According to the Swedish Government, all political decisions shall be formulated so as to take their long-term social, environmental and economic impact into consideration. The Swedish National Institute of Public Health sees health impact assessments (HIA) as an excellent tool in order to highlight how decisions contribute to the attainment of social sustainability. This report shows how an environmental assessment can be supplemented with a health impact assessment when municipalities are doing their physical planning, in this case an in-depth comprehensive plan. A very common conflict of interest is highlighted; the choice between building housing and preserving a green area close to the city centre. The example shows that an HIA can supply new and valuable arguments when such a decision is to be taken.

The report is intended for investigators and planning personnel at central agencies, county administrative boards, county councils and municipalities in Sweden.

The Swedish National Institute of Public Health’s task is to promote health and prevent disease and injury – primarily by providing the Government, central agencies, municipalities and county councils with knowledge. The Institute’s activities are pursued on a scientific basis.

Health impact assessment in physical planning
In-depth comprehensive plan for the Fyrvalla-Remonthagen area, Östersund

Anita Linell, Henry Stegmayr och Ida Knutsson
Health impact assessment in physical planning

In-depth comprehensive plan
for the Fyrvala-Remonthagen area, Östersund
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Foreword

The Swedish National Institute of Public Health (SNIPH) has been tasked by the Swedish Government to develop tools and methods to be used when performing health impact assessments (HIA) and to test them in certain areas that are strategically important for human health. HIA is a tool that shows how decisions can help achieve social sustainability. According to the Swedish Government, all political decisions shall be formulated so that they take the long-term social, environmental and economic impact into consideration.

This report shows how an environmental assessment of a comprehensive plan can be supplemented with an HIA in order to highlight both the environmental and social impact on health. An important aim of this case study is to provide guidance for those who wish to strengthen the demands for sustainable development in physical planning.

Anita Linell, Henry Stegmayr and Ida Knutsson have written the report. Valuable comments and ideas have been received from representatives of Swedish central agencies, county councils, county administrative boards and municipalities. A list of authors and contributors can be found at the end of the report.

Östersund, May 2008

GUNNAR ÅGREN  ANITA LINELL
DIRECTOR-GENERAL  HEAD OF DEPARTMENT
Summary

A common conflict in connection with physical planning is whether urban green areas should be preserved for recreation or developed to satisfy the need for centrally located housing. This was the case in the Swedish city of Östersund. When a large number of military units were moved away from the city, the issue of how the former enclosed area should be utilised was broached. The area can be described as a large green wedge pointing towards the city centre.

In the environmental report of the in-depth comprehensive plan for the area in question, three alternatives were studied; the Zero Alternative, Build More and Go Green. This report presents the health impact assessments (HIA) of the in-depth comprehensive plan, performed by the Swedish National Institute of Public Health (SNIPH) in partnership with the City of Östersund. Environmental as well as social health determinants were considered in the HIA.

The results of the case study are presented using “health matrices”, which show both the determinants studied and how prioritised population groups are affected, for example children, older people, disabled persons, women and men. By comparing health matrices for the three alternatives, a decision-maker can see the consequences of different decisions.

Tools such as GIS have been used in the impact assessments to provide information of the residents inside and outside the planned area. Consultations and exhibitions were held during the environmental assessment and these are also incorporated into the HIA.

The HIA shows that the Go Green alternative is to be recommended as the alternative that best satisfies health-promoting factors by preserving existing green structures in the planned area. The report also presents experiences from the HIA work process.

SNIPH has been tasked by the Swedish Government to develop methods for HIA within certain strategically important areas and to support the application of HIA on the central, regional and local level. This case study is part of this task and shows how HIA can be applied in municipal physical planning.
1. Background to this case study

The Swedish National Institute of Public Health’s assignment

The Swedish National Institute of Public Health (SNIPH) has been tasked by the Swedish Government to develop tools and methods to be used when performing health impact assessments (HIA) and to test them in certain areas that are strategically important for human health. This report, a case study showing how HIA can be applied in connection with a municipality’s comprehensive planning, is part of this task. The health impact assessment has been performed in accordance with the general guidelines published by SNIPH, *A guide to health impact assessments – focusing on social and environmental sustainability*. The health impact assessment (HIA) in this case supplements the environmental assessment performed by Östersund Municipality on the planning area of Fyrvalla-Remonthagen (1). The aim of the HIA is to provide a holistic picture of the impact on human health – both socially and environmentally.

Starting-points for the in-depth comprehensive plan for Fyrvalla-Remonthagen

The defence decision adopted by the Swedish Riksdag (the Swedish parliament) in 2004 led to the complete closure of the Östersund army garrison (infantry regiment I 5), the Jämtland air-force wing (F 4) and the defence colleges. As far as the Fyrvalla-Remonthagen area was concerned, a new use for the existing buildings and other installations needed to be found. As a result, the Östersund Municipal Executive Committee decided on 13 June 2005 to draw up an in-depth comprehensive plan for the Fyrvalla-Remonthagen area.

