

**CiViTAS**  
Cleaner and better transport in cities

**MIMOSA**

BOLOGNA • FUNCHAL • GDANSK • TALLINN • UTRECHT

## Measure Evaluation Results

### UTR7.1 Construction logistics plan

Patricia Stumpel-Vos (City of Utrecht)

Geisje Hoetjes (City of Utrecht)

Gerard Verrijn Stuart (City of Utrecht)

Date 12.10.2012



THE CIVITAS INITIATIVE  
IS CO-FINANCED BY THE  
EUROPEAN UNION

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

## ***Executive Summary***

Between 2010 and 2019 the central railway station area in Utrecht will be reconstructed. This implies additional traffic volume which is loading the usual traffic flow in the city centre. At the peak of the construction activities, it is estimated that 250 trucks will drive to and from the central railway station area every day. Aware of the complexity of logistical challenges faced by such large-scale construction work, the city of Utrecht wants to prevent traffic congestion due to construction works and negative impacts on the neighbourhood environment in the surroundings of the construction area. In the frame of the measure ‘Construction logistics plan’, a strategy was elaborated with the aims to minimize emissions due to trucks and construction machines in the city and to establish an efficient traffic management for construction vehicles in the city.

The main idea behind this measure was that the construction materials should not be delivered directly to the construction sites in the city centre, but to one central transfer site. From there different materials and deliveries would be combined into complete freights. At the moment when the material is needed, just one truck drives to the construction site at a convenient time. This would prevent building site obstruction caused by half empty vans and trucks with building materials arriving unscheduled. To achieve this, the measure was implemented in four stages:

**Stage 1: Market consultation** (*January 2010 – December 2011*) – The viability of three main measures was investigated and translated into first concepts for implementation: a truck buffer location; a consolidation centre; and parking solutions for construction workers.

**Stage 2: Establishment of a Construction Logistics Plan** (*since January 2012*) – The establishment of a construction logistics plan with a buffer zone and logistic centre taking into account the specific needs of parties involved (construction work companies and developers).

**Stage 3: Development of 4D planning software** (*November 2010 – September 2012*) – developed by the city of Utrecht and recently put into action for the first time. The 4D-software uses geographic information systems and construction work databases to visualise and analyse general accessibility of the city and construction logistics and traffic circulation in a certain area. The resulting map images are used to present all stakeholders with a clear construction logistics and traffic circulation action plan per area and per time window.

**Stage 4: Implementation of a central buffer zone** (*May 2012 – September 2012*) – At the start seven different locations in Utrecht were considered for a possible buffer location. Three locations have been examined in more detail taking into account costs and planning. However, instead of a zone near the construction site, at this moment a part of the area of the construction company has been made available as a buffer zone.

**Stage 5: Implementation of a Construction Logistics Centre** (*May 2012 – End 2018*)- The construction logistics centre (CLC) was implemented near Utrecht Central Station. One of the main construction companies in the Station area is involved in the project, however the CLC wasn’t used within the MIMOSA period yet. The implementation was delayed due to delayed construction works.

Since most of the activities of the measure are currently in implementation, the impact evaluation based on measurement of saved trips and emissions was not conducted. However, the process evaluation delivered some key-results.

<i>Measure title:</i>		<b>Construction Logistics</b>			
<i>City:</i>	<b>Utrecht</b>	<i>Project:</i>	<b>Mimosa</b>	<i>Measure number:</i>	<b>7.1</b>

The main **barrier** encountered was the delay in the construction works of the station themselves which affected the launch of the CLC. During implementation of the measure the following barriers were encountered:

- **Limited problem awareness:** especially among construction companies as freight issues were considered as solvable 'on the job'. Therefore their willingness to participate in a construction logistics plan or use a CLC is low.
- **Reluctance to impose strict regulations:** Reluctance from the city government to impose strict regulations on private companies concerning construction logistics.
- **Delays in building project:** Certain parts of the building project suffered delays and the major part of the flow of (smaller) construction materials was delayed until autumn 2012. The Construction logistic site is especially useful for this type of materials.

The efforts invested to establish a continuous and constructive dialog between the companies involved in the implementation of the CLC appeared as the main **driver** of the measure. The companies were not enthusiast about the idea of a comprehensive logistic concept and the dialog allowed companies to understand the benefits of it and contributed to gain their interest for the concept during the process. The following other drivers stimulated the measure:

- **Approved Air Quality Plan-** The city government recently approved the Air Quality Action plan in which construction logistics is not only important from a congestion and disruption point of view but also in the context of air quality.
- **Two parties agreed on a logistics centre-** One specific constructor and one transport company agreed on installing a construction logistics centre.
- **Proactive attitude-** The construction firms were actively approached and the benefits of cooperation were continuously explained.

