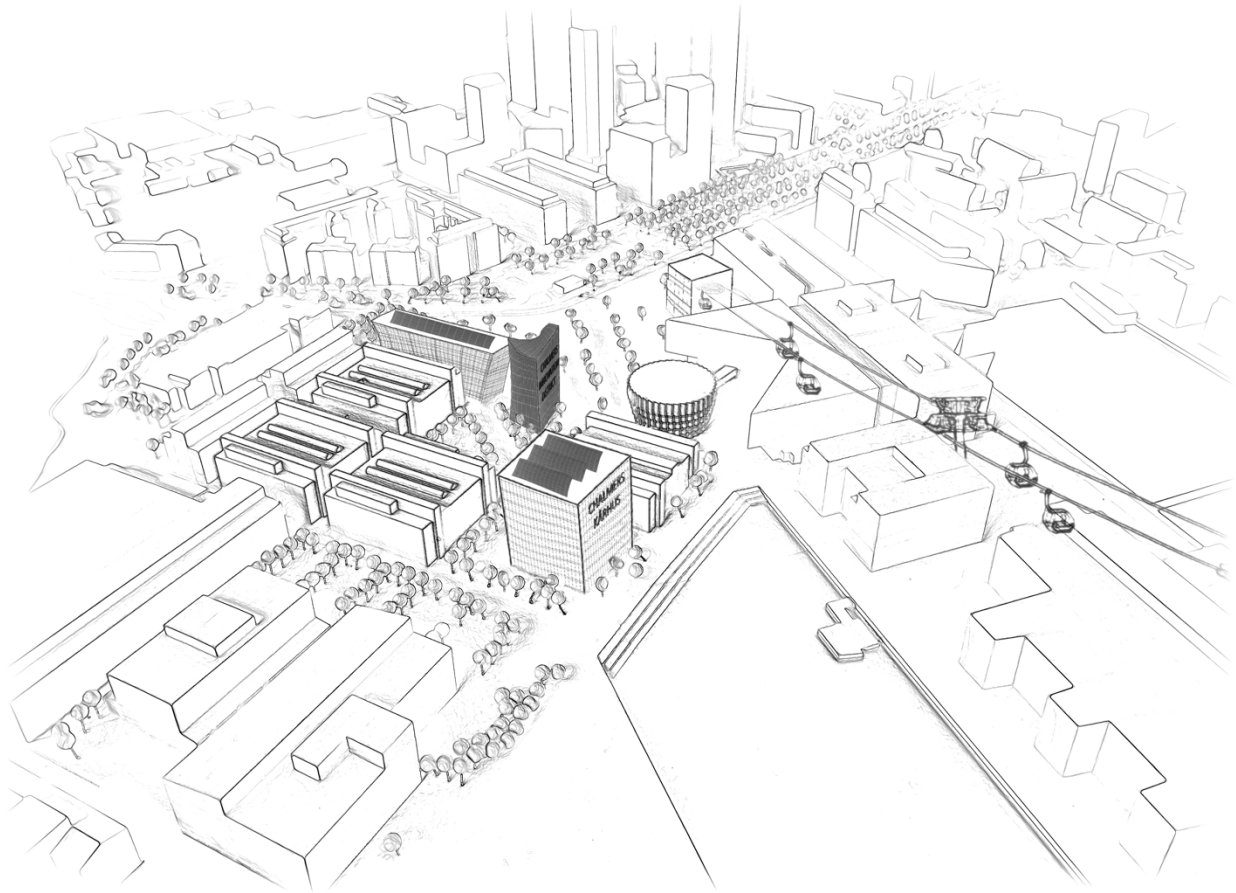




# CHALMERS

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## **Campus Lindholmen – Future identity** Strategies developed through case studies and interviews in Sweden and Japan

Bachelor's Thesis

Business strategy and entrepreneurship in building technology

MARTIN EVERBRING

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Department of Architecture  
Division of Building design  
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Gothenburg, Sweden 2016



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Gothenburg 2016

Campus Lindholmen – Framtida identitet  
Strategier utvecklade genom fallstudier och intervjuer i Sverige och Japan  
MARTIN EVERBRING, 1990  
THOMAS FRANZÉN, 1988

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Cover:  
Picture showing the vision of future Campus Lindholmen, through a suggestion made  
by the authors.

Chalmers  
Gothenburg, Sweden 2016

## **Abstract**

Chalmers University of Technology has two campuses located in Gothenburg, named Campus Johanneberg and Campus Lindholmen. The purpose of the Bachelor's Thesis is to contribute to the future development of Campus Lindholmen by investigating which identity is most suitable, how experiences from case studies and interviews can be used to develop strategies, and which strategies are needed in the future campus planning to achieve the chosen identity. The background is the need of new plans for the area of Campus Lindholmen, where the Bachelor's Thesis is aimed to evaluate which identity the future planning should contribute to create.

The Bachelor's Thesis is written at the Department of Architecture, with the property owner Chalmersfastigheter as partner. Additionally, collaboration is done with the organization Alliance for Global Sustainability, in order to exchange experiences on sustainable campus planning between Sweden and Japan. The method is to investigate the background and conditions of the Lindholmen area, both regarding physical aspects and regulations that affect the future development. Literature is used to describe theories connected to the chosen subjects, which are place identity, attractive places, sustainable campus development, campus planning, and environments for innovation.

The empirical results are generated through case studies and interviews in Sweden and Japan, with some additions from drafted material. The case studies provide with approaches to campus environments and are performed at Chalmers University of Technology, Tokyo Institute of Technology, The University of Tokyo, Keio University, Meiji University and Hokkaido University. The interviews provide with information about Campus Lindholmen but also with new ideas on the discussed subjects. These are place identity, attractive environments, initiatives for sustainability, interactions with society, campus planning, and future campus Lindholmen.

Through the analysis, several strategies are found for future campus development, mostly connected to strengthening the campus identity and encourage sustainable development. Collaboration between academy, business and society is considered important when developing Campus Lindholmen. An essential part of campus planning is the selection of campus model strategy, and how to implement the strategies. The literature, case studies and interviews help to evaluate how strategies can be created and used. The identity of a campus is shaped by its attractions, built environment, meeting places and the users. By developing a clear identity, the values of Campus Lindholmen can be conveyed to both internal and external stakeholders. Most fitting for Chalmers would be to communicate the university vision, "for a sustainable future".

The conclusion is that Campus Lindholmen should be a genuine driving force for sustainable development. Genuine means that both identity and activities should convey the same message. Strategies are needed to generate the identity and to encourage people to fulfil it. In the future campus planning, Chalmersfastigheter is recommended to continue demonstrating the vision of Chalmers through the built environment, and Chalmers should focus on enabling innovation through the choice of functions placed at Campus Lindholmen. By creating a campus with a balanced openness, internal qualities within the university can flourish at the same time as collaborations with the industry and society can generate synergies. Here, business opportunities and sustainable development can be achieved, and the authors call the concept Chalmers Innovation District.

Keywords: Identity, attractive environments, sustainable development, campus planning, innovation

## Sammandrag

Chalmers tekniska högskola har två campus belägna i Göteborg, det vill säga Campus Johanneberg och Campus Lindholmen. Syftet med examensarbetet är att bidra till den framtida utvecklingen av Campus Lindholmen, genom att undersöka vilken identitet som är mest passande, hur erfarenheter från fallstudier och intervjuer kan användas till att utveckla strategier samt vilka strategier som behövs i den framtida campusplaneringen för att uppfylla den valda identiteten. Bakgrunden är behovet av nya planer för området där Campus Lindholmen är beläget, och examensarbetet syftar till att utvärdera vilken identitet den framtida planeringen ska bidra till att skapa.

Examensarbetet är skrivet på institutionen för Arkitektur, med fastighetsägaren Chalmersfastigheter som partner. Dessutom genomförs ett samarbete med organisationen Alliance for Global Sustainability, med syftet att utbyta erfarenheter kring hållbar campusplanering mellan Sverige och Japan. Metoden är att undersöka bakgrund och förutsättningar kopplade till Lindholmen, både fysiska aspekter och bestämmelser som påverkar områdets framtida utveckling. Litteratur används till att beskriva teorier med koppling till valda ämnesområden, det vill säga platsidentitet, attraktiva platser, hållbar campusutveckling, campusplanering samt miljöer för innovation.

De empiriska resultaten genereras genom fallstudier samt intervjuer i Sverige och Japan, med vissa tillägg från skriftligt material. Fallstudierna ger synsätt på campusplanering och utförs på Chalmers tekniska högskola, Tokyo Institute of Technology, The University of Tokyo, Keio University, Meiji University och Hokkaido University. Intervjuerna bidrar med information om Campus Lindholmen men också med nya idéer kring de diskuterade ämnena. Dessa är platsidentitet, attraktiva miljöer, initiativ för hållbarhet, samverkan med samhället, campusplanering och framtida Campus Lindholmen.

Genom analysen utvecklas strategier för framtida campusutveckling, framförallt kopplat till att stärka campusidentiteten och uppmuntra hållbar utveckling. Samarbete mellan akademi, näringsliv och samhälle anses vara viktigt vid framtida utveckling av Campus Lindholmen. En väsentlig del av campusplanering är valet av strategi för campusmodell och hur strategierna ska implementeras. Litteraturen, fallstudierna och intervjuerna hjälper till att utvärdera hur strategier kan skapas och användas. Campusidentiteten formas av miljöns attraktioner, byggda miljö, mötesplatser och användare. Genom att utveckla en tydlig identitet kan Campus Lindholmens värden förmedlas till både interna och externa intressenter. Mest passande för Chalmers vore att kommunicera universitetets vision, ”for a sustainable future”.

Slutsatsen är att Campus Lindholmen borde vara en genuin drivkraft för hållbar utveckling, där genuin innebär att både identitet och aktiviteter förmedlar samma budskap. Strategier behövs för att skapa identiteten och för att uppmuntra människor att uppfylla den. I den framtida campusplaneringen rekommenderas Chalmersfastigheter att fortsätta demonstrera Chalmers vision i den byggda miljön, och Chalmers borde fokusera på att möjliggöra innovation genom valet av funktioner placerade på Campus Lindholmen. Genom att skapa ett campus med balanserad öppenhet kan både interna kvaliteter frodas samtidigt som samarbeten med näringsliv och samhälle kan generera synergier som leder till affärsmöjligheter och hållbar utveckling. Författarna kallar konceptet Chalmers Innovation District.

Nyckelord: Identitet, attraktiva miljöer, hållbar utveckling, campusplanering, innovation

## Foreword

*Campus Lindholmen – Future Identity* is a Bachelor's Thesis by Martin Everbring and Thomas Franzén, students on the programme Business strategy and entrepreneurship in building technology at Chalmers University of Technology. This report has been produced in collaboration with Chalmersfastigheter AB and aims to be a preparatory work for the planning of Chalmers University of Technology's Campus Lindholmen in Gothenburg.

The authors would like to express their sincere gratitude towards Alliance for Global Sustainability (AGS) who financed the study trip to Japan and assisted with contacts. We would like to thank Tomas Pettersson and Tomas Kåberger who assisted in preparations for the trip, and made it possible. A special thanks to Yutaka Goto, who helped contacting respondents in Japan, planning the trip and assisting in all interviews.

The Department of Architecture at Chalmers and Chalmersfastigheter AB provided with supervision, and we would like to thank the supervisors. Nina Ryd for providing with knowledge, insights and valuable advice for improving the Thesis. Åsa Östlund for guidance in establishing the scope, verifying the applicability and contributing with valuable expertise.

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Thomas Franzén

Martin Everbring

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# 1. Introduction

*Chalmers for a sustainable future* is the vision of Chalmers University of Technology and embraces all activities, from education and research to collaborations and campus development (Markides, 2010). According to this Bachelor's Thesis, one step is to establish an identity for the physical campus environment that attracts people who can generate innovation for a sustainable future. Especially when the surrounding city is developing rapidly and the surrounding world provides with more competitive creative environments than ever. The city district of Lindholmen will be denser with the realization of the vision RiverCity. Through case studies of campuses in Japan knowledge is gained on challenges within campus planning in dense city areas. It is important for Chalmers that the university conveys a sense of future to the society and lead the development. Chalmers Innovation District is suggested as a place identity concept with strategies for the future development of campus Lindholmen, which will be elaborated through this Bachelor's Thesis.

## 1.1. Chalmers and Chalmersfastigheter

In 1829 a school was founded through a donation from the will of William Chalmers, this later became Chalmers University of Technology (Chalmers, 2010). Chalmers has two campuses in Gothenburg and the facilities are operated by the property company Chalmersfastigheter. The location of Campus Johanneberg is in the centrally situated district of Johanneberg and the location of Campus Lindholmen in the expansive district of Norra Älvstranden (Chalmers, 2014). Chalmersfastigheter has a big role when developing campus Johanneberg and campus Lindholmen, especially due to the ownership of certain buildings which will be described more further on (Östlund, 2016).

Chalmers was established in Johanneberg in 1926 and has since then expanded and developed over the years. In present-day, Campus Johanneberg is the largest campus and this is where most of the research is conducted. The historical changes have led to several architectural styles which gives the buildings certain characteristics. The campus hosts 8500 students, 2000 employees and approximately 80 companies. The companies are located in close connection to the university particularly through the collaborations within Johanneberg Science Park and Chalmers Innovation. Additionally, about 3500 student accommodations are located in Johanneberg (Chalmersfastigheter, 2016).

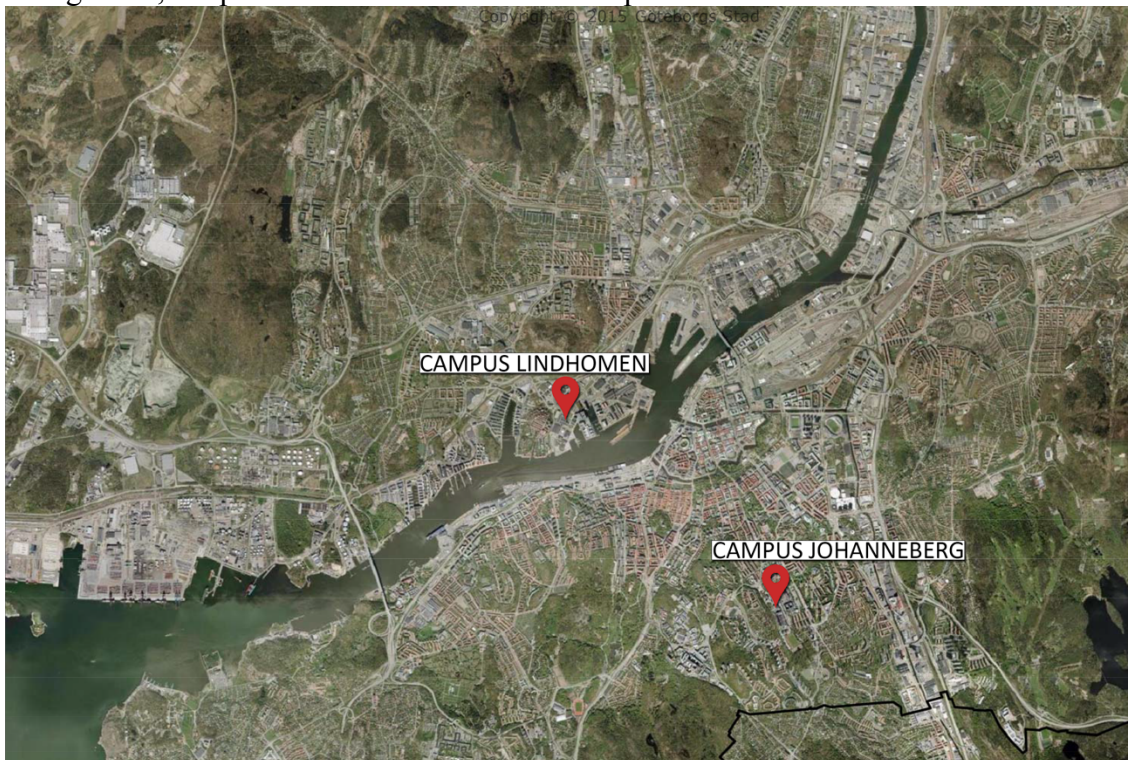
Chalmers was established in Lindholmen in 1994 and the area has had a continuously strong development since then. Today, Campus Lindholmen is partly characterized by the maritime activities connected to the Chalmers Department of Shipping and Marine Technology and the Swedish Maritime Administration. The location close to the water further enhances this identity. The Lindholmen area is also a place where academy and business meet, through the presence of Chalmers University of Technology and the University of Gothenburg, and through Lindholmen Science Park (Chalmersfastigheter, 2016).

In the campuses of Chalmers, some of the university facilities are owned by the governmental company Akademiska Hus, some are owned by Chalmersfastigheter and some are owned by the Chalmers Student Union. In Campus Lindholmen, all university facilities are owned and operated by Chalmersfastigheter. The city area surrounding Lindholmen is the most expansive part of Gothenburg and the work with planning the future development of the campus is ongoing. During the fall of 2016, Chalmersfastigheter and Älvstranden Utveckling initiate the work on new development plans with the help from several architectural firms. Stakeholders within the district of central Lindholmen and Chalmers administration are also involved in the work of

developing Campus Lindholmen (Östlund, 2016). The Bachelor's Thesis is aimed to be a guidance for the future work and help securing a clear strategic direction in the future planning of Campus Lindholmen.

## 1.2. Campus Lindholmen

Campus Lindholmen has developed over the years, but the campus has no program for expansion ready at the moment. Although, preparatory work for a local plan is underway through a dialogue with the city planning office. Although the work has already started with the local plan, the actual formal work is planned to commence during the fall of 2016. Diverging from Campus Johanneberg, Campus Lindholmen have existing building rights owned by Chalmersfastigheter and there are large-scale urban development projects realised through the vision RiverCity in the surrounding area (Östlund, 2016). Lindholmen is located on the north riverbank of the river Göta in the Lundby district, Gothenburg. The area referred to as Campus Lindholmen in this report is the marked area in figure 1, with Lundbyleden to the north, Sannegårdshamnen to the west, Göta river to the south and Frihamnen to the east. For the understanding of the surrounding physical environment and the location of Campus Lindholmen, descriptions of the historical background, the present situation and the future plans of Lindholmen will now follow.



*Figure 1. Map Gothenburg. Collected from (Göteborgs Stad, Fastighetskontoret, 2016). Edited by the authors.*

### 1.2.1. Historical background

Gothenburg has a history of heavy industry and in 1926 SKF formed a subsidiary called Volvo, which later became one of Sweden's main exporters and employers. The harbour in Gothenburg emerged as Sweden's largest port for export from the growing industry. Together with the engineering trades, the shipyards Götaverken, Lindholmen and Eriksberg developed into the city's leading lines of business, see figure 2 (Olsson, 1996). During the 1970s oil crisis, the heavy industry of Gothenburg deteriorated and many shipping companies filed for insolvency. Planning for urban renewal on the old shipyard land of Eriksberg started in the late 1970s. The renewal included dwellings, hotels, exhibition halls and a sports centre developed during the 1980s (Enhörning, 2010).

To this day, the whole north riverbank continues to develop at the same time as the heavy industry is leaving the city centre. Gothenburg's and Lindholmen's last shipbuilder Cityvarvet was liquidated 2014 (Tidningarnas Telegrambyrå, 2014). With Eriksberg and Sannegårdshamnen almost fully urbanised, Lindholmen and Frihamnen is next in line on the north river bank to be developed. From the shipping industry in Eriksberg a subsidiary called Eriksbergs Förvaltning AB was created for developing the premises. In 1996, the city of Gothenburg acquires Eriksbergs Förvaltnings AB and names it Norra Älvstranden Utveckling AB. In 2006, the company merged with Södra Älvstranden Utveckling AB and changed name to Älvstranden Utveckling AB (Älvstranden Utveckling AB, 2016). The purpose of the company is to promote the long term urban development around Göta river through realization of the vision RiverCity. Creation of a mixed used city with a functional combination of residential, commercial, office, recreation and entertainment shall be preeminent in the development (Älvstranden Utveckling AB, 2013).



*Figure 2. Lindholmen 1963 (Göteborgs Stad, Fastighetskontoret, 2016).*

### **1.2.2. Present situation**

Today, Lindholmen can be described as a place with possibilities of connecting Chalmers with business and rest of the community, because of the mixture of facilities for education, offices and other business. Additionally, Lindholmen is a place where accommodation, commerce, research, culture and recreation can be found. One collaboration is the IT University which is driven by Chalmers University of Technology and the University of Gothenburg, meant to encourage development within IT and communication, see figure 3 (Chalmersfastigheter, 2016). Another driving force is Lindholmen Science Park where industry, academy and public sector come together in development projects mostly within Transport, Media and Information and communications technology. It was established in 2000 and is owned by Chalmers University of Technology, the City of Gothenburg, Ericsson AB, Volvo Group, Volvo Cars, Saab AB, Telenor Sverige AB and Business Region Gothenburg. At this day 21000 work, study or do research at Lindholmen and the vision of Lindholmen Science Park is to increase that number to 30000 before 2020.



**Figure 3. Lindholmen 2015 (Göteborgs Stad, Fastighetskontoret, 2016).**

As previously stated, Lindholmen is a place for academy, business and innovation. An example of initiatives with the purpose to encourage collaborations between these stakeholders is the building "Kuggen", picture 1. It is classified according to "Miljöbyggnad Guld", which is the highest level that can be awarded, and is famous for its unique architecture (Chalmersfastigheter, 2016). Technical solutions such as movable sun screens, sun panels and interactive heating systems have enabled a low energy consumption. (Chalmersfastigheter, 2016). Another initiative is "ElectricCity", a collaboration where new solutions for the future of sustainable public transport is tested. The result is a new bus line between Lindholmen and Johanneberg with busses driven by renewable electricity. Behind the initiative is Chalmers, Swedish Energy Agency, Region Västra Götaland, City of Gothenburg, Göteborg Energi, Västrafik, Lindholmen Science Park and Johanneberg Science Park (Chalmersfastigheter, 2016). When the batteries are expended in the busses, they can be used in buildings to store locally produced electricity and help manage the variation in the grid (Lindholmen Science Park, 2015).



