

## Introduction

This document provides an overview of the living lab activities that have taken place in the seven Citylab cities to date (to 30 September 2017).

## Amsterdam

### Who are the main stakeholders?

PostNL, bike manufacturer

### What is the problem being addressed by the City Logistics Living Lab?

City centre road congestion partly caused by highly fragmented last-mile deliveries.

**Lead Partner** - PostNL

### Scoping studies undertaken

#### *i) Floating depots in the canal network for mail delivery*

The initial idea for the first CITYLAB implementation was to ship parcels into the city by a vessel (the floating depot concept) with a mechanism to lift the goods onto the quays. From the quays, parcels are transported by clean vehicles or bikes to the final destination. After some challenging issues with stakeholders, the lack of governmental support and the lack of financial viability, PostNL decided to use conventional vans for these parcels.

#### *ii) Parcel delivery by hybrid-push boats*

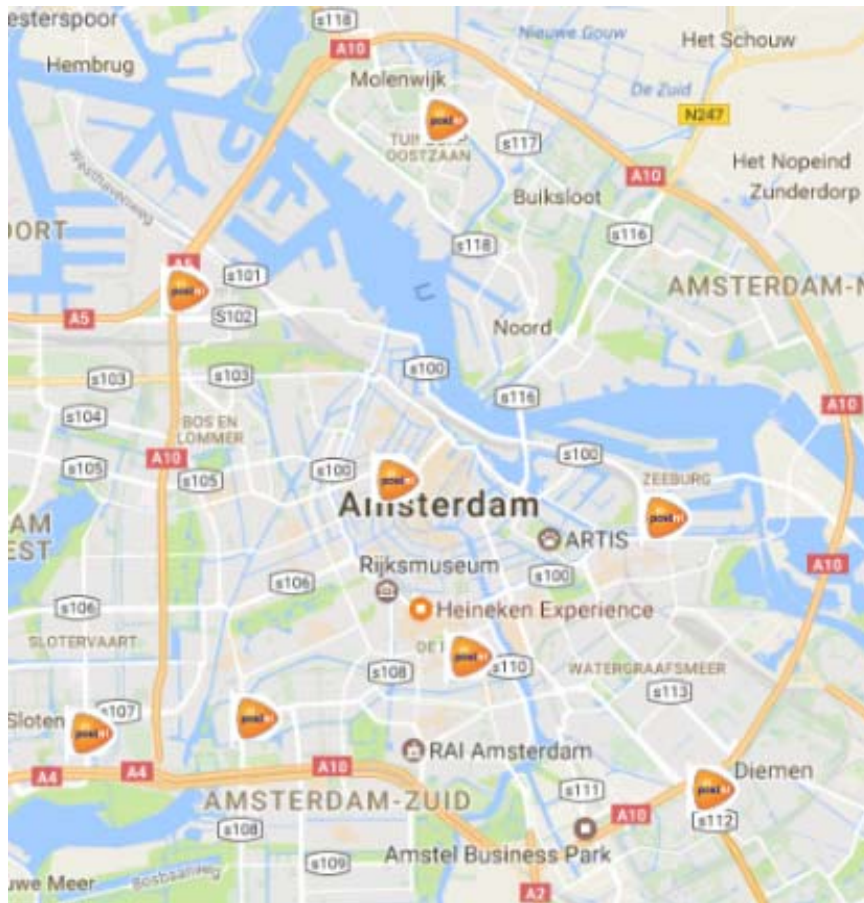
In the second proposed implementation, PostNL considered the possibility to use a floating depot pushed by a hybrid-push boat from where clean vehicles would supply parcels to the many pubs, restaurants and hotels in the 'de Pijp' in Amsterdam. After unsuccessful attempts in finding a launching customer and another negative business case, the floating depot idea with a push boat was no longer considered in the short term.

#### *iii) Using micro-hubs and electric freight bicycles to deliver and collect business mail*

In the third and ultimately adopted idea, PostNL planned to use locations like unused stores as a shared logistical micro-hub with other logistic service providers. From these micro-hubs, located in the city centre, electric freight bicycles will be used to empty public mailboxes and to collect and deliver mail to business clients. This has been implemented since May 2017 with 7 shared micro-hubs in operation which were already being used as, for example, a post office or for mail delivery. Each micro-hub is supplied by a truck twice a day. The first trip includes mail that will be delivered to business clients in the morning. Once the electric freight bicycles deliver all mail to the clients, they return to the micro-hub and are recharged. In the afternoon the electric freight bicycles start a second shift to empty all public mailboxes and to go to all the business clients to pick-up post and parcels to be sent. It is important to know that the collection of mail and parcels from business clients is time constrained and should occur during a time window, specified by the client. The second

trip from the truck in the evening is used to collect all mail from the micro-depots and transport this to a larger depot outside the city centre.

With this implementation, PostNL implemented two main improvements. The first improvement is the use of micro-hubs in the city centre to consolidate the last-mile freight flows to and from the city centre. The second improvement is the use of cycling infrastructure and electric freight bikes in Amsterdam to reduce pressure on the road network and improve their quality of service.



PostNL micro hubs in Amsterdam

## Brussels

### Who are the main stakeholders?

Mobility department of Brussels-Capital Region, Vrije Universiteit Brussel, Procter and Gamble, Febelco (pharmacy distribution) and Parcify (courier company).

### What are the problems being addressed by the City Logistics Living Lab?

A shortage of urban freight transport data for monitoring and assessment purposes.  
Distribution of goods to small independent stores.

