TØI report 1730/2019

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Institute of Transport Economics
Norwegian Centre for Transport Research

Evaluation of Oslo City Hub

The planning and establishment of a depot for transshipment of goods

TØI Report
1720/2019

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This is a translated version of report 1717/2019

ISSN 2535-5104 Electronic
ISBN 978-82-480-2275-6 Electronic
Oslo, October 2019

Tittel:	Evaluering av Oslo City Hub -Planlegging og etablering av et bylogistikkdepot for gods	**Title:**	Evaluation of Oslo City Hub -The planning and establishment of a depot for transshipment of goods
Forfattere:	Tale Ørving og Olav Eidhammer	**Authors:**	Tale Ørving and Olav Eidhammer
Dato:	10.2019	**Date:**	10.2019
TØI-rapport:	1730/2019	**TØI Report:**	1730/2019
Sider:	39	**Pages:**	39
ISSN elektronisk:	2535-5104	**ISSN Electronic:**	2535-5104
ISBN elektronisk:	978-82-480-2275-6	**ISBN Electronic:**	978-82-480-2275-6
Finansieringskilde:	Statens vegvesen Vegdirektoratet	**Financed by:**	Norwegian public roads administration
Prosjekt:	4683 – Oslo City Hub	**Project:**	4683 – Oslo City Hub
Prosjektleder:	Tale Ørving	**Project Manager:**	Tale Ørving
Kvalitetsansvarlig:	Sidsel Ahlmann Jensen	**Quality Manager:**	Sidsel Ahlmann Jensen
Fagfelt:	Logistikk og innovasjon	**Research Area:**	Logistics and innovation
Emneord:	Bylogistikkdepot Evaluering Varelevering Bylogistikk	**Keywords:**	Transshipment location Evaluation Urban freight Logistics

Sammendrag:

Målet med dette prosjektet har vært å evaluere prosessen med å etablere et bylogistikkdepot for omlasting av varer for sisteleddsdistribusjon (last-mile) i Oslo sentrum. I evalueringen legges det vekt på sentrale hendelser i planleggingen og samarbeid mellom de ulike aktørene og interessentene som har vært involvert i prosjektet. Målet med evalueringen er å gi et kunnskapsgrunnlag til andre private aktører eller kommuner som ønsker å etablere noe tilsvarende. Resultatene indikerer at det er fem suksesskriterier for en vellykket etablering; Tillitt mellom samarbeidspartnerne, ekspertkunnskap og engasjerte drivere i planleggings- og utformingsprosessen, støtte fra- og godt samarbeid med offentlig sektor, egnet og disponibel lokasjon for bylogistikkdepotet i bysentra og enkel og fleksibel utforming av bylogistikkdepotet.

Summary:

The aim of this project has been to evaluate the process of establishing a depot for transshipment of goods for last-mile distribution in downtown Oslo. In the evaluation, emphasis is placed on key events in the planning process and collaboration between the various actors and stakeholders who have been involved in the project. The goal of the evaluation is to provide a knowledge base for other private actors, cities or municipalities who wish to establish something similar. The results indicate that there are five criteria for a successful establishment; trust between the collaborators, expert knowledge and a dedicated driving force in the planning and design process, support from and good cooperation with the public sector, suitable and available location for the depot in the city center and simple and flexible design of the depot.

Dette er en oversatt versjon av rapport 1717/2019

This is a translated version of report 1717/2019

Language of report: English

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Preface

Oslo City Hub is an urban transshipment depot that is primarily designed for use in reloading goods from larger vehicles to smaller, electric vehicles. The depot is located at the Port of Oslo, centrally located in Oslo. The urban transshipment depot opened for operations on 8 May 2019.

The Port of Oslo, Filipstad Utvikling AS, MMW architects and DB Schenker have been heavily involved in the planning and establishment of Oslo City Hub. In addition, the Norwegian Public Roads Administration and Oslo Municipality have each participated and been an important source of support during the process.

This report evaluates the process in relation to the planning and creation of Oslo City Hub. This process has taken place from May 2018 to May 2019. The evaluation emphasises key events and collaboration between important stakeholders and participants in this process. The objective of the evaluation is to provide a knowledge base for other private stakeholders or municipalities that would like to establish an urban transshipment depot or similar solution.

The evaluation is based on interviews with stakeholders who played a key role in the planning and creation of Oslo City Hub as well as interviews with experts based on their experiences with similar logistical solutions in other European cities.

The report has been prepared on behalf of the Norwegian Public Roads Administration's Urban Logistics Programme, with Toril Presttun as the contact person. She has contributed her professional insight to the report. Tale Ørving was primarily responsible for the report and wrote chapters 1, 3, 4, 5 and 6. Olav Eidhammer wrote Chapter 2 and provided valuable insight for the remaining chapters of the report. Sidsel Ahlmann Jensen carried out the quality control on the report while Trude Kvalsvik was responsible for the final editing.

Oslo, October 2019
Institute of Transport Economics

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Content

Institute of Transport Economics
Norwegian Centre for Transport Research

Summary

Evaluation of Oslo City Hub

The planning and establishment of a depot for transshipment of goods

TØI Report 1730/2019
Authors: Tale Ørving and Olav Eidhammer
Oslo 2019, 39 pages, English

In an ongoing project in Oslo, a depot for transshipment of goods called Oslo City Hub has been established at Filipstadkaia. This depot is operated by DB Schenker and will mainly be used for reloading of goods from larger vehicles to smaller electric vehicles. The project arose when the Port of Oslo announced a competition for the use of a site area in the Port of Oslo in the fourth quarter of 2017. Filipstad Utvikling (consisting of Moment Eiendom and a representative from Hamoco) rents the area from the Port of Oslo and, in cooperation with DB Schenker and MMW architects established Oslo City Hub. The lease runs until April 30, 2021. This report evaluates the planning process prior to establishing the Oslo City Hub, which lasted from May 2018 to May 2019. The depot opened for operation on May 8, 2019. The aim of the evaluation is to provide a knowledge base for other private actors or municipalities that want to establish something similar.

Five criteria for a successful establishment of the Oslo City Hub was detected through the evaluation; trust between the project partners, expert knowledge and a dedicated driving force in the planning and design process, support from and good cooperation with the public sector, suitable and available location for the depot in city centers and simple and flexible design of the depot.

An important aspect of establishing a depot such as the Oslo City Hub is access to locations in the city center. In order to dedicate areas for logistics purposes, city logistics should be integrated into overall urban and area plans. Although the Oslo City Hub is driven forward and established as a private initiative, involvement from public bodies has been necessary in order to realize the establishment of the city logistics depot.

City logistics and experiences from other European cities

Norway as the rest of Europe is experiencing increased urbanization and densified cities. This leads to increased pressure on available infrastructure from the various road users and results in increased traffic volumes and competition for areas in city centers. Although city logistics are mainly carried out by the private sector, the public sector also has an interest in how it is handled and executed, especially with regard to the negative effects of transport (mainly emissions and noise). Therefore, the issues and solutions for city logistics lie in the intersection between private and public actors (Fossheim et al. 2019).

One trend that has existed over a long period of time in many European cities is that logistics actors are located on the outskirts of cities (so-called "logistics sprawl"). This can lead to an increase in vehicle kilometers and thus have a negative environmental impact (Aljohani and Thompson 2016; Diziani et al. 2012). Depots like Oslo City Hub and other types of terminals in the city center can help reduce this effect and help reduce the transport kilometers in cities.

As much of the reason why carriers want to establish depots in city centers is to be able to use smaller and more environmentally friendly vehicles for the last mile distribution, this solution is most suitable in cities with challenges related to lack of space, high traffic

volumes and pollution. The location can be decisive for the profitability of operations and the place for the location should therefore be made in consultation with the actors that will operate the depot (Ørving et al. 2018).

Expert knowledge from similar experiments

In connection with the knowledge base in this report, we have conducted three expert interviews with actors who have been involved in the establishment of depots and / or consolidation terminals in the cities of Paris, London and Gothenburg in order to gain an insight into their experiences and knowledge of goods depots and terminals in city centers. The main points from these interviews were:

- Tendering processes for locations for logistics purposes seems to be a growing trend in European cities. The challenge in many large cities is a lack of vacant space, and high market prices make it difficult for logistics operators to get a profitable operation.
- A thorough analysis of the power requirement is important prior to the establishment of a city terminal if the last mile distribution of goods is to be carried out with electric vehicles.
- It is a safety aspect related to sharing areas between logistics activities and soft road users. This can be partly solved with good markings and signage at the specific location
- There is a trade-off between depots or other city terminals in the city center that must be public-friendly and aesthetic vs. terminals outside the city center in less glamorous areas, which may have a more operative design
- Sufficient volume of goods and flexibility in design and functionality are important success criteria when establishing a goods depot or consolidation terminal
- It is important to integrate logistics into formal area plans for areas to be allocated to logistics activities before being tied up for other purposes
- Lack of awareness and knowledge about logistics in the public sector often coincides with the lack of area allocated for logistics activities in a city according to the representative from Paris.
- The Gothenburg municipality representative mentioned that one of the main success criteria behind a consolidation terminal in Gothenburg was good dialogue with the carriers both in advance, in the planning phase and after the establishment.

Oslo City Hub - Description

Oslo City Hub is a goods depot at Filipstadkaia in Oslo which is operated by DB Schenker and is mainly used for reloading of goods from larger vehicles to smaller electric vehicles. The project arose when the Port of Oslo announced a tender for the use of a site area in the Port of Oslo in the fourth quarter of 2017. Filipstad Utvikling (consisting of Moment Eiendom and a representative from Hamoco) rents the area from the Port of Oslo and, in cooperation with DB Schenker and MMW architects established Oslo City Hub. The lease expires on April 30, 2021. DB Schenker's goal is that 80% of their distribution within ring road 3 will be carried out with zero emission vehicles by 2019, and Oslo City Hub will be important in achieving this goal. DB Schenker looks at the Oslo City Hub project as an

opportunity to gain experience and build a concept that can be transferred to other cities in Norway.

Oslo City Hub consists of several containers assembled into a construction that enables a flexible and temporary solution with a low investment cost. In connection with the design phase of the Oslo City Hub, several and regular project meetings have been held to discuss sketches and solution proposals. According to both the project partners and DB Schenker, it has been crucial to bring the user of the Oslo City Hub with their expert knowledge in the design phase of the project. Figure S.1 shows the final construction of Oslo City Hub taken from the official opening on May 8, 2019.

Figure S.1: Oslo City Hub from the official opening on 8 May 2019. Photo: Olav Eidhammer

From idea to establishment of Oslo City Hub

Although the Oslo City Hub project is a result of a tender process announced by the Port of Oslo and an idea started by Filipstad Utvikling, there are several other key players who have been involved in the process and crucial for the final result and the establishment of the Oslo City Hub. The private actors involved in the establishment of the Oslo City Hub are also part of the project group who have worked extensively together in connection with the design of the terminal. The public actors who have had a role or interest in the establishment of the Oslo City Hub are mainly the Port of Oslo (which leases the area to Filipstad Utvikling and issued the tender), the Planning and Building Authority (which assessed and gave building permission to Oslo City Hub), The National Roads Administration, the eastern region (which gave the necessary dispensation for the application for a building permit) and the Urban Environment Agency (which aims to arrange for consolidation terminals or other city terminals in Oslo and thus have made themselves available to facilitate the Oslo City Hub project).

There has been an enthusiasm and positivity from all parties involved in the project and good communication between the players, both private and public. Public facilities and the use of facilitating political instruments and measures may be necessary for the establishment of similar goods depots in several places in Oslo and other Norwegian cities. On a general basis, DB Schenker misses a long-term plan in the City of Oslo for urban logistics and wishes that the municipality had a closer dialogue with the carriers about how the city logistics should be solved.

Figure S.2 shows the timeline of the administrative steps in the project from The Port of Oslo announced the tender until the Oslo City Hub was completed in May 2019.

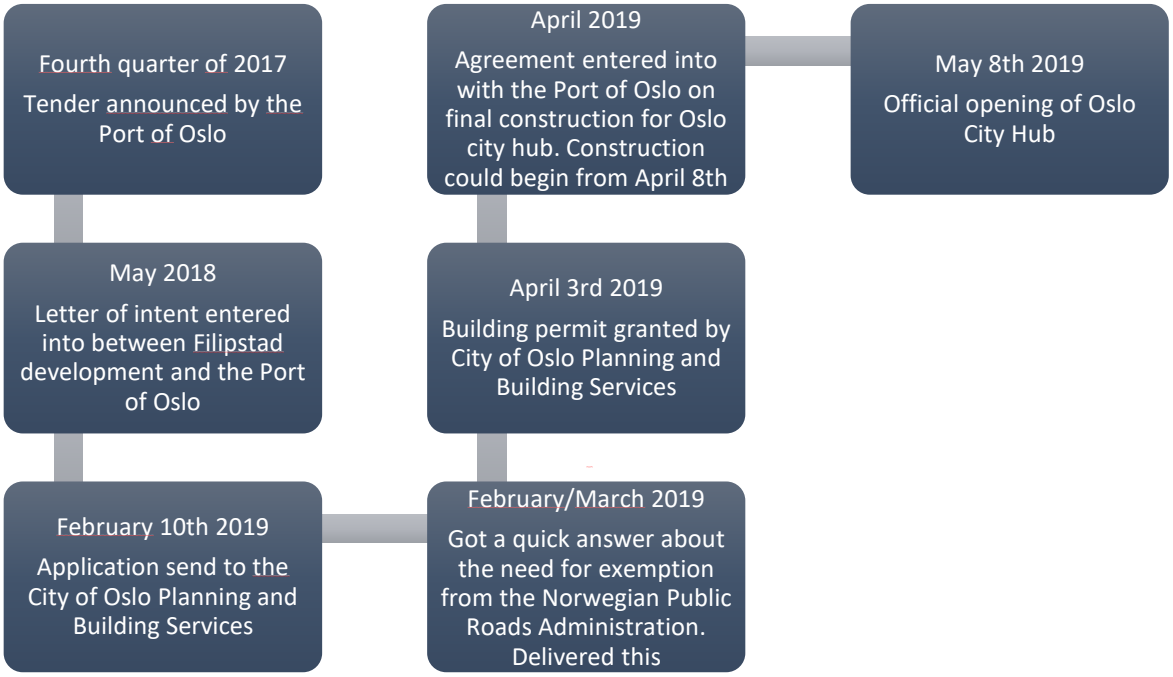


Figure S.2: Time line that illustrates the most important events in the planning process towards the establishment of the Oslo City Hub.