**Picture 1. The building Kuggen at Campus Lindholmen. Authors' picture.**

### 1.2.3. Future plans

Gothenburg is developing and so is Campus Lindholmen. New plans are being drafted within Chalmers administration and Chalmersfastigheter, and some decisions are already taken. Above this, the City of Gothenburg has an extensive development vision for the district called RiverCity which Lindholmen is located within. Decisions and plans considered to affect the development of Campus Lindholmen is described briefly below.

- A policy decision regarding a **strategic investment for extended activities at Campus Lindholmen**, named C 2015-1603, has been taken by Stefan Bengtsson, President and CEO of Chalmers University of Technology. The goal is to secure future expansion of the university and use the existing building rights at Campus Lindholmen as a part of the solution. The extended activities are in line with visions from both the City of Gothenburg and existing stakeholders at Lindholmen, for instance Lindholmen Science Park. As a result of the decision, functions now located to Campus Johanneberg may be moved to Lindholmen. The certain identities and potentials of each campus will be taken into consideration when deciding where the university functions should be located in the future (Bengtsson, 2015).
- A decision of investigation regarding **extended activities at Campus Lindholmen**, named C 2015-1977, has been taken by Stefan Bengtsson, President and CEO of Chalmers University of Technology. The investigation is aimed to identify which departments and functions that can be moved from Campus Johanneberg to Campus Lindholmen. The process will include interviews with stakeholders within Chalmers, but also with representatives from partners at Lindholmen, for instance The University of Gothenburg and Lindholmen Science Park. The final report of the investigation shall include a suggestion of which functions should be located at Campus Lindholmen (Bengtsson, 2016).
- A policy decision regarding a coordinated **strategic development of the academic environments** in Campus Johanneberg and Campus Lindholmen, named C 2015-1079, has been taken by Karin Markides, former President and CEO of Chalmers University of Technology. The campuses should communicate visualized sustainability and attract academy as well as collaboration with industry and society. The development should also function in line with the vision Chalmers for a sustainable future. The specific strengths of each campus should be emphasized in the future development. In Campus Lindholmen, important aspects regards the connection with the river as well as communicate a modern identity (Markides, 2015).
- A policy decision regarding **larger construction projects** within Chalmers, named C 2016-0133, has been taken by Stefan Bengtsson, President and CEO of Chalmers University of Technology. When major renovation and new construction of offices are made, the spaces should be planned as open office solutions complemented with resource rooms. The reason is to secure office areas to an increasing amount of employees in an efficient and flexible way. There is some resistance from employees who will move from individual offices to open spaces, which makes cooperation and dialogue with affected stakeholders important during the process (Bengtsson, 2016).

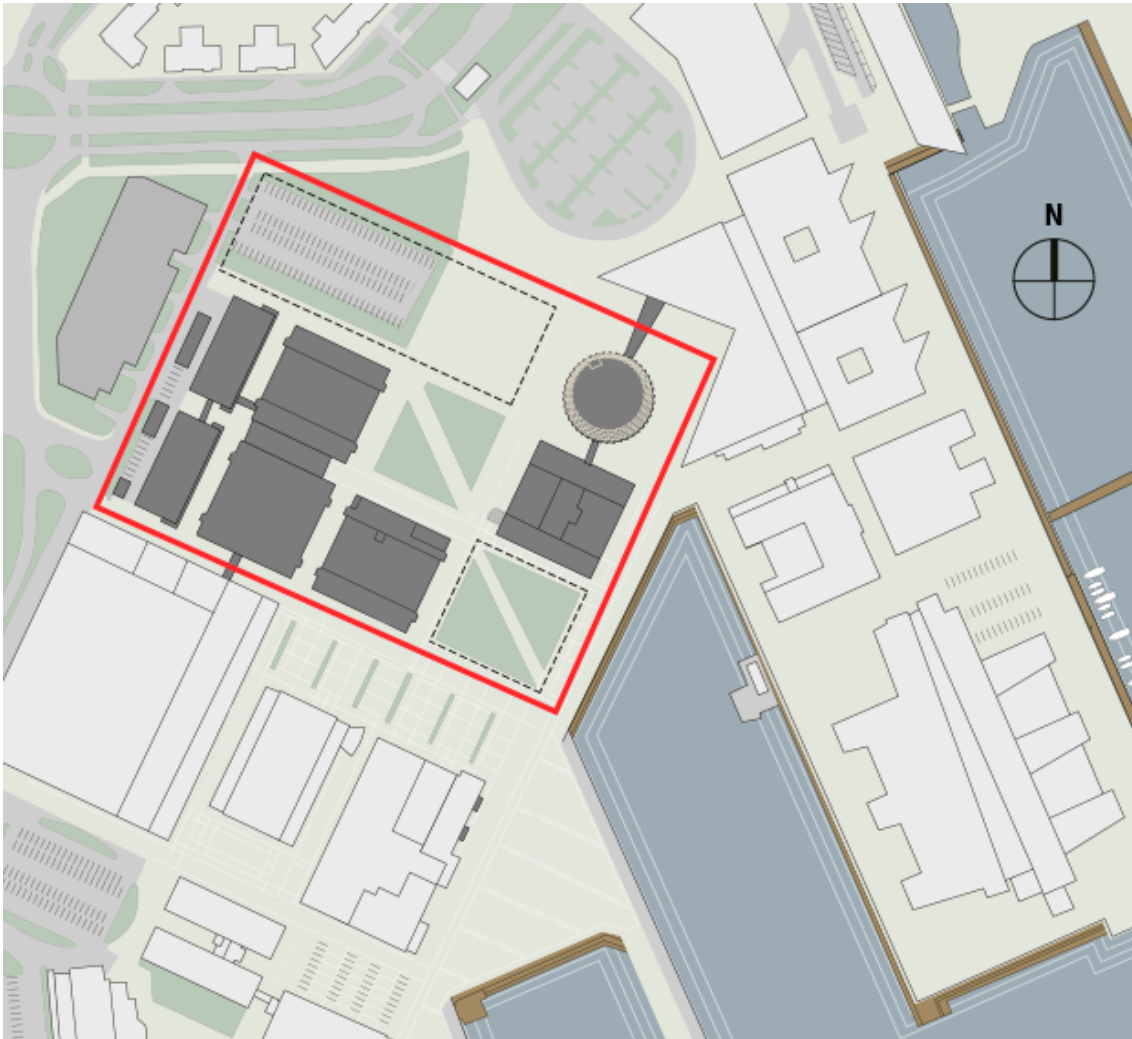
- The **RiverCity vision** is a plan created by the City Executive Board of Gothenburg with involvement from the people of Gothenburg, municipal administration representatives, companies, private industry and academia. The vision concerns central Gothenburg along the river and the goal is to create an attractive as well as sustainable city. The process includes three strategies. Number one is to connect the city, both physically through new links crossing the river and new meeting places, and socially by involving people in the development and counteract segregation. Number two is to embrace the water by creating an active riverside that enables a sustainable way of life. Number three is to reinforce the city centre in order to strengthen Gothenburg and the economy of the whole region (Hulthen & Ransgård, 2012). See Appendix 3 for a map showing the RiverCity.

### 1.3. Purpose and limitations

The Bachelor's Thesis is intended to investigate how future campus development of Chalmers Campus Lindholmen is recommended to be done and come up with applicable strategies for creating the most suitable place identity. The place identity is aimed to be connected to both local and global sustainability. The purpose is to create a useful suggestion of a concept that could be used by Chalmersfastigheter when developing and planning the future Campus Lindholmen. In this case, future campus development refers to the development of properties in the campus. This includes existing buildings and development rights for new buildings. The goal is to investigate local conditions of Campus Lindholmen and then use expertise from both Sweden and Japan to develop strategies for implementation. The scope the Bachelor's Thesis of can be summarized into the following question.

- *Which is the most suitable place identity for Chalmers Campus Lindholmen?*
- *How can experiences from interviews and case studies be used to develop strategies for planning future campus Lindholmen?*
- *What strategies are needed in the future campus planning to achieve the chosen identity?*

In order to establish useful and relevant strategies, the Bachelor's Thesis is limited both in terms of physical environments and in terms of explored subjects. The investigated physical place is limited to Chalmers Campus Lindholmen. The boundaries and development permissions can be seen in the figure 4. When elaborating on future strategies, it is exclusively suggestions for the area of Campus Lindholmen that is presented. Furthermore, the explored subjects are limited to examine place identity and sustainable development related to planning campus environments. The respondents are Swedish and Japanese experts within these subjects. Case studies were carried out on Campus Lindholmen and several Japanese universities through case studies, where campus identities were evaluated.



**Figure 4. Campus Lindholmen with development permissions.** Image received with permission from Chalmersfastigheter and edited by the authors.

## 1.4. Definitions

**Campus:** A campus is a defined group of buildings that belong to a specified institution, either academic or non-academic. It can also include the land associated with these buildings owned by the same institution. In this Thesis the university campus is defined as the sum of sites with primarily university or university-related functions (den Heijer, 2011). For example, this definition includes buildings with mixed use in a city campus and also facilities utilized by a university but owned by another institution.

**Zero Energy Building (ZEB):** An energy-efficient building, where the actual annual delivered energy is less than or equal to the on-site renewable exported energy. The energy consumed is calculated plus the energy consumed in the extraction, processing and transportation by source energy conversion factors (US Department of Energy, 2015).

**Zero Energy Campus:** An energy-efficient campus where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy. The energy consumed is calculated plus the energy consumed in the extraction, processing and transportation by source energy conversion factors (US Department of Energy, 2015).

## 2. Literature

In the selection of literature, the latest theories connected to the chosen subject has been used and categorized into the sections called: Place identity, Attractive places, Sustainable campus development, Campus planning and Environments for innovation. All sources are closely related to the environment and conditions surrounding Campus Lindholmen, in order to present the circumstances of this certain location. In addition, some theories are described from a broader and sometimes global perspective when its considered to be needed. The book *Att bygga mötesplatser* is the product of a research made by the architect consultants inobi, commissioned by Chalmersfastigheter. It used to describe current knowledge within the company when it comes to creating meeting places in campus environments. The creation of meeting places is just one of the aspects considered to be relevant when investigating the subjects of the Bachelor's Thesis, and is complemented with several other theories as described below.

When elaborating on identity in physical places the section *Rethink Place Identity* in the book *Rethink Place Branding* is used to describe how the choice of brand should be aligned with the perceived identity of a place. Theories about sustainable campus development is described through a definition of sustainability from the *Brundtland Committee*, and then further investigated by using an *International symposium of the Creation of Sustainable Campuses* as well as the book *Managing the University Campus*. This book is also used in the section Urban planning for innovation, where it is elaborated on how to plan urban environments that develop the society and generate innovation. Under the same section, the books *Att bygga mötesplatser* and *Partnerships for Smart Growth* are used. Furthermore, theories from the book *Att bygga mötesplatser* is dealt with in the section Attractive places, in order to discuss how physical environments can be built to generate valuable meetings between people, and how this can be attractive when managing a university campus.

### 2.1. Place identity

An attractive place need to convince people that the chosen brand is aligned with the true identity of the place. As with other types of brands, place branding has the ability to communicate certain functions and symbolic meanings that may generate value and motivation to people. The place identity is what being offered by a place by representing the value purchased by a customer. If people choose to purchase, or accept, a place it may encourage them to visit it or gives them feelings of loyalty to the environment. To achieve this in a successful manner, people firstly must be aware of the existence of the place and secondly, have incentives to visit it because of possible benefits. The benefits can be expressed in many forms and generated through different circumstances. For instance, people can be attracted to a place because of the absence of negative aspects occurring in other places, or because it contains positive aspects that cannot be found elsewhere. In either ways, it is important to identify which incentives are needed for people to purchase the place. One strategy is to consider which present attitude potential customers' have about the place. The next step is to identify which benefits should be conveyed to change negative attitudes and emphasise positive attitudes (Kerr & Oliver, 2015).

When the benefits are identified the message must be accepted as true by the purchasers. A successful place brand should not just be made up as a slogan or name, it should be communicated and trusted through the place identity. The difference between having a place brand and having a place identity is that people in the latter accept the intended message as truly conveyed by the place itself. Personal conviction through experiences is needed to complement the marketed place brand, and to achieve that, contact points between place and human are needed. The contact should be communicated through the

following three sources in order to be convincing and consistent. Firstly, the physical characteristics of the place creates a primarily experience and basic perception. Secondly, formal advertising and promotion shows which picture is supposed to be mediated. Thirdly, informal communication between both internal and external stakeholders spread rumours and expectations (Kerr & Oliver, 2015).

A place identity is people's interpretation of the elements and is influenced by factors from inside and outside the place. These elements can be both physical environments and processes generated at or by the place. Most important is that a place identity needs people to work and develop, because it is social processes through people's actions, feelings and human interaction that transfer a physical environment from being just a space to being a place with a living identity. The stakeholders of a place are both creating the identity and being shaped by it, because people seek places aligned with their imagination of themselves. People being residents in a place are the main identity-holders and their perception is needed to take into account when making place branding. Even though established identities take time to change, it is important to consider that identities are variable and need to be constantly monitored and managed. True place identities are generated through interactions between built environment, people and communicated branding (Kerr & Oliver, 2015).

## **2.2. Attractive places**

Today, we experience more meeting places than ever before, both physical and virtual, and they compete with each other. A meeting place is defined as generating interaction, collaboration, exchange of valuable information and mutual influence between people. The physical meeting places must attract people to survive in the competition. For instance, people need to feel secure in order to integrate with other people at physical places because otherwise, they might choose virtual meeting places instead. One possibility to link physical and virtual meeting places together is to create synergies between by integrating technology and virtual spaces in the same physical environment.

A global trend within physical meeting places is that the most important regions and cities in the world becomes fewer to the number which makes the attraction of people even more important to consider. A way of concentrating attraction to certain locations is to create clusters, where ideas can be generated within specific areas. However, some people believe that the next step is to create interdisciplinary clusters instead, where people from different fields can integrate. This could include certain districts or even whole cities with an identity of innovation (Berg, Livian, Eklöf, & Rosenhall, 2014).

Regardless of size, all planned meeting places need people to exist and is defined by users who confirm and develop the place. To create attraction, social objects are needed that help gathering people, because the most effective magnet is other people. For instance, social objects can be events and entertainment, both permanent and temporary, and can be divided into three main groups. The first one, relational social objects, exist between two persons through a common interest. The second one, static social objects, are permanent elements on a meeting place such as TV-screens in a restaurant. The third one, dynamic social objects, are joint performance among people.

Intended meeting places becomes more attractive if they generate social values through value-creating activities. To achieve this, deliberate design and strategies for creating meeting places are needed. Generated value can include both economical values and different forms of social values. The economic values of a meeting place could be confirmed through a direct transaction, for instance when a company pays a fee to attend

a conference. If it is free to use the facilities, the economic value can instead be measured through an interpretation of how much the activity is worth for the participants. This can be done by comparing the cost for similar activities in other places. The economic value can also be measured by the generated value in the surrounding business, for instance the increased turnover that the meeting place generates (Berg, Livian, Eklöf, & Rosenhall, 2014).

In places we experience to be safe and pleasant we are more willing to open up ourselves to others and the value of the meeting increases. To enable meetings can therefore be done by identifying existing meeting places and improve them in order to create conditions for meetings. In Sweden, it is important to take into account that most urban life disappears during the winter time. We therefor need to plan places that works in varying climates, for instance houses that are protected from the wind. Except from weather protection there are several tools that can be used in the planning of urban environments to attract and activate people (Berg, Livian, Eklöf, & Rosenhall, 2014).

As examples, attractiveness can be achieved by making a place exclusive through both limitations and accessibility. Limitations through positive friction can be physical obstacles that manage the flows of people and form spaces for meeting. Examples of this are stairs where the flow of people gets temporary crowded or entrances that are narrow but at the same time inviting. Accessibility, on the other hand, refers to measures that make the space available for indented visitors, for instance by enabling access with wheelchair or offer good public transportation. Nevertheless, most important when dealing with attractiveness is to create genuine places by using what is unique and strengthen it with the architecture (Berg, Livian, Eklöf, & Rosenhall, 2014).

Networking is important in today's society and meeting places can be defined as hubs in the network structure. In a flat structure every nod is connected to the closest ones, which make the distance between some nods long. In the hub structure different nods are connected to the closest ones but also to more distant nods through central hubs. In a society dependant on meetings, the ones who control the hubs are powerful (Berg, Livian, Eklöf, & Rosenhall, 2014).

### **2.3. Sustainable campus development**

The widest acknowledged definition of sustainable development comes from the Brundtland Committee in the report *Our Common Future* presented 1987. "Development which fulfils the need of the present generation, while not at the sacrifice of the ability of future generations to fulfil their needs". It is also generally accepted that sustainable development need the three aspects of economic development, social equity, and environmental protection to be successful (International Institute for Sustainable Development, 2010).

Campuses are vital parts for human development, which is one basis of sustainable development. This includes providing educational services that delivers people, or actors, that may work with sustainable development. Providing actors for sustainability is an intangible asset compared to lowering the environmental load of the campus itself, which generates tangible results. In order to generate competent people, universities need to provide opportunities for students to be engaged in projects to gain experiences necessary for their future work (Kazuhiro, 2014).

Another part of a University's mission is to spread knowledge to the society and provide with a steady flow of innovation that is open and not confined inside the university. A solution could be innovation hubs within the university with facilitate where knowledge can be transferred and spread. These spaces should be accessible by the public and if this space could be funded by the local government it would be very appreciated. Funding from private companies could also be used for creating spaces for the public within the campus. Seen from outside, lots of people find it difficult to access universities. However, many people would like to visit university campuses and take weekly lectures (Mori, 2014).

The proximity of a university in a city does not guarantee a good cooperative relationship that spread knowledge and innovation effectively. For instance, a university set up in a remote location is not the most sustainable campus model. No students want to live there and they would have to commute long distances to go to the university. Hokkaido University campus is located in the centre of Sapporo and the campus is quite accessible to the citizens. However, the research from the university is not accessible and people do not know where to find answers for their questions. There is no central information management system available, making it hard to make information available for the society (Yoshimi, 2014).

The University of British Columbia consider the definition of sustainability as an attribute of a societal dialogue. The university should be aiding the conversation with providing both new knowledge and expertise. But also by raising questions pushing towards the right direction. Sustainability science has a key role to play, and should be pushing boundaries and welcome development of new technologies (König, 2014).

In the Netherlands, the economic recession after the collapse 2008 helped campus users and policy makers realize that resources are scarce, and that that functions such as laboratories, offices and educational facilities with lower occupancy can be shared. Similar uses of function for students and employees enhance the opportunity for a more flexible use of space. Sharing these spaces between faculties, researchers and universities can also save both money and resources. As an example, it can enable extended opening hours or avoid vacant space that are not rented out. Sharing facilities between students, researchers and other universities can also stimulate collaboration. However, this can affect the exclusive identity of a university (den Heijer, 2011).

The sustainable campus scope is not limited to energy efficiency alone, but also in what way the energy reduction objective relates to other sustainability objectives. It is important to connect sustainable innovation in research with sustainable solutions on campus in order to be a good example for the students, and consequently higher education is considered a special sector. The students bring their experience to their future employers, where many will end up in leading positions dealing with sustainable development. One of the goals of a sustainable campus is to change the mind-set of the users towards a positive attitude of implementing sustainable concepts. Not only for the students, but also for employees and visitors. A campus involves relatively many people that can be influenced by sustainability initiatives. Setting an example by implementing visible sustainable solutions on campus can influence many people to become more environmentally conscious. Visitors even expect to see innovative solutions associated to sustainability when visiting a world-class university campus (den Heijer, 2011).

## 2.4. Campus planning

There are four models with important strategic choices in creating the future campus. It is vital to explore the possibilities and consequences of implementing these models before taking an action towards either direction (den Heijer, 2011).

*Exclusivity* – Exclusiveness of the campus is important to consider because this will affect the attraction of students and the collaboration with society. The more exclusive and competitive the campus is the less it supports collaboration with society, and the more selective the university becomes in who to collaborate with. One variable in appealing to students with talent is the exclusivity of the school, and a more open campus will lower that exclusivity. For instance, how many students would Harvard, one of the most prestigious universities in the world, lose if the education was open to anyone? The university would probably gain a lot in numbers of course, but the students with talent would probably look elsewhere for a more exclusive and competitive university. A more exclusive campus is less open for outsiders and therefore less open for collaboration with society. Showing the university identity, vision and goals in the campus environment increase the exclusivity. For instance, creating world class sports facilities solely used by the students adds to the identity and exclusiveness but provide with less cooperation with society (den Heijer, 2011).

*“Univer-City”* – It is also vital to reflect on how much space that the campus should share with others and which activities should be accommodated outside. When sharing functions like restaurants, cafés and parks the space is utilized more efficiently. There is much to gain financially in sharing spaces and knowledge, but also integration into the city. Expensive facilities, like laboratories, can be shared for reducing the footprint of the university and contributing to a more sustainable campus. Sharing space also suggest being flexible in renting space both inside and outside the campus, instead of building an entirely new building (den Heijer, 2011).

*Exterior campus* – It is also important to consider what activities to not have on the campus and leave the surrounding city to manage. A larger campus can have many of the functions needed in-house, but it can also be stimulating for students and employees to have the option to work outside the campus. Partnerships for sharing use, ownership or management contributes to knowledge-exchange. A capable virtual campus stipulates the opportunity for students to study outside the campus, reducing the need for study places (den Heijer, 2011).

*Community* – Last but not least it is vital to have the functions that attract students and aid in building a community around the campus. Many students want to develop a sense of place and an attachment to the campus. Supporting the creation of community on the campus can be done by creating spaces encouraging social contact. Creating a campus that supports the community and express university values in public and private space (den Heijer, 2011).

Whilst the separate models must be considered, multiple can be chosen to be incorporated on different areas of the campus. A combination of models can be used for an area for creating the suitable campus models. Different values need to be weighed against each other: competition versus collaboration, exclusiveness versus shared space, accessible versus isolated and virtual versus real-life (den Heijer, 2011).

A competing, exclusive and isolated university would for example be closed for the outside world except for few businesses which the university have a strong cooperation with. Other universities are considered as competitors and sharing space is out of the question. This university would have a strong identity, and a strong academic character.