Several recommendations should be taking into account for the implementation of similar measures. The elaboration of an overall logistic plan for large-scale construction work is a long-term process and should be implemented step-by-step. The involvement of several diverse parties in the project is crucial hence a constructive cooperation between the stakeholders should be established at the earliest stages of the process. Make visible that a comprehensive logistic plan leads to financial benefits for the stakeholders. Therefore it is recommended to start with pilot projects on a limited scale and integrate it in a long-term vision.

After MIMOSA, the implementation of the measure will carry on. Additional researches were conducted in September 2012 in order to identify the potential of CLC activities extension and to improve the operational organization for the companies involved. Based on the results of these researches and on the lessons learnt from the MIMOSA measure, a construction logistics plan has been developed and is planned to be implemented in the coming years. The Municipality of Utrecht aims to implement further pilot projects in the coming years. The overall framework for the construction work logistic will be defined and a clause on logistic conditions and organization will be integrated in the contract between the builders and the construction companies.

<i>Measure title:</i>	<b>Construction Logistics</b>				
<i>City:</i>	<b>Utrecht</b>	<i>Project:</i>	<b>Mimosa</b>	<i>Measure number:</i>	<b>7.1</b>

## A Introduction

### A1 Objectives

The measure objectives are:

#### High level objectives:

- Improvement of air quality

#### Strategic level objectives:

- Decrease construction traffic emissions in the city.
- More efficient road usage by construction traffic.
- To limit the negative impacts on traffic flow in Utrecht during the major road works and reconstruction of the central railway station area in Utrecht.

#### Measure level specific objectives:

- Decrease disturbance to the urban transport system caused by construction works traffic.
- Increase efficiency of construction works (e.g. shorter waiting times for vehicles unloading at construction sites; less storage space needed at construction site, more equal supply etc.)
- Decrease PM10, NO<sub>x</sub> and CO<sub>2</sub> construction work traffic emissions through a 20% decrease in construction traffic

### A2 Description

Between 2010 and 2019 the central railway station area in Utrecht will be reconstructed (see figure 1 and 2). This means that infrastructural, and other, improvements will be conducted. Altogether this will result in large construction work traffic flows that will also interact with each other. At the peak of the construction activities, around 250 trucks will drive to and from the central railway station area every day.

The big impact of this traffic on the city, and also on the progress of the construction projects themselves, required a coordinated approach to prevent traffic jams. Therefore it is important to level out the peaks in construction work traffic during the day.

There is not enough space in the central railway station to handle (approximately) the 250 trucks that will drive to and from the central railway station area every day as well as the many more construction workers that travel(led) to the construction site(s) by car. A possibility was created to manage the construction traffic in and out the station area in a regulated way. The city could offer areas where trucks and construction workers' private cars could (temporarily) park at a location in the vicinity of the main construction area that is available for a long time (preferably the whole duration of the project) and with good and predictable access to the construction site. This is a so-called buffer zone. This would be especially suitable for the first phase of the construction works, when large materials are needed. At the start of building activities there was no buffer zone, but construction workers tried car pooling.

In a later phase of the construction works a consolidation centre for smaller construction materials could be used to bundle the supply to the construction sites, thus improving efficiency. This consolidation centre would be located at the city borders.

<i>Measure title:</i>		<b>Construction Logistics</b>			
<i>City:</i>	<b>Utrecht</b>	<i>Project:</i>	<b>Mimosa</b>	<i>Measure number:</i>	<b>7.1</b>

To limit construction traffic flows a building materials transfer site (the consolidation centre) could combine deliveries of materials (of different building sites or different materials). This would save suppliers waiting at the construction site. Trucks can visit more sites a day and deliveries of different materials could be combined from the transfer site to the construction site in one instead of multiple trucks.

Switching to this different mode of supply is a large logistic operation and an organiser was needed to bring the different parties together. This was the role of the municipality and the chamber of commerce.

**Figure 1: Vredenburg construction site 2011 and 2012**



**Figure 2: Municipality office construction site 2012**



Both the buffer zone and the consolidation centre were based on the idea of a building logistic centre: Bouw Logistiek Centrum Utrecht (BLCU). The idea was that most of the construction materials won't be delivered at the construction sites in the city centre, but at one central transfer site. From there different materials and deliveries would be combined into complete freights. At the right moment just one truck drives to the construction site at a convenient time. This would prevent building site obstruction caused by half empty vans and trucks with building materials arriving unscheduled.

