Master thesis at the Department of Spatial Planning, Blekinge Institute of Technology, Karlskrona, Sweden 2009, Marcus Ekström and Maria Jellbin

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How to read this thesis

In Part I of this thesis the subject of sustainability and Toronto are presented.

In Part II focus is set on a new transit system

In Part III the benefits and problems of weaving environmental and social sustainability together is further explored.

In Part IV of this thesis the two individual parts meet in a planning proposal for Cherry Beach.
Summary

Between October 2007 and January 2008 we got the chance to live in Toronto, the most diverse city in the world.

Our choice of study has been to explore how sustainable city planning can be dealt with in a new community of the Central Waterfront of Toronto.

The themes presented by us are a new transportation system to decrease our oil-dependency and how to weave environmental and social sustainability together.

Focus has been on a new transit system in the form of a Personal Rapid Transit System, which is simplified a system of loops of guideways with small pods that takes you from A to B without stops on the way. Ideas of PRT was introduced in the 60s, and is by its forespeakers quick, environmentally friendly, reliable, convenient and cheap. It takes on the challenge to attract people who rather take the car in everyday life. A PRT system between Toronto Downtown and Port Land area as a way to decrease barriers and connecting new and existing built environment.

Further, the Swedish model of Hammarby Sjöstad, has attracted city planners from all over the world, among them Canadians working with the transformation of the Central Waterfront into becoming new mixed communities. The Hammarby sjöstad model is a great example of new urbanism with focus on the environmental part of the sustainability concept. But what can be seen as missing is diversity.

Diversity is a key word in Toronto with a couple of well visited neighbourhoods, Kensington Market and the Islands that can be seen as everyday urbanism areas. Still newly built areas at the Central Waterfront were missing these qualities. This led to a focus of what benefits and problems that can occur in weaving environmental and social sustainability together, using ideas of both new urbanism and everyday urbanism in building a new community.

This thesis is the result of our ideas of sustainable city planning and presents a planning proposal for Cherry beach at the Waterfront of Toronto.

Uppsala and Strömstad,
January 2009,

Marcus Ekström & Maria Jellbin
Our vision of the new community at Cherry beach, the Port Lands, Toronto
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PART I

INTRODUCTION
1. Introduction

1.1 Background

Our choice of study is sustainability within the field of urban planning. The major purpose of this thesis is to explore how we as planners can contribute to decrease the dependency of oil, and to become more energy efficient with the tools available for planners. Sustainability measures aims to deal with global problems such as global warming and increased levels of carbon dioxide emissions. As the solutions to these problems are sometimes best solved at the local level it is very important for all departments of study to look at good examples and to exchange ideas across the borders. Canada and Sweden are similar in many ways but on some issues they seem quite different. What Swedes and Canadians share is the same understanding that we need to think and act sustainable when developing our cities.

Many cities around the world go through the same change at their waterfronts. The manufacturing industry is shifting to knowledge-based industry to attract for example bio-technical and media companies. In Toronto the debate has been going on for more than 30 years and along the way, Canadian planners have had the Swedish project of Hammarby Sjöstad as a model in building new sustainable communities. The Central Waterfront is now being developed to reside more than 68 000 people, and the aim is that Lake Ontario will once again become accessible and part of Torontonian life.

1.2 Purpose

The main purpose of our thesis is to study what tools we as spatial planners can use in building sustainable cities – especially in terms of reducing the oil and energy dependency with focus on transportation and planning tools for sustainable community development. This study will result in a planning proposal for a Personal Rapid Transit system (PRT), and a mixed use neighbourhood at Cherry Beach at the Central Waterfront of Toronto.

Our aim is also to learn more about Canadian life, cities and planning, and to integrate those thoughts in our planning proposal.

1.3 Main and secondary questions

This thesis consists of four parts. It deals with our main question concerning spatial planning and sustainability in Part I. The two secondary questions are more detailed dealing with the two different themes transportation and community development. These themes are dealt with separately in Part II and III, and joint together at the same geographical site resulting in one plan in Part IV.

Main question
- What can we as planners do to move towards more sustainable cities and away from oil dependency?

Secondary questions
- How can a PRT system be made useable and an attractive component in the urban space?
- What benefits and problems will you get by weaving environmental and social sustainability together in planning a new community?

1.4 Methodology and time of completion

This thesis has been completed during the time span of May 2007 and December 2008. During the fall of 2007 and the spring of 2008 we have collected materials, researched on sustainable city planning, and attended conferences. Between October and January we lived in Toronto to get to know the city, Canadian life, and meet with planners and architects as well as others involved in city planning. We collected materials on the waterfront project and got supervision from Mr. Hon Lu at Toronto Economical Development Corporation (TEDCO), and Mr. Antoine Belaieff at GTTA (Greater Toronto Transportation Authority). During our stay we were also able to attend breakfast meetings, make field trips, and take part of public meetings. We also got the chance to travel in North America to see other cities, such as New York, Chicago and Calgary. Finally this thesis was completed in Sweden under supervision of Mr. Anders Törnqvist and Mrs. Anette Andersson at the Blekinge Institute of Technology (BTH), Karlskrona, Sweden.

1.5 Delimitation

In order to make detailed studies we have limited our approach to mainly environmental and social sustainability.