### 2.4.1. Individual needs in campus planning

In psychology the hierarchy of individual needs is described by the need-satisfaction theory by Abraham Maslow (1954). These were later transformed into user needs in real estate functions by Blyth and Worthington (2001) see figure 5. According to the original theory by Maslow there is a certain degree of hierarchy where the primal needs for survival and safety need (a, b) to be adequately met before higher levels can be reached. In campus management this is shown in the rising expectations of students and researchers, which have an impact on the campus management practice. Leading to higher needs such as attractive architecture and self-actualization via the physical working environment (den Heijer, 2011).



**Figure 5. Cumulative functions of real estate linked to Maslow's hierarchy of needs (den Heijer, 2011).**

Maslow's pyramid can be used to emphasize the relation between the individual needs and the built environment (den Heijer, 2011). These individual needs can be broken down into utility functions and cultural functions for defining the value of the space. Some functions like protection from weather and providing climate regulation, are more or less basic. While a symbolic function displays the ideas and anticipations by the designer but also by the users, making it an object with cultural and symbolic importance. Arranging available space by either separating activities that are likely to conflict or connecting activities that need effective communication, is also a variable in defining the quality of space (van der Voordt & van Wegen, 2005).

In measuring the quality of space a cumulative level of assessment makes it easier to evaluate buildings on a campus. Den Heijer, introduced an assessment method with three cumulative levels, which are: "plain and efficient", "social meeting place" and "inspiring and representative". The purpose of this assessment is to determine the characteristics of the buildings and apply a categorization of the quality of space. "Inspiring and

representative” represents the highest rating and describes buildings and spaces that can represent the campus. A “social meeting place” is a place that has qualities for meeting people, but does not have to be inspiring or have a special attraction. The lowest rating is “plain and efficient” which describes an area that does not have the qualities of the social meeting place or an inspiring and representative place (den Heijer, 2011). Comparing to Blyth and Worthington’s user needs in real estate functions to Den Heijer’s cumulative level of assessment the lowest functions of space (a) and (b) in figure 5, is incorporated in the lowest level. A social meeting place achieves in creating a place that connects people and supports different activities. The highest cumulative level is inspiring and representative and can reach (e), (f) and (g) in figure 5.

## **2.5. Environments for innovation**

A well-functioning society has the basic social development steps referred to as socialization, relationship and synergies. Socialization is regarding the ability to live next to each other and be respectful. Relationship is regarding relations, and understanding of other people's conditions. Synergies are regarding community, networks and partnerships. These levels must be maintained and renewed through new meetings and relations between people. Here, the meeting places are needed to create a sustainable development with innovative synergies. (Berg, Livian, Eklöf, & Rosenhall, 2014).

There are many benefits with creating social value, for instance research shows that societies with strong social capital has lower crime, better health and better education. To create this, it is important with public spaces where people can develop tolerance, integrate with each other and create understanding for one and another (Berg, Livian, Eklöf, & Rosenhall, 2014).

We are living in the networking age and networks consists of connections between people. We also live in a knowledge based society, and by integrating networking with exchange of knowledge the society can continue develop and generate innovations. A society based on knowledge is dependent on environments which create meeting places for people. The academy has created meeting places for 1000 years and has a good chance to keep on doing it. Another aspect to consider is that the private sector has taken a large role in providing the society with meeting places such as science parks and shopping malls (Berg, Livian, Eklöf, & Rosenhall, 2014).

Research from both the United States and Europe illustrate the same economic spin-off effects within a region and benefits of university-community collaboration. The presence of a university does not only amplify the knowledge base, but the students and employees that the university provides can also add the value to the economic base and urban mixture. In the Netherlands many cities increasingly acknowledge the value of the university and coordinate their planning processes with campus planners. An example is the programme "Knowledge city" from the Economic Development Board Rotterdam (EDBR), where goals and resources of the regional government, private institutions and universities are connected (den Heijer, 2011).

Campus environments have the potential to be the arena for urban mixture that generate innovation, but conflicts between different interests may occur as a result. One is the matter of combining local and global interests, because successful campus planning should open the campus against the surrounding local society but at the same time attract global actors within research and development. Another matter is regarding combining internal and external people. People within the university should feel at home in the built environment, but the university should at the same time attract external stakeholders and businesses. This could be a conflict if the planning is not done at the correct way. Creating channels for information and environments for meetings can lead to people's awareness of other people and how they are linked together (Berg, Livian, Eklöf, & Rosenhall, 2014).

When planning facilities for innovation it is also important to consider that people are different, that some inventors need privacy to be able to concentrate and that some innovations need interaction between people to develop. Group-internal meetings are between similar people and transboundary meetings are between different people. Innovation needs both. Innovations need implementation, and therefore it is import to

find a mix between this (Berg, Livian, Eklöf, & Rosenhall, 2014). One way of planning urban development for innovation is by using “Smart growth” and apply it in university environments. Smart growth is often referred to as to creating safe and convenient neighbourhoods and to increasing opportunities for walking, biking, and transit, as well as investing in existing environments instead of building new ones. Universities can be a part of this kind of development by interacting with the surrounding community (Wiewel & Knaap, 2005).

The primary mission of universities is to educate students, and a good way is to involve them directly in real-world problem solving, for instance within education programs such as architecture, urban planning and landscape architecture. Courses could be offered where students work directly with local governments or people in the neighbourhoods, dealing with real world issues. Universities occupy large areas of land and sometimes shape the character of neighbourhoods. If universities can implement smart growth in campuses, the surrounding city and communities could benefit and be encouraged (Wiewel & Knaap, 2005). Especially in the knowledge society, universities can be the power source that flow through the society in different levels and in different times of people lives (Berg, Livian, Eklöf, & Rosenhall, 2014).

### 3. Methodology

The study is done through a qualitative perspective, which means to focus on how the individuals perceive and interpret the surrounding reality. In this perspective, the individuals exist within the investigated environment and the researchers interact with the interviewees in order to become integrated in the empiricism. Observing and interacting with the interviewees is done through case studies in their natural working environments. Through this, the physical environment surrounding the interviewees can also be studied as a part of the case study. To enable flexibility, the Bachelor's Thesis is based on and formed by the empirical data collected during the working process. The literature is used to choose a relevant area of investigation that generates useful empirical data. (Backman, 2008).

Most empirical information is generated through interviews, and include additional information from other sources. For instance, through books, newsletters and websites that the interviewees refer to, but also evaluations of physical built environments when visiting Japanese campuses. The physical visits are referred to as case studies in the following sections and are presented in their entirety in Chapter 4 "Case studies". To give an understanding to the environment surrounding Campus Lindholmen and the context the area consists within, the development plan called "Vision RiverCity" is studied. Furthermore, essential strategic documents from Chalmers are used to show the direction of Chalmers' present and future activities at Campus Lindholmen.

To collect new approaches on campus planning and views of global sustainability a partnership with Alliance for Global Sustainability (AGS) enables an exchange of information with Japanese universities. AGS is an international partnership between Chalmers and other universities worldwide with the aim of pursuing research and development within complex global issues, focusing on environmental science and sustainable development.

Gothenburg is developing into a denser city and Japan is interesting to investigate because of the history of dense urban landscapes, especially in Tokyo where the world's highest land prices can be found due to this history. In Tokyo there are also profound experiences on tall buildings and knowledge of public transportation in dense urban landscapes that can be used when developing Gothenburg and Lindholmen. Furthermore, knowledge in energy and views on sustainability are in some cases more developed in Sweden than in Japan, which can be interesting to the Japanese contacts. The exchange can thus provide knowledge exchange in both directions (Kåberger, 2015). The knowledge exchange is done through case studies in four universities in Tokyo and one university in Sapporo, which altogether includes visits on seven campuses. The Japanese interviewees are connected to these universities and campuses.

By focusing the case study in Japan to campus environments the results are planned to be relevant and useful to the Bachelor's Thesis. The case study includes top-ranked universities that are considered to have experience from sustainable development. The universities are Tokyo Institute of Technology, The University of Tokyo, Keio University, Meiji University and Hokkaido University. A visit to Renewable Energy Foundation mad in order to give a basic understanding of Japanese energy policies and municipal requirements. The choice of universities and campuses is made with consideration of the main approaches of the Bachelor's Thesis, namely campus planning with focus on identity creation and sustainable development in dense urban landscapes (Goto, 2016). In some universities more than one campuses are visited because of the

possibility to compare the different characteristics between campuses within the same university.

The trip to Japan was coordinated with the help of Tomas Käberger and Yutaka Goto. Tomas Käberger is Professor at the Department of Energy and Environment and Head of the Energy Area of Advance, at Chalmers University of Technology. He provided with expertise regarding energy issues in Japan, because of his role as Chair of Executive Board at the Renewal Energy Institute in Tokyo. Yutaka Goto is Doctor and Project Leader at the department of Civil and Environmental Engineering, at Chalmers University of Technology. Providing knowledge regarding Japanese universities and help arranging and participating in the case studies and interviews in Japan.

### **3.1. Interviews**

In Sweden, the interviewees were chosen by their competence closely connected to the development of Lindholmen and local expertise of Gothenburg. Both employees within Chalmers and external experts were selected to provide different approaches. Partly in order to give an understanding of Chalmers and Lindholmen, and to gather opinions of future development. In Japan, the interviewees were chosen to provide new approaches to campus planning, place identity and views of sustainability. The interviewees have been selected with assistance from the supervisors and partners of the Bachelor's Thesis. All interviewees have approved the usage of their comments in the Bachelor's Thesis and were offered to verify the material when needed. The length of the interviews were approximately one hour each, even though some interviewees attended the same sessions and therefore had varying time to answer questions. Brief descriptions of all interviews follow below.

- Agneta Hägg Knape is Facility Strategist at Chalmers University of Technology. She interviewed to give a description of how Chalmers' strategically works with facilities and how the future requirements could look like.
- Niklas Wahlberg is CEO at Lindholmen Science Park. He has extensive knowledge about the Lindholmen area and experiences from collaboration between industry and academy. He is interviewed to describe the concept of Lindholmen Science Park and provide with ideas about the future development of the area.
- Erik Fischer is Development Manager at Adapta Fastigheter AB. He previously worked as Market Area Manager at Platzer Fastigheter AB and has gained extensive experience of the property market in Gothenburg. He is interviewed because of his expertise regarding property development and to provide with external opinions about Lindholmen.
- Lennart Hedström is CEO at Elof Hansson Fastigheter. He previously worked as CEO at Chalmersfastigheter from 1998 to 2011 and experienced a period of growth and transformation of the company. He is interviewed to describe the historical development of Chalmersfastigheter and Campus Lindholmen.
- Henriette Söderberg is Project Manager Department of Operation support, at Chalmers University of Technology. Currently working with the investigation aimed to identify which departments and functions that can be moved from Campus Johanneberg to Campus Lindholmen. She is interviewed for providing insights in the investigation's process and understanding of what functions might be needed at Campus Lindholmen in the future.

- Petra Ljung is Project Manager in Department of Operation Support, at Chalmers University of Technology. Currently working with the investigation aimed to identify which departments and functions that can be moved from Campus Johanneberg to Campus Lindholmen. She is interviewed for providing insights in the investigation's process and understanding of what functions might be needed at Campus Lindholmen in the future.
- Lena Andersson is CEO at Älvstranden Utveckling, the municipally owned company created to lead the development of the Gothenburg RiverCity. She is interviewed to describe the overall development plans for the city areas closest to the river and how Lindholmen is affected.
- Teruyuki Ohno is Executive Director at Renewable Energy Institute, a non-profit organisation which aims to build a society based on renewable energy. He previously worked as Director General of the Bureau of Environment at Tokyo Metropolitan Government, dealing with environmental issues including energy, climate change, pollution control and sustainable development. He is interviewed to describe the present situation of renewable energy sources in Japan and environmental policies in Tokyo.
- Koichi Yasuda is Architect and Professor at the Department of Architecture and Building Engineering, at Tokyo Institute of Technology. He is the manager for Yasuda Koichi Laboratory and Yasuda Atelier. He is interviewed to talk about campus planning and explain how the campus management are developing the campus facilities.
- Norihisa Kawashima is Architect and Assistant Professor at the Department of Architecture and Building Engineering, at Tokyo Institute of Technology. He previously worked at the Japanese architectural firm Nikkei Sekkei. He is interviewed to talk about campus planning and architectural assignments of his, connected to sustainability in the Tokyo area.
- Tomonari Yashiro is Professor at the Institute of Industrial Science, at The University of Tokyo. He is interviewed because of his role as University Vice President with responsibility for campus planning.
- Hiroto Kobayashi is Architect and Professor at the Graduate School of Media and Governance, at Keio University. He is also Japan Representative at the architectural firm Skidmore, Owings & Merrill LPP. He is interviewed to talk about campus planning and the "Student Build Campus" project which he is in charge of.
- Yutaro Muraji is Architect and Assistant Professor at the Graduate School of Media and Governance, at Keio University. He is interviewed to talk about his participation as project leader in the "Student Build Campus" project.
- Masami Kobayashi is Professor at the Department of Architecture and Director of the International Program in Architecture and Urban Design, at Meiji University. He is interviewed to talk about his role as Vice President with responsibility for campus management.

- Keisuke Hanaki is Professor at the Department of Urban Engineering and Adjunct Professor at Integrated Research System of Sustainability Sciences, at The University of Tokyo. He is interviewed regarding Alliance for Global Sustainability and about sustainable campuses in the Tokyo area.
- Shuichiro Asao is Doctor at Todai Institute for Advanced Study and Project Researcher at Integrated Research System for Sustainability Science, at The University of Tokyo. He is interviewed regarding Alliance For Global Sustainability.
- Takashi Mikami is Professor and Vice President with responsibility for campus management, at Hokkaido University. He is interviewed to talk about campus management and campus development.
- Takashi Yokoyama is Associate Professor and Project Manager at the Office for a Sustainable Campus, at Hokkaido University. He has a Teknologie Licentiate from Chalmers University of Technology. He is interviewed to talk about the work of the Office for a Sustainable Campus.
- Maki Ikegami is Doctor and Coordinator at the Office for a Sustainable Campus, at Hokkaido University. She is interviewed to talk about the work of the Office for a Sustainable Campus and about the Assessment System Sustainable Campus, which she has developed.
- Takao Ozasa is Associate Professor at Faculty of Engineering, Division of Architectural Design, at Hokkaido University. He is the Director of Office for Sustainable Campus. He is interviewed to talk about campus planning.
- Takeo Osawa is Associate Professor at Faculty of Engineering, Division of Architectural, at Hokkaido University. He is interviewed to talk about his work regarding creating campus identity by preserving historical buildings.

### **3.2. Procedure**

The information in the literature section is supposed to give a basic understanding to the subject, and the subsequent empirical facts collected during the working process is planned to further develop this subject. Continuously during the process, the extent of the Bachelor's Thesis is discussed with the supervisors. The study is done by initially examining the history of Campus Lindholmen, the circumstances that affect the development of the area, and investigating existing plans for future development. The information is collected through both interviews and written material, and to support the understanding additional facts from literature on the subject is used regarding the key subjects.

Municipal master plans and strategic documents from Chalmers are examined to understand the physical framework along with the educational requirements from Chalmers administration. Empirical data is then collected through interviews and written material. The main purpose during the first period of the working process in Sweden is to give basic information about the subject and knowledge that can be used as a starting point when collecting new information, especially when visiting Japan. The empirical facts are then processed into results and analysed and discussed to finally come up with a concept for creating a suitable identity when developing Campus Lindholmen.

In Sweden, the questions in the interviews are designed to fit interviewees with different expertise and therefore varies in some cases. Although, the approach in all interviews are connected to the key words of the Bachelor's Thesis and all interviewees are asked to describe their background and how their work is connected to Lindholmen. The questions in Sweden can be seen in Appendix 1. In Japan, the questions are designed more similar in each interview, in order to get different opinions and views of the same subjects. The subjects regard campus planning, identity, sustainability, city integration, transportation, business connections and property ownership. The questions in Japan, within these subjects, can be seen in their entirety in Appendix 2.

## 4. Case studies

Case studies performed in Campus Lindholmen and seven campuses in Japan. See table 1 below for a chronologic list of the visits and order of which each case study will be presented in this chapter. See figure 6 and table 1 for the location of where the studies were conducted.

CAMPUS	DATE	KEYWORDS	LOCATION
<b>Campus Lindholmen</b> Chalmers University of Technology	2016-01-20	Business, district, isolated campus, in development	Gothenburg, Sweden
<b>Ookayama Campus</b> Tokyo Institute of Technology	2016-04-06	Integration with society, modern architecture, residential surroundings	Tokyo, Japan
<b>Komaba Campus</b> University of Tokyo	2016-04-06	Academic, divided undergraduate studies and research	Tokyo, Japan
<b>Shonan Fujisawa Campus</b> Keio University	2016-04-07	Green, student build campus, public integration	Tokyo, Japan
<b>Nakano Campus</b> Meiji University	2016-04-08	Dense campus, vertical campus, shared space	Tokyo, Japan
<b>Surugadai Campus</b> Meiji University	2016-04-08	Urban campus, vertical campus, public space	Tokyo, Japan
<b>Hongo Campus</b> University of Tokyo	2016-04-08	Consistent architecture, historical and academic campus	Tokyo, Japan
<b>Sapporo Campus</b> Hokkaido University	2016-04-12	Green campus, large area, open public space	Sapporo, Japan

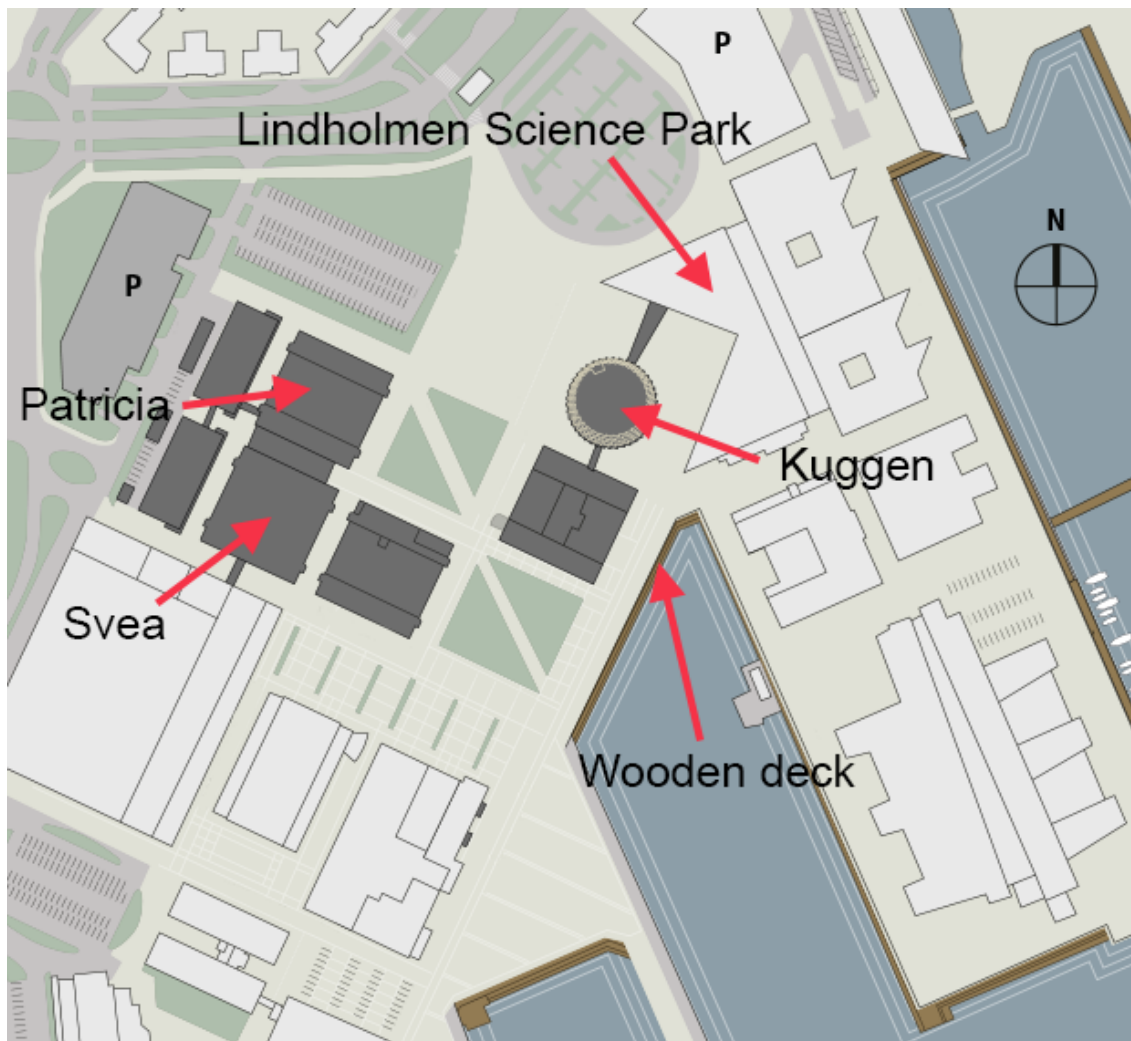
*Table 1. Case study visits.*



*Figure 6. Visited locations in Sweden and Japan. Image made by the authors.*

## 4.1. Chalmers University of Technology – Campus Lindholmen

Case study performed 2016-01-20



**Figure 7.** Campus Lindholmen map. Received with permission from Chalmersfastigheter and edited by the authors.

<i>Campus established</i>	<i>1994</i>
<i>Number of students</i>	<i>3000</i>
<i>Classification</i>	<i>Satellite Campus</i>
<i>Keywords</i>	<i>Business district, isolated campus, in development</i>

Chalmers campus Lindholmen is Chalmers University of Technology's second campus, and its located on the north riverbank of Göta river on Lindholmen. The first parts of the campus were established in 1994 when it became the second of Chalmers two campuses. The campus is placed in between the two means for public transport, the ferry and the bus stop. With the bus or the ferry, it takes 5-10 minutes to a major transportation hub. A majority of the buildings on Lindholmen contain offices, especially in the area around Lindholmospiren east of the campus. It is nearby this area most of the commerce, restaurants and services are located. On the southwest side of the campus its foremost school activities from three different upper secondary schools and the IT-University. North of the campus on the other side of the road stop are some residential houses and a seven story building with 380 student apartments.



