


## Research Article

## The Principles of Urban Design- Hammarby, Siostad, Stockholm

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## ABSTRACT

Hammarby Lake City is a sustainable mixed-use development in Stockholm that aims to transform an industrial site into housing, commercial, and recreational spaces. The project uses innovative technologies and strategies, such as transportation, urban planning, biogas production, and green roofs. Collaboration between public and commercial groups was crucial for successful implementation. The project aligns with Sweden's environmental, energy, social, and economic goals, as the construction and property industry contribute significantly to society's environmental impact. The government aims to create a "green welfare state" where everyone lives in adequate housing and a safe environment.

## 1. INTRODUCTION

hammarby sjöstad, or "hammarby lake city," is a mixed-use development next to Stockholm's city center that is sustainable and environmentally friendly. The project shows how to transform a former industrial site into housing, commercial spaces, and recreational space in a sustainable way, and how that development may be expressed as a direct extension of Stockholm's urban core. Physical adjacencies and strategic interactions between the new development, Stockholm city, and Lake Hammarby are responsible for many of the project's unique features and tactics.

Some of the successful technologies and strategies used at Hammarby include innovative transportation methods, urban planning, biogas production from waste, power generation from trash, installed photovoltaic arrays, solar hot water tubes, centralized vacuum tube recycling collection, storm water remediation, green roofs, brownfield cleanup, and public education on environmentalism.

The project's ambitious goals necessitated collaboration across a variety of public and commercial groups, resulting in the successful implementation of this visionary master plan. The endeavor yielded a successful "growth ring" expansion of Stockholm's city core, which fits Sweden's declared future environmental, energy, social, and economic goals.

"The construction and property industry in Sweden is responsible for a significant percentage of society's environmental effect; it accounts for 40% of total energy use, just over 40% of material use, and a significant portion of trash. Significant volumes of greenhouse gases are produced, accounting for roughly 20% of Sweden's total carbon dioxide emissions[1].

"In response to environmental and other constraints, Sweden's government has announced that it intends to build the notion of a "green welfare state," in which "everyone lives in adequate housing, at a reasonable cost, in a stimulating and safe environment, within a long-term sustainable framework."

- Site

The town of hammarby sjöstad is located south-east of Stockholm. It is close to the dense urban core, but it has never been adequately connected to the rest of the city because it was originally used as an industrial manufacturing and Shipping region.

The plans for hammarby sjöstad began in 1990 as part of a bid for the 2004 Summer Olympics. Despite the fact that the games were eventually awarded to Athens, excitement for the urban restoration of such a degraded and polluted site was

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maintained. It's worth noting that one of the project's most difficult difficulties, and also a measure of its success, was cleaning up the brownfield site[3].

Stockholm's assets, such as ecology and sustainability, were highlighted throughout the Olympic bidding process and became driving forces for the new development project. The new city is bordered on the south by a big natural park and on the north by a hilly island. Lake Hammarby, dubbed the "blue eye" of the city by the design team, is at the center of the project. Parks, footpaths, quays, boat moorings, docks, and, of course, mixed-use buildings cover two sides of the lake, which is referred to as the city's "most appealing public area." The public is encouraged to interact with the waterfront, and many of the planning decisions reflect the planners' intention for a more active city edge[3].



Fig .1. shows Hammarby Sjöstad location relative to Stockholm, <https://www.neighbourhoodguidelines.org/hammarby-sjstad-case-study>[3]

### 1.1 Key partners and actors are essential for successful collaboration and progress

Hammarby-Sjöstad's planning, and design were simplified by the City's land acquisition, local authority leadership, and Stockholm's sustainability program. Life-cycle cost analysis justified higher initial investments in better building design and transportation infrastructure. The Stockholm City Planning Bureau developed a strategic master plan, divided into 12 sub-neighborhoods. The plan is developed through parallel sketches, with the city selecting three to four private sector architects to create detailed proposals.