**Lead Partner** - Vrije Universiteit Brussel

## Scoping studies undertaken

### ***i) Utilizing On Board Unit data of heavy goods vehicles to gain insight in urban freight transport in the Brussels-Capital Region***

In 2016, Belgium introduced kilometre charging for heavy goods vehicles (HGVs). All vehicles of more than 3.5 tonnes must have a working On Board Unit (OBU) that registers their mileage on Belgian roads. The data generated by these OBUs are used to calculate the charge. This study used a sample of anonymised data to explore how the data could be used to gain insight in urban freight transport in the Brussels-Capital Region. Based on one month of data, we learned that 9,856 HGVs enter, leave or drive within the Brussels-Capital Region on an average working day. The analysis provided us with insights in the typical maximum allowed mass and the Euro class of the vehicles and where they are registered. We know that 70% of these HGVs starts and ends their day outside Brussels, 5% starts outside and end inside, 5% starts inside and ends outside, 14% starts and ends inside Brussels but leaves Brussels throughout the day and 6% stays in Brussels the entire day. We also identified hotspots for parking within Brussels, for entering or leaving Brussels and for loading and unloading.

**Status:** VUB carried out the analysis for the Mobility department of the Brussels-Capital Region. Final output still has to be presented and discussed. Afterwards, the Mobility department will explore how they can further use this type of analysis.

### ***ii) Increasing load factors by utilising spare van capacity***

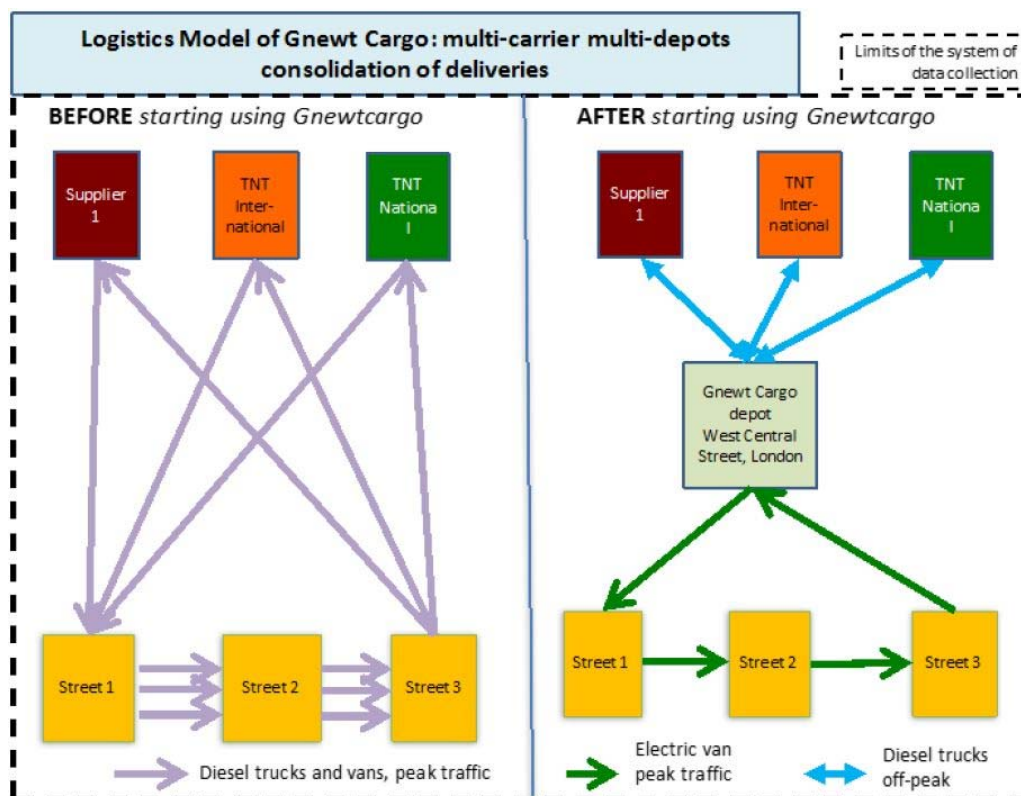
Procter and Gamble (P&G) wants to re-establish direct contact with independent retailers without burdening the urban freight transport system. The idea is to offer their products through an online sales channel and to use spare capacity in vehicles of other service providers to distribute the online sales to the independent retailers. Implementing the solutions revealed that it is possible to use the spare capacity in vans to carry out deliveries without driving additional kilometres and it is possible to integrate the solution in the operations of both P&G and the service driven company (Febelco). We also learned, however, that retailers are not keen to order online and to pay in advance for their products.

**Status:** The implementation was put on hold after six months of trial. P&G also launched the solution in a second Belgian city but found that retailers made the same objections against the solution.

## London

### Motivation and concept

The motivation is to demonstrate how to scale-up the market of electric freight transport by improving business models for clean deliveries with tricycles and other electric vehicles. The concept is explored in collaboration with Transport for London (local authority), TNT (shipper and operator) and Gnewt Cargo (parcels carrier). Gnewt Cargo has several years of experience operating clean vehicles in London and they are aiming at improved efficiency and profitability of their operations. They need to establish the most suitable arrangement of distribution centres, vehicle types and operating patterns. In the CITYLAB London implementation, TNT is increasing its use of Gnewt Cargo as a subcontractor for last mile deliveries in London, while expanding a business model that is acceptable for both parties.