**Picture 2.** The building Kuggen. Authors' picture.



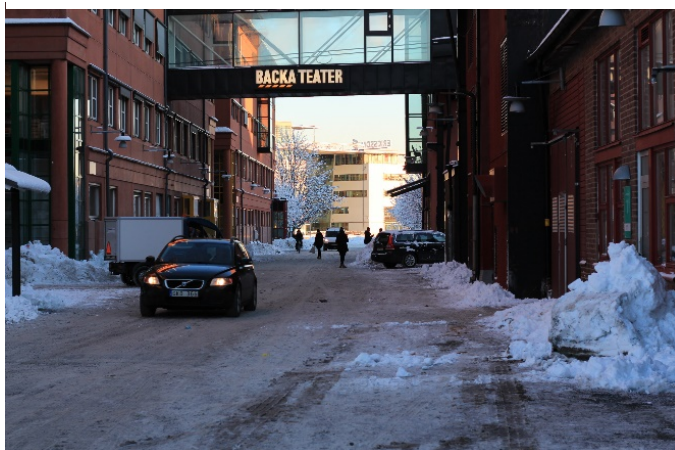
**Picture 3.** Footbridge between Lindholmen Science Park and Kuggen. Authors' picture.

One of the first things that meets the eye coming from Lindholmen bus stop is the building Kuggen, see picture 2. It is a cylindrical building with triangular windows and a façade with panels in different colours. Designed by the Chalmers alumni Gert Wingårdh, Kuggen is made to meet the requirements of Miljöbyggnad gold standard. It holds various technical systems for reducing energy usage and

solar panels for generating hot water and electricity. On the first level there is a reception desk and exhibition area, on the levels above there are mostly rented offices. It is made to be the place where academy meets business, and it has a footbridge extending to Lindholmen Science Park, see picture 3. Together with Lindholmen Science Parks building Navet it grants a modern impression, and visualize how close business and academy is on Lindholmen. It also creates an inspiring and representative part of the campus.



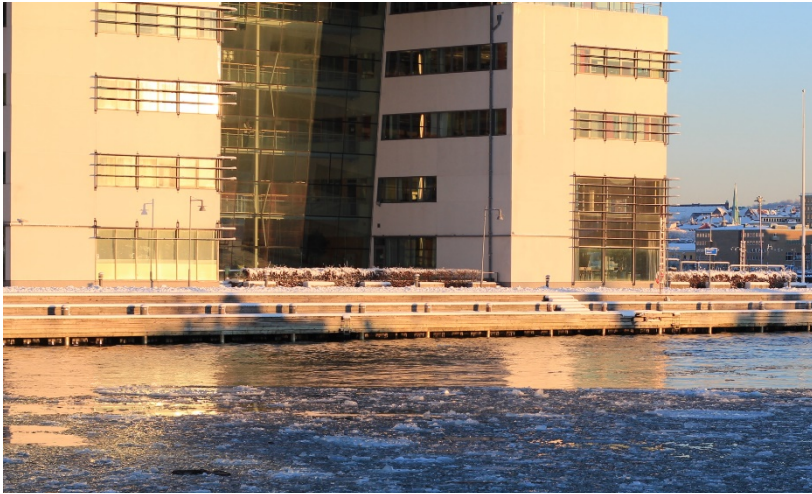
**Picture 5. Red brick facades. Authors' picture.**



**Picture 4. Red brick facades. Authors' picture.**

The other buildings connected to school activities are mostly red brick façades and materials with similar appearance and height. Most of the buildings utilized by Chalmers were built in the early 90s, for the maritime academy and later acquired by Chalmersfastigheter. The buildings have been refurbished and more glass in the façade conveys a more modern appearance, see picture 4 and 5. The space between the two buildings Svea and Patricia have a glass roof and curtain walls and provides study spaces and a restaurant for the students. In the Patricia building is the campus library which provides with study areas and bookable rooms. In the building Jupiter close to Kuggen is a bank office in the same building as a commercial restaurant and classrooms. These buildings are more plain and efficient in delivering the functions needed by the university.

The campus is renowned for its closeness to the water and inspiring atmosphere. The water is a great asset and of considerable importance for the area, generating a natural social meeting place. A wooden deck brings people closer to the water and provide a great space for studies, lunch or relaxation during the summer, see picture 6. It is also a great walkable path close to the water granting an impressive view over the city and outflow of river Göta, see picture 7. Unfortunately, the river also acts as a barrier towards the central parts of the city. When the ferries cease to operate later in the evening the detachment is



*Picture 6. Wooden deck by the water. Authors' picture.*

palpable. In the daytime is an immense flow of people on Lindholmen and it is a vibrant area, which is maintained by the many schools and offices on the site. There is a variety of smaller shops, restaurants and banks providing service during the daytime. After office and school hours many leave Campus Lindholmen

accompanied by restaurants and shops closing. This results in Lindholmen being lively area during the daytime, but less so in the evening and night-time.

Lindholmen is defined by business, schools and for vast unexploited areas making the area somewhat detached from the city. Sizable parking lots, former industrial properties and warehouses is a natural part of the environment around Lindholmen. Together with the unexploited areas, the freeway Lundbyleden and the Göta river efficiently undermine Lindholmens integration with the surrounding city. The offices and schools make Lindholmen function as a district of the city and brings services making the area ideal for business. The heavy industries have dispersed and an apparent transition towards a knowledge-based society is currently taking place.



*Picture 7. The Göta river. Authors' picture.*

Lindholmen campus has a modern expression stated through the architecture, but also by merging into the business district. On the west side of the campus the other schools' buildings are blending in with the university's, making the border indistinguishable. Adding restaurants and bank offices on the premises makes it even harder for the visitor to define where the "campus" is. There are no apparent entrance making it challenging for visitors to find their way. At the same time one of the greatest advantages of Lindholmen is the openness of the campus and close relations to the industry and other schools. The area offers plenty of synergies in providing a recruitment base for the university and future employers.

## 4.2. Tokyo Institute of Technology – Ookayama Campus

2016-04-06



Figure 8. Ookayama Campus map (Tokyo Institute of Technology, 2016). Edited by the authors.



**Picture 8. Main entrance crossing at Ookayama station. Authors' picture.**

Ookayama is the main campus of Tokyo institute of Technology (Tokyo Tech) and the campus was built in 1924. The main entrance is placed 100 meters from the Ookayama station, and it is pretty clear that this is the main entrance to the campus. There is a sign and a map over the campus and a very noticeable building with a façade of steel and glass. The Centennial Hall really catches the eye and show off some interesting architecture by Shinohara Kazuo, a Professor of Tokyo Institute of Technology. It looks like some kind of spaceship with its contemporary architecture. On the inside there is a museum, exhibition hall, reception, restaurant, cafe and some places to study.

It is a simple but effective entrance that is one of the first things a visitor would see when leaving Ookayama station. The buildings around this part of the campus vary in between 5 to 12 stories. The most prominent buildings are the Tokyu hospital covered in green seen in picture 8 and the centennial hall seen in picture 9.



**Picture 9. "Space architecture" Centennial hall. Authors' picture.**



**Picture 10. Ookayama campus Library has a modern expression. Authors' picture.**

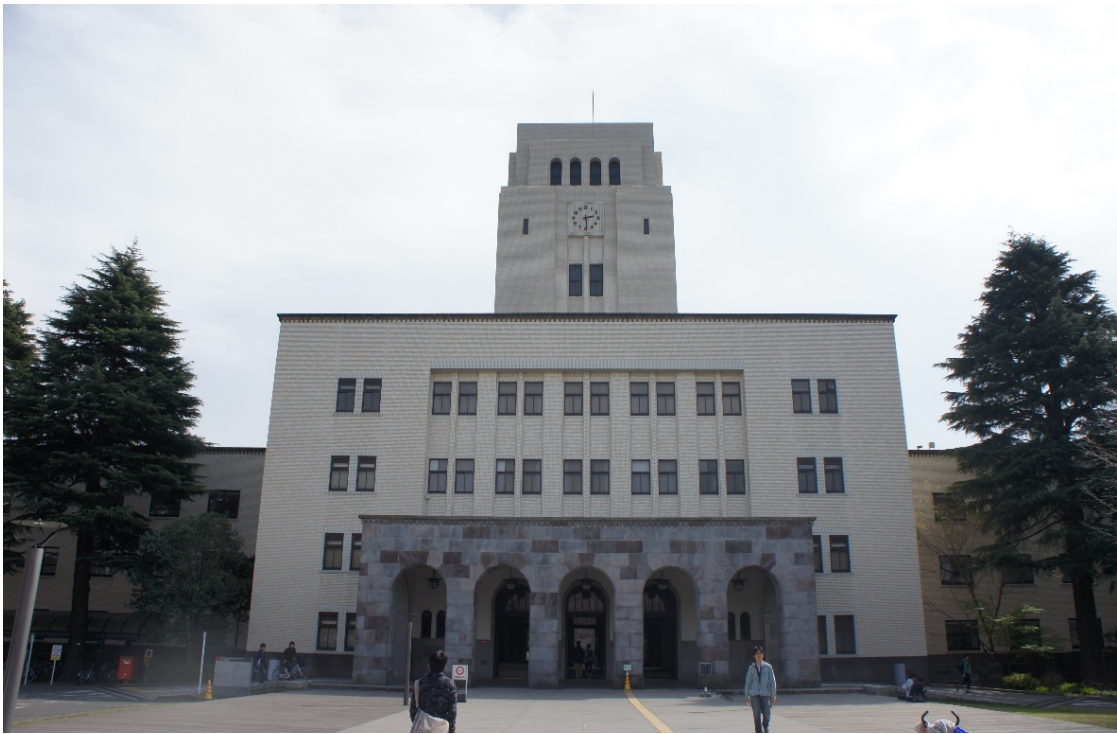
Moving past the Centennial Hall into the campus there is an open plaza and another visually striking building. When approaching the campus from the east, these examples clearly add to the modern impression of the campus. This is the Ookayama Campus library which was completed in February 2011, see picture 10. It is known as the “cheese cake” because of its triangular shape resembling a piece of cake. The vertical panels on the triangular part of the building has solar panels that provide with some electricity and shading the sunlight.



**Picture 11. Inside the campus library. Authors' picture.**

Part of the library is built right under the plaza, making use of the space and provides needed insulation on hot summer days. Even placed underground there is good lighting provided by the light well and LED lights, see picture 11. This is a quite traditional library that holds 28000 shelves, and over 700 study spaces.

This is a well-planned centre of the campus where there are people coming from all directions. The library serves as a hub to meet people and to study. This is definitely an inspiring and representative part of the campus.



**Picture 12. Main building. Authors' picture.**

The main building was completed in 1934, and is today an important symbol for Tokyo Tech, see picture 12. In front of the main building is the cherry blossom avenue. A wooden deck runs the full length of the avenue. During our visit the cherry trees were in full bloom, and families brought their picnic to sit under the trees. A meeting place very much available to the public, see picture 14.



**Picture 14. Open public space. Picture by the authors.**



**Picture 13. Cherry blossom avenue. Authors' picture**

Just next to the avenue is a small green area also used by the public, see picture 13. Especially appreciated on a sunny day and with the cherry trees blooming. This part of the campus provides spaces for the public to socialize on, which the public gladly use. Making the campus more accessible and open to the rest of the society. From the main gate to the library and the cherry blossom tree avenue is a very well planned public space of the campus. Giving the campus a sense of welcoming and generosity. The public is being invited and prioritized in this area. There were kids from kindergarten playing in the open green area.

Cars are forbidden in all of the campus, only some vehicles are allowed for deliveries. Bicycles are also banned from the campus, even though cycling is not very popular in Tokyo and some would even call it dangerous to use a bike in the city. Removing the vehicles adds to the peaceful atmosphere on the campus, and because of the compact layout and proximity to public transport this works rather well. The north and the south part of the campus is rather far from each other but would not benefit very much from being connected.

On the west side of the campus is the Environmental Energy Innovation (EEI) building, a cutting edge building in terms of energy usage. The seven storey building was built 2012, and is covered with solar panels that has a capacity to generate 650 kW, see picture 15. Meaning that the building is nearly self-sufficient on electric power. There are also several other technical systems that all contribute to the 60% reduction of carbon dioxide emissions.



**Picture 15. Environmental Energy Innovation building. Authors' picture.**

In terms of identity the EEI building does not contribute a lot to the campus environment. Placed right next to the railway it does sort of blend in with the other technical installations. This part of the campus is also less open to the public and more focused on the university's needs. The buildings are more plain and efficient and the atmosphere is more academic. The EEI building does however make a powerful statement considering the country's dependence on fossil fuels and nuclear power. Therefore, it is an important building for the university's identity, working for self-sustaining buildings and sustainable development.

Other parts of the campus are less integrated with the city and there is more of a focus on the functions of the university rather than the identity. Close to the Ookayama station is an area of the campus open to the public and it feels like this contributes to the atmosphere of the whole campus. All parts of the campus

except the area close to the station are neighbouring residential areas, and these areas are more private and introvert. Yet "private" is not a good keyword to describe this campus. Rather a planned and deliberate openness that brings the visitor to the most inspiring parts of the campus.

### 4.3. The University of Tokyo – Komaba Campus

2016-04-06

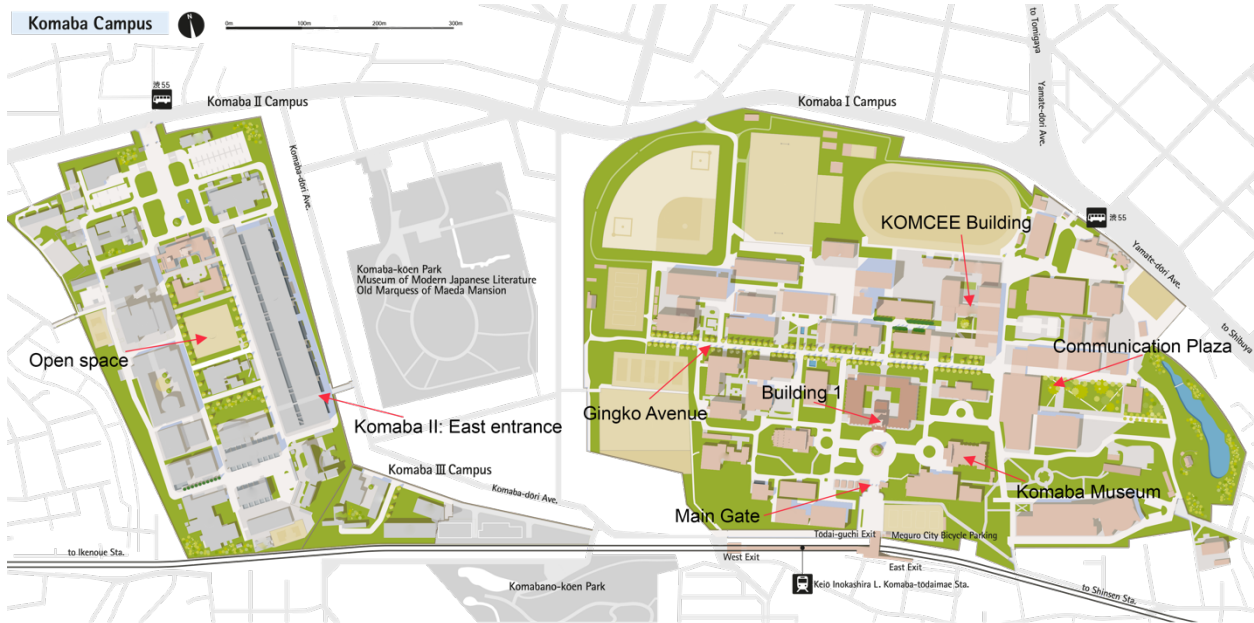


Figure 9. Komaba Campus map (The University of Tokyo, 2016). Edited by the authors.

<i>Campus established</i>	1935
<i>Number of students</i>	7500
<i>Classification Komaba 1</i>	Research Campus
<i>Classification Komaba 2</i>	Undergraduate Campus
<i>Keywords</i>	Academic, divided undergraduate and research



**Picture 16. Main gate Komaba 1 Campus. Authors' picture.**

Tokyo Komaba Campus is divided into Komaba 1 and 2, where the first is for students and the second is for researchers. The campus is situated at the Komaba region and the closest train station is located just outside the main gate. Komaba-todaimae station is two minutes by train from Shibuya, which is one of the major connection points in Tokyo. It is safe to assume that most people approaching Komaba 2 campus will be walking through the main gate, since it is so common to travel by train in Tokyo. The main entrance makes a tidy appearance which has a clear purpose of being the more public side of the campus and a social meeting place, see picture 16.

On Komaba 1, “Building 1” is the building with the clock tower which was erected in 1933 making it the oldest building on the whole campus. Close by lies another old building, the Komaba Museum of art and natural science, which attract the public to the campus. Many of the older buildings on the Komaba 1 campus have a red brick façade, bestowing a more historical character. The newer buildings are made out of precast concrete and has large parts of glass, creating a more modern expression, see picture 17. Both the new and old buildings are characterized by demonstrating an academic presence.



**Picture 17. Stairs to Communication plaza. Authors' picture.**



**Picture 18. KOMCEE building. Authors' picture.**

The most modern buildings on the campus is 21 Komaba Center for Educational Excellence (KOMCEE) and the east part was finished in 2014, see picture 18 and 19. It is called “21” because it is a building for the 21<sup>st</sup> century, with active learning environments, flexible classrooms, advanced energy preserving systems and an artificial intelligence managing the building. This is Tokyo University’s attempt to create a zero energy building (ZEB) that consumes zero or near zero energy on an annual basis. Created as a pilot project for ZEB it was subsidized by the Japanese government and New Energy and Industrial Technology Development Organization (NEDO). Except for the energy conserving systems KOMCEE is also made to include modern learning environments, a cafeteria and various study places. A small square is enclosed by the KOMCEE buildings and with glass façades the activities inside is visible from the square, see picture 19. The KOMCEE is an inspiring and representative place of the Komaba campus, displaying an initiative for sustainable development.



*Picture 19. KOMCEE. Authors’ picture.*

An avenue with ginkgo trees runs from the west gate all the way to the stairs to Komaba Communication plaza in the east, see picture 17. The avenue is rather effective at leading the people approaching from the west to the Communication Plaza, and can be seen in picture 20. The plaza serves as a social meeting place for the students and holds vital functions for the campus such as the library, dining hall, bookstore and a cafeteria. At the west end of the avenue are tennis courts and baseball fields, which are also seen in the northern part of the Komaba 1 campus. The sports facilities contribute to a more relaxed atmosphere and provide with good opportunities for recreation for the students.



**Picture 20. Ginkgo avenue. Authors' picture.**

A two-minute promenade from the west gate of Komaba 1 campus, lies the Komaba 2 campus. In between the two campuses lies a residential area and the Komaba Park, which successfully divide the two campuses. There is actually no visual connection between the two campuses making them undeniably separated.



**Picture 21. Komaba 2 East entrance. Authors' picture.**

Komaba 2 campus is focused on research and no teaching is performed, making it more closed to some degree. When approached from the west and east the entrances are quite insignificant and secluded, see picture 21. Towards the bus stop to the north is the main gate of Komaba 2, and a more public entrance. To the north there are two older buildings with red brick façades, and together with the more modern buildings they create an

enclosed courtyard in the middle of the campus. Large trees and the flat green area is a great social meeting place for the campus, both for attracting visitors but also for the employees, see picture 22. The architecture very much resembles Komaba 1 campus architecture, but there are fewer old buildings and more concrete structures. This makes the Komaba 2 campus appear as the more modern campus, and at the same time more austere.



**Picture 22. Open space. Authors' picture.**

Tokyo University Komaba campus is split for a reason, making a clear separation of studies and research. The physical separation does not deliver anything remarkable, except tranquilizing the Komaba 2 campus. Perhaps the calmer surroundings give the researchers peace of mind and improve their capability. The architecture is outlined as academic all across the campuses and buildings, new and old. Komaba 1 campus main gate does make an impression of being the front of the campus, and public functions like the museum is placed nearby this entrance. At the east part of Komaba 1 is a centre for the students, gathering many of the functions needed in one place and providing with a meeting place. One clear intention with Komaba 1 and 2 is to create separate clusters for the visitors, students and researchers.

#### 4.4. Keio University – Shonan Fujisawa Campus

2016-04-07

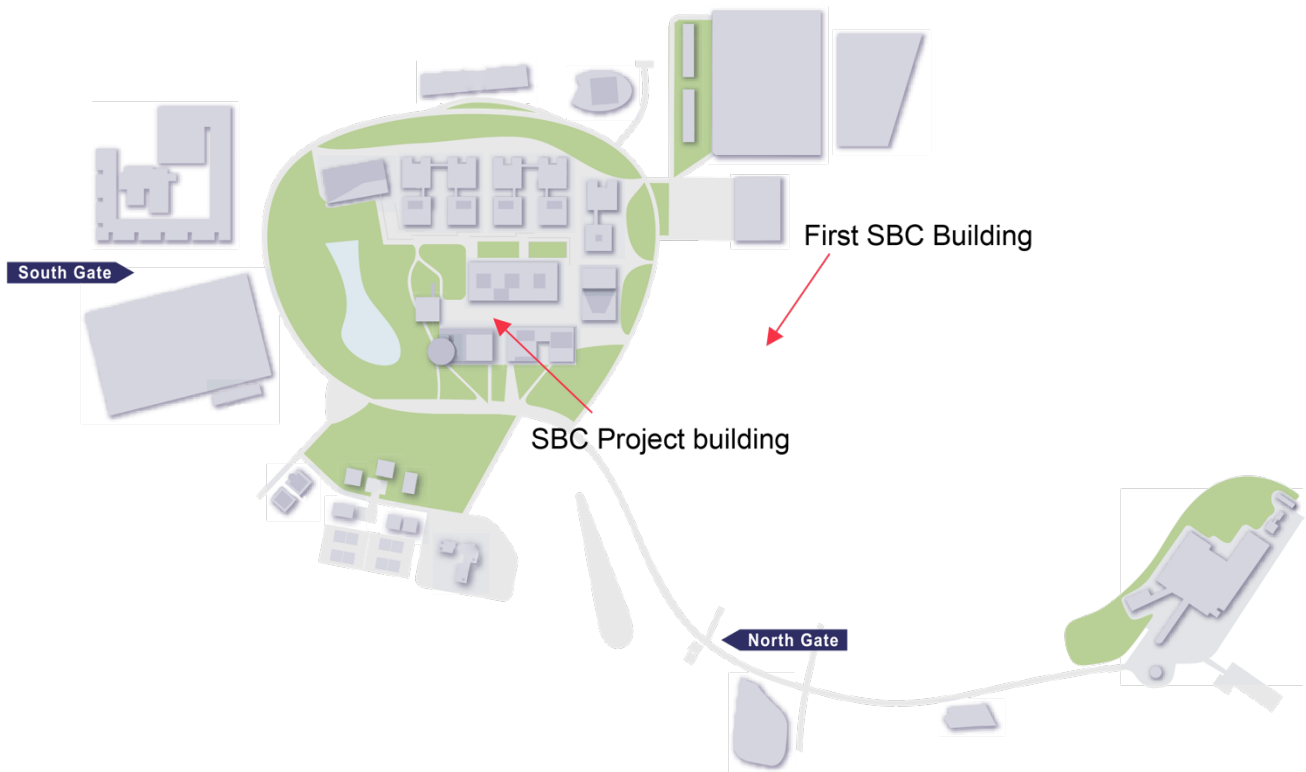


Figure 10. Shonan Fujisawa Campus map (Keio University, 2016). Edited by the authors.