The main aim of this in-depth comprehensive plan was to work out how to convert the area from a military zone to a non-military city district and to integrate it into the rest of the city. A starting-point for this was to use the existing development in the area primarily for activities that promote Östersund’s key areas of regional development:

- Tourism and experience industry/technology
- Eco-driven business development
- Östersund as a seat of education

The Östersund Municipality City Planning Office has put forward proposals for an “in-depth comprehensive plan” for Fyrvalla-Remonthagen (1). Different planning alternatives for the area were drawn up as part of the in-depth comprehensive plan.
Why perform a health impact assessment?

According to the review of the Swedish Planning and Building Act (PBA), the social dimension should be afforded much greater importance in environmental assessments of e.g. comprehensive plans in the future (2). This report aims to show how a better and more holistic picture of the impact on health of the various alternatives can be created. The HIA in this report analyses both environmental and social factors of significance for human health.

A guide to environmental assessments of plans in accordance with the Planning and Building Act (Miljöbedömningar för planer enligt plan- och bygglagen – en vägledning), published by the Swedish National Board of Housing, Building and Planning (3), has been used in the writing of this report.

**KEY FACTS – HEALTH IMPACT ASSESSMENT**

The overall aim of a health impact assessment (HIA) is to provide planners and decision-makers with knowledge about the overall health effects of a programme, plan or project, prior to a political decision being taken. Objectives for the social dimension of sustainable development have been concretised in the Swedish Government Bill Public health objectives, which consists of eleven “domains of objectives” or focus areas for public health promotion and which was adopted by the Swedish Riksdag in the spring of 2003 (Government Bill 2002/03:35) – see Figure 1. The eleven domains contain important determinants of human health.

The overarching aim of public health policy is to even out differences in health between various social groups. To this end, assessments of health determinants in an HIA are to contain a description of how various groups will be affected; both groups that already suffer from ill-health and those that are at risk of doing so. Aspects that must always be taken into consideration, if relevant, include: age, sex, disabilities as well as ethnic and socioeconomic background and sexual orientation.

HIAs should be performed prior to decisions that have a major impact on human health in general or on the health of certain groups (4). An HIA should therefore be preceded by a needs analysis, known as a “screening”.

Similar to an environmental assessment, an HIA should, after consultation, include not only documentation relating to the views, experiences and expectations of relevant stakeholders but also evidence of how these have been taken into consideration when performing the HIA.
Figure 1. This figure shows the interaction between 1) the three dimensions of sustainable development, 2) public health objectives and 3) environmental quality objectives.

KEY FACTS – ENVIRONMENTAL ASSESSMENT

Certain plans and programmes established by an authority or municipality are to be environmentally assessed if their implementation is likely to cause significant environmental impact. Environmental assessment is a process made up of certain stages, including stakeholder consultation and the establishment of an environmental report. The environmental report is a document identifying, describing and assessing the significant environmental impact of the proposed plan or programme. The concept of “the environment” is here a wide one and includes aspects such as population, human health, land developments and cultural heritage.

Plans and programmes that normally need to be environmentally assessed include municipal comprehensive plans, waste disposal plans, energy plans, action programmes for environmental quality norms and county transport plans.

Which plans and programmes are to be environmentally assessed and how this is to be done is regulated by Chapter 6 of the Swedish Environmental Code and in the EIA Ordinance.

Aim

The aim of this case study is to show how to add and develop an HIA in the environmental assessment of a comprehensive plan so that the plan’s effects on both the environmental and social dimensions of sustainable development can be presented.
2. Planning how to perform the health impact assessment

Delimitations

The geographical delimitation for the assessment is the Fyrvalla-Remonthagen area. At the end of the impact analysis, the studied area is expanded to adjacent local areas in order to highlight the conflict of interest between availability of housing and access to green areas in the various alternatives. The number of planning alternatives studied has been limited to three, each with a different level of ambition as regards land development: Zero Alternative, Go Green' and Build More.

The health impact assessment (HIA) is limited to the effect of environment and social factors on public health.

The future assessments of the planning alternatives have been made in a 15-year perspective, i.e. to around 2020.

Description of the area – status report

The area of Fyrvalla-Remonthagen is located in the east of Östersund and stretches in an east-west direction (1). It is part of the old Östersund garrison site used by the defence colleges (see Figure 2).

Within the planning area, there is a green “wedge” running into the city from the countryside to the east and linking the city centre with the surrounding forest. The planning area contains several attractive recreational and sports facilities.

Figure 2. Map of Östersund with the Fyrvalla-Remonthagen planning area highlighted.