Comparison of new and baseline operations

### Implementation status and next steps

Several issues have been identified during planning of the implementation. Contracts had to be renegotiated so that an existing TNT subcontractor could be replaced by Gnewt Cargo as planned. Also, operational changes that were necessary for the trial to commence took more time than anticipated. One significant challenge was that the existing Gnewt Cargo depots in central London were not sufficiently accessible for the large TNT trucks providing the parcels to Gnewt, and there was therefore a need to explore alternative depot locations. The conclusion was that an alternative TNT depot in Bermondsey was used, and a trial ran in the months August to October 2016. The implementation started with 5 new routes run by Gnewt Cargo via the TNT depot in Bermondsey, and

expanded to 10 new routes in another scenario. Data was collected and evaluated, showing the benefits of the solution compared to the business-as-usual situation. A dissemination event allowing an international audience to learn more about the solution was held in May 2017:

The Workshop "Growth of electric freight and consolidation in urban logistics"

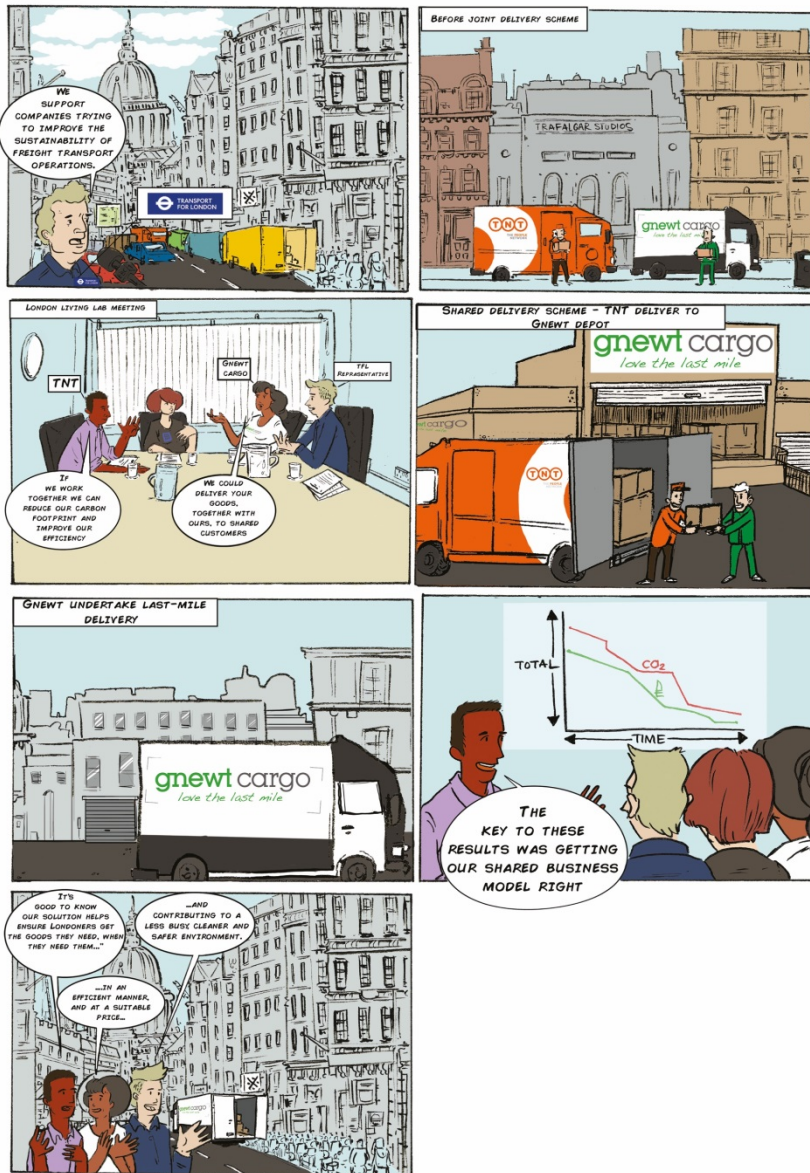
[Link to workshop report](#)

**Cartoon illustrating the concept**





# LONDON LIVING LAB



# Oslo

## The Oslo City Logistics Living Lab

### Who are the main stakeholders?

Steen & Strøm and the Institute of Transport Economics (TOI), with assistance from the City of Oslo's Agency for Urban Environment.

### What is the problem being addressed by the City Logistics Living Lab?

There is a need to reduce the impact of freight movements from and to major traffic generators particularly in urban residential districts. Norway, is in Europe, among the countries with the highest concentration of retail trade located in shopping centres, around 31 per cent (Stugu, 2015). Despite large volumes being delivered to these multi-tenant facilities, the in-house transport is made by the driver. This results in long vehicle dwell times and vehicle queuing in the freight receipt area, which contributes to inefficient use of space and delivery vehicles, increased use of fuel, as well as noise disturbance, traffic congestion, and driver stress levels (Browne et al., 2016).

Common logistics functions mean having a solution for common handling of freight from vehicle arrivals to the individual tenants within the centre (and back, in the case of returns). With such functions, dedicated local staff takes responsibility for the goods when the driver is finished unloading. The goods are then brought to a temporary storage facility or immediately to the shops by the local staff. Hence, the driver and vehicle may leave as soon as the freight has been unloaded and the necessary scans or signatures have been handled. So far, very few successful common logistics functions have been established.

