



Fig. 33

Move in date:	spring 1995
Location:	Björkhagen 12 km SW of Stockholm
Project initiators:	future residents
Size:	44 households

UNDERSTENSHÖJDEN

As I turned the corner, I saw a cluster of sliver gray houses with contrasting red-orange tile roofs and a proud rooster preening in the middle of the sidewalk. I knew I had come to the right place. The next sure sign of reaching the my destination was the 25m smoke stack rising from the furnace room in the common house. By the time I walk 100 meters into the site, I am enveloped by birch trees. Their stark white trunks meet my eye in every direction. I find it hard to believe that I am just minutes away from a subway to the center of Stockholm.

Understenshöjden seems to have risen up out of the birch forest in which 44 households are nestled. The trees would be growing inside the houses if they were any closer. The construction crew had been sternly warned to only cut the marked trees or else pay a fine for any tree cut down that was meant to be preserved.

The silver gray facade, treated with ferric sulfate (vitriol),⁹ further complements the forest atmosphere. Here the stark white of the birch bark is the showcase, while the houses blend in with the background.

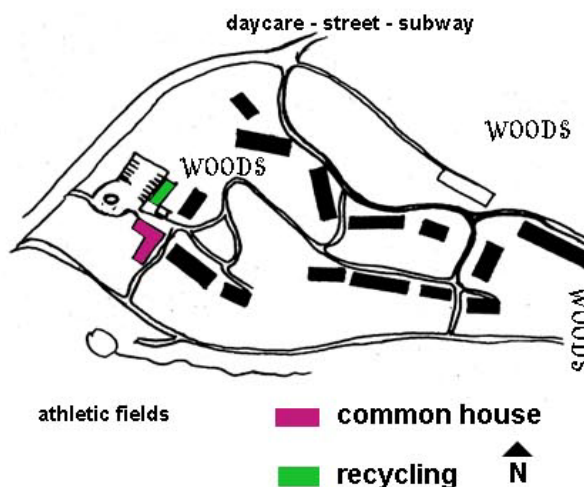
The color of the houses is a sensitive subject in Understenshöjden. Many color schemes were proposed. The current gray color won the vote by just a hair. The gray color had the added advantage of being vastly less expensive than the other options. The dissenting residents had to accept that they were outvoted. This compromise on color demonstrates both the strength and weakness of the democratic rules which dominated the process of planning Understenshöjden. The weak majority in favor of the gray may not, however, prevail in the long run. *“Come back in ten - fifteen years, it will most likely be a patchwork of colors. Some renegade resident will sneak out and paint his house and others will follow,”* says a resident who voted for the gray color.

Before my meeting I wandered about. I followed a small stream along the edge of the site. On my right were multiple playing fields and an athletic center, on my left was a birch forest, with rabbit cages and compost bins tucked in among the trees. I followed the stream up into the adjacent nature preserve. Over a rocky hill I found evidence of young children at work. A small playhouse had been erected from scraps of wood left over from building Understenshöjden. The kids do not play in the play house anymore, the fun was in building it, but there is no end of adventure nearby. Between the two chicken coops, and the neighboring athletic fields and nature preserve, there is an abundance of activities for the children. For the very young, two sandboxes have been built, and a daycare is located just next door. The welfare of children was a prime consideration in the planning of Understenshöjden.

Getting There - Understenshöjden

Residents in the Stockholm suburb of Björkhagen were fed up. Fed up with living in “sick buildings,” exposing their children to allergy producing materials, and tired of living in cramped anonymous apartments. The Björkhagen association was born out of this frustration. Over one-hundred families were first interested in the project. Association members did their homework; attending study circles, going on field trips, and inviting experts to speak. The association, in order to secure the land they wanted, were encouraged to work with an established builder. The group worked with two developers, HSB and SMAÅ.

The architect for the project bent over backwards to ensure families had the floor plan and solutions they wanted. Democracy was a very important aspect in this planning process. The whole group voted on nearly



every aspect of the project. This process, according to the survey, was very time consuming but worth it.

Location - Understenshöjden

Understenshöjden has been touted newspapers, magazines and planners alike, as the first “urban” ecovillage in Sweden, tucked in between rows apartment buildings. The entrance to Stockholm subway is just four blocks away. The district center for Björkhagen is next to the subway stop, with a community center, restaurants, a grocery and other stores. HSB, in a promotional brochure touts it a solution for “big-city people engaged in ecological thinking, but not ready to move out to the country, where other ecovillages are located.” [Brf Understenshöjden i Björkhagen, 3]. I agree Understenshöjden has a great location, however, it is misleading to categorize the other projects as being in the country. Other projects may appear less urban because they are located in areas surrounded by detached, single-family homes in stead of apartment buildings. This does not, however, mean they are estranged from the cities in which they are located.

Understenshöjden is edged by an athletic field, a nature preserve, a day care and apartment houses.



Fig. 34 - View between houses

There is no shortage of resources for children. The youngest children, under three, noted some concerned parents, do not have a safe place to play since there are so many rocks and different ground levels. Two sand boxes have been built to help accommodate very young children.

