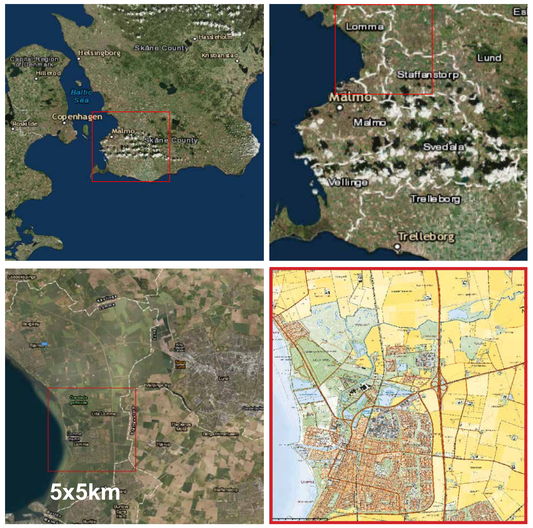
SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCE - SWEDEN IGC



Planning for Rapid Growth of a Coastal Municipality in Sweden

Lomma Municipality is situated on the South-West coast of Sweden on the Öresund coast of the Baltic sea. It is one of the fastest growing municipalities in Sweden. Most of this growth is focused around the main town (Lomma, population circa 15,000 people).

For much of the 20thC Lomma was industrial, manufacturing bricks, cement and asbestos products. The harbour was principally a facility for this and the local fishing industry but has since been dramatically gentrified and now serves as a berth for yachts with associated surrounding development of cafes, restaurants and other leisure services for this and for visitors to the popular beach. The municipality is now one of the most prosperous in Sweden attracting new residents due to its high quality of life combined with easy access to the regional capital Malmo, the University town of Lund and Copenhagen within commuting distance.

The pressure is thus not only to accommodate a rapid rise in population but a demand for high end housing, in Sweden generally a detached villa with own garden and parking for cars. This said, the harbour area itself has seen redevelopment into multiple occupancy buildings but these are also relatively expensive for the region and traditional Swedish planning policies have required a low Floor Area Ratio to provide out door communal space.

The town has experienced flooding in recent years and the risk is expected to increase as climate change impacts. The low lying coastal position of the town and its location at the outlet to a large catchment result in heavy flooding when that outflow meets a storm surge from the sea.

The surounding land is of high agricultural value, so for both local priorities as to flood protection and national directives in relation to food security and protection of eco-system services, inland expansion of the town is controversial. Though the extractive industry has gone some manufacturing industry remains so converting these areas to mixed use is one alternative to expansion but that implies important changes to the local job market as well as identifying suitable sites for manufacturing elsewhere.

*Legend for all IGC System Maps

- AGRICULTURE
- BUILT
- GREEN INFRASTRUCTURE
- INDUSTRY
- INSTITUTIONAL
- LOW DENSITY HOUSING
- MIXED COMMERCIAL / HOUSING
- TRANSPORT
- WATER INFRASTRUCTURE
- ENERGY INFRASTRUCTURE

Major Requirements by 2050

The target scenario was developed with the team at Lomma municipality. Trends provided by the IGC were presented for consideration as to which were considered the most important by workshop participants including planners, technical specialists and environmental specialists. Of the issues provided two were selected for further consideration; Urbanisation and flooding.

Urbanisation

IGC global scenarios were considered too conservative for this case study given the current rate of population growth. Workshop attendees set a stringent target of doubling the current population by 2050 (an annual growth rate of 2.4%) which reflected a belief that the rate of increase would accelerate.