The objective of the Oslo City Logistics Living Lab (OCLL) is twofold: i) To increase the understanding of how logistics operations at shopping centres can be more efficient; and ii) To support planning of common in-house logistics functions in a new shopping centre at Økern in Oslo.

### References:

Browne, M., Allen, J. and Alexander, P. (2016) Business improvement districts in urban freight sustainability initiatives: A case study approach, *Transportation Research Procedia*, 12, pp.450-460.  
Stugu, S. (2015). *Kjøpesentre i Norge: Konsentrert makt* (No. 3). [In Norwegian] Oslo, Norway: De Facto.



Location of Økern shopping centre in the new residential district Hovinbyen in Oslo.

**Lead Partner** - Institute of Transport Economics (TOI)

### **Scoping studies undertaken**

Information and experiences are collected from shopping centres with different solutions relevant for what is planned in the new Økern centre. One role of the Oslo living lab is to study these centres to extract knowledge on how to optimally organise a common logistics function.

i) ***Strømmen: Voluntary common logistics function, tenants' pick-up, changing to compulsory use***

At Strømmen shopping centre in the outskirts of Oslo, a common logistics function is established but not fully utilised. Tenants have to pay to have goods delivered to them, or they have to pick it up themselves. Therefore, most tenants have avoided the common logistics functions and rather had the goods delivered to them by the drivers or picked up the goods up themselves. The stakeholder interviews at Strømmen indicate that 44% of the respondents found the current solution of goods delivery to be satisfactory and saw no need for change. Many of these respondents received the goods at the store by the driver which was the reason why they were satisfied with the current situation.

**Status:** The solution has been further developed and from April 2017, the centre manager introduced a trial making the common logistics functions compulsory.

ii) ***Oslo city: Compulsory common logistics function, tenants' pick-up, in place when centre opened***

This centre has a staffed goods receipt, but the tenants have to bring the goods from the receipt to their stores. Moreover, only the smallest trucks may enter the goods receipt area, as the dimensions of freight vehicles was not properly considered when the centre was designed.

**Status:** The common logistics function at Oslo city has limitations due to size of the goods receipt area and the number of shops using this solution. Thus, it is key to design the common logistics function to accommodate all vehicles and a sufficiently large flow of goods coming to the centre.

iii) ***Emporia: Compulsory logistics function, deliveries to tenants, in place when centre opened***

This centre has an operational common logistics function with a dedicated operator bringing deliveries to the individual tenants. The service is compulsory for most tenants<sup>1</sup> integrated as part of the rent agreements and all the deliveries are done to the in-house logistics service provider (Logistikbolaget AB). Even though some shops/logistic service providers have contracts stating that the driver should deliver the goods to the shops this activity is prohibited. In some exceptions where the driver delivers the goods to the store the goods are registered by Logistikbolaget AB at the goods receipts and an employee from Logistikbolaget AB deliver together with the driver.

The costs of the service are registered for each delivery and invoiced as part of the tenants' rent. Logistikbolaget AB emphasise that the main cost of the services is personnel costs. The variable costs in their business model is a rate based on minutes used to perform the service. The fixed costs are

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<sup>1</sup> Two large grocery stores are exempted, and these have dedicated unloading docks and freight receipt.



covering costs connected to services like: Rent of goods receipt, rent of buffer storage, scanners, pallet jacks, roll containers, registration devices used by the personnel.

The store employee stakeholders at Emporia stated that the two most appreciated benefits were that goods are delivered to the stores and that waste are collected from the stores (61% of the answers). **Reference:** CITYLAB (2017). D5.3. Impact and process assessment of the seven CITYLAB implementations.

**Status:** The common logistics function at Emporia is in operation with a sustainable business model based on fixed and variable costs. It decreases dwell times, is perceived as satisfactory among store employees and is accepted as a common compulsory solution for the shopping centre.

### **The common logistics functions at Økern shopping centre**

Knowledge of design on logistics facilities in shopping centres established during the CITYLAB project supports a new standard for services to be offered, need for infrastructure and how to organise logistics in new shopping centres, i.e. common solutions for in-house logistics, click and collect services, waste management and return logistics.

One challenge in urban logistics is that stakeholders are not aware of the impact they have on efficient and sustainable deliveries. One such group is real estate owners, and it is therefore valuable that Steen & Strøm is exploring how to organise the logistics operations for inbound and outbound flows and waste to the new shopping centre at Økern. The centre is scheduled to open in 2022, and the ongoing phase (2017-2018) and the learning from Emporia, Strømmen and Oslo city is perfect for affecting how the centre is planned and constructed ensuring efficient logistics operations when opening.

### **Further plans of the city of Oslo**

The city of Oslo will establish a car-free inner-city centre by year 2019. As part of this, they are also studying how city logistics operations can be made more efficient. One of the issues they are working with is deliveries to multi-tenant shopping centres. Among the issues they consider, is alternative delivery hours and that each shopping centre should have a person responsible for logistics. The knowledge generated by CITYLAB will therefore be used in this process.