<i>Campus established</i>	<i>1990</i>
<i>Number of students</i>	<i>6000</i>
<i>Classification</i>	<i>Satellite Campus</i>
<i>Keywords</i>	<i>Green, student build campus, public integration</i>



**Picture 23. Entrance of Shonan Fujisawa Campus. Authors' picture.**

Keio Shonan Fujisawa Campus (SFC) is one out of the six major Keio campuses and was founded in 1990, see the entrance in picture 23. It is situated in the Shonan area southwest of Yokohama. Shonandai is the closest train station, and from there it takes approximately 20 minutes by bus to SFC. This is a pretty remote located campus even by Tokyo standards, but students accept that it takes at least a couple of hours of commuting every day. At this campus the isolation is turned into something positive, and there are very few things that can disturb the studies here. Here the studies come first and the physical environment is seen as a tool but considerably not regarded as important for the identity of the university.



**Picture 24. Park and university facilities. Authors' picture.**

The difference from a campus located in the more central parts of Tokyo is striking, here is a lush and spacious environment, see picture 24. The price on land is lower than in the city and there are no particular buildings that has to be preserved, which allow the campus to be more flexible. It grows the way that best suits the university's needs and the only thing that has to be preserved is the nature, even the main buildings are flexible and can be redeveloped. Practically all of the campus buildings are constructed by concrete, making it fairly colourless on a rainy day. Using the same materials over the whole campus gives it a unified expression, but it also makes it harder to navigate on the campus. The heavy concrete buildings and large green areas emphasize on the academic appearance of the campus, see picture 25.



**Picture 25. University facilities. Authors' picture.**

The physical expression of the campus excludes the public, which is somewhat true for SFC. Classrooms and the library is off limits for visitors and there is no public parking available. Resulting in a campus that does not get many visitors on a daily basis, but through different kinds of initiatives the university approaches the community. Projects like post-disaster reconstruction with sustainable materials on remote locations, or furniture carpentering and co-creation with the local public. These initiatives make the knowledge on the campus accessible by the public although the physical campus is harder to access.



**Picture 26. Inside SBC project house. Authors' picture.**



**Picture 27. SBC project house. Authors' picture.**

Another initiative that involves students is the Student Built Campus (SBC) project, see picture 26 and 27. Since it is rather expensive to build and new buildings were needed, this initiative was created. It involves students in building structures out of wood, which later is used by the university. In the middle of the campus is a small wooden building made for the sole purpose to support this project and house project meetings see picture 27. This unique collaboration with the industry benefits the students by getting real world knowledge and also aid the campus in attaining new buildings. The first SBC building containing both dormitories and teaching spaces was almost finished at the time of the visit, see picture 28. By exchanging land SFC acquired land north of the campus, where the SBC buildings will be built. In between the campus and the student built campus is a residential area that unfortunately divide the SBC from the rest of the campus.



**Picture 28. SBC built house. Authors' picture.**

The physical campus is all focused on the students and enhancing their ability to innovate, which is achieved through separating the campus from the public to a certain degree. Here are no open spaces or attractions for the public, except for the university itself. The architecture of the buildings on the campus are formal and with little variation. This results in a campus that is essentially solely utilized by the students and employees, but also a cohesive campus which few outsiders

would enter. Certain courses and initiatives are addressed towards providing public benefit, and giving the students real-life experience. These initiatives are vital for the community's impression of the campus, since the built campus environment is not contributing to the impression of being available.

## 4.5. Meiji University – Nakano Campus

2016-04-08

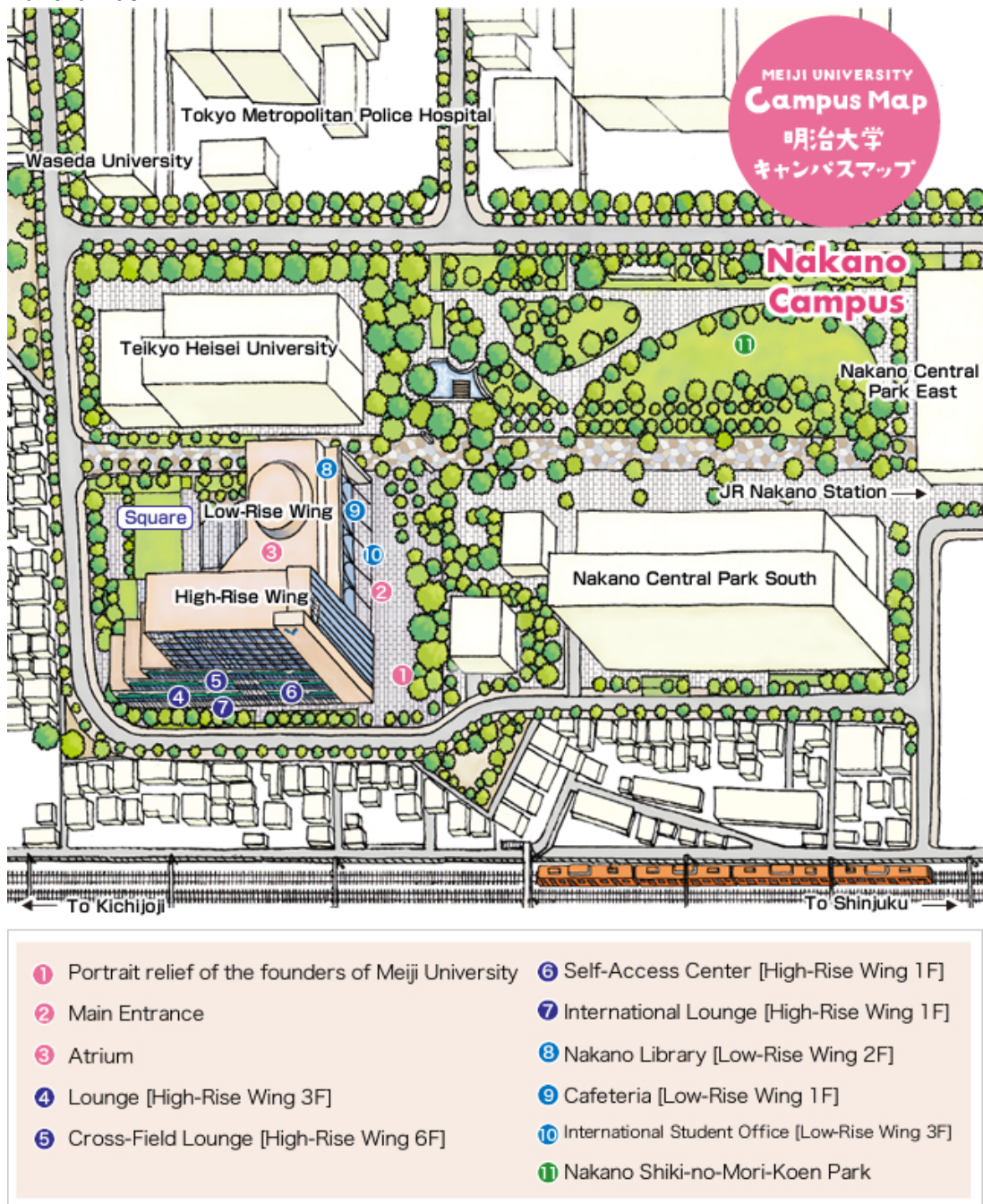


Figure 11. Nakano Campus map. (Meiji University, 2016)

<i>Campus established</i>	2013
<i>Number of students</i>	2500
<i>Classification</i>	<i>Satellite Campus</i>
<i>Keywords</i>	<i>Dense campus, Vertical campus, Shared space</i>



**Picture 29. Outside Nakano station. Authors' picture.**

Meiji University has four campuses and one of the newest campuses is Nakano campus, which opened in April 2013. The campus is placed about 5-8 minutes by train from Shinjuku, one of the most vital transportation hubs in Tokyo, see picture 29. The closest station is Nakano station a few minutes' walk from the campus and this is also an important station for commuters. Nakano is on the verge where the suburban area meets the urban area in Tokyo, see picture 18. Here people get off their bikes and switch to trains, because it is not as easy to bike in central Tokyo.

On the way to the campus there are many trees old and new, and also a small park just next to the campus. The area around the campus is a public area and both people and students often utilize the park close to the campus and visit the food trucks placed just outside it, see picture 30. Right between Meiji- and Teikyo Heisei University is a very busy promenade leading towards Nakano station. The promenade, campuses and office buildings are providing the local services and restaurants with a steady user base. Contributing to a very broad assortment of services available close to the campus.



**Picture 30. Food trucks on the promenade. Authors' picture.**

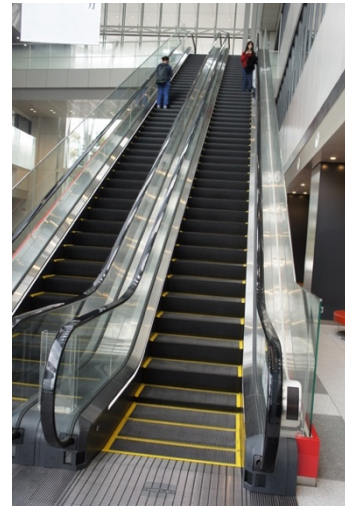


**Picture 31. Nakano Campus building from the square. Authors' picture.**

The Meiji Nakano campus is characterized by being focused to just one building, see picture 31. The campus itself consist of one building divided in to two wings. With cafeteria, library, offices, and an atrium in the low-rise wing. The high-rise wing enclose the rest of the functions needed, such as a lounge, offices, laboratories as well as areas supporting teaching and learning. Many laboratories and common spaces are shared by the students and researchers, rationalizing the space usage. There are even some evening courses for the general public improving the utilization even more.



**Picture 32. Entrance level lobby. Authors' picture.**



**Picture 33. Escalators. Authors' picture**

On the Entrance level there is directly inside an open lobby and an information area for visitors and students, see picture 32. There is also a store, student cafeteria and library, supporting the study areas and ensure that students will not have to leave the building for lunch on a rainy day. The lobby also serves as an inherent meeting place for people at the

campus as a cause of the conspicuous flow of people. Extra effort has been invested in the lobby for making it a social meeting place.



**Picture 34. Indoor atrium connecting the floors. Authors' picture.**



**Picture 34. Indoor atrium connecting the floors. Authors' picture.**

The Elevators is not the only way for travelling vertically in the building, escalators are strategically placed in between certain floors making it easier getting from one laboratory or lecture hall to another, see picture 33. By creating stronger links between certain floors the building is divided into sections with different focus areas. The lobby is the most obvious section, with a clear focus on spontaneous encounters and planned meetings. Higher up in the building an atrium opens up and add a visual connection between multiple floors, see picture 34. The connection accomplishes in creating an inspiring setting, and effectively separates itself from the plainer and more efficient areas and hallways, see picture 35.



**Picture 35. Lounge at the top floor. Authors' picture.**

Placed at the top of the campus is a lounge providing with a great view and a good place to relax, study and have lunch, see picture 36. The rooftop terrace connected to the lounge is a unique feature the students enjoy. There is no restaurant here, only microwaves and vending machines, forcing the users to go to the first floor if they want to buy an adequate lunch. One advantage of having a vertical campus is certainly the proximity an accessibility to various utilities. In an area as Nakano there is also a great variety of merchandise nearby the campus.



***Picture 36. Walkway in between Meiji- and Teikyo Heisei University. Authors' picture.***

The Nakano campus is a vertical campus but it is not that dissimilar from a traditional campus as one could think. Same functions are required and the possibilities are similar. Functions can be put closer together in order to create synergies, but this requires careful planning where far from all functions benefit from being put close together. Nakano campus seems like it has succeeded in making use of the spaces and sharing them in a deliberate manner. The main difference from a more traditional campus is the density. Functions are piled on top of each other reducing the use of land and incite more sharing of spaces. Sharing spaces does not come without any friction, but it might also spur some new ideas and creative thinking. With two University buildings so close, sharing spaces could be the next step, see picture 37.

## 4.6. Meiji University – Surugadai Campus

2016-04-08



Figure 12. Surugadai Campus map. (Meiji University, 2016)

Campus established	1886
Number of students	8000
Classification	Main Campus
Keywords	Urban campus, Vertical campus, Public space



*Picture 37. Liberty Tower. Authors' picture.*



*Picture 38. Canteen on the 17<sup>th</sup> storey. Authors' picture.*

Surugadai Campus is located in the Kanda Surugadai area, which is the traditional home of Meiji University since 1886. It is a dense urban area of Tokyo where several train stations are within walking distance. The area is defined by many public institutions such as schools and hospitals. Since this is downtown Tokyo almost any thinkable services needed is within walking distance. Therefore, the campus itself does not need to maintain all services needed. For instance, hotels and shopping malls abound in the area.

A major part of the campus is condensed on a small area. Two high rise buildings called the Liberty Tower and the Academy Common, constitutes the major part of the campus. Both of them built for the 120<sup>th</sup> anniversary of the university. Although being part of the same reconstruction program and being after one another, the two buildings bear little resemblance to each other.

Most of the student related activities are held in the Liberty Tower, which is a landmark for the Surugadai Campus, see picture 38. The building makes a majestic impression and looks like it is made to withstand the test of time. It is clearly

portrayed facing towards the east, whilst the back- and south sides are more secluded. On the entrance level there is a large lobby with high ceilings and an information desk. In the south end of the building is the library providing places to study. By excluding restaurants and convenience stores from the entrance level, the building generally only appeals to those visiting the library or associated with the university. The intention of placing the canteen 17 storeys up is undoubtedly to separate it from the public, making it more connected with the students and employees rather than being a public restaurant, see picture 39. This building have a clear focus on traditional teaching through lectures, where classrooms pervade almost every floor in a practical and effective approach. The Liberty Tower is an exquisite example of a building contributing to the identity of the university on the outside without being open to the public. On the inside the lobby and library is quite impressive, but the classrooms and hallways up in the building are more plain.



**Picture 39. Academy Common building. Authors' picture.**

The Academy Common is in many ways the opposite of Liberty Tower, but contribute with other qualities to the Suragadai Campus, see picture 40. The glass façade mirrors the surroundings making the building less eye-catching than the Liberty Tower. However, on the inside there is a more much more inspiring and representative environment than in the Liberty Tower, see picture 41. The Academy Common provide with several functions that opens the campus and invites people inside to an inspiring atmosphere. Meiji University Museum and Aku You Memorial Museum are important for attracting



**Picture 40. Inside Academy Common. (Meiji University, 2016)**

people to the campus. The Academy Common provide with several functions that opens the campus and invites people inside to an inspiring atmosphere. Meiji University Museum and Aku You Memorial Museum are important for attracting

the public to the campus. In the entrance level there is also a café and a supermarket that has stationaries and food. There are also opportunities for the general public to take courses on evenings and weekends provided by the university through Liberty Academy which resides on the 11<sup>th</sup> floor.

Other parts of the Suragadai Campus were not as prominent as the the Academy Common and Liberty Tower. There is a strong presence of Meiji University in the area, and it becomes even stronger by having an icon as the Liberty Tower making a great display of the university. The Academy Common is much more focused on being open and providing a representative environment for the public to visit. There are many spaces that is plain and efficient, but those are mostly seen by the students and employees of the university.

## 4.7. The University of Tokyo – Hongo Campus

2016-04-08



Figure 13. Hongo Campus map (The University of Tokyo, 2016) Edited by the authors.

<i>Campus established</i>	1876
<i>Number of students</i>	12000
<i>Classification</i>	Main Campus
<i>Keywords</i>	Historical campus, Consistent Architecture, Academic Campus

Tokyo University Hongo Campus is located adjacent to Ueno park. Because of its central location it has multiple train stations within a few minutes' walk, and is therefore easily accessible by public transport. The campus consists of three sections: Yayoi, Asano and Hongo. Hongo is the largest and most public section of the campus, containing education, research, but also several historic buildings and places for the public to visit. The Yayoi section has most of the sports facilities and hosts agricultural science. Asano is the smallest section which mainly accommodates engineering and research.



**Picture 41. Regulating with property tax. Authors' picture.**

The Hongo campus is large enough to have all the vital functions within the premises. It also provides with vital functions for the surrounding city, like a University Hospital, library, museum, green areas and attractions for tourists. The government exercises control over the properties on the campus by regulating property tax. Until a couple of years ago no commercial businesses were allowed on the campus at all, today they are allowed but must pay a raised real estate tax. Only large businesses like Starbucks can afford the high property tax set by the government, see

picture 42. Outside the campus several small businesses are supported by students and employees of the university for subsistence.



**Picture 42. Akamon gate. Authors' picture.**

At the larger entrances of the campus are gates and the most famous one is Aka mon – which means red gate, see picture 43. The Akamon gate was constructed in 1827 and was declared a national treasure before the Second World War. It is considered a vital piece of history and many travel to Hongo Campus in order to witness this landmark. The red gate is occasionally misconceived as the main gate, which is placed on the same street a couple of hundred meters north of this gate.

In between the main gate and Akamon gate is the Tokyo University Communications Centre which is a connection between the society and University. The university's research is exemplified through different kinds of products invented at Tokyo University. It demonstrates what the university bring to the society in a direct way. In the shop visitors can buy souvenirs and to receive information about the university. It is strategically placed in between the two largest entrances and is natural place for visitors to stop by.

The Great Kanto Earthquake in 1923 destroyed most of the old brick buildings in the Hongo section and many historical buildings were lost. During a reconstruction of the campus most of the brick buildings was rebuilt and is now reinforced with concrete in order to withstand future earthquakes. Yoshikazu Uchida was responsible for designing the new buildings and made a lasting impression on the campus with his distinctive style known as "Uchida Gothic". The most famous buildings by Yoshikazu Uchida on Hongo campus are the General Library and the Yasuda Auditorium.



*Picture 43. Yasuda Auditorium. Authors' picture.*

The Yasuda Auditorium which was completed in 1925 and is a fitting example of "Uchida Gothic" architecture, see picture 44. From the main gate leads an avenue of gingko trees straight towards the auditorium. In front of the building is a small park which makes it a typical inspiring and representative part of the campus. The red brick buildings all share this style and gives the campus a convincing and consistent academic identity.



**Picture 44. Built on top of another building. Authors' picture.**

Although most buildings have a red brick façade, there are some exceptions. Some are preserved historical buildings and there are a few modern buildings that disrupt the otherwise uniform architecture. One building close to the Yasuda Auditorium was built on top of another building using huge pillars to bear the load, see picture 45. Utilizing the land more efficiently, but surely at a greater financial cost.

Sanshiro pond is located in the middle of the Hongo Campus and is a pond that has been preserved since 1638, see picture 46. The garden around the pond serves the purpose to provide with a lush, green, soothing haven to retreat to on hot summer days. It serves as a social meeting point where people typically can bring their lunch or just relax. Whilst the garden around Kaitokukan in the south of the campus is off limits for everyone but distinguished guests, this garden is for everyone.



**Picture 45. Sanshiro pond. Authors' picture.**



***Picture 46. Uchida Gothic architecture. Authors' picture.***

The history of Tokyo University has a clear connection to Hongo campus, and the public in general also associate Hongo with Tokyo University. It is a classical academic campus in the middle of the city and it accommodates several of historical landmarks, some of which the university has built. The Hongo campus has a clear connection to the past through various historical elements, even though much was destroyed in 1923. It is also a campus with a clear academic character with mostly red brick buildings and Uchida Gothic architecture, see picture 47.

## 4.8. Hokkaido University – Sapporo Campus

2016-04-12



**Figure 14.** Sapporo Campus map (Hokkaido University, 2016) Edited by the authors.

<i>Campus established</i>	1902
<i>Number of students</i>	17000
<i>Classification</i>	Main Campus
<i>Keywords</i>	Green campus, Large areal campus, Open public space



**Picture 47. Promenades and open public spaces. Authors' picture.**

Hokkaido university is established all over the northern island Hokkaido in Japan, but most of the university's activities are located at Sapporo campus in the city Sapporo. Almost the whole city is planned in a grid pattern, but Sapporo Campus is one of the very green areas that deviate from this pattern, see picture 48. The campus is positioned a few minutes' walk northwest from Sapporo train station in the middle of the city. South of the station is a more commercialized area, whilst the north side of the station is best described as a residential area. Because of the expansion of the city Hokkaido university got relocated in 1902 to the present location. The main gate is located in the southeast part of the campus which is the gate visitors mostly use.



**Picture 48. Visualizing energy usage and electricity generated. Authors' picture.**

On the left hand side of the main gate is the information centre, which aims to provide information for tourists, visitors, employees and students. It has a façade made out of wood in order to blend in with the forest, together with photovoltaic panels and energy conserving systems this building also aim to visualize the aspiration of a sustainable campus. This is also visualized by a screen showing the buildings current use of electricity and the energy exported from the photovoltaic panels, see picture 49.