Björkhagen is located five kilometers south of the center of Stockholm. Stockholm, naturally, has every type of resource and service imaginable. The bus and subway system are extensive. It is not even necessary to own a car when living so close to a subway. Seven households in Understenshöjden do not have a car.

Design - Understenshöjden

The design of Understenshöjden marked a profound shift in ecological design towards a commitment to the larger picture. *“Ecological housing has been discussed as more than just energy efficiency. It has to do with that which is healthy for the body as well as the soul.”* The houses and landscaping are riddled with such details. The window frames are profiled at an angle to improve light infiltration. The lamp posts are made of wood, not metal. The kitchen has a special space for recycling that is easy to use, a welcome and awaited innovation. The walls are painted with egg tempera, a paint made of natural materials whose color that becomes richer with age. Even the signs in the parking lot are attractive - made from small wooden markers posted on thick birch branches.

The silver gray houses are arranged in five groups of no more than eight households. The groups are defined by different landscape qualities and names evocative of nature: Birch Wood, Spruce Heights, Pond, Farm, and Plantation. The site is on a hill of bedrock which required creative solutions for the foundation.



Fig. 35 - Houses on piers

The two main solutions are to place the house on wood and cement stilts or a concrete slab. The stilt solution was chosen to keep the amount of blasting to a minimum.

The houses have extra high ceilings and a large kitchen and living room area. The materials are as natural and unadulterated as possible. The homes provoke a feeling of serenity. The houses are heated both centrally and locally. Each house has a set of solar panels on the roof connected to an accumulator tank. Additionally, the common house has a wood pellet furnace. The heat from the central furnace is circulated by warm water via culverts to the accumulator tanks in the houses.

It was intended to have an on-site waste water treatment system. In fact the system was built and is used. The toilets are urine separating. The urine is collected in a tank and the black and gray water go to a settling tank, to a one of two biological reactors, to a second settling tank, under a UV filter, into a reservoir and down a constructed stream to a second reservoir. The last stage of the system, the reservoir and constructed stream bed, cannot be used. The water is instead pumped to the municipal sewage system. This decision was made by the local water treatment company. The phosphorus count in the water is too high as the water comes out of the system to the

reservoir. However, the reservoir and constructed stream bed are an integral part of the treatment system. Samples taken at the end of the water's cycle, at the second reservoir, show acceptable levels of phosphorus and all other elements. The issue is more political than practical. Hopefully, a compromise can be reached so that the system can be used as it was intended.

The district of Björkhagen collects pre-sorted recyclables from the recycling shed by the parking lot. The trash/recycling room is not conveniently located for all the residents, but a central location of the shed would make it difficult for the city to collect, resulting in the current solution. Next to the recycling room is a another similar sized room which serves as a second hand exchange for goods; a place to leave old clothes and find "new" clothes.

Social/Organization - Understenshöjden

The majority of the residents living in Understenshöjden today got to know one another in the planning process. Neighbors drop by regularly to borrow items, share news or just to say hello.

The frequency of meetings has decreased a good deal. People are still in recovery from the intense planning process. Parties are held at the common house. A handful of residents do not have washing machines, but instead use the laundry facilities in the common house where they are likely to run into others on the same mission.

The five groups of houses define five local maintenance groups as well. Each group is responsible for maintaining the immediate surrounding grounds and the compost. I ran across a sign listing the "compost captains" for each month. My host was pleasantly surprised to see the creative solution taken by that group of houses to divvy up the responsibility for the compost.

Resources - Understenshöjden

Many articles were written about Understenshöjden. The following list includes just a few of the best articles.

HSB. *Brf Understenshöjden i Björkhagen: Stockholms första ekologiskt inriktade bostadsområde*, (Homeowners association Understenshöjden in Björkhagen: Stockholms first ecologically oriented housing development) 1994.

Lanne, Lotta. "Björkhagens Ekoby Är Klar," (Björkhagens ecovillage is finished) *Kretslopp*, December 11, 1995, pp. 12,14,16-17.

Maechel, Ingela. "Den demokratiska arkitekturen." (Democratic Architecture) *Form for Living (FORM)*, April 1995, pp. 24-30.

Ekologiskt Byggande: En studie av tre ekobyar i HSB:s regi by Hans Bergström provides a technical description of all the facets of the ecovillages HSB has helped develop: Solbyn, Myrstacken, Understenshöjden.

Försörjning, Vardag och Miljö, written by Mona Mårtensson and Ronny Pettersson, was published in 1998. This report is the first in a three part series of studies on the environment and culture in the daily life of Swedish households. Members of the association planning Understenshöjden were interviewed for this study.

- 1 The site was not completely level, but it may as well be because the terraced effect was made obsolete.
- 2 "Ekologiskt boende i balans med naturen" p 20-21, Bärande idéer. The source of this article is still unknown.
- 3 Ibid.
- 4 Nordanstigs Bostäder took the initiative under the umbrella support from SABO (Sveriges Allmännyttigas Bostadsföretags Organisation) a national organization.
- 5 Sigtryggsson, Anita. "Gemenskap som gav eko," *BoFast*, Number 14, September 10, 1992. Page 18.
- 6 Similar quote with different ending in a student report by Rita Selén and Anette Nybom
- 7 Invarsson, Torbjörn. "Boende i samklang med naturens lager," *Nordanstig*, December 12, 1991. Page 21.
- 8 City council is translated from *socialdemokratiskts kommunalråd*
- 9 Vitrol, is an iron oxide wood treatment which speeds up the coloring process of the wood while creating a protective coat.

