

London Construction Consolidation Centre

Interim Report - May 2007



Transport for London



In partnership with

Bovis Lend Lease



Constructing Excellence



Stanhope



Wilson James



Introduction

In July 2001 the Mayor of London issued the Transport Strategy which was followed up in February 2004 by The London Plan, the Mayor's spatial development strategy. These led to the setting up of the London Sustainable Distribution Partnership (LSDP), and Transport for London's (TfL's) Freight Unit which was given a specific remit to developing the London Freight Plan (LFP).

The LFP is aimed at supporting the sustainable development of London by giving clear guidance and direction to complement the freight proposals set out in the Mayor's Transport Strategy. It sets out in a vision the need to balance increased economic performance with the environment and social impacts of freight transport for London.

The Plan clearly identifies the actions needed and sets out a delivery programme to promote the widespread adoption of best practice throughout the freight industry, and to gain access to the data needed to better understand freight operation and the contribution freight and servicing make to London's economy.

There are four key projects supported by three main work streams. The key projects are:

1. Freight Operators Recognition Scheme;
2. Delivery & Servicing Plans (DSPs);
3. Construction Logistics Plans (CLPs)
4. Freight Information Portal

The three on-going workstreams to support the Project's delivery are:

1. Partnership Development
2. Major Freight Projects
3. Freight data, modelling and best practice

(See Appendix 1)

This report looks at one method of addressing these issues, in particular at minimising the operational freight impacts of construction traffic for building and developments by using Construction Consolidation Centres (CCCs). It also identifies the requirements needed to encourage the introduction of CCCs in London, against the range of current methods and techniques of construction logistics being used.

It reviews both traditional and alternative methods along with the role they can play in reducing the number of construction freight vehicles on the road, improving journey times, improving productivity air quality and finally reducing material waste.

This interim report on the two year pilot study project, the London Construction Consolidation Centre (LCCC) looks at means by which the business case can be determined for the further development of CCCs in London.

The aim of this report is to look at how successful this Project has been to date, what it has achieved and how any similar projects could be taken forward in the future.

The key findings of the LCCC project are shown in the box below:

1. Reduction in the number of construction vehicles entering the City of London, and delivering to the sites being served by the LCCC, of 68%;
2. Reduction in supplier journey times, by going direct to the LCCC rather than driving into the City of London, (including loading / unloading time) of an average of two hours;
3. Achievement of delivery performance of 97% of goods delivered, right first time;
4. Reduction of CO₂ emissions, as a direct result of the reduction in vehicles highlighted above, of c.75%;
5. Reduction of materials waste of up to 15% - reduced damage, less shrinkage;
6. Increased productivity of the labour force by up to 30 minutes per day. On a site employing 500, this is up to 250 hours per day saved; equating to 30 workers if working an 8 hour shift;
7. A lower than expected take up by other construction projects to make use of this facility;

Supporting data is in the Appendix 2.

Contents

1.0	Introduction	5
2.0	Background	6
3.0	Aims and objectives	8
4.0	Methods and techniques of logistics	10
5.0	Methodology	12
6.0	Outputs.....	13
7.0	Actions to increase effectiveness of construction logistics	17
8.0	Barriers & Drivers	21
9.0	Recommendations & next steps.....	23
10.0	Appendix.....	25

1.0 Introduction

As a sector, the construction industry has in some areas changed little in the last 20 or so years but has moved considerably in others. The embracing of compulsory competitive tendering has meant that lowest price, lump sum contracts are the norm, and in order to achieve better cost certainty the industry has looked to the optimisation of the supply chain.

An article in the Harvard Business Review identifies logistics as having the potential “to become the next governing element of strategy, as an inventive way of creating value to customers, and immediate source of savings and important discipline or marketing and a critical extension of flexibility” (Fuller, O’Conner and Rawlinson 1993).

The process of optimising the supply chain happens when organisations look to pursue improvement across its full supply network, using what ever resources are appropriate to give it a competitive advantage. For organisations that have followed this course, one lesson appears to take on special significance, that efficient logistics is an area that offers a sure route for improvement opportunities. In this context logistics can be described as the timely positioning of resources.

Generally speaking full construction logistics is taken to be the detailed process of operating construction sites, i.e. security, welfare, transport management, materials handling, transporting, moving stores, sorting, loading products across the site. By far and away the biggest aspect both in cost and time of this is the delivery of construction materials.

In respect of CCCs, the report will show what the key drivers for their use are, and what the barriers are to their increased uptake. The report will inform TfL’s work in this sector to ensure efforts are focused on the logistics methods where immediate and long-term gains can be made.

For those in the construction industry charged with keeping costs as low as possible, the field of logistics has matured into an important business practice and one that should be placed in the hands of skilled professionals.

The construction logistics revolution started nearly a decade ago fuelled by a few visionaries who insisted on increasing the emphasis on what was typically a subordinated effort. The early advocates predicted that efficient construction logistics could provide levels of earning enhancements of typically 15%. Today the industry is on line to achieve these targets.

Organisations are now learning how to tailor their logistics network to provide new delivery systems for their projects and services. In the process, they have discovered that logistics can be a valuable tool for increasing customer satisfaction.

Furthermore, logistics also has the potential to address the climate change agenda by driving through efficiencies that show CO₂ savings.

2.0 Background

The London Construction Consolidation Centre (LCCC) is a £3.2m two year pilot study October 2005 to October 2007, made up of a partnership between Stanhope PLC, Bovis Lend Lease, Wilson James and Transport for London.