The campus is divided into three local units which is divided by green areas, these areas help with managing rainwater, produce fresh air and provides with parks highly valued by the community. People come to the university to go for a promenade on the avenues, and children play on the open public spaces. The parks provide with a social meeting place for the inhabitants, since these kind of environments are hard to find elsewhere the city, see picture 48. In cooperation with the city these green areas are to be preserved and the unexploited space in the north part of the campus are to be used for new buildings. Through the campus runs Sakushukotoni river, which is rich in biodiversity but was dried out over 50 years. The local government helped the university restore the flow in the river that flow through the campus in 2004.



**Picture 49. Bicycles on campus. Authors' picture.**

Much of the infrastructure in Sapporo was created for the Olympic games in 1972. Public transport system was refined through development of a subway system. During this time a road tunnel was built under the campus in order to deal with the increased traffic. On the campus is most traffic banned with exception for transports and the shuttle bus taking employees between the north and the south parts of the

campus. The campus is practically surrounded with subway and train stations, but they are all within a 15-20 minutes' walk. Since the streets are wide and the city is reasonably flat, bicycles is very popular in Sapporo and on the campus as well, see picture 50.



**Picture 50. Model dairy farm. Authors' picture.**

Buildings on the campus does not share the same architectural expression, are built in different styles and during different times. Still it is easy to know what is part of the campus since there is a wall around almost the whole area. Some of the oldest buildings have been preserved since 1877 and the oldest are designated as national important cultural assets. The model dairy farm is located in the north-eastern part of the campus and contains the oldest buildings on the premises, see picture 51. The buildings were inherited from Sapporo Agricultural College and the same college is now a part of Hokkaido University. Next to the Model farm is the Community Hall, that can be used by both the university and stakeholders from outside the university.



**Picture 51. CRIS building on the north side of the campus. Authors' picture.**

Also in the northern part of the Campus is the newer buildings where the campus is mainly being developed since 2010. The architecture is more modern and the glass and concrete finish is blend between academic and business, see picture 52. The buildings show a more modern and technical side of the university, and the area could develop into an inspiring and representative part of the campus in the future. One example is the

CRIS building, which is built in order to coordinate research with both governmental funds and partnerships with the industry. There is a lack of restaurants and cafes, stating the underdevelopment in the area. The buildings are housing research and most are related to nanotechnology and bioscience. A company doing research in medicine has a lab and office facilities on the campus and there are initiatives in bringing more companies to the campus for increasing collaboration with the industry.

The middle and south parts of the campus are generally expressing a more academic side of the university. There is little coherency in the types of façades and style of the buildings, but the academic impression connects the buildings. Most of the buildings are plain and effective, but some bring a little extra. Hokkaido University Museum is definitely one of the buildings adding to the academic atmosphere, see picture 53. It is a museum that demonstrates the research done at Hokkaido University and is an attraction for local citizens and tourists. Contributing to the transmission of knowledge to future generations, current students and to the society.



**Picture 52. Hokkaido University Museum. Authors' picture.**

Efforts are made in order to keep Sapporo campus open to the public and to attract visitors in order to show off the university. Preservation of old buildings, green areas and avenues is central to the university and coincide with the interests of the city. Public transportation is somewhat inadequate but not bad, especially since the city is so suitable for bicycling. There is a distinct academic atmosphere on a major part of the campus. Many of the historical and representative buildings are scattered across the campus and more plain and efficient buildings are squeezed in between. This results in the absence of an area focused on being truly inspiring and representative, although having many kinds of attractions. The university does integrate itself very well into the city by contributing with functions desired by the general public. Sapporo campus is a vital part of the city and the openness towards the public is mutually beneficial for the university and the city.

## **5. Interviews**

In this chapter, information collected through interviews in Sweden and Japan is presented. The material is clustered according to discussed subjects and presented as comments connected to each interviewee. Opinions specifically regarding future development of Campus Lindholmen are presented under the last heading in this chapter. The first paragraph of each heading is a summary of the discussed subject that follows.

### **5.1. Place identity and branding**

It takes time to build a place identity. When elaborating on place identity and branding of facilities, the general opinion is that original characteristics should be preserved whenever possible. If there is no need for preservation, new innovative ways of planning should be prioritized instead. Original strengths of a place could be both physical and social. For instance, natural elements such as cherry trees or constructed elements such as historical buildings can generate certain identities that are important to maintain. On the other hand, traditions or certain types of education and research could generate certain characteristics that also become an identity in many cases. Established identities are difficult to change, but when there are possibilities to create new environments the identity can be more actively chosen. This is the case in new-developed campuses, where sustainable buildings or forward-thinking education could be used as identities. Nevertheless, it should not be forgotten that a balance between the different interests in a place must be established to fully succeed in creating a place identity that could be branded truthfully. For instance, in Campus Lindholmen original characteristic such as the closeness of water and business atmosphere should harmonize with academic requirements and openness to the society.

Appealing design can be needed to create identity through buildings. The solution can be to either use simple frame but exclusive façade materials or use an exclusive shape but simple façade materials. Buildings that has none of these qualities easily becomes unattractive (Fischer, 2016).

When establishing an identity, the surrounding environment is important. At Tokyo Institute of Technology, the area is influenced by cheery trees that also give the university its main identity. An established identity needs to me maintained and in this case it is about taking care of our cherry trees that only lives for 65 years and then need to be exchanged (Yasuda, 2016).

To me, Lindholmen is an area with a strong identity of companies linked to Volvo, but also facilities for education. The campus has a more serious atmosphere than campus Johanneberg and has quite modern facilities, but it also feels more creative because of the inspiring environment next to the water (Fischer, 2016).

It is important to illustrate sustainability initiatives by showing energy efficiency information in buildings, and this could also be used when marketing buildings. It could be a label that people recognize and be used by both owners and users. The problem is that many Japanese tenants do not see the extra value supposed to be generated through this labelling, but I think this about to change. For instance, universities today need to report energy consumption each year and make plans for reduction, which could be a step to increase the incentives for more efficient buildings (Ohno, 2016).

A building that connected campus with science park, both physically and symbolically, was needed and Gert Wingårdh did the design. The solution was Kuggen, a circular building which creates no backsides and by that faces all surrounding buildings in an effective way. We designed the building in accordance with Chalmers' vision for a sustainable future and we made it as sustainable as possible at that time, for instance by installing technological solutions for sun screening and made the installations visible. Kuggen has become an iconic symbol for Chalmers, Lindholmen and Gothenburg, but unfortunately it has not been the physical meeting place we hoped (Hedström, 2016).

Branding of buildings can be done by giving them a name, emphasize qualities or highlighting architecture. Most common is identity creation through the companies situated in the building, that the building is called the same name as the company. When a name has been accepted it is hard to change, therefore, it is sometimes more efficient to name a building by its qualities instead of its businesses (Fischer, 2016).

It is also possible to brand an entire area or district, but it requires more effort because it takes long time to influence or change peoples' view of a district. The identity of an area takes long time to develop and it is often connected to people's feelings, experiences and prejudices. Moreover, for many areas I have experienced differences in opinions between people working within the area and people from outside, which can be another difficulty in creating the best district identity. When talking about Lindholmen, a part of Gothenburg still associates it with shipyard activities while an increasing amount of people associate it with growth, science park and future development. In this case, I believe every building project is important to strengthen the chosen identity (Fischer, 2016).

The identity between different campuses can vary within the same university. Tokyo Institute of Technology has three campuses and they are mainly characterized by their educational levels. For instance, one has more research, one has more undergraduate education and one is a high school. I also believe that technical universities sometimes are more modern and experimental by their nature and therefore generate certain identities. Especially when the modern spirit is illustrated in the buildings, which is the case here in Ookayama (Yasuda, 2016).

Many university buildings were constructed in the 1920th and 1930th, especially at Hongo Campus, which gives it a historic atmosphere. These old buildings need to be protected because during the years some of them have been destroyed, and the ones left need to be more prioritized in the facilities management. In addition to the buildings, it is the functions that generate the identity of each campus, and the functions are mainly decided by level of education. (Yashiro, 2016).

Keio University was established 150 years ago by Yukichi Fukuzawa, which makes it the oldest university in Japan. Today we have six campuses spread over the Tokyo area. Shonan Fujisawa Campus is the youngest campus and is characterized by lots of freedom compared to the older campuses, because the absence of old buildings needed to be preserved. The campus was built 25 years ago and has an experimental atmosphere, as well as connections to the nature through the surrounding forests. It is important for universities to lead the development towards the future by showing the value of innovations to the society. By attracting good professors we hope to keep this identity of innovative creation (Kobayashi H. , 2016).

Tokyo University's zero energy building projects are both for energy efficiency reasons and for branding reasons, to raise awareness among people by installing visible control systems for heating and cooling (Yashiro, 2016).

The identity of our campus is mostly connected to preserving all historical buildings and protecting the green areas. Hokkaido University has a long tradition and it is important to be both local and global when developing the campus. To make society aware, we need to market the identity and attracting people, but at the same time we should not forget that people need a quiet environment to study. One way to manage this interface is by controlling which areas visitors may use, but also which areas students may use for spare time activities outdoor, in order not to disturb the one who study (Osawa, 2016).

The Information centre at the university entrance provides with historical information as well as ongoing research. It also contains a souvenir shop for both internal and external stakeholders of the university (Yokoyama, 2016).

Meiji University has four campuses and Nakano Campus is the newest. The campuses are mostly divided by academic level. At the Nakano Campus we have an English track that enables for exchange students, gives the campus a more international character. The students can learn from each other about different cultures. Furthermore, the architectural students do projects in other countries as part of their education. We can get funds from the government to attract more international students (Kobayashi M. , 2016).

When managing the identity of Campus Lindholmen, the original strengths should be considered. Chalmers already has a strong brand and historical roots, but at Lindholmen the multicultural environment and a sense of future could be more refined. For instance, maybe some facilities could be used for education to other groups in the society (Hägg Knape, 2016).

Stefan Bengtsson, the President and CEO of Chalmers, believes that Chalmers has a narrow recruitment base that do not reflect the society. It is important to encourage the interest in science and technology. Maybe some kind of technological toys could be one solutions to make children interested in these fields (Hägg Knape, 2016).

Some people think the presence of high schools at Lindholmen weakens the university identity, but other people believe the younger students from the high schools should be invited even more to the Campus area. I believe the academic university environment should be as open as possible to the public and to students from different ages, for instance by construct a more extrovert student square and maybe have employees that can help attracting people to the site. This could also be a place where Chalmers illustrates the activities going on within the university. There is a unique opportunity of doing this at Campus Lindholmen, because of the already achieved openness. However, the students and teachers within Chalmers must accept the chosen campus direction, which requires cooperation and responsiveness (Hägg Knape, 2016).

There has been some concern on what kind of campus Lindholmen is. It does not have the strong academic identity as Johanneberg, making it less appealing for some moving to Lindholmen. It is important to make a clear choice on what route to take, mainly in terms of either increasing the association with the industry or increasing the appearance of the academy. There should be an advantage for the academy to be close to the industry, in particular if the university departments could gain from interacting with companies working in the same sectors. Some departments already work close to the industry and

would prefer to be placed closer to them physically. Others work with more theoretical research rather than applied research, and do not want to be mixed with the industry (Söderberg, 2016).

At Campus Johanneberg, Chalmers will always come first, but here at Lindholmen the industry is allowed to have a greater influence. I think that this is a good thing for Chalmers, who should take advantage of the identity differences between the two areas (Wahlberg, 2016).

## **5.2. Attractive environments**

Attractive places can be created in different ways depending on which aspects that appeal to people, sometimes depending on factors connected to internal or external stakeholders. In Japan, several opinions address green areas and open spaces as the most attractive factors for visitors. The dense surrounding urban landscape does not provide with enough parks, but in many campuses this asset is preserved. People walk their dogs or uses the campus as destination for kindergarten excursions which creates an appealing mix of people. However, the visits need to be conducted in a controlled manner for not disturbing the ongoing educational activities. When it comes to internal attractiveness both Swedish and Japanese respondents believe it to be important to attract students by modern facilities and technical equipment. Here, visible sustainability and environments that encourage innovation can be effective ways of attracting students. It is also important to provide the students with facilities where they can be involved in projects and feel belonging, such as Student Union Buildings.

In order to create an attractive environment on Lindholmen the focus should be on what the students desire and want. The study environment should be a support to the more formal learning environment. The places to study outside the classrooms are very important and should be well equipped, for example electricity outlets for charging computers and cell phones. The basement and the first floor in Kuggen will be modified to a library, study areas and group rooms. If Lindholmen could offer more spaces like this, Campus Lindholmen would be even more attractive to students. A new Student Union Building could also be a step into the right direction (Hägg Knape, 2016).

Residential houses surround the Ookayama Campus and people live very close to the campus boundaries. The main reason visitors enter the campus is to witness the cherry trees blossom very noticeable if you visit the campus during the right time. Part of the campus actually feels like a park and with no cars, which is why people walk their dogs and kindergartens use it for excursions. However, sometimes the visitors can be too many which may lead to lack of toilets and sound levels that disturb the education. Visitors mainly stays in the area of the cherry trees but we are planning do some limitations for where visitors are allowed to go (Yasuda, 2016).

At the time Lindholmen Science Park was built there was a huge risk because there were no tenants ready to move in. This has changed and the area is going in to a new phase where the market, businesses and Chalmers recognizes the value in the area. However, there are no guarantees that Lindholmen will be as popular in 10 years' time, as it is today (Andersson, 2016).

The reason the company Ericsson has office at Lindholmen is because the students are there. They want to be close to the students to secure recruitment needs, which is the largest driving force to having science parks in close connection to academy. It is all about attracting people and when it comes to young people the modern atmosphere at

Lindholmen and the position close to water helps the companies with recruitment. The added-value of working at Lindholmen attracts people which is an advantage to the companies situated there (Hedström, 2016).

In the weekends, many visitors and families visit the Nakano campus because of the open areas at the university in contrast to the surrounding dense city (Kobayashi M. , 2016).

I got the mission from Karin Markides, the former President and CEO of Chalmers, to investigate how both campuses should be equal attractive and at the same time keep their individual characteristics. The background is the resistance from departments in Johanneberg to move to Lindholmen, because Lindholmen is not perceived as sufficiently academic (Hägg Knape, 2016).

In order to integrate Lindholmen into the city the public transportation is very important. It is also vital to create an attraction here that appeals to people in Gothenburg, but also beyond the city limit. Today the selection of restaurants and shops is very limited, and not very appealing at the evenings, a greater assortment could draw people to the area (Wahlberg, 2016).

The type of business determines which location the companies' facilities should be in. For instance, the demand can change whether the business is extrovert or nor, or if the business is in need of recruitment. In the case of Chalmers, it is import to recruit both students, but also employees within research and development must be attracted. To make it attractive to the academic world and to within Chalmers it is important to move all levels of education within the same field when expanding the educational facilities. Both Bachelor's and master students along with researchers should be represented within the same area of education and by that keep whole departments at the same campus, and not split them up between Lindholmen and Johanneberg. Chalmers should be better to communicate that the university has two high quality campuses (Fischer, 2016).

The Sapporo campus is divided by green areas into three local units, which is a layout we aim to preserve in the campus planning. The green areas serve in correspondence with the local community, where people go for a walk and children use it as a playground. The university hospital, located in the eastern part of the campus, also serve as a vital connection to the community. Sometimes the campus is open for a farmer's market and almost every day there is a symposium in the community hall (Ozasa, 2016).

There is a certain resistance within Chalmers to move to Lindholmen, despite the many good qualities here. Coming closer to companies like Volvo, Ericsson and Getinge, but also the smaller consultant firms should be a great incentive for Chalmers to move departments here (Wahlberg, 2016).

In dense urban landscapes there are much waste energy, but at the same time there are possibilities for energy efficiency because the energy supply can be more co-used than on the countryside. Besides, in cities public transportation can replace vehicles which is a more efficient way of transportation. Nevertheless, the ambition in cities should be to create urban atmospheres where people could walk or bicycle in more. It is a challenge to create physical conditions for this and to provide with air quality that is good enough, but I think it can be possible in greater extent than today. When building new roads, some space could be reserved for biking and walking, as an example of attracting people by creating more sustainable transportation (Ohno, 2016).

Until Gothenburg has decided how to solve and optimize the public transportation across the river, Lindholmen will stay a satellite area. A lot of large infrastructure projects, for instance bridges and other overpasses, would be needed to reduce the river barrier in order to move the city centre. The ropeway is a very good initiative that I hope will be completed, but even more initiatives are needed to succeed to increase the activity at Lindholmen and make it attractive for a longer period of time, because compared to the city centre Lindholmen is still quite screened off from the rest of Gothenburg (Fischer, 2016).

The Shonan Fujisawa Campus is located in a suburban region and the transportation possibilities are quite few. There are plans for a railway station that might be built in the future. The isolation gives the campus a certain atmosphere, sometimes because students stay here all day and night (Kobayashi H. , 2016).

There is an idea to exchange properties between Chalmersfastigheter and Älvstranden Utveckling AB for mixing Chalmers into the area and the campus into the city. This would integrate Chalmers more with the city, making the campus more open to the public. From our side we would appreciate to see an open and creative campus that provides with meeting places (Andersson, 2016).

### **5.3. Initiatives for sustainability**

Initiatives and measures for contributing to a sustainable society can be done through both preserving existing strengths and through finding new ways of innovation. A distinctive general opinion is that the nature, both concerning vegetation and water, should be protected when it is possible in the campus environments. Other ideas of sustainability concern the preserving of historical buildings or the use of modern building methods. Nevertheless, science and new technologies are needed to make the society evolve sustainably. Successful examples used in campus environments are solar panels, sun screening panels, and sophisticated heating and cooling systems. It is also stated that new technologies need assistance from the academy to succeed. One of the most significant aspects to consider, is the importance of showing sustainability and by that encourage further development and create awareness. For instance, through a sustainable campus office, a university information centre for visitors, or digital displays showing students and visitors the energy use of the facilities.

Today we have a sustainable campus project, with the goal to reduce the energy use by replacing old and ineffective buildings with newer and more effective ones. Some parts of the project can be subsidized through lower taxes because of environmental advantages it may generate, but most important are the economic benefits from lower electricity costs. It is very important to work with energy efficiency in the university, because many buildings consume much energy such as hospital facilities and laboratories. To lead the development, we have pilot projects called “zero energy building projects”, where we use special heat pumps and control systems for heating and cooling. In Japan, more energy is needed in summertime than wintertime because cooling consumes much energy. Furthermore, the systems are often ineffective and become much more efficient with newer systems for both heating and cooling that runs on water heated or cooled by groundwater. Still, we need all stakeholders within the university to work together with sustainability measures and make energy savings more integrated in all campus planning as well as in each department and faculty (Yashiro, 2016).

The advanced energy management system in the KOMCEE-building in Komaba campus is making people aware of what is happening and how much energy is used. This is a very good way of displaying energy usage (Asao, 2016).

One of the most important steps to a more sustainable society is to change the demand by making people more aware of the energy consumption. By rationalizing the demand and by using already existing technology within buildings and infrastructure, the electricity use can be decreased. People must be encouraged to act correctly in terms of using the buildings in the most efficient ways, for instance by using more efficient lightening (Ohno, 2016).

To enable a sustainable society, the energy demand must decrease by spreading the sustainable approach and encouraging people to care about the environment. In the university, this awareness work is important both internal and external (Ikegami, 2016).

In the Environmental Bureau at Tokyo Metropolitan Government we introduced several sustainability policies, for instance the Tokyo Cap-and-Trade which is Japan's first mandatory emissions trading scheme and the Green Building Program which is a building environment plan designed to clarify environment-friendly approaches to buildings. One goal of the bureau is that by 2020, 20% of the energy should come from renewable sources. Still, I think the goal could be aimed even higher, maybe around 40%. It should be possible if an efficient combination between increased renewable energy is combined with a reduced demand on electricity (Ohno, 2016).

At Keio Shonan Fujisawa Campus, we focus much on creating sustainable environments through an urban approach. We also try to implement innovation and create global collaborations. We try new methods for building, for instance "digital fabrication" by using laser cutters to produce wooden blocks that can be easily assembled. Another innovative method that in fact originates from old Japanese building methods is "Creative destruction", a flexibility method in which each house are torn down and rebuild with the same materials every 20th years (Kobayashi H. , 2016).

Efforts are being made in order to keep the campus development sustainable. For instance, keeping space open to the public, preserving old buildings and the popular avenue running through the campus. The control of water is also an important question for the campus environment and farming on the campus. In collaboration with the municipality the river which flows through the campus will be purified and connected to another river outside the campus. This will create an appealing environment, handle the rainwater efficiently and provide the farms with water. The areas around the river serves as a host for biodiversity and is a popular place to visit. Nature and culture preservation is also important for tourism. The park and natural areas will be utilized but the old historical buildings are harder to make use of (Ozasa, 2016).

The area of Ookayama has a history of green areas and we have tried to preserve these characteristics in a sustainable way when developing the campus. The plan has been to link the surrounding green areas to the campus by green passages that runs through the area and combine it with cherry trees to maintain the identity. A sustainability initiative in the campus is the solar panel experimental building and another is one building on which we have put a new façade that helped reducing the energy use by 10% through efficient sun screening (Yasuda, 2016).

One project at the Office for Sustainable Campus is the development of the Assessment System Sustainable Campus that can be used to internally grade the sustainability of a campus by Gold, Silver and Bronze. Several universities globally have used this system to evaluate their facilities management. The grade can be used to promote the university. I have also worked with defining the “sustainable campus” and created an illustration of this (Ikegami, 2016).

Tokyo Institute of Technology has a centre for providing information about environmental issues, for instance energy consumption and facts about photovoltaic panels (Kawashima, 2016).

Home management systems and “Internet Of Things” can reduce the energy costs for Japanese households with 10% per year. We want to spread these types of systems to include more in society for coordination purposes. It can be applicable in caretaking and healthcare, as examples. All people have different behaviour and day rhythms, especially when it comes to people’s homes. If we could use systems, like the one in the living lab, in greater extent we could reduce the energy consumption in society. Although, to be able to improve and develop we need to exchange experiences on living labs and new techniques (Yashiro, 2016).

Lindholmen Science Park works with influencing people to leave their cars and use public transport. All businesses here work with sustainable development in some way. The hardest is to make the area socially sustainable. Perhaps Chalmers needs to take a larger responsibility and work harder with integration for instance (Wahlberg, 2016).