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

Private parties prefer measures that allow a construction project to be carried out in as fast and cheap a way as possible. In the case of construction logistics, so-called 'just-in-time-management' is often applied. This also helps to keep the stock of supplies of building materials on the construction site as small as possible. The accessibility of the construction site is of major importance in this case and all private parties benefit from a site that is as accessible as possible. A central buffer zone and/or consolidation centre could contribute to this.

The motivation for the city to implement logistic measures is to prevent inconvenience for people who live near the construction site or near the construction traffic routes and people who use the public road. In this case this measure aimed to decrease the construction traffic emissions in the city and to achieve more efficient road usage by construction traffic.

In order to manage the different construction logistics the following activities were set-up:

- Establishment and implementation of a construction logistics plan.
- Implementation of a central buffer zone and parking spaces, maybe developing further into a construction logistics consolidation centre.

## B Measure Implementation

### B1 Innovative aspects

The innovative aspects of the measure are:

- **A new organisational arrangement-** until now, optimisation of urban construction logistics has been carried out in situations with only one major contractor. In the situation of Utrecht, there are multiple contractors who are independent from each other, but interdependent since they are operating in the same restricted space. A new organisation of logistics requires an innovative organisational plan.
- **New physical infrastructure solutions-** a central buffer zone for parking construction-works trucks will be implemented and this zone may be developed further into a constructions logistics consolidation centre.

### B2 Research and Technology Development

The following research and technology development activities took place:

**1. Market consultation:** Construction firms and the transport and logistics sector have been consulted about various (already determined) different promising solutions and locations. This resulted in deliverable D.7.1.2.:

#### ***Motivations of the different stakeholders to participate in construction logistics***

- Private parties are mainly interested in measures that help to make the construction project as cheap and fast as possible. Often, logistics are arranged in such a way that materials are stored on site for as little time as possible and are delivered just when needed. This 'just in time' principle is of great importance for the accessibility of the building site. If the Central Station area is difficult to reach, the supplier of materials runs a financial risk because he has a contractual responsibility towards the builder. This risk will (in financial terms) also be

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

transferred from the builder to the contractor (developer). This means that all parties involved benefit from optimal accessibility.

- The motivation of the municipality has to do with their responsibility to keep the city attractive, accessible and liveable. Utrecht wants to minimise the disturbance for a) the surroundings of the construction area, b) the surroundings of the construction routes and c) the users of the public roads. The contractor needs to be made aware of the risks of his project for these areas and he needs to be enabled to optimise his work. The city wants to take a role in guiding and informing the companies that are (re)developing (large) construction areas. One part of doing this is the development of a brochure with the various available construction logistics measures on offer to potential users.

### ***Solutions that Utrecht is implementing (or intends to) and the research that preceded this***

- To optimise Construction logistics, Utrecht determined various concepts for solutions. The first concerns decentralised (temporary) parking locations: trucks can be temporarily parked at a buffer location and construction workers can park their cars at a designated decentralised area. The second solution focuses on transfer locations: clustering or bundling of flows of (smaller) construction materials at a so-called consolidation centre.
- It is expected that the accessibility of construction sites in the centre will be very poor sometimes. Decentralised parking/buffer locations allow trucks to enter the Central Station area in a phased (or predetermined) way. This is especially relevant in the first phase of a construction project, when large materials need to be delivered to the site. In the case of calamities or standstills, trucks can be diverted to this temporary waiting spot. Less time is lost and the building process becomes more efficient. Trucks and construction workers' cars can also be parked there when they are not being used. The buffer location is arranged by the municipality. The locations should preferably be available throughout the project and they do not need many facilities. Utrecht looked in to 7 different options, of which 3 were researched in more detail (costs and design). The preconditions were spaces for a minimum of 25 trucks and 200 parking spaces personnel cars, until 2018.
- Transfer locations require quite a large area which needs to be specifically furnished to make temporary storage or transfer of materials possible. Materials are bundled before they are taken to the construction site in one big load. This increases efficiency of the construction activities, because the same transport can be done in fewer trips. Furthermore, waiting times for construction traffic at the building site decrease and there is less need for storage space on the construction site. Such a transfer location needs to be secure and very accessible.
- Research and discussions with stakeholders revealed some barriers to this solution. As the concept is to be used by different parties the responsibility for the maintenance of the location and for the stored materials will be unclear. A warehouse like this would be best used by one (construction) company at a time, but the costs will then be (too) high and there is insufficient space in/near the centre. A solution would be to create an integrated approach, where an independent party takes care of the logistics at the depot to receive and transfer materials. It needs to be sufficiently large to cover the costs, which will be paid by the (private) stakeholders who committed themselves to this kind of construction logistics management. Many parties need to be involved and the depot should be close to the building site.