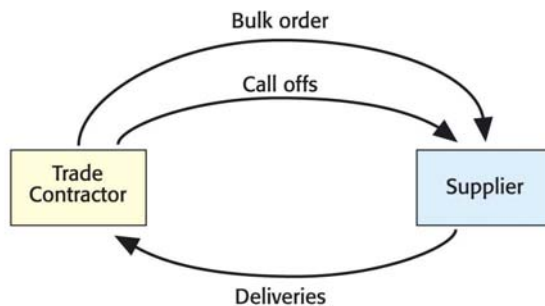
The LCCC operates from a 5000m² facility that can process in excess of 200,000 pallets of construction project materials per annum, based on a dwell time of seven days. The capacity is based on a calculation supplied by the Department for Trade and Industry (DTI).

The Centre is located in South Bermondsey, outside of the Congestion Charging zone, 3 miles from the City of London and just 4 miles from the West End.

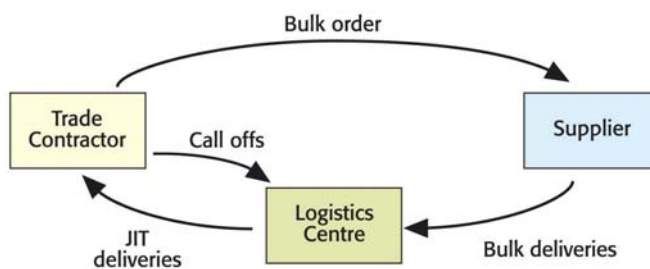
The Centre provides a specialist facility to provide 'just in time' deliveries of construction materials. This process reduces the number of deliveries going to the construction site thus reducing congestion and emissions. The Centre uses Euro III standard vehicles, which are (LEZ compliant engines ahead of the LEZ introduction in 2008) and with the aim to use bio-fuels, makes the Centre's vehicle fleet as environmentally friendly as possible at this moment in time.

The process for the Centre's operation is that Contractors place orders for their material requirements with their suppliers in their normal way, but instruct the delivery to be sent to the LCCC, not the construction site.

Traditional configuration



Configuration with Logistics Centre



Supply chain configuration

Figure 1

Each day the contractors plan their next day's production and material needs and place a delivery order with the LCCC. This is then assembled and delivered within 24 hours, on a vehicle that has consolidated numerous contractors' requests.

The construction industry has a problem of over-ordering and tackling this issue would minimise the amount of waste being sent to landfill.

The LCCC has been able to provide a focus on the amount of waste generated in the construction industry. This waste arises from;

- over-ordering;
- damage;
- packaging;
- off-cuts;
- design changes;
- planning & programme amendments;

Initially the Centre was used to service four main key central London developments; Unilever House , Bow Bells House, 1 Coleman Street and 35 Basinghall Street, all of which have considerable delivery constraints as a result of their central location, and planning restrictions. Such constraints included narrow one way streets and limited operating hours for certain types of work such as deliveries due to the proximity of other businesses.

The Centre has recruited two additional projects in its operating period of approximately 15 months.

The LCCC project has also formed part of a study carried out by Peter Brett Associates on the wider use of Construction Material Consolidation Centres (CMCCs) in the capital.

3.0 Aims and objectives

The key aim of the LCCC was to understand and demonstrate the potential benefits and reduction of impacts that this type of urban freight distribution can provide. It also provides comprehensive, independently verified data to attain a much higher level of knowledge of urban freight distribution of construction supplies.

More significantly the long term goal of the Project was to develop the business case for, and the industry acceptance of, consolidation centres as a concept initially for London, but also for the rest of the UK and other European cities. It should be noted that Stockholm set up such a centre for Sweden's largest ever housing development.

The Projects objectives are:

- To achieve:
 - At least a 40% reduction of local distribution journeys by HGV;
 - 100% reduction of local distribution journeys by HGV;
 - Real time response route management / optimisation (vehicle marshalling, emergency / congestion response);
- Setting up of stakeholder group of industry specialists and other key individuals to capture and disseminate the knowledge gained and promote best practice;
- Associated data for the development of a wider business case study for CMCCs in London;
- Associated data for the development of a financial model to understand the different financial levers available to promote the cost effective operations of CMCCs across London:
 - The economies of scale available to a multi-project operation;
 - Capacity limit on fixed resources (e.g. physical floor space);
 - Establishing model / operational criteria;
 - Share and learn best practice in the construction industry;
 - Identify the costs of not adopting a LCCC approach in London;
- Development of procedures to establish route planning optimisation for construction distribution vehicles. Understanding of route planning issues and possible practicable options;

- Establishment of premises with the capability to lend themselves as a small-scale vocational training facility, such as HGV driving, forklift truck driving, vehicle directing – all within a ‘live’ (but safe and controlled) environment. The training and development of workforce and operative members of the supply chain also to take place at the LCCC to include training on:
 - Planning and logistics;
 - Supplier development;
 - New key performance indicators for LCCC upstream and downstream of the distribution centre;
- Data Capture:
 - General Data and trends;
 - Use of advanced software that includes GPS vehicle tracking and telematics for data capturing purposes and fleet control;
 - Detailed financial data;
 - Conduct surveys / questionnaires to LGV drivers at the LCCC distribution point;
 - Database of construction suppliers covering origins and main details;
- Development of an operational model for construction of the potential Olympic facilities
- Associated data for the understanding of the potential costs and benefits of urban distribution of construction supplies through CMCCs for large scale construction projects like Thames Gateway Development, Thames Gateway Bridge, high-rise buildings, East London Line or even TfL’s own infrastructure projects;
- Development of an operational model to increase security – reduce the risk of terror attack through “known-vehicles”

As a result of the work carried out by Constructing Excellence in relation to this study it became clear that in order to fully achieve the required outputs it would be necessary to address the wider logistics processes (e.g. supply chain, waste, etc) within the construction industry, and so this has been incorporated in this study.