Understenshöjden-Overview

Planning start:	spring 1990	Number of Households:	44 households, circa 130 people
Move in date:	fall 1995	Size of homes:	101-145m2
Location:	Bjorkhagen 5 km SE of Stockholm	Type of ownership:	home owner's association
Project initiators:	future residents	Project developers:	HSB and SMAA
Project leader:	??	Builder:	Platzer Bygg AB steered total contractor
Architect:	Bengt Bilen	Building cost:	10,880 SEK/m2 at 1995 prices
Landscape architect:	Marie Aslund		some variation due to self-finishing options
SITE			
Location:	walking distance of stores, services, childcare, schools, athletic fields, and subway station borders a nature preserve		
Transportation:	5 minute walk to subway station - 12 minutes by subway to center of Stockholm, multiple bus routes, safe bicycle routes to city		
Design:	total area of site (xx), site on a hill, houses arranged along slope houses arranged in 5 clusters, and 14 rows of houses (2 to 7 houses per row) around looping pathways gravel pathways (most cables under paths to minimize need to disturb ground) play areas: two sandboxes, rope swings, nature preserve athletic facilities for older children		
Landscaping:	as much as possible of woods left undisturbed landscaping details of natural materials such as stone or wood walls resident's own responsibility to develop immediate yards as flower beds or otherwise bushes and trees planted for wind protection and division between site and athletic fields		
Gardens:	little gardening space, some households have a larger yard than others		
compost:	five compost areas - yard and household compost		
food storage:	pantry off kitchen		
Common house:	250 m2 - not finished as of 5/98 - furnace room & laundry room finished will have: kitchen, play room, storage and party/meeting room with an open fireplace appearance similar to houses		
other structures:	storage shed for each house located near houses, workshop-recycling/trash rooms/machine storage - located by parking lot, similar in appearance to houses with some insulation		
House exterior:	silver gray (treated with ferric sulfate - vitriol) wooden siding, bright colored doors (red, yellow, blue) red ceramic roof tiles		
INTERIOR			
Floor plan:	extra high ceilings (2.7 m, first floor, 2.5 m second floor), standard- three bedrooms, equal size kitchen and living room; floor plan individualized in consultation with architect		
Foundation:	two types of foundations: on bedrock - meets ground at entrance, on pillars in back & layer of macadam, on clay - ventilated crawl space first floor - wood and cement with insulation		

Frame:	several types of materials, primarily masonite joists, brick for first floor bathroom
Insulation:	eco-fiber: first floor - 30cm (<i>U-value 0.14 W/m² C</i>), between floors - 15cm, between houses - 22cm, B62 attic - 50cm (<i>U-value 0.11 W/m² C</i>), outer walls - 25 cm (<i>U-value 0.18 W/m² C</i>),
Floors:	solid pine floors - soaped or oiled
Walls:	egg tempra on spackeled dry wall [egg tempra - 20% cold-pressed linseed oil, 4% egg, 45% water, 30% pigment, 1% perservative], ceramic tiles and brick in bathroom
Woodwork:	painted with linseed oil paint or natural - oiled or soaped
Windows:	double glazed with low emissive coating on inner pane, angled wooden frames (linseed oil paint) to let in more light, open to the inside for ease of cleaning, (<i>U-value 1.9 W/m² C</i>)
Glass rooms:	no glass room
Kitchen:	cabinets of veneered pine plywood and masonite, solid wood cabinets an option, cabinets to ceiling (no wasted space), lots of counter space, pull out island with recycling underneath, energy efficient appliances, pantry off kitchen
SYSTEMS	
Heating:	central pellets furnace connected to houses via culverts, plus each house: 400 liter accumulator tank, 8.3 m ² solar panels, back-up electric furnace (3kW), floor heat in bathroom (option for more), radiators in rest of house, ceramic stove an option
Ventilation:	natural ventilation assisted by temperature regulated centrifugal fans over stove and in bathroom - condensation collected in tray in attic (emptied maunally), intake under window sills - manual regulation
Water:	tap water from municipal source
gray water:	on-site waste water treatment: 3-chambered settling tank, to two biological reactors (Bioclere), to sedimentation tank, to UV filter, to resevoir, to constructed stream, to resevoir [water not permitted to pass to resevoir due to regulations - as of 5/98]
black water:	wall mounted urine separating toilets (Dubbletten), to two urine tanks - total 80 m ³ , feces/black water to on-site waste treatment
Electricity:	energy efficient appliances, electric magnetic field minimized by twisting & shielding cables, electricity to bedroom can be shut off at night, each house has separate electric meter
Trash/Recycling:	recycling, second-hand (exchange between residents), and trash rooms by parking, picked up by city