The geographical study area is a part of Toronto’s central waterfront project and is naturally bounded by Lake Ontario. After analyzing the area we have chosen to focus on the Port Lands with the part south of the ship channel called Cherry beach. To some extent we have also looked upon how the area connects with the rest of the city, especially concerning public transportation.

1.6 Assessment of sources

We have in our thesis used a wide range of research material. Within the field of sustainability there is a lot of activity and many new technologies come and go. There is also the discussion and different point of views on oil and whether its resources are scarce or not. The problem with the sources concerning PRT is that most of the reports come from fairly similar groups (mainly private companies) who all have the same interest in making profit on new technology. Thus, one has to be aware of this although there are some governmental organisations such as SIKA (Swedish Institute for Transport and Communications Analysis) that also contribute with reports and research material on the subject of personal rapid transit. Also, a lot of the sources are rather contemporary as it is closely tied to current technology, a fact that might bring different assessments of the impact of such a transit system, depending on when the view on PRT and the public space has been stated.

There are different ideologies and approaches to sustainable communities. Two collections of articles written by well-known planners and social critics have been used as well as a debate in Michigan on different urbanisms where opinions on city planning differ. Sustainable cities are mainly oriented towards environmental aspect of the concept explaining what can be done with the hard infrastructure, and many publications of low energy consumptions are material from companies with economic profit in mind.

Even though urban planning is not politically bounded some of the sources are clearly marked by the author’s political view. Also when it comes to planning tradition Europe and America are quite different and the expectation and demand from the market shows in the “best practice” that the sources express.
2. Sustainability, oil dependency, and planning

2.1. History of sustainability

Sustainability was put on the world agenda by the United Nations (UN) and they have led conferences on the issue since the 70s. The most well known literature is the Bruntland report (1987) called Our common future, with the key statement, defining sustainability as:

Meeting the needs of the present generation without compromising the ability of future generations to meet their own needs.

The interest in sustainable development has increased as the focus has shifted from a global to a local perspective with the mantra: “Think global - act local”.

Through the UN different agreements towards sustainable development has been produced, among them the Rio declaration, Agenda 21, the Global Forest Principles, the Convention on Climate Change, and the Convention on Biological diversity (Rio de Janeiro conference in 1992). Such agreements have been developed and used, and targeted the local level.

A number of nations have also approved to an addition to the United Nations Framework Convention on Climate Change (UNFCCC) known as the Kyoto protocol, a promise by developed countries to reduce green house gas emissions. A clear focus is currently on climate change and global warming. Our planet’s resources and the environment limit the economic growth and new ideas and actions must take place to solve the equation.

2.2 Sustainability and the city

Every country in the world is dependent on oil, grain and steel. The world’s resources are finite and how we use land and water is crucial. The sustainability concept is often divided into three parts; environmental, economic, and social. A sustainable city comprises every aspect of living. It is therefore complex which explains why many theorists rests on one of the three legs more than the others.

The built environment is one of our most long-lasting investments. Therefore we as planners play an important role in making our cities sustainable and we are obliged to build cities where it is possible to live sustainable lives. Spatial planning is important also because it involves both long term planning (regional and comprehensive planning), short term planning (detailed planning), policies and programs. Processes where the politicians are the outermost responsible.

Reaching environmental sustainability in a city will not automatically make the city all-through sustainable socially and economically. And vice versa, an economically sustainable city doesn’t necessarily make it a good living and ecological environment. The three parts are equally important and what they comprise is cross-connected. Some aspects of a sustainable city are easy to use as key ratios such as for example levels of emissions. Other aspects are more hard to measure since they are individual-based. An example of the latter is the “feeling like home” and attractiveness.

There are limits to what planners can control regarding sustainability, but the physical design can make it easier or more difficult for people to make environmental, social and economical investments.

2.3 Existing built environment

In existing built environment we find these aspects of greatest importance to deal with concerning our main question moving towards more sustainable cities and away from oil dependency:

1. Decrease oil dependency in the transportation and housing sectors
2. Re-use energy, water and materials
3. Increase the use of renewable resources

Beyond these environmental actions each community must focus on their respective shortages economically and socially.

2.3.1 Oil dependency

Increasing environmental problems such as global warming caused by carbon dioxide emissions from cars are a serious threat to the Canadian life, but also to the rest of the world. As North American cities have sprawled out from the city centre a lot of them are facing a dramatic change in urban planning and transportation, cities that have been developed around the car and its demands. Also when the oil price rises, public transportation will have an important role to play in future urban development. It is not economically and environmentally sustainable to continue to use oil as the major source for fueling the car and heating houses. Environmentally friendly materials which are energy efficient are needed to minimize the leakage of heat and good isolation is required. One has to adopt a holistic view of the development of our society, where comprehensive and yet flexible structures need to be laid out. Energy efficient houses and transportation systems are some of the issues that are important parts of the puzzle for a more sustainable society, hence how we live and how we move. The quote below expresses this.

“Cheap oil has enabled Canadian cities to sprawl into a state of auto dependence in which distances between home, work, shopping and school often preclude access by anything other than an automobile.”