4.0 Methods and techniques of logistics

There are four basic methods of logistics used in the construction industry:

Method	Which is	Used by	Vehicles in daily use in London
<i>Traditional</i>			
Method 1:	The contractor goes to the supplier to pick up materials	About 10% of the industry	Up to 125,000 based on Project ratios
Method 2:	The contractor has materials delivered to site	About 50% of the industry	25,000, based on Project ratios
Method 3:	The contractor uses portfolio analysis to segment ordering processes and call off arrangements	About 35% of the industry	As part of the above number of vehicles
<i>Alternative</i>			
Method 4:	The contractor co-ordinates a start-to-end process and tags information, people and materials flows.	About 5% of the industry	As part of the above number of vehicles

An assessment of the potential impact on waste arising and CO₂ emissions shows that the greatest potential benefits lie in moving the large constructors using method 3 to method 4.

In the alternative method there are seven main techniques that make up the process:

Logistics planning across full supply chain	Constructors have professionally trained logisticians who can plan across the ranging, procurement, storage, distribution and back loading activities
Consolidation Centre	A distribution facility for materials that receives materials, equipment and plant and delivers to the sites in consolidated loads
Just-in-time (JIT)	A service of frequent deliveries in work packs, 'pulled' just in Delivery to the workplace in time for the trade to perform the next task
4th party logistics (4PL)	A service to co-ordinate other logistics providers where there is more than one supply chain
Logistics specialist on site	A service to receive deliveries and distribute materials, equipment and plant - just in time - so that operatives handle materials only when assembling or installing
Demand smoothing	A service to enable the peaks and troughs in demand to be evened out over a period of time
Integrated ICT system across full supply chain	An interoperable information system that tags and tracks materials through take off, manufacture, distribution, assembly and installation.

Various conclusions and recommendations emerge from analysing the potential impact and timeframes of the techniques and assessment of the potential for change in various sectors and segments of the construction industry.

This report is focused on the analysis and assessment of the consolidation centre technique.

5.0 Methodology

The data for this report has been gathered via various methods:

- Desk study
- Driver surveys
- Telematics on the LCCC's vehicles
- Constructing Excellence Logistics Conference
- Site interviews with Trade contractors
- On-line industry survey

Further data on vehicle movements and information of delivery and journey patterns of suppliers and hauliers has been gathered to enable a full picture to be developed in respect of this subject matter.

These processes will provide invaluable, and hitherto un-captured, data that will allow the project to address its stated Aims and Objectives (S. 3.0).

The driver surveys will provide information about reduced journey times and trips into the capital backed up by data gathered in terms of their origins and destinations. Coupled to this is the data captured via the LCCC's own vehicle telematics system.

Further data gathered through surveys with contractors and the industry as a whole will provide valuable information to enable the development of more CCC's to be realised.

6.0 Outputs

6.1 Reduced congestion

The LCCC has reduced the related construction traffic trips to the sites served in central London by approximately 70%.

- Reduction of construction freight-related trips up to 70%);
- Reduction in construction material supplier journey times up to 2 hours per journey by delivering to the LCCC rather than direct to the site (including unloading);
- Reduction in overall transport;
- Over a period of 12 months 2000 commercial vehicles did not enter the Congestion Zone
- Therefore these trip reductions have had a positive effect on congestion by freeing up network capacity.

6.2 Efficiency

On average 95% of the goods, by item, selected by the trade contractor were delivered to site right first time, compared to the industry average of less than 50% (Constructing Excellence). A separate productivity study by BSRIA comparing traditional site practices on sites not using a CCC process, showed a 47% reduction in the time taken to search for the materials on site. This has resulted in:

- Improvement in certainty of supply (100% availability within 24 hours);
- 95% delivered right first time;
- Increase in on-site productivity by 47% compared to non served sites (materials related);
- In relation to labour, the use of logistics to deliver materials to the point required to carry out the work should improve productivity of the operative by ½ hour per day. (There are an average of 1000 workers on the 4 participating sites);
- 15% reduction of materials waste, e.g. shrinkage, damage etc
- Improvements in site safety through reduction of materials and packaging on site
- Increased inventory control and stock visibility
- Tracking the vehicles which allowed for visibility and real-time control (reduction in local distribution journey times, from the LCCC to the sites, of up to 10%)

6.3 Environment Impacts

Typically (as measured by surveys of supplier's drivers) up to two hours was saved on every journey when suppliers were delivering to the LCCC when compared to delivering directly to the site. This, along with the vehicle reduction and efficiencies as outlined in 6.2, provides environmental benefits including:

- Reduction in CO₂ emissions on final distribution runs of up to 80%;
- Reduction in packaging;
- Reduced landfill waste;
- Better fuel efficiency achieved;
- The drivers for improving construction logistics are the traditional drivers of time and cost, but a new driver has emerged – the environment;

6.4 Employment

The Centre has provided the opportunity for 15 local people to gain employment and learn a range of new, and important skills in the logistics arena, in particular in relation to the construction industry

6.5 Road safety, skills and education

Over 50 internal training places have been created and the Centre has looked at whether there is an opportunity to develop a plan to deliver a Centre of Excellence for vocational training and professional learning from businesses, local authorities and people in London.

