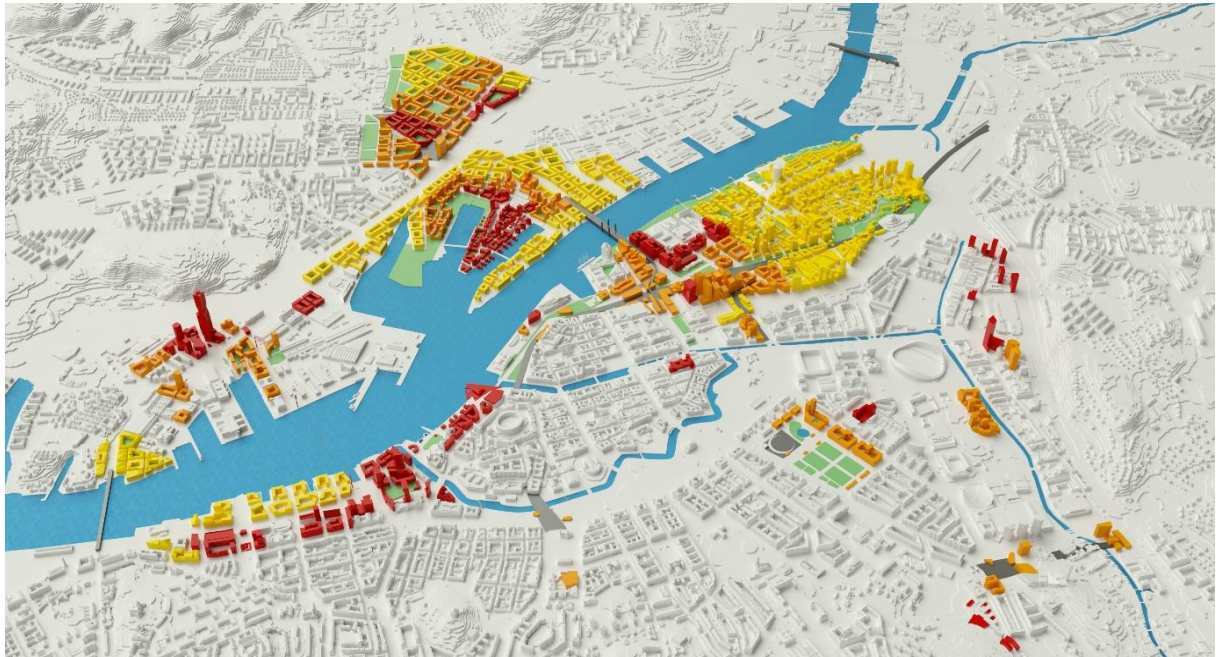




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Inclusion of logistical regulations in land allocation agreements

Investigation of a public landowner in a city development project
Master's thesis in the Master's Programme Design and Construction Project Management

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Cover:

Vision Älvstaden (Älvstranden Utveckling, 2018)



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Abstract

The thesis aims to investigate how Älvstranden as a public landowner can affect developers and contractors to adhere logistical solutions by the means of land allocation agreements. Research questions encompass which areas of responsibility Älvstranden has as a public landowner, how land allocation agreements can be utilized for conveying logistical regulations and how stakeholders perceive these regulations. The investigation has been conducted in an abductive manner and has constituted of a literature study, including topics of construction logistics, land allocation agreements and public private partnerships. Furthermore, 13 interviews have been conducted with stakeholders involved within project Masthuggskajen, Uppsala Bygglogistikcenter, a third-party logistics provider, logistics consultants and a logistics researcher.

The study shows that common and efficient solutions to address the implications of construction transports are construction logistics centres (CLC). Furthermore, land allocation agreements and organisational relationships within public-private partnerships influence projects proceedings to a great extent. For this reason, land allocation agreements must be balanced in terms of alignment of incentives, allocation of support, costs and benefits, and conveyed solutions must contain attributes of feasibility. If not, there is a risk of distrust and a favour of opportunistic behaviour, thus jeopardizing project success. Stakeholders in the form of developers, contractors and third-party logistics service providers have diverse opinions regarding whether the logistical element should be included within land allocation agreements or not, to which extent, and how it should be formulated. However, the majority express no aversion of inclusion if it brings economic incentives.

This master thesis provides contributions for Älvstranden by suggesting that they should implement logistics in land allocation agreements through stipulating regulations in a comprehensive manner. This should be done by internally employ logistic competence. Finally, the positive results from Uppsala Bygglogistikcenter indicate that the utilization of a CLC would be a great option within vision Älvstaden.

Key words:

Construction logistics, Construction transport, Land allocation agreement, Public-private partnership, Third-party logistics service providers

Sammanfattning

Detta examensarbete syftar till att undersöka hur Älvstranden som offentlig markägare kan påverka fastighetsutvecklare och entreprenörer att följa logistiska lösningar genom markanvisningar. Forskningsfrågorna omfattar vilka ansvarsområden Älvstranden har som offentlig markägare, hur markanvisningar kan användas för att förmedla logistiska lösningar samt hur olika intressenter uppfattar dessa. Undersökningen har genomförts genom en abduktiv ansats, inklusive en litteraturstudie som omfattar ämnen likt bygglogistik, markanvisningar och offentlig-privata partnerskap. Vidare har intervjuer genomförts med 13 intressenter som är involverade inom projekt Masthuggskajen, Uppsala Bygglogistikcenter, en tredjeparts logistikleverantör, bygglogistikkonsulter och en bygglogistikforskare.

Studien visar att bygglogistikcenter är vanliga och effektiva lösningar för att hantera konsekvenserna av byggtransporter. Dessutom påvisas att markanvisningar och organisationsrelationer inom offentlig-privat samverkan påverkar projektförfaranden i stor utsträckning. Av detta skäl måste markanvisningar formuleras på sådant vis att de balanserar incitament, fördelning av stöd, kostnader och fördelar, förmedlade lösningar måste vara praktiskt genomförbara. Om detta inte sker finns det risk för att misstro och opportunistiskt beteende äventyrar projektets framgång. Intressenter i form av fastighetsutvecklare, entreprenörer och tredjepartslogistikföretag har skilda åsikter angående huruvida det logistiska elementet ska inkluderas i markanvisningar eller inte, i vilken utsträckning och hur de ska formuleras. Majoriteten uttrycker dock ingen motvilja mot inkludering så länge det främjar ekonomiska incitament.

Detta examensarbete bidrar till Älvstrandens arbete genom att föreslå att de ska inkludera logistik i markanvisningar genom att formulera dessa med en utförandebeskrivning. Detta bör göras genom att internt anställa logistisk kompetens. Slutligen indikerar de positiva resultaten från Uppsala Bygglogistikcenter att användning av ett CLC skulle vara ett bra alternativ inom visionen Älvstaden

Nyckelord:

bygglogistisk, byggtransporter, markanvisning, offentlig-privat samverkan, tredjepartslogistik

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1 Introduction

The introduction chapter first convey a background of the topic, explaining its relevance and introducing Älvstranden Utveckling AB, *vision Älvstaden* and the urban environment around Göta Älv in Gothenburg. Thereafter, the aim, the research questions and limitations are presented. Finally, the thesis structure is conveyed which provides readers with a tool for navigation.

1.1 Urbanisation implies logistical implications

As global urbanization increases, our cities will expand and get denser. This process has been monitored by the United Nations Department of Economics and Social Affairs (UN DESA) (2018) which in 2018 stated that 55% of the world's population lived in cities. However, their 2050 estimations reach an increase to a distribution of 68%. This demographic movement will imply a need of expanding city development in the sense of building new infrastructure and buildings, as well as refurbishment of existing construction. Consequently, construction is nowadays increasingly taking place in urban environments.

This growth is elaborated by Guerlain (2019) who conveys that this process does not occur seamlessly and imply challenges that originate from the complex, unique and multiorganizational attributes of the construction industry. The industry is project based and each project have a specific project organisation. These organisations constitute of many different stakeholders, such as, developers, specialised contractors and subcontractors (Jin, et al., 2017). In addition, these projects rarely have the same prerequisites and require unique approaches (Janné, 2018). Henceforth, the industry is prone to inefficiencies where lacking communication and joint coordination plays a vital role (Thunberg, et al., 2014; Ying et al., 2018).

In general, construction projects in urban environments include involvement of municipalities since they often are the landowners within cities. As landowners, they have the duty of conveying land allocations while stipulating terms of exploitation to developers (Christensen, 2014; Caesar, 2016). These relationships, involving both public and private parties, are named public private partnerships (PPP) and are often an utilized organisational constellation within large infrastructural projects (Jacobson & Choi, 2008; Kwak, et al., 2009; Dewulf, et al., 2012). Further, when terms have been agreed upon between landowner and developer, the developers procure contractors whose task is to deal with the operational aspects of fulfilling the construction while considering the contractual demands (Rumane, 2017; Sullivan, et al., 2010; Sears, et al., 2015; Caesar, 2016).

Several studies (Bankvall, et al., 2010; Dablanc, 2009; Sullivan, et al., 2010; Browne, et al., 2012) highlight the impact of construction logistics in urban development. How construction logistics is organized becomes a key issue, with implications for construction efficiency as well as for reducing disturbance on third parties, such as, pedestrians, commercial stores, offices etc. (Sundquist, et al., 2018; Dubois, et al., 2019; Janné & Fredriksson, 2019). One consequence of increasing construction within cities is that the quantity of transport vehicles on the streets will increase as construction traffic will add vehicles to, often, already crowded streets (Browne, et al., 2012; Dablanc, 2007; 2008;

Anderson et al., 2005). Correspondingly, Janné (2018) concludes that construction transportation is one major issue within construction logistics in urban development. Transports in cities are challenging and causes noise disturbance, pollution, traffic congestions and safety hazards. In consideration to environmental aspects entailed to construction transports, these do generally constitute of 30% of the total tonnage related to a city's total urban freight (Dabanc, 2009). In order to cope with these challenges, logistical checkpoints, consolidation centres (Lundesjö, 2010), various schemes and plans for constraining or encouraging logistical approaches (Browne, et al. 2012) are often advocated solutions as a result of clients' policies and demands stipulated in contractual agreements (Sullivan, et al., 2010). These demands have great influence on project proceedings since they curb construction approaches (Caesar, 2016), thus the formulation is of great importance to achieve successful projects and avoid inefficiencies and relational issues (Lu, et al., 2016; Li, et al., 2005; Boissinot & Paché, 2011; Kusari, et al., 2013)

According to Fredriksson (2020), researcher within logistics and city development, most studies various stakeholder's tasks problematize the construction logistics setting through an operations management point of view rather than a holistic project planning management view. Furthermore, supply chain management and logistics have not been given enough focus within the design phase and the integration between practice and planning is the underlying reason for the industry's inefficiency (Thunberg, et al., 2014). Additionally, questions have been urged regarding accountability for whom that should act as initiator of construction logistics services and how variation in stakeholder perceptions affect the development of logistics services (Janné, 2018; Ekeskär & Rudberg, 2016). The governance mechanisms of logistical solutions, logistical governance, in city development projects have been elaborated while shedding light on stakeholders' perceptions, however further research is needed regarding governance solutions and how they address construction logistics (Janné & Fredriksson, 2019). In the sense of land allocations, it is urged that further investigation is needed for how the land allocation system affect the projects final result (Caesar, 2016). Furthermore, several research initiatives and pilot projects have been initiated to bridge theory and practice within this topic (Fredriksson, 2020). The construction logistics centre in Uppsala (Uppsala kommun, 2019) and the research project MIMIC (Vinnova, 2020) are two examples of how governance mechanisms are implemented and city development knowledge is exchanged between stakeholders to reach holistic logistical solutions on the community level.

1.2 Älvstranden in the context of urban development in Gothenburg

The municipality of Gothenburg (Göteborgs Stad, 2019a) concludes in their annual population report that the urbanization in Gothenburg has grown since 1980 and will continue to grow past 2040. In 2019 the number of people moving into the city was approximately 7400 annually (Göteborgs stad, 2019b) and the current pace of which the city construct offices or residences as to cope with demands is insufficient (Västsvenska Handelskammaren & WSP, 2017). As elaborated by Guerlain et al. (2019), this deviation in supply and demand urges for actions in form of increasing the pace and magnitude of construction of infrastructure, homes and offices. Another cooccurring process that has been ongoing since 1970 is the degrading exploitation of the shoreline of Göta älv (Älvstranden Utveckling, 2014). The previous shipbuilding yards and docks are no longer

flourishing nor being used to their prior extent which have resulted in a degradation in else attractive properties.

Älvstranden Utveckling AB, hereinafter called Älvstranden, is a municipal governed real estate company formed with the purpose of addressing the previously mentioned processes of property decadence and development (Älvstranden Utveckling, 2014). As an initiation action plan, the city of Gothenburg (Göteborg Stad) developed “*vision Älvstaden*” which is a vision that aims to develop the central city districts surrounding Göta Älv, see figure 1 below.

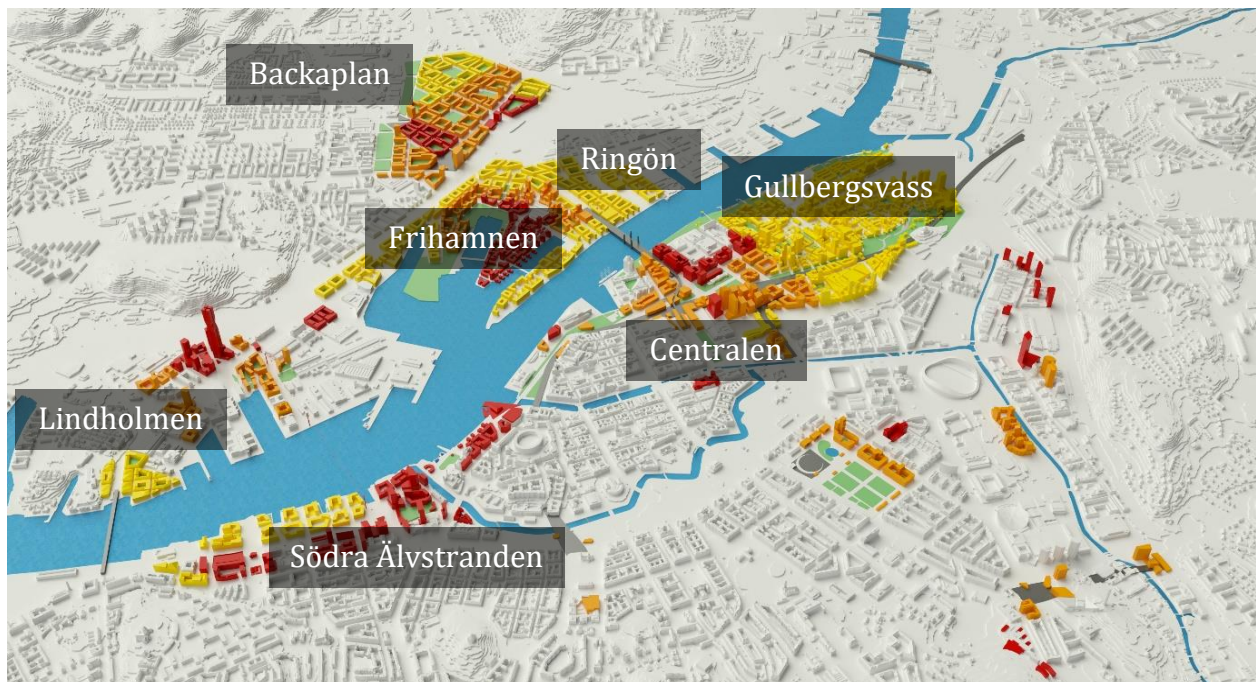


Figure 1. Surroundings of Göta Älv in Gothenburg and the areas encompassed by vision Älvstaden. (Älvstranden Utveckling, 2018)

These areas cover a buildable surface area of 5 million square meters and will approximately house 25 000 new residences and 45 000 workplaces (Älvstranden Utveckling, 2012). According to the owner directives, Älvstranden must consider the perspectives of social, environmental and economic sustainability while developing *vision Älvstaden* (Älvstranden Utveckling, 2019). To concretise this, Älvstranden has developed a business plan with five strategic goals: establishing a living street level, mitigate housing segregation, bisect emissions throughout the project life cycle, fulfil production volume goals according to Färdplan Älvstaden (Älvstranden utveckling, 2015) and also maintaining a stable economy. Along with the business plan, Älvstranden has also developed a business strategy called Älvstadsmodellen. This strategy explain how business should be conducted, frequently advocating the utilization of a consortium organisation within their projects (Älvstranden Utveckling, 2019).

Despite focusing on mitigating issues within the social, economic and environmental perspectives, the development of *vision Älvstaden* will imply consequences in the sense of logistics, pollution and additional traffic to already congested streets. In addition, it is important to consider that there are several large infrastructure projects that take place simultaneously, for example Nya Hisingsbron and Västlänken (Göteborgs stad, 2019b) and that these affect one another since the projects must share the same logistical pathways through the city.