From the letter of intent between the Port of Oslo and Filipstad Utvikling was signed in May 2018 until the official opening of the Oslo City Hub in May 2019, it has been one year of planning. This planning period has consisted of several important events central to the progress of the project, including obtaining a building permit from the Planning and Building Administration. From the application was sent to the Planning and Building Administration and the building permit was granted it took just under two months. Filipstad Utvikling found this to be a decent process. The construction could start on April 8, 2019 and the Oslo City Hub was completed on May 8, 2019, right in time for the official opening.

What is important when establishing a terminal in city centers?

Based on the evaluation of the planning process and the establishment of the Oslo City Hub, figure S.3 summarizes the main success criteria important for the realization of the project.

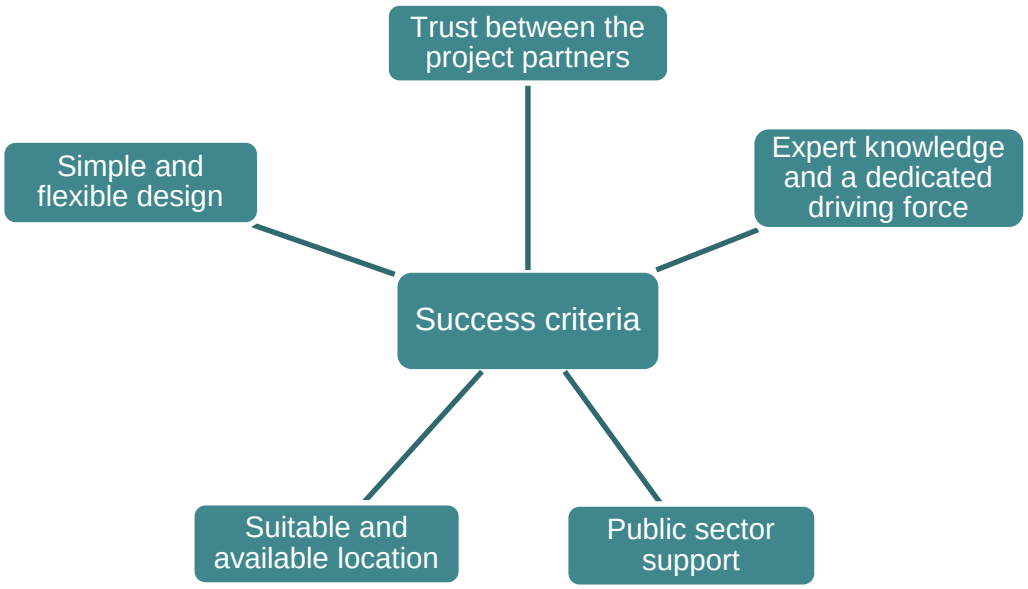


Figure S.3: Compilation of the main success criteria in the planning process of the establishment of Oslo City Hub.

An important aspect for establishing a goods depot such as Oslo City Hub is an available location in the city center. In order to secure areas for logistics purposes, delivery of goods should be integrated into overall urban and area plans. Although the Oslo City Hub is driven forward and established as a private initiative, involvement from public bodies has been necessary in order to realize the establishment of the city logistics depot.

The involved project partners believe that if the concept is successful in Oslo, they can also succeed in other cities in Norway. It may be easier to establish a similar solution in other smaller cities and municipalities, as the size of the city affects the area requirement for a goods depot or other city terminals. The availability of suitable locations is often a barrier when establishing terminals in city centers. The Oslo City Hub project has provided experiences and knowledge that are useful when starting up in other cities, which ease the upcoming planning processes.

Transportøkonomisk institutt
Stiftelsen Norsk senter for samferdselsforskning

Sammendrag

Evaluering av Oslo City Hub

Planlegging og etablering av et bylogistikkdepot for gods

TØI rapport 1730/2019
Forfattere: Tale Ørving og Olav Eidhammer
Oslo 2019, 39 sider

Det har blitt etablert et bylogistikkdepot for gods på Filipstadkaia kalt Oslo City Hub. Depotet opereres av DB Schenker og skal hovedsakelig benyttes til omlasting av varer fra større kjøretøy til mindre elektriske kjøretøy. Prosjektet oppstod ved at Oslo Havn utlyste en konseptkonkurranse om anvendelse av et tomteareal på Oslo Havn sine områder i fjerde kvartal 2017. Filipstad Utvikling (bestående av Moment Eiendom og en representant fra Hamoco) leier arealet av Oslo Havn og har i samarbeid med DB Schenker og MMW arkitekter etablert Oslo City Hub. Leieforholdet løper til 30.april 2021. Denne rapporten evaluerer planleggingen og etableringen av Oslo City Hub som har pågått fra mai 2018 til mai 2019. Depotet åpnet for drift 8.mai 2019. Målet med evalueringen er å gi et kunnskapsgrunnlag til andre private aktører eller kommuner som ønsker å etablere noe tilsvarende.

Vi har gjennom evalueringen i denne rapporten kommet frem til fem suksesskriterier for en vellykket etablering av Oslo City Hub; tillitt mellom prosjektpartnerne, ekspertkunnskap og engasjerte drivere i planleggings- og utformingsprosessen, støtte fra - og godt samarbeid med - offentlig sektor, egnet og disponibel tilgjengelig lokasjon for depotet i bysentruma og enkel og fleksibel utforming av depotet. Det er ikke en uttømmende liste, men suksesskriterier som vurderes som sentrale i etableringen av Oslo City Hub basert på intervjuer med involverte aktører.

En viktig forutsetning for å etablere et bylogistikkdepot som Oslo City Hub er tilgang til sentrumsnære arealer. For å sikre arealer til logistikkformål bør varelevering integreres i overordnede by- og arealplaner. Selv om Oslo City Hub er drevet frem som et privat initiativ, har det vært nødvendig med involvering fra offentlige instanser for å få realisert etableringen av bylogistikkdepotet.

Bylogistikk og erfaringer fra andre europeiske byer

Norge som resten av Europa opplever økt urbanisering og fortettede byer. Dette fører til økt press på tilgjengelig infrastruktur fra de ulike trafikantgruppene og resulterer i tett trafikk og kamp om arealer i bysentra. Selv om bylogistikk i hovedsak utføres av privat sektor har offentlig sektor også en interesse i hvordan denne blir håndtert og utført, spesielt med hensyn til de negative effektene av transportene (hovedsakelig utslipp og støy). Derfor ligger problemstillingene og løsningene for bylogistikk i skjæringspunktet mellom private og offentlige aktører (Fossheim m. fl. 2019).

En tendens som har eksistert over en lengre periode i mange europeiske byer er at logistikkaktører lokaliserer seg i utkanten av byene (såkalt «logistics sprawl»). Dette kan være med på å øke kjørte kilometer og dermed ha en negativ miljøpåvirkning (Aljohani og Thompson 2016; Diziani m. fl. 2012). Bylogistikkdepoter og andre typer terminaler i sentrum kan være med på å redusere denne effekten og bidra til å redusere kjørte kilometer i byer.

En viktig grunn til at transportører ønsker å etablere bylogistikkdepot er for å kunne benytte mindre og mer miljøvennlig kjøretøy for sisteleddsdistribusjonen i bysentra. Denne løsningen er best egnet i byer med utfordringer knyttet til plassmangel, tett trafikk og forurensning, men hvor det samtidig er arealer som kan avsettes til logistikkformål.

Lokasjonen kan være avgjørende for lønnsomheten ved drift og plasseringen bør derfor gjøres i samråd med aktørene som skal operere bylogistikkdepotet (Ørving m. fl. 2018).

Ekspertkunnskap fra lignende forsøk

I tilknytning til kunnskapsgrunnlaget i denne rapporten har vi gjennomført tre ekspertintervjuer med aktører som har vært involvert i etableringen av bylogistikkdepot og/eller konsolideringsterminaler i byene Paris, London og Gøteborg for å få et innblikk i deres erfaringer og kunnskap om etablering av ulike byterminaler. Hovedpunktene fra disse intervjuene er:

- Anbudsprosesser for arealer til logistikkformål kan bli en voksende trend i europeiske byer. Utfordringen i mange store byer er mangel på ledige arealer, og høye markedspriser som gjør det vanskelig for logistikkaktører å få en lønnsom operasjon.
- En grundig analyse av strømbehovet er viktig i forkant av etablering av en byterminal dersom sisteleddsdistribusjonen av varer skal utføres med elektriske kjøretøy
- Det er et sikkerhetsaspekt knyttet til å dele arealer mellom logistikkaktiviteter og myke trafikanter. Dette kan delvis løses med god oppmerking og skilting på området.
- Det er en avveining mellom sentrumsnære byterminaler som må være publikumsvennlige og estetiske vs. terminaler utenfor sentrum i mindre glamorøse områder, som kan ha en mer operativ utforming
- Tilstrekkelig volum av gods og fleksibilitet i utforming og funksjonalitet er viktige suksesskriterier ved etablering av et bylogistikkdepot eller en konsolideringsterminal
- Det er viktig å integrere logistikk i formelle arealplaner for at arealer skal bli avsatt til logistikkaktiviteter før de blir bundet opp til andre formål
- Mangel på bevissthet og kunnskap rundt logistikk i offentlig sektor henger ofte sammen med mangel på areal avsatt til logistikkaktiviteter i en by ifølge respondenten fra Paris
- Gøteborg kommune respondenten nevnte at en av suksesskriteriene bak etableringen av en konsolideringsterminal i Gøteborg var god dialog med transportørene både i forkant, i planleggingsfasen og i etterkant av etablering.

Oslo City Hub -Beskrivelse av konseptet

Oslo City Hub er et bylogistikkdepot for gods på Filipstadkaia i Oslo som opereres av DB Schenker og hovedsakelig skal benyttes til omlasting av varer fra større kjøretøy til mindre elektriske kjøretøy. Prosjektet oppstod ved at Oslo Havn utlyste en konseptkonkurranse om anvendelse av et tomteareal på Oslo Havn sine områder i fjerde kvartal 2017. Filipstad Utvikling (bestående av Moment Eiendom og en representant fra Hamoco) leier arealet av Oslo Havn og har i samarbeid med DB Schenker og MMW arkitekter etablert Oslo City Hub. Leieforholdet løper til 30.april 2021. DB Schenker har et mål om at 80% av sendingene sine innenfor ring 3 skal utføres med nullutslippskjøretøy innen 2019, og Oslo City Hub blir viktig for å nå dette målet. DB Schenker ser på Oslo City Hub prosjektet som en mulighet til å høste erfaringer og bygge opp et konsept som kan overføres til andre byer i Norge.

Oslo City Hub består av flere containere satt sammen til en konstruksjon som muliggjør en fleksibel og midlertidig løsning med en lav investeringskostnad. I forbindelse med utformingen av Oslo City Hub har det blitt avholdt flere og jevnlige prosjektmøter for å diskutere skisser og løsningsforslag. I følge både prosjektpartnerne og DB Schenker har det vært avgjørende å ha med brukeren av Oslo City Hub med deres ekspertkunnskap i utformingsfasen av bylogistikkdepotet. Figur S.1 viser endelig konstruksjon på Oslo City Hub tatt fra den offisielle åpningen 8.mai 2019.

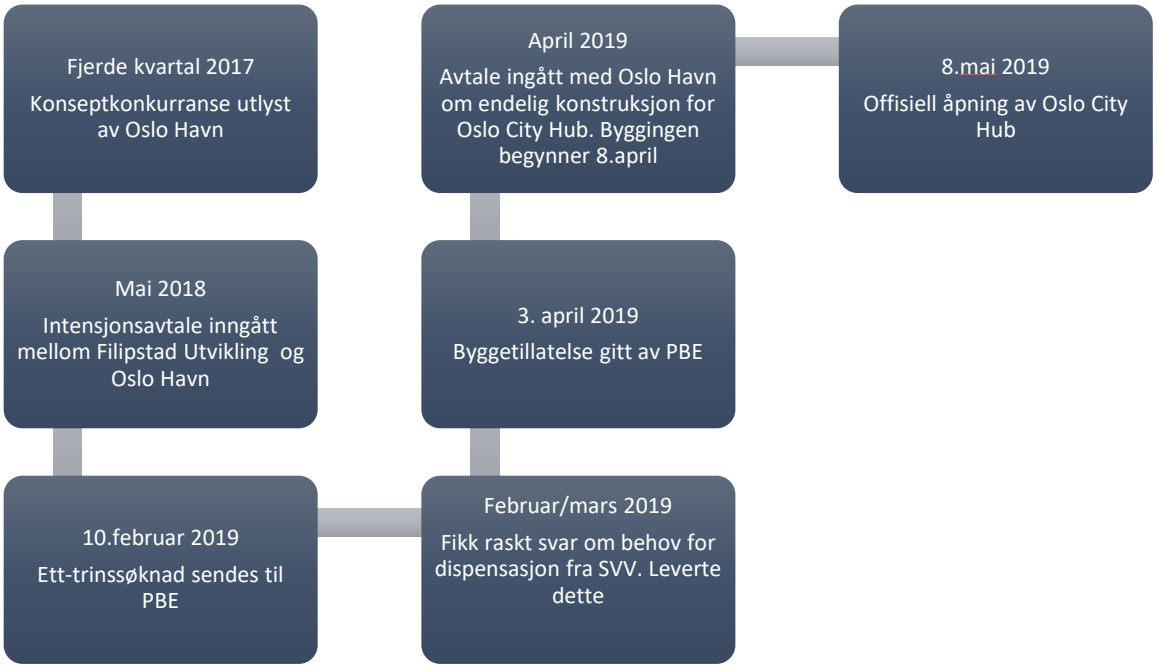
Figur S.1: Oslo City Hub fra den offisielle åpningen av huben 8.mai 2019. Foto: Olav Eidhammer

Fra ide til etablering av Oslo City Hub

Selv om prosjektet med etablering av Oslo City Hub er et resultat av en konseptkonkurranse utlyst av Oslo Havn og en ide startet av Filipstad Utvikling, er det flere andre sentrale aktører som har vært involvert i prosessen og avgjørende for sluttresultatet og etableringen av Oslo City Hub. De private aktørene som er involvert i etableringen av Oslo City Hub er også en del av prosjektgruppen som har jobbet mye sammen i forbindelse med utformingen av bylogistikkdepotet. De offentlige aktørene som har hatt en rolle eller interesse i etableringen av Oslo City Hub er hovedsakelig Oslo Havn (som leier ut arealet til Filipstad Utvikling og utlyste konseptkonkurransen), Plan- og bygningsetaten (som vurderte og ga byggetillatelse til Oslo City Hub), Statens vegvesen, region øst (som ga nødvendig dispensjon til søknad om byggetillatelse) og Bymiljøetaten (som har som mål å tilrettelegge for konsolideringsterminaler og andre byterminaler i Oslo og dermed har stilt seg til rådighet for å tilrettelegge for Oslo City Hub prosjektet).