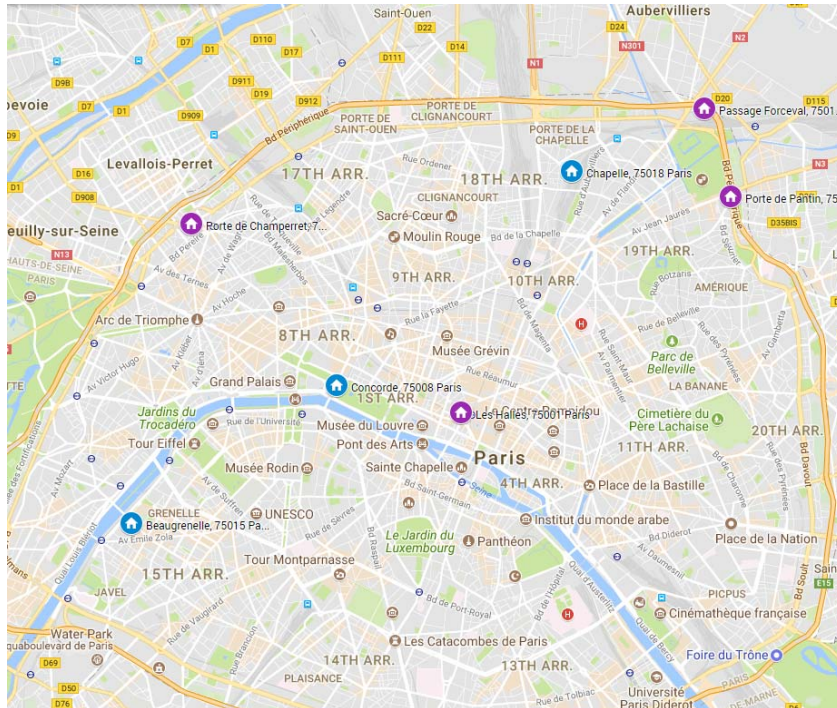
## **Paris**

### **Who are the main stakeholders?**

City of Paris, Sogaris (real estate developer), Chronopost (express carrier), SNCF (rail company)

### **What is the problem being addressed by the City Logistics Living Lab?**

Logistics sprawl is the spatial deconcentration of logistics facilities and distribution centres in metropolitan areas and has been a noticeable trend for the last decades in large cities around the world, including Paris. The two logistics facilities, known as 'logistics hotels', at Chapelle and Beaugrenelle, address this issue by reintroducing logistics terminals in dense urban areas.



**Current logistics hotels in Paris (blue) and sites of future projects (purple)**

### Lead Partners

- CITYLAB research: IFSTTAR
- Logistics hotels projects: Sogaris and City of Paris

### Scoping studies undertaken

#### *i) Creating new urban consolidation and logistics spaces*

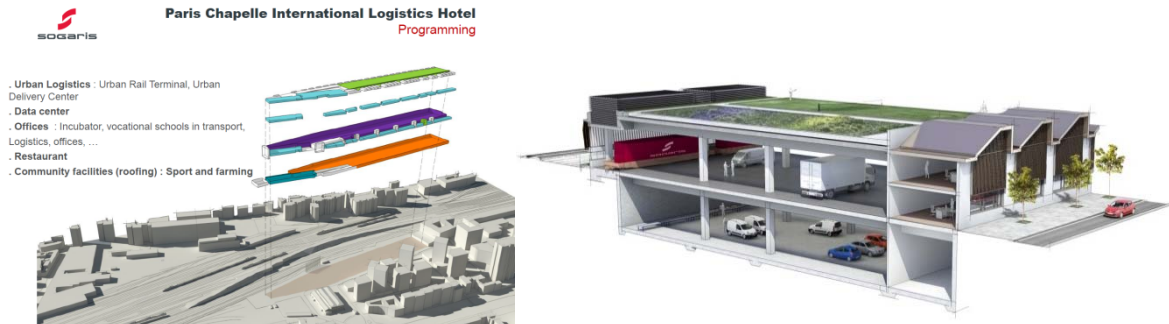
The Chapelle logistics hotel is composed of an urban railway terminal (TFU, Terminal ferroviaire urbain) on the ground level, and an urban distribution space (EUD, Espace urbain de distribution) in the underground level. It is a solution to logistics sprawl as it consolidates goods import to Paris into an urban terminal, reducing the distances needed to cover the 'last mile' deliveries. In addition, clean modes are being used: a rail service to get into the Chapelle terminal, and the use of electric vans for the final deliveries. The rail operation completes the downstream nexus of the logistics infrastructure network of Sogaris in the northern rail network (the upstream is at the platform of Bruyère-sur-Oise, a road-water-rail multimodal platform located 40km north of Paris).

The 10,457 m<sup>2</sup> TFU is at the ground level. The 390 metre long terminal is connected to the Northern rail network and it will propose two short-line urban rail shuttles per day from Dourges and Bruyères-sur-Oise, respectively 200 km and 40 km north of the Ile-de-France region, which can handle 1,470 pallets (600 tons) per day. The ex-ante estimate for the total operation costs is 50 million euro per year.

The EDU is at the Northern part of the underground level. It comprises a 1,000 m<sup>2</sup> delivery area with eight posts accessible for vehicles of 50m<sup>3</sup>, a 9 000 m<sup>2</sup> operational zone and undefined surface for offices and social activities. The EDU is 4.30 metres high.

## Chapelle International logistics hotel concept

(Source: Sogaris)



**Status:** The terminal's construction was completed in July 2017. The logistics firms and start-ups will move in from September 2017, followed by the start of logistics operations.