Challenging conditions of several ongoing construction projects within the perimeter of *vision Älvstaden* are expressed by many project managers at Älvstranden. For instance, in Masthuggskajen it is mentioned that logistical dilemmas have not received enough attention in early project stages hence resulting in hasty discussions regarding feasible solutions. In another project, what was considered a suitable logistical solution got precluded due to dissent between Älvstranden and the contractor having misaligned interests and perception of feasibility. These examples of not seizing the opportunity to use a suitable logistical solution nor giving the logistical dilemmas enough attention have urged a desire from Älvstranden to evaluate upcoming projects logistical solutions. The correlation between negative impacts and construction transportation is acknowledged by Älvstranden and is considered to be an aspect that is easy to remedy or ease. Therefore, there is a need in early project stages to direct contractors to adhere logistical solutions that correspond with Älvstranden's mission and goals regarding bisecting emissions, establishing a living street level and fulfilling construction volume objectives within *vision Älvstaden*.

1.3 Aim

The aim of this thesis is to investigate how Älvstranden, as a public landowner with the responsibility of developing *vision Älvstaden*, by using land allocations agreements can affect developers and contractors to adhere logistical solutions. The logistical solutions should correspond to Älvstranden's strategic goals with *vision Älvstaden* regarding bisecting emissions throughout the project life cycle and establishing a living street level.

1.4 Research questions

RQ1: What responsibility does Älvstranden has as a public landowner when developing *vision Älvstaden* in terms of construction logistics within a dense urban environment?

RQ2: How can Älvstranden through land allocation agreements address the logistical implications entailed by the development of *vision Älvstaden*?

RQ3: How are various stakeholders (third parties, contractors and developers) affected by the landowner's land allocation agreements?

1.5 Limitations

In order to provide an exploration in line with the aim and research questions that is of relevance for Älvstranden, several limitations are set as to allow for an in-depth investigation in a contemporary setting.

Firstly, depending on what necessary actions that Älvstranden must execute to fulfil their long-term purpose of developing a sustainable environment, they can adopt various roles. This implies for a wide range of possible responsibilities, hence, making the scope of accountabilities incomprehensible to elaborate simultaneously. For this reason, Älvstranden will exclusively be investigated through the perspective of them acting as landowners, thus mainly having the responsibility of conveying site directives.

Secondly, construction logistics is a term encompassing several domains whereas this thesis only considers off-site logistics. This means that the part of construction logistics that will be regarded is how construction materials are transported back and forth to the construction site. This limitation has been chosen because off-site logistics is the part of construction logistics where Älvstranden as a landowner has the greatest possibility to affect project proceedings and because it is the part that affect third parties the most.

Thirdly, a geographical limitation is made. Älvstranden operates within Gothenburg and the impacts on third parties and consequences of emissions are more palpable within the setting of dense urban cities. The areas encompassed by the projects within *vision Älvstaden* and its vicinity are chosen as geographical boundary. This imply that investigated logistical approaches, impacts on third parties and environmental effects of emissions are considered within this area.

Fourthly, the time aspect in relation to encompassed project phases, the planning, pre-construction and construction are considered, whereas the facility management is neglected due to its comparatively modest contribution to amounts of construction transports.

At last, the project delivery method is not specifically taken into account. It is considered that the contractual demands set by Älvstranden's can convey regardless. To limit the thesis to only one project delivery method is thought to restrain the applicability of the results of this thesis, hence making such limitation would be contra productive.

1.6 Thesis structure

The thesis is structured into five parts, following the introduction. Firstly, theoretical considerations are portrayed along with an analytical framework of how each theory is interlinked with the topic. The theoretical scope does mainly encompass logistics within the context of constructing in dense urban environments. Also investigated is how it should be handled and with what measures, what implications that exists, who are involved and how they are affected.

Secondly, the study's methodology is described. Within this chapter, the research process, strategy and quality are elaborated and motivated. Furthermore, ethical aspects pervading the thesis is highlighted and discussed.

Thirdly, the empirical data chapter presents the empirical material encompassing *vision Älvstaden*, Älvstranden in the role as landowners and how Älvstranden conduct business (Älvstadsmodellerna). Further depicted are involved stakeholders' perceptions of the logistical element within Älvstadsmodellerna. Then, results from a construction logistics centre in Uppsala is conveyed.

Fourthly, the empirical data and theoretical considerations are analysed regarding stipulated research questions, to form conclusions. Finally, the conclusions provide answers to each research question and put these in relation to previous conducted studies within the subject. Lastly, proposals for further research are presented.

2 Theoretical considerations

The chapter starts with a description of the construction industry followed by the phases and processes of construction. The concept of stakeholders is explained highlighting developers, contractors and third parties. Further, construction logistics is depicted in the context of dense urban environments and entailed consequences regarding pollution and health aspects. The common approach of Public Private Partnership (PPP) is presented together with its areas of concern which is followed by the organizing of construction transports and several advocated logistical solutions, Construction Logistic Centres (CLC) and Construction Logistic Plans (CLP). Further the problematisation of the funding of logistical solutions are shed light upon, as well as cultural and relational aspects within construction are portrayed. Lastly, the legal aspects of contractual demands are elaborated.

2.1 Attributes of the construction industry

The construction industry is considered to be a large industry in terms of total turnover and number of employed personnel (Ekeskär & Rudberg, 2016). In Sweden, its turnover in 2018 added up to 52,7 billion EUR, which constituted for 11,2% of Sweden's GDP (Svenska Byggindustrier, 2020a). In 2018, it employed 320000 persons, a significant proportion of Sweden's 10,12 million inhabitants. (Svenska Byggindustrier, 2020b)

A characteristic of the construction industry is that it is considered ineffective due to its setting, fragmentation and complex project organisational structures (Fellows & Liu, 2012). The environmental characteristics of construction projects is depicted as moving factories hence minimizing opportunities for local optimization and urging ineffectiveness (Ekeskär & Rudberg, 2016). Moreover, the industry is project based which means that when a project finishes, another commonly gets initiated where the tendering process starts over and contractors, subcontractors, consultants etc. are to be procured for a consecutive project. Henceforth, this creates difficulties in sustaining long-term relationships within the construction business (Janné, 2018). Further, several Swedish studies (Josephsson & Chao, 2014; Strandberg & Josephsson, 2005; Josephsson & Saukkoriipi, 2005) have shown that the productivity within the construction business is low. For instance, as much as 33% of an 8 hour day is devoted to waiting and 25% to handling of materials (Strandberg & Josephsson, 2005).

Another attribute is that the industry is a resource dependent industry (Lindén & Josephson, 2013; Dubois & Gadde, 2000) where joint resource utilisation and reciprocity among construction activities are considered to imply challenges for supply chain management (Bankvall, et al., 2010). This is because several parties conducting various activities, at the same construction site, often at the same time, affect one another and therefore interdependency must be handled (Janné, 2018). In this setting, in terms of involving numerous actors in large complex projects, relational issues are inevitable (Lu, et al., 2016)

A final characteristic is the cultural resistance to change. There is a general tendency to use conventional and well elaborated methods rather than adopting new foreign solutions. This aversion to adopt new ways of action originates from avoiding

unnecessary risks (Sullivan, et al., 2010). As a result of being prone to cultural norms, organisations risk missing opportunities for implementation of successful innovations (Sarhan & Fox, 2013).

2.2 Construction Projects: Phases, Processes and Stakeholders

The characteristics of construction projects vary and are difficult to generalize. The processes of which they encompass within their life cycle are innumerable and take place through several phases where project complexity affect comprehension and duration (Rumane, 2017). Within construction projects, there are several groups or individuals that can be affected by participation in project decision making or by project outcomes (Jin, et al., 2017). These groups or individuals can be defined as stakeholders and are divided into internal and external. The internal stakeholder, the project owner(s), commands the overall managerial responsibility. This task encompasses running the project in compliance with the external stakeholders, such as contractors, sub-contractors, design-teams, suppliers, legal authorities, as well as third party stakeholders like residents, pedestrians, motorists, visitors etc. Thus, it is important for each project owner to identify which stakeholders that are involved in which stage, whom that need to be considered and when (See e.g. Janné, 2018; Jin, et al., 2017; Sullivan, et al., 2010; Stathopoulou, et al., 2012). Stakeholders influence on projects can be beneficial as well as it can aggravate, in either case, it must be addressed and dealt with (Jin, et al., 2017). Conclusively, in order to apprehend the meaning of construction one must understand each stakeholder's perception (Janné, 2018).

2.2.1 Phases and Processes

The most common phases within a construction project are in chronological order: the design phases ("Conceptual Design", "Schematic Design" and "Design development"), the construction phase and lastly the testing, commissioning and handover phase (Rumane, 2017). These are depicted in *Table 1* with corresponding process.

Table 1. Activities and phases encompassed through a construction project life cycle (Rumane, 2010).

Conceptual Design	Schematic Design	Design Development	Construction	Testing, Commissioning, and Handover
Identification of objectives and goals (Terms of Reference)	General scope of work/basic design	Detail design of the work	Mobilization	Testing
Identification of project team	Regulatory approval	Regulatory/ authorities approval	Execution of works	Commissioning
Data collection	Schedule	Contract documents and specifications	Planning and scheduling	Regulatory/ authorities approval
Identification of alternatives	Budget	Detail plan	Management of resources/ procurement	Move-in-plan
Time schedule	Contract terms and conditions	Budget	Monitoring and control	As-built drawings/ records
Financial implications/ resources	Value engineering study	Estimated cash flow	Quality	Technical manuals and documents
Development of concept design		Contract documents bidding and tender documents	Inspection	Training of user's personnel
				Handover of facility to owner/end user
				Substantial completion

Within the design phases, as can be seen in the three first columns in *Table 1*, demands regarding cost, quality and time are identified, creating a frame for which the construction design must comply with. Consequently, the construction design must be elaborated in conjunction with construction methods, choice of material, maintenance and operational aspects (Sears, et al., 2015). As a result, within the design phases it is of importance to foresee entailed consequences of stipulated project frames when making estimations and forecasts (See e.g. Li, et al., 2005; Lim, et al. 2016; Jereb, 2017; Sullivan, et al., 2010). Followingly is the construction phase, which can be seen in the fourth column in *Table 1*, where the construction design is to be actualised. The realization must be conducted within the stipulated boundaries set in earlier project stages (Sears, et al., 2015; Rumane, 2017; Sullivan, 2010; Janné, 2018). Henceforth, the design phases have great influence of how the construction phase unfolds since specified terms could restrain construction approaches (Sullivan, et al., 2010). As a consequence of this interdependence and the attributes of the construction industry, operational aspects as communication (Sears, et al., 2015), logistics and supply chain management (Janné, 2018; Spillane & Oyedele, 2017; Navon & Berkovich, 2006) and risk management (Enshassi & Ayyash, 2014) are of importance to consider within the construction phase.

Finally, see column five in *Table 1*, when construction is complete, the building is put through commissioning and testing to ensure that stipulated functions and requirements from the design phases are satisfied. Afterwards, the handover process succeed where construction documentation in accordance with the procurement contract are submitted to the client, constructional changes and claims are resolved and the client makes sure that all other contractual obligations are fulfilled (Lambeck & Eschemuller, 2009).

2.2.2 Developers

Developers, often called clients, are the ones owning, initiating and sanctions the construction project. In this role, they have the possibility to set project frames (Rumane, 2010) hence influencing proceedings in great extent. This stakeholder group can be divided into two, private and public developers (Barrie & Paulson, 1992), where the difference between these is that public developers are governed by public parties, such as municipals. Regarding construction project development, these have different perceptions and incentives. The private developers have their aim towards making profit and ensuring future business survival. Conversely, public developers have less economic incentives, yet they need to satisfy the needs of the public and cater them with adequate facilities (Barrie & Paulson, 1992; Sullivan, et al., 2010; Li, et al., 2005).

While setting project frames in early project stages, developers cost estimations are crucial for how projects unfold (Lim, et al., 2016; Li, et al., 2005). This is because faulty estimations might result in unemployed opportunities for development, unnecessary expenditures and unsuccessful management. However, the emphasised difficulties encompassed with estimations within large-scale construction projects are explained to be caused by shortage of time, uncertainties and scope apprehension in early project stages (Lim, et al., 2016). Henceforth, it is of great need that the organisation possesses knowledge and experience regarding estimations (Li, et al., 2005) and be aware of how processes in between project phases affect one another, such as logistics and supply chain management (Thunberg, et al., 2014).

When the construction phase is initiated, developers can monitor and guide contractors through governance tools in order to ensure fulfilment of project goals and objectives (Rumane, 2017; Boissinot & Paché, 2011). However, these tools must be used with caution since they could convey distrust and result in being disadvantageous.

2.2.3 Contractors

Depending on delivery method, the contractor does commonly manage the process of construction, hence the main task is to complete given tasks provided by the client through providing necessary means in compliance with procurement documents. Besides being obliged to adhere contractual agreements, their work is influenced by prevailing environmental characteristics hence making them constrained to adapt proceedings to construction sites prerequisites (Rumane, 2017; Sullivan, et al., 2010; Janné, 2018), such as unknown soil conditions. In order to fulfil stipulated demands while considering unknowns and errors for margin, contractors must include a buffer in their bids to mitigate consequences of unforeseen events (Enshassi & Ayyash, 2014). However, when attending biddings, this safeguard is often compromised to remain competitive, hence resulting in a task of finding balance between risk and profit. Conclusively, while preparing a tender the contractors should identify and evaluate the reasons for using cost contingency.

Another site characteristic affecting contractors are spatial limitations. Construction sites in dense urban environments are commonly encompassed by restrictions in space, hence urging the need for focus on logistics and supply chain management (Janné, 2018). Another driver for contractors to shed light upon logistics and supply chain management are the economic incentives. This is because materials constitute of 40 to 65 percent of a

common construction projects total on site costs (Spillane & Oyedele, 2017) and since there is room for improvement concerning transportation of material to site (Seuring & Goldbach, 2002). This means that, with a greater level of consolidation, hence fewer vehicles, combined with deliveries resulting in less material handling, would imply lower costs.

2.2.4 Third Parties

Third parties constitutes of parties such as residents, pedestrians, motorists and visitors (Jin, et al., 2017), that in general not are concerned about project issues (Karlsen, 2002). However, construction in urban areas will generate conflicts for third parties (Anderson, et al., 2005; Betzke, 2013; Dablanc, 2008; Browne, et al., 2012). This is because city development projects will, due to increase in amount of transports and construction sites, encompass additional traffic congestions, accidents and noise disturbance (Anderson, et al., 2005; Betzke, 2013). Furthermore, the increase in amount of vehicles will imply more emissions hence resulting in the possibility of reducing life quality (Dablanc, 2008) and resulting in negative health aspects as premature mortality, sleep disturbance, disability, aggravation of respiratory and cardiovascular diseases (Browne, et al., 2012). Despite not generally possessing concern about construction issues, certain implications, such as pollution, could aggravate these stakeholders and affect their cooperation (Karlsen, 2002)

2.3 Land allocation

In order to be able to construct or drive urban development one must have access to available land. The supply of land can be conducted through several ways, however, in urban environments where landowners commonly are municipals, one must be allocated land. For this reason, the municipal has an important role in the process of land allocation (Christensen, 2014; Caesar, 2016). According to the Act on Guidelines for Municipal Land Allocations (2014:899) (Sveriges Riksdag, 2014) the definition of land allocations is:

“An agreement between a municipality and a developer that gives the developer sole right to under limited time and under given conditions negotiate with the municipality regarding transfer or lease of certain of the municipality-owned land area for construction”.

This process is a preceding planning phase that creates an interdependent relationship between the landowner and the developer that stipulates a framework of how the developer can exploit the area, see *Figure 2* below.