Resilient, Responsive Redesign of Place is a project I have been involved in, that is aimed to help building houses to people affected by natural disasters. We developed the concept in northern Japan after the Tohoku Earthquake in 2011. We learnt the local people to build houses and furniture in accordance with our drawings by using leftover plywood. We have also tested similar projects in other countries, for instance Myanmar, Nepal, Philippines and Kongo. Sometimes we have used bamboo or other wooden materials instead, but the main principle is that the locals can build the houses themselves and also maintain them after we leave. Students are part of these projects and I believe it to be very enriching to their development, especially when the project is done in another culture (Kobayashi H. , 2016).

Renewable Energy Institute is a research institute working mainly with developing the production and demand of renewable energy. We look at both energy supply and energy consumption, mostly in terms of electricity. We are focusing on solar and wind power, where solar is most developed and wind is growing. Also hydro energy is interesting, but Japan is unfortunately not suitable for building it. Solar power is built both on rooftops and in mega solar power plants which were highly expanded after the Fukushima accident. Mega solar power plants need much space though, and I think the rooftop placement will increase again, partly because all houses are connected to the grid which makes it possible to sell the redundant electricity (Ohno, 2016).

#### **5.4. Interactions with business and society**

Collaboration with stakeholders outside the academy is important to secure continuing progress and enable flexible facilities. At Chalmers, projects including university and industry are common but can still be developed. In the Japanese universities, this is less common because campuses have traditionally not been a place for external businesses. Another way to interact with the society is by mutual projects, especially because the academy need to encourage the society to develop sustainably. Transboundary projects are also important for the students because the society can provide with training in solving real-life tasks. In terms of integrating academy with industry, the view in Japan is about to change and possible synergies through interaction of academy and business are becoming more lucrative for several universities. One example is flexible facilities that can be adapted to fit both education and business. The budgets for universities are shrinking in Japan as a result of decreasing population, and some university facilities may need to be used for other functions than education. In such cases, a possibility is to rent out office spaces to external stakeholders that could benefit of being close to the university. This is a view that is shared with Chalmers, where renting out offices is an established way of increasing flexibility. If a successful result of collaborations is to be achieved, practical issues need to be solved by controlling which spaces are intended for these projects and keep other spaces more private. Enabling innovation though synergises between academy, business and society is an important role of universities, according to some opinions.

The connection with the industry is very noticeable at Lindholmen, where many company employees go to the restaurant in Lindholmen Science Park for lunch, as an example. Some companies are here only because of the operation of Chalmers and Gothenburg University. It would be very giving for the area if Chalmers becomes more active on Lindholmen, because many businesses would welcome this (Wahlberg, 2016).

We have some experiences of living labs in the Komaba Campus, but with no people living in it. One idea is to let companies that manufacture home management systems promote their products by using the living lab. Different companies create the systems, which in some ways are good but in some ways inefficient because of incompatible systems. However, the university tries to persuade the companies to simplify the systems in order to contribute to an interoperable society. The first step in the process is to install new technologies. The second step is to invite retailers to test the installed equipment in reality. A parable can be drawn to smartphones, where several companies develop applications that are compatible to each other. It is valuable to both the developers of the systems and to the retailers to use the living labs for testing equipment. Furthermore, it enabling unique marketing if people come and test the products in reality (Yashiro, 2016).

The first step in introducing business through Lindholmen Science Park was by constructing the building Navet along with surrounding facilities. The idea of combining academy with business was generated through an abundance of facilities at Campus Johanneberg that needed to be taken care of during the 90's economic crisis. The solution was renting offices to companies that could benefit from being close to Chalmers, and at the same time Lindholmen Science Park was founded to further integrate academy and business (Hedström, 2016).

Since 2010 the campus is being developed mainly in the northern area with new buildings involving research in nanotechnology and bioscience. There is a plan to develop this area even more with restaurants and cafes. There is also an initiative to bring more companies into the campus and increase collaborations. The university budget from the government

is decreasing, so we are looking at possibilities to collaborate with the private sector to get more funds. For instance, one company doing research in medicine built a lab and offices on the campus, and agreed on building another building for Hokkaido University instead of buying or renting land. In the north-western area there will still be some land used for farming and agricultural science (Ozasa, 2016).

In Hongo Campus there is just one building used for rented office spaces. One explanation could be that most buildings are old and not that attractive for companies, and the ones who still are renting are mostly entrepreneurs involved in high tech development. There is an idea by the university to construct larger than needed and rent out the additional office space. Some of the private universities already do this. However, renting out to private companies does come with an economic risk (Hanaki, 2016).

The Komaba Campus is not integrated in the surrounding built environment and there is little cooperation with companies. We are trying to improve this, and I believe some newer satellite campuses are more integrated in the society because they do not have the same historic academic characteristics (Yashiro, 2016).

In the architecture department there are limited cooperation with business, but overall in the university there are a lot. For instance, there is the newly build Centennial hall, facing the public transport station next to the main entrance of the campus. This is a meeting place that encourages collaboration between academy, business and society (Yasuda, 2016).

When the university budget is decreasing one long term solution for the Office for Sustainable Campus could be collaborations with companies. We have also thought about increasing the collaboration with the municipality regarding sustainability, and would like to know more about how it is done in Sweden (Ikegami, 2016).

It is important for the academy to interact with the society, for instance by doing projects together with the local people living nearby the campus. Japan, just as Sweden, has a knowledge based society where an increasing number of people work with services instead of production. To continue developing the society, the academy need to encourage people by awaking awareness and curiosity for science and sustainability (Muraji, 2016).

To keep developing I think Chalmers has an important role to play when it comes to connecting innovation and capital. There are initiatives for this in Johanneberg but it is within other industries and it is therefore needed at Lindholmen too. The people who can affect how innovation and capital meet must be located at Lindholmen and operate incubator activities. A suggestion is to create a hub for start-ups through an office-space hotel. Gothenburg and Lindholmen has already had a lot of exiting innovation but this development should continue and be supported (Fischer, 2016).

One initiative together with society through the municipal office, is to build a Manga museum and laboratory in the campus to highlight and develop the Manga culture in this city area (Kobayashi M. , 2016).

Chalmers can promote collaboration by assigning which spaces that should be used for collaborations. One idea is to split the buildings horizontally, instead of looking at Lindholmen Science Park and Kuggen one by one. The entrance level should be open to the public, with restaurants, cafés and conference that draw people to the venue as long as it is open. On the second level is what we call Open Arena Lindholmen, where access

is needed but still many have. For instance, students, researchers and politicians. The higher up in the building you get, the more private becomes the offices through limited accesses, for separate companies when it is preferable (Wahlberg, 2016).

The development of Hokkaido University has been made in cooperation with the city, and the university was relocated to the present location in 1902 due to expansion of the city. The city of Sapporo has continued to grow in all directions since then, but not as fast to the north where some farmland still exists and where the campus has mainly expanded instead, towards the forest and agricultural area. However, today the city surrounds the campus completely because of continued growth and the remaining open farmland is mainly located within the campus area (Ozasa, 2016).

Certain hours there is a flow with people here at Lindholmen that only can be compared to Nordstan, but after the office closes down at 7 pm there are rather few people around the area. There is a trend to create meeting places utilized 24/7, but it comes at an undeniable cost. Especially during the colder months where some visitors would linger, hide and find a place to spend the night. I would like to have the building open 24/7 but it need to be financially viable and function in everyday operations. More service-, and security personnel are needed in order to keep a facility open and especially during the night. As long as people are honest and act reasonably there is no problem for it to work, but from my experience this is not the case (Wahlberg, 2016).

A new public transit system is planned to be built over the river making it easier to travel across. It is essential to provide with a way to travel safely and quickly over the river, and the ropeway will provide that missing link. The placement of the station at Lindholmen is not yet decided either on the parking lot north of the science park or at Karlstaden. The intention is to begin with connecting the city by shortening the time to travel over the river, and later extend the ropeway with more stations, maybe even all the way to Chalmers Johanneberg campus (Andersson, 2016).

Some students come to the open collaboration workspace on the second floor of Lindholmen Science park to get a cup of coffee and work on their projects. This is great, but there needs to be a balance, and students cannot be allowed to go everywhere (Wahlberg, 2016).

There is a bridge placed on the second level between Lindholmen Science Park and Kuggen that links the buildings together, and Markides ambition was to take this even further by connecting all buildings. It would open up the other properties for having more open collaborative workspaces such as the one on the second level of Lindholmen Science Park (Wahlberg, 2016).

## **5.5. Campus planning and management**

Many questions need to be dealt with when planning and managing campuses. Should the facilities be governmentally or privately owned and should the work be done through in-house knowledge or external expertise? When universities own their facilities it is easier to decide on how to prioritize maintenance and development. Decisions from the university management can be implemented through a facility strategist or be forwarded to the university owned property company. In Japan, most university facilities are owned by the government and new buildings need governmental founding. However, the maintenance and operations are sometimes managed by the universities themselves which sometimes is experienced as a difficulty when it comes to coordinate actions. On the other hand, the visited Japanese universities use in-house knowledge in a wide extent. In several

cases architects, engineers and department managers form teams that produce strategic master plans and often operational campus planning activities. In most cases, the work is coordinated by the Vice President of the University and in one university, even the students can participate in the campus planning by taking a campus planning course. In both Sweden and Japan, a constant challenge is to unify all stakeholders within the university, especially if the goal is to be as sustainable as possible.

In the late 1990s Chalmers had become a foundation which enabled the possibility to own buildings. The ownership of the buildings was given to Chalmersfastigheter, a property company fully owned by the foundation. By owning the properties Chalmers gets more control over facilities and economy, but the disadvantage can be less flexibility in the amount of space. The organisation of the facilities was still within the university, but I suggested to move it to Chalmersfastigheter to make the business more effective (Hedström, 2016).

When making plans for campus development we meet in open discussions with people from all departments participating. We try to involve architects, head of departments and also students to create new ideas, which is a quite unique method within universities. Still, which projects can be implemented is decided by the budget and it is decreasing at the moment which affect our work (Kobayashi H. , 2016).

I am responsible for the project called “Student Build Campus” where the students are involved in creating new campus facilities. The ones interested can take a course where they get involved in the designing process and where teachers, architects and students all work together (Kobayashi H. , 2016).

We have a campus planning course that all students in the university can apply for and be able to test their knowledge in the reality. We also have something called Tsukamoto Laboratory where courses are thought and architectural projects are realized. It is important with interaction between architecture and engineering in order to create buildings resistant to earthquakes (Yasuda, 2016).

With guidance from the teachers, students have had the possibility to build a wooden house in the campus that are going to be used for both education and as dormitory. This is a good experience for the students for many reasons. They are trained to use their educational knowledge to create real things and it also helps them to feel involved and raise commitment to the facilities (Muraji, 2016).

Campus Lindholmen is affected by the policy decision on construction or major refurbishment of office space, made by Chalmers President and CEO, Stefan Bengtsson. During the investigation of departments suitable for relocation to Campus Lindholmen there have been some opposition to moving because of this policy decision. Relocation means new office spaces, which also mean a prerequisite on open and flexible spaces. Far from everyone wants to leave their closed offices for an open office space. Many researchers are not used to working in an open space environment, which is uncommon in the academic world (Ljung, 2016).

There is an internal rental model which allocates increased facilities costs on all departments, because larger construction would not be able to be financed otherwise. Furthermore, larger investment decisions must be taken by the board of the University and when dealing with strategical decisions also the board of the Chalmers Foundation could be involved (Hägg Knape, 2016).

Both the Office for Sustainable Campus and the facilities department reports to the university Vice President. We need to cooperate with each other but are still investigating in which ways the Office for Sustainable Campus should function. Today we choose which projects we should be involved in and we are also trying to develop the collaboration with other departments. Our work is well-structured but we need more long-time view when it comes to budgets and collaborations (Ikegami, 2016).

In 2006 we started our work with creating a sustainable campus by doing studies in urban design through collaborations between faculty of engineering, faculty of architecture and the facilities department who makes the master plans (Ozasa, 2016).

The University of Tokyo has huge facilities and it is difficult to make the budget sufficient. The narrow budget makes it hard to finance initiatives for more sustainable design, both because it is sometimes more expensive initially than traditional building and because it is not always obvious for the users why it is better to build in new ways. (Yashiro, 2016)

Most of the buildings are owned by the government and are rented by the university, but we have our own facility department with people employed for maintenance. Sometimes own funds or donations are used to pay for buildings, for instance the Ookayama Library opened in 2011. Universities belong to the Ministry of Education, Culture, Sports, Science & Technology, which has a shrinking budget since the population of Japan is decreasing. This affects the universities because the government asks universities to adapt to fewer students (Yasuda, 2016).

When managing the campuses we need to take into account that the population is decreasing and the government want to spread the students over all universities in the country, not just in the Tokyo area (Kobayashi M. , 2016).

My role as Facility Strategist is meant to set out a clear direction for facilities issues at Chalmers. The goal of the university is world-class education and excellence within research, which facilities should support. I am also participating in a facilities council with different stakeholders within the university, for instance representatives from the Chalmers Administration and Chalmersfastigheter. There is also decisions on its way regarding possible relocations of functions from Johanneberg to Lindholmen and one consequence could be a smaller number of departments that instead becomes larger than today (Hägg Knape, 2016).

The University of Tokyo has a campus planning office, which is a joint organisation between supporting staff, technicians and professors. They have the authority to decide about all facilities issues, but need to report to the head of the campus, which is the vice president of the university. We do the grand design and long-term planning, and sometimes we involve famous professors of the university. The campus planning office includes all stakeholders affected by each project. When building new facilities one person is chosen to manage the project. Then we create a team that support with procurement of contractors and architects, and sometimes more competence is used from within the university (Yashiro, 2016).

The Vice President of the University is in charge of the campus facilities and leads the in-house discussions regarding facilities and campus planning. Seven professors from different fields are members of the group which make drawings and some of the

projections, but then hire external construction firms and architectural firms when constructing new facilities. In more extensive campus planning processes more university employees are participating, and together have discussions about budgets and plans. These larger meetings lead to propositions to the university board. Sometimes the campus management makes action plans and future development plans that are supposed to guide the master planning. In our work, it is most effective to make conceptual plans for buildings which means to plan for functions instead of actual buildings. This method is effective when dealing with environments that are changing (Yasuda, 2016).

Chalmers is an organization in constant change and this put demands on both offices and learning environments. When it comes to offices, there is a decision taken within that all new office areas should be activity based rather than individual offices. This is meant to save resources since less reconstruction will be needed when the demand of space is changing. This type of open office solution could also have shared spaces between teachers, students, researchers and administrative staff. In Campus Lindholmen, I think there is great potential in creating these shared functions that may generate interesting meeting places. Actually, some spaces are already shared between students, researchers and business from Lindholmen Science Park, but it could be developed further (Hägg Knape, 2016).

## **5.6. Future Campus Lindholmen**

The overall view on future Campus Lindholmen shows an opportunity of growth and development. More or less successful urban planning and facilities in the existing environment are mentioned, where the building Navet is an example of a facility that enable interaction and positive flows of people, and the building Kuggen is an example of a building that could be developed further to fill its full potential. Also the urban environment has advantages and disadvantages, where the possibilities with building rights are mentioned as a strength, and the not yet fulfilled ambition of creating a Mix-use-city is mentioned as a weakness. Suggestions when developing future buildings are to make them taller to increase the flows of people, create business opportunities for showing the university for visitors, and construct a new Student Union Building for improving the student life. The comments show that further possibilities for collaborations and interactions are important factors for the future, but the opinions differ in some ways when it comes to implementing these ideas. On one hand, the facilities should contain all kinds of functions. For instance, offices, academy, accommodation and businesses open for the public. On the other hand, the existing characteristics of Campus Lindholmen should be developed further instead of introducing new. For instance, that facilities for offices should have higher priorities than accommodations.

There have been some improvements in terms of creating campus life since Campus Lindholmen was established, for instance a Student Union space, but it is still mostly a business area with lots of people during daytime and empty during the rest of the time. Campus Johanneberg is more integrated in the city and more active during all hours. Compared to other universities Chalmers has many students moving from other locations and therefore need to provide with accommodation. One opportunity is to create a living campus environment by placing the accommodations within the campus. Another way of creating an active urban atmosphere is to open the campus for the rest of the city. One example is the Student Union Building at Campus Johanneberg which generates integration between students, companies and society (Hedström, 2016).

There are plans from Volvo to move 10 000 workplaces to the nearby situated area Lundby. If Volvo do so, the offices at Lindholmen will be even more attractive because

suppliers to Volvo need to be close physically. This is positive as long as the market is good, but it could become a problem for a district that is dependant of one company if the trend changes as in 2008. The presence of companies should still be taken into account when developing the area by implementing more projects like ElectriCity where Volvo is a partner. If Chalmers also move the right educational activities to Lindholmen, it would create an interesting mix of academy and business which would create synergies. This would support the overall development of Lindholmen and at the same time strengthen the identity of the area. The first step is to create the right facilities and support the development and encourage cooperation (Fischer, 2016).

In Campus Johanneberg we have limited options of new buildings before the new master plan is approved, but in Campus Lindholmen we have a couple of building rights that can be used already now (Hägg Knape, 2016).

I see Lindholmen as a sleeping district with no people left after the workers and students have gone home. To me, this shows that Lindholmen is an unsuccessful attempt to a mixed-use city and still mainly is a business district. This identity is about to change, especially if you ask Älvstranden Utveckling AB, who probably will say that Lindholmen is the new city centre, especially when considering all development plans for the area. However, much work is needed to be done before the feeling of a mixed-use city centre exists, for instance regarding transportations and to taking care of the extensive parking lots in the area (Fischer, 2016).

For the future I think the environments for the students should be developed further, and create more meetings places between students and companies. The idea is that the meetings should happen in Navet but when the students are limited to some spaces valuable exchanges are missed. Navet is constructed to create a flow of people, which is a good solution for meetings but it could be developed even more. Other meeting places around Navet is the coffee machines in each floors, that generates interaction between people. This fact could be a lesson for which environment people prefer to interact (Wahlberg, 2016).

New buildings at Campus Lindholmen should be built in more floors than today, in order to increase flows of people below the buildings, which creates more activity and meetings. Much people in the same place also make business like shops possible in the area and public transport can support the transportation effectively. Although, it is important to choose a number of floors that is economical viable and not just build as high as possible (Hedström, 2016).

Technology has made new working places possible and places where you could both fika and work are popular. Another suggestion is that the first floor in Kuggen could be a very interesting meeting place if the space was filled with activities, for instance games that attract high school students. Campus Lindholmen should be a place that is full of live, where the facilities support physical meeting instead of digital (Hedström, 2016).

Connecting Campus Lindholmen and Campus Johanneberg is important. With the technology available today it is easy to create a digital link which can play a part in the connection. One example is the video link between Tongji University in Shanghai and Aalto University in Helsinki, which is open 24/7. This makes it possible for students to communicate in a simple, but efficient way. Maybe this could be implemented to bring Chalmers' two campuses closer to each other (Wahlberg, 2016).

I think Lindholmen could be a form of living lab where innovative ways of transportation can be tested in a real life environment. Every day there is 22000-23000 people here, people eager to test new things and also companies that wants to be at the forefront of technology and innovation. Sustainable solutions could be analysed and elaborated. Tested on students that are eager to try new things and that actually are the future users. I believe in these kind of Living labs where innovations are used in their native environment. It is a great opportunity to create this on Lindholmen (Wahlberg, 2016).

There is already an inspiring atmosphere at Lindholmen Science Park, and this should be stimulated. The connection between academy and industry should also be kept and strengthened. Lindholmen should be a living neighbourhood and follow the RiverCity Vision. Maybe the campus could be some kind of living lab and experiment with new innovative solutions. Later this year there will be experimental student apartments in modules called “urban cribs”, placed close to the Lindholmen Campus. They have a temporary building permit of 15 years and these kinds of initiatives are welcomed (Andersson, 2016).

To continue the expansion of Lindholmen the future of housing is needed to be included in the area, for instance by using the results from HSB Living Lab. Use new buildings to overbuild barriers and connect Lindholmen to the surrounding areas by developing unutilized spaces. Some of the best locations in Lindholmen closest to the water is parking lots, which must be changed. Actually, it is almost just in front of Campus Lindholmen and the Ericsson office that the river is accessible and this is a great advantage that can be used more (Fischer, 2016).

In the not so distant future there will be a lot of more people living on Lindholmen, especially with the production of Karlastaden, but also with other projects. I think that future investments need to come from the industry and Chalmers for Lindholmen to function as a driving force for the economy in the area. Turning Lindholmen to a mixed used city companies like Ericsson would have to face difficulties to grow in the area. Even if a city architect thinks that it is for the better to put apartment buildings in-between the office buildings, the same buildings will complicate further development of the area. I believe that there is a need to concentrate the industry to create hubs to some extent. The current residential projects are very much needed for the area, and will provide a good basis for services needed to create a more living area (Wahlberg, 2016).

The focus areas on Lindholmen is transport, IT and media, but it is hard to match a certain department at Chalmers to be the perfect match for the industry. Possibly Technology Management and Economics or Applied Mechanics would fit in here, but if I were the one to choose one department at Chalmers to move to Lindholmen, I would choose Computer Science and Engineering. I believe it to be the best fit because of the current development within transport focused a lot on software and internet connection. The vehicle manufacturers know about this and also Ericsson are making large investments in this area. This is also connected to city planning, when the connected vehicles will drive themselves the infrastructure must follow. Lindholmen could be the place to develop this kind of technology (Wahlberg, 2016).

Chalmers should be considering what kind of spaces the students need in terms of study places and lecture-halls in the future. I think it is very important to reflect on how students study, what kind of environments they study in as well as how modern teaching works. There will always be a need for lab environments, but the question is if there will be a need for lecture halls for 200 people in the future (Wahlberg, 2016).

There are possibilities to evaluate which environments that are most attractive for the departments and students when there is a chance to create something new. The new lecture halls at Lindholmen should probably be more flexible and be able to adapt to different needs (Söderberg, 2016).

The future identity of campus Lindholmen should be generated by concentrating the views of future development, and by that using the existing knowledge-intensive atmosphere. Especially regarding the present areas of expertise within communication, IT and infrastructure. The competence is already there so way not use it in the development of the area, and let the people working and living in this environment be the ones who test the products as well (Fischer, 2016).