The current accident statistics for the LCCC operation are that there have been no reportable incidents since the commencement of operations. Given that the LCCC is a two-year pilot it is not possible to say what the ongoing impact CCCs would have on road incidents, but clearly a reduction of 2000 vehicles over a 12-month period is likely to have a positive impact.

6.6 Waste

There is evidence that on a typical construction project about 15% of the material supplied to the site (by value) is not incorporated in the construction or returned and is therefore wasted. The interviews, workshops and online survey show that there is wide agreement that better logistics has a substantial effect on minimising waste from the construction process.

The reasons found for waste arising in construction are:

Reasons	Estimated impact by percentage of value of materials received
Over-ordering	5-10%
Damage	3-25%
Off-cuts	5-20%
Packaging (both inappropriate and poor)	1-5%
Design Change	1-5%
Programming and Planning	1-10%

(Source: Constructing Excellence)

6.7 Business Benefits

Whilst the business benefits to the use of the LCCC are still being fully explored, other research linked to the construction logistics discipline, has identified a 15%(Constructing Excellence) saving, by value, by the construction industry if it were to embrace more effective construction logistics as outlined in 4.0 above, Alternative methods. In order to to achieve this there needs to be a means of extracting the added value that construction logistics brings to the development of construction in the capital.

Other case histories presented to Constructing Excellence have suggested that local authorities can achieve up to 18% reduction in overall costs due to the integration of information systems and communications technology, supplier involvement in the logistics process to the use of impressed stores and vehicles. This alone would demonstrate the business case from embracing logistics. Clearly further work will be needed to identify the business benefits more clearly.

6.8 Contractor feedback

A series of interviews have taken place regarding the operation of the Consolidation Centres by its users. The initial responses suggest that Contractors believe the concept to be good but that there was still a lot to learn. The interviews have shown that the construction projects using the LCCC are managed in a traditional construction project management environment.

6.9 Marketing plan

Over 60 assorted construction companies and Project teams have visited the Centre, but to date, only two have actually signed up to its use. Several projects have shown significant interest but to date no further sites have joined.

The marketing plan will be developed to embrace areas such as procurement, supply chain management, advanced partnering and measurement through the use of open book and shared costs relationships. It should also look at the monetarisation of the benefits and build these in.

6.10 Size and scope of the logistics sector serving construction

Within the UK construction industry the value of distribution only is about £2bn. This does not include modern logistics services such as the use of CCCs that could reduce the amount of waste produced and increase recycling.

Compared with the retail and manufacturing industries (where logistics has already been fine-tuned), the potential benefits of applying modern logistics in construction remain largely untapped. The biggest single barrier to changing this is the lack of understanding of the full logistics processes by the industry.

6.11 Distribution channels

Distribution channels in construction are numerous and the potential for both process and material waste is high. Responsibility for logistics is fragmented due to the contracting nature of the construction industry.

Distribution can be as simple as a single supplier supplying the whole site for one particular product, to as many as 30 different suppliers providing materials to each individual contractor working on the construction site.

Supplies are delivered directly from the manufacturer or via a wholesaler, who may vary in size from SME to multi-national and can be delivered or collected, depending on the need and size of product being ordered.

6.12 Logistics methods used in construction

The methods of logistics can vary according to the sophistication of the constructor and the technology used, though there are seven principles of logistics (4.0 above) that, when applied to construction, show a large gap between best practice in construction and manufacturing or retailing.

Consolidation is an 'easy win' which can impose logistical discipline on a chaotic industry with the broader definition of reducing waste, energy as well as money and human resources wasted through inefficient processes.

The Japanese automotive industry has led the way in defining waste (in terms of process and materials) and designing production systems and managing the whole supply chain to achieve better results more efficiently. These ideas are now widespread in the UK manufacturing industry. Through this rigorous management of the supply chain, manufacturing has been transformed into an industry that is much less wasteful and highly competitive.

The construction industry needs to embrace these ideas in order to progress from dealing with the effects of waste, in its widest sense, to eliminating the causes.

7.0 Actions to increase effectiveness of construction logistics

In order to ensure that the principles of CCCs are taken forward TfL should focus its activities initially on the short-term. To that end the business case and logistics planning are the guiding principles for short-term gains. Longer term development should also be looked at concurrently and the use of Integrated ICT systems and lean processes that are the guiding principles for these should be included.

7.1 Short-term actions

Business Case:

The following table indicates the areas of construction that could be influenced:

Sector	Segment	Value £bn
Public	Housing	0.95
	Schools	1.45
	Health	1.70
	Central Government and Agencies	2.65
Private	Housing	4.30
	Retail	3.37
	Developer	3.00
Total		17.42

(Values are taken from Construction Industry Segmentation & Analysis, AMA Research Ltd. 2006)

In order to influence at least £10bn of procurement, and gain significant benefits in respect of reduced congestion, emissions and improved road safety, TfL should focus on new-build and refurbishment projects in the following sectors and segments:

- Public – housing, schools, health, and central government and agencies including TfL, Police and LFEPA;
- Private – housing and retail;

The focus needs to be on reducing the waste arising from over-ordering, damage, design change, and planning and programming, by encouraging take up of these alternative logistics techniques.

- Logistics planning across the full supply chain;
- Construction Consolidation Centres;
- Construction logistics specialist on site;
- JIT delivery to the workplace;

Of these, logistics planning is the top priority as the need for consolidation and logistics specialist on site will become apparent. The use of CCCs and JIT will follow as a consequence, but this must be specified in the logistics plans.

TfL and Constructing Excellence are preparing a template for Construction Logistics Plans and for consultation during the summer 2007.