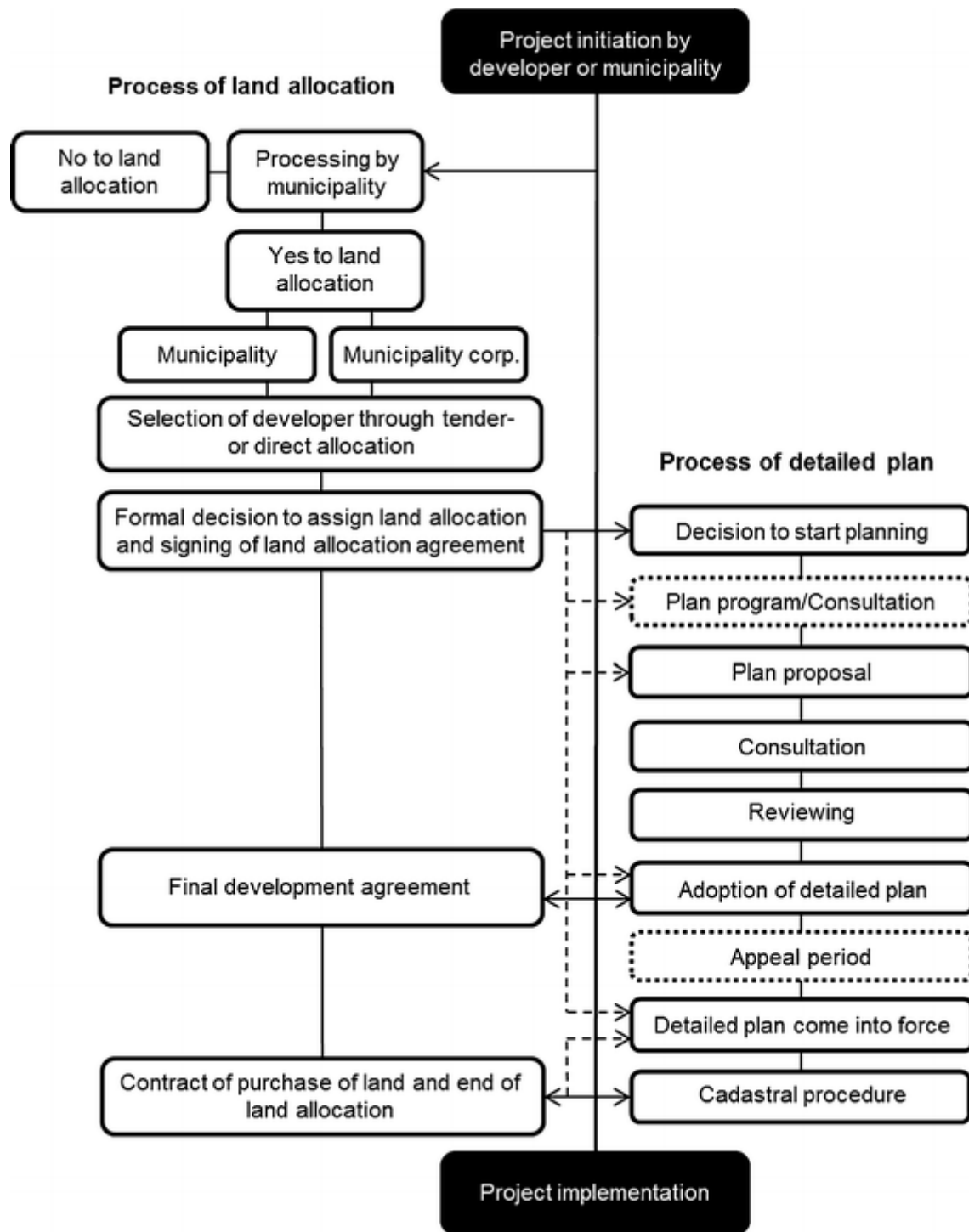


Figure 2. The process of land allocation (Caesar, 2016).

Commonly, the procedure is performed jointly between landowners and developers to establish a development right that is marketable and that harmonize with detail plans and urban development goals set by the municipal or the state (Christensen, 2014; Caesar, 2016). These agreements do frequently encompass regulations regarding tenure and scope, meaning that the developer must develop a certain number of dwellings under a given time frame. Additionally, the agreements could involve more specific demands as specifying construction methods and environmental regulations. However, these demands should not be formulated in a way that explicitly exclude or economically prohibit one developer over another (Caesar, 2016).

2.4 Construction Logistics

The construction industry is heavily dependent on large quantities of materials (Lindén & Josephson, 2013; Dubois & Gadde, 2000) which has to be delivered to the right spot at the right time in order to deliver a final product to stipulated time and price (Ekeskär & Rudberg, 2016; Lindén & Josephson, 2013; Thunberg, et al., 2017). To achieve this, construction logistics have to be utilized, which is defined by Janné (2018, p. 9) as: *“Dealing with supplying the right materials to the correct customer and construction site to meet customers’ requirements”*.

Construction logistics can be separated into on-site and off-site logistics. The on-site logistics consider logistics operations at the project site posthumously of the material arriving at site (Sundquist, et al., 2018). The main driver of the development of on-site logistics is to maximise the efficiency and productivity of the skilled workforce (Sullivan, et al., 2010) by handling the materials and planning its physical flow (Sundquist, et al., 2018). The off-site logistics considers the supply chain management premature to the arriving of materials, thus, including the transport of material from production to the construction site. It is the off-site logistics that stands for the greatest contribution of greenhouse gas emissions and impact on third parties (Sullivan, et al., 2010).

The signification of logistics within construction is important to clarify. Sullivan et al. (2010) claims that construction logistics have been given insufficient attention and is prone to opposition against long term change. In order to address the problems of construction logistics and manage the material deliveries there is a need to enhance the mechanisms of how construction logistics are controlled, coordinated and executed (Janné, 2018). A key to achieve this is to make logistical investments in an early project phase by involving essential organisational members to improve coordination and communication (Agapiou, et al., 1998), hence acknowledging interest and challenges among other stakeholders (Jereb, 2017).

The logistical element in construction is often difficult to quantify as it is often embedded in the procurement of materials (Sullivan, et al., 2010). For this reason, along with contractor’s willingness to outsource risk, project control is fragmented regarding effects on project performance. Consequently, an increase of dedicated logistics contractors, third party logistics provider (TPL), have entered the business to handle logistics more comprehensive to get a grasp of its implications. Compelling motivations to utilize a dedicated actor is that it enables logistical experts to take care of else non-value adding activities performed by construction contractors.

Besides utilizing TPLs as logistical experts, Sullivan et al (2010) urges the need for having a logistical manager to handle questions and issues related to the logistics throughout the projects phases and planning. The attributes of the logistics manager should be great knowledge of the vicinity, possession of a comprehensive perspective regarding project scope, thorough understanding of the construction program, yet also having the qualities of being a great communicator. This is because local weather conditions, traffic passability, insufficient understanding of the project’s comprehension and lacking communication between stakeholders is crucial for how the logistics unfolds.

When construction takes place in dense urban environments, it is of importance to consider spatial limitations and demands regarding accessibility, environment and noise disturbance (Janné, 2018; Dablanc, 2007). In addition, constructing new city districts along already existing ones will affect the habitableness of existing dweller as well as newcomers (Betzke, 2013). In summary, constructing under these circumstances are prone to two major dilemmas; how to manage construction transportation and the stakeholders involved (Janné, 2018)?

2.4.1 Organizing construction transports

The transport of materials to a construction site are commonly addressed through the procurement of materials where the logistical elements are stipulated in the procurement contract (Sullivan, et al., 2010). The logistical aspects in these contracts tend to vary and exist in a plethora of variations depending on project prerequisites. Due to the logistical element being embedded in the procurement of materials and contractor's willingness to outsource risk, project control is fragmented regarding effects on other stakeholders and project performance. Consequently, an increase of dedicated logistics contractors has entered the business to handle the logistics more holistically to get a grasp of its implications. Furthermore, because of the dispersal of logistical elements, the responsibility and service that these contractors provide are characterized by diversification. For instance, they primarily deal with logistical activities as material handling, transport of materials and people, yet also provide support functions as waste management and site security. Compelling motivations to utilize a dedicated actor is that it enables logistical experts to take care of else non-value adding activities performed by construction contractors.

2.4.2 Advocated logistical approaches

The impacts generated by construction transports can be eased through slight changes in working practices or through implementation of more extensive models including delivery planning services, just-in-time deliveries, consolidation centres and third-party logistic providers (Janné, 2018). These can be initiated by various governmental levels, urban, national and international (Browne, et al., 2012), in other words, the means of action could be taken either by the municipal, the government or an international authority as EU. When shedding light upon the urban level, there are several aspects that can be addressed, see the rightmost column in *Table 2* below.

Table 2. Features of urban freight that lead to negative impacts and the associated initiatives that can be used to change them (Browne, et al., 2012)

Features of urban freight transport leading to negative impacts	Initiatives that can result in reduced impacts	Lowest govt level at which initiative typically implemented
Total vehicle kms / journeys by road in urban area	Load consolidation	Urban
	Ordering and delivery frequency	Urban
	Modal shift	National / urban
	Fuel taxes	National
	Location of activities (Land use)	Urban
	Congestion charge	Urban
	Parking regulations/On street loading spaces	Urban
	Real time traffic information	Urban
Fossil fuel consumption per vehicle km	Driver behaviour	Urban
	Vehicle engine design	International / national
	Vehicle design (Aerodynamics)	International / national
	Additions of biofuels to petroleum mix	National
	Matching vehicles to loads	Urban
	Use of vehicles powered by non-fossil fuels (inc bicycles)	National / urban
	Use of bicycles	Urban
Local pollutant emissions per vehicle km	Vehicle engine emissions standards (Euro standards plus other initiatives)	International
	Use of traps and filters	National
	Low emissions zones	Urban
Noise levels caused by each freight journey	Driver behaviour	Urban
	Vehicle design	International / national
	Ability to switch off built in reversing signals etc.	Urban
	Design of vehicle reception areas	Urban
	Loading time restrictions	Urban
Accident risk per vehicle km	Driver behaviour	Urban
	Vehicle design (wing mirrors)	Urban
	Cyclists wearing fluorescent clothing	Urban

Derived from the urban aspects mentioned in *Table 2*, Browne et al. (2012) identify several solutions that have been adopted in cities in the UK, France, Japan and the Netherlands:

- Various types of consolidation centres
- Schemes for: Freight operator recognition, lorry control, congestion and delivery
- Plans for: Logistics, service and deliveries
- Emission and air quality zones
- Regulations connected to vehicle characteristics and loading times
- Local cement plants
- Night deliveries

These measures in the UK, France Japan and the Netherlands have in each case conclusively resulted in reduced amount of deliveries to site, fewer vehicle kilometres,

henceforth lower emission of greenhouse gases and less traffic congestions.

Construction Logistics Plan: Transport for London

Several studies urge the need of addressing logistics in early project stages (Jereb, 2017; Sullivan, et al., 2010; Transport for London, 2019). In this stage, it is important to outline a plan, encompassing site perimeter, access and loading points, footprints and vehicle movements (Sullivan, et al., 2010). An example of this is the Construction Logistics Plan (CLP) that Transport for London (authority in London) use to address logistics in early stages (Transport for London, 2019).

To minimize the impact of construction logistics, the city of London has issued a set of regulations aiming to force developers and contractors to pay attention to the logistical issue. The responsible unit for this set of regulations is the statutory corporation Transport for London, which also acts as a statutory consultee in issues regarding planning of logistics that impacts the London's transport network. One part of the procedure for presumptive construction projects include an obligatory construction logistics plan, CLP. (Transport for London, 2019)

According to Transport for London (2019) the CLP should provide a framework and understanding of how vehicles related to the construction will affect the road network regarding the proposed development. All phases of the construction process must be included within the CLP. Henceforth, the CLP should comprehend traffic management where specific information about which routes that will be affected, the total amount of vehicles generated and their impact on exposed community considerations (schools, hospitals, etc.) must be clearly stated. Furthermore, the CLP should include an assessment of a modal shift, the possibility to replace a saturated means of transport with another to make the first less congested.

The preconstruction procedure, as shown in *Figure 3* and described by Transport for London (2019), starts with a pre-planning meeting aiming to determine if a CLP is required, if the impact level is considered to be low, it might be sufficient with a regular transport assessment. Nevertheless, despite a low impact level, special project prerequisites and construction impacts could entail the need of a plan. If the impact level is considered to be medium or high, an outline CLP must be submitted as a part of the planning documentation and has to be approved in order to start construction. When approved, the procured contractor starts developing the detailed CLP. This is a more extensive and detailed document that needs to be continuously updated throughout the construction process. Weatherley (2017) mediates referring to an interview with Transport for London that apart from the environmental benefits and the reduced impact for civilians, a well written CLP saves costs by encouraging reduced deliveries and efficient working practices.

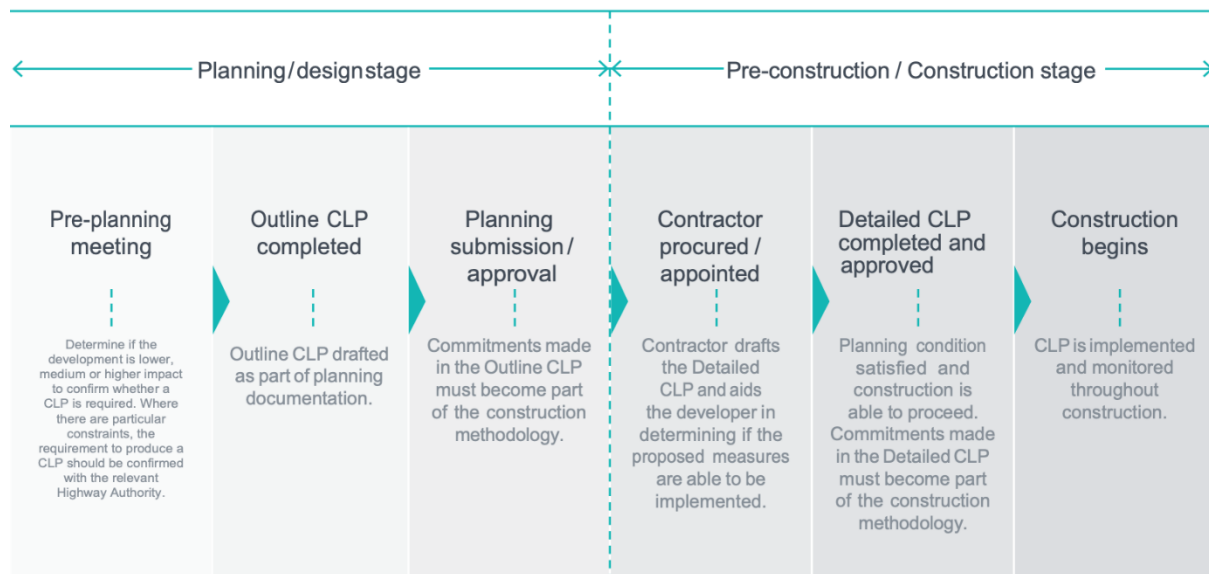


Figure 3. The procedure of the work structure of a CLP in a pre-construction phase. (Transport for London, 2019)

2.4.3 Construction logistic centres

Regarding the construction phase, a frequently advocated solution to construction logistics is the construction logistics centres (CLC) (see e.g. Sullivan, et al., 2010; Browne, et al., 2012; Dablanc, 2009; Guerlain, et al., 2019). The CLC is a centre which primarily addresses the problem of the negative impact of construction transports on the urban city grid. The basic idea is to consolidate goods from different suppliers, hence increase the load volume of transports and thereby achieve higher efficiency. The initiative of using a CLC can be taken by different stakeholders (Browne, et al., 2012), such as a municipality (Transport for London, 2013) or the developer (Ekeskär & Rudberg, 2016). However, it is often run by a third party logistics provider (TPL), whom through the CLC can expand their logistics services towards the contractor and simplify their supply chain (Marasco, 2008). These services can for example be waste management (Lundesjö, 2010), warehousing, additional transport, inventory management and value adding activities such as secondary assembly and information-related activities (Janné & Fredriksson, 2019). Hence, materials can then arrive to the CLC to be repacked, consolidated and delivered to the construction site the next day or it can be stored at the CLC and value added through various procedures. Another popular value adding activity at the CLC is “kitting”, where the consolidated transport is packed from a full bill-of-materials of a specific spot at the construction area, such as a single room or apartment (Lundesjö, 2010). In order to facilitate this process, Lindén and Josephson (2013) encourages the use of a joint IT-platform provided by the CLC, where scheduling of transports urges the contractor to plan their material flows, which makes the process more efficient.

Despite of the advantages and feasibility, the implementation of a CLC does not take place seamlessly (Sullivan, et al., 2010). Cultural inhibitors are mentioned as a cornerstone to the reluctance of why the industry has not adopted the approach more frequently. Additionally, Janné and Fredriksson (2019) do further address that conflicting goals in-between stakeholders is of concern. These issues of resistance will be further elaborated in section 2.8.

2.5 Environmental effects of construction transports

Increasing construction within cities implies additional construction transports congesting often already crowded streets (Browne, et al., 2012; Dablanc, 2007; 2008; Anderson et al., 2005; Janné, 2018). Furthermore, this increases the total urban freight, where construction transports constitute of 30% of the total tonnage freighted within a city (Dablanc, 2009). According to Browne et al. (2012) the feature of urban freight that is connected to the majority of the negative impacts is the total vehicle kilometres and number of journeys, see *Figure 4* below.

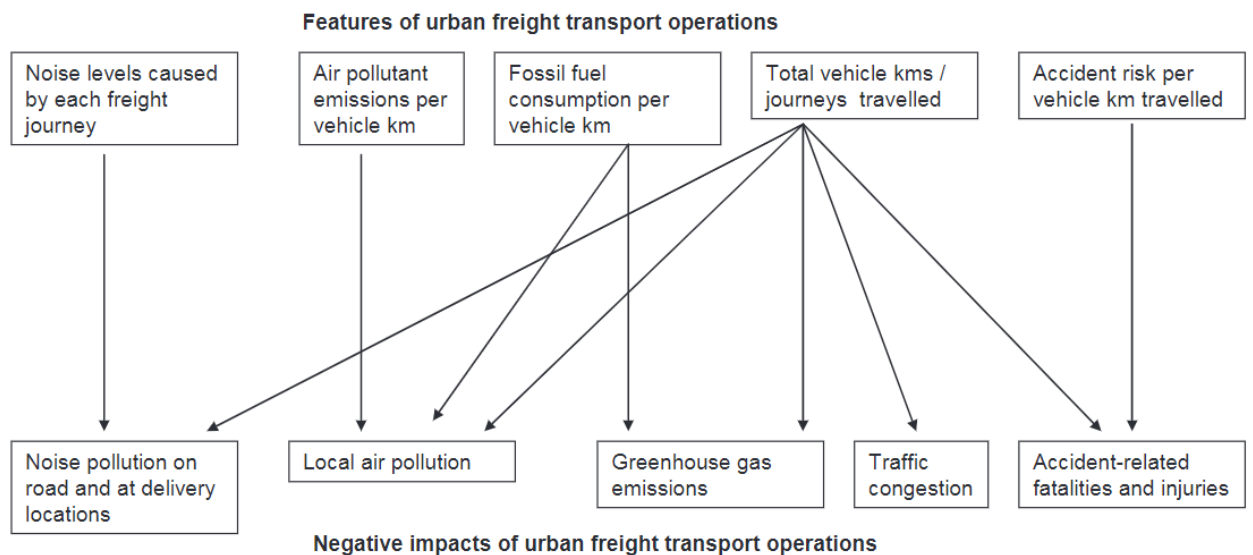


Figure 4 Fig. 1. Relationship between features and negative impacts of urban freight transport (Browne, et al., 2012)

To further break down construction projects environmental effects, Sezer and Fredriksson (2020) investigate the correlation between the amount of transports and constructed gross floor area in Swedish construction projects. They approximate the ecological footprint of several projects transports regarding CO₂ emissions, see *Table 3* below.