Measure title:	<b>Construction Logistics</b>				
City:	<b>Utrecht</b>	Project:	<b>Mimosa</b>	Measure number:	<b>7.1</b>

### ***Utrecht's cooperation with private construction and transport companies***

- In Utrecht's Central Station area, a variety of contractors are working on different projects. They are interdependent since they work in the same area with limited accessibility. The bundling of materials of different parties in one truck to (and also from) the construction site requires much coordination and comprehensive logistic organisation.
- The transport company Hoek, already very active in Utrecht and in its cooperation with the city, has plans that match well with the plans of Utrecht. A Construction Logistics Centre Utrecht (CLCU) could serve as a decentralised collection place for a large part of the construction materials. Transport companies can deliver their materials there at any given time, without getting stuck in the city centre. At the CLCU, the materials are combined and completely full trucks deliver it to the building site at a suitable, pre-agreed, time to the various contractors. Hoek already has the necessary infrastructure (e.g. distribution centre, buffer zone) that would make this possible. The CLCU could be open 24/7, if necessary. The CLCU would also take care of the communication with e.g. the truck drivers and would closely communicate with the various building sites. Building companies could even temporarily second one of their employees to the CLCU. Ideally, construction companies would agree with their suppliers beforehand that they can only deliver their materials through the CLCU.
- The advantages of this concept for the city are that the CLCU delivers materials to the construction site outside of rush hours. This has benefits for traffic safety (e.g. fewer cyclists on the road at those times). It also increases the accessibility of the centre, which increases the traffic flow of other traffic. This in turn improves air quality (indirectly). Furthermore, it is important for Utrecht to stimulate 'the Utrecht model' again, where city and private parties work together to put Utrecht on the map as a sustainable distribution city, just like in the case of the Cargohopper. Utrecht and also the Chamber of Commerce can play a large part in convincing stakeholders of the benefits of these sustainable concepts.

#### The following **lessons were learned**:

- Private parties are often not yet interested if the Construction projects are in a very early stage (before implementation). Furthermore, sometimes the developers do not yet know which construction firms will carry out the future work. Once the construction starts and developers experience logistical problems, they become interested in alternative solutions.
- Project developers do not have much faith in the measure to let workers park their cars in a buffer zone outside the centre. Construction workers often use their own tools, which they need to bring to the construction site.
- Strong advocates for the Consolidation Centre approach are needed – both from the public and the private side. Political support from the municipality, like in Utrecht, is important for this.
- Private parties focus on the financial aspects of the new system. It is important to show evidence of the benefits. It is worth considering including a cost specialist in the team to develop the compelling cost argument on each project.
- Many resist change; they are largely content in following the practices and routines that have served them well in the past. For example, the common practice of 'over-ordering'

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

of materials, just in case, leads to wasted materials. Introducing fundamental changes to working practices in an industry can be challenging and it is difficult to try to influence the entire supply chain in an established industry.

- It is not so easy to really measure and prove the business case. Although people with experience in this sector will intuitively know that significant benefits can be experienced, it is difficult to measure and tie these together in the form of a complete business case. The key issue is to get visibility of changes and measure impacts.
- The standard approach to construction logistics is fragmented, with each contractor, subcontractor and supplier responsible for its own deliveries. This approach requires a different, more holistic way of thinking.
- The increasing environmental awareness and need to deliver improved sustainability impacts, such as reductions in waste and emissions help with the uptake of the Consolidation Centre approach.

2. Another RTD activity took place: an agreement was set up between the municipality and private firms concerning the **concept of a construction logistics plan**. This should lead to a construction logistics plan. The focus was on the traffic flow from the Westside area of Utrecht towards the central railway station area. Various locations in and around this area were examined to be used as central buffer zones for parking trucks in order to facilitate just-in-time delivery, as well as parking of construction workers' private cars. Besides the suitability of these locations creating a consolidation centre was examined, this resulted in deliverable D.7.1.2 the construction logistics plan:

- In an earlier report, seven different locations were identified that could be used as a buffer zone that could accommodate excess trucks and serve as a temporary parking place for both trucks and the private cars of construction personnel. This has now been narrowed down, and the Project Organisation of the Railway Station Area Utrecht (POS) will now be able to create at least 25 spaces for trucks and 200 spaces for cars or minivans until 2018. This is to improve accessibility, quality of life and safety in the centre of Utrecht during the execution of the Masterplan. If POS wishes, it can extend the created parking facilities by renting extra spaces at 2 locations, increasing the amount of parking spaces to around 500. A part of the fair centre in Utrecht can be used if necessary to create another 25 spaces for trucks. These amounts will cover the necessary capacity, as previously defined. POS can offer the parking spaces cost-neutral to the end-users.