The City then invites a consortium of developers and architects to promote architectural diversity and to encourage greater levels of design through competition. They follow the design code when developing each plot or building in the sub-neighborhood. More than 30 architects and more than 30 developers have been identified. JM, Skanska, Family Housing, Swedish Housing, HSB, SKB, and Borätt are important developers[6].

## 2. KEY PARTNERS AND ACTORS

The city had bought most of the land in Hammarby-sjöstad, making planning and design easy. The city's sustainability policy encouraged the local government to take the lead at every level, from master planning to building. The development was able to justify larger initial investments in better performing building design and transportation infrastructure because all planning applications in Stockholm are based on life-cycle cost analysis. The Stockholm City Planning Bureau, directed by architect Jan Inghe-Hagström, developed the strategic master plan as the initial phase in the planning process. The design is split into 12 sub-neighborhoods, each of which is being built in stages. 'Parallel sketches' is a method in which the city picks three to four private sector architects/planners to create comprehensive plans for a sub- neighborhood. To produce the master plan, the city examines each drawing and integrates the best characteristics[4].

## 3. ENVIRONMENT

Hammarby Sjöstad's environmental policy is important to the development's success as a model for Swedish city planning. "Targets for decontamination use of brownfield property, provision of public transportation choices to discourage automobile usage, energy consumption, and water and waste recycling" are included in the program. The "hammarby

model" for recapturing energy through careful water, waste, and rubbish management is noteworthy. Birka Energy, Stockholm Water Company[2].

and the City of Stockholm Waste Management Bureau collaborated to build it. The "hammarby model's" stated aims include being twice as efficient at energy generation, waste recovery, and energy saving as equivalent enterprises that do not use the system. An innovative sewage treatment facility is one example of the model.

At a central plant, waste is cleaned and purified before being converted into biogas for cooking.

The district heating unit uses the excess heat obtained during the purifying process. A test section of the sewage treatment plant also recycles trash for agricultural use. A centralized, envac, trash vacuum system is another intriguing aspect. Residents separate their trash and deposit it in the right receptacle. The bins are connected to a centralized network of pipes, and the trash can be triggered at various intervals, bringing garbage to a central plant under vacuum pressure. Any combustible waste is burned to keep the flats warm. Residents chip biodegradable garbage in special equipment in each unit and recycle it[10].

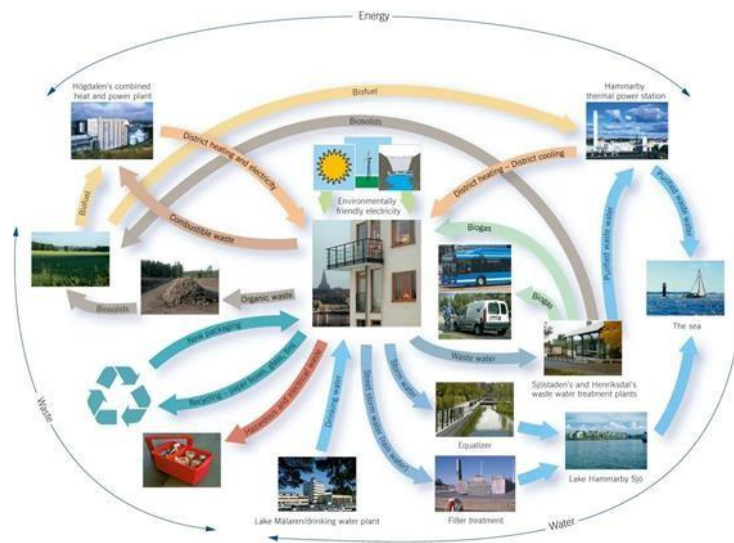


Fig .2. The Hammarby model

<https://www.neighbourhoodguidelines.org/hammarby-sjstad-case-study>

#### 4. DEVELOPMENT AND FINANCING STRATEGIES

The strategic master plan, which was headed by architect Jan Inghe-Hagström at the Stockholm City Planning Bureau, was the initial stage of the planning process. The concept is broken down into twelve sub-neighborhoods that be constructed in stages. The city hired three to four private sector architects and planners to create comprehensive plans for every sub-neighborhood through a procedure known as "parallel sketches." The city created a master plan by combining the best aspects of each scheme after evaluating them. In collaboration with the developers and architects, the city planning and design team subsequently created a design code for every sub-neighborhood. The local government granted planning clearance based on the design code. The code gave a summary of each block's design, organization, and structure, including important landmarks, public areas, and pedestrian walkways[7].