Table 3. Details of twelve construction projects in Stockholm (Sezer & Fredriksson, 2020)

Project (N=12)	Gross area (m ²)	Size	Time	Transports	Transports/m ²	Transports/flat	CO ₂ emissions (tonsCO ₂)
A	21458	158 flats	2014-2017	961	0,05	6,1	93
B	2200	45 flats	2015-2016	833	0,38	18,5	81
C	3200	18 town houses	2015-2017	1005	0,31	55,8	97
D	-	90 flats + 113 student flats	2014-2016	1772	-	8,7	171
E	14281	100 flats	2014-2016	1671	0,12	16,7	161
F	8627	121 flats	2014-2016	2244	0,26	18,6	217
G	-	141 flats	2013-2016	2310	-	16,4	223
H	-	83 flats	2014-2015	3139	-	37,8	303
I	6600	64 flats	2014-2016	2997	0,45	46,8	290
J	-	30 flats	2014-2016	2440	-	81,3	236
K	18600	154 flats	2014-2017	5548	0,30	30,0	543
L	8460	167 flats	2015-2017	4518	0,53	27,1	436

Despite reaching quantifiable emissions, there is a deficiency of the data that compose the foundation of their investigation (Sezer & Fredriksson, 2020). While conveying the shortage, emphasis is put on lacking documentation and inconsistencies in measurement methods. Correspondingly, the numbers presented above is explained to only depict transports related to deliveries of material and excludes the proportion of vehicles related to personnel traffic.

Melanta et al. (2013) highlight the construction industry's aversion towards facilitating the progress of using methods associated with lower greenhouse gas emissions. This is because it takes time, implies further costs and does sometimes entail less favourable trade-offs between emissions, productivity and costs. In accordance with Sezer and Fredriksson (2020), Melanta et al. (2013) state that the lack of availability of tools in early project stages for making emission estimations is a great hindrance for stakeholders to apply more holistic emission strategies when evaluating construction approaches.

2.6 Organizing large construction projects – Public Private Partnerships

Managing large infrastructure projects have previously been addressed by the public sector, however, since the 80's, the involvement of the private sector have increased significantly (Dewulf, et al., 2012). This transition has been motivated by increasing interdependence among activities and stakeholders and the idea of combining the advantages of both sectors. As a result, public sector involvement has reduced thus making the public sector taking a more holistic approach including creation of favourable investment environment, establishing an adequate framework, providing support, being involved in all phases and to select an appropriate concessionaire. Conversely, narrow and specialized tasks have been assigned to the private sector (Dewulf, et al., 2012; Kwak, et al., 2009). A frequently used constellation within these projects (Kwak, et al., 2009) and public sector construction projects (Jacobson & Choi, 2008), are public private partnerships (PPP). The PPP arrangement could provide favourable prerequisites

regarding, funding, risk exposure and supportive functions. However, inaccurate implementation might jeopardize project success and result in failure (Kwak, et al., 2009).

2.6.1 Areas of concern within Public Private Partnerships

Adopting a PPP is not easy due to contractual complexity and high level of uncertainty over long project life cycles (Kwak, et al., 2009). These partnership arrangements are encompassed by several principal success factors which have been grouped into effective procurement, project implementability, government guarantee, favourable economic conditions and available financial market (Li, et al., 2005). However, when studying important characteristics in PPP:s Trafford and Proctor (2006) identify five areas of concern, communication, trust, planning, ethos and directions.

Communication

A key factor to unite the partnering organisations is the interpersonal connections and relationships, which has to be nurtured and given attention in order to maintain solid communication (Trafford & Proctor, 2006). According to Huczynski & Buchanan (2001), the communication should be open and relationships based upon trust and mutual understanding and, where the aim is to be cooperative instead of competitive. Even though it seems like basic principles, they are rarely seen. Some of the main barriers that limits the communication is according to Trafford and Proctor (2006), power- and gender differences, physical surroundings, language and cultural diversity.

Trust

Trust is considered a vital component in PPP:s and a lack of trust has shown to be a major contributor to alliance failures (Peng & Shenkar, 2002). According to Handy (1995) it is of great importance to understand that in strategic alliances, control and trust are inextricably interlinked with risk and therefore the openness is of great importance to counteract the "blame" culture.

Planning

Another area of concern within PPP's is to achieve a coherent planning (Trafford & Proctor, 2006). When adopted properly, this will imply great value, however when not, it could entail costly distractions (Gomes-Casseres, 2000). Trafford and Proctor (2006) conveys that their study indicates that motives and intentions underlying the planning within the partnership, often do not correspond with respectively partners. In order to mitigate this misalignment, the joint planning should encompass an allegiance strategy which include guidelines regarding how the partnership should relate to internal coordination and collaboration, organisational scope and structural flexibility.

Ethos

Another phenomenon that can be of complication in PPP:s is ethos, the phenomenon of character and fundamental values (Trafford & Proctor, 2006). Marschollek and Beck (2012) highlight that the environmental attributes of these inter-organisational cooperation's could imply cultural clashes. They shed light upon issues entailed to diverging ethos within these partnerships and that these constitutes of misunderstandings, conflicts and in worst case, project failures. Furthermore, Trafford and Proctor (2006) convey that nonuniform leadership styles within PPP's compose a foundation for the challenges and implications that are entailed. As solution, Marschollek

and Beck (2012) advocate that organisation within the partnership need to adopt an approach that align parties cultural differences.

Directions

Moreover, within a PPP, the public party does often lack competence regarding leadership (Cabinet Office, 2003; Teelken, et al., 2012). The Cabinet Office (2003) explains that the public sector is frequently scrutinized, hence urged to improve collaboration and efficiency. Further, it is mentioned that the public sector does not comprehend what type of leadership that is suitable for given situations. Emphasis is put on inhibitors as reward and accountability structures, the appointment and monitoring to compose the cause. Correspondingly, Teeleken et al. (2012) highlight that public leaders tend to use a top-down hierarchical monitoring role rather than paying attention to the interests and values of other stakeholders. For instance, the paradox in-between privatisation and publicization is stressed. The advantage of innovation gained through outsourcing operations to private parties is conveyed to be contradicted by the public monitoring. To conclude, Teeleken et al. (2012) summarize that the top-down accountability and performance standards attributes of the political environment contribute to the stagnation of development in leadership competence.

2.7 Problematizing the funding of logistical solutions

As concluded by the previous elaboration of stakeholder perceptions within construction logistics, economic incentives (Navon & Berkovich, 2006) and cost estimations in early project stages (Lim, et al., 2016) are perceived to be of importance. However, the cost of logistics within the construction industry is complex to pinpoint (Sullivan, et al., 2010) and is consider to be intangible (Janné, 2018). According to Sullivan et al. (2010), this is because it is frequently embedded within the daily work tasks for contractors and henceforth difficult to estimate. A result is that it implies challenges of pricing the logistics element of a contract. In addition, due to this embeddedness, a cultural aversion exists to adopting new logistical approaches that at first sight seem more costly, *“therefore logistics remains a kind of ‘grudge purchase’ and is rarely accorded systematic resourcing”* (Sullivan, et al., 2010, p. 58).

Eng-Larsson and Norrman (2014) mediate that transportation services often are dealt with through contractual agreements. Further, it is conveyed that the encompassed risks and profits of the provided service is derived through the formulation of these agreements, whereas Naryanan and Raman (2004) highlight the importance of aligning the incentives of parties involved. Likewise, Stathopoulou et al. (2012) analysis of stakeholders perception of policy innovation within urban freight indicates that asymmetrical allocation of support, costs and benefits is risky. Therefore, unequal terms will result in aversion towards reaching agreements and less likelihood of implementing advocated solutions.

Janné (2018) elaborates the cost modelling of a TPL provider operated CLC and sheds light upon the lack of custom developers and contractors possess to this situation. In conjunction with Sullivan et al. (2010), the perception of logistics being an additional cost is also highlighted by Janné (2018). In order to ease the elusive perception, Janné (2018) advocates an activity-based cost (ABC) approach for making the logistical element more quantifiable when evaluating the CLC scenario. This approach shed light upon the

relationship between an activity and its related costs, it constitutes of seven steps: determining of activities, activity breakdown, identification of resources consumed within the activity, find cost drivers, gathering of cost data, allocation of costs and finally a concluding cost analysis. Janné (2018) concludes that the ABC method showed that the CLC implies additional costs due to transports back and forth to the centre, yet also because of operations within the centre. However, emphasis is put on that these costs are small in relation to the projects total cost and that the site organisations willingness to adopt the centre impacts the centre's utilization.

In an attempt to address the complex, multi-stakeholder and multi-factorial setting, Stathopoulou et al. (2012) encourage that initiatives should be taken by policymakers regarding the abovementioned asymmetries of risk, profits (Eng-Larsson & Norrman, 2014) and incentives (Narayanan & Raman, 2004). In order to tackle these issues, the policymakers must understand each stakeholder's perspective and cater a cooperative environment. The comprehension of various perceptions should identify where conflict of interests might occur and what constraints and concerns each party possess. By achieving this setting, it is possible to guide stakeholders' preferences into alignment with desired objectives. To complement the advocated approach of Stathopoulou et al. (2012), Eng-Larsson and Norrman (2014) emphasise that these initiatives ought to be considered in early project stages to make decisions centralized hence creating more holistic and effective solutions.

2.8 Cultural and relational aspects within construction

The attributes of construction projects are underpinned by lacking communication and reluctancy of embracing new methods hence resulting in unemployed potential (Fellows & Liu, 2012; Bankvall, et al., 2010). Moreover, relational conflicts are portrayed to be inevitable within complex and wide scoped construction projects where phenomenons such as opportunistic behaviour and cultural embeddedness are frequently occurring (Lu, et al., 2016).

2.8.1 Opportunistic behaviour

Within the aspect of communication, opportunistic behaviour is important to consider in business relations including its entailed consequences (Boissinot & Paché, 2011; Lu, et al., 2016). According to Williamson (1985, p. 47), opportunistic behaviour is defined as "*self-interest seeking with guile*", which in the context of construction and contractors Lu et al. (2016, p. 2) derive into, "*during the construction phase, the contractor exercises private control, withholds or distorts information, withdraws commitments or promises, shirks obligations, and breaches explicit or implicit agreements, trying to earn unilateral gains at the expense of the owner*". This is a phenomenon that occur in between transactions among individuals or organisations that could vitiate relations (Boissinot & Paché, 2011). Moreover, this issue is explained to be derived through information asymmetry, bounded rationality, few parties being involved in the transaction, uncertainty about environmental aspects, relation characteristics and if the transaction affect important assets. It is further explained that opportunistic behaviour can be identified in several degrees. When the level of opportunistic behaviour reaches an inflection point this behaviour could result in one party's wish to refrain contract signing.

To mitigate opportunistic behaviour organisations should implement control strategies encompassing formal and informal control mechanisms and governance tools. The formal tools are characterized by authoritative audits with the intention to ensure contractual fulfilment from signing parties (Boissinot & Paché, 2011). In comparison, the informal tools regard methods of socialization which through for instance co-location, group meetings, supplier conferences and cross-functional teams aim to improve business output and mitigate issues as opportunistic behaviour (Cousins, et al., 2008). Though, the exercise of these measures is not seamless (Boissinot & Paché, 2011). When adopting monitoring of contractual parties there is an entailed risk of undermining the trust (Kusari, et al., 2013). This is explained as encompassing benevolence in early relation stages but through the transaction phase imply distrust and aversion. In addition, Boissinot and Paché (2011) conclude that formal control mechanisms are costly and that organisations have to find a balance to between being permissive towards deviant behaviours and exercising moderate control.

2.8.2 Cultural embeddedness

Organisational culture is a phenomenon that affect how work is conducted and is reflected by employees' personal values (Sullivan, et al., 2010). For this reason, logistics must be cultural embedded in organisations in order to regard its influence in each project phase. This is motivated through emphasising on how logistics traditionally have been conducted in construction projects. Frequently, the common procedure is to let the contractor manage the dilemma of how materials should be transported to and from site and associated umbrella services. The reason for this is usually due to preliminaries in tender documents which are difficult to determine in early project stages, henceforth prearranging the responsibility to the contractors. Consequently, this procedure tends to result in a logistical approach as what Sullivan et al. (2010, p. 58) explain as "*make do and mend*" rather than adopting a "*carefully planned, professional function*".

Moreover, in the context of service development and maintaining a competitive business, the employee's personalities have a great impact on innovation in the workplace (Yesil & Sozbilir, 2013). It is conveyed that openness to experience is connected to one's attentiveness with feelings, preferences of variety, aesthetics sensitivity and imagination, hence closely related to creativity. For this reason, in order for companies to facilitate individual innovation behaviour, it is of importance to cater a workplace culture that promote curiosity, intelligence and flexibility. Despite shedding light upon the correlation between openness to experience and innovation, it is concluded that the result shows no indication that other personal traits affect innovation.

2.9 Legal aspects and contractual demands

Within a construction project, clients and contractors work together to reach a common goal and their interdependent efforts affect the projects successfulness. However, either party's defection could entail great losses for the other, hence urging the need for parties to possess collateral. To ensure parties against undesired outcomes and contingencies a contract is a great measure (Lu, et al., 2016). As a consequence, both governmental and client's demands' and policies influence the scope of how contractors deliver a project, hence curbing the range of available project strategies (Sullivan, et al., 2010). Further, the contract could be divided into four dimensions that sway project guidelines and code of conducts: issue inclusiveness, contingency adaptability, term specificity and contractual

obligatoriness (Lu, et al., 2016). These encompass to what degree issues are included, level of detail in contractual terms, how to handle unforeseen events and to what extent parties are forced to obey the contract.

Within the topic of project feasibility, Norrman and Henkow (2014) underline the conjunction between logistics and legal principles. By referring to the strive for making logistics more efficient they present challenges and friction between these two domains that affect one another. Variation in legislation is mentioned as contributory factor to the tension which is shown to bring a greater workload for logisticians and less environmentally friendly solutions (Norrman & Henkow, 2014). In addition, an increase of urban freight regulations such as constraints regarding environmental zones and transport vehicle characteristics could have negative effects on supply chain efficiency (Quak & Koster, 2009). Conclusively, the processes of increasing efficiency within logistics tend to contradict the legal belief system and can be derived to a clash between innovation and conservatism (Norrman & Henkow, 2014). Henceforth, this issue could be summarized as an senior logistics manager responded in Norrman and Henkow's article (2014, p. 759): *"If the legal side instead of always telling us No, you cannot do it like that, would have advised us what to do, we would have involved them much earlier"*.

Despite stipulated demands and policies by clients and governments, the developer or project owner should ensure project technical feasibility by not stipulating unreasonable performance demands (Lu, et al., 2016; Li, et al., 2005) nor immoderate construction design (Li, et al., 2005). In addition, there is a balance between conveying adequate amount of issues with moderate level of term specificity and indirectly expressing distrust (Lu, et al., 2016). However, an extensive issue inclusiveness in the contract tends to mitigate opportunistic behaviour even though it might signal distrust. Moreover, to an extent, a thorough contract completeness, have negative impacts on opportunistic behaviour. This is because the contractual dimensions term specificity, contingency adaptability and contractual obligatoriness stipulate support for explicit contract violations.

If the ability to convey feasibility through contracts, is not possessed within the developer's organisation, which is often the case for public developers, it is appropriate to address the issue through hiring external expertise. Henceforth, in order to unveil potential deficiencies regarding thorough and realistic assessment in early project stages, Li et al. (2005, p. 465) declare that *"although much of this assessment is treated as commercial-inconfidence, some forecasts may need to withstand open public scrutiny"*.

2.10 Analytical framework

This section covers how each theory topic relates to the stipulated aim and research questions, see *Figure 5* below. In *Figure 5*, every research question is given a colour to simplify apprehension of which topic that corresponds with each research question. Arrows in between topics indicate how they relate: a bidirectional arrow indicates that topics affect one another or are interdependent, while a unidirectional means that one topic leads to the other. The red arrows portray how each research question derives from one another. In other words, as the aim raises each research question, they are all interlinked through the topics "construction logistics and transports" and "land allocation agreements". The analytical framework is used for analysis in chapter 5.