1. Is termed the Planning alternative in the environmental report.
Description of the population

Figure 3 shows a number of important service facilities marked in the areas adjacent to Fyrvalla-Remonthagen. The map also shows the proximity of the planning area to the Rannåsen nature reserve.
There are 14,800 people registered inside and within 1 km from Fyrvilla-Remonthagen. About 400 people live inside the area, 3,400 people within 300 m and 11,000 people between 300 m and 1 km from the area (see Table 1). The population is heavily concentrated in the south-west of the development area, where e.g. Östersund’s business centre is located. The eastern and northern parts comprise the former military zone and the Östersund Cross-Country Ski Club (ÖSC area). The only real permanent population within 1 km of Fyrvilla-Remonthagen in these areas is Rannäsen village with about 25 inhabitants.
Compared to the municipality in general, relatively many young people and older people live in and around Fyrvalla-Remonthagen, and not many children and middle-aged people. This is common population structure in slightly larger urban areas/Regional centres. The chance to study at university, among other things, attracts young people and they often move to urban areas like Östersund. This is also true to a certain extent of older people, especially women, who have perhaps lost their husbands and cannot manage in a house on their own or want to move closer to local amenities. Breaking down the figures by sex (Table 2) confirms that older women are overrepresented in the area, especially within 300 m of Fyrvalla-Remonthagen.

Table 1. Age distribution in and around Fyrvalla-Remonthagen.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Within the development area</th>
<th>Development area–300 m</th>
<th>300 m–1 km</th>
<th>Total within 1 km</th>
<th>Total Östersund Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–15 year</td>
<td>66</td>
<td>423</td>
<td>606</td>
<td>1 699</td>
<td>9 998</td>
</tr>
<tr>
<td>16–29 year</td>
<td>70</td>
<td>610</td>
<td>1 343</td>
<td>3 466</td>
<td>10 914</td>
</tr>
<tr>
<td>30–39 year</td>
<td>37</td>
<td>416</td>
<td>826</td>
<td>1 752</td>
<td>7 667</td>
</tr>
<tr>
<td>40–64 year</td>
<td>162</td>
<td>1 135</td>
<td>1 539</td>
<td>3 458</td>
<td>19 765</td>
</tr>
<tr>
<td>65–year</td>
<td>100</td>
<td>794</td>
<td>2 242</td>
<td>3 156</td>
<td>10 938</td>
</tr>
<tr>
<td>Total</td>
<td>435</td>
<td>3 378</td>
<td>5 878</td>
<td>14 751</td>
<td>58 583</td>
</tr>
</tbody>
</table>

Table 2. Population distribution by sex and age in and around Fyrvalla-Remonthagen.

<table>
<thead>
<tr>
<th>Number of men/women</th>
<th>0–15 year</th>
<th>16–29 year</th>
<th>30–39 year</th>
<th>40–64 year</th>
<th>65–year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the development area</td>
<td>37/29</td>
<td>29/41</td>
<td>19/18</td>
<td>83/79</td>
<td>41/59</td>
<td>209/226</td>
</tr>
<tr>
<td>Development area–300 m</td>
<td>215/208</td>
<td>310/300</td>
<td>220/196</td>
<td>538/597</td>
<td>274/522</td>
<td>1 555/1 823</td>
</tr>
<tr>
<td>300 m–1 km</td>
<td>666/604</td>
<td>1 343/1 443</td>
<td>826/715</td>
<td>1 490/1 671</td>
<td>795/1 477</td>
<td>5 060/5 878</td>
</tr>
<tr>
<td>Total within 1 km</td>
<td>898/841</td>
<td>1 682/1 784</td>
<td>1 065/1 927</td>
<td>2 111/2 347</td>
<td>1 108/2 028</td>
<td>6 824/7 927</td>
</tr>
<tr>
<td>Total Östersund Municipality</td>
<td>5 083/4 915</td>
<td>5 439/5 475</td>
<td>3 921/3 746</td>
<td>9 757/10 008</td>
<td>4 232/6 007</td>
<td>28 432/30 151</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of men/women</th>
<th>0–15 year</th>
<th>16–29 year</th>
<th>30–39 year</th>
<th>40–64 year</th>
<th>65–year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the development area</td>
<td>18/15</td>
<td>14/18</td>
<td>9/8</td>
<td>40/35</td>
<td>20/26</td>
<td>100</td>
</tr>
<tr>
<td>Development area–300 m</td>
<td>14/11</td>
<td>20/16</td>
<td>14/11</td>
<td>35/33</td>
<td>17/29</td>
<td>100</td>
</tr>
<tr>
<td>300 m–1 km</td>
<td>12/10</td>
<td>27/25</td>
<td>16/12</td>
<td>29/28</td>
<td>16/25</td>
<td>100</td>
</tr>
<tr>
<td>Total within 1 km</td>
<td>13/11</td>
<td>25/23</td>
<td>16/12</td>
<td>31/30</td>
<td>16/26</td>
<td>100</td>
</tr>
<tr>
<td>Total Östersund Municipality</td>
<td>18/16</td>
<td>19/18</td>
<td>14/12</td>
<td>34/33</td>
<td>15/20</td>
<td>100</td>
</tr>
</tbody>
</table>
The development area has a high recreational value in Östersund and is frequently used by schools, preschools, local residents and for various events. The planning area also constitutes an important link from the city into the ÖSC area and the Rannåsen nature reserve. Many of those who use the planning area are from the Solliden district, which houses a hospital for rheumatic diseases, senior citizen housing and a rehabilitation centre. The centre of Remonthagen is only a 10-minute walk for about 3,000 people. The age distribution is roughly 25 percent children and young people aged 24 or less, 50 percent adults of working age and 25 percent pensioners.