Stakeholders:

Focus on stakeholders will show who must be engaged in this process. A two-pronged approach is needed:

- To convince clients about the business case and to demand change from their main contractors;
- To educate the main contractors (and their supply chain) about the business case and techniques that will deliver.

In most cases the recommended entry channel to the stakeholders is via the major main constructors who are working in the target sectors and segments. This is because they are relatively few in number compared to the other stakeholder groups and they lead established supply chains.

The next channel is via their clients and dialogue with clients and main contractors must include contractual terms offered to trade and logistics contractors. The LCCC research revealed:

- Contracts that penalise trade contractors for delays are probably the biggest single cause of over-ordering because the risk of having insufficient materials weighs heavily on trade contractors who build it into tenders;
- Contracts with hauliers usually bear no relation to project risks. When stepping up from general hauliers to construction logistics contractors, the terms of contract should reflect their vital role in delivering projects.

Sectors:

Housing:

- Entry to housing will be easier in the public sector than the private sector (which is three times as large) because the public sector is already adopting change en masse via the Housing Corporation and the Housing Forum, which is part of Constructing Excellence. Once a start is made in public housing, it will be a matter of transferring the experience gained to the private sector where there is a much larger potential gain.

Schools, health and central government:

- These segments are increasingly managed under framework agreements which have led to some consolidation and integration of supply chains. These agreements are usually governed by KPI's that are periodically changed to accommodate emerging business drivers (such as minimising waste).

Retail:

- This segment is dominated by a relatively small number of clients who have already caused big changes in their supply chains, mainly driven by retail needs to minimise stock and costs yet ensure product is always available. This is the only segment where the entry channel should be via the clients, though care should be taken that some of these commercial relationships will make it difficult to realise the potential of waste minimisation, for example sharing the dividends.

Logistics providers:

- There would appear to be a number of logistics providers ready to offer alternative logistics techniques and whilst the number with hands-on experience is limited, many are already providing similar services in other industries. These companies are well placed to manage logistics planning, warehousing and distribution. In the short term it should be noted that they will have a learning curve to go through and understand the construction industry. So in the meantime it will be necessary to nurture the emerging construction logistics specialists listed as 'not ranked in the top 100 logistics companies'.

7.2 Longer-term actions

The second strand of actions should focus on the long term. It should run concurrently with the short-term work and roll out the gains pioneered in the short-term campaign.

The extra alternative techniques that should be encouraged in the medium/long term are:

- Integrated ICT (Information & Communication Technology);
- Demand smoothing;
- 4th Party Logistics;
- Off-site construction;

Integrated ICT:

Of these, the most important is Integrated ICT because it has the power to open communication along, and between, supply chains. Experience in the retail and automotive industries show the importance of ICT in supply chain integration, JIT delivery, and traceability of components from design through manufacture, distribution, assembly, installation, commissioning, operation, refurbishment and eventual demolition. This research has not discovered any full systems in construction but there are partial systems operated by manufacturers and constructors in isolation from each other. Therefore Constructing Excellence recommends that the entry channel should be via those logistics suppliers who are able to offer such systems.`

Demand smoothing:

The construction industry is notorious for its irregular demand cycles. Demand smoothing (including forecasting) is widely practised in the retail and automotive industries, but the patterns of demand in construction are different. Hence, Constructing Excellence recommends TfL would derive the most benefit from demand smoothing via the framework agreements that are in the public and private sectors.

4th Party Logistics (4PL):

4PL is a niche specialist logistics service that co-ordinates various supply chains for one customer (or main contractor). In principle, it is transferable to any major construction project and the need should be apparent in the logistic plan. TfL should look to the logistics specialists with the know-how and technology needed to run a 4PL service when addressing longer term aims.

Off-site construction:

Also known as pre-assembly and off-site assembly, this is not rated in the short-term actions because the decision to construct offsite must start with outline planning and it takes some time to percolate down the supply chain. Nevertheless, results should be expected in large procurements within a couple of years. This is a rapidly emerging 'sub' industry and the recommended entry channel is via the organisation Build Offsite, which is managed by CIRIA.

8.0 Barriers & Drivers

Clearly there are some issues to overcome to be able to encourage and commit further sites to sign up to using the LCCC.

In the first instance it is worth looking at what the barriers are to other organisations getting involved, and then to look at the drivers that are pushing for the change to happen.

8.1 Barriers

In order to understand the barriers it is important to identify what is stopping the industry addressing the logistics issues in their part of the supply chain. This could be due to the relationships that exist in the industry that prevents the embracing of logistics, or a lack of knowledge.

In no particular order, the barriers include:

- invisible costs and no way to extract savings from improved methods;
- lack of strong financial drivers for change;
- lack of understanding of the problem;
- fragmentation of the industry;
- lack of leadership and champions;
- business case not yet demonstrated;
- disconnection between investment and benefit;
- disconnection between designers and the supply chain;
- ineffective ICT systems;
- an immature collaborative culture.

8.2 Drivers

Following identification of barriers it is necessary to look at what the drivers for change are and what logistics practices the construction industry could need to embrace to address these.

In no particular order these include:

- concern for the environment
- increased regulation
- how to make construction a sustainable industry
- concern about loss of materials
- concern about security
- logistics can improve KPI's: programme certainty, productivity, cost
- contractor demand for more efficient processes, for example JIT
- need to move deliveries away from peak times to avoid congestion
- potential to use existing fleets for 'reverse' logistics
- site constraints
- limited potential to recycle or reuse waste.

Finally it is critical to understand what can be done to overcome these barriers to encourage the construction industry to become more engaged and to put more of their Projects through the LCCC.