### B3 Situation before CIVITAS

For this measure the situation before Civitas (without the reconstruction) is not interesting as before there was no reconstruction and no problem with construction traffic. The problem only starts with the reconstruction and this measure seeks to prevent problems. So it is more about what situation would occur without the measure.

The reconstruction of the central railway station area in Utrecht and the infrastructure result in major construction work traffic flows. This traffic will have major impacts on the city and on the progress of the construction projects themselves. There was not enough space in the central railway station to handle the (approximately) 250 trucks that would drive to and from the central railway station area every day and the many more construction workers that would travel there in their own cars.

Measure title:		Construction Logistics			
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

The construction works traffic would cause a lot of extra disruption on the roads leading to the construction area. There was not enough space available at and around the construction area to facilitate the parking and the handling of construction works vehicles. Parking on the streets was not a solution as this became clear during the pouring of concrete for the Music centre Vredenburg; this caused problems for the environment and also interfered with the regular supply of the city centre.

## B4 Actual implementation of the measure

The measure was implemented in the following stages:

**Stage 1: Market consultation** (*January 2010 – December 2011*) – The viability of three main measures was investigated and translated into first concepts for implementation: a truck buffer location; a consolidation centre; and parking solutions for construction workers. This has resulted in two provisional ideas for locations, one more suitable as buffer location, one suitable for both (also accessible by waterway). Construction firms and the transport and logistics sector were consulted about various different promising solutions and locations. This resulted in deliverable D.7.1.2 February 2010 and is summarised in part B2 of this report.

**Stage 2: Establishment of a Construction Logistics Plan** (*since January 2012*) – The establishment of a construction logistics plan with a buffer zone and logistic centre depended on the interest of the different parties (construction work companies and developers). To establish a construction logistic plan the following actions were taken:

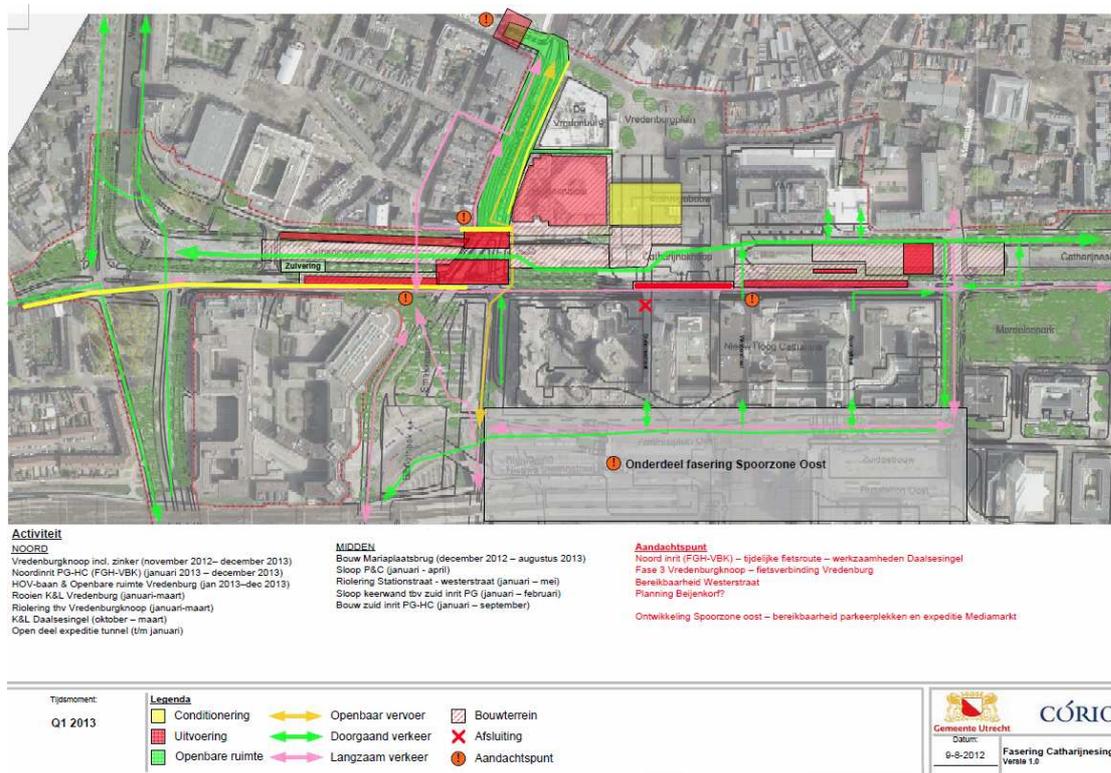
1. Desk-research about the possibilities to use legislation (traffic legislation, tender legislation, environmental legislation) to achieve a construction logistic centre.
2. Two inspiration sessions with different parties and experts involved in construction.
3. Research on construction logistics best practices. In September 2012 research was conducted by the engineering agency DHV ([www.royalhaskoningdhv.com](http://www.royalhaskoningdhv.com)) on the possibilities to continue and implement more building logistics measures in the Station area in Utrecht and how different parties should operate within this. Obstacles, solutions and lessons learned are included. This research will result in recommendations on good construction logistics organisation. This research will be published after this evaluation report. The results will be used to make a plan on how to handle future construction logistics.

