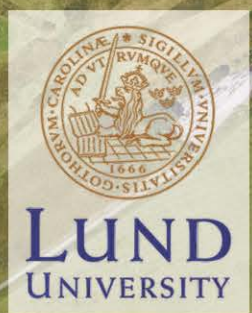


# TRANSITIONS

SUSTAINABLE BUSINESS DISTRICT IN URBAN FRINGE



**TRANSITIONS**  
Sustainable Business District in Urban Fringe  
**Author**  
Hikmatyar Abdul Aziz  
**Master Thesis Project Report**  
Sustainable Urban Design  
School of Architecture, LTH  
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May 2020

# TRANSITIONS

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## **Master Thesis Project Report**

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May 2020

## **Author**

Hikmatyar Abdul Aziz

## **Supervisor**

Louise Lövenstjerne  
Daniel Wasden

## **Examiner**

Peter Siöström

## **Jury**

Jenny B Osuldsen  
Nevena Krilic

# ACKNOWLEDGEMENTS

This thesis project, Transitions: Sustainable Business District in Urban Fringe, is made by very dynamic processes, insightful inputs and cooperative supports of many people and institutions to whom I would like to thank about.

Firstly, I would like to thank LPDP which fully support me by granting a scholarship to do master study in Sustainable Urban Design at Lund University.

I would also like to thank my supervisors, Louise Lövenstjerne and Daniel Wasden, who dedicate their time to give guidance and assistance during final semester.

I want to mention SUDes team, guest lecturers and course assistants for amazing two years in this program. All of them broaden my perspectives and become important figures in this master life.

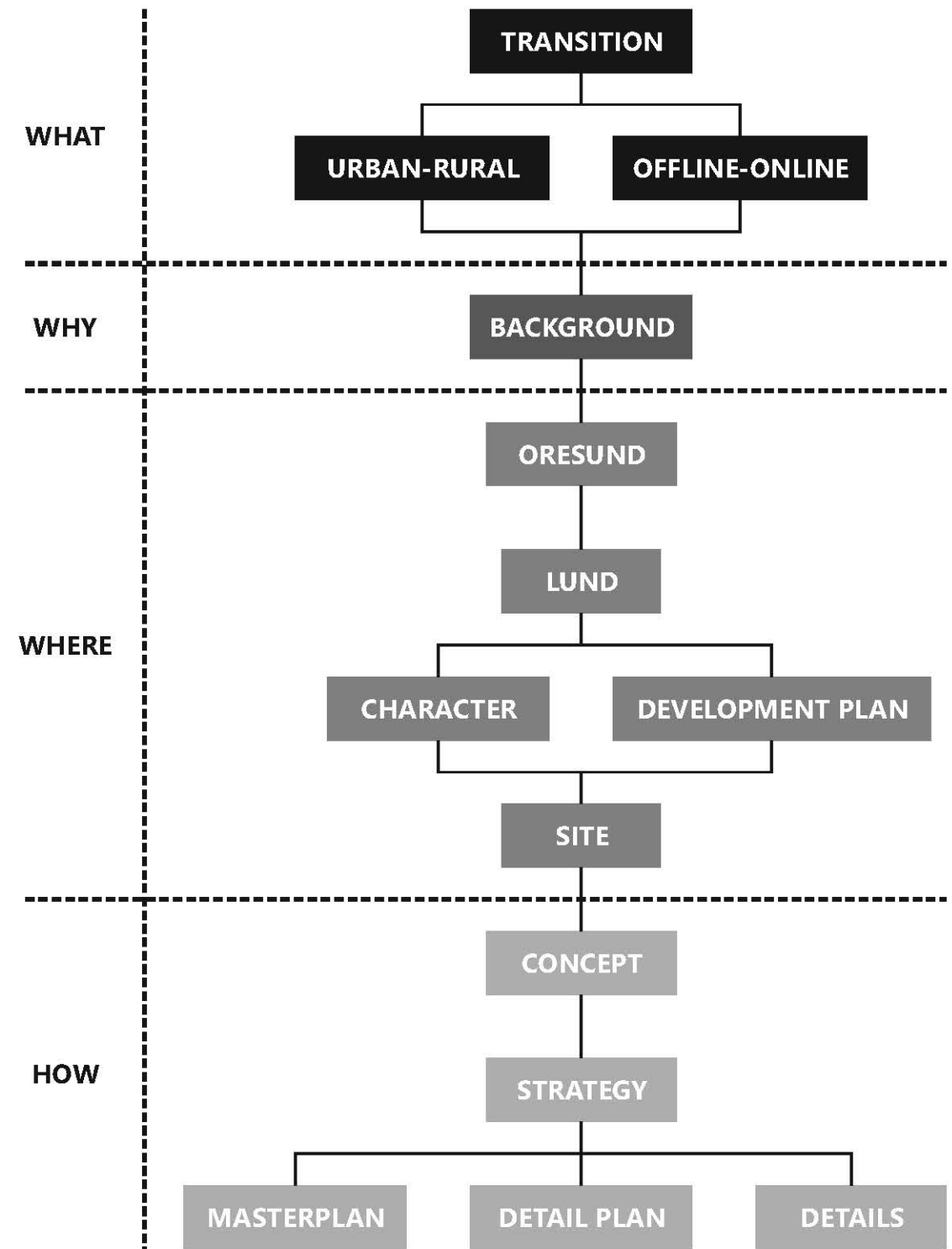
Furthermore, I would like to thank SUDes friends for unforgettable learning process through inspiring discussions, tutorials, group works and presentations.

Thank you for everyone who takes part in this learning journey.

To my family, thank you for love and support. This achievement is for you.

# CONTENT

<b>0 ABSTRACT</b>	<b>11</b>
<b>1 WHAT : TRANSITION</b>	<b>15</b>
1.1 URBAN-RURAL	16
1.2 OFFLINE-ONLINE	18
<b>2 WHY : BACKGROUND</b>	<b>21</b>
2.1 URBAN GROWTH	22
2.2 URBAN LIFESTYLE	28
<b>3 WHERE : CONTEXT</b>	<b>35</b>
3.1 ORESUND	36
3.2 LUND	38
3.3 CHARACTER	44
3.4 DEVELOPMENT PLAN	46
3.5 SITE	52
<b>4 HOW : DESIGN</b>	<b>65</b>
4.1 CONCEPT	66
4.2 STRATEGY	68
4.3 MASTER PLAN	74
4.4 DETAIL PLAN	80
4.5 DETAILS	84
<b>6 REFLECTION</b>	<b>93</b>
<b>7 RESOURCES</b>	<b>97</b>



# 0 ABSTRACT

# ABSTRACT

Recent urban development has serious consequences such as limited space and expanded urban sprawl which lead to complex problems on the edge. Also, there is large number of urbanization where people from rural areas try to find better opportunities by moving to big cities.

Furthermore, fringe area seems like an unplanned area which lose its identity and do not optimize its potentials. Those situations bring huge challenge for re-envisioning and designing the edge which not only accommodate site-specific issues but also create better transitions to surrounding area.

Urban fringe should get more attention and focus from stakeholders, architects, planners, etc. It is a meeting place of space and opportunity which can be a platform to designing better future.

On the other hand, advance technology is transforming our lifestyle include shopping activities. There are many online shops where people can buy anything from home. This condition shapes people habit from shopping offline to online. The existence and relevancy of shopping mall or central business district (CBD) is questioned.

It is very crucial to re-thinking kind of commercial block that not only fit with the needs of present situation but adaptable for the future. Optimizing flexible program and communal space which bring diversities and possibilities.

This project is trying to analyze two transitions, urban-rural and offline-online, then propose experimental proposal of business district in the fringe area.

# 1 WHAT : TRANSITION

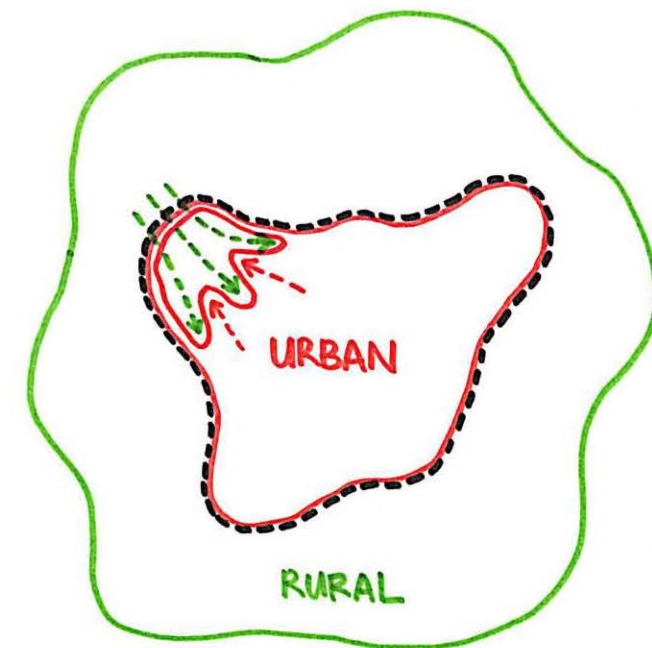


# 1.1 URBAN-RURAL

Urban consolidation describes the policy of constraining further development and population growth to within the boundaries of preexisting urban areas rather than expanding outward into suburban areas. Urban consolidation seeks to increase the population density of a given urban area by expanding upward, redeveloping preexisting buildings and lots, and constructing new facilities in available spaces. It is theorized that discouraging urban sprawl and encouraging further development of housing units in preexisting urban areas will lead to a net gain in social and economic prosperity (e.g. more accessible public transportation, more efficient use of public utilities, and increased affordability of housing).

A major feature of modern urban consolidation practices is the incorporation of urban green space and open space areas. In higher density environments, incorporating natural settings into the landscape design can have positive impacts, such as increased happiness, decreased stress, and a reduction in maintenance costs.

There are broadly three kinds of urban consolidation: Market-led consolidation of existing residential areas involves residential redevelopment of established dwellings as well as non-residential land and buildings at higher densities than the metropolitan average. Transit-oriented development (or TOD) involves high-density residential and mixed-use buildings within walkable precincts around public transport nodes, often referred to as Activity centres. The third approach is to require that all new development on the urban fringe of existing metropolitan areas is at higher densities than the current average for those cities.



RURAL	FRINGE/EDGE	URBAN
AGRICULTURE FARMING RESOURCES	?	ECONOMY EDUCATION FACILITIES

OPPORTUNITY + SPACE

## 1.2 OFFLINE-ONLINE

Online shopping is a form of electronic commerce which allows consumers to directly buy goods or services from a seller over the Internet using a web browser. Consumers find a product of interest by visiting the website of the retailer directly or by searching among alternative vendors using e-commerce, which displays the same product's availability and pricing at different e-retailers. Now, customers can shop online using a range of different computers and devices, including computers, laptops, tablets, and smartphones.

E-commerce allows customers to overcome geographical barriers and allows them to purchase products anytime and from anywhere. Online and traditional markets have different strategies for conducting business. Traditional retailers offer fewer assortment of products because of shelf space where, online retailers often hold no inventory but send customer orders directly to the manufacture. The pricing strategies are also different for traditional and online retailers. Traditional retailers base their prices on store traffic and the cost to keep inventory. Online retailers base prices on the speed of delivery.

The marketing around the digital environment, customer's buying behaviour may not be influenced and controlled by the brand and firm, when they make a buying decision that might concern the interactions with search engine, recommendations, online reviews and other information. With the quickly separate of the digital devices environment, people are more likely to use their mobile phones, computers, tablets and other digital devices to gather information. In other words, the digital environment has a growing effect on consumer's mind and buying behavior.



## 2 WHY : BACKGROUND



## 2.1 URBAN GROWTH

Question : What is the future of fringe area?



Cities are growing and developing while rural towns and areas are shrinking and becoming impoverished. Almost half of the country's municipalities in Sweden have smaller populations compared to three decades ago, and many are now fighting to survive.