**Relevant stakeholders**

Participation and influence are self-explanatory in a democratic society. The stakeholders invited to consultation meetings were local property owners, central agencies, organisations, municipal authorities along with tenants and other residents or people working in Fyrvalla-Remonthagen and its surrounding areas.

**Objectives that influence the planning process**

There are many factors that influence and steer the drawing-up of plans. Among other things, the plan must be compatible with national, regional and municipal objectives and visions.

**National objectives**

**PUBLIC HEALTH OBJECTIVES**

The Swedish Riksdag passed the Government’s Public Health Objectives Bill in April 2003 (5). The overall aim of Swedish public health policy is to create social conditions that will ensure good health on equal terms for the entire population. Good health is “a condition of complete physical, mental and social well-being and not just the absence of disease or disability”.

The Swedish public health policy is based on eleven domains of objectives, within which evidence-based determinants of key importance for public health have been established (6). The overarching aim is to improve the health of the entire population and create the conditions for equitable and gender-equal health.

As part of the cooperation, a large number of central agencies have developed evidence-based indicators that are especially important for the achievement of the objectives.

**ENVIRONMENTAL QUALITY OBJECTIVES**

The overarching aim of Swedish environmental policy is to hand over to the next generation a society in which the major environmental problems have been solved (7). To achieve this aim, 16 environmental quality objectives have been established. They describe future goals for the environment and the focus of Sweden’s environmental efforts, nationally, within the EU and internationally.
Three important strategies form the basis of our environmental work. These are based on more efficient energy use and transportation, non-toxic and resource-efficient natural cycles and efficient management of land and water and a good built environment (8).

The box below shows the eleven domains of objectives for public health and the sixteen environmental quality objectives, all of which have been adopted by the Swedish Riksdag. The objectives chosen for analysis are marked in blue.

<table>
<thead>
<tr>
<th>SWEDEN’S PUBLIC HEALTH OBJECTIVES</th>
<th>SWEDEN’S ENVIRONMENTAL QUALITY OBJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>focusing on social sustainability, consist of 11 domains:</td>
<td>focusing on ecological sustainability consist of 16 environmental quality objectives:</td>
</tr>
<tr>
<td>✓ 1. Participation and influence in society</td>
<td>✓ 1. Reduced climate impact</td>
</tr>
<tr>
<td>✓ 2. Economic and social security</td>
<td>✓ 2. Clean air</td>
</tr>
<tr>
<td>✓ 3. Secure and favourable conditions during childhood and adolescence</td>
<td>✓ 3. Natural acidification only</td>
</tr>
<tr>
<td>✓ 5. Healthy and safe environments and products</td>
<td>✓ 5. A protective ozone layer</td>
</tr>
<tr>
<td>6. A more health-promoting health service</td>
<td>✓ 6. A safe radiation environment</td>
</tr>
<tr>
<td>7. Effective protection against communicable diseases</td>
<td>✓ 7. Zero eutrophication</td>
</tr>
<tr>
<td>8. Safe sexuality and good reproductive health</td>
<td>✓ 8. Flourishing lakes and streams</td>
</tr>
<tr>
<td>✓ 9. Increased physical activity</td>
<td>✓ 9. Good-quality groundwater</td>
</tr>
<tr>
<td>✓ 10. Good eating habits and safer food</td>
<td>10. A balanced marine environment, flourishing coastal areas and archipelagos</td>
</tr>
<tr>
<td>✓ 11. Reduced use of tobacco and alcohol, a society free from illicit drugs and doping and a reduction in the harmful effects of excessive gambling</td>
<td>11. Thriving wetlands</td>
</tr>
<tr>
<td></td>
<td>12. Sustainable forests</td>
</tr>
<tr>
<td></td>
<td>13. A varied agricultural landscape</td>
</tr>
<tr>
<td></td>
<td>14. A magnificent mountain landscape</td>
</tr>
<tr>
<td></td>
<td>✓ 15. A good built environment</td>
</tr>
<tr>
<td></td>
<td>✓ 16. A rich diversity of plant and animal life</td>
</tr>
</tbody>
</table>

**Gender equality objectives**

Sweden’s 21 county administrative boards are responsible for ensuring the national gender equality policy has an impact on the regional and local levels. This includes considering gender equality aspects in planning. The tool used when performing HIA, the Health Matrix, considers the gender perspective in every assessment.
UN Convention on the Rights of the Child

The UN Convention on the Rights of the Child provides a universal definition of the rights that should be afforded to all children throughout the world. The definition applies to all societies, regardless of culture, religion or other characteristic. The Convention sets out the rights of the individual child. Every person under the age of 18 is considered a child, unless they become of legal age earlier in accordance with national legislation. The UN Convention on the Rights of the Child is taken into consideration in the Health Matrix insofar as the impact on children is evaluated for every relevant determinant.