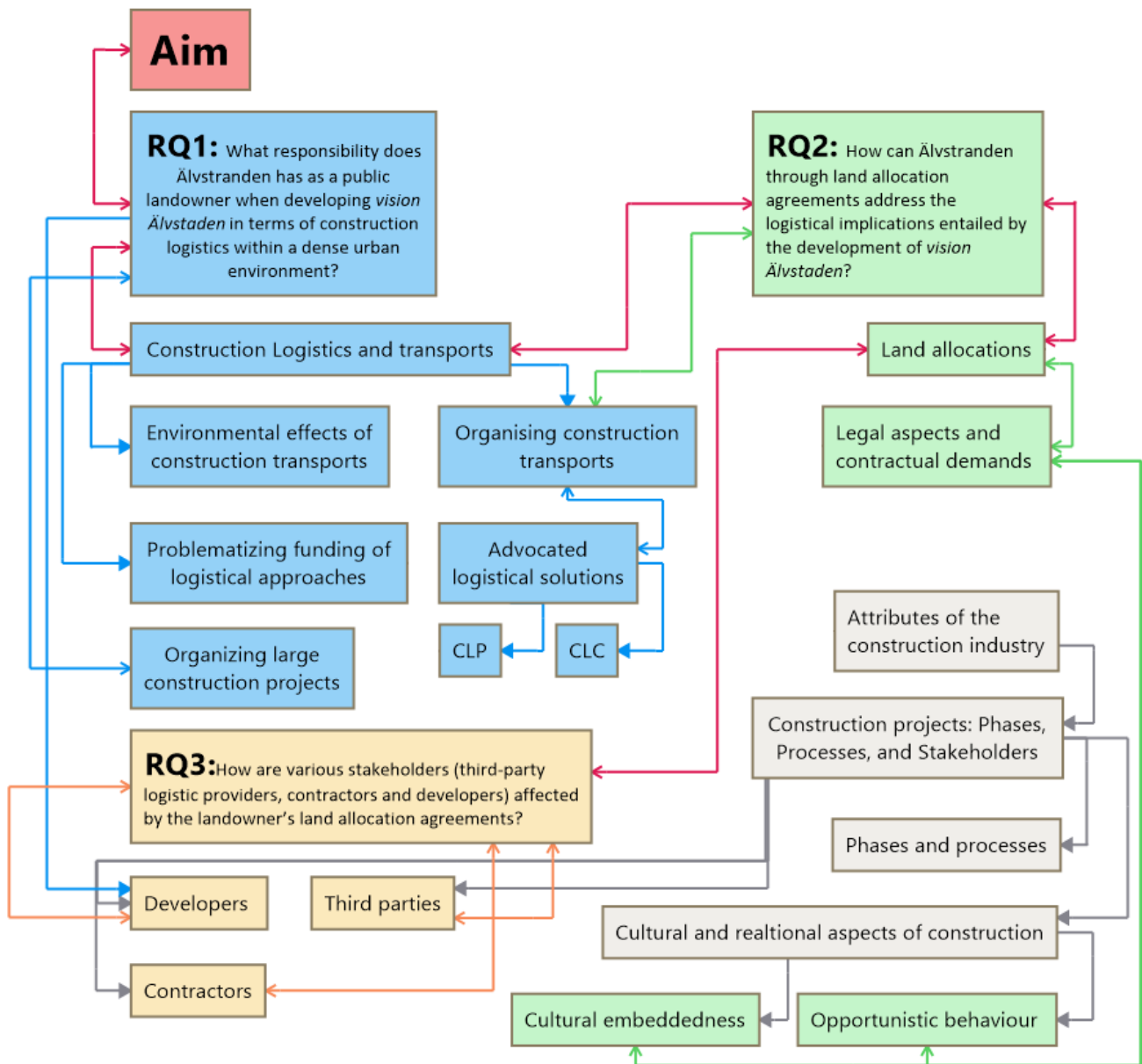


Figure 5. Analytical framework.

3 Method

The chapter presents the chosen methodology for the master thesis. The conducted research process is explained in conjunction with what theoretical and empirical information that is gathered. Further, the selected strategy is conveyed, elaborating how the material is collected and assessed. Afterwards, the quality of the study is discussed, describing the trustworthiness of the information and where it has been gathered. Finally, ethical aspects pervading the delivery of this thesis are depicted, explaining which ethical and moral guidelines one should adhere when conducting research of this sort.

3.1 Research process

The gathered information presented in *Theoretical considerations* originates from a literature study, encompassing books and articles mainly regarding construction logistics, land allocation agreements and public private partnerships. Several of the studied articles deal with foreign and domestic construction logistics cases and have been chosen for review due to similar case prerequisites in order to gather an apprehensive perspective. In terms of studied books and articles, key search words have been: '*construction logistics*', '*construction logistic solutions*', '*logistic governance*', '*third party logistics*', '*land allocation agreements*' and '*public-private partnership*'.

The study has been conducted under a five month period during the spring of 2020, for Älvstranden Utveckling AB. The authors have partly been located at their office, which has given the possibility to maintain a close verbal communication with employees, hence a great deal of informal verbal sources have been utilized, both overt and covert. These informal verbal sources can be seen as a valuable addition as well as confirmation of information gathered from formal meetings at Älvstranden. Formal meetings and interviews have also pervaded the way of communication with other organisations, such as developers, contractors and TPL providers. Regarding the interviews, a semi-structured approach has been conducted. Main questions were predetermined and succeeded by follow-up questions, allowing a more diverse source of information, see Appendix A. The predetermined questions were set to attain a reflection of the interviewee's perceived reality and way of working, hence giving this source of information an inductive point of view. All interviews were conducted in Swedish and documented exclusively through notes. Henceforth, quotations presented in this thesis are translated from Swedish to English. The time frame for each interview was set to an hour and time the deviation resulted in plus/minus 10 minutes.

In total, 13 interviews were conducted whereas the majority are or have been involved within project Masthuggskajen and the remaining consisted of consultants, a third-party logistics provider, and other employees at Älvstranden. These interviewees were chosen based upon their role of relevant knowledge and was done to apprehend a representative range of perceptions of project Masthuggskajen and construction logistics. The respondents are presented below in *Table 3-6* along with their title, type of stakeholder, assignment and role. Names have been excluded in order to obtain a higher level of integrity in case of sensitive information and opinions.

Table 4. Interviewees and originators of formal communication at Älvstranden.

Title	Stakeholder	Assignments/Role	Date
Project Manager A	Älvstranden	Manages project Masthuggskajen	20/02/12
Project Manager B	Älvstranden	Manages project within vision Älvstaden	20/01/22
Project Manager C	Älvstranden	Manages project within vision Älvstaden	20/01/22
Vice President	Älvstranden	Member of the board of Älvstranden	20/03/10
Environmental Director	Älvstranden	Responsible for sustainability	20/02/07

Table 5. Interviewed developers.

Title	Stakeholder	Assignments/Role	Date
Developer A	Large sized property developer	Project chief and manages project within Masthuggskajen	20/03/04
Developer B	Large sized property developer.	Project chief and manages project within Masthuggskajen	20/03/19
Developer C	Large sized property developer and contractor	Project chief and manages project within Masthuggskajen	20/03/17

Table 6. Interviewed contractors.

Title	Stakeholder	Assignments/Role	Date
Contractor A	Large sized property developer and contractor	Project chief and manages project within Masthuggskajen	20/03/17
Contractor B	Small sized contractor	Site manager at a project within Masthuggskajen	20/03/24

Table 7. Interviewed consultants and CLC operators.

Title	Stakeholder	Assignments/Role	Date
Consultant A	Third party logistics provider	Operations manager involved within project encompassed by Masthuggskajen	20/03/17
Consultant B	Logistics consultant	Business chief at a large sized contractor and former logistics consultant	20/03/09
Operations Manager A	CLC operator	Manages the operation of a CLC	20/02/07

In the beginning of the thesis, Älvstranden had an inarticulate desire regarding how logistics would help them reach their goals with *vision Älvstaden* regarding bisecting emissions and establishing a living street level. Consequently, the aim was not particularly specific, and focus was directed towards evaluating logistical solutions, regarding their feasibility in *vision Älvstaden*, how they were funded and their environmental aspects. At one point, the study was about to elaborate whether naval construction transportation

would be the optimal solution for *vision Älvstaden*. However, after a while the authors got notified about an inquiry that was ordered from a TPL provider regarding advocated logistical solutions at Masthuggskajen, which explicitly showed results about the thesis point of departure. For this reason, in consultation with supervisors at Älvstranden and Chalmers, focus was redirected towards land allocations agreements and the possibility to include logistical regulations. This redirection was chosen because it would not explicitly elaborate what solutions that would be most suitable, but rather how Älvstranden would utilize their role as landowner and ability to sway project proceedings in early project stages, hence still be able to reach their goals. As a result, additional light was shed upon logistics in early project stages and contractual aspects and how these would affect project outcomes. After focus shifted towards land allocation agreements, interviews were conducted which subsequently influenced the theoretical considerations as it highlighted areas of concern that were not acknowledged nor given sufficient attention. For instance, the domains of opportunistic behaviour and cultural aversion did frequently get accentuated through several interviews which led to a greater theoretical focus. Similarly, theoretical findings regarding the importance of addressing logistics in early stages did influence what interview questions that were chosen, such as “*What are your opinion of adresssing logistics in early project stages?*” and “*Have you been given the opportunity to influence logistical proccedings in early project stages?*”. Finally, as land allocation agreements turned out o be a less elaborated topic, the theoretical considerations regarding these and domestic laws and regulations connected to land allocations did not get acknowledged until end of the research process.

3.2 Research strategy

In order to provide solid argumentations and answers to the research questions of the master thesis, a qualitative approach of the study was set in an early stage. Stakeholders opinions are essential to the study, whereas a qualitative research strategy allows these to prevail and facilitate an in-depth analysis of the topic (Bell, et al., 2019). Furthermore, several unknown variables permeate the research process which additionally support the approach. The aim of the thesis is to provide insights into how Älvstranden could approach logistics through land allocation agreements wherefore a qualitative research strategy is suitable as to explore the phenomenon in its contemporary context.

An abductive research approach can be seen as a combination of the inductive and deductive approach, aiming to bridge the advantages of both approaches (Bell, et al., 2019). The inductive approach generates theory by data collection from the empirical world whereas the deductive develops propositions based upon current theory, see *Figure 6* (Dubois & Gadde, 2002). Ketokivia & Choi (2014, p. 236) describe the abductive procedure as “*disciplined iteration between general theory and the empirical data*”.

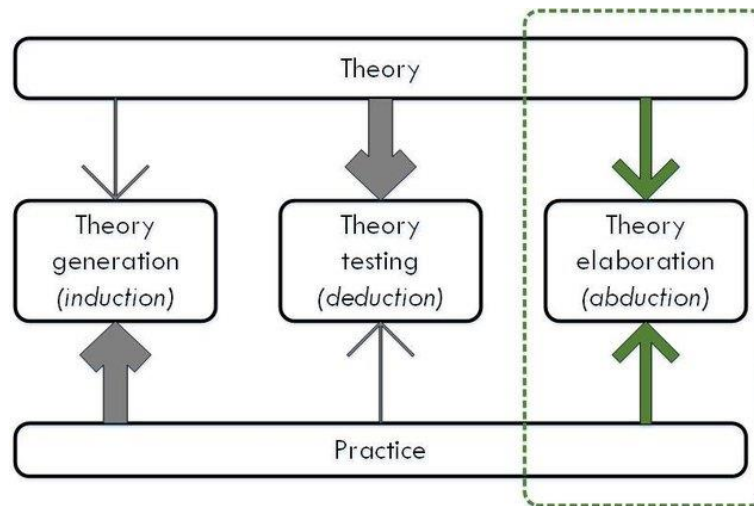


Figure 6. Illustrating the difference between inductive, deductive and abductive research approach. Adapted from Ketokivita and Choi (2014).

This thesis is formed by an abductive approach, meaning that the empirical data and the theoretical considerations have influenced each other to a great extent, see Figure 7. In terms of case studies Dubois & Gadde (2002) conclude that an abductive approach based upon 'going back and forth' in between theory and empirical observations are preferred in order to evolve the, at the beginning articulated, preconceptions into a deeper understanding of both theory and empirical data. Whereas in this thesis this behaviour has influenced especially the follow up questions during the interviews, a course of action also supported by Bell et al. (2019).

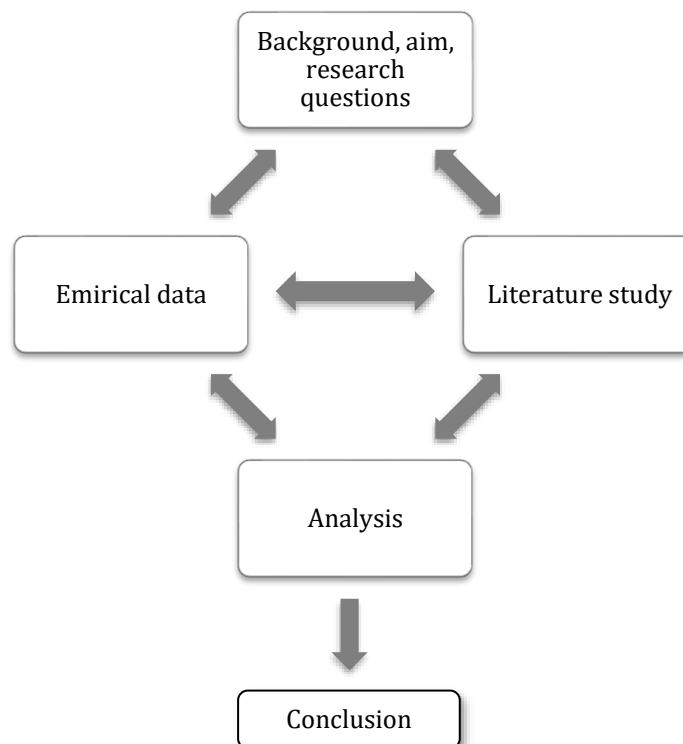


Figure 7. An illustration of the abductive research strategy of the study.

3.3 Quality of the study

When conducting qualitative studies, the research quality can be addressed by two criteria: validity and reliability (Yin, 2003). The issue of validity originates from researchers who are commonly bounded in the processing information and tend to put emphasis on results rather than evaluating how these were acquired (Miles & Huberman, 1994). Validity in research is about exposing the study through an apprehensive perspective and shed light upon the thesis through multiple viewpoints (Yin, 2003), which is achieved by using multiple sources of information and case studies. This has been achieved as all the referenced literature in this thesis are published and acknowledged literature which has been accessed through valid sources, combined with perspectives gathered at the interviews and the daily work conducted at Älvstranden. Literature were handed out directly from the thesis supervisor at Chalmers University of Technology and attained through Chalmers Library or Google Scholar. Furthermore, qualitative case study research is often prone to critique regarding generalization. As researchers tend to focus on results (Miles & Huberman, 1994), case studies should, to increase validity, opt for making comparisons with other studies or cases to provide theoretical and empirical foundation to the contributions (Yin, 2003). Thus, within this thesis, another similar case in Uppsala is evaluated and empirical data has been sampled from various stakeholders to provide a wide foundation for the analysis. At last, to further ensure validity, researches must be cautious when drawing conclusions from data and filling in details of ambiguous information (Yin, 2003). This is because individual's recognition and perception of a data affect their ability to make connections. Consequently, to mitigate this issue, research should strive for making their results and methodology open for scrutiny. Another measure to this problem is to revalidate data by letting originators review how the data is portrayed and let them reassure that it does not depart from its context. For this reason, to convey unswayed information, direct quotes from interviewees are presented in its original context and the originators have been given opportunity to review how their thoughts are presented.

The second criterion, reliability, indicates the research process consistency and seeks to reduce faults and biasness (Singh, 2014). In other words, this means that other researchers should be able to conduct the same study and provide the same conclusions (Yin, 2003). This has been achieved through composing a thorough methodology chapter, encompassing the research process and strategy. Moreover, a thesis structure with research questions has been chosen. These questions compose a clear pattern throughout theory, empirics, analysis, and conclusion to improve coherency and facilitate for the reader to follow what data that is connected to each research question. In addition, to further complete the proceeding of how data were gathered, interview questions are appended in the end of the report, see Appendix A.

Finally, to support the trustworthiness of this thesis, close collaboration with supervisors at Älvstranden and Chalmers have pervaded the conduction of this study. Within these relationships, the researchers have received frequent feedback regarding data and theoretical considerations. Furthermore, since this study was done as a master thesis, it has increased the level of objectivity. This is because the authors do not possess any employment at the firm and aims to act as a neutral party. However, despite receiving this opportunity, full objectivity is hard to achieve and therefore subjectivity cannot be fully ruled out. However, the purpose of this thesis is to bring forward a clear and comprehensive portrayal of the logistical issue Älvstranden faces with the development

of *vision Älvstaden*, thus providing a basis for further discussions and facilitate decisions in upcoming projects. For this reason, in the position of composing this thesis and support the quality of the study, it has been pointless to embellish, withhold or blemish any sort of information, whether it be theoretical or empirical.