The chairman of Lindholmen Science Park wants to create a museum where you could catch a glimpse of the future. Collaboration between Chalmers and the industry would attract people, and young people in particular. There has also been a discussion of moving Physical Toys from Chalmers Johanneberg to Lindholmen, but there was no agreement on the rent (Wahlberg, 2016).

## 6. Discussion

Throughout the Bachelor's Thesis different strategies have been found for future campus development with connection to strengthening the identity and sustainability. Collaboration between academy, business and society is generally considered important for a university, but even more so for Lindholmen Campus. This might be the case because Lindholmen Campus is at a crossroad in term of choosing the degree of openness and collaboration. A critical part of campus planning is the selection of campus model strategy, and where to implement the strategies. Both case studies, interviews and literature supports the hypothesis that a more open campus is a more sustainable campus. This because of the opportunity to share facilities, exchange knowledge and encourage innovation. However, there are different ways of attaining openness and the degree of openness varies a lot between the studied campuses. Ranging from having whole buildings mostly intended for serving the public to having the premises closed off and not trying to attract visitors. The identity of a campus is shaped by its attractions, built environment, meeting places and by the people in the area. By branding an identity on a campus the university can promote its ideals and values. It would be fitting for Chalmers to communicate its vision: "for a sustainable future", because of the policy decision and Chalmersfastigheter's mission.

### 6.1. Planning strategy

Chalmers and Chalmersfastigheter's part in the exploitation of Lindholmen will be important for the whole district of the city, according to several interviewees. By owning the properties on campus, Chalmersfastigheter have a favourable position in the development of the identity of the campus. The current place identity is strengthened by Chalmers presence, whilst the businesses and Lindholmen Science Park has an even stronger influence. In the case study of Campus Lindholmen it becomes very clear that the character of the campus complies with the surrounding area, making the campus hard to distinguish. Complying with the surrounding area works for the integration, but at the same time against the identity and exclusiveness of the campus. As several interviewees mentioned Chalmers and Chalmersfastigheter must make a choice on which type of campus Lindholmen will be in the future.

The four different strategic models in creating a future campus in Managing the University Campus help understanding the consequences of the strategic choices of campus management. They can also be used as tools for describing a campus or the future development of a campus. All four models are appropriate to consider for campus Lindholmen to create the desired atmosphere. The exclusiveness, Univer-city, exterior campus and community of Lindholmen are all important models to consider. Adding to the exclusivity of Chalmers campus may not seem to be a good idea at first because it does not increase the cooperation with society. The same collaboration which is found to be one of the vital parts of a sustainable campus. However, by creating a more secluded space for students and employees, important values like the identity of the school can be preserved. This would aid in the creation of a community and at the same time let students and employees have their own space,

A range of views on the strategic choices of future campus Lindholmen came to light during our interviews. Stakeholders involved in the development of Lindholmen campus were interviewed and external knowledge served as a counterpoise to aid in the discussion. Mixing the campus with the city in order to create a Univer-City was stated as the choice for including the city and promote collaboration. Creating a community on the campus was also considered important by some, for making the campus more

appealing to Calmers students and employees. However, only respondents in Japan mentioned the use of different models on the same campus, and deliberately guide visitors to special parts of the campus. In the case studies this appeared to be working well on certain places and appeared to utilize the resources more efficiently. Plain and efficient buildings would be placed in areas not visited by the public, making it financially viable to spend more resources on inspiring and representative buildings placed in a public part of the campus.

The case studies in Japan gave some insights in how to utilize buildings in branding a Campus. Ookayama campus showed a campus which deliberately show the most prominent buildings for branding the university. Appealing places attract visitors to certain areas of the campus, where the most inspiring buildings are. Same kind of effective branding with a few buildings close to an attraction was also the case at Komaba campus. The Museum of Natural Science attract visitors and display the area around the main gate. Here even the students have their own Communications Plaza and the zero energy building-project KOMCEE is just next to it. Placing a building made for branding close to a social meeting place is evidently for putting it up for display.

Meiji university has its campuses in dense urban areas, which forced the campus to put its functions on top of each other in a vertical campus. Both the satellite campus Nakano and the main campus Surugadai had most of its activities in high rise buildings. Nakano campus resides in one building, making much of the space in the campus shared by the users. In Surugadai the spaces were less shared in the Liberty Tower, but even more shared with the public in the Academy Common. By being more secluded the Liberty Tower support the hypothesis that there is a need for some private areas on a campus. The Academy Common provide with several functions that opens the campus and invites people inside to an inspiring atmosphere. In the entrance level there is a museum, café and a supermarket, which attract people into the building. On evenings and weekends there is also opportunities for other than students to take courses provided by the university. Liberty tower is very important for the identity of the campus and make a grand impression, even if it is just the lobby and library that is accessible by the public.

On Lindholmen campus, Kuggen has distinctive architecture and an excellent sustainability branding, making it a good building for demonstrating Chalmers identity. It is not sufficiently associated with Chalmers however, and there are not enough activities that attract people. Losing this association to Chalmers lets some of its precious branding value for the campus unfortunately go to waste. There are plans to change this and turn the ground floor and basement into a student library with study places. Increasing the flow of students around Kuggen increase the students influence on the creation of its identity. This makes it more associated to Chalmers, thereby enhancing its branding potential for Chalmers.

Both Hongo and Sapporo campus had historical buildings declared as national treasures attracting the public, characterising the campuses as historic and important. For Hokkaido university it is vital to preserve these buildings for attracting visitors and to preserve its identity. The city has a scarcity of open public spaces, making Sapporo campus even more important to the society. Hongo campus utilize its historical buildings by placing a Communications Centre where the university's research is exemplified through different kinds of products invented at University of Tokyo.

In Japan the campus development is made in collaboration between the departments and the competence within the university is used when creating new buildings. In several cases architects, engineers and department managers form teams that produce strategic master plans and often operational campus planning activities. At Hokkaido university there is even an office for sustainable campus coordinating the departments to work for a more sustainable campus. Using the in house knowledge when planning makes the stakeholders and future users involved in making future buildings as fit for the users as possible. By making the employees part of the creation of new buildings they also get a stronger connection and sense of place. At Shonan Fujisawa Campus this is taken one step further by involving students in the campus planning through the student build campus initiative. Involving students in the planning and building of the campus give the students real world experience, and raise the commitment to the facilities.

The influence of students on the built campus environment was generally low in Japan, with an exception for SFC. It is quite special for Chalmers Student Union to be owning buildings on campus Johanneberg, and it exemplifies the strong presence of the student union. Campus Lindholmen would gain from having the same presence and a new Student Union Building would certainly support that. This would increase the students sense of place and could be taken a step further by involving students in the process for raising the commitment to the campus even further.

## **6.2. Sustainable campus**

Reviewed literature states the university's role in a knowledge based society is of great significance, also some of the respondents agreed with this statement. It becomes even more noteworthy in creating a sustainable society, when many of the future actors for sustainable development comes from the University. Leaders in the future society needs to know how to act for sustainable development, and be inspired to work for it. Respondents also raised the concern in that universities need to inspire and encourage people by awaking awareness and curiosity for science and sustainability. A university should have places for supporting innovation, inspiring and spreading knowledge to the society, and there should be a place where people from outside the university could take part of some of the knowledge and innovations created at the university.

“Development which fulfils the need of the present generation, while not at the sacrifice of the ability of future generations to fulfil their needs” is the common definition of sustainable development delivered by the Bruntland Committee in 1987. We found it to be lacking when describing the knowledge based society which a university campus is a vital part of. Making knowledge of sustainable development available to the current generation and to future generations is a fundamental part on a university's agenda. We find the definition of sustainability somewhat dated in not recognizing the importance of spreading knowledge. Therefore, the definition should be changed to: “Development which fulfils the need of the present generation, whilst spreading and utilizing knowledge for fulfilling present needs, while not at the sacrifice of the ability of future generations to fulfil their needs and providing knowledge for fulfilling future needs”.

The university campus is an important part of the society, which can provide with tangible usefulness for an area and unmeasurable knowledge for sustainability, if utilized appropriately. By integrating the campus using the Univer-City model into society it does not ensure the spreading of knowledge, but certainly assist the progress of doing it. However, a campus that is fully open and mixed with society loose some of its attractiveness to students and ability to support a community. Therefore, a campus need several ingredients to make it truly sustainable. Collaboration with stakeholders outside

the academy is important to enable flexible facilities and catalyse innovation. No magic formula or recipe for creating a sustainable campus is in this Thesis, nor is there a single answer for planning every single campus. It needs to be a mix of different strategies that complement campus activities and the surrounding area.

Creating and maintaining an identity on the campus can influence a wide range of people. In this Thesis it was found that the creation of identity is achieved by influencing the informal communication, physical characteristics, attraction of people and creating meeting places. The physical environment is must be supporting the identity for people to accept it, but merely altering the setting cannot create an identity. By creating a meeting place that attracts people who support the identity, the place identity will be become accepted.

## 7. Conclusions

Knowledge through used literature, learnings from interviews and observations from case studies have been used to evaluate the subjects of the Bachelor's Thesis in order to come up with usable suggestions.

The Bachelor's Thesis is aimed to investigate how future campus development of Chalmers Campus Lindholmen is recommended to be done and come up with applicable strategies for creating the most suitable place identity. The place identity is aimed to help generate innovation and be connected to both local and global sustainability. The purpose is to create a useful suggestion of a concept that could be used by Chalmersfastigheter when developing and planning the future Campus Lindholmen. In this case, future campus development refers to the properties in the campus which include existing buildings and land areas for possible buildings. The goal is to investigate local conditions of Campus Lindholmen and then use expertise from both Sweden and Japan to develop strategies for implementation. The scope of the purpose can be summarized into the following question.

*Which is the most suitable place identity for Chalmers Campus Lindholmen?*

The most suitable place identity for Chalmers Campus Lindholmen is to be a genuine driving force for sustainable development. This is achieved by creating a physical environment sustaining the spreading of knowledge, supporting innovation and maintaining collaboration. An open and welcoming place identity would be mutually beneficial for Chalmers and the surrounding area. The vision of Chalmers should be exemplified in the built environment showing a campus in the forefront of technology and sustainability. "For a sustainable future" could be expressed by transforming future Lindholmen campus into a Zero Energy Campus, which is conveyed with information through visible technology and energy usage on screens.

To be successful, the chosen identity should be distinctive and genuine. By summarize the values into a concept where internal academic qualities can flourish at the same time as collaborations with industry and society can generate synergies, environments for innovation can be generated. The authors call this concept Chalmers Innovation District. A place identity that enables inspiring study environments and encourages student life, and at the same time enables business opportunities and contribute to sustainable development.

*How can experiences from interviews and case studies be used to develop it?*

By using literature to assess built campus environments and validate strategies for creating sustainable campuses. In the assessment several strategy models could be observed and verified to be working models. Even campuses in a dense urban environment, like the visited Meiji campuses, can achieve openness in designated areas and at the same time support the student community with exclusive spaces. By deliberate planning and supporting architecture a cohesive and open campus can be achieved, like Ookayama campus. Reaping benefit from having historical buildings on the campus is displayed at Hongo and Sapporo campus. University of Tokyo utilize this opportunity to display its innovations through the Communications Centre. Sapporo city lack in open public space; which Hokkaido provide concurrently with demonstrating its identity of being respectful of nature and society.

Interviews broadened the perspective on organising campus planning and management. Campus planning in Japan differentiated notably from the way Chalmers planning and management is organised. The different departments were included in the early planning and programming of new buildings. Professors in various disciplines had the possibility to contribute with solutions and insights on best practice for campus buildings. We can see that it would be a great advantage for Chalmers to work even closer with Chalmersfastigheter and provide with the in-house knowledge that can be used in the development. Even better would be to extend the cooperation to include Chalmers ventures and include Chalmers innovations as well as students in the creation of future campus Lindholmen.

*What strategies are needed in the future campus planning to achieve it?*

A transcending campus plan with strategies for controlling collaboration, meeting places, openness and exclusiveness will be central at the future campus Lindholmen. Having parts of the campus providing with a meeting places for the society benefits Chalmers in presenting the core values of the university and chosen identity. The open areas should be inspiring and representative for attracting talent and for verifying the qualities of the university. Some areas of the university will need to be excluding the general public, as this will aid the students in building a community. A vigorous community aid in recruitment to the university, provide with students that have stronger commitments to the facilities, and make the students perform better.

The transcending campus plan should be closely connected to Chalmers vision “for a sustainable future”. Lindholmen could become the example of technical innovation used for sustainability. Visibly displaying technical innovation in the environment and on buildings like Kuggen. One part of the campus plan should be to make Lindholmen a Zero Energy Campus to demonstrate Chalmers vision in the physical environment. This demonstration is made by displaying energy usage and visible innovations. Showing Chalmers Zero Energy Campus for students, employees and the general public will influence the society for a sustainable future.

## 7.1. Recommendations to Chalmersfastigheter

Displaying Chalmers identity and vision in the physical environment should be prioritized by the University and by Chalmersfastigheter. However, Chalmersfastigheter should focus its resources towards the suggested public spaces of the campus which should be considered the face of Chalmers campus, see figure 15. Here Chalmers vision should be demonstrated visually and the area should be inspiring and representative. Preferably the area should be displaying innovations from Chalmers and knowledge from Chalmers. Towards the public there should also be facilities supporting the spreading knowledge from the university, following the “Univer-City” model. For example, a reception providing with information about Chalmers or a Chalmers museum attracting visitors. There could also be auditoriums and classrooms that are partly visible to the public and available for educating other than students during evenings and weekends.



**Figure 15.** Suggestion for implementation of strategies at Campus Lindholmen. Edited by the authors.

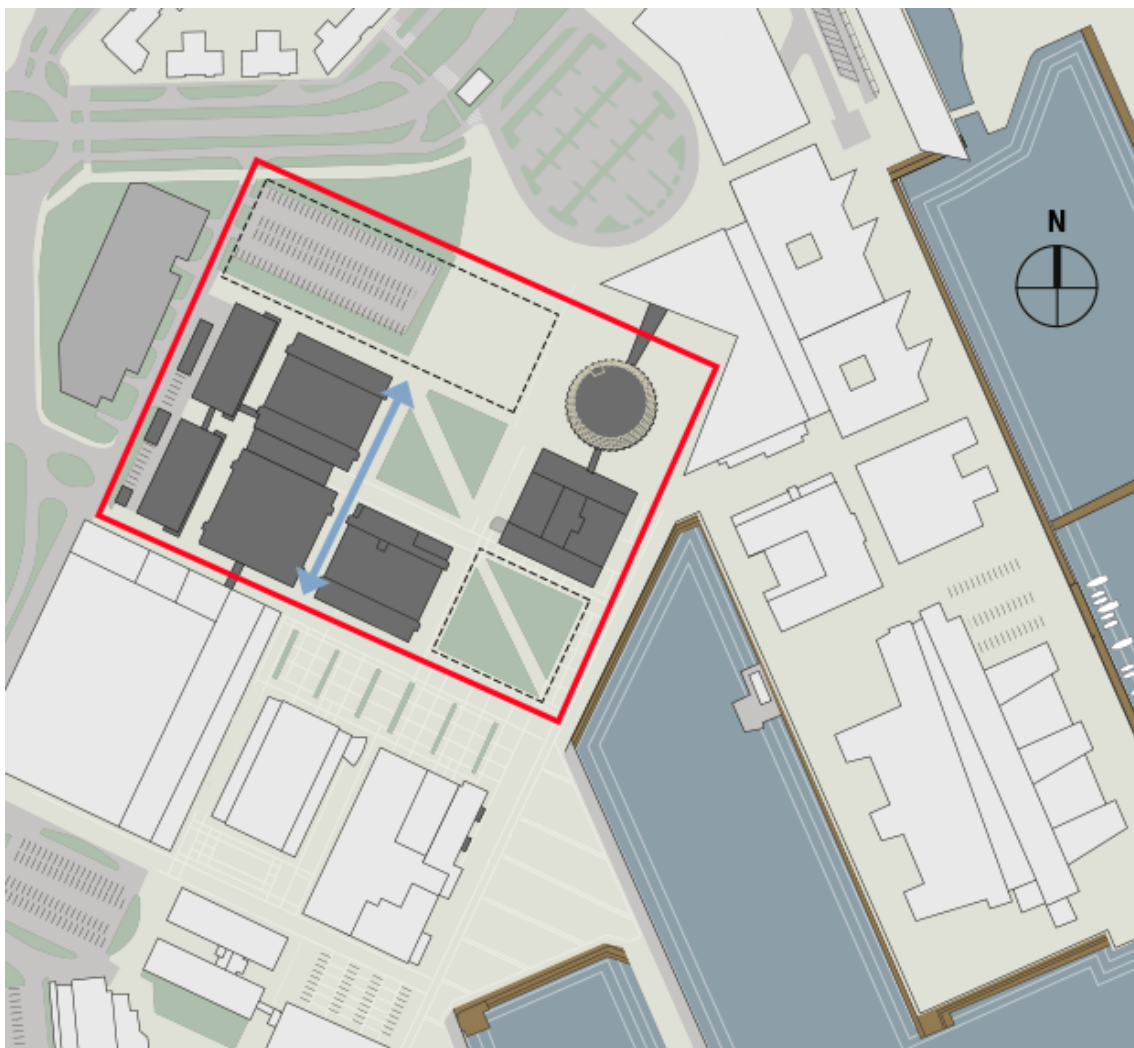
On the blue area demonstrated on figure 15, are the more secluded campus area, which mostly students and employees will be utilizing. This area should primarily be focused on executing the “Community” strategy, encouraging social contact and providing space that aid in building the student community. There should also be some exclusiveness in this area, where students and employees can make their own sense of place. The exclusive

areas will also be important for sharing the university's core values with the students and employees.

The yellow part of the campus represents the interaction between academy, public and business, see figure 15. Meetings should be encouraged and spaces that nourish collaboration should be prioritised. This is an important and unique place where academy and business truly intersect. Increasing the flow of people would boost the branding value of Kuggen, that will be in the centre of attention. People should be encouraged to walk in this area and become curious about Chalmers. One way of guiding people towards this area would be to have an avenue leading here from the bus stop.

### 7.1.1. Development rights

This is our suggestion in developing the two areas that Chalmersfastigheter wish to exploit in the future is seen on the map in figure 16. The two development rights are marked with black boxes.



**Figure 16. Development rights on Lindholmen. Edited by the authors.**

The development right towards the bus stop is very exposed towards the public on the north side, but more secluded on the south side towards the campus. Our suggestion is to make this into a prominent building exhibiting the identity of the campus and Chalmers vision visually. We consider the KOMCEE building at Komaba Campus and the Library at Ookayama campus to be good role models. However, there should be a more distinct entrance unlike the mentioned examples. The entrance should lead to a walkway through the building leading to the more secluded campus area, shown with the blue arrow in

figure 16. This building is a great opportunity to emphasize on what is open and what is exclusive on the campus. The activities and functions in the building could be semi-open and more closed on the southwest side. There could be some open functions in the ground floor, but they should be concentrated to the east side. This would be a great building to have as flexible as possible for hosting evening courses, renting out office space and maybe even laboratories.

The second development right in the southern part of the campus is clearly visible from the water and the other side of the river. The promenade at the waterside is also an area that is open to the public. Therefore, the entrance level towards the river should be open and include the public. Generally, the first floor should be more open to the public whilst the upper floors should be more private. This building should also provide with visuals that correspond with Chalmers' vision. Various activities would fit in on this development right: a museum, library, or host the Physical Toys that could move from Chalmers Campus Johanneberg. One possibility is to make the second development right into the Student Union Building at Campus Lindholmen. A building for the students on Lindholmen would support the creation of a community, and socialization between students. But the Student Union Building could also be placed on the green area in between the two building rights. Which would emphasize on a more exclusive student union building only for students. Conclusionally Lindholmen should be a campus not only for the general public nor only for the students or employees. It should be a campus that can be shared, which is possible if planned and executed accurately

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## **Appendix 1: Questions in Sweden**

1. Can you describe your work and career?
  - a. For how long have you worked with this profession?
2. What does your company do?
3. How do you work with identity and branding?
4. What is your overall reflection about Campus Lindholmen?
5. Would appreciate having office at Lindholmen?
6. Which identity has Campus Lindholmen according to you?
  - a. Why?
  - b. Does it correspond with the brand of Chalmers?
  - c. Which identity do you think Campus Lindholmen should have?
7. Is the area of Lindholmen integrated in the surrounding city?
  - a. What kind of values are connected to being integrated in the city?
  - b. How could it be integrated differently?
8. How would you define of sustainability?
9. What is your idea of having academy and business in the same facilities?
10. Do you think accommodation would be suitable in Campus Lindholmen?

## Appendix 2: Questions in Japan

1. How is your process for planning campuses?
  - a. Why is your campus designed the way it is?
  - b. Which people are involved?
  - c. What is the plan for future development?
2. What are the main identities of your campuses?
  - a. Do you use your facilities for marketing your University?
  - b. Any specific buildings/environment contribute to this identity?
3. How do you consider sustainability when developing campus plans?
  - a. Sustainability goals?
  - b. Green areas integrated?
  - c. Energy-saving measures?
  - d. Meeting points?
4. What type of urban landscape surrounds the campus?
  - a. Is your campus integrated into the city?
  - b. How does your campus and the surrounding city complement each other?
5. How do people transport themselves to the campus?
  - a. Do you depend on public transportation?
  - b. Is it possible to reach your campuses by bicycle?
  - c. How much space is used for car parking within the campus?
6. Do you include business in the campus environment?
  - a. Is business integrated with the academy?
  - b. Can companies that are relevant to the education rent offices on the campus?
7. Are there accommodations within or close to the campus?
  - a. What types of accommodation?
  - b. Is it hard for new students to find accommodation?
8. Who are the property owners on your campuses?
  - a. How is your campus development financed?
  - b. Are there any incentives for creating sustainable campus?
9. How many students are studying in your campuses?
  - a. How many international students?
  - b. How many men/women?

## Appendix 3: Map RiverCity

### THE RIVERCITY GOTHENBURG AREA



Map RiverCity (Hulthen & Ransgård, 2012).