(Pearl, Anthony)

2.3.2 Re-use

Both water and energy can be reused, for example an office daytime can help heat housing units night time. Green walls and roofs and open water channels can collect rain water and be re-used to irrigate lawns, and at the same time become a positive element in the city. A new community must be able to provide for itself and its waste. This includes waste management within the house, the community and the city.

2.3.3 Renewable resources

In theory there is sufficient local natural resources wealth in the shape of sun, wind, ground and water that we today do not use. Walls, roofs, streets, plazas are surfaces that can collect energy. From an economic perspective the best solutions are hybrid systems that supplement these local, renewable resources with import from elsewhere (Federation of Canadian Municipalities, 2001, page 10). Favorably a district heating system is used together with deep lake cooling. Passive house technology can decrease energy consumption. A wind power station of 3 MW can approximately serve about 1 500 one family houses with electricity every year (Boverket 2008). Solar panels can heat water and there are geothermal sources in the ground. Using renewable resources will decrease the usage of oil and other endless resources.
2.4 New communities

In building new communities it is more cost-effective to plan for sustainability from the beginning than proceeding with more conventional approaches and then adding on sustainability features at a later date (Swedish trade council, 2004, page 8). Many urban planners have explained what a healthy neighbourhood should comprise. We have chosen one of many lists of qualities in new communities presented by Stephen Wheeler in the City Reader, third edition (Wheeler, 2003, pg. 490-494):

1. Compact, efficient land use
2. Less automobile use, better access
3. Efficient resource use, less pollution and waste
4. Restoration of natural systems
5. Good housing and living environments
6. A healthy social ecology
7. A sustainable economics
8. Community participation and involvement
9. Preservation of local culture and wisdom

2.5 Problematization

In accordance with the main question, of what we as planners can do to make our cities more sustainable and less oil-dependant, we have realized that the two major issues we should focus on are transportation and benefits of weaving environmental and social sustainability together.

This follows the TWRC’s Sustainability Framework. For urban planners land use is the tool we possess. When it comes to land use examples of suitable actions and strategies are to plan for mixed use for a mix of users, and for public transit.

This proposal deals with a new district at Cherry beach at the Port lands, but we are aware that other efforts in Toronto are as much or even more important for decreasing oil dependency, such as improving public transportation in the suburbs and improve isolation of old buildings.

The picture below illustrates how different aspects in urban planning fit within the sustainability concept. In this thesis we have chosen to focus on foremost transportation, and what benefits you will gain by weaving environmental sustainability together within the green and yellow fields.
3. Facts about Toronto

3.1 Country, province and city

Canada is a monarchy with Queen Elizabeth II as its head of state. The country is a federation composed of ten provinces and three territories. Toronto, on the north shore of Lake Ontario is the capital of the Province Ontario. Toronto is Canada’s largest city with about 2.5 million people (Statistics Canada. 2007) and about 5.1 million in the Greater Toronto Area. The city is the centre for commercial, financial, industrial, and cultural life and one of the most liveable, and multicultural urban places in the world today.

The country of Canada was founded in 1867, but people had been occupying the country and modern day Toronto long before that. The first Europeans discovered the area around the early 17th century as they set out to meet and live with natives, at that time the Hurons – whom the French wanted to build alliances with. European traders inhabited this part of modern Ontario during the 17th and 18th century, and since trading was carried out between the French and the British, the passage between Gregorian Bay and Lake Ontario (the Toronto area) became of importance.

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During fights between the English and the French the Toronto area still remained French during the 17th and 18th century, with interaction with the natives.

The name Toronto comes from the native Iroquois term “where there are trees in water” and not the still-popular Victorian romanticism which states the meaning of the name being “meeting place”. Interestingly because of its handling of pigs the nickname of the city during late 19th was “hog town”.

In 1763 New France including Toronto became British. This led to harder times for the natives as they weren’t treated as good as when the French ruled the area. In 1787 Toronto was bought by the government from the Mississaugas (natives) to make the way open for Euroamerican settlement.

Despite this the natives stayed in the area and are still evident in today’s Toronto.

In 1793 the lieutenant-governor of Upper Canada, John Graves Simcoe, named his settlement (now the capital of Upper Canada) York, which he also strengthened by building Yonge Street (see map x), and a sawmill, and attracted farmers to the settlement for defence against the Americans and the French which had just recently declared war against the British. There were several attacks on York during the first two decades of the 19th century but the city remained British.

Toronto and the province changed dramatically between the end of the war in 1815 and the building of the railway in 1851. The city had changed from being an outpost on the frontier to a business and administration centre. It had also been populated with British newcomers after the war which was seeking a better life on the other side of the Atlantic Ocean. The population of York grew from 720 in 1815 to some 30 000 in 1851. There was now a concentration of governmental, commercial, and institutional power in Toronto which led to its greater influence over provincial society. Together with the railway the harbour of Toronto rapidly changed the city status and by 1900 there were over 200 000 people living in Toronto.