3.4 Ethical aspects

In terms of conducting research, ethics represent a vital role. Ethics in this sense encompass the issues of distinguishing between what is acceptable and not acceptable behaviour (Resnik, 2011). This behaviour is explained to be acquired via different social contexts and throughout our childhood which results in societal norms and personal values. Henceforth, depending on what circumstances one has been exposed to throughout childhood and adolescent our norms and values may differ. Thus, this divergence is the cause for societal and global ethical discussions and disagreement since it gives us various perceptions of what is right or wrong. The entailed implications derived from nurture and nature will doubtlessly influence the structure of this thesis. This is because each highlighted theoretical domain is a result of subjective perceptions of what is of importance within the topic of this thesis. In addition, this phenomenon will also permeate interviews as it directs selection of interviewees and interview questions. Furthermore, it will also affect what connections that are discovered within the analysis, thus owe a great deal to what conclusions that are derived.

In the field of research, Oliver (2010) elaborates the areas of concern regarding ethics. Chronologically, before the research starts it is of importance to reflect upon whom that will be involved in the research and if there are people of vulnerable character that needs to be respected. Henceforth, when conveying information from respondents in this thesis, names are excluded and only profession are presented, which also has been clearly stated for each interviewee. Further, the information of which the research is based upon, how it is gathered and dealt with needs to be considered regarding its originator. Oliver (2010) claims that from the researcher's point of view it is importance to contemplate in which linguistical way the research is conveyed. Hence, not distorting or misrepresent information that relinquish its original meaning.

Similarly, in the context of this research, through Resnik's (2011) ethic elaboration, one could derive eleven principles: honesty, objectivity, carefulness, openness, respect for intellectual property, confidentiality, responsible publication, social responsibility, non-discrimination, legality and competence. To corroborate and further develop the thoughts of Oliver (2010), Resnik (2011) summarizes the essence of the principles into the following. In order to conduct ethical research, one should strive for honest communication by not deceiving recipients or fabricating information and data, yet also avoiding biasness in the collection and choice of sources and where objectivity is necessary. For this reason, covert information gathered through observations and discussions, has been handled in a heedful manner. Further, to be able to convey unswayed information, direct quotes from interviewees are presented in its original context and the originators have been given opportunity to review how their thoughts are presented. Nevertheless, despite adhering ethical guidelines, one could question the authors biasness towards Älvstranden. However, the authors of this thesis are not employed nor involved in any context with the firm and therefore not explicitly nor tacit

obligated to be biased. To conclude, the authors have no gain in distorting the portrayal of theoretical nor empirical findings.

3.5 Sustainability aspects

Sustainability has been a widely discussed topic during recent years that is used to discuss environment, societal and global issues within societal fields. This encompass domains such as business and education which commonly encompassing climate issues and the use of non-renewable resources (Becker, 2011). To date, sustainability issues have gained greater acceptance and an urge for better understanding of these problems have arisen (Franklin & Blyton, 2013). Research is an approach that is effective regarding unveiling the truth (Mutch, 2005), hence appropriate while addressing issues such as sustainability. This is because it combines both reasoning and experience and provides additional knowledge to else unknown understandings.

The construction industry is prone to several discussions regarding sustainability (Ortiz, et al., 2009), such as using more environmentally friendly construction materials, building more energy efficient and reducing the amount of construction transports. When shedding light upon construction transports, several initiatives have been taken to improve construction logistics and supply chain management (Transport for London, 2019; Browne, et al., 2012; Lundesjö, 2010). These elaborates implications raging from global to local, urging to make the construction transportation more efficient and reduce its environmental impacts.

In the context of sustainability, this thesis provides several contributions. Firstly, Älvstranden is an organisation that has clear goals related to environmental issues. For this reason, since the purpose of this thesis is to help Älvstranden in their work of making contractors and developers adhere logistical approaches that correspond with these goals, the connection between the thesis contributions and sustainability is clear. Secondly, regarding the economic aspect of sustainability and considering the aim of this thesis, one could argue that by investigating the opportunity to implement solutions in land allocations that would imply better economic circumstances, this thesis provides contribution to economic sustainability. However, opinions differ regarding the economic aspect of implementing innovative construction logistic solutions. Advocators of implementation, such as TPL providers or parties concerned about environmental issues, argue for cost savings. On the contrary, contractors and developers possess an opposite perception and states that an implementation would imply greater costs. This contradiction shed light upon this thesis contribution to social sustainability. This is because, which logistical solutions that gets stipulated in land allocation agreements have a great influence on how third parties will get affected. For this reason, when evaluating an implementation of a solution that would imply a cost increase one should consider the social advantages a logistic solution would imply, especially when the public role involve social responsibilities, not least towards third parties whom themselves have little influence on construction activities but nevertheless gets affected during construction time.

Finally, besides addressing the environmental, economic and social issues related to Älvstrandens work, this thesis contributes to sustainability in a wider sense. This is because the conclusions are considered to be generalizable, henceforth applicable for

cases of similar character thus provide additional support towards the transition of a more sustainable society

4 Empirical data

The chapter presents the empirical material. Firstly, *vision Älvstaden* is described regarding scope, development and purpose. Secondly, the role of which Älvstranden has been assigned as public landowner and property developer is portrayed. Thirdly, the way Älvstranden conduct business is mediated along with the perceptions from developers, contractors, TPL providers and consultants. Finally, a CLC in city development projects in Uppsala is investigated regarding, operations, contractual guidelines, and results.

4.1 Vision Älvstaden

Vision Älvstaden is the most extensive urban development projects in Scandinavia and encompasses several smaller urban development projects including Lindholmen, Frihamnen, Södra Älvstranden, Ringön, Backaplan and Gullbergsvass, see figure 1. These projects accumulate approximately a buildable surface area of 5 million square meters, and with a goal of housing 25 000 residences and 45 000 workplaces. The aim of the vision is to develop an environment along Göta Älv that interlace Gothenburg with the river, strengthening the city centre, while creating a green and attractive atmosphere. The vision was established through international workshops and investigations with citizens and city development experts containing a goal for how existing properties should be addressed while regarding the residents of Gothenburg and the environment. At last, the proposal for starting the development was accepted and signed by the municipal of Gothenburg in October 2012 and to the vision has been initiated where the last project is planned to be completed in 2050.

4.2 Älvstranden in the context of being a municipal landowner

In 1996 Göteborgs Stad acquired the company Eriksbergs Förvaltnings AB, later named Älvstranden Utveckling AB. Subsequently, the ownership of the properties transformed from being state property to be a municipal governed possession. Henceforth, Älvstranden's operations must be conducted in accordance with municipal law principles, regulations, and directives from the town council of Gothenburg, such as The Swedish Public Procurement Act. As stated in the owner directives formulated by the town council, Älvstranden's long-term purpose is to foster a sustainable urban development around Göta Älv. In order to fulfil this purpose, Älvstranden can besides being a landowner take on a role as developer and facility manager. However, the main intention is to act as landowners, hence primarily convey site directives, based on social, economic, and environmental sustainability.

Älvstranden's societal role have several similarities to the city of Gothenburg's Real Estate Office (*Fastighetskontoret*) since both organisations must adhere the directives given by the municipal council, see *Figure 8*.

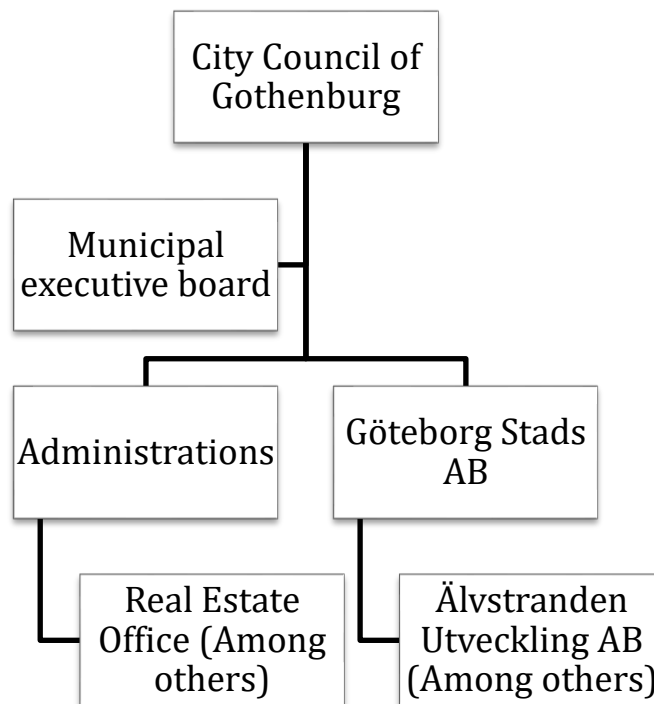


Figure 8. Simplified hierarchy of Älvstranden's relation to the city council of Gothenburg and the Real Estate Office.

However, the major difference is that the Real Estate Office is a municipal administration, whereas Älvstranden is a limited company (*aktiebolag*), thus obliged to adhere the limited companies act (*aktiebolagslagen*). This means, for instance, that regulations differ regarding legal liability and bookkeeping where Älvstranden must be profitable to avoid liquidation. But, according to the Vice President at Älvstranden, the organisation takes part in collaborative forums together with several other construction related municipal administrations with the intention to promote knowledge sharing.

4.3 Älvstadsmodellen: How Älvstranden conducts business

Älvstranden has developed a strategy of how to approach city development projects which is guised into a model called *Älvstadsmodellen*. In general, *Älvstadsmodellen's* chronological proceeding starts with Älvstranden allocating land to various property developers who are interested in exploiting the area, see Figure 9. Secondly, when developers have been chosen, a consortium is established, see Figure 10.

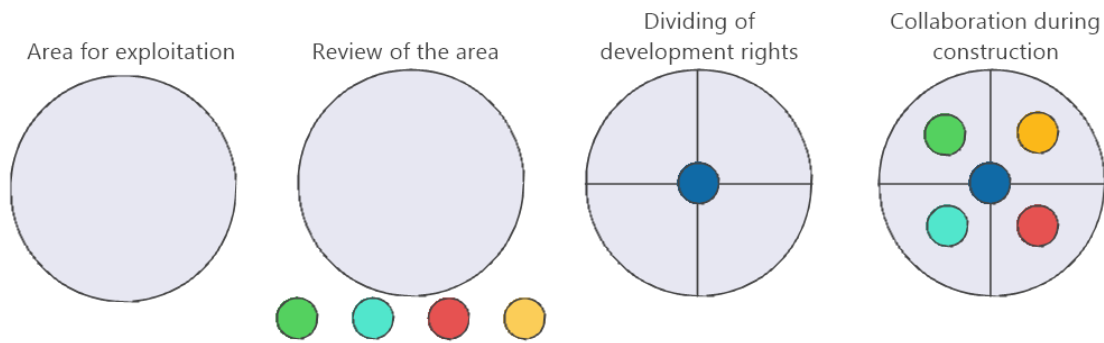


Figure 9. Different phases within Älvstadsmodellen. Älvstranden is represented by the blue circle whereas the green, cyan, red and yellow are developers.

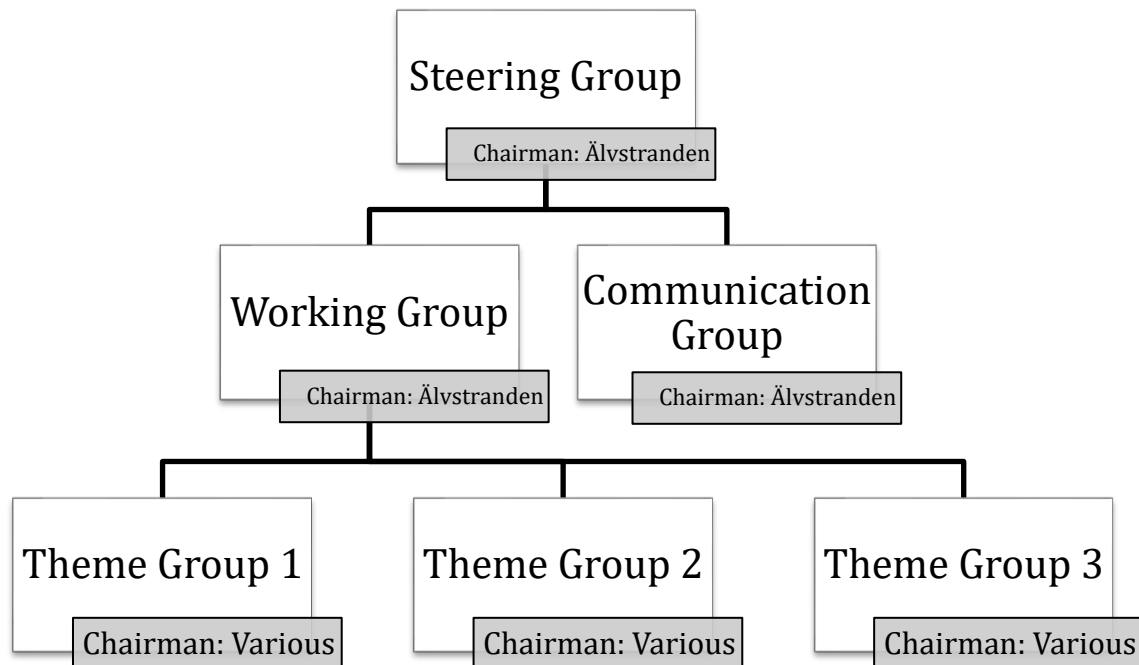


Figure 10. Schematic organisation of a consortium in Älvstadsmodellen.

This organisation is responsible of formulating a local plan with corresponding development order in a manner that creates development rights that are of equal interest to exploit. Thirdly, these rights are distributed among the developers hence making the construction processes ready to be initiated. Afterwards, when construction is ongoing, the consortium acts as a support function for the developers with knowledge sharing forums.

The consortium consists of a Steering group which has the overall responsibility of the consortium where Älvstranden is assigned the governing role. It is at this top level the overall decisions are taken, further tasks are distributed to the Working Group and the Communication Group. These groups have an operative responsibility for implementation, monitoring and fulfilment of goals respectively coordinating the communication within the consortium and with stakeholders engaged in the project.

Subordinate, and assigned by the Working Group, are several theme groups which are responsible for elaborating questions and shed light upon areas of concern, such as logistics and sustainability.

4.4 Älvstadsmodellen in Masthuggskajen

Regarding *Älvstadsmodellen*, Project Manager A contextualizes Masthuggskajen and elaborates how the project has proceeded to date and explains that all developers have been allocated land whereas only one has been granted and started construction. In the light of logistics management, it is mentioned that logistical issues are currently dealt with through the theme groups where the consortium carries out a joint effort towards solving an increasingly urgent matter. Unfortunately, the logistical approach has drifted towards a more operational method where issues are solved in an ad hoc manner. This is because logistics did not get enough focus in early project stages which to date has resulted in measures being discussed and implemented after contractor acquisition and signing of agreements. Despite the insufficient emphasis on logistics at the beginning, the consortium had acknowledged the putative impacts on construction transports and the need for a logistical solution. For that reason, a TPL provider was involved to investigate project prerequisites to support the consortium in the process of deciding and determine a logistical solution. However, due to indefinite project conditions the TPL providers were unable to provide a, to the consortium, persuasive solution resulting in the implementation of a logistical clause in the contractor agreement.

Consequently, this has resulted in a scenario where any new logistical solution that the consortium wants to convey to the contractors has to be of reciprocal desire. This is because the contractors are only obliged to adhere contractual terms stipulated in the already signed contract. Conclusively, in order to guide the contractors to deliver their work in accordance with the logistical goals and aims of *vision Älvstaden*, the proposed solution must contain incentives for the contractors.

4.5 How Älvstranden addresses logistics

Älvstranden has along with the development of *vision Älvstaden* an urging need of addressing logistical issues within their projects. It is frequently mentioned that the logistical aspect of construction is a parameter that is comprehensible and easy to remedy hence a great departure for reaching their strategic goals: bisecting emissions and establishing a living street level.

To date, Älvstranden address logistical dilemmas within respectively consortium according to *Älvstadsmodellen* which Project Manager A shed light upon in *section 4.4*. Project Manager A does conclude by expressing a desire to deal with logistics in a stage which precludes a reactive logistical approach that address issues as they arise. Instead, it is mentioned that it should be addressed proactive where stakeholders' incentives are aligned. Regarding Älvstranden's internal logistical work, the Vice President underlines that their current approach constitutes of a forum where all project managers gathers, discuss, and coordinates their projects issues, including logistics. However, when questioned, the Vice President insinuates that Älvstranden do not possess any logistical expertise internally.

In the future, both Project Manager B and C wish to tackle the construction logistics in a holistic perspective that cater all stakeholders' incentives. They depict this as a solution that mimic the functions of a CLC that enables modal shifts between sea and road and that cater several projects. Further, in the role as landowner, they convey that an option to realize this "logistical utopia" is through stipulating logistical guidelines in the land allocation agreement.