Det har vært en entusiasme og positivitet fra alle involverte parter i prosjektet og god kommunikasjon mellom aktørene, både private og offentlige. Offentlig tilrettelegging og bruk av fasiliterende politiske virkemidler og tiltak kan være nødvendig for etablering av lignende depoter flere steder i Oslo og andre norske byer. På generell basis savner DB Schenker en langsiktig plan i Oslo kommune for bylogistikk og skulle ønske at kommunen hadde en tettere dialog med transportørene om hvordan bylogistikken bør løses.

Figur S.2 viser tidslinjen over de administrative trinnene i prosjektet fra Oslo Havn utlyste konseptkonkurransen til Oslo City Hub stod ferdig i mai 2019.

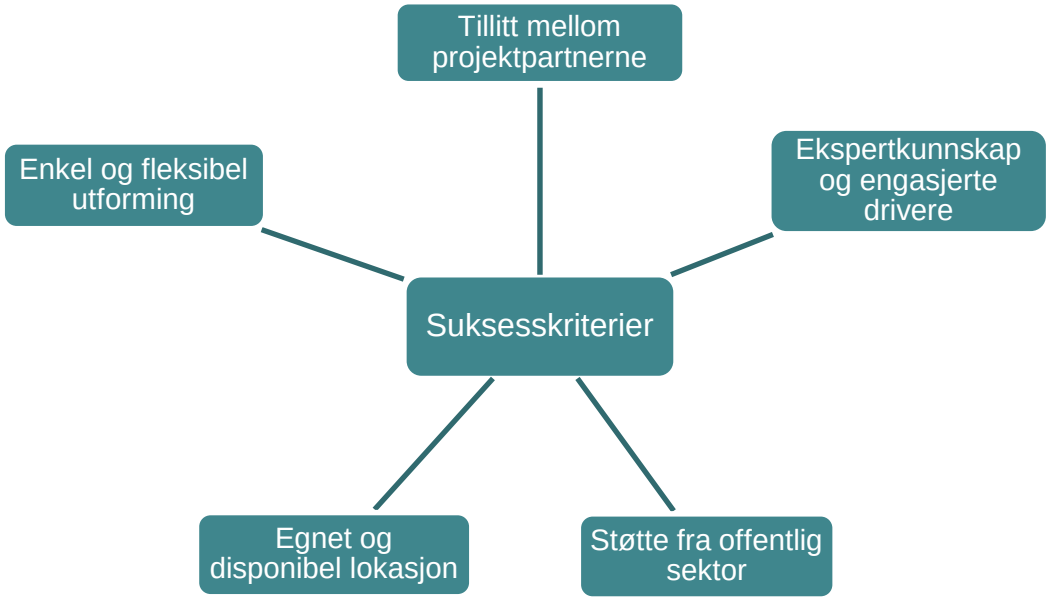


Figur S.2: Tidslinje som illustrerer de viktigste hendelsene i planleggingsprosessen frem mot etablering av Oslo City Hub.

Fra intensjonsavtalen mellom Oslo Havn og Filipstad Utvikling ble inngått i mai 2018 til den offisielle åpningen av Oslo City Hub mai 2019 har det vært ett år med planlegging. Denne planleggingsperioden har bestått av flere viktige hendelser sentrale for fremdriften av prosjektet, deriblant byggesøknad til- og byggetillatelse fra Plan- og bygningsetaten (PBE). Fra søknaden ble sendt til PBE og byggetillatelse ble gitt tok det rett i underkant av to måneder. Dette mente Filipstad Utvikling selv at var en grei prosess og hadde ingenting å utsette på tidsbruken det tok fra offentlig sektor sin side. Byggingen kunne starte 8. april 2019 og Oslo City Hub stod ferdig allerede 8.mai 2019 til den offisielle åpningen.

Hva er viktig ved etablering av et bylogistikkdepot i bysentra?

Basert på evalueringen av planleggingen og etableringen av Oslo City Hub oppsummerer figur S.3 fem suksesskriterier for en vellykket etablering av Oslo City Hub. Det er ikke en uttømmende liste, men suksesskriterier som vurderes som sentrale i etableringen av Oslo City Hub basert på intervjuer med involverte aktører.



Figur S.3: Sammenstilling av suksesskriterier for en vellykket planlegging og etablering av Oslo City Hub.

En viktig forutsetning for å etablere et bylogistikkdepot som Oslo City Hub er disponible og egnede sentrumsnære arealer. For å sikre arealer til logistikkformål bør varelevering integreres i overordnede by- og arealplaner. Selv om Oslo City Hub er drevet frem som et privat initiativ, har det vært nødvendig med involvering fra offentlige instanser for å få realisert etableringen av bylogistikkdepotet. Dette samsvarer med funn i litteraturen som påpeker at det er vanskelig å initiere eiendomsprosjekter i de indre byene uten å måtte involvere offentlige instanser. Det kan derfor være fordelaktig med et nært samarbeid med byplanleggingsmyndigheter for å lykkes med logistikklokasjoner i bysentra (Diziain et al., 2012).

De involverte prosjektpartnerne mener at dersom konseptet blir vellykket i Oslo ser de ikke bort ifra at det kan lykkes også i andre byer i Norge. Derimot kan det være enklere å få etablert en tilsvarende løsning i andre mindre byer og kommuner ettersom størrelsen på byen påvirker arealbehovet til et slikt depot. Tilgjengeligheten på tilstrekkelig areal er ofte hovedbarrieren ved etablering av byterminaler. Dessuten har Oslo City Hub prosjektet gitt erfaringer og kunnskap som er nyttige ved oppstart i andre byer og kommuner, som kan gjøre planleggingsprosessen mer effektiv.

1 Introduction

1.1 Background

Like the rest of Europe, Norway is experiencing rising urbanisation and increasing population density in cities. This places more of a burden on the available infrastructure from the various modes of transport and results in traffic jams and conflicts over city centre spaces (Fossheim et al, 2019). At the same time, the increasing prevalence of e-commerce and home delivery may have a significant effect on transport needs in many cities, but in what way and to what extent is still uncertain (Visser et al, 2014). Demand for goods transport in cities is increasing, which is likely to increase the number of lorries hauling goods in the cities. This may have a considerable effect on air quality, noise, safety and the urban environment in general. Smaller, lighter electrical freight vehicles are a possible solution to these problems. However, this often requires more space for logistical activities as well as terminals in the cities. The current distribution solutions often call for a sorting process requiring vast acreage. Sorting is thus often located in terminals outside of the cities, where land is generally more readily available and cheaper than in the city centres (Moolenburg et al, 2019).

The National Transport Plan 2018-2029 states that: "Effective transport chains must be facilitated, better utilisation of transport capacity and a transition to low- and zero-emissions technology even for industrial and commercial transport." NTP also has a specific goal on near emissions-free distribution of goods in city centres by 2030 (Ministry of Transport, 2017, pp. 155–156). Urban logistics involves the transport of goods and services in cities and includes the movement of goods, equipment and waste to, from, within and through cities (Presttun et al, 2018). Even though urban logistics are primarily dealt with by the private sector, the public sector also has an interest in how it is handled and carried out, particularly with respect to the negative effects of transport (mainly emissions, noise and space usage). The cities' prioritisation of land use in the municipal plans as well as how cities design and regulate their streets and the way in which incoming goods can be delivered at properties is very important for the transport industry. For this reason, issues and solutions when it comes to urban logistics lie at the crossroads between private and public stakeholders (Fossheim et al, 2019; Presttun et al, 2018).

In recent years, there has been an increasing focus on the integration of goods delivery and logistics in urban and mobility planning. On the other hand, there is a lack of awareness of the effects of measures related to the distribution of goods and its significance to the urban environment (Fossheim & Andersen, 2017).

An urban transshipment depot for goods has been established at the Port of Oslo. The depot is called Oslo City Hub and is operated by DB Schenker. It is mainly used for reloading goods from larger vehicles to smaller, electric vehicles. Oslo City Hub arose when the Port of Oslo announced a competitive tender for a concept concerning the use of a plot of land on the grounds of the Port of Oslo during the fourth quarter of 2017. Moment Eiendom (a real estate company) and Hamoco won the competition and were encouraged to consider collaborating with Oslo Fintech and MMW architects. Oslo Fintech withdrew from the project early on and Moment Eiendom collaborated with MMW architects to carry out the project. Filipstad Utvikling AS was founded in connection

with the award of the land and is owned by four partners at Moment Eiendom, along with a representative from Hamoco AS. Filipstad Utvikling joined forces with DB Schenker and MMW architects to plan and create Oslo City Hub on this plot of land. The lease for Oslo City Hub runs through 30 April 2021. Filipstad Utvikling subleases the Oslo City Hub area to DB Schenker. DB Schenker's goal is for 80% of its deliveries within the Ring 3 area in Oslo to be carried out by zero-emissions vehicles by 2019, and Oslo City Hub is an important part of reaching this goal. Oslo City Hub is a private initiative. The municipality has supported the project without being a driving force or being notably involved. Oslo City Hub held its official opening on 8 May 2019.

1.2 Purpose

The goal of this report is to evaluate the process of planning and creating an urban transshipment depot (Oslo City Hub) established for the reloading of goods for last mile delivery in Oslo city centre. Particular emphasis has been placed on documenting the process from the concept stage to completion of the depot, i.e. the planning and creation of Oslo City Hub. In this way, other private stakeholders or municipalities interested in this type of urban transshipment depot and distribution solution can benefit from the findings of this evaluation and utilise them as a foundation for their own plans, for example, to serve as valuable input when designing the depot itself, picking a suitable location or identifying important stakeholders who should be included in the process. The evaluation can also provide useful insight into the planning processes of cities, urban area development work, infrastructure and content of urban logistic plans as well as serve as a basis for drafting policies.

1.3 Structure of the Report

This report is structured in the following way. Chapter 2 contains a description of the method used in the evaluation in this report. In Chapter 3, we present relevant literature that deals with challenges and opportunities in urban logistics. In this chapter, we have also conducted interviews with European stakeholders who are experts on the creation of urban terminals and freight delivery in cities. In Chapter 4, we discuss the background behind the creation of Oslo City Hub and describe what the concept is based on while also providing a description of the design of the urban transshipment depot. Chapter 5 covers the process from the concept stage to the creation of Oslo City Hub, including the stakeholders that were involved and key events in the planning. Chapter 6 provides a summarised evaluation of what is important in creating an urban transshipment depot like Oslo City Hub and offers recommendations for other private stakeholders and municipalities who would like to create a similar facility.

1.4 Glossary

Table 1.1: Explanations of the terms used in the report.

Urban transshipment depot	Oslo City Hub is an urban transshipment depot. An *urban transshipment depot* is defined as a depot located close to a city centre where an individual freight company can reload its goods to vehicles adapted for urban use. Urban transshipment depots facilitate the reloading of goods to smaller, more environmentally friendly means of transport, such as electric vehicles and cargo bikes for last-mile distribution of goods into city centres (Ørving, 2019).
Consolidation terminal	A consolidated shipment is the result of a combination of several smaller deliveries from multiple different suppliers or shippers into one full container or lorry shipment. The goal of consolidated shipments is to allow suppliers or shippers to optimise their value chain logistically by reducing the amount of time required and the cost.
Freight forwarding terminal (freight forwarder's terminals)	In this report, the term *freight forwarding terminals* refers to the large terminals of a freight forwarder (in this case, DB Schenker), where freight is forwarded for several suppliers, but not for multiple shippers (as is the case for consolidation terminals).
Multi-purpose terminal	A *multi-purpose terminal* is a terminal used by multiple stakeholders who either offer different services or have different use purposes for the terminal. This can also be called a logistics "hotel".
Urban terminal	An urban terminal is a collective term for depots and terminals that are located in city centres. These may serve different functions.
Last mile delivery	*Last mile delivery* means the transport of goods from a terminal to the final delivery destination, for example a household or company. Last mile delivery is typically focused on delivering goods to the end user/customer as quickly and efficiently as possible.
Cross-docking	*Cross-docking* is a logistical practice where materials/goods are unloaded from an incoming semi or other vehicle and directly loaded onto outgoing vehicles, with little or no storage in the interim.

2 Method and Analysis

The evaluation was carried out in the form of a case study, where the objective was to study the process from the concept of an urban transshipment depot to the creation of Oslo City Hub. Case studies are one of several ways in which social science studies can be conducted. According to Yin (2009), case studies are usually the preferred investigative method if you are looking for answers to: 1) how and why questions, 2) when the investigator has little control over the events to be examined, and 3) when the focus in on concomitant phenomena within a real-world context.

A common definition is utilised by Yin (2009) *"The essence of a case study, the central tendency among all types of case studies, is that it tries to illuminate a decision or set of decisions: why they are taken, how they were implemented, and with what result"*. We have based our study on this definition.

The study is qualitative, and the objective was to gain more insight into the stakeholders involved in the process, how and why they were involved in the planning and the roles they played in the establishment of Oslo City Hub. In particular, this involves a deeper understanding of the planning process, the strategic choices stakeholders have made and how the collaboration between stakeholders has functioned and been organised. In order to obtain detailed knowledge about this, interviews with a broad cross-section of key stakeholders involved in the founding of Oslo City Hub were carried out during the planning process. Multiple interviews were conducted with several of the stakeholders while, in other cases, interviews were held with multiple individuals within the same company or with public sector stakeholders. This type of case study is descriptive in nature.

Data for the analysis was obtained with the help of a semi-structured interview guide. In other words, a set of questions form the backbone of each interview. In addition, we asked follow-on questions that were adapted to each respondent's role in the project. Semi-structured interview guides ensure that interviews are structured but have built-in flexibility due to a design based on keywords as opposed to pre-formulated questions. For this type of interview, the order of the questions is less important to the discussion than touching on all of the issues that were listed ahead of time. This method also allows you to modify or add questions during the course of the study.