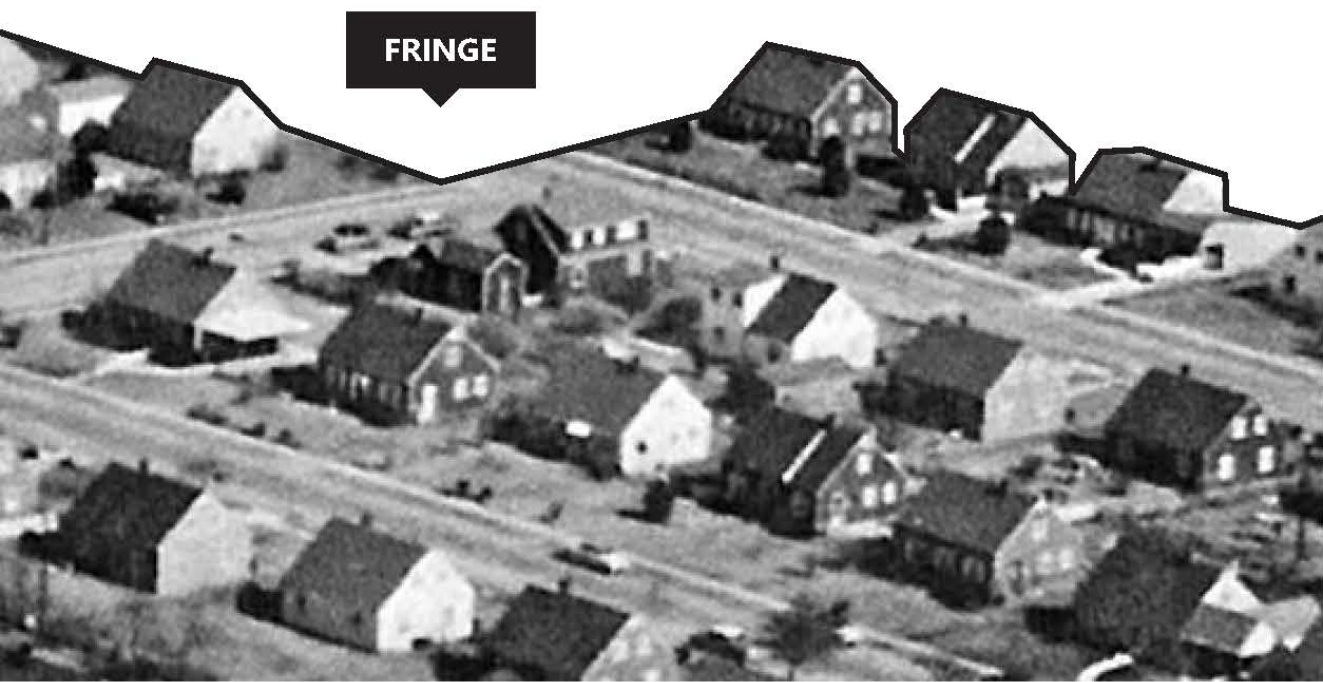
Since the mid-1980s, more than half of the country's 290 municipalities have seen a reduction in population, according to the Central Statistics Office (Statistiska centralbyrån, SCB). A look at rural municipalities specifically shows an even clearer town-country split, with two-thirds of rural municipalities shrinking since 1985.

It is primarily young people leaving, and that has devastating consequences which lead to bigger gap between urban and rural. Fringe area becomes a place to densify urban program and take advantage of rural qualities.

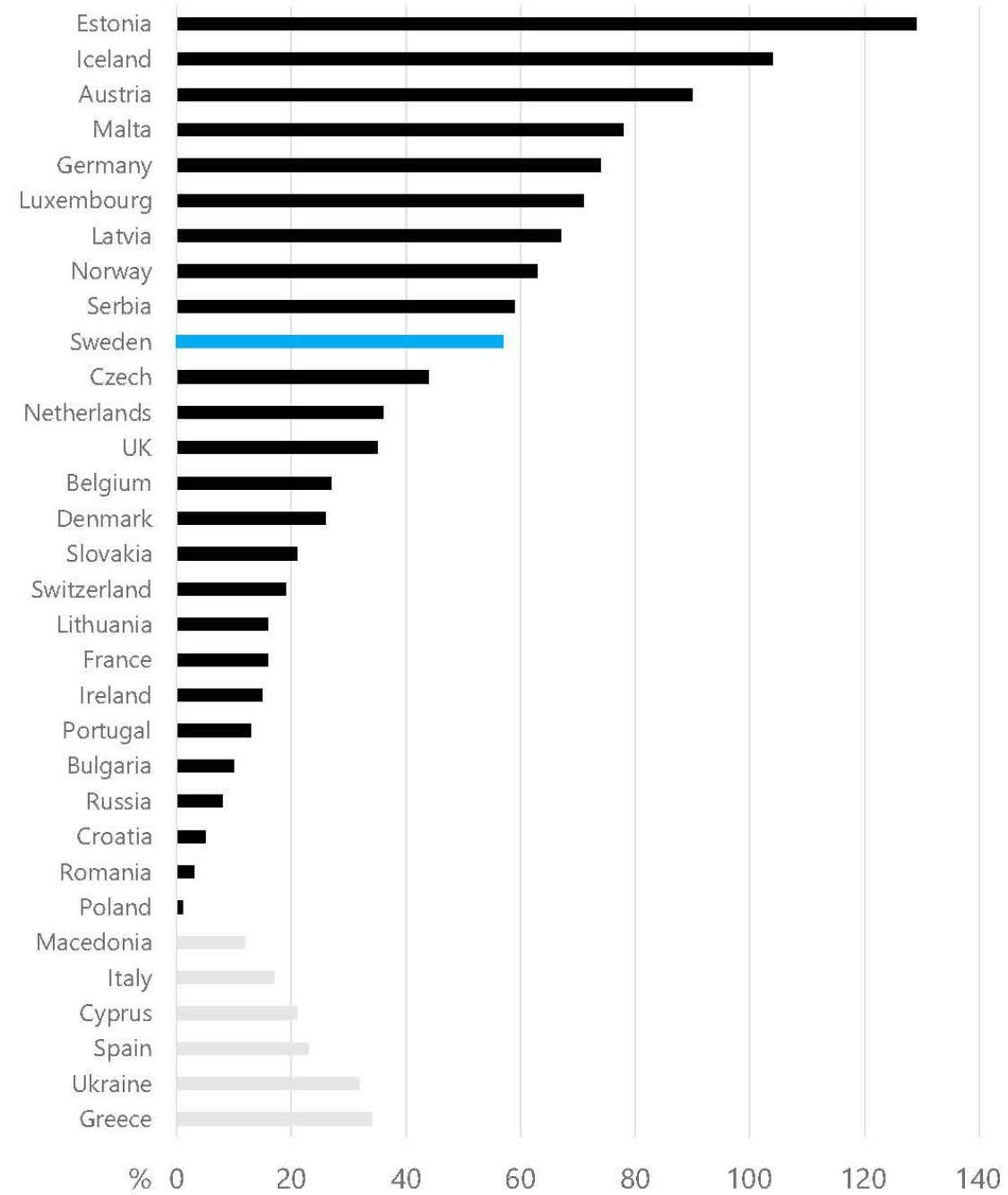
The strength of rural areas decreases - tax incomes and the employment sector weaken as well as purchasing power. Fewer individuals go out and spend money, which means that services that make locations attractive, like shops, restaurants and so on, slowly and surely disappear. Those who do not live with rural challenges can also find it difficult to see that they are there - and this is a breeding ground for populist forces.

Economy experts predict that the phenomenon of the drain on younger populations in rural areas leads to dimming average age, fewer people refuelling cars, fewer seeking medical care, and the gradual disappearance of basic services like schools, medical centers and gas stations. As many as 33 municipalities have lost at least a fifth of their populations since 1985.

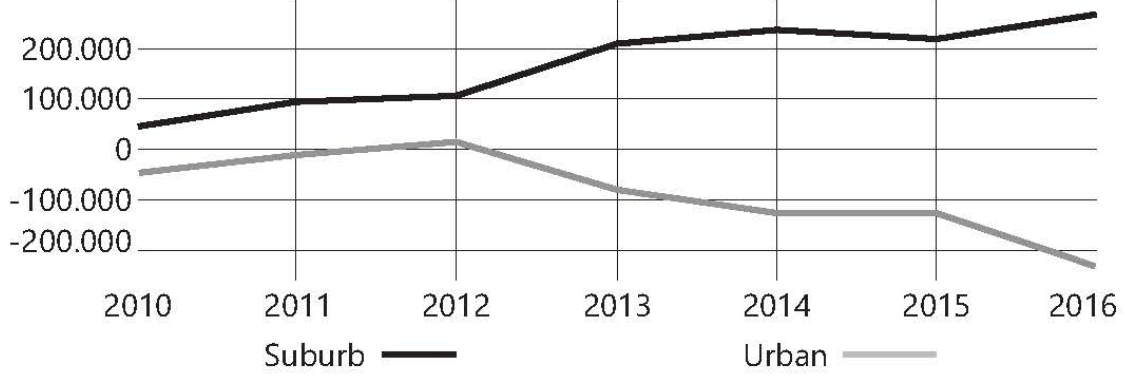




Housing Price Change in Europe (last 10 years)



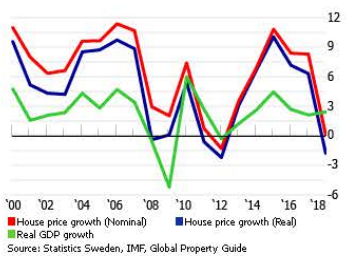
Suburban Migration Accelerates



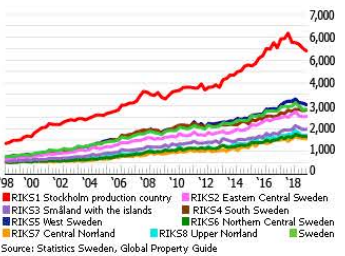
House Price Change, Annual (%)



GDP Growth vs. House Price Growth (%)



Average Price - Houses (SEK1,000)



# NOVA

## 2.2 URBAN LIFESTYLE

Question : What is the future of shopping activity and business district?



In business theory, a disruptive innovation is an innovation that creates a new market and value network and eventually disrupts an existing market and value network, displacing established market-leading firms, products, and alliances.

A disruptive process can take longer to develop than by the conventional approach and the risk associated to it is higher than the other more incremental or evolutionary forms of innovations, but once it is deployed in the market, it achieves a much faster penetration and higher degree of impact on the established markets.

Beyond business and economics disruptive innovations can also be considered to disrupt complex systems, including economic and business-related aspects. Through identifying and analyzing systems for possible points of intervention, one can then design changes focused on disruptive interventions.

Now, market is disrupted by high-tech innovation which shapes urban lifestyle especially people's shopping behaviors. This shifting from offline to online trends are happening all around the world. Today, business district, shopping mall, shops need to offer flexibility and new spatial experience.