### *ii) Transforming old industrial site or parking into urban consolidation and delivery centres.*

Beaugrenelle urban distribution space is located in the 15th arrondissement of Paris. The Beaugrenelle Urban Distribution Space was transformed from an old car park and has been in operation since 2013. It is configured as an urban distribution centre (cross dock depot) to serve parcel and express deliveries from the Chronopost company in the South-West Paris and immediate neighbour cities. It is composed of a road logistics terminal of 2 565 m<sup>2</sup> operating parcel and express transport with two delivery areas and one customer reception area open from 9h-19h. Another area of 462 m<sup>2</sup> is dedicated to offices and sanitary/social infrastructure. The logistics hotel also serves as a city office where shippers and receivers can drop off and pick up their parcels and thus provides more flexible and convenient solutions to customers.

#### Organization of the Beaugrenelle urban distribution space

(Source: Sogaris, 2014; Chronopost, 2014, APUR, 2014, sites visits and meetings 2016 and 2017)

##### Beaugrenelle logistics hotel concept



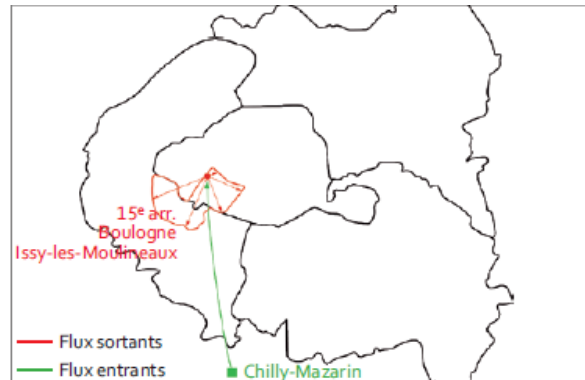
##### Outside view



Inside view



Catchment area



**Status:** The 11 employees and 50 drivers of the sole operator of the terminal Chronopost (express parcel integrator) handle 6 500 parcels per day (distribution and collection) and 3 500 deliveries per day. Chronopost currently uses a fleet of 50 vans (mostly owned by contractors), including 2 electric vans.

### *iii) Switching the parcel delivery fleet to clean vehicles*

The warehouse location has a direct impact on the distance over which goods are moved in urban areas. Compared to the distribution without consolidation, it contributed to the following emissions reduction: 50.4% CO<sub>2</sub>; 52.4% PM; 47.8% SO<sub>2</sub>; 34.3% CO; 34.7% HO; and a reduction of 52 % vehicle kilometres. In 2016, by adding electric vehicles to its fleet, it contributed to an 8% reduction of noise.

**Status:** Chronopost (and its outsourced contractors) has a fleet composed mainly of Euro 5 vans, of which around 20% were electric vehicles at the beginning, with a lesser share today (2017). Tests of using natural gas vehicles are planned.

## Rome

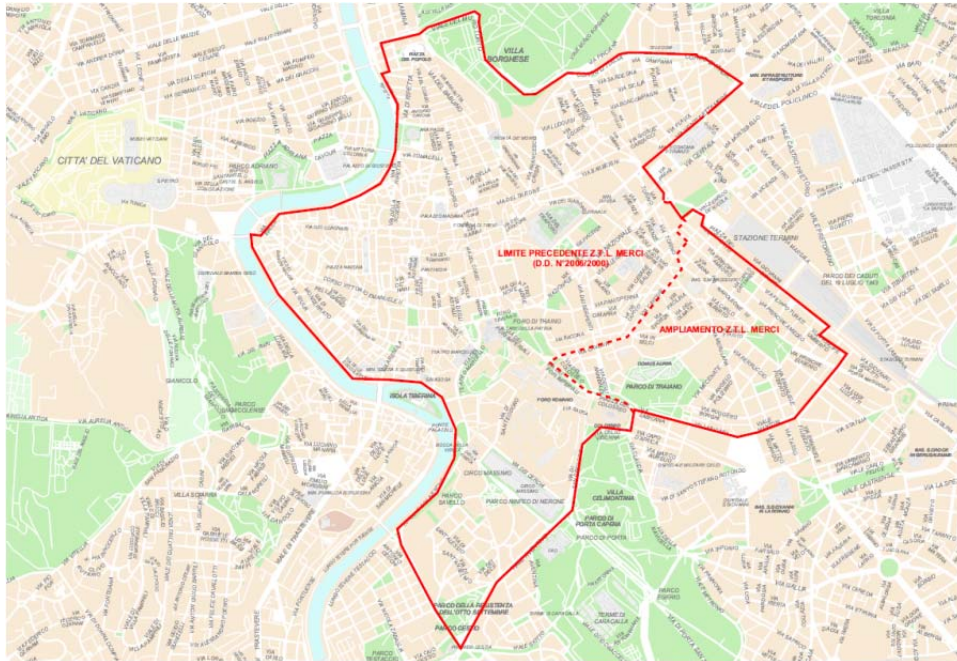
### **Who are the main stakeholders?**

Rome City Council, University of Roma Tre, National Post (Poste Italiane), Mobility Agency of Rome (Roma Servizi per la Mobilità), MeWare, Logistics Operators Associations, Retailers Associations, Citizens Associations.

### **What is the problem being addressed by the City Logistics Living Lab?**

The main problem relates to the improvement/maintenance of accessibility while reducing negative impacts (emissions and pollution), especially in the limited traffic zone (shown on map below). The idea is to provide experiences useful for developing and implementing the coming Sustainable Urban Mobility Plan (SUMP) in Rome.