Information was collected on activities, plans and processes involved in the establishment of Oslo City Hub in the form of interviews with landowners (Port of Oslo), tenants (DB Schenker Norge AS), partners (Kolonial AS), architects (MMW architects), property developers (Moment Eiendom and Filipstad Utvikling) and Oslo Municipality agencies (City of Oslo Planning and Building Services and the Agency for Urban Environment) in order to raise the level of knowledge about the process behind the creation of an urban transshipment depot. The interviews were conducted face-to-face with respondents, with two project workers from the Institute of Transport Economics participating in addition to representatives of the stakeholders who were interviewed. Each of the interviews was carried out over the course of 1 to 2 hours. The interviews are documented in separate documents.

In addition to the information provided from the interviews, the stakeholders involved in the process of establishing Oslo City Hub supplied us with information via e-mail, phone conversations and documents in order to provide us with more detailed insight into the project's progress and the process as a whole. All of the companies and public agencies

interviewed have been involved in the development, planning and founding of Oslo City Hub at one time or another.
Before we started interviewing stakeholders in connection with Oslo City Hub, we wanted to create a platform containing basic knowledge about the challenges and opportunities related to the creation of urban terminals. Therefore, we interviewed European experts who were involved in the founding and operations of various types of urban terminals in Paris, London and Gothenburg. Information and experience from these interviews were vital in formulating questions for the stakeholders interviewed.
The background of the interviews was that the knowledge about the process and the experiences with the chosen solutions was to be useful for others who would like to establish urban terminals.

3 Urban logistics and experiences from other European cities

This chapter begins with a brief review of the literature on urban logistics and outlines the challenges and opportunities associated with goods delivery in cities, including a brief description of where an urban transshipment depot should ideally be located (Chapter 3.1). Chapter 3.2 presents the findings of three expert interviews with stakeholders who were involved in the creation of urban transshipment depots and/or consolidation terminals in Paris, London and Gothenburg in order to gain insight into their experience and knowledge about the topic.

3.1 The need for urban transshipment depots and other urban terminals

One trend that has existed for quite some time now in many European cities is for logistics stakeholders to locate in the suburbs ("logistics sprawl"). There are various reasons for this trend, among others:

- *Trends within the logistics sector*. Several researchers believe that regional and operational changes in commerce, the rise of global trade and e-commerce and new practices such as Just-in-time manufacturing and the use of containers have played a large role in transforming and reshaping the logistics industry. These shifts in the competitive environment have contributed to the need for expansive regional distribution centres to serve large local and regional markets. (Hesse and Rodrigue, 2004; McKinnon, 2009; Benjelloun and Crainic, 2009). Older, smaller logistics facilities with fewer loading ramps are often considered to be ineffective and incapable of accommodating the new operational requirements for modern logistics facilities (Leigh and Hoelzel, 2012).

- *Expensive land in city centres*. Areas in the suburbs of cities usually offer cheaper, more sensible locations for logistics facilities that need to provide more efficient operations and access to regional markets (Aljohani and Thompson, 2016).

- *Lack of integration of goods delivery in land-use planning*. In several European cities, the availability of reasonably priced land in the city centre for establishing and operating a logistics facility, is limited. Another challenge is the conflict between freight activities and other land usage when these activities operate and function in the same environment, competing for the same land areas to the detriment of both. For example, a logistics facility operating close to a residential area would be categorised by many urban planners as a noise, safety and/or health issue (Christensen Associates et al, 2012).

On the other hand, the volume of freight delivered in urban city centres has risen significantly in many European cities in recent years, and a majority of the customers and

distributors are often located in inner city areas. At the same time, logistics facilities have largely tended to be located in the suburbs (Aljohani and Thompson, 2016).

The location of logistics facilities not only affects shipping activities in a city, but also the urban environment. The development of logistics sprawl may contribute to an increase in the number of miles driven, thus having a negative impact on the environment (Aljohani and Thompson, 2016; Diziani et al, 2012). Reloading terminals and other types of terminals in the city centre can help reduce the impact of logistics sprawl and the number of miles driven in a city. Urban logistics terminals help enable freight from the large warehouses and freight forwarding terminals in the suburbs and countryside to be transported on fewer, larger vehicles into the city centre while at the same time permitting last mile delivery to take place with smaller vehicles adapted to the urban environment. This consequently reduces the environmental impact of both incoming and last mile transport (Presttun et al, 2018).

Several publications have documented various urban transshipment depots and which success criteria are related to well-functioning terminals (BESTFACT, 2013; Browne et al, 2011; CITYLAB Amsterdam, 2018; Ørving et al, 2018). An important reason why logistics stakeholders like to locate urban transshipment depots in city centres is to enable the use of smaller, more environmentally friendly vehicles for last mile delivery. Thus, this solution is most suitable in cities experiencing challenges related to a lack of space, traffic jams and pollution, but with areas nonetheless available that can used for logistics purposes. These are issues that many European cities have tried to fix by introducing access restrictions for various vehicles (environmental zones) (Merchan et al, 2016).

In Norway, several measures are being implemented that affect the delivery of goods in cities, for example wider pavements, more pedestrian streets, bicycle infrastructure regulations, mass transportation-only roads, an increase in road tolls and specific traffic regulations. In Oslo, several measures have been introduced with the goal of increasing the quality of life in the city centre, such as the removal of street parking spaces for private vehicles, new traffic patterns and roads closed to through traffic (Oslo Municipality Bilfritt byliv [Car-free city life], 2018). All of this can contribute to making the delivery of goods in cities more complicated.

An urban transshipment depot that facilitates the use of smaller, more environmentally friendly vehicles can make it easier to comply with access restrictions and solve logistical challenges related to densely populated urban areas (Merchan et al, 2016). An urban transshipment depot or other urban terminal should be located close to areas with high customer density so that the distances between delivery points are not overly large. It should also be located close to the motorway network so that the vehicles that will be supplying the terminal with goods avoid unnecessary driving in the city centre. The location can be crucial for the profitability of operations and should therefore be decided upon in consultation with the stakeholders who will be operating the urban terminal (Ørving et al, 2018). Dizian et al (2012) found that close collaboration between urban planning authorities, real estate companies and users is crucial for the success of logistical functions located in city centres.

3.2 Expert knowledge from similar attempts

In connection with the knowledge base of this report, we interviewed three respondents with vast, relevant experience from the launch of similar solutions to Oslo City Hub in other European cities. What all of the solutions have in common is that they involve reloading goods from larger vehicles to smaller vehicles for last mile delivery to city centres.

Reloading goods can either be the only function of such a solution or just one of several different activities and services offered by the urban terminals. A presentation of the three interview respondents and their relevance to this project is depicted in Table 3.1. All of the information presented in this chapter is based on these three interviews.

Table 3.1. Overview of the type of solution, city and sector represented by each of the interview respondents.

Type of solution	About the solution/concept	City	Sector
Logistics "hotel" in the city	Multi-purpose terminals in Paris that function as urban transshipment depots for shippers in addition to serving other purposes, such as office and sports facilities etc for other stakeholders.	Paris	Research (transport researcher)
Urban transshipment depot	Urban transshipment depot in London city centre for reloading goods to environmentally friendly means of transport for last mile delivery in the city centre.	London	Private sector (Freight company)
Consolidation terminal	Consolidation terminal in Gothenburg city centre that consolidates goods for last mile delivery in the city centre. This distribution is carried out by a third party.	Gothenburg	Public sector (City of Gothenburg)

The respondent from Paris is from the research sector and has worked with a large number of processes involved in the establishment of logistics "hotels" and other multi-purpose terminals in Paris. The respondent from London is from the private sector and has participated in several processes involved in the creation of an urban transshipment depot in London city centre. These urban transshipment depots are used for reloading of goods (cross-docking) without intermediate storage, and the goods are not divvied up among competing stakeholders. The respondent from Gothenburg is from the public sector and has initiated and been involved in the process of opening a consolidation terminal in Gothenburg city centre.

3.2.1 Initiatives, preparation and the beginning of the planning process

During the interviews, the respondents pointed out several aspects that were crucial to the planning process for various urban terminal solutions. These included how an urban terminal should be started, key stakeholders in the planning process and analyses that should be run prior to construction and completion work.

Initiatives for urban terminal solutions

In recent years, tender processes for land areas used for logistics, similar to what the Port of Oslo announced, have become more common in Paris (city centre). The respondent from Paris feels that this is a growing trend in several European cities. In Paris, the municipality announces the land area tenders and decides who should be awarded a building permit. Two main criteria are important: The project's sustainability and social benefits. It has become ever more common in logistics for large property developers to apply in response to these tenders in spite of the fact that the areas are urban and complex. What purpose the areas are used for depends on the team applying, which often consists of architects, property developers and, in some cases, users of the planned construction. One of the reasons for the increasing level of interest by the developers in using the areas for logistics purposes is that the demand for this type of area has risen. In the past, it was a risky investment to erect logistics terminals in areas close to city centres without government subsidies, but now logistics companies are willing to pay a higher price to rent locations close to city centres. Even though logistics areas close to city centres have become a growing trend in Paris, it is still a small niche since most logistics terminals continue to be located outside the city. The respondent from Paris feels that the demand for logistics areas close to Paris's city centre will persist but is uncertain whether the same trend would apply to smaller cities such as Oslo. The respondent points out that London has the same demand but lacks available land space. As a result of this trend in Paris, the respondent believes that closed tender processes for areas used for logistics have become more common and that there is less cooperation among various logistics stakeholders. Land plots are also a scarce resource in Paris, which intensifies the competition.

In Gothenburg, the municipality took the initiative to build a consolidation terminal in the city centre, where a third party is responsible for the last mile delivery. The municipality carried out a study on the city centre in advance and discovered that they wanted to consolidate goods that were going to the Old Town area ("innerstaden"). This solution provided more flexibility for the shops while at the same time reducing traffic congestion from cars in the inner city. The respondent explained that the streets are narrow in this part of Gothenburg city centre and that if all the freight forwarders switched to electric vehicles and other means of transport, it would result in too many vehicles on the whole. According to the respondent from Gothenburg Municipality, space and land areas are the most important factors when it comes to building an urban terminal in the city centre. Therefore, it is necessary to involve the landowner and property developer in the projects. In order for land plots to be used for logistical purposes, this must be integrated in the city's overall planning processes. In other words, the municipality's planning department is an important stakeholder whenever land plots are to be used for logistical purposes; otherwise, the land plots can be used for other purposes.

In London, the local authorities have embraced and supported the idea of an urban transshipment depot for the reloading of goods from larger vehicles to smaller zero-emissions vehicles, but they are unable to contribute land or real estate. It is therefore up to the logistics stakeholders themselves to find such areas. The stakeholder from London recently made a decision to move its urban transshipment depot from the city centre back to the suburbs, largely due to the high market prices in London city centre. The respondent explained that there are many variables, influencing the opportunity to perform efficient delivery of goods in the city centre, that are outside of the control of freight forwarders. The respondent describes the urban environment as an ecosystem that can vary significantly from city to city.

Analysis of electricity requirements

A thorough analysis of electricity requirements is important prior to establishment of a transhipment terminal if last mile delivery is to be carried out with electric vehicles. Such an analysis should find answers to:

- How many vehicles will need charging and how much and how often?
- At what times will the various vehicles need to be charged? Is a power distribution system needed?
- What power capacity will be needed in the future? The requirements at start-up may differ from the long-term requirements.
- What initiatives must be launched to ensure an adequate supply of electricity? Is extensive or costly work required? In this case, who needs to pay for this work?
- What type of technology will be needed in order to satisfy power supply needs?

The respondent from London experienced that landowners often expected the area they rented out to be returned in exactly the same condition. This means that excavation to lay electrical cables in the ground can be difficult. This should therefore be clarified ahead of time. With respect to the power supply and distribution, solutions are available for allocating electricity in the most efficient way possible 24/7 as needed. In London, they wanted to use the vehicles throughout a 24-hour period. This made charging challenging due to the short time windows between shifts. Transport stakeholders were therefore dependent on a high level of predictability when it came to charging options, both in relation to the depots and elsewhere in the city. For this reason, it is advisable to have a clear plan for where and when vehicles should be charged.

Another aspect to consider is whether the electric vehicles should be parked and charged in the terminal when not in use or whether the driver can take the car home after work. In Paris, the respondent experienced that drivers did not want to switch to electric vehicles since they did not have the option of taking the car home after work due to a lack of battery capacity or lack of charging options.

The safety aspect in relation to combined areas

There is a safety aspect connected with dividing areas between logistical activities on one hand (with semis, heavy pallets, forklifts, delivery vehicles and electric cargo bikes) and bicyclists and pedestrians on the other. How to handle the flow of goods and people in a safe manner is an important aspect in the planning and design of the area. The interview respondent from London has had a positive experience when it comes to dedicated and well-marked areas for different user groups and activities. Areas marked as limited to authorised personnel increase the liability for cyclists and pedestrians if they move into the logistics area. There is a trade-off between having isolated logistics areas and combined areas for visitors and material handling.

In Paris, some simple regulations were needed in order to permit both visitors and logistical activities to occur in one area. According to the respondent, this just involved a few legal aspects and permits that were easy to manage.

Noise issues

Noise pollution was a big challenge for the creation of urban transhipment depots in London city centre. This required investment in noise-limiting measures such as plastic or Styrofoam around pallets to reduce noise. The urban transhipment depots located close to densely populated areas received constant complaints. For this reason, it is important to recognise what lies in close proximity to the depots that could cause issues for operations, particularly with respect to night-time deliveries.

3.2.2 Experience from operations

Urban transhipment terminals close to city centres can be challenging

In London, the respondent had already moved its depots that were located close to the city centre out of the inner city by the time of the interview. There were three main reasons for this:

- To avoid the combination of bicycles and pedestrians on the one hand and logistics activities on the other
- Wanted a terminal strictly designed and adapted for logistical activities
- High property prices in London city centre

The respondent was worried about the driving distance and efficiency once it was initially decided that all urban transhipment depots had to be moved out of the city centre. Some of the drivers who previously had 15 metres to their first delivery point would now have around 1500 metres. However, it turned out that the increased distance to the inner city was compensated for by using a building adapted and designed for logistics purpose. Factors such as a loading ramp adapted for large vehicles, more space, better organisation of the flow of goods and improved efficiencies into and out of the area resulted in time savings and more efficient processes. In addition, the respondent alluded to an increase in the cost and level of risk caused by goods needing an extra round of manual processing over the course of transit when urban transhipment depots were used.