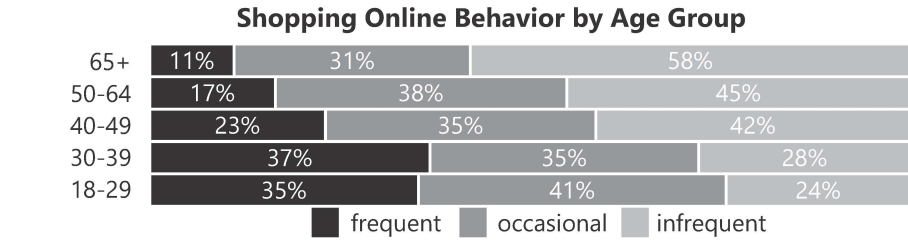






SHOPPING

Reasons consumers shop online instead of in stores



Grocery



Clothing & Footwear



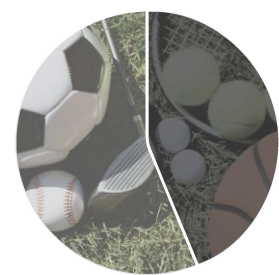
Furniture & Homeware



Health & Beauty



DIY/Home Improvement



Sports Equipment



Household Appliances



Electronics & Computers



Jewelry/ Watches



Books, Music, Movies

■ in store

■ online

# 3 WHERE : CONTEXT

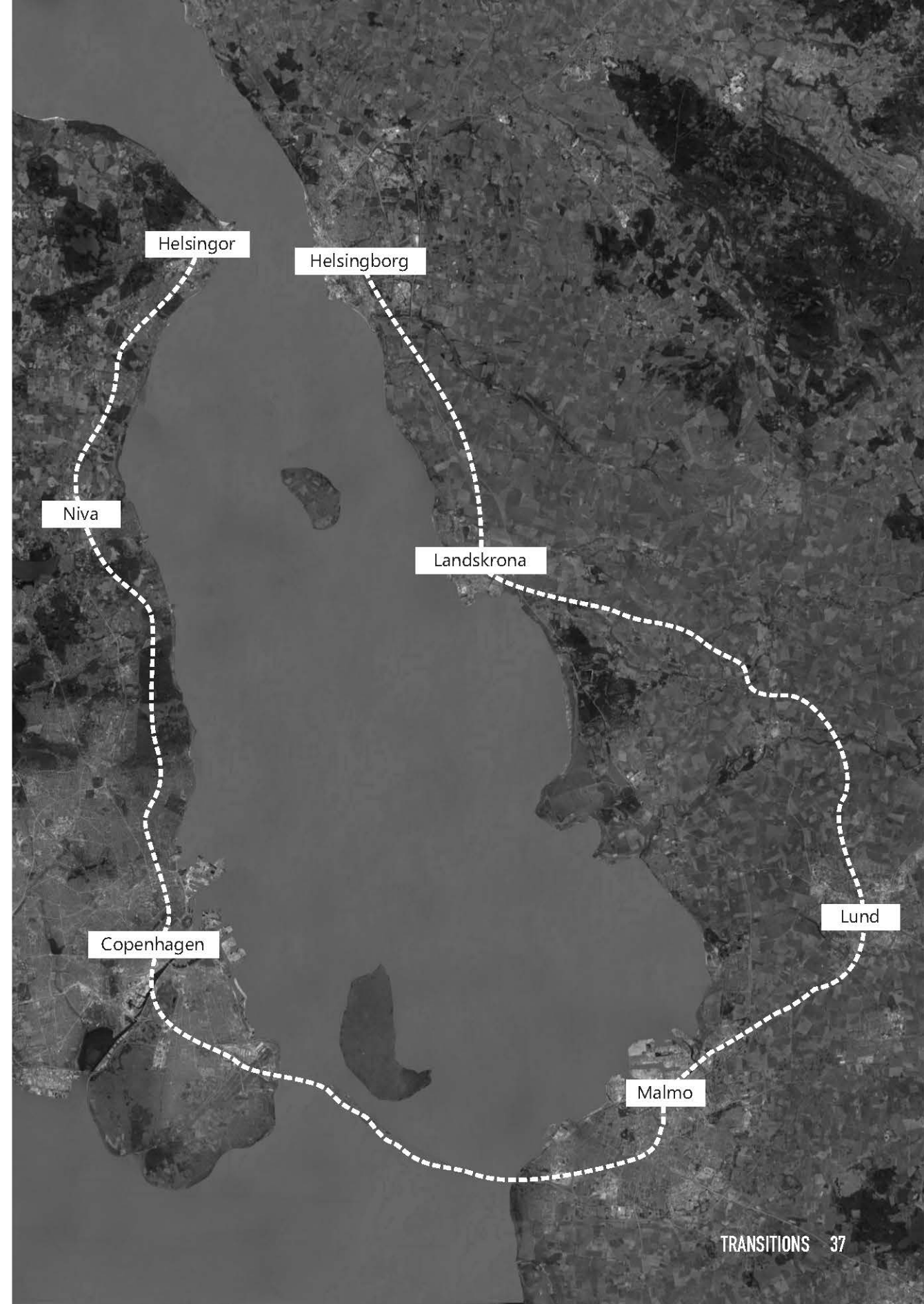
## 3.1 ORESUND

The Øresund Region is a metropolitan region that comprises eastern Denmark and Skåne in southern Sweden. Centred around the Øresund strait and the two cities which lie on either side, Copenhagen in Denmark and Malmö in Sweden, the region is connected by the Øresund Bridge, which spans the strait at its southern end, and ferry route between Helsingør and Helsingborg at the narrowest point of the strait.

The region has a population of 4,002,372 (2018) and a population density of 191.79/km<sup>2</sup> (496.7/sq mi). In recent years, part of the population has stressed Scania's regional identity again. The region consists of both rural and urban areas. Areas on the periphery of the region have a relatively low population density. Helsingborg also forms an important urban hub on the Swedish side. The Øresund Region is an important hub for economic activity in Scandinavia.

In 2007, almost 25 million people traveled over the Øresund Bridge: 15.2 million by car and bus, and 9.6 million by train. By 2009, the figure had risen to a total of 35.6 million travellers by car, coach, train or ferry. Statistics compiled in January 2007 show 14,000 people commuting each day over the Øresund Bridge.

Apart from work related commuting, Swedes cross over to Copenhagen to enjoy shopping and nightlife, to attend cultural and educational institutions and to use Copenhagen Airport. The commercial interaction across the border has also significantly increased. In 2018, an average of 19,100 vehicles crossed the bridge each day. In May 2018, Øresundsmetro Executive was announced to link Copenhagen, Malmö, and other cities in the region via a driverless metro system with short travel time.



## 3.2 LUND

Lund is a city in the southern Swedish province of Scania, across the Øresund strait from Copenhagen. The town had 91,940 inhabitants out of a municipal total of 121,510 as of 2018. It is the seat of Lund Municipality, Skåne County. Archeologists date the foundation of Lund to around 990, when Scania was part of Denmark.

Lund is located in Sweden's largest agricultural district, in the south-west of Scania, less than ten kilometres (6.2 miles) from the sandy shore of the Öresund Strait. Its location on the south-facing slope of the Romeleåsen horst leads to the city rising from the low-lying Høje River in the south to 86 metres (282 feet) above mean sea level in the north.

The nearest large Swedish city, Malmö, is about 15 kilometres (9.3 miles) to the south-west. Other Swedish cities are more distant: Gothenburg is 250 kilometres (160 miles) away, the capital Stockholm is 600 kilometres (370 miles) distant, and Umeå lies 1,200 kilometres (750 miles) to the north.

Lund city contains four main city squares that are connected by a number of roads and passages that represent the main city centre containing numerous restaurants, shops and bars. Clemenstorget is located alongside the railway and associated station and hosts a small market and is planned to be the central terminus of the tramway currently under construction. Bantorget is a green park-square, Lund's Grand Hotel is placed there. The city hall is located on Stortorget which often features concerts and various events. Mårtenstorget hosts the Lund Market Hall and serves as a market square during the daytime. In earlier times the square was used as a cattle market and was known as Oxtorget. Smaller city squares in Lund include Domkyrkoplatsen, Petriplatsen, Västra stationstorget and Knut den Stores Torg.



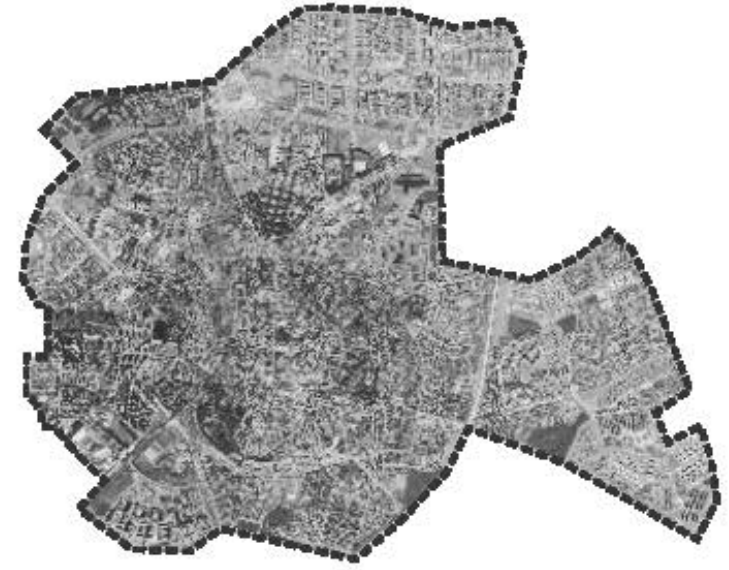
Over the second half of the 20th century the population of Lund more than doubled, driven in large part by the growth of the university and high tech industries. For example, Tetra Pak, the food packaging and processing company, was founded in Lund in 1952. Suburbs were added to the outer edges of the city: Klostergården, Norra Fälåden and Linero in the 1960s, Norra Nöbbelöv in the 1970s, Gunnesbo in the 1980s and Värpinge in the 1990s.

The central part of Lund largely retains its medieval street layout. A few buildings from the Middle Ages remain, including Lund Cathedral, Liberiet, St. Peter's Priory, the restaurant Ståket and Krognoshuset. Many of today's buildings in the centre were constructed in the late 1800s, including Katedralskolan, the Grand Hotel and the main building and library of Lund University.

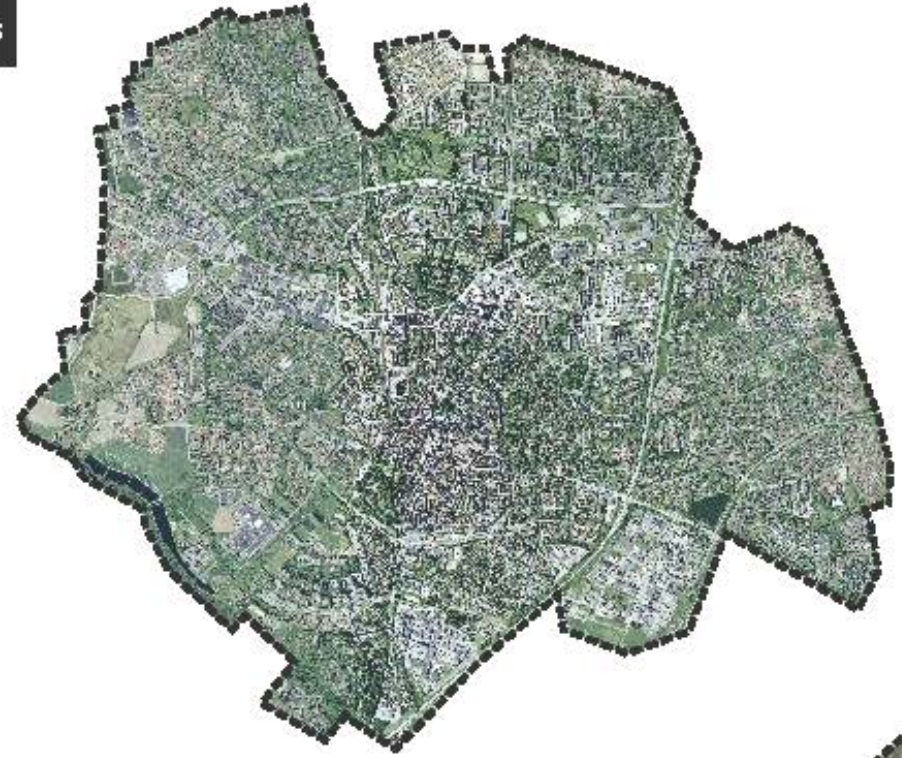
1950s



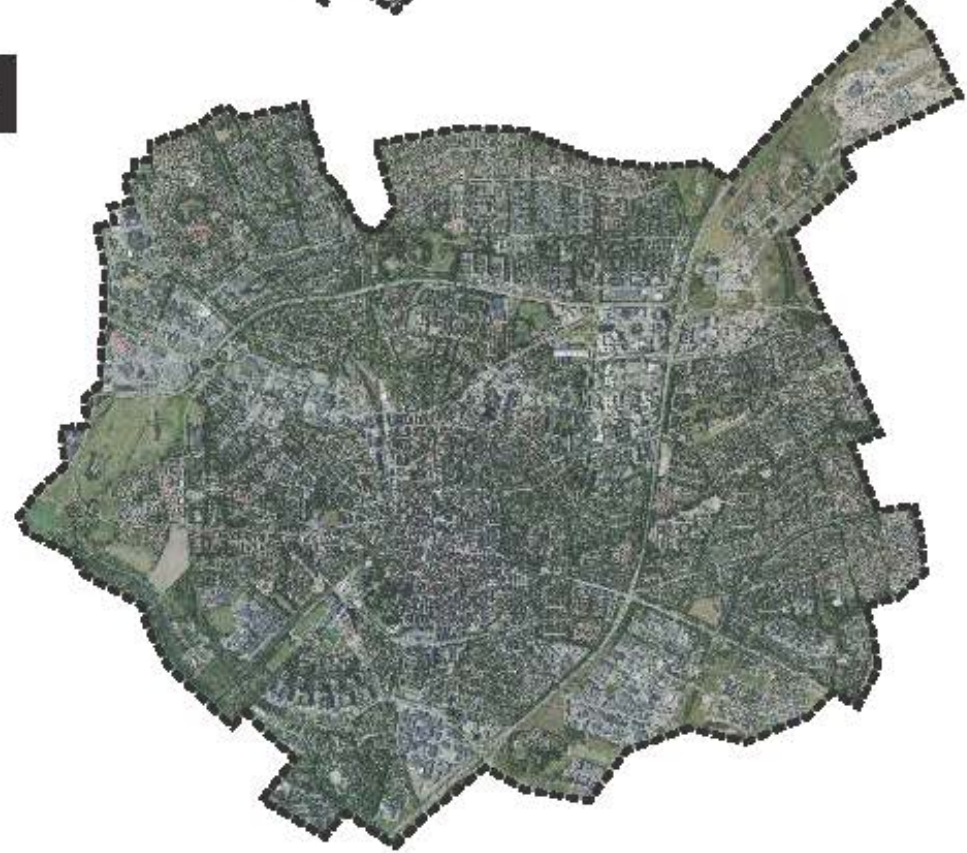
1970s



2000s



2019



1900s - 1950s HISTORICAL PLACES



1970s - 2000s RESIDENTIAL DEVELOPMENT



1950s - 1970s ECONOMIC ACTIVITIES



2000s - 2019 INNOVATION AND OFFICES



## 3.3 CHARACTER

As one of the oldest cities in Sweden dating back to 990, Lund is a city of contrasts where 1,000 years of history blend with modern knowledge and ideas. This city has strong character about charm of a small picturesque, cobble-stoned city, side-by-side with big city attractions such as services, shopping, restaurants and cultural events.