The way forward is to encompass the whole logistics process and in order to do this the LCCC project needs to learn from the work carried out so far..

9.0 Recommendations & Next Steps

Overall, it is likely that cost will be the biggest driver for change and therefore the LCCC business case needs to be strong. In order to build a robust business case the prime objective should be to understand what areas of construction can be influenced so that real savings can be achieved. The two key areas where this can happen are through the environmental gains (reduced congestion, CO₂ etc) and through the minimisation of process and waste.

Clearly the former is an area that TfL is able to influence, whilst the latter is an area of focus for the construction industry. TfL's sphere of influence is in the public sector and should focus on new-build and refurbishment projects in the following sectors and segments:

- Public – GLA Group;
- Non-GLA group e.g. public housing, schools, health, central and local government and agencies including defence and prisons for example;
- Private – housing and retail.

As a whole the construction industry should address the following (in no particular order):

- Develop the use of Construction Logistics Plans;
- Make logistics planning the norm across the full supply chain;
- Produce a strong, robust business case;
- Make the business case for minimising waste and encourage the reduction in process waste which will offer the best financial incentives;
- Rewards needed to encourage participation;
- Logistics specialists are needed as part of the construction team;
- Regulation and cost (NOT collective 'will') will drive change will create the tipping point;
- Need to develop and publicise new approach to logistics including JIT, RFID (radio frequency identification), lean principles;
- Need for robust ICT systems that enable communication along the supply chain;
- Cost of disposal needs to rise further;
- Need to invest in education in order to increase awareness of the problem in order to be able to understand and improve;
- Large number of small traders will be a particular issue in educating for change;
- Many answers may already be 'out there', especially in best practice, look at transferring these from other industries;

Next Steps

To achieve the actions set out earlier, TfL needs to work in partnership with the relevant bodies across the capital. The objectives for future use of the LCCC are:

- the existence of construction logistics plans implemented through contractual conditions and the Freight Operator Recognition Scheme (FORS) membership will reduce commercial vehicle Penalty Charge Notices (PCN's) at construction sites;
- network reliability will be enhanced by promoting off-peak and out of hours deliveries;
- quality impacts, noticeably reducing carbon dioxide, particulates, and nitrous oxide emissions by using best practice, suitably trained London drivers in less polluting, better maintained vehicles;
- where practical to make off-peak and out of hours deliveries and for suppliers to be required to use best practices to reduce fuel consumption , and therefore emissions;
- fly tipping will be reduced using FORS registered companies for waste contract with construction waste management plans;
- overall number of casualties is reduced by supplier embracing the management of occupational road risk; programme;
- the number of thefts from freight activities on London Roads will be reduced through use of construction logistics plans and minimising trips;
- the number FORS registered companies will be increased through contractual requirement for membership being a contract selection criteria;

To achieve the above objectives TfL must:

- Work in partnership with key sectors, clients, industry and suppliers, in the first instant promoting awareness of its goals , and then be unable to provide professional advice and support that links together the construction process;
- Demonstrate the appropriate leadership in the construction industry .by doing this them, this means it must embrace construction logistics with its own procurement and construction activities in all areas. It will need to be able to provide professional advice and support that links the freight sections , objectives , and that of TfL's construction activity;
- Embrace all stakeholders in this process, be able to advise and be prepared to support the construction client and their procurement initiatives to facilitate better logistics, this means being able to work across organisations to embrace the community, the regulatory bodies, the client, the supply chain including a logistics operations.

10 Appendix

10.1 London Freight Plan:

This document is aimed at supporting the sustainable development of London by giving clear guidance and direction to complement the freight proposals set out in the Mayor's Transport Strategy.

4 Key Projects:

Freight Operators Recognition Scheme

- Promotes two-way engagement with freight operators;
- Promotes the uptake of best practice for fuel efficiency; management of road risk, legal record keeping and reducing penalty charge notices;
- Recognises operators with rewards, encouraging operators to raise standards;
- Set the FORS standard for use as a contract award criteria for servicing, maintenance and supply contracts;
- A simple way for clients to ensure sustainable credentials of freight operators;

Delivery & Servicing Plans (DSPs)

- Promotes and actively encourages the widespread use of plans to minimise the operational freight impacts of premises;
- Achieved through Corporate and Social Responsibility, planning conditions and Network Management Duty;
- Equivalent to Travel Plans for people and monitored in the same way;
- Aimed at reducing delivery trips particularly during peak periods, increasing availability and use of legal loading facilities, and increase the use of freight operators using best practice (FORS) through the use of suitable contract award criteria for servicing, maintenance and supply contracts;
- Specific consideration is given to promoting out of hours deliveries and the use of consolidation to help reduce CO₂, congestion, trips, and promote FORS membership;

Construction Logistics Plans (CLPs)

- Promotes and actively encourages the widespread use of plans to minimise the operational freight impacts of construction traffic for building and developments;
- The plans will show facilities included in the building design that will increase the benefits made possible by DSPs;
- Achieved through Corporate and Social Responsibility, planning conditions and Network Management Duty;

- Equivalent to Travel Plans for people, and monitored in the same way;
- Aimed at reducing delivery trips, particularly during peak periods, reduce lane closures and carriageway restrictions, increase delivery reliability, reduce construction duration, and increase the use of freight operators using best practice (FORS members) through the use of suitable contract award criteria for servicing, maintenance and supply contracts;
- Specific consideration is given to promoting out of hours deliveries and the use of consolidation to help reduce waste, CO₂, congestion, trips, and promote FORS membership;

Freight Information Portal:

- Promotes a single interface between London and freight operators;
- Promotes the integration of systems and acts as a single point of registration for delivering in London, linked to FORS membership;
- A range of systems and services will be made available to all, with commercial advantages offered to FORS members with links to procurement contracts using FORS membership as a selection criteria;
- Aims to reduce operators' administrative costs and improve access to and reliability of freight journey planning in the Capital;

On-going work streams:

Partnership Development:

- Will assist the Plan delivery by building partnerships at pan-London and sub-regional levels to help co-ordination between TfL, businesses, operators and boroughs;
- This will be in line with the Mayor's existing Transport Strategy, including the LSDP and London's sub-regional Freight Quality Partnerships;
- It will help exchange information; share concerns and best practice; help develop new initiatives and agree plans;

Major Freight Projects:

- These will be developed and implemented as they arise, in particular, to help modal change to rail and water;

Freight data, modelling and best practice

- Vital to help build the freight knowledge base and our understanding that the role freight plays in maintaining London as a World Class city;

- It will develop a regional freight modelling capacity and help build business cases for appropriate and timely intervention(s) based on the analysis of best practice case studies;
- Progress towards attainment of the vision for sustainable freight distribution in London will be reported annually against seven sustainable freight Progress Measures that reflect each area of sustainable development;

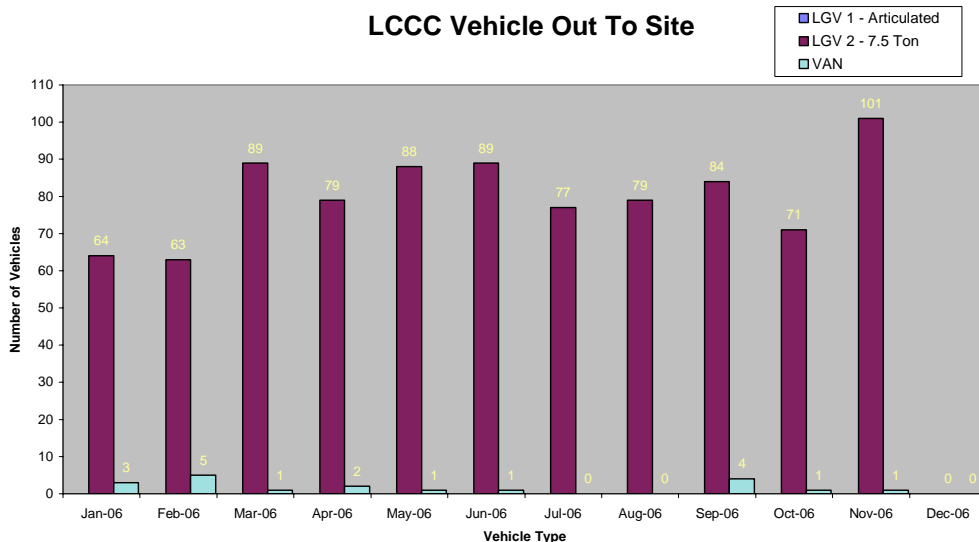
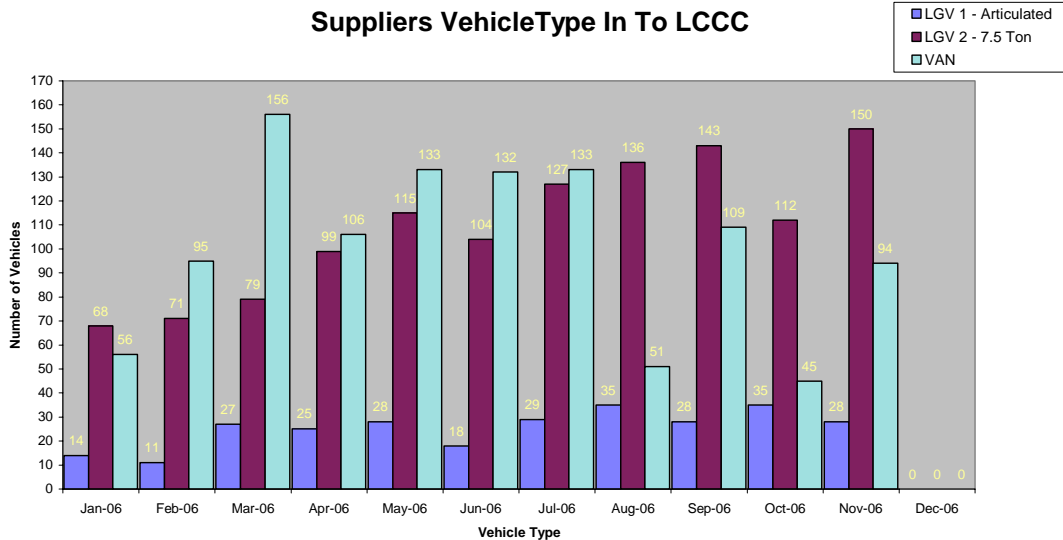
Other drivers for change include:

- Constructing Excellence's Strategic Forum for Construction
- the DTI Report 2004 Consolidating Construction Materials – Transferring the Methodology,
- The Traffic Management Act, 2003.
- The Stern Review Report – The Economics of Climate Change

10.2 Data supporting key findings

Reduction in the number of construction vehicles that would have entered the City of London, and delivered to the sites by 68%

This reduction is measured by comparing the number of vehicles delivering to the LCCC (these would otherwise deliver to the site) to the number of LCCC vehicles that delivered to the site. The charts below show the data collected in 2006. The process also virtually eliminates articulated vehicles entering central London.