At the same time, the respondent felt that it could not be ignored that the increased distance from the terminal in the suburbs to the inner city increased transport times into the city, especially with respect to the ever-increasing level of traffic in London. The company tried to use cargo bikes at the urban transhipment depots in order to avoid traffic jams and delays but was forced to give up on this idea after they relocated the depots from the city centre due to the increased distance to the inner city. Most of the company's terminals in the suburbs are very utilitarian with little aesthetic appeal and are not designed for customer visits or use as display windows. There is a trade-off between setting up a location in areas where customers can come and pick up their own products and setting up in less attractive, but more functional areas.

Potential for profitable operations

In the case of the consolidation terminal in Gothenburg, it was not the technical issues that were the problem (access to electric vehicles etc.), but rather getting the solution to be financially acceptable with a sustainable business model. The consolidation terminal in Gothenburg has been around for six years and started with 100% of the financing provided by Gothenburg Municipality. Today, the solution is 10% financed by municipal project funds that partially fund the lease for the terminal. The goal is for the municipality to

eventually withdraw completely and for the service to be financially sustainable in the long run. The respondent from Gothenburg Municipality describes this process as challenging. For example, a year of negotiations were required to reach an agreement with the freight forwarders on a unit price for packages delivered on behalf of the companies by Stadsleveransen (the third party responsible for the last mile delivery). However, this fee is not enough to finance the solution. Some of the cost is also financed through vehicle advertising. It has been difficult to get the shops (the receivers) to pay for this service. They are concerned with receiving products, but less concerned about the logistics. The shops have already paid for the shipping and do not see a reason to pay any more. It is voluntary to participate in the solution, and the goal is for all who join in to profit from their participation. Around 50-60% of all deliveries to the Old Town area ("innerstaden") in Gothenburg currently pass through the Gothenburg consolidation terminal, where PostNord is the largest user. The largest share of the goods delivery traffic is generated by the small freight forwarders, so the focus now is on getting these freight forwarders to participate in the solution. It is important to get the large stakeholders to join in first in order to ensure financial stability.

From the perspective of Gothenburg Municipality, a clear financing plan was required from the start: a solid business plan addressing how the solution could be financed in the long run. According to the respondent from Gothenburg, there are many pilot projects going on in European cities dealing with consolidation solutions, but few initiatives of this sort survive.

In Paris, a standard business model is used for the multi-purpose terminals, which involves the developer being both the owner and manager of the terminal. This is a simple solution without co-owners. The management of the multi-purpose terminal has customers (users) who rent space, usually through short-term lease contracts. The customers/users have a lot of power since they can choose to move out after the building is completed. As mentioned, the trend in market prices for such facilities in Paris has been favourable, providing higher profits for the owners while at the same time reducing the risk of not being able to attract new tenants. If the demand falls, the rent must be lowered. This is a risk that the developers/owners take on. Multi-purpose terminals remediate this risk while other urban terminals can have issues with finding a good business model. With a variety of users, as is the case with a multi-purpose terminal, owners are able to generate a diversified income stream and not be dependent on subsidies. One of the multi-purpose terminals (logistics "hotels") in Paris even houses offices and a sports facility. The respondent from Paris was only aware of one case in which local authorities in Paris supported a consolidation terminal by providing subsidies. A manager of operations receives the goods and only one stakeholder distributes the goods from the terminal. There is no notable interest among the logistics stakeholders in such solutions, so the project applications during the tender rounds often do not include such solutions. In the vast majority of cases, the logistics operators reload goods from their own multi-purpose terminal and share the terminal with other types of stakeholders who offer other types of services.

3.2.3 Success criteria

Success criteria for a successful urban terminal for reloading of goods are focused on what should be in place when it comes to the users of the urban terminal (private or public sector) on the one hand and the municipality on the other.

Freight volume and flexibility in design

All the interview respondents point to an adequate freight volume as an important success criterion. The respondent from Gothenburg Municipality feels that an adequate freight volume must be in place in order for a consolidation solution to have satisfactory revenue. If this is difficult, one solution may be to include waste transport/handling. The "Beloved City" (Älskade stad) initiative in Stockholm accomplishes this nicely with the help of Ragn-Sells, where waste is consolidated on the return (Älskade stad, 2019).

The respondent from Paris felt that it can be smart to ensure flexible solutions with respect to the urban terminal itself, the vehicles and operations in order to facilitate changes underway if needed. Considerable flexibility in regard to the urban terminal itself and the area around it makes it easier to find new tenants if one of the users chooses to move to another location. For a multi-purpose terminal, it is important to come up with an appropriate use for the area and assess how the area should be allocated between the various users throughout the course of the day. The most hectic times should also be identified so that activities that can be carried out at other times can be scheduled to avoid these time periods.

According to the interview respondent from Paris, shipping companies in Paris continue to feel that logistics terminals in the city are expensive and complex. For some of the land for which a tender has been announced, there are already existing buildings (for example, closed filling stations) or underground terminals. Existing buildings can often have size restrictions that make entry with lorries and other large vehicles challenging. This forces the logistics companies to have to invest in custom vehicles and equipment.

A growing new trend is for architects in Paris to show more interest in urban terminals and for logistics developers to collaborate to a larger degree with large, well known architecture firms. This improves the aesthetics of the urban terminals and allows them to fit in better with the urban environment. By including a logistics expert in the application process for land plot tenders, architects can rest assured that the design will be adapted to the logistics solutions and avoid putting the final touches on the design before the users of the urban terminal are in place. This has been shown to be a success criterion for successful operations.

Continuity in the flow of goods

Ensuring continuity in the flow of goods not only depends on the actions of each and every stakeholder, but also on the actions of other parties at and outside of the urban terminal. It is important for logistics stakeholders to have an alternative plan for unforeseen events; this is particularly important for a multi-purpose terminal where several different kinds of activities take place at the same time. Factors that should be included in such a plan include alternative time windows, periods for deliveries, rush hours at the urban terminal, the area around the terminal and sensitive variables. This type of plan can prevent bottlenecks in the system. Efficient flow of people and goods is the key. The respondent from London had a positive experience with a one-directional flow of goods and vehicles. This means that the vehicles arrive on one side and depart on the other side so that unnecessary manoeuvring is avoided when executing turns.

The public sector's awareness and knowledge of logistics

In Paris, the municipality is quite active when it comes to logistical areas and logistics activities in the city. According to the respondent from Paris, it is crucial that those who work with transport and area planning in particular are well versed in logistics. This is important in order for land to be set aside for logistics activities before it is tied up for other purposes. This awareness and knowledge are often in the hands of a few individuals in the various sectors within the municipality, so it is therefore important to integrate logistics into formalised area plans.

The respondent from Gothenburg Municipality mentioned that one of the main success criteria behind the consolidation terminal in Gothenburg was effective communication with transport companies both before, during and after the planning phase. The stakeholders involved collaborated effectively. Among other things, Gothenburg Municipality has hosted a freight forum the past 11 years. The members of this forum include the largest stakeholders in freight transport. This kind of network allows e.g. the city to notify stakeholders about plans that will affect them and to receive their input. This promotes better understanding between various interest groups. However, maintaining this kind of network requires some work.

The lack of awareness and knowledge of logistics in the public sector often results in a scarce supply of land areas earmarked for logistical activities in cities. The respondent from Paris mentions that in the inner city there is good awareness of logistics but that this is not the case when it comes to the adjacent municipalities that make up Greater Paris. These municipalities possess many potentially suitable locations for logistics but they often prioritise the construction of offices and residential units. It is an issue that Paris is so fragmented.

London is now trying to find ways to integrate logistics with residential areas and commercial buildings. For many years, London deprioritised areas for logistics consolidation but now realises that it must do something to reverse this trend as the city is growing at a fast pace. If all industrial areas are redeveloped for other purposes, the logistics system in the city will not function optimally in the future. The respondent from London believes that public authorities will introduce regulatory measures requiring transport stakeholders to consolidate freight going into the city.

Main findings from Chapter 3:

- Issues and solutions when it comes to urban logistics lie at the crossroads between private and public stakeholders.
- Tender processes for land parcels used for logistics purposes may become a growing trend in European cities. In Paris, the municipality announces the land area tenders and decides who should be awarded a building permit. The challenge in many large cities is the lack of available land and high market prices make it difficult for logistics stakeholders to run a profitable operation.
- A thorough analysis of electricity requirements is important prior to completion of an urban terminal if last mile freight delivery is to be carried out with electric vehicles.
- There is a safety aspect connected with dividing areas between logistical activities on one hand and bicyclists and pedestrians on the other. This can partially be solved with proper markings and signage in the area.
- There is a trade-off between urban terminals close to the city centre, which must be user friendly and aesthetically pleasing, versus terminals outside the city centre in less attractive areas, which can have a more utilitarian design.
- The consolidation terminal in Gothenburg has found it challenging to maintain a financially sustainable business model without any subsidies from the municipality.
- Adequate freight volume and flexibility in the design and functionality are important success criteria when establishing an urban transhipment depot or consolidation terminal.
- It is important to integrate logistics in formalised area plans in order for land to be set aside for logistics activities before it is tied up for other purposes.
- According to the respondent from Paris, the lack of awareness and knowledge of logistics in the public sector is often correlated with the scarce supply of land areas earmarked for logistical activities in a city.
- The respondent from Gothenburg Municipality mentioned that one of the main success criteria behind the consolidation terminal in Gothenburg was effective communication with the shippers both before, during and after the planning phase.

4 Oslo City Hub -description of the concept

In this chapter, we start by introducing the background behind the project (Chapter 4.1) before we proceed to describe how DB Schenker plans to put Oslo City Hub into use (Chapter 4.2) and how it is designed to suit this purpose (Chapter 4.3). The information for this chapter was obtained from interviews with Filipstad Utvikling, DB Schenker, Kolonial and MMW architects.

4.1 Background

The Port of Oslo announced a concept competition concerning the use of a plot of land on one of its areas during the fourth quarter of 2017, see Figure 4.1. The Port of Oslo informed us during the interview that it wanted to move the border dividing the port from the city westward. Among other things, they did not want the port so close to Tjuvholmen. The Port of Oslo wanted to rent out the areas near Mohngården (see Figure 4.1). They are already renting out the area (land area under the building) just next to Shed 13 to Modus Design (see Figure 4.2). The Port of Oslo liked this solution and decided to announce a tender for the area behind Mohngården. The Port of Oslo wanted this to be a pilot project for urban development in Filipstad with features designed for use by the general public. Moment Eiendom and Hamoco won this competition and were encouraged to consider collaborating with Oslo Fintech and MMW architects. Oslo Fintech withdrew from the project early on and Moment Eiendom collaborated with MMW architects to carry out the project. Filipstad Utvikling AS was founded in connection with the award of the land and is owned by four partners at Moment Eiendom, along with a representative from Hamoco AS. Filipstad Utvikling entered into an agreement of intent with the Port of Oslo in May 2018. The lease arrangement for the area Filipstad Utvikling is leasing from the Port of Oslo runs through 30 April 2021, with a right to extend the contract under certain conditions.
The original concept briefing for the use of the area was focused on the environment, technology and future urban development. Mobility ended up being the concept's headline, with a combination of freight and passenger transport. The lot is located close to the city area and the Kiel ferry and is well suited for loading and unloading of freight and passengers. For this reason, an assessment was made of whether an area could be developed for a future-oriented mobility concept with car pools, bicycle pools and other sharing economy mobility options offered. At this point in time, Moment Eiendom was already discussing possible areas for reloading freight onto electric cargo bikes with DB Schenker. DB Schenker has leased areas to reload freight from delivery vehicles and lorries onto cargo bikes at the Port of Oslo's areas since June 2018. DB Schenker wanted to develop the concept, and a collaboration between the parties continued to develop. They decided to establish Oslo City Hub, which would primarily serve as an urban transshipment depot for use in reloading goods from larger vehicles to smaller, electric vehicles.

Kolonial (one of Norway's largest grocery stores that perform home delivery), which wanted to establish a presence at Oslo City Hub, eventually became involved in the project. Kolonial had used Moment Eiendom before and therefore got wind of the project at Filipstad. At that time, the project was still in the concept phase. Eventually, Kolonial withdrew from the partnership at Oslo City Hub. The reason for this was, among other things, that the electric vehicles Kolonial tested were still not good enough that they wanted to take the risk of buying more, which was a requirement for the project. At the same time, the rent was too expensive in relation to the cost savings Kolonial could realise. Enova turned down Kolonial's application for the project, which made it even more difficult to prioritise this project ahead of other projects Kolonial was working on at the time. Kolonial expresses that when the economy is unfavourable and companies like Kolonial cannot benefit from subsidies, the marketing value is the only benefit of being a part of Oslo City Hub. DB Schenker and Kolonial have been key contributors in the design of Oslo City Hub. (Read more about this in Chapter 4.3).

Currently, DB Schenker is the only one using Oslo City Hub, but the intention is for other stakeholders to establish a presence in the area Filipstad Utvikling has made available. The area consists of around 4,000 sq. m of land abutting the back of Shed 13 and Mohngården. Several other stakeholders have expressed an interest in setting up a facility in the area, and the current thinking is that a combination of different mobility services should be offered. Then the area would achieve a so-called multi-purpose function similar in a way to the Paris concept in Chapter 3.2.

Figure 4.1: The area at Filipstad where Oslo City Hub will be built. Mohngården on the left, motorway E18 on the right. Photo: Tale Ørving

Since the planning commenced, the goal for the completion of Oslo City Hub has been April 2019. This was changed along the way to 8 May. The completion date was decided upon by Filipstad Utvikling in collaboration with DB Schenker. The two parties wanted a

specific completion date to work towards while utilising the agreed lease period in the best possible manner.