When New Brunswick, Nova Scotia, and the United Province of Canada formed the ‘Dominion of Canada’ within the British Empire in 1867, Toronto became a city within a country instead of a colony. The nation became bigger with the acquisition of the great northern and western interior by 1870, and as with when British Columbia and Prince Edward Island came into Confederation in 1871 and 1873 respectively, which was followed by the acquisition of the Arctic from Britain in 1898 and the entry of Newfoundland in 1949. By now Toronto was the ultimate city for business and commerce and the largest urban centre in the most inhabited province of the new country. When the Canadian Pacific Railway was finalised in 1885 Toronto had a connection with the Pacific Ocean and an even bigger market to sell its products to. Toronto grew to become an industrial city with new business such as banks, but people lived scarcely in the city. The houses were shacks. Even though officials tried to improve housing standards in 1929, when depression hit Toronto, compared with other cities of the early 20th century, lack of heat and running water was evident in Toronto. As a reaction to this, reformers and philanthropists initiated a movement in order to beautify the urban environment and such buildings as Union Station and the Art gallery of Toronto was built during the First World War. This was also the time when the Toronto Transportation Commission was formed and gained economic momentum during the interwar years when gas rationing was a fact; revenues that would help build the city’s first subway line. In the late 1930’s two airports were built; the island airport named Port George VI Airport, and Malton (today known as Lester B. Pearson International Airport).

![Map of Toronto and surrounding areas.](image)

The two pictures show Toronto's situation by Lake Ontario and how the city sprawls. The major roads are marked by yellow.
After the Second World War car usage boomed in Toronto. This together with people moving out of the city affected its structure and gave it an urban sprawl-like character. During the 1950’s a lot of investment was put down on roads and highways and in 1953 the Gardiner Expressway was built. The success of Toronto is partly based on its many immigrants that started moving to the city after the Second World War mainly from Eastern Europe, which was followed by Asian immigrants later in the 20th century. Personal freedom, tolerance, a good living standard and technology, and increased education also added to the development of Toronto as a successful city. Many of the world’s premier thinkers and scientists had Toronto as their home. Nobel Prize winner such as chemist John Polanyi, novelist Margaret Atwood, artist Michael Snow, pianist Glenn Gould, and of course famous thinker and writer in the field of urban planning Jane Jacobs all live or used to live in Toronto.

3.2 Governmental structure
As the Constitution Act was passed by the British Parliament in 1867, the Canadian Federation was created (initially consisting of four provinces; Ontario, Quebec, New Brunswick and Nova Scotia). The two initial levels of government were the federal and the provincial levels. The federal government had its seat in Ottawa and Ontario. Provisions were made for legislative institutions modelled on those of Britain for both orders of government (Electronic source: Government Ontario, 2008).

As of today, Canada consists of ten provinces and three territories and the third and final governmental level is the municipal level. Because Canada in 1867 was a rather large country with vast areas and weak links, the federal government was given powers to strengthen the links between the regions. Hence some powers were specific for the federal and provincial governments while some where shared between them. Immigration, indirect taxation, criminal justice, defence, and trade and commerce are included in the federal government’s powers. Education, health and social services, administration of justice, prisons, and direct taxation belongs to the provincial government’s responsibility. Although, the two levels of government consult each other regarding issues of mutual interests.

In 1982 Canada became totally independent as the British Parliament gave Canada the power to amend its Constitution, including the Constitution Act.

3.3 Planning regulation
Planners in Toronto are restricted and guided by laws, regulations, zoning bylaws, and policies. The planning act governs planning across all of Ontario and the municipality is obligated to have an Official Plan that sets out an approval process for development of land and minimum requirements of public consultation. It also sets out appeal rights to the Ontario Municipal Board. Planners are also guided by policies, Provincial Policy Statements, set out by the province regarding provincial interests, for example the environment, the economy, and housing matters. This means planning decisions have to be consistent with the policies set out by the Provincial government.

The Official Plan sets out the broad direction for land use in each municipality for 10-20 years. Zoning by-laws, site plan control, plans of subdivision, severances, and other land use decisions by municipal councils are guided by Official Plan policies (Electronic source: Carolinian Canada, 2008).

The Official Plan has to be reviewed every five to ten years. Applications of development are evaluated from the intent of the Official Plan. More detailed planning from the Official Plan is called zoning Bylaws and it puts the Official Plan into action on a specific site and regulates the use of land and construction. It usually deals with suitable densities of a specific site, building heights, and parking and open space requirements.

3.4 Public transit
Being one of the biggest cities in North America and in Canada, Toronto has a major task to provide its almost 3 million inhabitants with efficient public transit, hence not an easy task. The responsibility lies on the Toronto Transit Commission which operates the buses, streetcars, and subway trains. According to the TTC, “the TTC carries 1.4 million passengers on an average business day” (Toronto Transit Commission, 2005). That amount of passengers puts a lot of pressure on the city’s public transit, although the majority of Greater Toronto’s inhabitants travel by car. The streetcars, buses and subway connects the different areas of Toronto to each other and is, compared to many other North American cities, quite efficient. Change from one transit mode to another is easy because the different modes of transit are connected in a grid, where the passenger can hop off a streetcar and take the subway to the final destination. The most frequently used transit corridors are those where the subway goes, and where the streetcars are going west-east and vice versa.