The combination of businesses, students and researchers from around the world has given birth to Lund's unique character as a city of strong research-based global industries. Sweden's first and most successful research park, Ideon, is situated in Lund, and the country's two largest research ventures, MAX IV Laboratory and ESS are located here.

Lund University's students become majority of the population of the city and consequently have a significant impact to the atmosphere. They influence all aspects of life in Lund, from the daily rhythm of the city to city planning. The combination of old traditions and history together with modern life makes Lund a great place to live and study.

It is easy to get around in the city and most people use bicycles for their daily transportation. In addition, there is a comprehensive public transportation system including buses and trains around Lund. The Lund train station is the hub that connects Lund to Malmö and to other destinations in the region, as well as to the rest of Sweden.



## 3.4 DEVELOPMENT PLAN

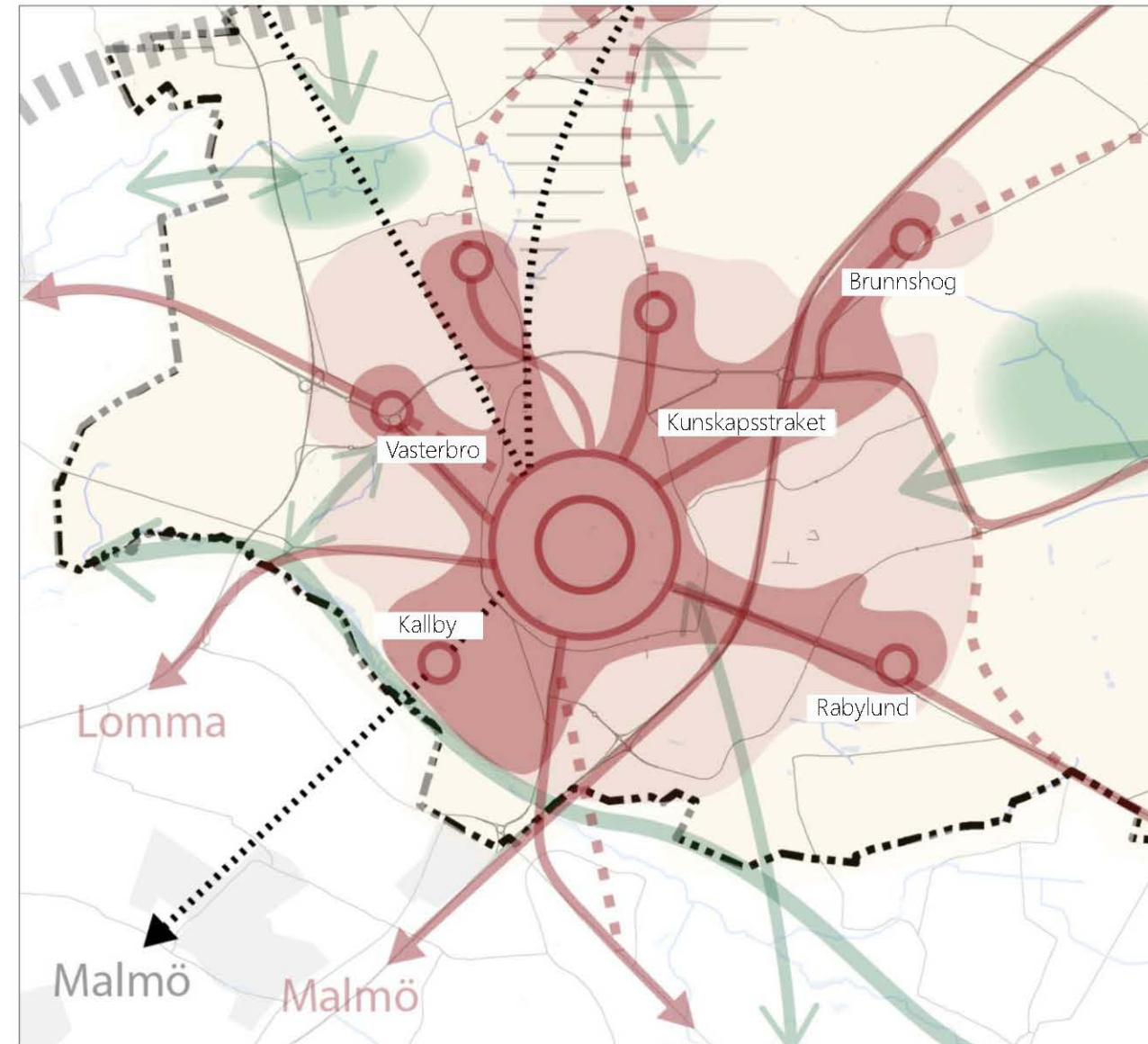
Lund is a regional engine with an international profile and strong development power. With a high-speed train station, Lund's connections are strengthened in a national and northern European context. Lund C is an attractive station and entrance to the city.

The overview plan enables 17,500 homes until 2040 and a place for a multifaceted business community. Lund grows through densification and in priority development areas. The city grows from the inside out and into strategically important routes and nodes for urban development. Public transport should be developed according to a strict thinking and be a structure for the development of the city. In Brunnhög, development will take place throughout the entire time span until 2040, with ESS, research facilities in Science Village, Science Park and Brunnhög district. The tram will be taken into service at the beginning of the planning period and will support continued development in Science Road, with a mix of housing and high densification potential for urban integrated business.

Urban transformation in Västerbro contributes to more housing in mixed cities through densification and development of the urban content in the older industrial area. Källby in southwest Lund will receive a train station in the early 2020s.

When the city's older industrial areas are transformed into mixed buildings, space is needed for businesses programs. There also needs to be space for new central business district. Therefore, new workplace and business areas are planned for a strong business development in Lund.

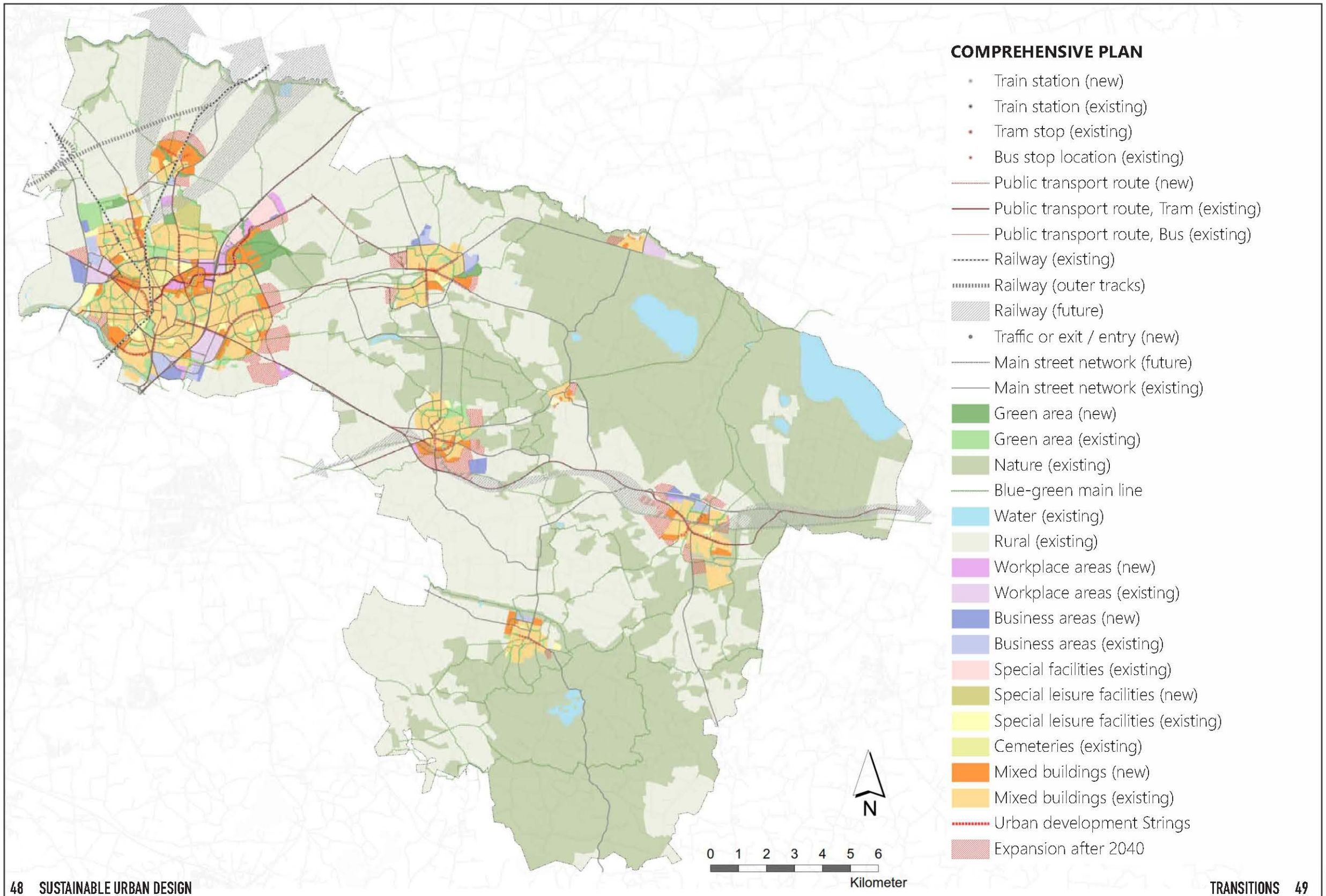
A strengthened green infrastructure that will connect the city's green areas and establish contacts with the surrounding landscape is being developed. The green infrastructure is important for contributing to biodiversity, ecological preservation, and climate adaptation to rainfall and heat waves.



### STRATEGIC PLAN

- Development focus
- Urban
- Development node
- Rural / agricultural
- High quality nature
- Green connections
- Study area for 4-railway
- Railway
- Public transport
- Public transport (future)
- External goods





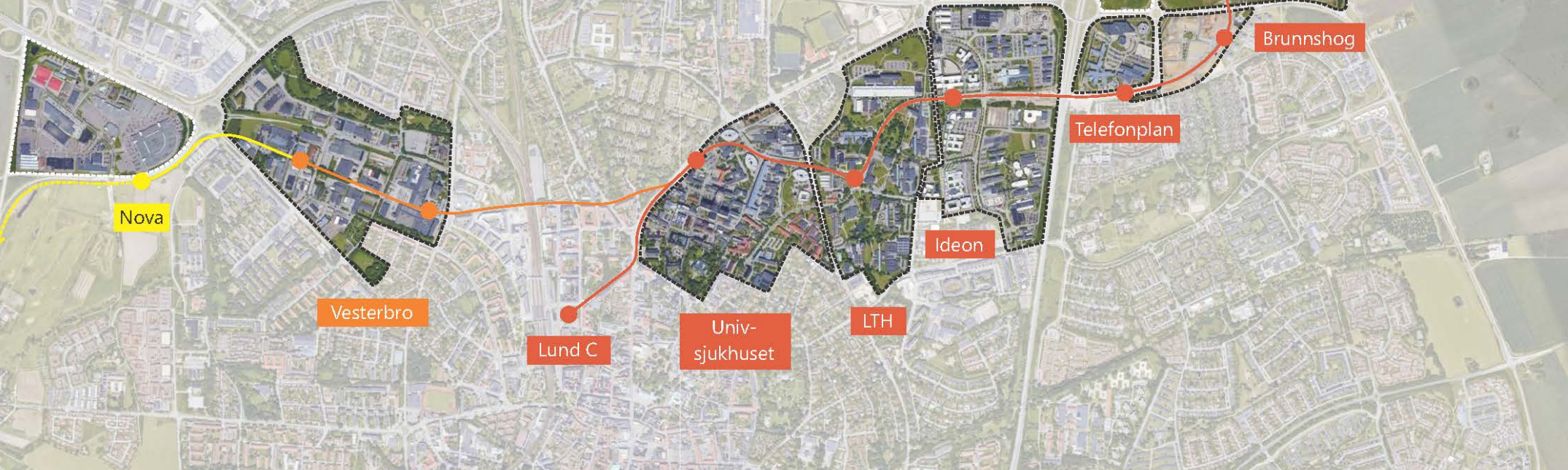
The comprehensive plan prioritizes urban transformation into a mixed city, inside and out. At the same time, we strive for long-term sustainable development, including reduced car dependency. Access to public transport is expected to become increasingly decisive and focus is placed on taking advantage of bus stops near locations. A gradual development towards sustainable travel also means a gradually increasing scope for urban transformation and densification.