The role that Älvstranden has in a societal and limited company context is problematized by the Vice President. On one hand, Älvstranden has to take on the role as representing the municipal, and on the other, they have to act as profit striving organisation. As a result, a cognitive dissonance has occurred among the representatives of Älvstranden regarding clashing incentives and areas of responsibility. For instance, the Environment Director highlights that in the past, discussions with the city's administrations took place regarding logistical issues entailed to *vision Älvstaden*. Nevertheless, the conversation did not result in any distribution of responsibility regarding logistical issues.

4.6 Stakeholders' perceptions of logistics related to Älvstadsmodellen in Masthuggskajen

There are several stakeholders, such as developers, contractors, TPLs and consultants, involved within the logistical dilemmas that the development of *vision Älvstaden* entail. Within project Masthuggskajen, they possess various perceptions regarding how and if issues should be addressed in early project stages and what aspects that should be accentuated. Following, summaries of each of these stakeholders' views are depicted.

4.6.1 Developers

While shedding light on logistics in early project stages, Developer A highlights that the general opinion of involving as many stakeholders as possible as early as possible could imply advantages but is not a feasible solution. This is exemplified as that this mindset often departs from a hindsight where all preliminaries are known, hence making the solution insignificant to a great extent in early stages, thus resulting in early involved stakeholders being faced with perplexity. However, at the same time, all developers highlight the importance for policymakers to acknowledge logistics before land allocation and to stipulate clear guidelines and regulations. Developer B draw attention to this issue by mediating that logistics should accompany quality, environmental aspects and costs as a selection criterion within the procurement process. In addition, Developer A and B further depict the unfolding of the logistical approach at project Masthuggskajen by saying "*the logistics coordinator has had a hell, he has to coordinate the will of a group of small popes with veto rights*", respectively "*it (logistical considerations) arrived when the clock had turned five past twelve*".

Regarding prescribed logistical approaches in land allocation agreements, all developers convey that this is an approach that could work in practise. However, Developer A and C accentuate the importance of formulating these paragraphs in a way that focus on demanding specific result rather than stipulating how to achieve them. To support this mediation, Developer C explains that "*the stakeholder with the greatest economic incentive should be the one responsible for how to address the issues*". On the contrary, Developer B

would desire an agreement that specified details regarding transports and their operations.

Furthermore, mutually expressed among the developers, is that they have no aversion towards adapting logistical demands provided that these bring economic incentives. However, Developer A mentions that the way solutions such as CLCs have been portrayed to date will not change the industry's logistical mindset. Despite that this portrayal highlights savings in time and costs through practical examples, Developer A underlines that these savings do not preponderate the effort necessary for contractors to change their logistics management. At last, Developer A stresses the cultural barrier that permeate this resistance by saying *"we are not really there yet"*.

While discussing Älvstranden's role as communal landowner and limited company, all developers mentions confusion and misunderstanding. Concerns are prevailing regarding the scope of Älvstranden's commitment and responsibility. As a result, Developer C mentions that this imply consequences for developers and contractors since they do not know whom to contact or address regarding communal issues. Conclusively, Developer C conveys that is not sustainable for Älvstranden to convey a vision to developers that imply commitments that they cannot handle themselves. In the same manner, Developer B complement this by underlining inadequate follow up on contractual agreements, *"if we would not have been so humble, and instead strictly adhered the contract, Älvstranden would be in trouble"*. At last, Developer B summarize, *"Älvstranden have probably gotten over their head when trying to develop projects in dense central urban districts compared to Norra Älvstranden"*. The spirit of the conclusion is that project prerequisites at Norra Älvstranden were less complex and challenging since they mainly consisted of old industrial premises rather than living urban environment with spatial restrictions.

4.6.2 Contractors

Regarding the possible implementation of a CLC, Contractor B expressed scepticism of implementing it at a city development project like Masthuggskajen due to divergent prerequisites, *"I do not see any point with it (CLC), I mostly see it as an intermediary part that aggravate the building process."* Though, when talking about a more, for the city, overall approach to construction logistics, Contractor B highlights the usage of consolidation centres that is not project specific. Further it is implied that the centre should cover the city districts more permanently. However, Contractor A is positive to a CLC covering all projects within Masthuggskajen, but at the same time thinks that it is a too expensive solution and highlights accountability concerns regarding logistics.

Contractor B prefers that demands stipulating specific logistical solutions in land allocation agreements are kept to a minimum and questions the logistical approach in early project stages, *"the more specified the demands are, the easier it is to get it wrong and it opens for misinterpretation"*, and *"you should probably not decide to much about it (construction logistics) early on"*. Instead, both Contractor A and Contractor B thinks that it is up to the contractor to appoint means and solutions necessary to fulfil the construction logistics. Contractor A believes that it is the contractors that has the greatest economic incentives to keep the deliveries in time, and therefore should be trusted to procure their own choices of logistical solutions.

Regarding output specifications in the contractual demands, Contractor B is sceptical. Contractor B means that it is difficult to stipulate these because they are formulated from a reference value acquired from other projects. Moreover, since project prerequisites often vary, it is futile to extract comparative values, hence making output specifications less useful. One example brought to light was a building where the contractual demand was a 30% decrease of water utilization. Though there were no specific reference value of how much water that normally would be utilized, and therefore it was no problem at all to fulfil the demand. "It is a game of numbers, regardless of contractual demands, we will adjust our tenders with fabricated numbers in a way that enable us to adhere demands while maintaining a reasonable level of dedication".

To further elaborate the stipulated terms in the land allocation agreement, Contractor B stresses that specified courses of action regarding logistical solutions will probably imply antagonism. This is because contractors already have established thorough logistical approaches with their current suppliers or TPL providers, hence averse to waive these.

Finally, despite displaying hesitation towards advocated logistical solutions, both contractors are aware of the complex prevailing circumstances that characterize the areas encompassed by *vision Älvstaden* and the need to establish some sort of coordination.

4.6.3 Third party logistics providers and consultants

According to Consultant A, the problem in today's construction material market is that the transport is included in price of material. This implies that many separate carriers from different suppliers are used and hence stressing the road network. Furthermore, 50 % of the total amount of daily transports tend to arrive to construction sites in between 7am and 9am if no logistical planning is utilized. This implies longer waiting times at the construction site and thereby losses in working hours.

The TPL business can in general can be described as quoted from Consultant A, "*Construction logistics. Easy. But really complicated*". It is stated that the mix of different stakeholders with different interests is a complex dilemma and difficult to grasp. Various stakeholders possess different incentives, hence needs to be persuaded in different ways to reach consensus. Furthermore, involved parties tend to link logistical solutions operational responsibility with its cost. Meaning that the one paying for a solution is the one accountable for its operation. As a result, this have led to resistance regarding implementation of new solutions since additional responsibility is not desired. Consultant A further states that, in these scenarios it would be of great value if municipal administrations set an example in terms of advocating and utilizing a, to the contractors, reluctant idea, in order to promote positive change. This statement is supported by Consultant B who also emphasizes clarity in the municipalities actions for the reason of facilitating further discussion with the remaining stakeholders.

According to Consultant A one significant success factor is early stage involvement of logistical approaches, as it increases the chance of getting all the stakeholders "*onboard*". The resistance to achieve agreements is always greater if some entrepreneurs already have started their work. When talking about project Masthuggskajen, Consultant B mentions a recently finished project of similar character in Sweden where 40 developers were involved, and the construction logistics had been neglected at the preconstruction phase. "*The only thing that made a later solution possible was that the municipality in the*

land allocation agreements had stated that the developers had to coordinate their work". Though, as mentioned by Consultant A, early involvement of stakeholders will imply more difficulties to establish and reach logistical solutions because of the uncertainty of prerequisites, hence "Therefore it is of great value to budget for a logistical solution."

When questioned regarding economic incentives for developers, Consultant A presents a cost allocation plan based upon the cost of a logistical solutions in relation to money and time saved by implementing the logistical solution. According to Consultant A, the TPL provider often can present a positive result to the developer or contractor. However, as also supported by Consultant B, the interpretation and willingness to adopt the solution based on personality. Regarding cost allocation in multi contractual projects, Consultant A suggests that the cost for each developer should be based upon GFA.

According to Consultant B, when it comes to major city development projects with many stakeholders, it is of great importance that a neutral part monitors the logistics. This part could be an external consultant or expertise hired at the one stipulating the contractual agreements.

4.7 Construction logistic centre: Uppsala Bygglogistikcenter

Alike Gothenburg, other municipalities in Sweden face the same situation regarding construction, congested infrastructure, and environmental issues. One municipality that has addressed these issues is Uppsala, where a CLC have been implemented in major parts of urban development projects since 2018. As landowners within three construction project areas, Rosendal, Ulleråker and Östra Sala backe, the municipality has together with developers formulated procurement contracts, obligating contractors to use a third party CLC provider for all construction logistics. In addition, it was stipulated in the contract that the developers were the ones financing the CLC.

The operating manager of the CLC explains that the aim of the CLC is to increase coordination of flow of materials among construction sites to reduce the number of construction-related transport within the city. It is further mentioned that the location of the centre is strategically located in accordance with the three project areas and that this has resulted in less disturbance on third parties and reduced CO2 emissions.

According to the operating manager, all deliveries to the three urban development areas are consolidated at the CLC. These deliveries are then distributed to the construction sites the following day, where fossil fuel free vehicles are used in the greatest extent possible. However, exceptions are made, direct deliveries are allowed if the cargo exceed 13 pallets or a fill rate of at least 80% of the permissible loading weight or volume of the truck. In addition, certain materials are always delivered directly to the site for practical and safety reasons, such as concrete, framing of joists and dangerous goods. The operating manager mentions that to make sure that contractors adhere these terms, spot checks on direct deliveries are conducted to ensure that requirements are met, if not, contractors are fined.

For deliveries to be able to access the construction site and enter through the site perimeter, contractors and developers are required to register the deliveries in a delivery planning service called STC. Through the STC, contractors get assigned a delivery time and gets notified when the delivery is on its way. Simultaneously, the delivery driver receives an entering code, valid only when the delivery is scheduled to take place. To

maintain the benefits of using this planning system the operating manger mediate that it is designed to aggravate bypassing, hence making it tedious for contractors to not utilize the STC.

The operating manger summarizes that the implementation of the CLC not occurred seamlessly. At first, developers and contractors responded with aversion. However, this phase was brief, and after a while they got accustomed. Despite meeting a dull reception, the CLC has during 2019 manged to direct 78% of the transports through the CLC (22% were direct deliveries) and consolidate the cargo. This has resulted in 8% less transports on the city grid compared to not using a CLC. Finally, the precision of deliveries to the CLC has been excellent, 99,9% were both on time and in accordance with ordering.

5 Analysis

In the analysis chapter, the empirical data in chapter 4 is analysed based on the analytical framework in chapter 2 to form the basis for the conclusions. Analysis thus covers three research areas. Firstly, an analysis of Älvstranden's role as a public landowner. Secondly, the inclusion of logistics within land allocation agreements is discussed. Thirdly, an analysis of stakeholders' perception of this inclusion in land allocation agreements is conveyed.

5.1 Analysis of Älvstranden's responsibilities in the role as a public landowner

By being a public developer and landowner, Älvstranden must adhere to municipal law principles, regulations and directives that implies high responsibility to foster public values. At the same time Älvstranden is a limited company and must also follow the limited company act, henceforth they have attributes of both being a private and public developer (Barrie & Paulson, 1992). For this reason, they are considered to suffer from the paradox in-between privatization and publicization (Teelken, et al., 2012). Parallels can be drawn to the cognitive dissonance within Älvstranden where the Vice President mentions dilemmas with clashing incentives. Furthermore, this issue is also stressed by both contractors and developers whom mediates a confusion of which role and accountability that Älvstranden possesses within their projects.

Älvstadsmodellen is considered to be equated to a PPP, as depicted in *section 2.6*. When engaged in these partnerships it is crucial to have relationships based on trust and open communication (Trafford & Proctor, 2006), however, the developers point to the opposite, with uncertainties regarding Älvstranden's role and responsibility pervaded their conveyed perceptions. Another important aspect within PPPs are ethos (Marschollek & Beck, 2012). Derived from the empirical data is that each stakeholder has various incentives regarding the development of *vision Älvstaden* which in accordance with Marschollek and Beck (2012) may cause cultural clashes. The contractors and developers primarily have economic incentives, but as stated in Älvstranden's owner directives, the importance of a living street level and impacts on third parties are major concerns on their behalf. One underlying reason for these clashes could be the attributes of the political environment that Teeleken et al (2012) depict. Expressively, the top down accountability characteristics disfavour interests and values for stakeholders. Trafford and Proctor's (2006) studies also indicates that the stakeholder's intermutual motives and intentions underlying the planning can be of concern, as stated by Project Manager A, Älvstranden have noticed this problem regarding the planning of construction logistics and aims to move from a reactive to a proactive planning approach where stakeholders incentives are aligned. This can be seen as a step in the right direction as early stage involvement of logistical approaches are preferred to facilitate the process (Jereb, 2017; Sullivan, et al., 2010; Transport for London, 2019). However, in order to obtain these advantages there is a need of a logistic manager (Sullivan, et al., 2010), whereas according to the Vice President no such role exists at Älvstranden. According to Consultant A and B a municipal action plan for construction logistics can be of great value, a statement also supported by theory (Browne, et al., 2012; Transport for London, 2013). Although, regarding what Consultant B conveyed considering inadequate follow ups on already stipulated demands, Älvstranden is considered to be far away from establishing a plan of similar character. In

addition, their lackadaisical approach towards monitoring of contractual obligations as expressed by Lu et al (2016), could be a cause of opportunistic behaviour.

Conclusively, it is interesting to consider Älvstrandens logistical accountabilities and how they have addressed them to date. One could argue that there is an obvious conjunction between the inability to make decisions regarding logistical responsibilities that the Environmental Director mentions, and the lack of internal logistic competence at Älvstranden as highlighted by the Vice President. Further, it is interesting to reflect upon if this is a result of the political environment that Teeleken et al (2012) highlight regarding prevention of leadership development and whether the attributes of this setting affect the development of logistical competence at Älvstranden. Moreover, departing from the conclusions of Li et al (2005) regarding unveiling of public deficiencies, it would be of interest to discover how this obvious connection between lack of logistical competence and inability to make logistical decisions would withstand public scrutiny? Could the opinion of Developer B, "*Älvstranden have probably gotten over their head when trying to develop projects in dense central urban districts compared to Norra Älvstranden*" be a sample of how this would be perceived, or is it an example of one stakeholder neglecting the holistic perspective? Regardless, these topics would need further investigation.

5.2 Analysis of inclusion of logistics within land allocation agreements

The construction of Scandinavia's largest city development project, *vision Älvstaden*, is considered to take place in an setting equated to what Janné (2018) explains as a dense urban environment. Henceforth, in the context of construction logistics within dense urban environments, the development of *vision Älvstaden* will imply consequences for third parties (Betzke, 2013; Janné, 2018; Dablanc, 2007, 2008; Anderson, et al. 2005; Browne, et al., 2012) and contractors (Rumane, 2017, Sullivan, et al., 2010; Janné, 2018). Health aspects and everyday life disturbances will affect third parties whereas spatial limitations and restrictions in construction procedures will restrain contractors. To further illuminate these implications, it is of interest to shed light upon the 5 million new square metres of construction that *vision Älvstaden* supervene along with *Table 3* in *section 2.5*. This is because in the column highlighting transports/m², one could distinguish an average value of 0.3 transportations/m², which would imply an additional 1.5 million heavy vehicles stressing the city grid in Gothenburg. The implications affecting third parties is obviously of knowledge to Älvstranden, thus the formulation of their goals regarding bisecting emissions and establishing a living street level. Likewise, despite not being explicitly mentioned, the operational implications are considered to be acknowledged by all stakeholders, since the recognition have pervaded later discussions.

Logistical issues are preferably tackled in early project stages (Jereb, 2017; Sullivan, et al., 2010; Transport for London, 2019). This opinion is supported by Project Manager A when mentioning that they rather would have a proactive approach than reactive. In addition, all developers and consultants are positive to early address logistics and they highlight the importance of logistical issues being acknowledged by policymakers. Developer B goes as far as stating that logistics should be included as selection criterion in the procurement process. Conversely, Developer A and Consultant A accentuate the disadvantages of risking early involved stakeholders being faced with perplexity of handling these issues to early, respectively difficulties to establish and reach logistical

solutions due to uncertain project prerequisites. Furthermore, Contractor B has consenting opinions and urges that early addressing increases the chance of formulating unfavourable regulations, meaning that decisions based upon indefinite prerequisites will imply adverse effects.