Streetcars
As the transit map shows existing east-west bound streetcar lines are found on Queen Street, Dundas Street, King Street College Street, Front Street, and at the central waterfront on Queens Quay. North-south streetcar lines consists of Spadina Avenue. (marked on map on next page in yellow)

Subway
The subway network (marked in yellow and green) is designed like the letter U with an east-west line crossing it on Bloor Street, north of Toronto’s downtown area. The east-west subway line runs from Kennedy in the east, in the municipality of Scarborough, to Kipling in the west, where
connecting buses run to Toronto’s major airport (Pearson International Airport). This line crosses the north-south subway lines at Yonge Street and Spadina Avenue. Both of these north-south subway lines meet at Union Station of downtown Toronto. They also connect the northern parts of Greater Toronto, as in Finch and Downsview.

**Buses**
The TTC buses run north to south and vice versa. They connect both to the subway and also to the streetcars.

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**3.5 Communities & Architecture**

Toronto is said to be the most multi-cultural city in the world, with more than 50% of its inhabitants born outside of Canada. The multi-cultural character is reflected in the communities. As an example you will find Little Italy, Portuguese town, Little India, China town, Little Poland, Little Greece etc. Most of the buildings are from the 20s and the 50s when immigrants came to the city and Toronto was growing the most. The architecture is to great extent Victorian, consisting of narrow, 2-3 storey buildings with a peak roof and/or bay window. Towards the street there are often small gardens, stairs and porches. Along main streets where the street car runs, many of the houses are vertically mixed used, with shops, cafes or hairdressers downstairs and living area upstairs.

In Downtown Toronto you find the financial district, an area with most of Toronto’s high-rise buildings containing banks and larger companies. The more recently built areas at the waterfront are high-rise condominium buildings. The farther from downtown you go, the more the car dependant and mono functional areas you’ll find.

The Islands is a contrast to the city-life in Toronto. It can only be reached by ferry and no cars are allowed. The houses have been built and rebuilt, and vary in both form and colour.

The study area Cherry beach is situated at the Port Lands that today is the most central industrial site in Toronto and functions as Toronto’s port. The area around Cherry beach, The Spit, is used for recreational purposes. Port Lands is part of Toronto’s waterfront project, a transformation from industrial land to mixed used neighbourhoods.
4. The Waterfront project

4.1 Brief introduction

Toronto’s waterfront is going through the same change as many other industrial ports are throughout the world. Since the railroad laid its tracks on the waters edge in the mid 19th century the city has been separated from the water and public access has been poor. Throughout history massive lake fill has taken place and today about 85% of the land base on the central waterfront human constructed (Habel et al, 2005, page 17). Lake fill has historically been synonymous with economic growth and social stability and great part of the masses came from development in Downtown of Toronto. The shape of the city has been transformed and the relationship between lake Ontario, City of Toronto, and the Torontonians has changed.

As part of globalization cities of the 21st century compete to attract businesses and tourists. At the same time knowledge about how everything is connected, economically, socially, and ecologically, is increasing. In the fall of 2001 Toronto Waterfront Revitalization Corporation was established, consisting of three levels of government. They are now leading an ambitious city building initiative on 800 hectares of land (2 000 acres), spanning 25 kilometres of Lake Ontario Shoreline (Habel et al, 2005). The Central Waterfront anticipates over 40,000 new housing units for over 68,000 people (Swedish trade council, 2004, page 23). All combined Toronto has the opportunity to make their waterfront project sustainable, attractive, and educational - A showcase to the world.

4.2 Historical context

In late 19th century the water’s edge was on Front street. Fish markets, hotels, warehousing, and activities at the wharves made the waterfront a lively place. Most of the land was privately owned but was in trust for the use and benefit of the town of York. In 1853 two different plans were presented; one that proposed better public access to the water, the other to accommodate a corridor for the tracks of Grand Trunk Railway. Since the first plan was deemed too costly and since the railroads at this time had great power the latter took control of Toronto’s waterfront. As a result the city was shut off by physical barriers, by tracks and parked freight trains. In 1880 the situation worsened as the city advanced into the water to provide space for a competing railroad company, the Canadian Pacific.

At the beginning of the 20th century manufacturing had become the single most important industry in Toronto. As the city grew, the waste generated was disposed at the waterfront marsh which created new land for industrial and commercial purposes. But lake filling had a backside as the marsh couldn’t absorb the increasing amount of waste that was generated and disposed of. The marsh was seen as a breeding ground for diseases, something of great concern for the city.

To oversee the activities with freight handling between railway, water, and the industrial development at the waterfront, the Board of Toronto Harbour Commissioners was created, and a lot of land was deeded to them.

Their plan was to dig out the harbour to get enough depths for ships and construct new land for industrial purposes with the sediment. In order to gain public acceptance the plan included green space, a beach and a lakefront boulevard.

Since then the plan has been revised. The Commission took advantage of the building boom in Toronto Downtown in the 1950s and 1960s to lake fill at the Spit but the forecasted increase in shipping never occurred when Toronto changed into becoming a service-based economy. As the environmental awareness increased the port and industrial activities retreated.

Following plans presented a continuation of massive lake filling but the Commission was in debt and public attitude towards lake filling were changing. Eventually the plans were put on the shelf. In the late 1980s and early 1990s the Harbour Commission lands were transferred to Toronto Economic Development Corporation (TEDCO) (Habel et al, 2005). The public access to the waterfront is still poor and the promised multi-use parks with green space and marinas has turned into high rise buildings and parking lots. The land is owned by three levels of government whereupon Toronto Waterfront Revitalization Corporation was formed in 2001 to develop the waterfront into a more public, accessible, and sustainable part of the city.