Stormwater and climate adaptation, especially with regard to flood risks, are among the key factors in planning. Analysis indicate the need for powerful measures for stormwater management and the plan proposal includes, among other things, larger

delay ponds in Norra Värpinge, upstream of the Rinnebäcksravinen. The risk of flooding in the event of a fall means that parts of the proposed development areas must first be investigated further with regard to flood risk before further planning for exploitation is possible.

The emerging urban environment is linking the research area to city center by the tramway from Clemenstorget to ESS, will further strengthen the importance of the commuting node. At the same time, the urban environment is developing on both sides of the railway and more passages are added for companies, jobs, trade and services to make it a significant target point also in a regional perspective.

This area is characterized by its content and its history, where the industry's functional requirements have shaped the architecture and the urban structure. Several of the activities are based on yesterday's and today's discoveries and the courage to invest in these. Here you will find unique buildings, enterprise and culture, a continuity of discoveries and innovations. Qualities to build upon.



Nova Vesterbro Lund C Univ-sjukhuset LTH Ideon Telefonplan Brunnhog MAX IV Science Village

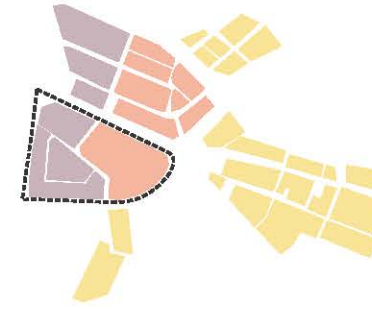
## 3.5 SITE

In the early 2000s, the municipality of Lund was located outside the city without major trading venues. The municipality's comprehensive plan for 1998 stated that it would not allow shopping centers outside the city center because they wanted to preserve trade in the center.

However, it turned out that the detailed plan for the area allowed buildings for retail purposes and building permits were granted in 2001. Nova Lund was built by JM who later handed over the administration to Wihlborgs and before the mall was completed Rodamco had bought the property. It was granted a building permit with one exception - the mall was not allowed to have a grocery store.

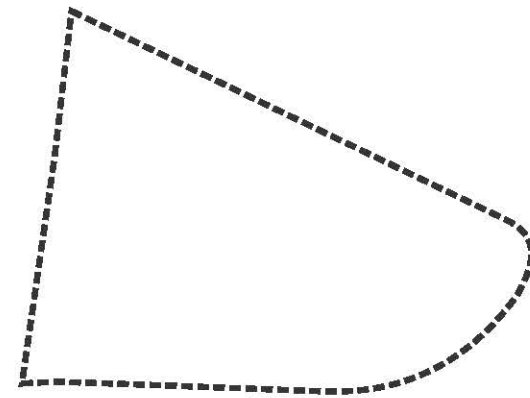
Nova Lund opened its doors for the first time in 2002. Four years later, an extension of 6,500 square meters of retail space was completed at the same time as the car park was expanded to 1,500 seats. In 2009, plans to further expand Nova Lund were presented. But Building Committee in Lund Municipality said no to a continued expansion of Nova Lund.

Nova Lund is located about 2.5 kilometers northwest of the city center. To get to the mall by car, people can use several major roads very close by: former national highway 16 west towards Flädie (connection to the E6), County Road 108 towards Kävlinge and Staffanstorp. Bus lines such as city bus line 5 stops at Fjelierondellen near the mall. Today there are cycle and walkways with fair connections to get to Nova Lund.





SCALE COMPARISON



SITE



NOVA



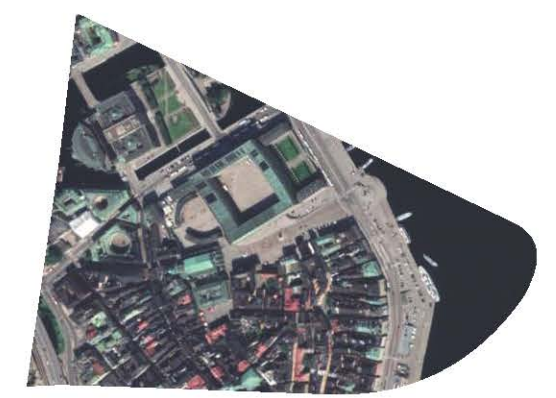
LUND



MALMO



GOTHENBURG



STOCKHOLM



## BUILDING



There are old structure on the site which can be recycled and adapt in term of building scale. It is important to optimize existing structure in sustainable perspective in order to keep previous function and add new value. For example, Nova is the largest building built from concrete and serve people with its commercial shops. It can be recycled and become shopping mall as it is. Also, the building together with other concrete structure (blue) can be used as base structure for new programs such as office, housing, etc. This vision can add value for existing structure and bring diversity in the future.

On the other hand, buildings on the west (red) consist of light structure which still can be reused for specific program. Those buildings has compatible scale for communal purpose such sport center, school, storage, car building, etc. Also, previous program like commercial can be kept and added by more residential function on top. Combining old and new structure as strategy to respond current situation not only reduce carbon foot print but also accommodate relevant program. Shopping mall is a need for urban economic activities and it will be more useful if densification can bring other qualities on it.



## SPACE



More than half of the site is dominated by parking lot. It shows that the area is very car dependent. Also, the high quality soil is almost covered by asphalt and concrete which segregate blue and green structure around the site. The parking lot becomes ineffective space because it is only full occupied in specific time such as weekend or holiday. Transforming this huge parking area into attractive and efficient space through densification becomes one of the biggest challenge for the future plan.

Some parts of the area are covered by green structure and mostly can be found in the peripheries. It consist of open green space and tree which give a sense of space and barrier from the traffic. Also, there are few spots where gigantic electricity plant stand out dominantly. This electric system can be planted underground in order to create human scale atmosphere. Then, spatial qualities can be added to the site. Bus stops determine development nodes on the site and make the site well connected to the city.



## STREET



Connection is a key structure for the site in order to be integrated with local assets and urban network. Local road in the south is major connection from site to city center. Now, it looks like high speed road because there is no intervention which can slow the traffic down. From local perspective, it also divide the site from neighborhood in the south such as Klosters Falad and Vildanden. This road can be transform into commercial street which has urban character by adding active programs and crossings. That transformation will strengthen connection between the site and southern area.

There is inner street that connects the site to many places in the north (Gunnesbo, Nobbelov, etc.) and the south (Varpinge, Papegojelyckan, etc.). This internal connection also shape plot ratio in the site. It can be reformed into mixed use street which bring urban life in the area. By adding diversity and new programs in that connection, the street will attract people who live nearby to come to the site. New street scape will restructure local network and integrate Vasterbro, Klosters Falad, Vildanden, Gunnesbo, Nobbelov, and the site itself.



HIGHLIGHTS



PARKING



TRAFFIC



ACCESS



BORDER



DENSITY



INDUSTRY



SPORTS



PARK



# 4 HOW : DESIGN

# URBAN-RURAL

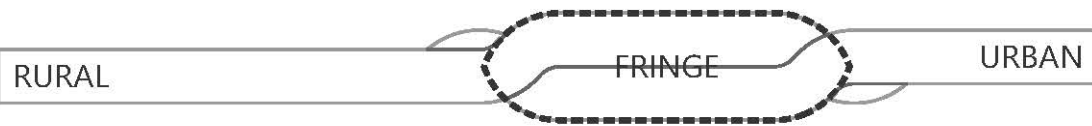
PAST



PRESENT



FUTURE

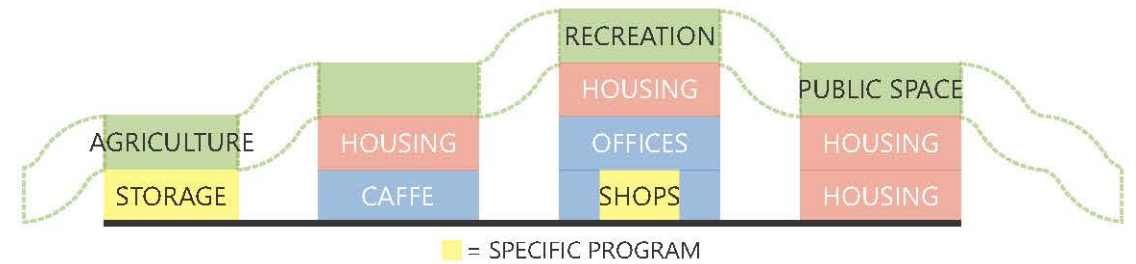
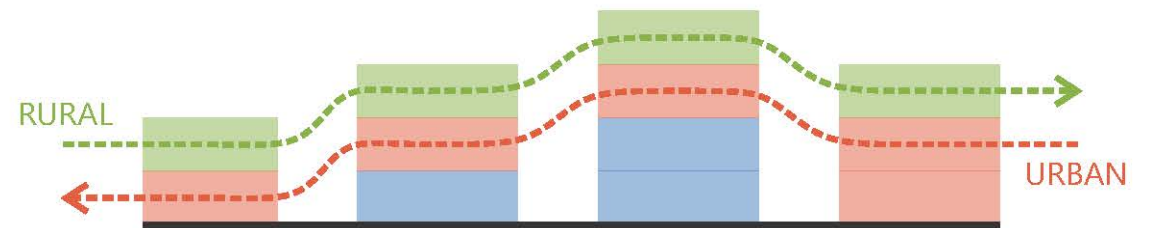
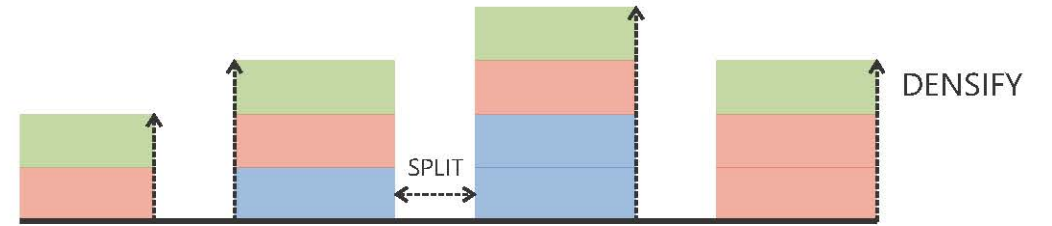