Advocated logistical solutions for the entailed consequences of construction logistics in dense urban environments are many and well elaborated. The CLC (Sullivan, et al., 2010; Browne, et al., 2012; Dablanc, 2009; Guerlain, et al., 2019) , CLP (Transport for London, 2019) and various schemes for deliveries, vehicle and emission regulations are proven to result in lower greenhouse gas emissions and fewer vehicles stressing the street grid (Browne, et al., 2012), hence considered to imply better circumstances for third parties. However, variation in legislation might entail a greater workload for logisticians and less environmentally friendly solutions (Norrman & Henkow, 2014) since it urges adaptiveness, thus compromising effectiveness. Moreover, regarding CLCs, contradictory opinions are conveyed by Contractor A and B who shed light upon accountability issues respectively that this solution could aggravate the construction process. In addition, diverging ideas prevail regarding which level of comprehension the CLC should cover. Contractor A is of the opinion that it should be implemented on a project level while Contractor B thinks an all-encompassing city level would be more suitable. Worth discussing is that several external interviewees initial approach towards a CLC is deprecatory where additional expenses is emphasized. However, when being questioned what kind of solution that they think would be the most favourable for mitigating the logistical implications of the development of *vision Älvstaden*, numerous depicted a solution similar to a CLC. This confirms the opinion of logistics being a 'grudge cost' (Sullivan, et al., 2010) and what Contractor A conveys about that the CLCs portrayal today will not change the industry's logistical mindsets.

As landowners, hence having the possibility to convey land allocations (Christensen, 2014; Caesar, 2016), Älvstranden has great opportunities to influence the development of *vision Älvstaden*. Through the land allocation agreements, they can convey demands for how the land should be addressed (Caesar, 2016), hence have the opportunity to stipulate logistical regulations in land allocation agreements. However, given the opportunity to in a great extent influence projects proceeding, it is considered that Älvstranden in their formulation of these agreements is exposed to the same risk as developers regarding forecasting. In other words, the possibility of risking unnecessary expenditures, unemployed opportunities for development and unsuccessful management (Lim, et al., 2016; Li, et al., 2005). When establishing a land allocation contract, several domains are considered to be of importance to reach an agreement. Henceforth, the contract should encompass alignment of incentives (Narayanan & Raman, 2004), attributes of feasibility (Norrman & Henkow, 2014), proper allocation of support, benefits and costs (Stathopoulou, et al., 2012). If these domains are unheeded, opportunistic behaviour could pervade (Lu, et al., 2016) and vitiate (Boissinot & Paché, 2011) the contractual relation. One example of failure within this discipline on Älvstrandens behalf is the dissatisfaction Contractor B express regarding Älvstrandens insufficient follow up on contractual demands within Masthugskajen. However, the domain of monitoring is a doubled-edged sword, on one side it could mitigate opportunistic behaviour (Boissinot & Paché, 2011), on the other it could convey distrust (Kusari, et al., 2013). It is of interest to further contemplate this domain while regarding Uppsala Bygglogistikcenter. This is because they present great results while they through the means of monitoring charge

finances for violation of contractual agreements and through their design of the STC force contractors to utilize the CLC. However, worth questioning, and what requires further research is whether there is a correlation between their results and these measures.

To further elaborate on the land allocations and the logistical element of these contracts, various opinions exist concerning how and if it should be included regarding level of specifications and whether regulations should address solutions or output results. Unanimously, contractors are averse to logistical directives and express that it is their responsibility to handle. Contractor B clarifies the aversion by saying that specifying how to deal with logistics would imply antagonism since this probably would waive already established solutions. In addition, Contractor A states that regulations regarding output results are pointless due to the lack of comparability reference values contain. On the contrary, developers have no aversion towards adopting logistical directives if they are economically beneficial. However, disagreement prevails concerning the formulation, Developer A and C are of the opinion that specifications should focus on output result whereas Developer B thinks that agreements should be clear and include details regarding logistical proceedings.

Conclusively, it is of interest to contemplate the formulation of these agreements regarding the fine balance between conveying adequate amount of issues with a moderate level of term specificity and indirectly expressing distrust (Lu, et al., 2016). Equally interesting is the equipoise between being permissive towards deviant behaviours and exercising moderate control (Boissinot & Paché, 2011). These tugs of wars are considered to summarize the formulation of land allocation agreements hence deducing the issue of reaching a successful agreement to the competence of establishing a satisfactory balance.

5.3 Analysis of stakeholders' perception of logistical inclusion in land allocation agreements

The stakeholders involved within the development of *vision Älvstaden* will be affected in one way or another. This affection is greatly interlinked with the logistical approach Älvstranden choose to adopt. This is because Älvstrandens approach could be derived into several options, ranging between, choosing a holistic inclusion of logistical regulations in land allocations agreements and stipulating solutions in detail, and the option of letting the logistical element of construction be dealt with by contractors, hence exclude any logistical involvement as landowners. However, Älvstranden displays clear intentions of addressing logistics as landowners, henceforth scenarios resulting in no or minimal involvement of logistical issues in the agreements will not be elaborated.

Each contractor conveys preferences of dealing with logistics themselves and display aversion towards early addressing, meanwhile, several authors (Jereb, 2017; Sullivan, et al., 2010; Transport for London, 2019) and both Consultant A and B, shed light upon obvious advantages of adopting an initial approach. With these opinions as point of departure it is interesting to notice to which extent logistical issues in the land allocations agreements should be included and how they affect each stakeholder.

The option of having a comprehensive inclusion is considered to imply a great need for Älvstranden as policymaker to possess adequate knowledge of how issues should be addressed. This opinion originates from previous equation between formulating land

allocation agreements and making early project estimations, meaning that both processes are prone to the entailed risks derived from forecasts (Lim, et al., 2016; Li, et al., 2005). Minding contractors' dissuasion to inclusion, this scenario is thought to depart from how construction logistics traditionally is conducted, hence being a case of cultural aversion (Sullivan, et al., 2010). As a result, to mitigate this resistance, it is considered that the included logistical issues must be conveyed in a persuasive manner. Notably, since stipulating logistical demands in these agreements is thought to be rather innovative, it is important for policymakers to tailor how logistical issues are communicated. This is because the probability of adopting inventive ideas are a matter of personality (Yesil & Sozbilir, 2013).

Another option is to have less inclusion of logistical issues and mainly stipulating demands concerning output results. Several stakeholders have diverging ideas regarding this approach, hence, it is difficult to derive any obvious conclusion. Regardless, it is of interest to elaborate contractors' opinions regarding this option. On one hand, contractors wish to handle logistics by themselves without external interference. On the other hand, one could question why a contract that only include output results would not satisfy this desire? While regarding what Contractor B mentioned regarding output demands being a 'game of numbers', this dilemma is thought to be summarized and equated to a matter of opportunistic behaviour that could occur in business transactions (Lu, et al., 2016).

As underlined by each developer, they express no aversion of adopting logistical directives in land allocation agreements if they are economically motivated. Henceforth, it is considered that developers are not considerably affected by the formulation of the contract since they always have the option of not entering an agreement. However, depending on the extensiveness of the logistical approach within the land allocation agreements, the developers and contractors will face the issue of mediating these directives to further parties. This implication have been given light in previous studies (Janné & Fredriksson, 2019) and is accentuated by Developer A by mentioning that the way solutions are portrayed today will not persuade nor preponderate the effort necessary for contractors to change their logistics management. This dilemma, in conjunction with the vast amount of parties involved in *vision Älvstaden*, is considered to multiply the challenges of joint resource utilisation and reciprocity among construction activities as Bankvall (2010) discuss regarding supply chain management. Consequently, besides formulating the agreements properly, it is a major necessity to be able to persuasively mediate them.

It is of interest to elaborating how third parties are affected by the land allocation agreements. Besides being involved in the initial workshops that resulted in the development of *vision Älvstaden*, third parties have a minimal possibility to affect its proceeding. For this reason, they are impotent of handling their exposure towards the entailed health and disturbance impacts of construction within urban environments (Anderson, et al., 2005; Betzke, 2013; Dablanc, 2008; Browne, et al., 2012) Henceforth, within *vision Älvstaden* third parties have solely Älvstranden to rely on to cater their needs. The spirit of this notation is considered to be the most important aspect for public developers and landowners to regard when initiating development projects such as *vision Älvstaden*. It is their responsibility to make sure that the needs of the public do not get

compromised over profit. Thus, who should make sure that the citizens of Gothenburg do not get harassed by profit striving organisations but Älvstranden?

Considering the complexity and fragmentation of the construction industry (Fellows & Liu, 2012), the outcome of the approach Älvstranden choose to adopt considering addressing of logistical impacts within land allocation agreements, is difficult to predict. Accordingly, it is complicated to foresee how every stakeholder will be affected. However, regarding the positive results from Uppsala Bygglogistikcenter, the logistical unfolding at project Masthuggskajen and theoretical support about early addressing (Jereb, 2017; Sullivan, et al., 2010; Transport for London, 2019), low productivity due to material handling (Strandberg & Josephsson, 2005), one could argue that the inclusion of logistical issues within land allocation agreements will mainly have positive effects.

6 Conclusions

In the conclusion chapter, conclusions are derived from chapter 5 and are presented in accordance with the research questions. Further, the authors convey their opinions of how they think Älvstranden should further conduct the development of *vision Älvstaden*. In addition, a reconnection to previous studies is conveyed where topics of further research are suggested.

6.1 Conclusions to research questions and proposals for further commitment

Firstly, in their process of implementing logistical regulations in land allocation agreements, Älvstranden must decide what role they wish to have regarding the logistical issues entailed to *vision Älvstaden* and how they should address the adherent challenges. Depending on what role they choose as a public landowner, Älvstranden has various responsibilities. Choosing a role that implies an extensive logistical inclusion does entail a responsibility of fulfilling their commitments. However, regardless of what role they adopt, they still have the accountability to cater public needs. It is crucial, as mentioned by all developers, that Älvstranden conveys what role they will take and be more explicit about their accountabilities to avoid uncertainties and misunderstanding. For this reason, it is concluded that as a public land owner in the development of *vision Älvstaden* has to assure that public interests do not get compromised, wherefore Älvstranden must act upon their responsibilities, including embracing the various perspectives of multiple stakeholders with various incentives and interests.

Secondly, addressing construction logistics in land allocation agreements is considered to be a suitable alternative due to consent among stakeholders. This confirms previous studies that point to the importance of addressing construction logistics in the early phases. Depending on what role Älvstranden wishes to have regarding the logistical issue, the addressing through land allocation agreements can differ, ranging from comprehensive to less extensive. Either they include logistical regulations in land allocations agreements and stipulates solutions in detail, or they convey their desires in terms of output results, hence, transferring the responsibilities of logistics to the contractors. In either case, the formulation of the land allocation agreements must be balanced regarding alignment of incentives, allocation and support, costs and benefits

where conveyed solutions must contain attributes of feasibility. If the contracts do not fulfil these issues, there is a risk of expressing distrust and favour opportunistic behaviour. Previous studies covering different stakeholders show that they are positive, with the exception of contractors, to early addressing logistical issues through land allocation agreements. The aversion that contractors display is a matter of cultural embeddedness, thus considered to be mitigated through a phase of wean, as in the case of Uppsala Bygglogistikcenter. Therefore, in conclusion, including the logistical element within the land allocation agreement is a favourable solution. To avoid that contractors exploit vague output result, the agreements ought to have a great level of term specificity. However, to be able to formulate agreements correctly and to find a balance among contractual regulations, Älvstranden must possess logistical competence. The competence could either be employed internally, or it must be procured by outsourcing. This could be achieved by employing a logistical manger or by procuring a logistics consultant to complete the agreements with a logistical inclusion.

Thirdly, all stakeholders will get affected in various ways depending on the approach Älvstranden chooses to adopt regarding stipulating terms in the land allocation agreements. Regardless of the alternative Älvstranden chooses, the developers are driven by economic incentives and have no aversion to adopt new solutions as long as they are financially motivated. However, contractors are affected more extensively depending on the approach Älvstranden chooses. If Älvstranden has an extensive inclusion of logistical regulations in the agreements, these must then be presented and implemented in a persuasive manner to convey contractors and counter their cultural resistance of adopting new solutions. If they instead choose to formulate the agreements with output results, it is of importance to be aware of the entailed risks of using reference values exposed to opportunistic interpretation. Whatever approach Älvstranden choose, third parties will doubtlessly be affected by the outcomes of *vision Älvstaden*. Their health will get affected through emissions, noise disturbance and an increased risk of traffic accidents as pedestrians and motorists will get exposed to traffic congestions to a greater extent. In addition, third parties are impotent of affecting the outcomes which means that they must rely on Älvstranden's ability to mitigate these implications.

Finally, to reach their strategic goals with vision Älvstaden and to fulfil their role as a public actor, the inclusion of logistical elements in the land allocation agreements is a great option. To reach a more extensive logistical approach with land allocations agreements, comprehending all entailed issues regarding *vision Älvstaden*, the logistical competence must be employed internally and the agreements must encompass an extensive inclusion of regulations. This is to create a long-term solution and to avoid that other stakeholders exploit vague reference values. In addition, Älvstranden should further elaborate logistical proceedings for upcoming projects and make use of the knowledge gained from Masthuggskajen in forthcoming projects. To further emphasise a comprehensive logistical approach, they should adopt the solutions from Uppsala Bygglogistikcenter by establishing CLCs and stipulate requirements of utilization in the land allocation agreements.

6.2 Further research

This thesis is considered to contribute to the logistical domain of construction in several ways as it elaborates what explicitly has been sought for in previous studies. Firstly,

logistical addressing in early project stages and its implications for forthcoming construction proceedings (Thunberg, et al., 2014) and logistical governance (Janné & Fredriksson, 2019) are elaborated through the investigation of logistical implementation in land allocation agreements and gathering of stakeholder perceptions. Further, the problematizing of whom that should act as the initiator of logistical solutions (Janné & Fredriksson, 2019) is also considered in the study. Since Älvstranden is a public landowner, they formulate the agreements and convey the solution to be adopted. However, there is still a need for investigating how the land allocation system affects the projects final result, which has been called for in previous studies (Caesar, 2016). As only one project encompassed by vision Älvstaden has begun construction, this area will remain to be investigated. For further research, it would be of interest to continue where this thesis research process ended. This means that the domain of how developers could utilize land allocations agreements as a governance tool needs to be further investigated. In addition, it would be desirable to investigate the aim of this thesis while shedding more light upon the interaction between land allocation agreements, detail plans and the Swedish public procurement act. Lastly, it would be of interest to evaluate the results of logistical inclusions in land allocation agreements and what measures landowners should take to financially persuade stakeholders to adopt the stipulated terms.

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10 Appendix – A

Interview questions for developers:

Preface:

- Could you what your (the company) role is within project Masthuggskajen?
- How has the consortium setup worked out in Masthuggskajen?
- How has the process of land allocation worked out and what is your view of how Älvstranden has acted in this process?

Land allocation:

- If you compare the process of Masthuggskajen to other projects, do you see any differences in the land allocation?
- What do you want to be included in the land allocation agreements? What do you think of requirements in these? Should it be specified in detail or more output results?
- What is you interpretation of construction logistic in early project stages? Do you think this (the answer) is a result of corporate/industry culture?

Logistics:

- Have you (the company) been involved in any construction logistics issues? If so, what has your opinion been?
- At what stage has the construction logistics been brought up? Would you say that a lot of focus has been put on this issue?
- In the projects you have been involved in, has there been any specific logistic solution?
- Have there been any specific requirements from Älvstranden in terms of construction logistics?
- What is your view of the construction logistics at Masthuggskajen at present? That is, after agreements have been signed with contractors and that a late implemented solution can become expensive and debated.
- What is your view of a CLC? (And describes Uppsala Bygglogistikcenter)

Sum up:

- In city development like Masthuggskajen, where cooperation is highlighted as a key component, do you see any tendencies that different stakeholders acts upon a hidden/own agenda?
- What do you consider important to put focus on to circumvent today's logistics problems?
- In what way would you have acted if you had Älvstranden's role as a municipal landowner?

Interview questions for contractors:

Preface:

- Could you what your (the company) role is within project Masthuggskajen?

Land allocation:

- In what way do you get affected by the land allocation agreements?

Logistics:

- What is your approach to construction logistics and how do you handle it today?
- Do you think there is a need to implement “logistics thinking” in early project stages?
- What do you want to be included in the land allocation agreements? What do you think of requirements in these? Should it be specified in detail or more output results?
- In large city development projects like Masthuggskajen/Älvstaden do you see any problems with the construction logistics? If yes, how would you want to address this?
- Whom/which stakeholder do you think should be responsible for the construction logistics?
- What is your view of a CLC? (And describes Uppsala Bygglogistikcenter)

Sum up:

- What do you consider important to put focus on to circumvent today’s logistics problems?
- In what way would you have acted if you had Älvstranden’s role as a municipal landowner?

Interview questions for TPL-providers:

Preface:

- What is your role and your working duties?

Following:

- What is your view of construction logistic requirements in land allocation agreements?
- In what stage do you wish that you as a TPL-provider were involved?
- From your point of view, how much money can be saved when implementing an efficient construction logistic solution?
- Are there any incentives for you as a TPL-provider to not have an overall role in these large city development projects?
- What is your view of taking on “multi-projects” where many contractors are involved?
- What is your view of the logistic proceeding at Masthuggskajen?

Interview questions for consultants

Preface:

- Which projects have you been involved in?
- What was your role in these projects?

Following:

- Which types of logistical solutions/approaches did you used in these projects?
- Which stakeholders were involved in these projects?
- What is your experience of construction logistic requirements in land allocation agreements?
- How do you think construction logistics should be addressed in these early project stages? What do you recommend Älvstranden as public landowner to do?