4.3 Toronto Waterfront Revitalization Corporation (TWRC)

Toronto Waterfront Revitalization Corporation (TWRC) was formed in 2001 (name changed to Waterfront Toronto in 2007), a corporation between three governmental levels; the Government of Canada, the Province of Ontario, and the City of Toronto.

The history of the waterfront and the many interests and land owners makes the waterfront project complex. TWRC sees the waterfront project as an opportunity to “ensure that Toronto
becomes the city where the world desires to live.” (Electronic source: Waterfront Toronto home page)

In able to put Toronto at the forefront of global cities in the 21st century the City of Toronto’s Central Waterfront Secondary Plan has set four core principles that are guiding the Development Plan. The four core principles are (City of Toronto, 2003, page 2):

1. Removing Barriers/Making Connections
2. Building a Network of Spectacular Waterfront Parks and Public Spaces
3. Promoting a Clean and Green Environment
4. Creating Dynamic and Diverse Communities

By transforming the waterfront into beautiful, sustainable new communities, parks and public spaces, fostering economic growth in knowledge-based, creative industries the vision is to ultimately: re-defining how the city, province and country are perceived by the world and strive to ensure that Toronto becomes the city where the world desires to live.” (Electronic source: Waterfront Toronto homepage)

In order to transform the waterfront TWRC are working with different planning documents and policies, public meetings and forums, a homepage, competitions and for example inviting the Swedish Trade Council to make a review (see page 19). One of the documents striving to make the waterfront project more sustainable is TWRC’s Sustainability Framework.

4.4 Sustainability Framework

During recent years work on sustainability issues in Canada has concluded with several planning documents. The Sustainability Framework for the Toronto Waterfront is one example of this. The framework deals with questions on sustainability which includes energy, land use, architecture, identifying the actors and more. The framework is said to be used as a complement to existing Toronto plans including the Central Waterfront Plan, the Official Plan, the Economic Development Strategy, the Social Development Strategy, and the Culture and Heritage Plan. The Sustainability Framework uses a holistic way of approaching the major threats to a sustainable development as it focuses on integrated decision making and the interconnectedness between the society, the environment, and the economy. These theories on society, economy, and the environment can be recognized in literature from the UN conference in Rio de Janeiro in 1992 which has had a big impact on the way sustainability is perceived in the world. These theories focus on sustainability when it comes to energy, land use, transportation, sustainable buildings, air quality, human communities, cultural resources, natural heritage, water, materials and waste, and innovation. All of these topics are listed in the action plan and they consist of objectives, strategies, and actions and to some extent specific targets.

4.4.1 Land use

The key objective of land use is to optimize street layout, placement of buildings for saving energy with natural lightings, and also accessibility to the lake. This topic also discusses the need for a mixed-use community with different functions within the neighbourhood and an integrated transit system. Listed objectives within the department of land use consists of making sure development patterns are consistent with sustainability, achieving vibrant street life, maximizing opportunities for use of renewable energy, enhanced animal and aquatic habitat, compatibility between designated land uses and sustainable infrastructure, and recapturing value of abandoned and underused sites. Within each of these objectives there are strategies and actions to be used in order to be in line with the objective. Examples of suitable actions and strategies are to plan for mixed use (i.e. a balance of residential, commercial, industrial, and parks and greenery), and for public transit. An important way to achieve the objective of vibrant street life is to orient buildings and streets in order to make sure that pedestrian areas have good sun light, and to designate car-free zones as well as separate cycle

Above: Frontpage of the Sustainability Framwork

A view of Toronto from the Islands
It is also important to orient buildings so that it will allow them to have more natural lighting and heat during the whole year. Actions such as creating and maintaining networks of natural systems and create infrastructure that facilitates understanding and appreciation are also important when trying to enhance animal and aquatic habitat. It is also important to coordinate infrastructure and land use planning and to develop sites adjacent to existing infrastructure. Buildings, parks and open spaces should also be designed so that they facilitate an opportunity for future district energy solutions. Sites of previous brown fields should be redeveloped and a strategy for this kind of development should be created.

4.1.2 Sustainable buildings
This topic focuses on indoor climate, green houses, LEED standards, sustainable building material, new and state-of-the-art architecture, and reuse of existing materials from the specific site. Objectives included are more sustainable buildings, high performance sustainable building systems, building sites that maximize sustainability opportunities, buildings that are compatible with a high quality of life in associated communities, and long life for buildings and related structures. As with land use there are several strategies and actions in order to achieve these objectives. An important strategy is to try and use more sustainable building materials and of course to showcase these sustainable buildings of outstanding beauty and high performance, and to do it early in the waterfront revitalization process. It is also important to apply LEED standards on the buildings, and to hold workshops with actors from the department of design, construction at the very start of every building project. Also, a target is set to have all new buildings designed between 2005 and 2008 conformed to LEED Gold certification. Further on it is also important to locate buildings close to existing infrastructure in order to minimize the need for new infrastructure and resource use, and the action is therefore to explore the possibility for district heating and cooling. Further on it is also appropriate to create buildings and sites that allow sunlight into corridors and courtyards, and buildings with for example atria, winter gardens, roof-top gardens, terraces, green houses etc. The buildings should also be flexible as the first floor is designed to house residents and in an eventual future also commercial business.