AGRICULTURE RECREATION PUBLIC SPACE



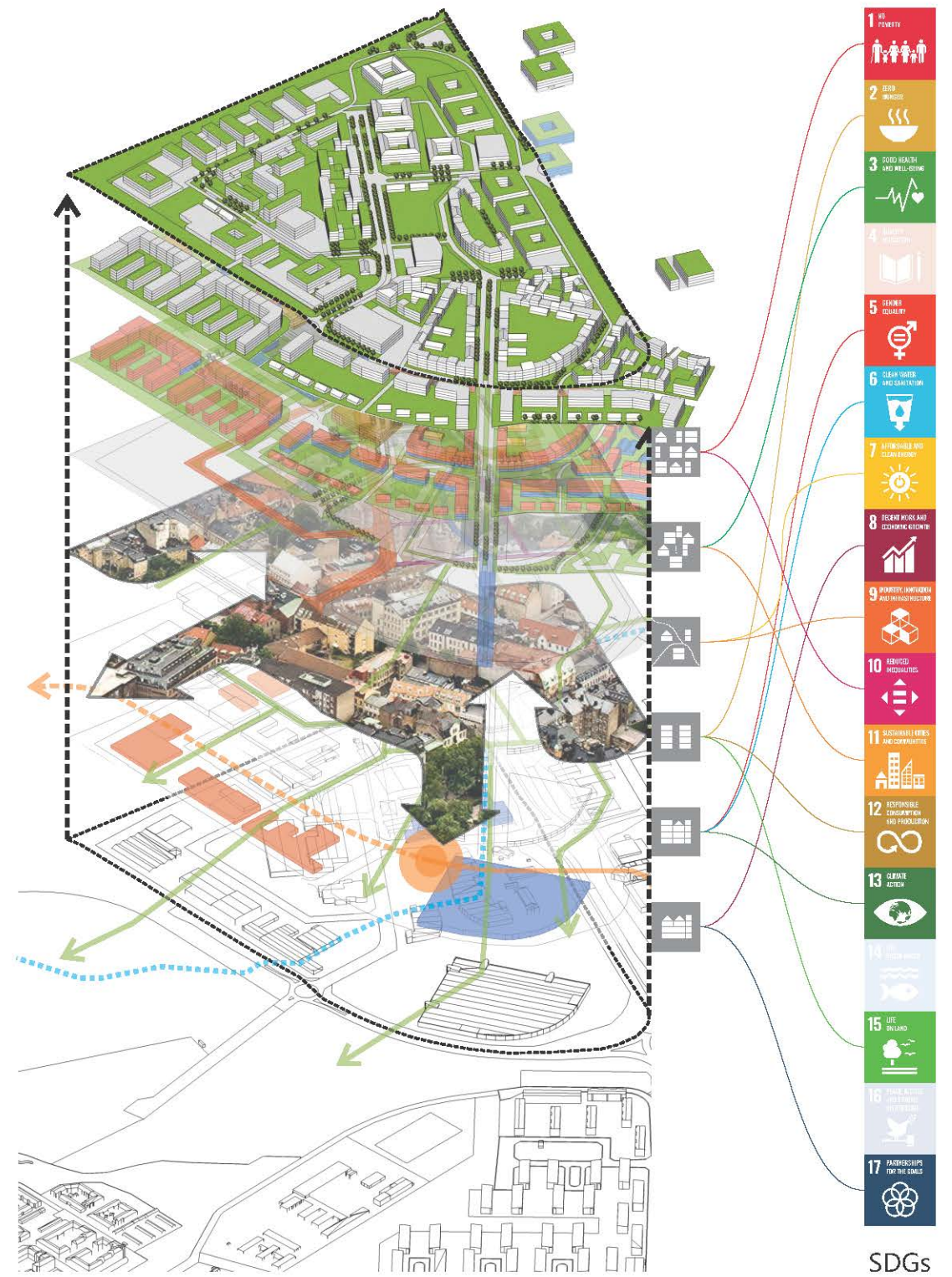
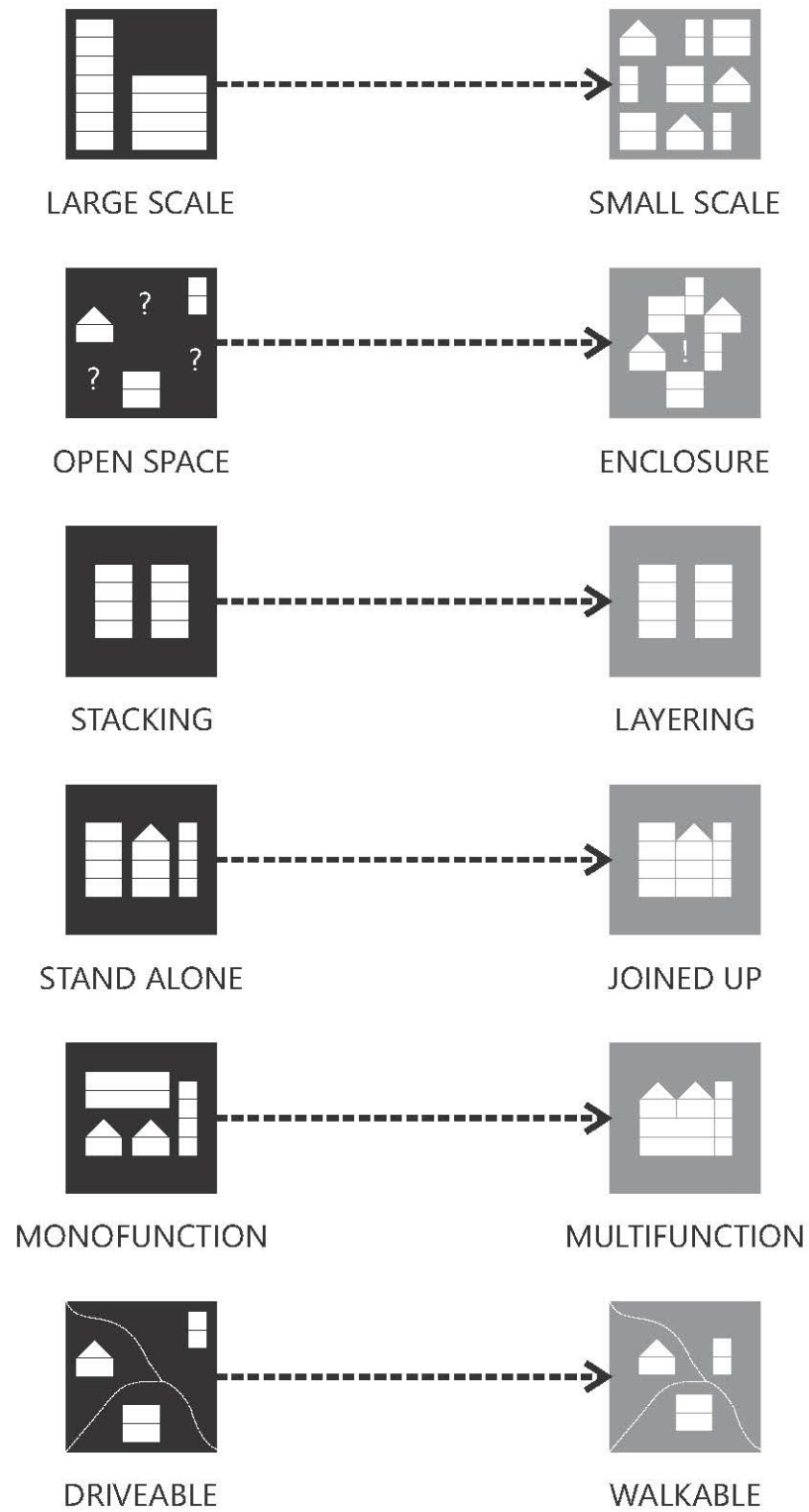
SHOPS OFFICES CAFFE HOUSING