**Stage 3: Development of 4D planning software** (*November 2010 – September 2012*) –4D-planning software has been developed by the city of Utrecht and has recently been put into action for the first time. The Central Station Area Project Organisation has implemented a first test phase to get more experience with it. The 4D-software uses geographic information systems and construction work databases to visualize and analyse construction logistics and traffic circulation in a certain area and the general accessibility of the city. The resulting map images are used to present all stakeholders with a clear construction logistics and traffic circulation action plan per area and per time window.

Besides the 4D-software for planning the construction area, the city of Utrecht is working together with the city of Amsterdam on the development and usage of a model that predicts the number of traffic movements (both material and working men) on the basis of only a few parameters (e.g. m<sup>2</sup> building, type of building).

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

Figure 3: 4D-planning software map



**Stage 4: Implementation of a central buffer zone (May 2012 – September 2012)** – At the start seven different locations in Utrecht were considered as possible buffer locations. Three locations have been examined in more detail taking into account costs and planning. The location needs space for at least 25 stands for trucks and 200 parking spaces for cars (workers). And the location should be available until the end of 2018. The following locations in Utrecht were considered appropriate:

1. Jaarbeursterrein (Overste den Oudenlaan)
2. Defensierrein (Overste den Oudenlaan)
3. GVU terrein (Europalaan)

All three locations are at the west side of the station area near access roads. Another possibility which was taken into account is a location outside the city near the main roads.

Instead of a zone near the construction site, at this moment a part of the area of the construction company has been made available as a buffer zone.

**Stage 5: Implementation of a Construction Logistics Centre (May 2012 – End 2018)**  
Implementation was started in the form of the set-up of a construction logistics centre (CLC) near Utrecht central station. There are agreements with construction companies that they deliver their materials to this CLC and from there they can be brought in a clean and bundled way to the construction site. The CLC is open 24/7 and also has storage capacity. Transport will be more efficient, cheaper and cleaner and the city will remain better accessible.

The concept construction logistic plan is largely dependent on cooperation with the construction firms working in the Utrecht Central Station area. Without this, it might prove unsuccessful. To manage this risk, construction firms have been and will be actively approached and the benefits

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

of cooperation will be explained. So far at least one major construction firm is already actively involved in the construction logistics centre.

Nevertheless in the MIMOSA period this CLC has not yet been used: its success depends on the participation of different suppliers and the flow of (mainly smaller) construction materials, which is in turn dependent upon the progress of the construction work around Central Station (including new music centre Vredenburg).

## B5 Inter-relationships with other measures

The measure is related to other measures as follows:

- **UTR 4.2 Hinder planning and Communication**, besides the construction logistics plan, there was also communication towards the citizens regarding the intended construction work, aiming at a reduction of the private traffic in the specific zone and access routes.
- **UTR 8.2 Clean Route Planning for Freight Transport**, the clean route planning for freight transport takes into account the construction logistics and as much as possible tried to avoid other freight transport passing through the construction zone, also taking into account timing on the access routes.

## C Impact Evaluation Findings

This measure aimed to decrease disturbance to the urban transport system caused by construction works traffic, achieve more efficiency in construction works and decrease PM10, NO<sub>x</sub> and CO<sub>2</sub> construction work traffic emissions. Impacts on environment and transport will be taken into account. The measure has not yet however resulted in the usage of a construction logistics centre, as construction works are delayed and the construction logistics centre is only meant for and efficient for smaller parts. Therefore there is no impact to evaluate within the CIVITAS MIMOSA period. Evaluation of this measure has consequently focused on process evaluation.