4.2 Concept and functionality

DB Schenker plans to use Oslo City Hub as a depot for freight reloading from semis to electric delivery vehicles and electric cargo bikes. The thought is that the freight will pass through the depot quickly and efficiently in the form of pure cross-docking. DB Schenker plans to sort the freight in the terminal at Alnabru (located in the outskirts of Oslo) and then fine sort it between the electric delivery vehicles and cargo bikes at Oslo City Hub. No storage of the freight has been planned, only what needs to be in place ready for the second distribution round the same day. Freight will not be stored in the depot overnight. Anything that, for various reasons, is not delivered over the course of the day will be returned to Alnabru. On the other hand, both the cargo bikes and delivery vehicles will be stored at the depot (also at night) when not in use, and charged there. This is an important function for Oslo City Hub and is a prerequisite for DB Schenker to be able to carry out last mile delivery with electric vehicles. The vehicle fleet (number of cargo bikes and delivery vehicles) to be used for last mile delivery is a contributing factor that affects land requirements (both in and around the depot). DB Schenker's goal is for 80% of its deliveries within the Ring 3 area to be carried out by zero-emissions vehicles by 2019, and Oslo City Hub is an important part of reaching this goal. Eight new MAN electric delivery vehicles will be purchased for deployment from Oslo City Hub. The electric delivery vehicles have a payload of 1 tonne. These delivery vehicles have a door between the driver and the cargo area that facilitates easier delivery, eliminating the need to go around to the back of the vehicle to unload goods. According to DB Schenker, a similar solution has increased productivity by 30% in Malmö, Sweden. In addition to the electric delivery vehicles, DB Schenker has three electric cargo bikes that will operate out of the hub. DB Schenker has already opened a small depot at Filipstad for bicycle distribution in Oslo city centre that they are planning to relocate to Oslo City Hub. DB Schenker believes that this can improve the bicycle distribution and make it more efficient and profitable. They feel that bicycle distribution has been shown to be effective in the inner city with the traffic situation as it is.

DB Schenker views the Oslo City Hub project as an opportunity to harvest knowledge and develop a concept that can be transferred to other cities in Norway. Among other things, the concept is about to be implemented in Trondheim. DB Schenker would like to perform an assessment of the efficiency and profitability of the new distribution solution at Oslo City Hub before the concept eventually is transferred to other cities. DB Schenker believes that the concept may be better suited to cities other than Oslo. In Oslo, large areas are needed for reloading to environmentally friendly last mile delivery and the land requirements (if multiple stakeholders are to share the terminal) are too large. In other words, the size of the city affects the land requirements. DB Schenker says that they basically are receptive to competitors setting up facilities at Oslo City Hub, but that if all of the large stakeholders will use the terminal for reloading to environmentally friendly means of transport, an area 10 times as large as the current one will be required.

DB Schenker would like to use the Oslo City Hub solution to obtain answers to questions such as:

- Is an urban transshipment depot like Oslo City Hub the right solution in the future or should larger freight forwarding terminals be invested in?
- Should they invest in cross-docking solutions or steer clear of these in the future?

The safety aspect in relation to Oslo City Hub

In Chapter 3.2.1, the expert interviews illustrated that there is a safety aspect connected with dividing areas between logistical activities on one hand (with semis, heavy pallets, forklifts, delivery vehicles and electric cargo bikes) and bicyclists and pedestrians on the other. At Oslo City Hub, this aspect has been dealt with by designing the depot so that large lorries have direct access from the motorway network without any conflict with pedestrians and bicyclists. This helps improve to ensure safety and improve the urban environment.

Expected profitability

DB Schenker is uncertain whether Oslo City Hub will be a profitable project for the company, but feels that the experience gained throughout the project may provide valuable competitive advantages and that the company can play the role of a pioneer and reshape the freight market. At the same time, there are considerable costs associated with this project. For example, the work involved in planning and preparing Oslo City Hub for the launch took about 1.5 man-years for DB Schenker according to the company itself. Significant costs have also accrued in connection with the land lease for Oslo City Hub since real estate prices in the area are high. In addition, DB Schenker has invested in 8 new electric delivery vehicles that will be used for distribution at Oslo City Hub.

At the same time, the distribution solution from Oslo City Hub will help reduce the number of trips through the Oslo ring toll zone since freight transport from Alnabru to the depot will be carried out via semis while last mile delivery will be performed directly from the depot using smaller delivery vehicles and cargo bikes. DB Schenker feels that the Oslo Package 3 ('Oslopakke 3') toll stations will result in considerably higher costs for the company but that these costs will be significantly reduced from the transition to distribution out of Oslo City Hub and the use of electric delivery vehicles within Oslo city centre. According to DB Schenker, Oslo Package 3 has helped speed up the pace of development and spurred on more rapid changes within the transport sector.

4.3 Design of the terminal

Out of consideration to the relatively short lease period, Oslo City Hub is designed with a containerised structure (shipping containers) that enables the depot to be easily disassembled, moved or modified as needed.

Flexible containerised solution

The container concept was developed by MMW architects. MMW architects designed a similar facility at Filipstad previously in connection with a project for Modus Design AS (see Figure 4.2). Modus Design AS wanted a new, temporary solution for its head office

and production facilities. This building consists of ten 40-foot-long containers that are stacked on top of one another, making up a total of 4 floors (mmw.no).

Figure 4.2: Containerised structure like the one planned for Oslo City Hub. Offices belonging to Modus Design AS at Filipstad in Oslo. Photo: Nils Petter Dale. Reprinted from: mmw.no

The containerised structure enables flexible, temporary construction with a low cost of investment. If the need for the building goes away, the containers can be relocated to other places and be used in other construction or resold for shipping purposes. In order for the containers to be reused for shipping purposes, they must be intact with no installed windows or doors etc (like the containers in the image above). These properties make the construction well suited for temporary projects like Oslo City Hub, where the contract term for the land lease is relatively short. In contrast to when containers are used for shipping, the certificate for the containers is just as valid after the containers have been used for a building. There is therefore not much depreciation in the value of the containers over the course of the lease period, which reduces the risk associated with the establishment of Oslo City Hub, even though the operating period is likely just two to three years long.

The design process and the final construction

Oslo City Hub consists of containers - a vertical layer of two containers 6 metres in height and five horizontal containers above each module designed to serve as roofs. The overall height is thus 9 metres, see Figures 4.3 and 4.4. Several project meetings have been held on a regular basis in connection with the design of Oslo City Hub in order to discuss blueprints and proposals for solutions. The design process was carried out as a collaborative venture between DB Schenker and the project partners. According to both DB Schenker and the project partners, the participation of DB Schenker (the user of Oslo City Hub) with its expert knowledge was critically important in this phase of the project. As an example, in consultation with DB Schenker, the project group discovered that the height of the containerised structure needed to be increased where the semis would be unloading freight into the three openings (shown on one side of the image in Figure 4.3). Modules 1 and 2 (right side of Oslo City Hub in Figure 4.3) are designed to service cars with a loading height of 60 cm (delivery vehicles) and 110 cm lorries/semis. It was decided to raise modules 1 and 2 80 cm above ground level before excavation in order to minimise molestation to the area as much as possible. At the same time, DB Schenker wanted module 3 (farthest to the left in Figure 4.3 with installed windows and doors) to be at

ground level since it is the main entrance to Oslo City Hub. In order for the building method to work, where containers were placed horizontally above as roofs, all sides needed to be equal in height. The solution turned out to be a combination of so-called high-cube containers and standard containers (which stand on top of a foundation), where the high-cube containers are taller than the standard containers. Using high-cube containers for container heights 1 and 2 evens out the height difference for the modules in container layer 3. This enabled the construction both to be adapted for deliveries from semis and serve as an entrance for visitors and employees while, at the same time, containers were able to be used as a roof throughout the building, see Figures 4.3 and 4.4. The roof consists of 15 empty containers that are not planned to be used. DB Schenker feels that it is a shame that 15 containers will remain empty at a location like Oslo City Hub that is so ideal from a strategic standpoint. In light of the fact that this is a temporary project extending over a brief time period, for Filipstad Utvikling, there is a risk associated with installing windows or making other significant modifications to these containers since it complicates the options for recycling and reuse of the containers.

Figure 4.3: Illustration of Oslo City Hub viewed from the northwest. Illustration: mmw arkitekter AS, 2019.

Figure 4.4: Illustration of Oslo City Hub viewed from the southwest. Illustration: mmw arkitekter AS, 2019.

The solution with container modules is easy to set up and re-establish in transitional periods, which corresponds well with the temporary time horizon of the Oslo City project. DB Schenker also mentioned some potential weaknesses in the design of the depot, such as heating in the building during the winter months, noise (this type of construction permits a fair amount of noise), openings (can only be opened up to a limited extent without losing its load-bearing capacity), insufficient water and drainage and the fact that the uppermost floor will not be used for anything. Whether or not this proves to be an issue will be revealed during the operational period. Heat pumps are planned to be installed in the depot autumn 2019.

The footprint of Oslo City Hub is 36 * 12 meters, which includes loading space for the electric vehicles. DB Schenker plans to use 152.5 sq. m of gross interior space for cross-docking freight and 148.8 sq. m of gross interior space for a terminal/warehouse/cargo cycle loading etc. The grounds area for arranging goods on the semis/containers has not been included above. This is land that Filipstad Utvikling has set aside for this purpose and to serve as an entryway to the other modules in the building. There will be a need for land for delivery vehicle parking spaces along the longer side of Oslo City Hub and for semis on the one shorter side. As of now, it has yet to be determined what module 3 will be used for. Figures 4.5 and 4.6 show images of the construction activities taken at the end of April 2019.

Figure 4.5: Construction activities at Oslo City Hub taken on 29 April 2019. Mohngården on the right. Photo: Tale Ørving

Figure 4.6: Construction activities at Oslo City Hub taken on 29 April 2019. Photo: Tale Ørving

Figure 4.7 shows the final construction at Oslo City Hub taken at the grand opening of the hub on 8 May 2019.

Figure 4.7: Oslo City Hub during the official opening of the hub on 8 May 2019. Photo: Olav Eidhammer

Main findings from Chapter 4:

- Oslo City Hub is located in an area where it eventually will become part of a larger environment. Filipstad Utvikling has planned a multi-purpose area, i.e. the option for several stakeholders to use the area that Oslo City Hub is already a part of.
- Simple, inexpensive terminal building using shipping containers as modules
- There are two key stakeholders (Filipstad Utvikling and DB Schenker) who are the driving forces behind the project. DB Schenker is willing to allocate resources to test a new zero-emissions distribution solution. The project suits DB Schenker's goal of emissions-free freight distribution within the Ring 3 zone by 2021.
- Optimal location for distribution within the Ring 1 zone.
- Only cross-docking of freight through the terminal, no significant sorting or storage of goods. Reloading from larger vehicles to cargo cycles and electric delivery vehicles.
- An important caveat for Oslo City Hub is that cargo bikes and electric delivery vehicles must be stored and charged at the depot overnight when not in use. This is an important prerequisite in order for DB Schenker to be able to carry out last mile delivery with electric vehicles and will have a direct effect on the need for space.
- DB Schenker hopes that the Oslo City Hub project will provide valuable experience and help them develop a concept that potentially can be transferred to other cities in Norway.
- At Oslo City Hub, lorries and semis have direct access from the motorway network without any conflict with pedestrians and bicyclists. This is advantageous, both for safety and the urban environment.

5 Oslo City Hub – from idea to completion

In this Chapter we start with a presentation of the stakeholders who played the key roles in the creation of Oslo City Hub and describe their collaboration (Chapter 5.1). Then we describe how the interview respondents from the logistics sector feel that the public sector can support similar urban terminals and effective urban logistics (Chapter 5.2). Finally, we take a look at the planning process from concept to completion, illustrated with a timeline of the most important events (Chapter 5.3).

5.1 Stakeholders involved and their roles

The private sector stakeholders who were involved in the creation of Oslo City Hub worked closely together in connection with the design of the urban transshipment depot. The public sector stakeholders who played a role or held an interest in the creation of Oslo City Hub mainly include the Port of Oslo (which leases the area to Filipstad Utvikling and announced a tender for the concept competition), the City of Oslo Planning and Building Services (which evaluated and issued the building permit for Oslo City Hub), the Norwegian Public Roads Administration, Eastern Region (which provided the required exemption from the building permit application) and the Agency for Urban Environment (whose goal is to act as a facilitator for consolidation terminals and other urban terminals in Oslo and has thus lent its assistance to the Oslo City Hub project).

5.1.1 Private sector stakeholders

Filipstad Utvikling

Filipstad Utvikling AS is owned by four partners at Moment Eiendom, along with a representative from Hamoco AS. Filipstad Utvikling has signed a lease agreement with the Port of Oslo that expires in April 2021. Filipstad Utvikling sub-leases the Oslo City Hub area to DB Schenker.

MMW architects

MMW architects has partnered with Filipstad Utvikling in the development of Oslo City Hub and is the architect behind the containerised construction used.

DB Schenker

DB Schenker is a German logistics and shipping company. DB Schenker has been an important partner for Filipstad Utvikling in the planning and establishment of Oslo City Hub. DB Schenker operates Oslo City Hub.

5.1.2 Public sector stakeholders

The Port of Oslo

The Port of Oslo is a non-profit company under the 'Byrådsavdeling for næring og eierskap' [City Council Department of Industry and Business Ownership]. The main objective of the Port of Oslo is to ensure effective, rational port operations. This includes facilitating effective, environmentally friendly maritime transport and to oversee traffic in the port district. The Port of Oslo must also manage the port's property and facilities in a responsible financial and environmental manner (Port of Oslo, 2019).

The City of Oslo Planning and Building Services (PBE)

The City of Oslo Planning and Building Services (PBE) is an agency under the 'Byrådsavdelingen for byutvikling' [City Council Department of Urban Development] (Oslo Municipality, 2019). PBE is responsible for the municipality's overall land use planning, planning and construction case work, map management and supervision of surveyors and land allocation companies (Oslo Municipality PBE, 2019). PBE received the building permit application from Filipstad Utvikling for Oslo City Hub and approved it following a standard application and case management process.

Norwegian Public Roads Administration

The Norwegian Public Roads Administration, Eastern Region, 'Planforvaltning- og miljøseksjon' [Plan Management and Environment section] of 'Vegavdeling Oslo' [Oslo Department of Roads]. The section is responsible for plan management of external planning matters relevant to the national motorway network in Oslo as well as professional responsibility for environmental management and measures related to air and water quality and noise pollution in Oslo and Akershus.

The section provides professional assessments and makes statements on external planning and construction matters affecting the national motorway network in Oslo. It also participates in processes related to land development and transport in Oslo and coordinates the department's role in such matters.

- As *the "owner" of the roads*, it plays a supportive role in safeguarding the ownership interests of streets and land in regulatory and construction matters. It must ensure that the purpose of the motorway network is maintained in line with applicable guidelines and that adjoining land use does not come into conflict with this.
- As *the authority in the sector*, it ensures that land use plans take into account national and regional considerations for coordinated residential area and transport planning, mass transit, bicycle/walkway traffic safety and environmental and universal design requirements.
- As *the road authority*, they adopt measures in cases dealing with exemption from zoning boundaries and modified use of road exits in accordance with the 'Veglova' [Act on Roads].