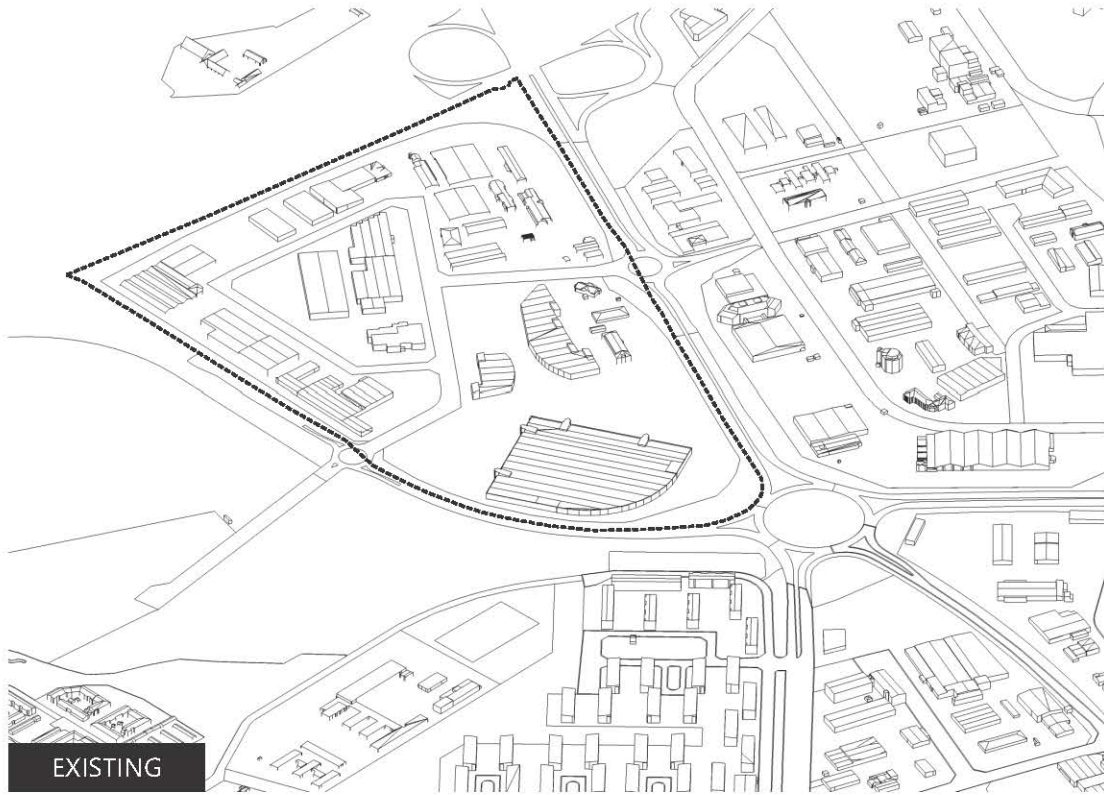
# OFFLINE-ONLINE

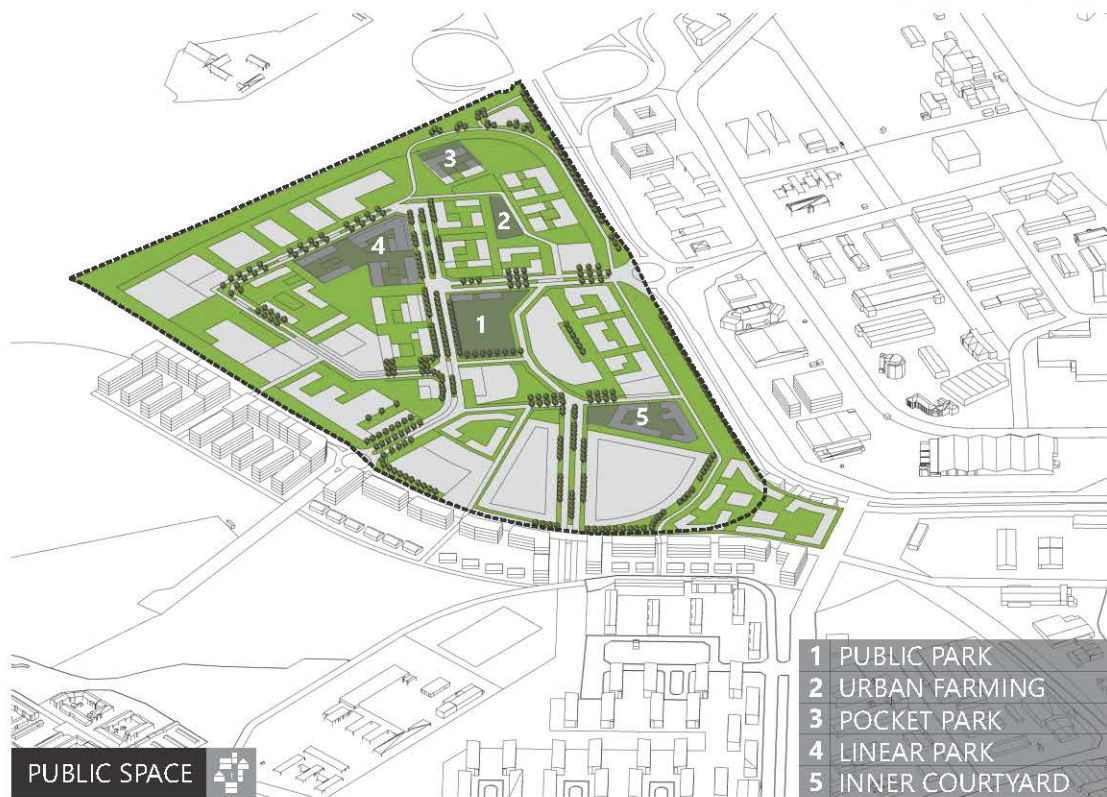
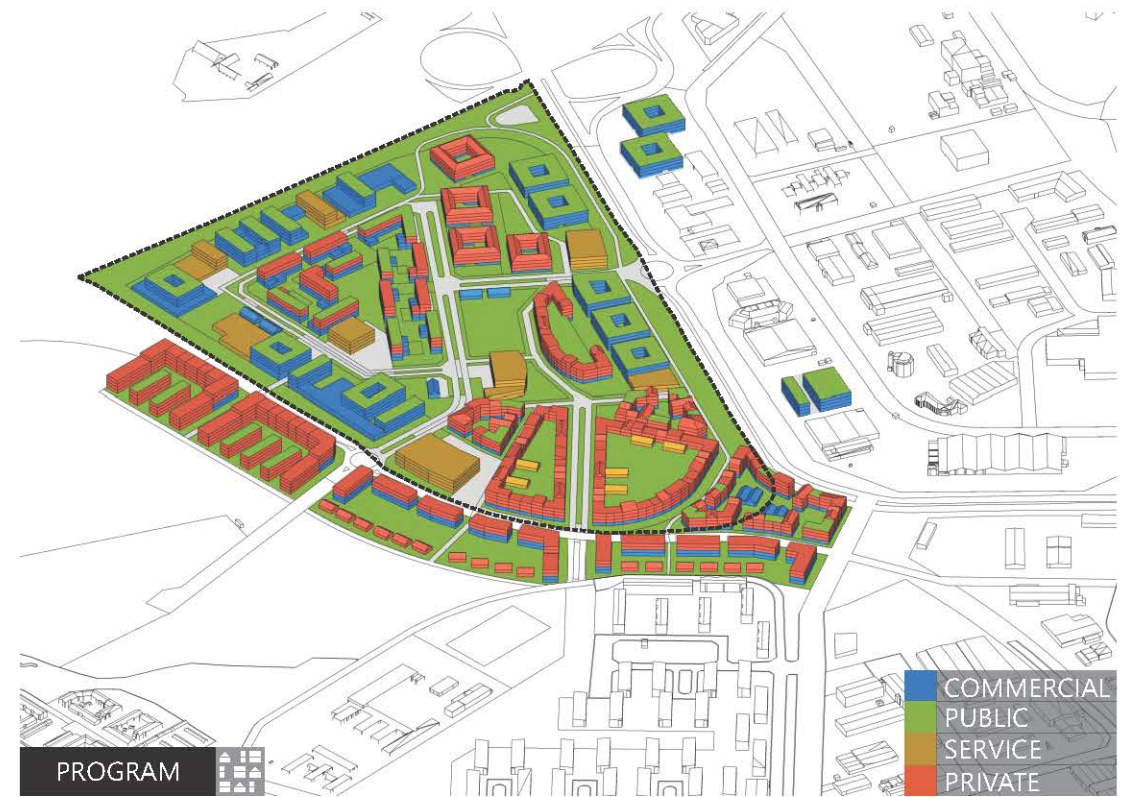
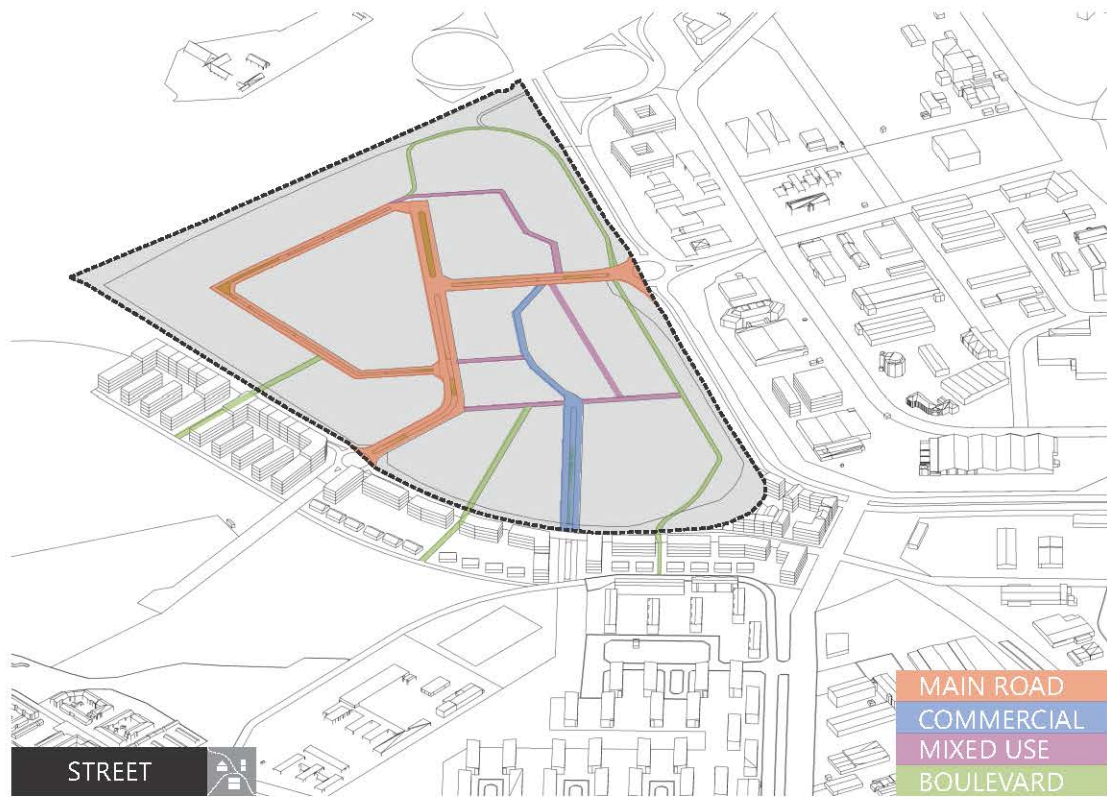