Municipal objectives

The municipality has also drawn up local objectives that should be considered during the planning process. Here, we present only the objectives for the regional growth programme.

Östersund Municipality has selected three key areas of development that are given special consideration in the regional growth programme:

- Tourism and experience industry/technology
- Eco-driven business development
- Östersund as a seat of education

Choice of assessment tool

The assessment tool, known as the Health Matrix and used in this case study, was originally developed by the Swedish Association of Local Authorities and Regions, SALAR (9). The Health Matrix provides a good structure for the analysis. It also provides support for a systematic working method, when many priority groups and determinants are to be analysed. Another advantage of the Health Matrix is that it includes many of the policy documents that are often used as a basis when assessing the social dimension of sustainable development, the UN Convention on the Rights of the Child, integration policy, policy for the disabled, gender equality perspective and a socioeconomic perspective.

Furthermore, the Health Matrix provides a good holistic picture of the health impact for decision-makers and makes it easy to compare the impact of different planning alternatives.

Only qualitative assessments are made in this HIA. The assessments show how a draft plan affects health determinants at the relevant projected time of the study, 2020 in this case, compared to the current situation. Three assessment levels have been used:

- Improvement
- Unchanged situation
- Deterioration/Change for the worse
Choice of objectives and determinants

ENVIRONMENTAL OBJECTIVES – determinants

As regards the Swedish environmental quality objectives, the same objectives and determinants used in the environmental assessment have been used here, although they have been narrowed down to the objectives deemed important for health. These are: Reduced climate impact, Clean air, A non-toxic environment, Good-quality groundwater, A good built environment and A rich diversity of plant and animal life.

PUBLIC HEALTH OBJECTIVES – determinants

The following public health objectives and determinants/indicators have been chosen for the analysis. The SNIPH checklist for selection of determinants/indicators has been used when drawing the sample (10).

Choice of determinants for PARTICIPATION AND INFLUENCE IN SOCIETY

- Access between, to and in buildings
  An important prerequisite for the health of disabled and elderly people is access between, to and in buildings in both their living and work environments as well as to green areas.

Choice of determinants for ECONOMIC AND SOCIAL SECURITY

- Availability of housing
  Availability of good housing and of a nearby healthy physical and social environment are important factors that can have a positive impact on human health and well-being. The different planning alternatives vary in scope as regards the construction of new housing.

- Access to education
  There is a strong connection between level of education and health. The higher a person’s education, the better their health is on average. This can be explained by the fact that a person’s level of education determines their standing on the labour market and hence their access to material resources, as well as the possibility of exposure to various physical and psychosocial risk factors in the work environment.

- A safe local environment
  There is a relationship between the feeling of safety in the local environment and self-rated physical and mental health. An environment that is perceived as unsafe restricts people’s freedom of movement and their scope for using the housing environment or adjacent areas for e.g. recreation and outdoor life.
Choice of determinants for HEALTHIER WORKING LIFE

❖ Opportunities for recuperation
An essential aspect to maintain good health in working life is the opportunity to unwind and recuperate between work shifts. Workplaces with good access to green structures provide more opportunity for recuperation. The Swedish Environmental Protection Agency has published a report highlighting the connection between health and the natural environment (11).

Choice of determinants for SAFE ENVIRONMENTS AND PRODUCTS

❖ Risk of accidents
Injury risks can manifest themselves in various environments that are represented in the planning alternatives, e.g. work, traffic, housing, school and recreational environments.

Choice of determinants for INCREASED PHYSICAL ACTIVITY

❖ Supportive environments for physical activity
Existing green environments are utilised to varying degrees in the planning alternatives. Access to green environments is a prerequisite for physical activity which in turn promotes good physical, mental and social health development. A rule of thumb is that there should be green areas for recreation, sports facilities, playgrounds and so on, within 5-10 minutes of people’s homes and workplaces.

Choice of priority groups

Equity in health
Here we present the priority groups selected for the analysis in order to see how the decision affects equity in health. The reasons for selecting these groups are given below.

❖ Children
Children and adolescents are more sensitive than adults to air pollution, noise and other environmental disturbances. Furthermore, safe and secure housing and recreational environments are important for children, as are environments that promote physical activity.

❖ Older people
Older people constitute a very variable group when it comes to their needs and possibilities to move about in the community. Their speed and reactions decrease as they get older. Older people with impaired hearing may find it difficult to communicate in noisy environments. Sensitivity to air pollution increases with age. Older people are overrepresented when it comes to accidents involving cyclists and pedestrians. About half of the pedestrians and cyclists injured every year are over the age of 65. Women are involved in more accidents than men. Proximity to green areas is especially important for older people with mobility problems.
Chronically ill persons
People with impaired lung function are more adversely affected by air pollution than others. Noise can cause hypertension and cardio-vascular problems. Those who already suffer from these afflictions can be more troubled by noise than others.

Persons with disabilities
Physically disabled people justifiably have higher demands on accessibility in housing, traffic and work environments. One way to meet these demands is to make access easier for people in wheelchairs and those who use walkers and other walking aids. Impaired sight or hearing may heighten the risk of accident.