According to the code, a group of developers and architects were asked to design each plot or building inside the sub-neighborhood to promote diversity and encourage greater standards of design through competition.

In order to build the neighborhood, the city of Stockholm partnered with 25 construction companies, who were responsible for 80% of the local expenses. Two government organizations, the Swedish Road Administration (which oversees the routing of the Southern Link ring road) and the Swedish Rail Administration (which handles rail transportation), provide an additional source of funding. An effective development process with a healthy balance between planning and the market was guaranteed by a number of factors[8].

Single ownership: From the beginning, practically the whole site was owned by a single entrepreneur. This indicated that the strategy was not upset by any conflicting interests, long-term master plan vision, Massive early infrastructure: Power, water, and recycling were all first installed with significant public expenditure, Collaborative approach: Architects and developers examined how they could arrive at a feasible solution for every area of development. While adhering to the same overarching master plan, numerous developers created each zone with modifications to the design[9].



Fig .3. The 2009 version of the official master plan for Hammarby Sjöstad and its 12 sub-districts. Different architects' teams have detailed the subdistricts that are the result of a phasing and diversity strategy.

<https://www.neighbourhoodguidelines.org/hammarby-sjstad-case-study>

#### 4.1 Transportation

A important issue for hammarby sjöstad, in addition to public circulation and activity along the beach, was the integration of a master transportation plan to address the project's social and environmental problems[7].

The viability of the new city, planners realized, would be contingent on an efficient transportation system that could convey citizens swiftly and easily both within the new development and to the old city outside.

Planners also encourage people to utilize public transportation by making it a more convenient option than driving a car. In Hammarby Sjöstad, the public transportation system consists of a network of pedestrian sidewalks, cycling lanes, trams, buses, personal automobiles, "shared" vehicles, and ferries.

Because of the diverse range of transportation technology available, all areas of the new city are accessible, and the user may choose whatever mode of transportation to employ.

In addition to bus and automobiles, the city features four tram stops that are immediately connected to the main city subway line, with ambitions to expand this service to Stockholm's central transit center, Slussen.

Alternatively, two ferries across Lake Hammarby have been created to suit the community's requirements and run every 10 to 15 minutes. Finally, citizens can use the "city car" carpool service[5].



Fig .4. shows, Exterior plan and Minimod project, <https://www.neighbourhoodguidelines.org/hammarby-sjstad-case-study>



## 5. CONCLUSION

The Swedish "green welfare state" and how it may "support sustainable development, new jobs, growth, and welfare" can be seen at hammarby sjöstad. On multiple levels, the initiative is groundbreaking. Pedestrian friendliness, building size, mixed uses, multi-modal transportation, green spaces, water and light access, all set within the requirement to reduce the project's environmental effect, define a community that has the potential to be sustainable on numerous levels.

The new development also guarantees that there is a dynamic interplay between areas of the city by merging into the size and urban fabric of the ancient inner city. People, vehicles, products, and services may all move across places without the stress of a total shift in urban character. The project's level of environmental consciousness is another accomplishment. The ordinary hammarby sjöstad house, for example, uses half the water and consumes significantly less power than a normal Swedish home.

The development's electrical usage is further mitigated by on-site power generating. The success of hammarby sjöstad demonstrates the value of well-organized public sector participation in development projects. It also emphasizes the significance of public-private sector cooperation and agreement, as well as meticulous examination of plans prior to implementation.

Sustainable communities in Sweden:

- Urban planning
- Soil decontamination
- Energy
- Eco cycle
- Traffic
- Green structure and water
- Building and housing
- Information, knowledge dissemination and housing expo activities

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## Conflicts Of Interest

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