The last point is the most relevant one when it comes to the Oslo City Hub project. It was the Eastern Region of the Plan Management and Environment section of the Oslo Department of Roads that provided the exemption that the project needed in the building permit to PBE. An exemption from the zoning boundary requirement was provided. A zoning boundary limits how close to the road you are allowed to build. The zoning

boundary must take into account traffic safety, operation and maintenance of the road, land use requirements for future improvements and the property environment along the road (Norwegian Public Roads Administration, 2019).

The Agency for Urban Environment (BYM)

The Agency for Urban Environment (BYM) is an agency under the 'Byrådsavdelingen for miljø og samferdsel' [City Council Department of Environment and Commercial Transport] (Oslo Municipality, 2019). BYM participates in the STOR project, which is a cooperative venture between The Norwegian Public Roads Administration Oslo, BYM and Ruter.

BYM received an order from City Council Department of Environment and Commercial Transport to assist in establishing more urban terminals: initially, shippers/freight forwarders who load or reload their freight at the terminal, and longer term, consolidation terminals where multiple stakeholders consolidate the freight prior to last mile delivery.

5.1.3 Collaboration between parties involved in the project

Information in this sub-chapter has been obtained from interviews with key stakeholders.

Collaboration between Filipstad Utvikling and the Port of Oslo

During the entire planning process, Filipstad Utvikling has had ongoing contact with the Port of Oslo concerning the progress of the project. According to Filipstad Utvikling, there have been regular meetings between the two parties. Filipstad Utvikling feels that the Port of Oslo has been an active participant in the process and an important stakeholder when it comes to the realisation of the concept. The Port of Oslo is described as being positive and helpful when it comes to ensuring that the concept succeeds. At the same time, according to Filipstad Utvikling, the Port of Oslo offers some tough guidelines in the form of short contract periods, brief termination periods and specific wishes as to what the tenants should offer and what kinds of activities they should carry out. According to the project group, the Port of Oslo had one criterion for Oslo City Hub, namely that it must also be a destination for visitors and that it must be possible to enter the facility from the Harbour Promenade. Filipstad Utvikling and the Port of Oslo have discussed and agreed upon a temporary solution related to the power supply for Oslo City Hub and the charging of DB Schenker's delivery vehicles and cargo bikes.

From the perspective of the Port of Oslo, they report that the collaboration with Filipstad Utvikling has functioned without a hitch and the two parties have enjoyed open dialogue during the planning process. The Port of Oslo indicates that the project has been modified somewhat from the initial concept along the way, but within the boundaries of the original framework. The Port of Oslo experienced that if modifications were planned that lay outside the framework of the tender, Filipstad Utvikling sought the approval of the Port of Oslo in advance. The Port of Oslo did not want to get too involved in the features and design of Oslo City Hub but had hoped that the final solution would be more oriented to the general public than Oslo City Hub ended up being. At the same time, the Port of Oslo felt that the area continues to have the potential to offer this and that interest in the area will continue to grow once Oslo City Hub is in place.

One thing that the Port of Oslo believe they would do differently if they could have started the process over again is to set stricter requirements for the progress of the project so that Oslo City Hub would have been completed sooner and the Port of Oslo would have received rental income at an earlier point in time. This did not become a significant issue in this case since the prior tenant for the area had an ongoing contract on a monthly basis. This made the situation quite flexible and the Port of Oslo did not lose much money over the fact that it took some time to complete Oslo City Hub. The Port of Oslo says that it received full income for the area up to the end of December 2018 when it had to terminate the existing agreement and clean up the area so it was ready for construction. The Port of Oslo received money from Filipstad Utvikling as construction on the depot started.

The Port of Oslo also feels that the time considerations for the lease period are challenging. The time perspective is affected by the pace of the area development at Filipstad (Port of Oslo), which makes it a special risk scenario for anyone setting up operations there. All of the risk has been taken by Filipstad Utvikling, which has an option on the land plot. The Port of Oslo respondent feels that the establishment of Oslo City Hub can provide some beneficial spin-off effects and that several stakeholders will join in now that Filipstad Utvikling has something to show.

Collaboration between the project group and the Agency for Urban Environment (BYM)

In the interview, Moment Eiendom expressed that they have experienced an exclusively positive attitude from local authorities. The fact that it is a temporary project makes it easier to achieve breakthroughs. DB Schenker was originally planning to complete the Oslo City Hub project without any help from the public sector, but then BYM asked if there was anything that they could do to facilitate the project. DB Schenker then provided some feedback, including mentioning the need for charging options, not only at Oslo City Hub but in Oslo city centre in general. DB Schenker intends to collaborate effectively with Oslo Municipality and feels that the municipality needs to take the initiative to hold discussions with the industry and reach an agreement on how urban logistics should function in the future.

In an interview with BYM, BYM indicated that Oslo Municipality would like to start an process searching for land areas that can be used for various urban terminals and adapted for operations. This can be done as a follow-on after the land use and transport plan for Oslo and Akershus is revised. In connection with the opening of Oslo City Hub, BYM has offered to contribute by facilitating the required infrastructure, such as e.g. water and sewage, charging points, marking and signage and contact between the various stakeholders. The fact that the Filipstad area is being developed in cooperation with several different stakeholders provides BYM with a better opportunity to act as a facilitator. At the moment, only DB Schenker has set up a facility in the area, but there are concrete plans for additional stakeholders in the mobility sector to join in later. BYM does not place specific demands on the design and operation of Oslo City Hub, but it is implicitly understood that the depot and shipping from the depot must be fossil-free.

Collaboration between Filipstad Utvikling and DB Schenker

Filipstad Utvikling feels that the collaboration with DB Schenker has worked well and explains that it has had a close dialogue with DB Schenker since June 2018 when DB Schenker started up with 1 container and 3 electric cargo bikes. Their dialogue continued to grow and the Oslo City Hub project took shape fairly quickly. The process has required a lot of time and planning from both parties, and there are many details that needed to be in place even for a relatively small project like Oslo City Hub. Filipstad Utvikling and DB Schenker have also been in frequent contact with authorities, both together and individually.

According to Filipstad Utvikling, the fact that they were not able to sign a contract with DB Schenker until the end of March 2019 presented a challenge for the planning process. In order to maintain progress toward the planned opening of Oslo City Hub in spring 2019, Filipstad Utvikling had to take on a financial risk, among other things, in connection with engaging various advisers and ordering needed materials. In other words, the collaboration and progress were based on the parties trusting one another, working toward a common goal and agreeing on terms and conditions etc. Filipstad Utvikling believes that both parties have been focused on solutions and feels that the results have been positive.

5.2 Input from Oslo Municipality

Public sector facilitation and the use of facilitating policy instruments and measures may be needed to establish similar urban terminals at other locations in Oslo as well as in other Norwegian municipalities. In this sub-chapter, input is provided on how public authorities can facilitate the establishment of urban terminals and how the municipality can promote effective urban logistics. The information in this sub-chapter has been obtained from interviews with the logistics stakeholders DB Schenker and Kolonial.

On a general basis, DB Schenker feels that Oslo Municipality lacks a long-term plan for urban logistics as well as a commitment and clear preference with respect to how the municipality would like urban logistics to function in the future and how it plans to go about solving issues. DB Schenker feels that a close dialogue with the largest shipping companies is needed during this process in order to ensure that solutions are appropriate. DB Schenker feels that the Oslo City Hub project will be helpful in getting this process started. Starting up a project like this solo and being able to demonstrate positive results and effects from this type of solution will count far more than words and objectives alone and will help speed up the process.

DB Schenker sees a new trend in the market, a transition from B2B to more and more B2C. This has an effect on the size and number of packages and is closely correlated with the rise of e-commerce. Where DB Schenker previously delivered one large parcel to a shop, now there are often 10 smaller packages that need to be shipped to various home addresses.

Kolonial feels that the public sector's understanding of commercial shipping is low compared to passenger transport and that the public sector must gain a better understanding of the effect commercial shipping has and will have on densely populated areas. According to Kolonial, there is little data and research available in this field. Kolonial specify that linear growth is often forecasted in terms of commercial shipping, but adds that nothing is linear when it comes to the Internet. As an example, the closure of many

brick-and-mortar shops and decrease in their overall numbers is an escalating effect correlated with the rise of e-commerce. The increasing prevalence of online sales will not be scalable when it comes to customers collecting their parcels in shops. The authorities must understand the extent and consequences of the changes taking place. Kolonial specifies further that for each reloading point it gains access to in its distribution, the opportunity to replace a larger portion of its vehicle fleet with electric alternatives increases while the average number of miles driven decreases.

Kolonial feels the private and public sectors must actively work on solving the different freight distribution issues. The questions are what needs to be done and who should be responsible? It is important that industrial stakeholders are involved in the municipality's solution in designing an urban logistics policy. The public sector cannot just look ahead 10 years, but must also look at the technological solutions available going forward. There is a need for industrial stakeholders to take the lead and test and invest in new distribution solutions. Kolonial adds that the public sector is supportive when things are done the right way and that it therefore pays off to start experimenting at an early stage so stakeholders have something to show. Kolonial would like to see a framework to facilitate experimentation and learning.

5.3 The time aspect

Figure 4.8 shows the timeline for the most important milestones of the project, from when the Port of Oslo announced the concept competition tender in 2017 to when Oslo City Hub was completed in 2019.

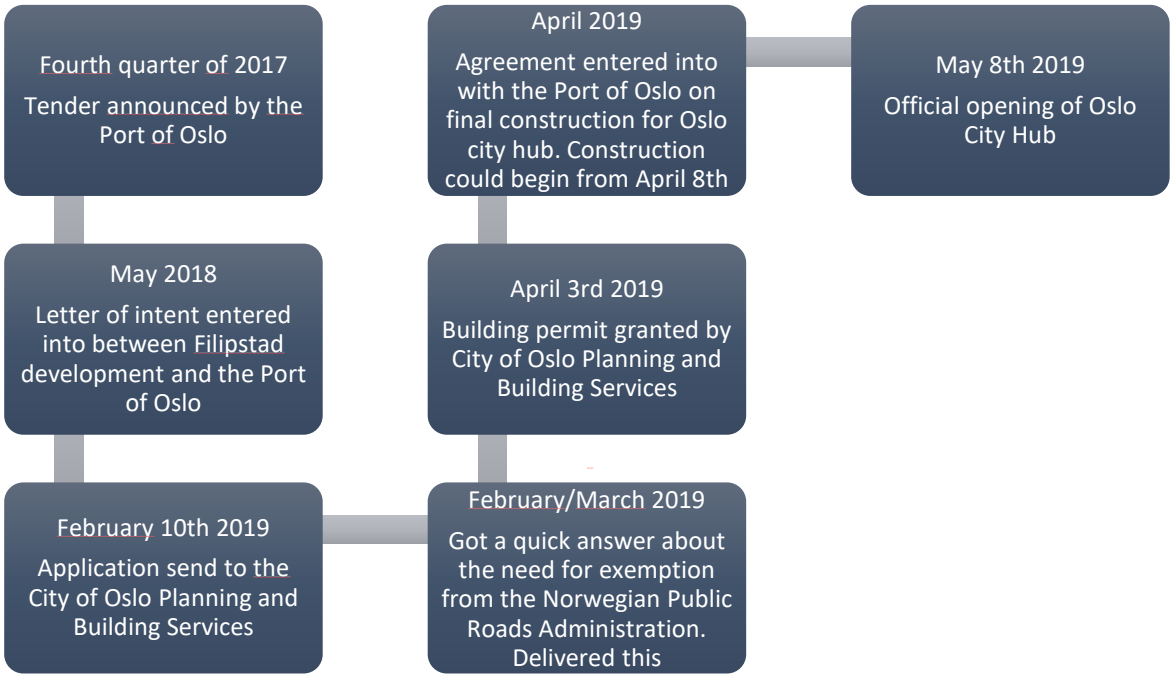


Figure 4.8: Time line that illustrates the most important events in the planning process towards the establishment of the Oslo City Hub.

During the period starting with the founding of Filipstad Utvikling and the signing of an agreement of intent with the Port of Oslo (May 2018) up to the date when the building permit application was sent to PBE (February 2019), the plan for the use of the area was significantly amended (see Chapters 4.1 and 4.2). When Filipstad Utvikling sent its one-step application to PBE, it received a prompt reply that it needed an exemption from the Norwegian Public Roads Administration (SVV) since the planned construction was less than 50 metres away from motorway E18. Filipstad Utvikling was then ordered by SVV to move the construction so that it was at least four metres away from the fence that faced the pedestrian walkway and E18 (see Figure 4.1). This did not involve a major relocation of the construction for Filipstad Utvikling. Once Filipstad Utvikling made the required modifications and submitted the application for exemption, it was handed off to a new team at PBE, and a new process with a 12-week-long processing time began. Filipstad Utvikling's building permit was approved by PBE on 3 April. Filipstad Utvikling felt like things ran smoothly and had no complaints about the amount of time used by the public sector on this process. The company felt that it was its own lack of internal coordination that was to blame for the delay. Construction started on 8 April, and Oslo City Hub was officially opened on 8 May. An agreement for the final construction of Oslo City Hub was entered into between the Port of Oslo and Filipstad Utvikling. This is a step-by-step solution, which means that each time Filipstad Utvikling modifies the construction of the building, the lease agreement for the building's footprint is modified accordingly. Filipstad Utvikling is the owner of the construction. The agreement with the Port of Oslo expires in April 2021, but Filipstad Utvikling hopes to either extend it or move the construction further out on the Filipstad lot. This is contingent on the general regulations for the Filipstad area. Filipstad Utvikling hopes that operation of Oslo City Hub will show that the solution benefits the city as a whole.

The official opening of Oslo City Hub was held on 8 May 2019 (see Figure 4.9 from the opening).

Figure 4.9: From the official opening of Oslo City Hub on 8 May. Photo: Olav Eidhammer

5.4 Critical components in the planning process

Power supply

The power supply to Oslo City Hub is currently being received on a provisional basis from the Port of Oslo's power outlets. This provisional solution is sufficient to make Oslo City Hub operational. In the long run, an increase in the power supply is needed once more stakeholders, who will need charging capacity, commit to setting up facilities in the area. Moreover, the current solution does not allow DB Schenker to quick-charge the vehicles. Facilitation of an increased power supply is an urgent topic that continues to be discussed in the collaboration with BYM.