4.1.3 Transportation
This topic primary focuses on tools for decreasing the power of the automobile, creating traffic nodes, and walkways for pedestrians and bicyclists. Objectives included within the department of transportation are minimizing car use and increasing walking, cycling and public transit use. Strategies listed to achieve these objectives are to plan for mixed use, to discourage car use, and that it should be easy to use transit, the bike, or walk instead of using the car. Appropriate actions for these strategies are to restrict parking opportunities, designate car-free zones, create car-pooling opportunities, create biking paths and pedestrian links between the waterfront neighbourhoods and the rest of the city, and extending the amount of space for bike parking at both residencies and commercial buildings.

Above: ticket for the street-car. To the right: newly built areas at the Harbourfront in Toronto are mainly made up by condominiums, homes for hundreds of people with many facilities inside the buildings, but with a poor outdoor public space.
4.5 Current plans

The overall vision for the central waterfront is to develop 40 000 new building units for more than 68 000 people in mixed-use neighbourhoods, provide for 1 million square metres of employment space, expand public transit and make new major cultural and recreational attractions at the waterfront. (Electronic source: Waterfront Toronto homepage). The map shows what plans there are for adjacent areas of the study area Cherry beach (marked by purple).

4.5.1 East Bayfront
At East Bayfront low scale development is suggested at water’s edge with promenade by the water, with parks and squares. Commercial and culture is concentrated along Queens Quay Boulevard, employment mainly south, and residential, including affordable housing and rental units, north of the boulevard. Tall buildings work as gateway sites.

4.5.2 West Don Lands
A new mixed use neighbourhood is being developed close to the Don River east of Toronto downtown and adjacent to the rail road tracks.

4.5.3 Lower Don lands
Plans for Lower Donlands are directly north of the Ship channel and the study area, Cherry beach. The vision for Lower Don lands includes a transformation of the Don River outlet with parks and sport fields and a new mixed use neighbourhood.

4.5.4 The FilmPort
The FilmPort that is under construction today will be the largest film and television production cluster outside of Los Angeles, California. This is in line with the Official Plan that Port Lands should become a convergence community for creative and knowledge-based industries. The plans include a major film studio complex, commercial offices, film school and amenities such as restaurants and shops, as well as additional high-tech industries like equipment suppliers, costume houses, special effects companies etc. (Electronic source: E-architect Filmport Toronto)

4.5.5 Lake Ontario Park
Lake Ontario Park will become a large park area that is all edge. The Park stretches far east and will consist of everything from beaches, sports, wild life, culture, cycling, restaurants, piers, pools and all kinds of water activities which will attract many people all year round.

Map over current projects at the Toronto waterfront
4.6 Swedish Trade Council and the Toronto Waterfront Review

Sweden is recognized globally as leading the way in innovative and exemplary sustainability practice when it comes to designing, building, and operating cities. While the Stockholm waterfront project Hammarby Sjöstad was being built, TWRC made a study tour to Sweden. Since they liked what they saw they invited a Swedish expert team to undertake a sustainability review of the Toronto waterfront. The team was organized through the Swedish Trade Council, consisting of university researchers, municipal officials, and sustainability practitioners. In 2004 the expert team looked at the two precinct plans of East Bayfront and West Don Lands as well as the whole of Toronto waterfront with the Hammarby eco-cycle Model in mind (see page 21). The report "Sustainability Review for the Toronto Waterfront Revitalization Corporation" builds on Swedish experiences and practice as well as a recommendation for the TWRC how to improve sustainability in revitalizing the waterfront. The following quote from the Swedish Trade Council (2004, page 7) explicitly displays the Swedish way of spatial planning:

The Swedish model of sustainable city building is characterized by a holistic and integrated systems approach to land-use planning, major infrastructure development, building and public space design, cultural features, architectural distinction and community programming and education.

4.6.1 Plan the Waterfront Area as a Whole
The expert team found that there is a need for a holistic view on the Toronto waterfront. Even though the Toronto Waterfront is so vast that it is necessary to divide and plan smaller parts separately, linking between the areas with a comprehensive view is important.

4.6.2 Remove the Physical Barriers
The key is to integrate the waterfront with the city as a whole. The barriers that exist between the city and the waterfront makes the city turn its back on lake Ontario. Making Gardiner Expressway underground and tunnelling or decking the railway would radically change the conditions for the layout of great parts of the waterfront (Swedish trade council 2004, page 29). Removing Barriers is also the first core principle presented in the Central Waterfront Plan (see above). What is done in the precinct plans is affected by sustainability principles incorporated into site planning, infrastructure planning and waterfront-wide planning and what policies there are at the provincial and federal level (Swedish trade council 2004, page 29).
5. Case study - Hammarby Sjöstad, Stockholm, Sweden

5.1 History of Hammarby Sjöstad

Just like many other cities around the world, Stockholm has changed the usage of its waterfront. One of the largest development areas in Stockholm during the last years is Hammarby Sjöstad, a previous port and industrial land which has been transformed into a mixed use community with focus on sustainability throughout the whole planning process. Hammarby Sjöstad is an ambitious urban planning project that has attracted visitors from all over the world.