Socioeconomically disadvantaged persons
Socioeconomically disadvantaged groups have poorer health than the rest of the population. Income affects material conditions, such as quality of housing, access to food, clothes, transport, recreation and physical activities.

The gender perspective – gender equality in health
An assessment has been made for every priority group in order to see whether the outcome discriminates between the sexes.
3. Description of the current situation, the different courses of action and environmental impact

**Description of current situation**

The west part of the planning area borders on the Storsjöbygden area, which has been designated a cultural heritage site of national interest under Chapter 3 of the Swedish Environmental Code (1) because its value as an old agrarian settlement. Fyrvalla-Remonthagen (see Figure 5) is not just close to the city, but is also close to the countryside and much of the planning area consists of natural countryside.

*Figure 5. The area of Fyrvalla-Remonthagen with its former military buildings in the foreground and green areas in the background. Photo: Östersund Municipality/Kontrastfoto.*
The fact that the area was previously a military zone and was used for military exercises has prevented it from being developed. It is adjacent to Östersund’s major recreational area with jogging and skiing tracks around the Östersund Cross-Country Skiing Club (ÖSC) and the Östersund Ski Stadium. Remonthagen, the “green heart” of the area, is already used for recreational purposes by the vast majority of Östersund residents (1). In addition to recreation, the area is also used for large-scale events such as informal sports tournaments and outdoor concerts. It is important to preserve and strengthen Remonthagen as a well-defined urban green area.

The green “wedge” also aids the distribution of plant and animal life. To safeguard and promote biological diversity in the city’s built-up areas, it is important to preserve and consider these corridors in any future development. According to Östersund Municipality’s Environment and Planning Office, Lövberga Park is one of the most important parks for the city’s inhabitants, since it is of high quality and is easily accessible for both suburban residents and those who live in the city centre.

There are two housing areas in the planning area. One is made up mostly of detached houses and the other is a mixture of row-houses and detached houses. These residential areas lie somewhat isolated on the edge of the city. The buildings in the Fyrvalla area have been specially adapted for use by the military colleges. Many of the buildings and the equipment in and around them are very technologically advanced. This has a value when converting Fyrvalla from a military zone into a civilian area in the future.

The planning area lies in-between the commercial city centre and Östersund’s external shopping centre, Lillängen. There are relatively few food shops within or directly adjacent to the planning area. There are some amenities on the university campus that can also serve the planning area. The distance between the planning area and the nearest food shop is not more than 1.5 km. There is a day-care centre in Lövberga Park. There are also schools, senior citizen housing and several more day-care centres in the adjacent areas.

The planning area also includes Talldungen Grove – three buildings of different military history origin. These were moved here during the 1940s and 1950s by the artillery division old comrades’ association, which also owns them. Two of the buildings are deemed to be of high historical value and, according to the county museum should be preserved in Talldungen Grove. Several buildings of historical value and three ancient remains (pit traps) are located within the area.

There are also two well-known, high-risk facilities within the area. In an engine laboratory in the Fyrvalla area, there is a halotron facility, a fire-extinguisher plant containing chemicals. The Armed Forces will leave this facility behind. In the Rescue Services’ exercise area, there are classrooms and an LPG plant containing three cubic metres of LPG.

Calculations of current levels of air pollution from vehicles indicate emission levels that are well below the Swedish Environmental Protection Agency’s guideline values. The fact that military vehicle-technology activities have been decommissioned in the planning area has no doubt improved the pollution levels overall.

Outside the gates there is a lack of lighting and signage intended for pedestrians and cyclists. Apart from the jogging and skiing tracks, it is more a question of spot lighting at individual facilities rather than systematic directional lighting. The external environment is currently not particularly well adapted for persons with impaired mobility and special orientation problems.
Description of studied alternatives

The alternatives selected for HIA for Fyrvalla-Remonthagen are Zero Alternative, Go Green and Build More (1). Table 3 presents the main characteristics of the studied alternatives.

<table>
<thead>
<tr>
<th>Part of the planning area</th>
<th>Zero Alternative</th>
<th>Go Green</th>
<th>Build More</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remonthagen</strong></td>
<td>Partly developed for higher education activities.</td>
<td>Most of the green areas are preserved, 9 percent to be developed. Housing, workplaces or sports facilities to be built in three construction areas.</td>
<td>All green areas to be developed. Possible developments are dwellings, workplaces and offices or education facilities.</td>
</tr>
<tr>
<td><strong>Fyrvalla with buildings within the former military zone</strong></td>
<td>Temporary planning permission. The municipality will buy the land. Long-term investments cannot be made.</td>
<td>Existing buildings to be utilised as education and work premises in accordance with the city’s key areas of development.</td>
<td>Development and more intensive use of the area. Buildings to be used for more vehicle technology activities and other industrial facilities.</td>
</tr>
</tbody>
</table>
Zero Alternative in 2020

Zero Alternative is an assessment of development in the area up to 2020 if none of the plans are adopted (Figure 6). The valid detailed plan stipulates general use. New facilities will be established in existing buildings in the Fyrvalla area by means of temporary planning permission.