DESIGN PRINCIPLE

STRATEGY









OLD STRUCTURE  
NEW STRUCTURE  
TRAMWAY

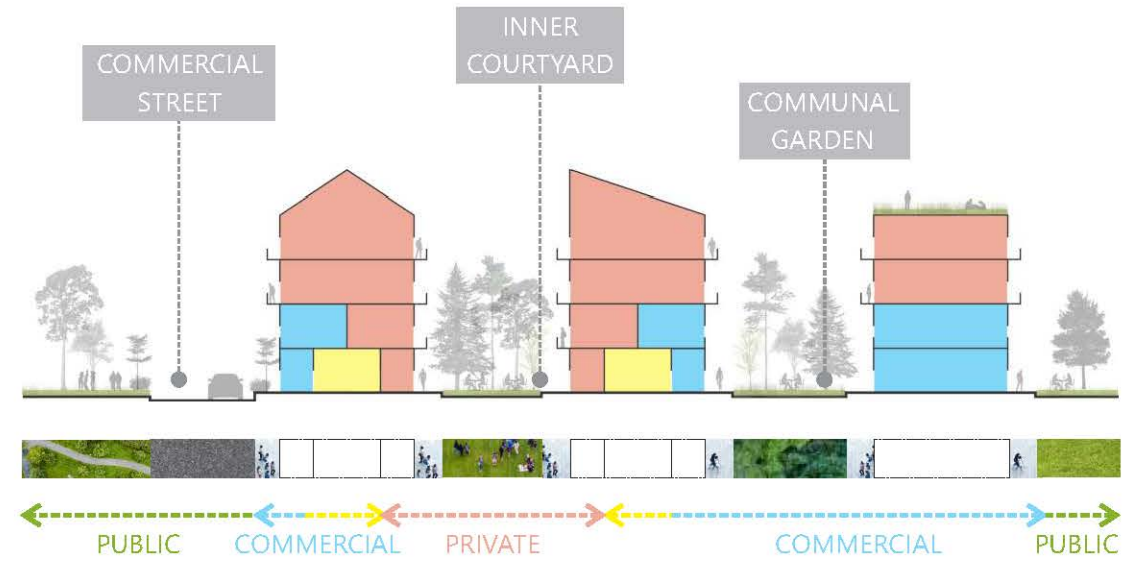


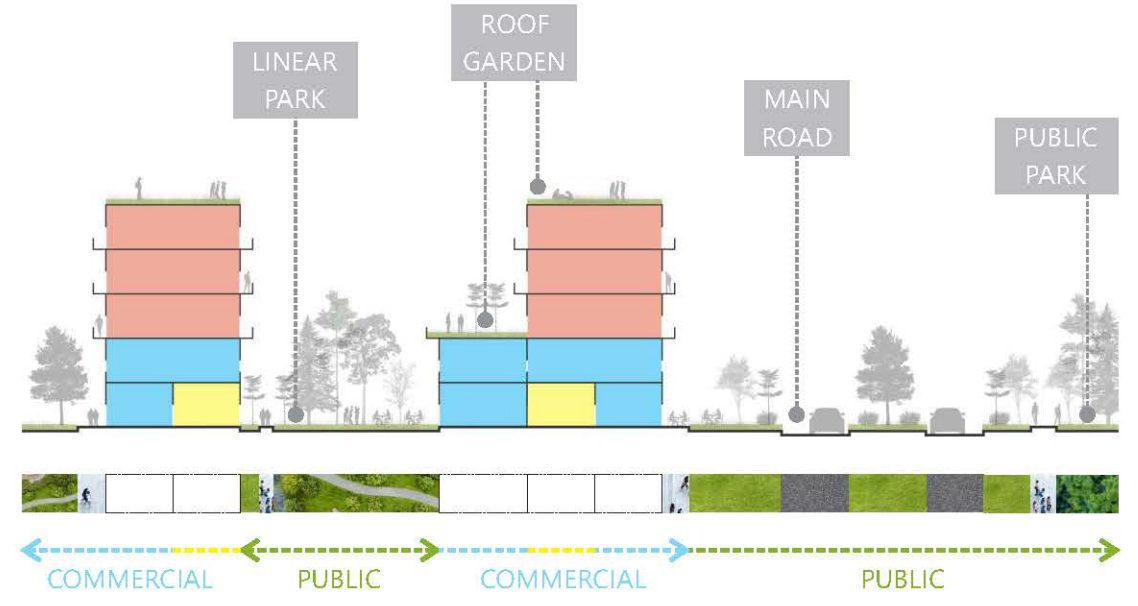
-  VASTERBRO PLAN
-  OLD STRUCTURE
-  NEW STRUCTURE
-  TRAMWAY

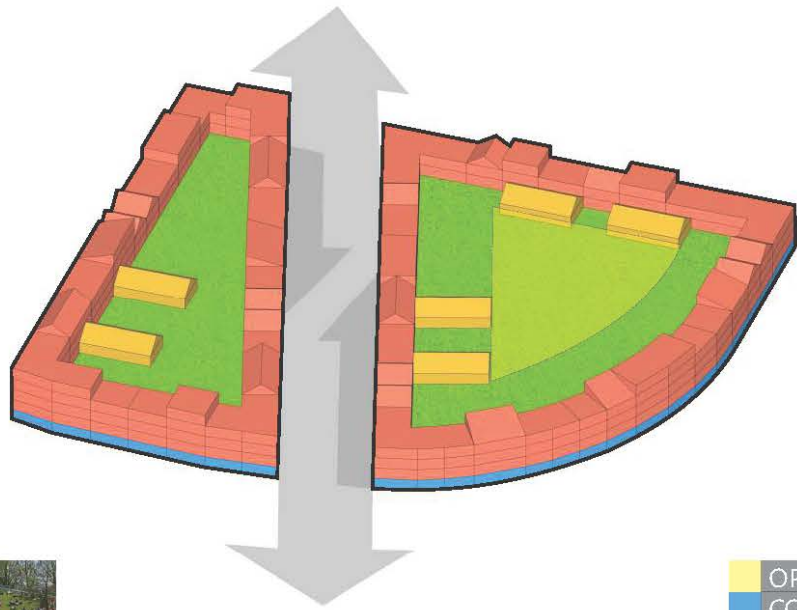


- NOVA-LUND
- NOVA-VARPINGE
- VILDANDEN-GUNNESBO
- OLD STRUCTURE
- NEW STRUCTURE
- TRAMWAY





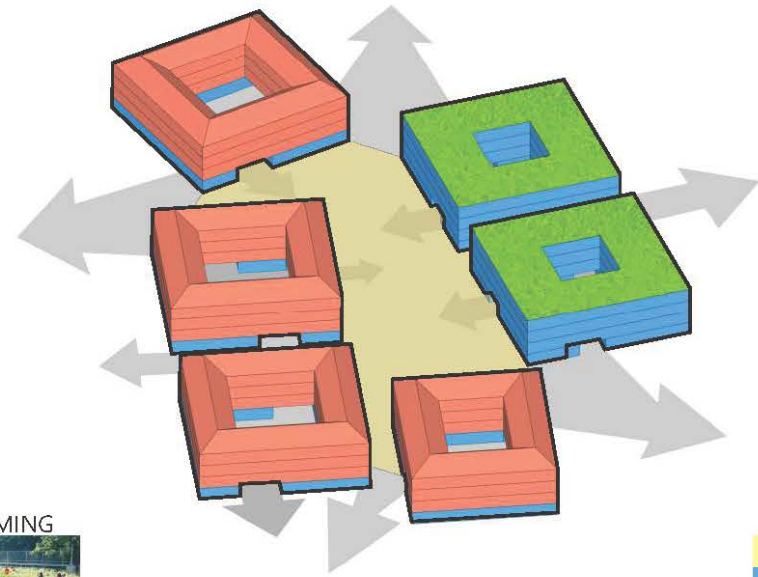




OPEN SPACE



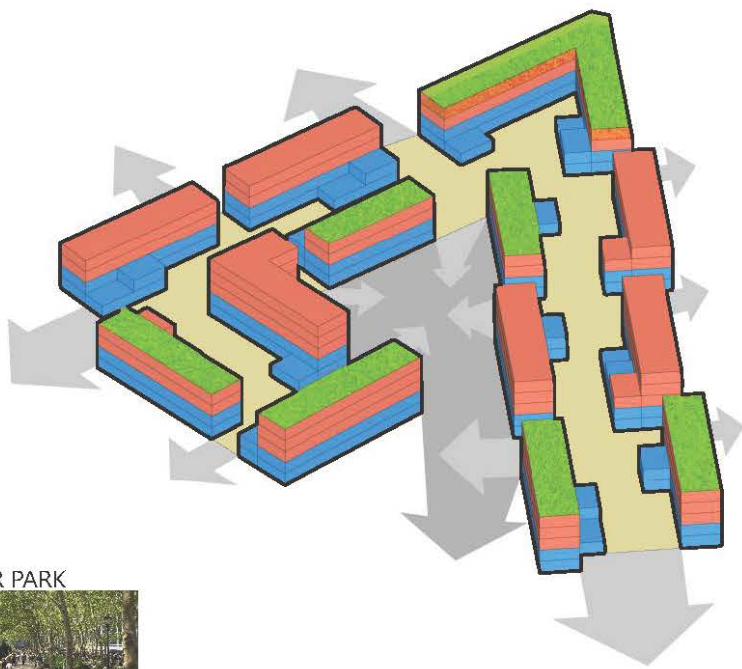
OPEN SPACE
COMMERCIAL
PUBLIC
PRIVATE



URBAN FARMING



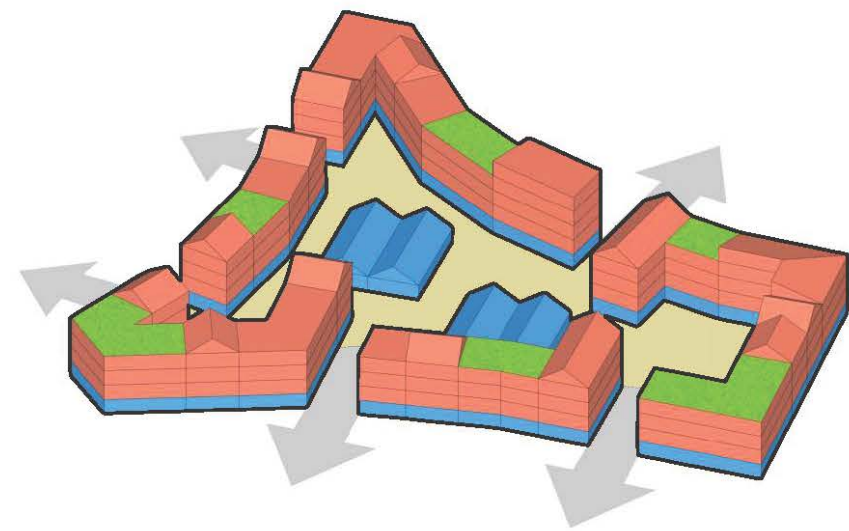
FARMING
COMMERCIAL
PUBLIC
PRIVATE



LINEAR PARK



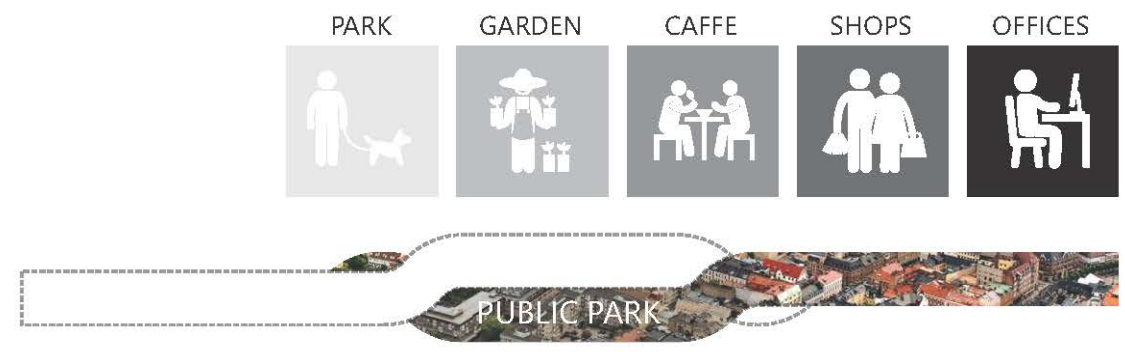
PARK
COMMERCIAL
PUBLIC
PRIVATE



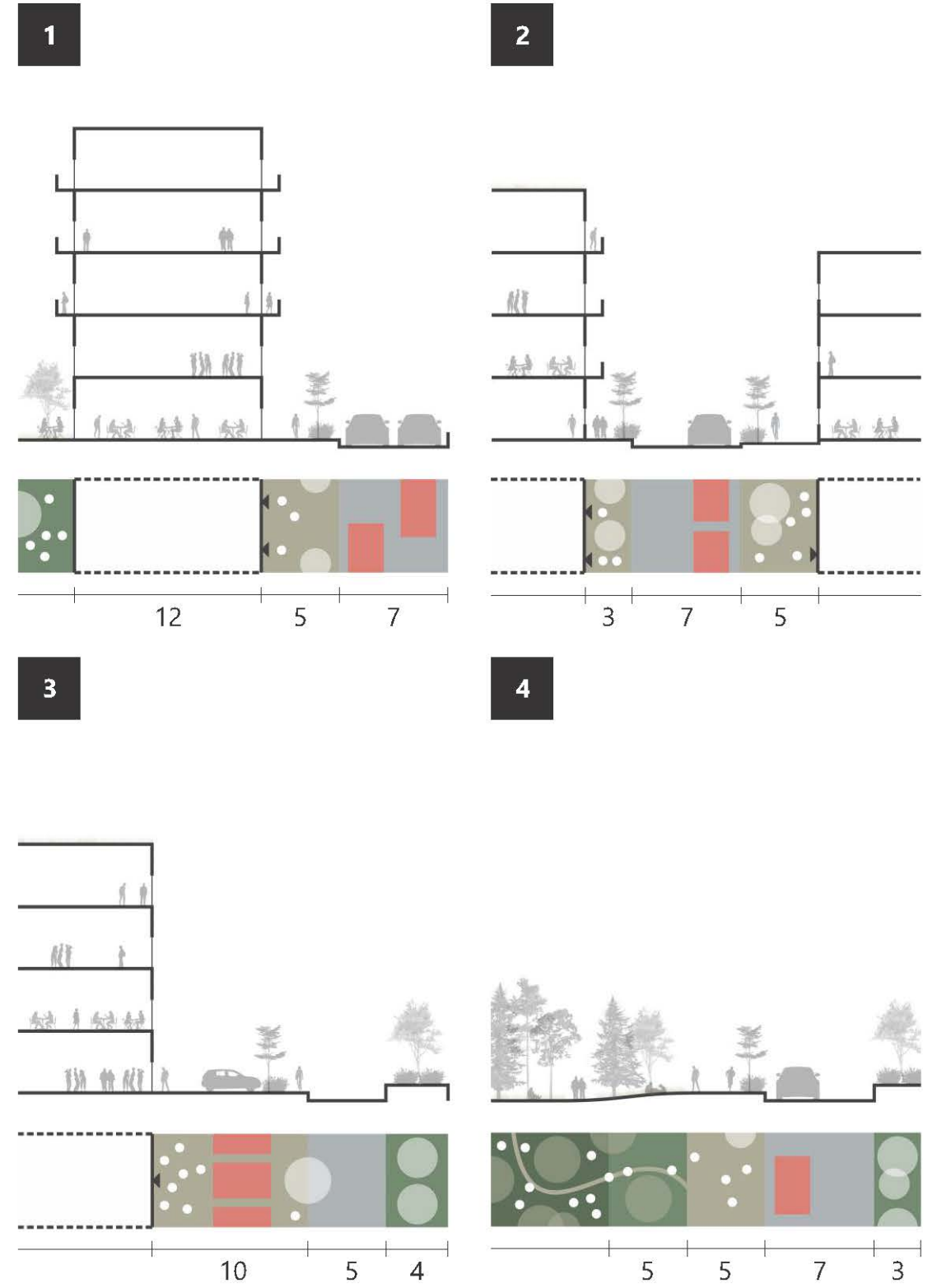
INNER COURTYARD



COURTYARD
COMMERCIAL
PUBLIC
PRIVATE



	YES	MAYBE	NO	Curb Ramps	Marked Crosswalks	Ped Signals - Countdown & APS	Corner Curb Extensions	Street Trees	Tree Gates	Sidewalk Planters	Stormwater Control	Pedestrian Lighting	Special Paving	Site Furnishings	
Main Road	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	1
Commercial Street	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	YES	YES	YES	2
Neighborhood Commercial	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	YES	YES	YES	
Downtown Residential	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	YES	YES	YES	
Residential Throughway	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	NO	MAYBE	
Neighborhood Residential	YES	MAYBE	MAYBE	MAYBE	YES	YES	YES	YES	NO	YES	YES	YES	NO	NO	
Industrial	YES	MAYBE	MAYBE	NO	YES	YES	YES	YES	NO	NO	YES	NO	NO	NO	
Mixed use	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	MAYBE	YES	YES	3
Parkway	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	
Park Edge	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	
Boulevard	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	YES	NO	YES	4
Ceremonial	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	
Alley	YES	MAYBE	NO	NO	NO	NO	NO	YES	MAYBE	YES	YES	YES	YES	MAYBE	
Shared Public Way	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	YES	YES	YES	
Paseo	YES	YES	YES	YES	YES	YES	YES	YES	MAYBE	YES	YES	YES	YES	YES	





# 6 REFLECTION

# REFLECTION

This thesis project, Transitions: Sustainable Business District in Urban Fringe, invites a lot of discussion and deep research during its making process. Starting with study about two transitions, urban-rural and offline-online, which become crucial issues to be solved by government, organization, community, and planners for achieving Sustainable Development Goals.

Today, fringe areas as the transitional space between urban and rural aren't well connected with its surroundings. That disintegration have some implications such as unidentified character, segregation, lack of spatial qualities, etc. Despite of its challenge, the edge should be a platform to rethinking urban-rural relation and create soft transition.

On the other hand, the world are facing disruptive transformation that change urban lifestyle especially people's shopping behavior. This situation enforce developers and planners to offer different programs and qualities in designing future business district. It is not only providing big market place to fulfill people demands but also proposing densification in sustainable way which strengthen fringe area as development node.

Lund is a growing city where many innovative development happens. As research-based global city, there are huge investments for urban consolidation in few parts of the city. MAX IV, ESS, Knowledge Path are current projects followed by future industrial transformation in Vasterbro. Nova is the last puzzle to strengthen local connection from east to the west of Lund. This urban fringe could be a platform to densify existing business district and provide more affordable housing in the city.

The idea about soft transition are sharpened through dynamic process, discussion, mid-review, and presentation. Also, there are many inputs and feedbacks from experts which develop the proposal to respond global issue and local context. At the end, this thesis project becomes a study to rethinking urban fringe as solution through site-specific analysis, concept, strategy, and detail designs.

Fringe area has a lot of qualities by taking the advantage of urban and rural character. It has potential to create sustainable habitat and bring diversity in our life.



# 7 RESOURCES

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# OTHERS

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## Map Sources

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## Image Sources

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