Hammarby Sjöstad was once an idyllic place of beautiful nature by the sea but when industries in Stockholm needed more space focus was turned to Hammarby Sjöstad, which was a strategically vital place for this type of use. Small companies started their small-scale business here, but there was also some contamination left in the ground from oil and steel companies. Hammarby Sjöstad is a natural expansion of the downtown part of Stockholm and was planned as an Olympic village if Stockholm would have been awarded the Olympic Games in 2004. Hammarby Sjöstad was created by removing barriers such as traffic, old industrial uses were phased out, concentrated or given a new use, and a mixed form of tenure was proposed. A holistic focus was adopted on modern architecture with sustainable materials such as glass, wood, steel, and stone. The Hammarby model was created which consisted of different aspects of sustainable development such as information, water, energy, waste, and communications.

5.2 Transportation

The main goal of Hammarby Sjöstad was to enable the residents to make 80% of their trips consist of public transit, walking or riding the bike. As the traffic in such a dense area puts a lot of pressure on the environment an effort was made on energy efficient transit solutions. Car pooling groups were initiated with about 30 cars available for residents and workers but the major effort was made on the new streetcar line, Tvärbanan, connecting the new community with several buslines and the rest of the city. The rights-of-way streetcar line has been given priority in the area and stretches throughout the area as a spine. It connects to the existing line-haul transit corridors and gives people a chance to commute to several areas in Stockholm without having to pass the downtown area.

5.3 Urban plan

The new architecture used in Hammarby Sjöstad is supported by a heating system based on recycling waste and giving the buildings a good indoor climate. The energy is produced completely by renewable sources at the local district heating plant such as waste and organic waste from the households. As the surface water is dealt with locally in the area, the sewage plant is not used for this purpose; it only deals with the waste water from the buildings. The green roofs also absorb rain water which is then evaporated. The whole area has the character of modern architecture reminding of the Stockholm inner city street measurements, block sizes, building heights, density, mixed use, and sightlines towards the water, parks, and sunlight. Buildings have big balconies and windows facing the south, flat roofs, and bright facades.

5.4 Information

Hammarby Sjöstad has its own homepage (http://www.hammarbysjostad.se) which addresses mainly people living in the neighbourhood. In Hammarby Sjöstad, the technical solutions are demonstrated. You can follow how the water runs from roof to open channels for delay or see the green roofs on the bicycle parking. Centrally you find an information centre (Glashuset, “the Glasshouse”), where you can get information folders on how to decrease your energy use or information about the neighbourhood and how the Hammarby eco-cycle model works.

5.5 Water and Sewage

The water and sewage system is designed to be as efficient and as clean as possible. Rainwater is collected in open channels, polluted surface water is filtrated and delayed before it is transported to the sea. The sewage from Hammarby Sjöstad is taken to a sewage plant. The waste goes back to nature and the bio gas that is produced is used for running buses.

5.6 Waste

In the Hammarby eco-cycle model waste is separated at the source and recycled. Organic waste is brought back to farmers and burning waste becomes energy at the power and heating plant. The system is made simple and pedagogic to use and green rooms and collectors are placed where people pass everyday, with closeness to both buildings, blocks and neighbourhoods. To avoid heavy traffic in the community a vacuum system is used.
5.7 Analysis of the Hammarby eco-model

Overall Hammarby Sjöstad is an ambitious planning project and definitely a development we look upon as a good example. But perhaps Hammarby Sjöstad could have gone one step further in its environmental strive, and set a goal of becoming carbon neutral. There are many rooftops and walls that have potential to be used for collecting renewable energy from the sun, or be used as green roofs. The community development focuses mainly on environmental sustainability and the community is quite homogenous.

When it comes to transportation planning in Hammarby Sjöstad it has been done in an efficient and appealing way as focus has been to make it easy for residents and workers in the area to use quick public transit, to bike or walk; hence discouraging the use of cars. With the introduction of the new streetcar line a new line-haul transportation corridor has been established which connects to other transportation corridors very well. This is a quality because it makes it easier to commute for residents who now don’t have to pass through the downtown area of Stockholm to get to their destination. Connections across existing transportation corridors within cities have become even more important as not everyone commutes downtown, although currently that is how it most often works. According to reports the new streetcar line is very popular.

The urban plan is very attractive, with a human scale and the water is both used as a component as open water channels as well as the attraction of the sea is well used with sightlines and beautiful promenades. The architecture is excellent, yet, the variation is within the same type of architecture and the question is if Hammarby Sjöstad attracts and is open for a diversity of people with different dreams and economic possibilities.

Furthermore the eco-cycle model ideas of recycling as far as possible, both when it comes to waste as well as energy the Hammarby Sjöstad model is a success, but with new technology the model can become even more environmentally sustainable.

Critique towards Hammarby Sjöstad has been collected from the residents every year. They express that is not enough work places in the area, the large windows make the apartments hot in summer and cold in winter. Residents in apartments on the bottom floor feel observed. There is insufficient capacity of daycare centres and schools. Further on there is a lack of some important services and not enough parking lots. The architecture is attractive but not always functional.