and last drop: ..... 228 minutes
Total distance travelled: ..... 14 miles
Distance from depot to first drop: ..... 4 miles
Distance travelled between drops: ..... 6 miles
Distance from last drop to depot: ..... 4 miles

Postal delivery company

City centre delivery round

Round time: ..... 6.50 am-9.40 am
210 deliveries
2000 pieces of mail delivered
Vehicle moved 4 times during round (less than half a mile in total, 52 addresses delivered to after each move)
Total round time (time depart depot to return): ..... 170 minutes
Time to drive from depot to first drop: ..... 10 minutes
Time to drive from last drop to depot: ..... 10 minutes
Time elapsed between first and last drop: ..... 150 minutes

Vehicle Activity	Percentage of delivery round time accounted for by each activity
travelling on the road	10%
held up in traffic	2%
parked at the roadside with postman present (e.g. completing paperwork, sorting deliveries etc.)	1%
parked at roadside without postman present (i.e. driver away from vehicle making deliveries)	87%
ALL ACTIVITIES	100%

Drinks delivery company

Eastern Norfolk round

Round times: ..... 7.30 am - 1.15 pm
12 premises delivered to
5867 kgs delivered
Delivery time ranges from 7 mins (114 kgs) to 25 mins (1355 kgs)

Total round time (time depart depot to return): ..... 285 minutes
Time to drive from depot to first drop: ..... 15 minutes
Time to drive from last drop to depot: ..... 15 minutes
Time elapsed between first and last drop: ..... 255 minutes
Total driving time (inc. to and from depot): ..... 121 minutes
Driving time between first and last drop: ..... 91 minutes
Loading/unloading time at drops: ..... 164 minutes
Total distance travelled: ..... 106 km

Norwich city round
Round times: ..... 8.00 am - 2.20 pm
16 premises delivered to
8355 kgs delivered
Delivery time ranges from 5 mins (206 kgs) to 45 mins (906 kgs)
Total round time (time depart depot to return): ..... 380 minutes
Time to drive from depot to first drop: ..... 2 minutes
Time to drive from last drop to depot: ..... 5 minutes
Time elapsed between first and last drop: ..... 373 minutes
Total driving time (inc. to and from depot): ..... 80 minutes
Driving time between first and last drop: ..... 73 minutes
Loading/unloading time at drops: ..... 300 minutes
Total distance travelled: ..... 26 km

Norwich city round
Round times: ..... 7.40 am - 1.30 pm
16 premises delivered to
8000 kgs delivered
Delivery time ranges from 5 mins (159 kgs) to 30 mins (2091 kgs)
Total round time (time depart depot to return): ..... 350 minutes
Time to drive from depot to first drop: ..... 10 minutes
Time to drive from last drop to depot: ..... 10 minutes
Time elapsed between first and last drop: ..... 330 minutes
Total driving time (inc. to and from depot): ..... 135 minutes
Driving time between first and last drop: ..... 115 minutes
Loading/unloading time at drops: ..... 215 minutes
Total distance travelled: ..... 36 km

Norwich (inner and and outer urban area) round
Round times: ..... 6.45 am - 1.00 pm
8 premises delivered to
9499 kgs delivered
Delivery time ranges from 10 mins (517 kgs) to 110 mins (3482 kgs)
Total round time (time depart depot to return): ..... 375 minutes
Time to drive from depot to first drop: ..... 15 minutes
Time to drive from last drop to depot: ..... 20 minutes
Time elapsed between first and last drop: ..... 340 minutes
Total driving time (inc. to and from depot): ..... 160 minutes

Driving time between first and last drop: ..... 125 minutes
Loading/unloading time at drops: ..... 215 minutes
Total distance travelled: ..... 104 km

Waste collection company

Two rounds:
(i) Containers: 13 premises collected from on round
(ii) Wheelie bins: 49 premises collected from on round

Wholesale company

Round: 20 premises delivered to (delivering 59 totes, polys and cartons)
Takes place AM and PM