Flood risk

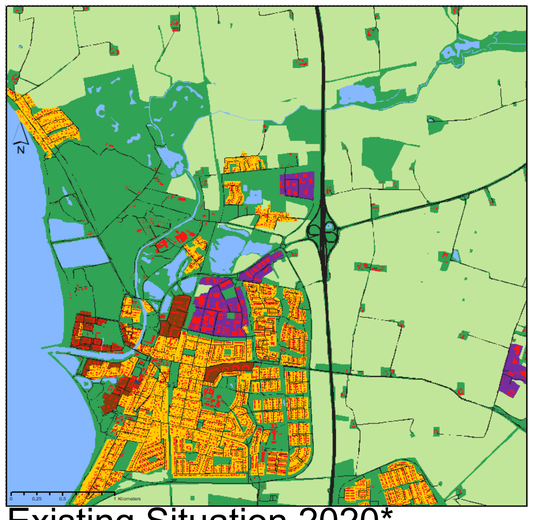
The global scenario's from the IPCC were those the municipality already referred to in the current comprehensive plan and were adopted for this project at Worskshop 1. With respect to river flooding a range of models were investigated to predict impact of proposed designs but non were considered responsive enough for a geodesign workshop so a recently commissioned model (based on MIKE Flood) was provided for reference.

Agricultural land

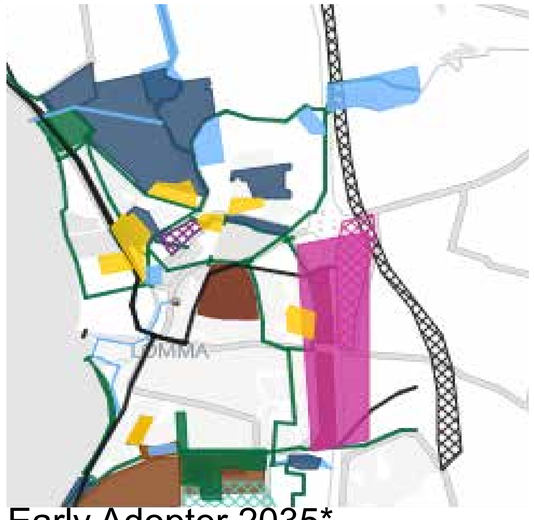
Workshop 1 was also used to develop evluation maps. Of particular significance was the general agreement that, despite the widely recognised importance of agricultural land with respect to flooding, food security and other ecosystem services, this should be not be classified as "inappropriate" for housing development but would, non the less, be considered as a last resort.

Innovations

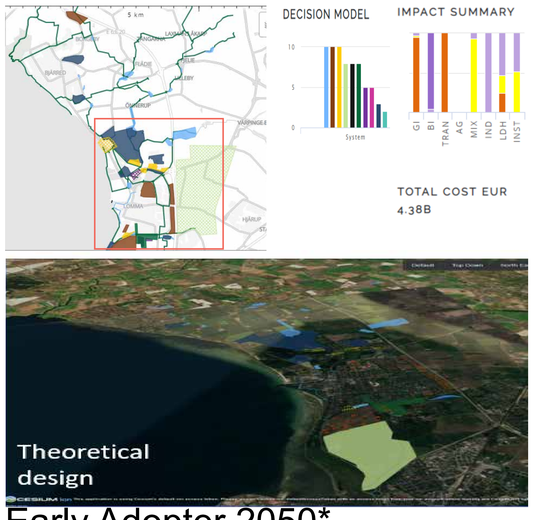
Innovations to be adopted ; WAT 2, WAT7 and WAT 8; ENE 1; Mixed Use Commercial & High Density Housing.



Existing Situation 2020*



Early Adopter 2035*



Early Adopter 2050*

Early Adopter Scenario

Given the time scale at which comprehensive planning operates in Sweden and the existing adoption of the water innovations relevant to flood management, this scenario is arguably the more likely. However, the best route to achieve a transition to a higher proportion of mixed use commercial/high density was a source of extensive debate during Workshop 2.

Urbanisation

A growth rate of 2.4% was accommodated by almost reversing the current ratio in building high and low density housing, converting industrial land first. There was considerable debate as to the political feasibility of this strategy and over how dense a development would be accepted. While the total population growth was met note that by 2050 the study area was exceeded (see development of the outlying town to the north) as feasible options in the main town grew limited.

Flood risk

Attendees at Workshop 2 were cognisant of a new IPCC report (which was released in October 2018 between the two workshops) suggesting the IPCC 2013 predictions to be conservative and so believed that even if an early adoption of a carbon economy were achieved globally it was prudent to consider the 'worst case scenario'. Responses to this in the design are principally to focus development away from the sea and extend the existing sea wall to protect those already living in the risk zone. As some key brown field sites sit near to the river exposure to this risk was reduced by introduction of levies and three large retention pools further upstream.