Little predictability

One factor reducing the predictability is that the Port of Oslo is unable to enter into agreements with private sector stakeholders or interests that run past 2021. Beginning in 2022, the Port of Oslo can terminate agreements on 6 months' notice. This project should therefore be regarded as a pilot project to assess whether it is a good solution and can be transferred to other places and cities. The fact that it is a temporary project also has some advantages - it is easier to receive a building permit and get underway more quickly. This provides an opportunity to test out the solution and receive more rapid feedback on what works and what does not. Filipstad Utvikling and DB Schenker share the opinion that testing and trials that yield results showing that this is a good, effective solution will have a positive ripple effect. This will provide experience and knowledge that can be used to develop similar solutions at other places that can shorten the planning process. Nonetheless, there is a risk associated with investing in equipment and vehicles that are customised for distribution from Oslo City Hub when it is unclear just how and where this distribution will take place after 2021.

Main findings from Chapter 5:

- Oslo City Hub is a private initiative. The municipality has supported the project without being a driving force or being notably involved. The process is a collaboration between several stakeholders.
- Oslo Municipality has offered to contribute to the project in the form of facilitating the supply of electricity.
- PBE followed up on the application for the building permit etc.
- Oslo Municipality plays a subordinate role since a tender for the area was announced in an open competition by the Port of Oslo.
- The project has not been subsidised by the municipality or other public sector operation.
- SVV has contributed by providing an exemption from the road regulation.
- Enthusiasm and a positive reception from all parties involved in the project.
- Good communication between the stakeholders, both private and public sector.
- Advantageous that the private sector stakeholders have carried out their roles in a professional manner and known who and what is needed to erect a building (for example in a building permit).
- A driving force (large stakeholder with financial muscle) and a team of professional stakeholders responsible for their individual parts of the planning and completion process up to the opening of the terminal have been important.
- DB Schenker would like to see Oslo Municipality come up with a long-term plan for urban logistics. DB Schenker and Kolonial agree that industrial and shipping stakeholders should be involved in this process.
- Kolonial feels that the public sector's understanding of commercial shipping is inadequate and that there is a need for more research and knowledge about the effect commercial shipping has and will have on densely populated areas (especially when it comes to e-commerce).
- Kolonial specifies further that access to reloading points in the city centre will improve its opportunity to replace a larger portion of its vehicle fleet with electric alternatives and lower the average number of miles driven.

6 Summary and discussion

In this chapter, we summarise the main findings from the report and present the success criteria identified for establishing an urban transshipment depot like Oslo City Hub (in Chapter 6.1), present a compilation of the most important challenges (in Chapter 6.2) and, last but not least, discuss the transferability of the idea to other private sector stakeholders or municipalities that would like to establish a similar facility (in Chapter 6.3).

6.1 What is important for the establishment of an urban transshipment depot in the city centre?

Based on an evaluation of the planning and completion of Oslo City Hub, we have arrived at five success criteria that account for the successful establishment of Oslo City Hub, summarised in Figure 6.1. The success criteria are a compilation of the results of our interview rounds with experts and key stakeholders. The choice and definition of success criteria are more or less exclusively based on the viewpoints of respondents. The list is not exhaustive and simply includes the success criteria that the interview respondents considered to be important for the establishment of Oslo City Hub.

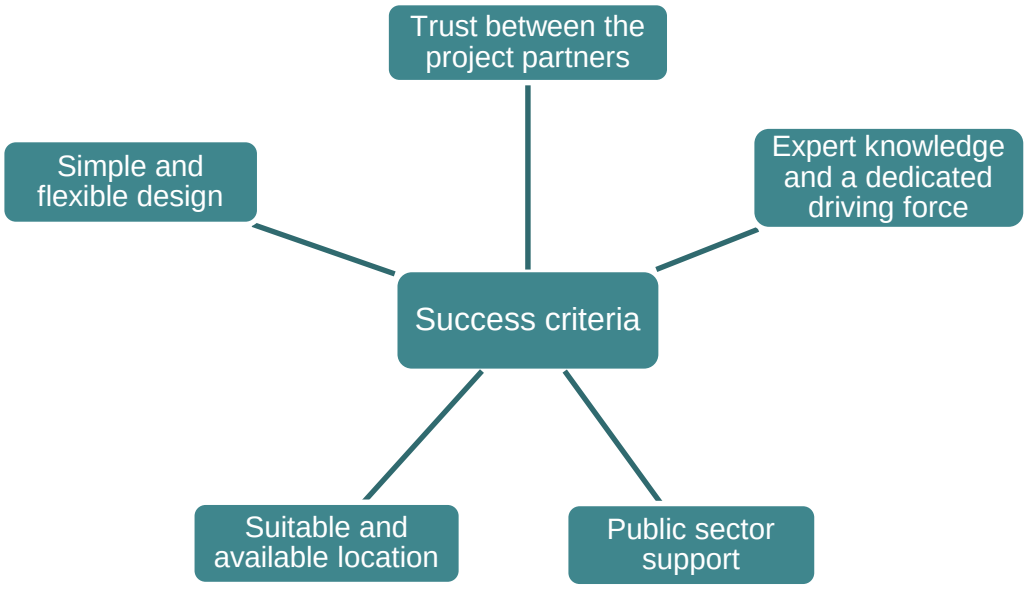


Figure 6.1: Compilation of the main success criteria in the planning process of the establishment of Oslo City Hub.

Trust between the partners

As mentioned in Chapter 5.1.3, Filipstad Utvikling, which assumed the greatest amount of risk in the planning of Oslo City Hub, points out that trust between the partners in the project has been crucial to the progress and success. For example, DB Schenker was not

able to sign the contract with Filipstad Utvikling until the end of March 2019. As a result of this, Filipstad Utvikling assumed a financial risk, among other things, in relation to engaging various advisers and ordering needed materials to ensure the progress of the project. This decision was based on built-up trust between the partners.

Expert knowledge and dedicated prime movers in the planning and design process

According to Filipstad Utvikling, MMW architects and DB Schenker, having a logistics stakeholder participate in the planning of Oslo City Hub was crucial in order to ensure a functional design for Oslo City Hub that was adapted for incoming and outgoing traffic and reloading (see Chap. 4.2). The same stakeholders feel that it has also been beneficial to have an architect that is familiar with this type of building structure and what is required to ensure the building is both aesthetically pleasing and suitable for the urban environment. This was confirmed in the expert interviews in Chapter 3.2.3, where the respondent from Paris pointed out that rising interest in the design and completion of logistics facilities in the city on the part of architects has helped urban terminals look more aesthetically pleasing and fit in better with the urban environment. At the same time, by including a logistics expert in the application process or earlier in the planning phase, architects can rest assured that the design will be adapted to the logistics solutions and avoid putting the final touches on the design before the users of the urban terminal are in place. This has been shown to be a success criterion for successful operations in Paris.

Based on the interviews with the stakeholders involved in the establishment of Oslo City Hub, we feel that it is essential to incorporate committed prime movers into the planning and completion work, individuals who both have experience from similar processes and an opportunity to invest plenty of time in bringing the concept to completion. For Filipstad Utvikling, it has been an intense, time-consuming process in which it has taken a lot of risk in connection with its investments in time and materials. The same largely applies to DB Schenker. As mentioned in Chapter 4.2, the work involved in planning and preparing Oslo City Hub for the launch took about 1.5 man-years for DB Schenker.

Support and effective collaboration from the public sector

The public sector was not involved much during the planning phase for Oslo City Hub. However, the project was nonetheless dependent on various public agencies, such as the Port of Oslo, the Planning and Building Agency (PBE) and the Norwegian Public Roads Administration (SVV), in order to realise the concept (see Chapter 5.1). Oslo Municipality's Agency for Urban Environment (BYM) was also somewhat involved and supported the project by offering to act as a facilitator. This corresponds with findings in the literature that highlight the difficulty in initiating real estate projects in inner cities without the involvement of public agencies. Close cooperation with urban planning authorities can therefore be important in order to succeed with logistics locations in city centres (Diziain et al, 2012).

The planning and completion of Oslo City Hub was directed by private sector companies. During interviews with DB Schenker and Kolonial, both parties highlight the general importance of improved cooperation between the public and private sectors in designing future urban logistics initiatives (see Chapter 5.2). Increasing e-commerce may lead to big changes in urban logistics and, in particular, in commercial shipping in densely populated areas. Urban transshipment depots in city centres like Oslo City Hub are examples of measures that can assist a more rapid transition to electric vehicles for last mile delivery, while also reducing the average miles driven. Oslo City Hub is also described as an

experiment that DB Schenker has used to assess whether this type of facility can be an effective, appropriate distribution solution and serve as a way to convince the public sector with actual results that this type of depot can contribute to higher efficiency and environmentally sound distribution.

Gothenburg Municipality has had a positive experience with involving logistics stakeholders in urban planning and strategy sessions before implementing changes that will affect the stakeholders. In this way, logistics stakeholders can provide their input while the municipality gets a better understanding of the needs and challenges faced by the shipping industry. This leads to better mutual understanding and cooperation between the public and private sectors (see Chapter 3.2.3).

Suitable, available locations for urban transshipment depots in city centres

Without access to areas in the city centre, a concept like Oslo City Hub cannot be completed. Available land is often a scarce resource in cities and is largely used for purposes other than logistical activities. It has been shown to be difficult for logistics stakeholders to acquire land for urban terminals without the support of the public sector (Ørving et al, 2018). As described in Chapter 3, more cities nevertheless see an increasing need for areas dedicated to logistical activities in order to facilitate effective, environmentally friendly urban logistics. An urban terminal must satisfy a number of requirements in order to ensure profitable operations, and the location should therefore be chosen in consultation with the stakeholders that will be operating the urban terminal. Two factors are crucial when it comes to the location: that the urban terminal is close to the motorway network with easy access for supply vehicles and that it is close to areas with high customer density to facilitate efficient product distribution with more small environmentally friendly vehicles.

The developments in Paris, where logistics stakeholders are increasingly participating in tenders for land parcels, is rare in Norway as far as we know. This is becoming more and more common in the city of Paris even though it still remains a small niche in the overall real estate scene. Like many other European cities, available land is scarce, which intensifies the competition. In Paris, the municipality is the one that announces tenders for land parcels, using two key criteria: sustainability and social benefits. It has become ever more common in Paris for large property developers of logistics facilities to apply in response to these tenders in spite of the fact that the areas are urban and complex. The collaboration on the Oslo City Hub project between the real estate company Moment Eiendom, MMW architects and DB Schenker ended up working out well, yielding relatively rapid, successful results in the form of an urban transshipment depot. Areas opened up to competition can also be in the form of existing buildings such as closed filling stations or car parks owned by local authorities.

Simple and flexible design due to the short time horizon

In light of the short lease period for the area, a construction method was needed that could facilitate rapid construction once the building permit was in order along with straightforward disassembly following expiry of the lease period. After the end of the lease period, the land must be returned in the same condition as it was when the agreement was signed. For this reason, it would not be appropriate to make sizeable alterations, such as e.g. ground excavation. The construction makes it possible to relocate Oslo City Hub to another location if needed. Flexibility was also mentioned as a keyword for success in the expert interviews in Chapter 3.2. Flexibility in the design makes it possible to make changes underway, which is particularly important whenever a new distribution solution is being tested. Considerable flexibility in the urban transshipment depot and the surrounding area also lowers the risk to the lessee in the event new or additional tenants with other types of needs must be recruited.

6.2 Challenges to completion

Short time perspective and limited amount of predictability for logistics stakeholders

Assuming the lease period ends as agreed in April 2021, DB Schenker would enjoy a period of operations of two years. This is a short time horizon with respect to establishing a new distribution solution with newly acquired electric vehicles. DB Schenker sees this brief operating period as an opportunity to gain useful knowledge and experience around the new concept and plans to assess whether cross-docking, in the form of a transshipment depot in the city, is something in which the company would like to invest in the future. The results of operations (profitability, efficiency and social benefits) will be useful as real-life input that can be provided to the public sector and used when concepts like this are to be evaluated. As mentioned in Chapter 5.2, DB Schenker would like to see Oslo Municipality develop a long-term plan for urban logistics as well as a commitment and clear preference when it comes to how the municipality would like urban logistics to function in the future and how it will go about solving issues. This would provide greater predictability for logistics stakeholders and reduce the risk of converting to new, more environmentally friendly distribution solutions.

Profitable operations

For logistics stakeholders, there are costs associated with adding an additional reloading step before goods are delivered to the end customer. One of the reasons for this is the risk of injury when people handle the goods. This cost must be weighed against the environmental benefit, logistical results and other societal advantages of this type of urban transshipment depot. An advantage for the logistics stakeholder, for example, can be better accommodation of customer wants and needs, such as providing more flexible delivery times and making a quicker transition to environmentally friendly vehicles. Another financial barrier is that land close to a city centre tends to be more expensive than in areas outside of the city. The profitability of operations has not been evaluated in this report but is an important consideration in any assessment of the potential of this type of commercial shipping solution.

6.3 Opportunities to transfer the concept to other cities

The partners involved indicated that if the concept is successful in Oslo, it is not beyond the realm of possibility that it also could succeed in other Norwegian cities. It may be easier to establish a similar solution in other cities and municipalities since the size of the city affects the relative scarcity of available land. Access to land is often the main barrier to establishing an urban transshipment depot or other types of urban terminals in city centres. The Oslo City Hub project has provided experience and knowledge that can be valuable when launching this type of concept in other cities and municipalities. There are several specific factors that affect both the need for and advantages of various urban terminals, including:

- the population density of the city;
- the size of the city;
- available land areas in the city;
- the role of urban logistics in overall city planning;
- the conditions for environmentally friendly freight distribution in the city;
- the regulations/restrictions/subsidies that apply to commercial feight and other traffic;
- the existence of freight forwarders that are willing and have the resources to offer logistics services out of a terminal in the city centre; and
- the location of the transport companies' existing terminals (whether these are in or outside the city and, if applicable, how far these are located from the city centre).

A prerequisite for the establishment of an urban transshipment depot like Oslo City Hub is available and suitable land close to the city centre. We have seen that there are several different ways to set aside land for logistics activities: through competitive tenders like the ones carried out by the Port of Oslo and Paris Municipality, through an initiative for a consolidation terminal as was done by Gothenburg Municipality or by delegating the task to the transport companies themselves as in the case of London. One potential approach to ensure that land is set aside for logistical purposes is to integrate commercial freight transport in general urban planning and land use plans.

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