## Limited Traffic Zone for freight deliveries in Rome

**Lead Partner** - Rome City Council

### Scoping studies undertaken

#### ***i) Jointly increase recycling and reduce transport negative externalities by improving and optimizing waste collection and reverse logistics***

Many countries are facing problems related to landfill capacity and emissions from combustion, leading to an increased attention paid and effort made to reduce, reuse and recycle waste. The need to recycle has implications on logistics, negatively affecting the environment. In fact, door-to-door systems applied to several types of recycling materials imply a large number of trucks and fragmented collection taking place that negatively impact on service efficiency, while using ad-hoc collection points implies costly infrastructure interventions, greater effort and involvement of citizens and additional dedicated trips. The proposed solution concerns an innovative system for integrating direct and reverse logistics flows in the urban area with the aim of improving clean waste collection, so to increase the amount of recycled materials while also minimizing the amount of transport-related CO<sub>2</sub> emissions. The main idea is to involve the national postal operator, already delivering mail/parcels all around the city, in the collection of recycled materials during the same transportation route, and using electric vehicles. This avoids having dedicated collection trips and increases load factors thus reducing congestion and pollution.

**Status:** As a first step, the solution has been tested on a small scale considering a specific material (plastic caps) and covering a relatively small area (around 1 km<sup>2</sup>, involving four department buildings of the University of Roma Tre). The small-scale implementation proved the service to be technically feasible and environmentally sustainable but not financially profitable. The second step is exploring the opportunity to extend the implementation according to the recently passed action plan of the Environmental Department of the city of Rome. The SUMP steering committee has acknowledged



the issue and, together with the Environment Department will address the issue which is linked also to the development of “Re-use Factories” to limit the amount of waste the city of Rome has to deal with.

### ***ii) Loading areas management***

Parking and unloading can be difficult in Rome’s limited traffic zone. Transport providers have either to cruise for a free parking space or double-park illegally implying, from a private perspective, an increase in expenditures due to delays in deliveries, additional fuel consumption, rising driving stress and parking fines and, from a social perspective, a negative contribution to congestion, infrastructure damage, vehicle emissions, greenhouse gases, and noise. The idea is to first map the actual location of loading/unloading bays (last data 1999), investigate freight distributors’ needs in terms of number of loading/unloading bays and then optimize their locations. This line of intervention is relevant for both environmental sustainability and urban freight distribution effectiveness. The number of loading bays and the probability of finding them free are at the core of a deep-rooted problem in Rome. Already back in 1998, the insufficient number of loading bays and the lack of appropriate surveillance with respect to their correct use were indicated as the two most relevant elements hindering an efficient urban freight distribution system.

**Status:** It is in the planning phase of the Living Lab. The Mobility Agency in Rome together with the University of Roma Tre are currently planning all the activities needed to acquire the information useful for optimizing loading/unloading bays in the area considered.

### ***iii) Demand management through off-hour deliveries***

Urban freight traffic regulation has, so far, been based on EU-emission class restrictions and time windows to reduce traffic congestion in the inner city. The most intense freight-related traffic takes place between 08:00 and 10:00 in the morning and between 15:00 and 16:00 in the afternoon. The idea is to identify the most effective levers to stimulate a voluntary off-hour delivery program adoption. As a starting point, three different options have been considered: assisted deliveries, 24hours-deliveries through urban consolidation centres, and unassisted deliveries. The first type implies that staff from the receiving institution is present when deliveries are performed during out-of-peak hours. The second type refers to a special kind of staffed delivery where regular goods delivery at the establishment is performed by small and sustainable trucks coming from an urban consolidation centre during the night. The third type relates to deliveries made by transport providers when shops are closed, through a direct access to the storage area. This policy initiative is currently investigated among the sub-group dedicated to urban freight issues within the steering committee for the development of the SUMP of Rome.

**Status:** It is in the planning phase of the Living Lab. The University of Roma Tre with the support of the Mobility Agency has been performing preliminary meetings with the main identified stakeholders (retailers associations, transport providers associations, citizens associations) to introduce the concept and collect relevant information. This issue is currently under discussion within the steering committee for the development of the SUMP of Rome where also other innovative issues will be discussed.

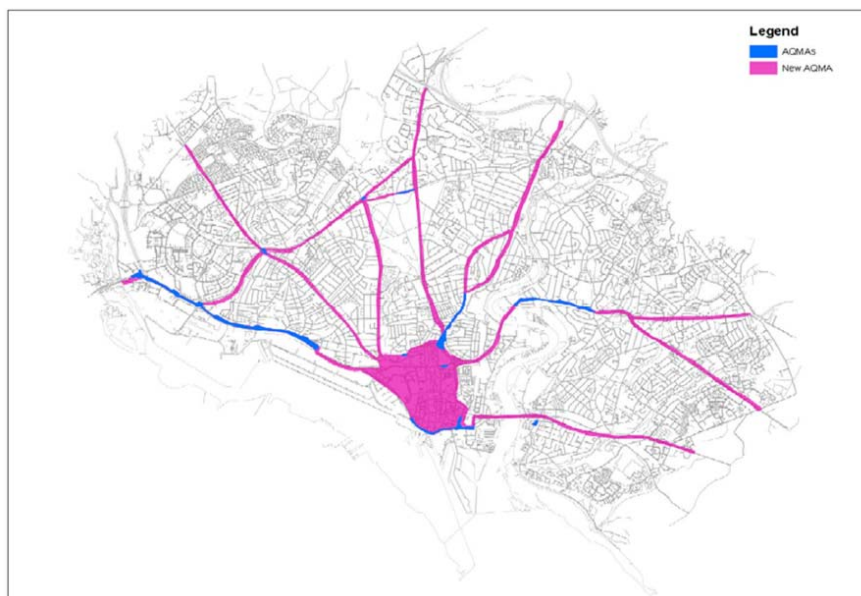
## Southampton

### Who are the main stakeholders?

Southampton City Council, Meachers Global Logistics, University of Southampton, University Hospital Southampton NHS Trust, Isle of Wight NHS Trust.