However, the detailed plan stipulates neither permanent facilities in existing buildings nor new buildings. The result of Zero Alternative means that no long-term investments, especially within all the existing premises, can be made. In other words, premises with a substantial cultural value will not be safeguarded (1). University-linked facilities will be developed on part of the Remonthagen area in accordance with applicable development plans. Temporary planning permission is given for up to 20 years.

ZERO ALTERNATIVE

The land outside the gates, i.e. the exercise area in Remonthagen, will be sold by The National Fortifications Administration. If the municipality does not buy the land, it will be put up for public sale. The assessment presupposes that the municipality will buy the land outside the gates.
Go Green in 2020

The main aim of the comprehensive plan is to allow the planning area to be converted from a military zone into a civilian city district and to integrate it into the rest of the city. Activities/facilities that support Östersund’s key areas of development: Tourism and experience industry/technology, Eco-driven business development and Östersund as a seat of education are prioritised in the proposal. Existing buildings in the Fyrvalla area to be utilised primarily as workplaces and education. In principle, no new development rights are proposed within the area (Figure 7). A new entrance to Teknikhuset directly from Stuguvägen will be built to improve accessibility and traffic safety.

GO GREEN

Three areas within Remonhagen will be developed. Furthermore, the Rescue Services’ exercise area and the Armed Forces test-driving track will continue to be used and activities expanded. The driving track can be used both by the Rescue Services and for upper secondary vehicle technology education.

One of the main characteristics of Go Green is the way it preserves and strengthens the green “wedge” that runs into the city centre from the countryside to the east. Remonhagen will become a green area for both large-scale and small-scale activities and events. The green areas will be linked together whilst existing recreational and sports facilities will be preserved and developed.
Build More 2020

Land development increases in the Build More alternative. The green areas in Remonthagen will be utilised for building developments (see Figure 8) More intensive use of the existing premises in the Fyrvalla area will mean more vehicle-technology activities or some other industrial operations, since Teknikhuset offers good facilities for such activities.

Figure 8. Map showing the construction areas for the Build More alternative.
Identification and assessment of the environmental impact

Table 4 shows the environmental impact of the alternatives studied. This makes it easier to compare the alternatives when assessing their impact on health determinants. The background data in the table is taken from the Östersund Municipality’s Comprehensive plan for Fyrvalla-Remonthagen (1).