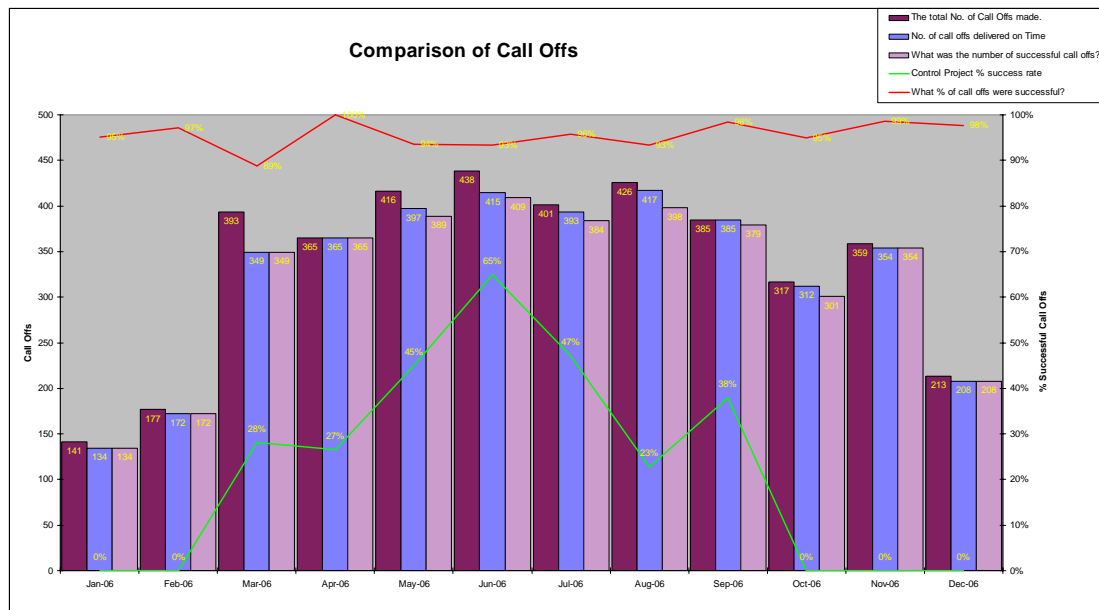
Reduction in supplier journey times, by going direct to the LCCC rather than driving into the City of London, (including loading / unloading time) of an average of two hours

A survey of drivers delivering to the LCCC showed the average journey time reduction is more than two hours, made up of:

- an average of 40 minutes saved in the time to unload an LGV2 lorry at the centre compared to at a central London site that normally takes several hours
- an average of 40 minutes saved in the time to reach the centre compared to a central London site
- an average of 40 minutes saved when leaving the centre of London.

Achievement of delivery performance of 97% of goods delivered, right first time

The KPI “Comparison of call-offs” below shows that the average rate of successful deliveries at Unilever House is typically 97%. In comparison, the average rate in the control site is less than 40%. To be “successful” a delivery must be complete and made within 15 minutes of the agreed delivery time and be right first time.



Reduction of CO₂ emissions, as a direct result of the reduction in vehicles highlighted above, of c.75%

The centre has reduced the amount of CO₂ emitted from the goods vehicles distributing construction materials. CO₂ emissions for a £150 million category B office redevelopment was reduced by 19.3 tonnes which is 73% less than the estimated emissions had deliveries been done in the traditional manner.

Reduction of materials waste of up to 15% - reduced damage, less shrinkage

Evidence from a study that Constructing Excellence has done on the impact of logistics on waste minimisation shows that about 15% of material sent to sites is not actually incorporated in the works. That study also showed that consolidation will cause a significant reduction in this waste by influencing the tendency to over-order and also reduce losses due to damage and theft.

**Increased productivity of the labour force by up to 30 minutes per day:
On a site employing 500, this is up to 250 hours per day saved; equating to 30 workers if working an 8 hour shift**

A study by BSRIA, commissioned by Wilson James, concluded that “the amount of time that the specialist trade contractor workforce spent collecting or waiting for, materials on the two study projects was 4.9% of the working day. On 20 other projects that BSRIA has studied that had no logistics specialist involvement, this figure was 10.1% of the working day. This is a saving of 25 minutes per person per day.”

10.3 Waste minimisation

Mechanisms for minimising waste – potentials and timeframes

Mechanism	Impact	Timeframe
design for manufacture and assembly	High	Medium
off-site assembly	Medium	Medium
use of recycled components	Low	Short
better use of off cuts	High	Short
CAD-CAM	See design for manufacture and assembly	
order what's needed	High	Short
minimise storage	High	Short
tag and track materials	High	Medium
tax empty containers	Low	Short
packaging fit for purpose	Low	Short
logistics 'how-to-do-it' guide	Medium	Short
business case	High	Short
ICT systems	High	Long
logistics plan with KPI's	High	Short
rewards for adherence and delivery	High	Short
understand cost of waste	High	Short
education and training	High	Medium
optimise fit, form and function	High	Medium
stillages and reusable packaging	High	Short

There are several waste minimisation schemes that have been identified through research carried out by Constructing Excellence and WRAP (Waste & Resources Action Programme). WRAP has identified three potential actions to minimise waste:

- reduce the amount of waste created in the chain of construction processes;
- increase the amount of waste that is recycled;
- increase the amount of recycled materials and products that are used in new projects;

As a general rule, civil engineering is less wasteful than building because it already practices JIT (concrete, aggregates, cabling, etc) and it has become adept at recycling waste either within the project or elsewhere. Therefore the recommendations refer mainly to building.