### C3 Achievement of quantifiable targets and objectives

No.	Target	Rating
1	20% reduction in estimated construction work road traffic (to be estimated by (model) calculations beforehand and measured in practice)	O
2	More equal supply of construction works traffic (less high transport peaks at construction site itself) (to be estimated by (model) calculations beforehand and measured in practice).	O
3	Swift and smooth construction process (based on expert judgement of companies involved).	NA
<b>NA = Not Assessed    O = Not Achieved    * = Substantially achieved (at least 50%)</b> <b>** = Achieved in full            *** = Exceeded</b>		

During the measure lifespan, no major problems with congestion or disruption caused by construction vehicles can be reported until now despite the absence of any construction logistics

<i>Measure title:</i>		<b>Construction Logistics</b>			
<i>City:</i>	<b>Utrecht</b>	<i>Project:</i>	<b>Mimosa</b>	<i>Measure number:</i>	<b>7.1</b>

centre and/or bundled deliveries. Unfortunately, this makes involved companies very reluctant to participate in a construction logistics centre for bundled deliveries. However construction work in Utrecht city centre will continue in the next few years and the conducted research indicates that the objectives can be achieved in the future when a construction logistics centre will be available.

## **C7 Future activities relating to the measure**

The construction logistics centre wasn't used during the CIVITAS MIMOSA period. However the measure will continue after 2012. In September 2012 research was conducted on the possibilities to continue and implement more building logistics measures in the Station area in Utrecht and how different parties should operate within this. This research will be published after this evaluation report. Recommendations and next steps according to this research are:

- The municipality should set the framework and organise facilitating measures regarding construction logistics.
- Construction companies should use construction logistics requirements when tendering building companies for construction work.
- Within two years 2 projects in the station area should be started with construction logistics, for instance bundling.
- At short notice the results of the current research will be presented and discussed in a workshop with the different partners. All different stakeholders in construction work in the station area will be invited.

With the results of this research and this CIVITAS MIMOSA process evaluation, building logistics in Utrecht will continue in the coming years. Besides the music building Vredenburg, there are other different building projects in the coming years that will profit from building logistics.

## **D Process Evaluation Findings**

### **D.1 Deviations from the original plan**

The deviations from the original plan comprised:

- **No usage of the construction logistic centre** – As a result of delayed construction work, there was no usage of a construction logistics centre during CIVITAS MIMOSA. Construction work in the station area and especially the planned pilot project, music hall Vredenburg, was delayed and the construction logistics centre works for smaller parts in the end phase of construction in particular. The end phase of construction is now planned to start at the end of 2012 and finish at the end of 2013.

Measure title:	Construction Logistics				
City:	Utrecht	Project:	Mimosa	Measure number:	7.1

## D.2 Barriers and drivers

In this chapter barriers and drivers are described for each measure phase (between brackets the barrier/driver field number as described in the process evaluation guideline).

### D.2.1 Barriers

#### Preparation phase

- **Involvement/communication (5): Limited problem awareness-** There was limited problem awareness among construction companies and developers (until recently): freight issues were considered as solvable 'on the job'; it was not considered important to make a construction logistics plan and organise logistics in advance.
- **Cultural (3): Reluctance to impose strict regulations-** Reluctance to impose strict regulations on private companies concerning construction logistics.
- **Planning (7): Delays in building project-** Certain parts of the building project suffered delays and the major part of the flow of (smaller) construction materials was expected from the autumn of 2011 onwards and this was again delayed until autumn 2012. The Construction logistic site is especially useful for this type of materials.

### D.2.2 Drivers

#### Preparation phase

- **Political/Strategic (1): Approved Air Quality Plan-** The city government recently approved the Air Quality Action plan. With this plan construction logistics is not only important from a congestion and disruption point of view but also in the context of air quality.
- **Organizational (8): Two parties agreed for a logistic centre-** One specific constructor and one transport company have agreed on installing a construction logistics centre for one major project in the station area. This will be a driver in convincing other companies.
- **Involvement/communication (5): Proactive attitude-** The construction firms were actively approached and the benefits of cooperation were continuously explained, which as a proactive attitude helps to better implement the measure.

### D.2.3 Activities

#### Preparation phase

- **Involvement/communication (5): Actively approaching construction firms-** The concept construction logistic plan is largely dependent on cooperation with the construction firms working in the Utrecht Central Station area. Without this, it might prove unsuccessful. To manage this risk, construction firms have been and will be actively approached and the benefits of cooperation will be explained. So far, this approach has been successful and at least one major construction firm is already actively involved in the construction logistics centre.
- **Technological (10): Plans for a logistics centre-** One constructor and transporter have made plans for operating a CLC, where other suppliers and transporters should deliver their

<i>Measure title:</i>		<b>Construction Logistics</b>			
<i>City:</i>	<b>Utrecht</b>	<i>Project:</i>	<b>Mimosa</b>	<i>Measure number:</i>	<b>7.1</b>

materials and from there they can be brought in a clean and bundled way to the construction site. The municipality is in contact with the two companies to see how the CLC's function can be expanded to other construction projects within the station area as well. However at the end of CIVITAS MIMOSA the CLC was still not in use and it will probably not be used due to the different barriers mentioned before (especially a lack of urgency).