### What is the problem being addressed by the City Logistics Living Lab?

A need to reduce the environmental impacts of logistics operations in the city of Southampton which have been linked to poor air quality in the centre and along key transport corridors.



Southampton's proposed air quality management areas

**Lead Partner** - Southampton City Council

### Scoping studies undertaken

#### *i) Reducing the impacts of personal deliveries to students in halls of residence*

Young people are significant generators of home deliveries and when clustered in university halls of residence, can generate considerable freight traffic to one location. This study worked with Southampton Solent University and the University of Southampton to explore the potential for consolidating these deliveries using an urban consolidation centre. Data were compiled from three linked sources: a delivery audit of four halls of residence at University of Southampton (5,050 residents); annual package receipt records from Southampton Solent University halls (2,294 residents); and an online shopping survey distributed to Southampton University students (486 responses). The results indicated that over 13,000 courier trips are generated annually, delivering over 4,000m<sup>3</sup> of packages. These could be consolidated onto fewer than 300 vehicles for an annual service cost of approximately £18 per student, reducing congestion, parking infringements and improving air quality. Analysis indicated student acceptance of a consolidated parcel service but operational challenges included enforcement, performance risk, finance and

delivery speed. **Reference:** Cherrett, T., Dickinson, J., McLeod, F., Sit, J., Bailey, G., Whittle, G. (2017). Logistics impacts of student online shopping – Evaluating delivery consolidation to halls of residence. *Transportation Research C: Emerging Technologies*, 78, 111-128.

**Status:** Full-scale trial not undertaken by the universities due to issues with handling same-day deliveries. Micro-consolidation trials using Parcelly ([www.parcelly.com](http://www.parcelly.com)) at the University of Southampton are being discussed as an option for reducing delivery vehicle impacts.



**One of the surveyed halls of residence (City Gateway, Southampton)**

***ii) Consolidating inbound freight to University Hospital Southampton and Isle of Wight NHS Trusts.***

The University of Southampton, with aid from the city council, undertook delivery and service plans to quantify the current freight movements and to identify in what ways consolidation might help the two hospital trusts reduce not only their carbon footprints but also better utilise their internal space.

At Southampton General Hospital, 901 vehicle arrivals were observed Monday to Friday (11-15 May 2015) between the hours of 7am and 6pm, comprising 70% deliveries, 12.3% collections, 16% combined delivery and collection and 1.7% service activity, with peak periods of 11:00-12:00 and 13:00-15:00. The average vehicle dwell time was 20 minutes. Around 71% of vehicles were vans and 18% were rigid 2-axle lorries. From 110 driver interviews it was estimated that their vehicle rounds could have generated 5,274 vehicle-kms, 125 journey time hours and 0.43 tonnes NO<sub>2</sub>. The majority (81%) of these vehicles originated within the Southampton area, of which 67% were NHS transport vehicles operating between sites within the city. 53% of the items being collected and delivered across the various departments were in boxes while 25% were in roll cages. Suggested areas for possible improvement included: some consolidation of pathology

courier services; defining specific bays for specific classes of vehicle; implementing a holding area, queuing or vehicle booking system; considering use of an electronic unattended delivery system (e.g. locker bank) to enable more deliveries to be made out-of-hours.

**Status:** The University Hospital Southampton NHS Trust is planning to use the Southampton Sustainable Distribution Centre, operated by Meachers Global Logistics (MGL), for consolidation and temporary off-site storage, particularly for pharmacy items. MGL have applied for a controlled drugs licence to allow this and are awaiting formal approval.

The Isle of Wight NHS Trust ultimately decided not to proceed with consolidation due to financial pressures and a change of director within the procurement team having other priorities.

### ***iii) Switching some of Southampton City Council's vehicle fleet to electric operation***

As of May 2017, SCC operated a vehicle fleet of 472 vehicles of which 360 were cars or vans. The vast majority of these cars and vans drive less than 60 miles each day and would potentially be suitable for replacement by electric vehicle. The vehicles undertake various services including those relating to animal welfare, waste and recycling, hygiene, libraries and parking. From a sample of 19 vans across the different service areas, average annual emissions per vehicle were estimated as: 1,350 kg CO<sub>2</sub>, 1.9 kg CO, 2.3 kg NO<sub>x</sub>, 2.5 kg HC+NO<sub>x</sub> and 0.2 kg PM. An analysis of charging infrastructure requirements for an initial replacement of 17 vehicles suggested that 8 Single Phase 16A 7kW 2-socket charging points would be needed: 4 at the Civic Centre, 2 at the City Depot, 1 near Ocean Village and 1 near Bitterne, at a cost of around £3,000 each, although SCC would likely wish to consider future expansion plans. Operational cost savings of between 57% and 65% were estimated; to reduce capital expenditure it was recommended that older vehicles be replaced when they reach the end of their useful life rather than costly immediate replacement of newer vehicles. As a result of these findings (from two University of Southampton student projects), SCC are now planning for routine use electric vehicles where appropriate.

**Status:** An on-street trial on electric vehicle performance is currently underway and a further six electric vehicles are due to be procured in the autumn of 2017.