Agricultural land

By adopting high density mixed use housing and converting currently industrial areas first, agricultural land is largely protected. Where agricultural land is used in order to meet the population growth target the negotiation between the teams was to the effect that only high density would be allowed in these areas. However it was recognised that this approach used up most of the available brownfield sites, thus looking beyond 2050 finding a solution becomes more problematic without further densification.

Innovations

More mixed use high density housing; Retention pools; Underground garages doubling as retention pools; 'Sacrificial' greenspace? (v.controversial); Green Infrastructure.

Participant Team Credits

This work was carried in collaboration with staff at Lomma Municipality. It is an entirely theoretical exercize for the ICG project and does not represent any official policy or plan of Lomma municipality. The work was funded as an SLU Movium Partnerskap project in collaboration with Lomma Municipality and Geodesignhub.com.

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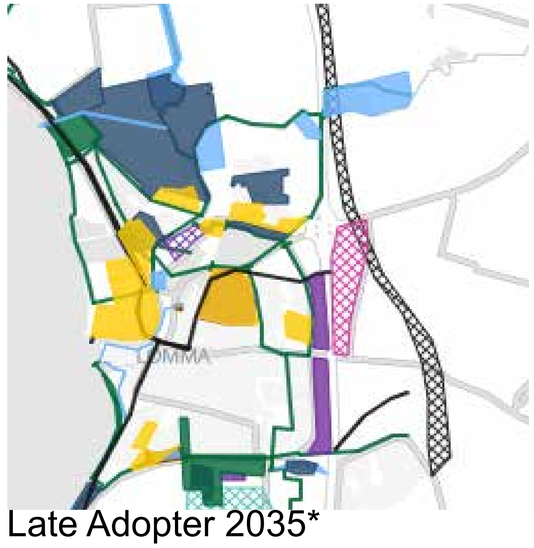
Thanks are also due to the workshop participants from Lomma Municipality.

GEODESIGN HUB

LOMMA KOMMUN

JÄNKESMEDJAN MOVIUM

SVERIGES LANTBRUKSUNIVERSITET SLU



Late Adopter 2035*

Late Adopter 2035

Late Adopter Scenario

The late adopter scenario is limited to 2035 since workshop participants were of the view that designing for this in 2050 was of little relevance given that the issue is already recognised and adaptations being implemented. With respect to Sea Level Rise and river flooding defensive measures are already in place with respect to IPCC 2013 and consultation ongoing as to how more recent reports will impact.

Urbanisation

In some respects housing demand is harder to manage than planning for flooding since by 2035 population growth could still be accommodated with lower density housing (even if it is considered unlikely that current development patterns will persist). The rate of growth is the same between this and the early adoption scenario, the difference is that the proportion of low density housing built is similar to today. Despite this, encroachment on agricultural land by 2035 is still relatively limited but most of the brown field sites are used up thus little is saved for development through to 2050.

Flood risk and Agricultural Land

As explained above, the flood risk model is the same between the two scenarios. Given current policies to take fooding into accout it is reasonable to suggest that most or all of the flooding innovations proposed for the Early Adoption scenario will also be deployed here. The difference is that without earlier adaptations by 2050 easily defensible areas are already covered with low density housing. In a global late adopter scenario it is reasonable to expect that pressures on agriculture else where will lead to more stringent legal protections of agricultural land in Sweden and/or higher land values. Either would then push development toward more flood risk areas but as flood risk increases globally it can also be expected that flood defense costs, insurance costs and public policy will resist building on flood plains leaving the most likely outcome of a late adopter scenario to be a local restriction in housing supply and price rises.

Innovations

Levies and retention pools are relatively uncontroversial and would still be adopted. Other options such as sacrificial land are already in consideration but are controversial. Lomma is a small municipality receiving large volumes of flood water from upstream. Upstream Nature Based Solutions could be effective but require catchment planning beyond the scope of this project.