- **Involvement/communication (5): Inspiration session-** The municipality continued stimulating more construction companies to join the CLC in order to expand the scheme. A workshop ('inspiration session') took place in November 2011 with construction and transport firms active in the station area. The aim was to get an inventory of the obstacles they encounter and ask them about their ideas for solutions. The inspiration session should also make them more enthusiastic to work with each other and with the city on this project.
- **Institutional (2): Exploring increasing benefits with permits/exemptions-** Utrecht looked into possible legislation that the city can amend (or permits/exemptions it can provide) to increase the benefits of construction logistics planning for the transport and construction companies. A set of requirements that construction firms and transport companies need to fulfil when they are working in a large building project in the centre of Utrecht is part of this too (e.g. delivery times, routes, maximum weight of trucks). To do this, additional workshops were organised after the 'inspiration session', regarding policy, legal and practical consequences of potential new legislation, permits or exemptions.

## D.3 Participation

### D.3.1. Measure Partners

- **The city of Utrecht** – Department of traffic, responsible for freight logistics measures.
- **The city of Utrecht** – Project organisation station area (POS), responsible for organisation of public area and traffic during construction works in the Station area. POS has contact with the construction companies and can set conditions.
- **Construction companies** – Construction companies working on the different construction sites in the city centre: Heijmans (music hall Vredenburg), BAM (apartments and shops apartment building Vredenburg and all the new shops, parking places etc. within Hoog Catharijne (shopping mall around the train station), Besix (Public transport/train station and infrastructure Westside of the station), Dura Vermeer (cables and pipelines and tram terminal), Boele & Van Eesteren (new council office).
- **Transport companies** – Transport companies delivering construction freight in the Station area: Hoek transport, UTS Transport.

### D.3.2 Stakeholders

- **Traffic in the station area** – The traffic in the station area is influenced by the construction work traffic and obstructed by the same. Traffic in the station area profits from a construction logistics plan and smooth traffic flows.
- **Residents** – Utrecht residents living or working around the station area and residents visiting the station area suffer construction traffic nuisance and air pollution. They benefit

<i>Measure title:</i>		<b>Construction Logistics</b>			
<i>City:</i>	<b>Utrecht</b>	<i>Project:</i>	<b>Mimosa</b>	<i>Measure number:</i>	<b>7.1</b>

from construction logistics plans that decrease the number of freight trucks and other construction traffic.

## D.4 Recommendations

### D.4.1 Recommendations: measure replication

Construction logistics is interesting for cities dealing with large constructions works which is loading the usual traffic flow due to a lot of different small deliveries on the construction site(s). Bundled delivery of building material could decrease building traffic, traffic congestion and improve air quality. The implementation of the measure is not finished yet, however for the preparation and successful implementation the following is recommended:

- **Start small** - Define pilots and start small, it is difficult to find many partners at the start to join a pilot as many of them prefer to see effects first before joining. If you start small and can show effects, others will join later.
- **Show your successes-** Organise PR and marketing activities for small successes to create a snowball effect.
- **Long term vision** - Focus on long-term period and projects to create a more feasible business case. Results take time, a long time success gives more reliable results and a better showcase. A good showcase can be used for future activities.
- **Evaluate and measure-** Make fact-finding a part of your measure, collect data about transport movements and logistic transport costs to show the profits of the measure.

### D.4.2 Recommendations: process (related to barrier-, driver- and action fields)

- **Find a showcase** – A good showcase is a good driver for the measure and needed to convince organisations to participate. So finding or working on a good showcase will pay off in the future.
- **Focus on financial benefits** – For participating parties the financial benefits are the best driver to encourage cooperation. Make sure to use and show these benefits.
- **Distribute costs and benefits** - Create balance in sharing costs and benefits between participating organisations.
- **Start early** - Stimulating public-private co-operation, organising and implementing the measures takes time, so start early.
- **Invest in relationships** - Invest in relationships between people, they make it work!

## E References

- Ontwikkelingen bouwlogistiek Utrecht, Project organisation station area, Stadsontwikkeling verkeer en vervoer, city of Utrecht, April 2011