Table 4. How the different parts of the planning area are affected in the studied alternatives.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Zero Alternative</th>
<th>Go Green</th>
<th>Build More</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utilisation of green areas</strong></td>
<td>Green areas will be utilised for university buildings (currently rather low quality). No additional planting (to replace these areas).</td>
<td>Nine percent of the green areas will be utilised for building development (currently rather low quality). Some planting will be done which will improve the environment and create clear distribution corridors to promote biological diversity.</td>
<td>Basically all green areas will be utilised for building development. Minimal distribution corridors. Remonthagen no longer accessible for recreation.</td>
</tr>
<tr>
<td><strong>Impact on land and water</strong></td>
<td>No major changes in water use. Not clear how storm/wastewater will be taken care of. Swedish Armed Forces to remediate the area.</td>
<td>No impact on water resources/supply. Go Green recommends that stormwater from the new development be taken care of locally. There is, or is assumed to be, municipal sewerage for all building developments apart from the one at Furulund. Go Green recommends that all hose water at the Rescue Services’ fire brigade training ground be taken care of. The Swedish Armed Forces will remediate polluted parts of the area. Future detailed plans must be preceded by soil testing. The work of the Armed Forces shall be closely followed.</td>
<td>Local infiltration of stormwater will deteriorate, though there will be no major impact on groundwater. More industrial activity increases the risk of unwanted discharges. Municipal water and wastewater pipes are a prerequisite for largescale developments. Stormwater should be disposed of in an acceptable fashion. Not all the land will have been tested by the Armed Forces and any further development must be preceded by testing.</td>
</tr>
<tr>
<td><strong>Impact on the urban and rural landscape.</strong></td>
<td>There will be slightly more development around Remonthagen than in the Go Green alternative. There will otherwise be no change from the current situation. Impact on the local climate and light, sun and wind conditions is similar to Go Green. Assumption: the above assumes that the municipality owns the land.</td>
<td>The urban landscape will change mostly around Remonthagen with clearer spatial definition with the help of buildings and vegetation. Lighting will also affect how the urban landscape is perceived. Views will be preserved. Destroyed landscapes will be recreated. Historically, Remonthagen has been an open area used for military exercises. The openness of these areas will be safeguarded. New buildings will be located on a slight slope facing south, protecting them from the dominant north-westerly winds, but still exposed to sunlight.</td>
<td>The urban and rural landscape will change as a result of the entire open area of Remonthagen being developed. Views will be obscured by new buildings. Remonthagen would no longer show traces of Östersund once being a large military town. The local climate, lighting and wind will be similar to Go Green, apart from Remonthagen’s open field that will be more exposed to wind.</td>
</tr>
<tr>
<td>Impact</td>
<td>Zero Alternative</td>
<td>Go Green</td>
<td>Build More</td>
</tr>
<tr>
<td>--------------------------------------------</td>
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</tr>
<tr>
<td><strong>Plant and animal life</strong></td>
<td>Less land erosion due to military activities being discontinued will benefit plant and animal life. Green areas will disappear when the land is developed. No new additions of greenery, which will not help biological diversity.</td>
<td>Strengthened distribution corridors and less land erosion due to military activities being discontinued will benefit plant and animal life. Green areas will disappear when the land is developed but they are located so that ample green passages will remain.</td>
<td>Large-scale development reduces the distribution and habitats of plant and animal life. Red-listed species within the area may be jeopardised.</td>
</tr>
<tr>
<td><strong>Impact on cultural environments</strong></td>
<td>The cultural buildings in Talldungen Grove will not be safeguarded.</td>
<td>The forthcoming detailed plan proposes preserving and safeguarding the buildings in Talldungen Grove. Historical connections to Östersund as a garrison town are safeguarded when Remonthagen is left open.</td>
<td>Not likely that Talldungen Grove will be developed, which means that the cultural buildings can be preserved. The historical link between Remonthagen and Östersund as a garrison town will be removed.</td>
</tr>
<tr>
<td><strong>Transport</strong></td>
<td>The city will become denser but there are no initiatives aimed at improving walkways and cycle routes or expanding public transport. New activities and temporary planning permission generate visitors and traffic, but the traffic environment cannot be changed without amendments being made to the plans. Likely that traffic would increase. The impact of noise and vibrations will be similar to Go Green, but the fact that no new investment will be made in e.g. public transport will probably increase car traffic within the area.</td>
<td>Go Green will condense the city and improve walkways, cycle routes and public transport, which should reduce road traffic. Since new developments lead to people moving house, it is difficult to determine whether they will cause an increase or decrease in transport in the area. An expansion of the proposed areas would however increase traffic considerably in order to support them. Go Green involves fewer road exits, reduced speed and a safer traffic environment. Expanded walkways and cycle routes will improve traffic safety. An expansion will increase road traffic, and therefore traffic noise, locally within the planning area. This increase will not exceed existing limit values, however.</td>
<td>More intensive development will generate much more traffic, which will require new traffic solutions, especially along Stuguvägen. Intensive development will condense the city and benefit non-vehicle traffic. Several new traffic solutions will be needed to supply the development. Road traffic is likely to increase somewhat. More development also generates greater traffic flows and accompanying noise levels.</td>
</tr>
<tr>
<td><strong>Energy supply</strong></td>
<td>In Zero Alternative, Fyrvalla, Högäsken and Erikslund will be supplied with district heating. There are no recommendations for district heating for the construction areas established in the campus plan.</td>
<td>Go Green proposes 100% district heating supply west of the E14 motorway, including the construction areas.</td>
<td>A high degree of development presupposes district heating over the entire area. Municipal water and wastewater, as well as district heating, must be considered, if the area east of the E14 is also to be developed.</td>
</tr>
<tr>
<td>Impact</td>
<td>Zero Alternative</td>
<td>Go Green</td>
<td>Build More</td>
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<tr>
<td><strong>Systems for natural cycles</strong></td>
<td>Existing buildings can be utilised with temporary planning permission, leading to suboptimal use of resources due to certain investments not being made.</td>
<td>Existing buildings and infrastructure will be reused. Go Green advocates waste separation at source.</td>
<td>The existing development in Fyrvalla can be reused. Otherwise, new development will take place.</td>
</tr>
<tr>
<td><strong>Accessibility</strong></td>
<td>No new additions for accessibility.</td>
<td>Go Green increases accessibility both in general compared to the current situation, even for persons with disabilities. The tunnel under Stuguvägen should be improved, however. Large open spaces and walkways and cycle routes separated from the traffic will make it easier for children to move around. Distance to shops and basic services will be 500–1000 m, which is shorter than the key figure for welfare. Preschool less than 500 m. School between 500 and 1,000 m. The planning area shall be served by public transport and there will be one stop in the middle of Fyrvalla and one in Remonthagen. The whole area offers recreation and good opportunities for sport.</td>
<td>The city will be condensed, which will bring services closer. More people will have the opportunity to live or work centrally with beautiful views. Fewer green areas will force people to look for alternative natural environments and recreation/sport areas.</td>
</tr>
<tr>
<td><strong>Recreation and outdoor life</strong></td>
<td>Opportunities for recreation and outdoor life will remain unchanged. The area offers fewer opportunities for recreation.</td>
<td>Go Green increases access to the area with its preserved green structure. The area will be made more accessible with information signs, more cycle routes and walkways that are separated from the road traffic. The OSC area with Rannäsen nature reserve lies adjacent to the planning area. The reserve is an urban, forest-rich and attractive recreational area both in the winter and the summer. Existing ski and jogging tracks between and within the OSC area and the planning area are safeguarded in Go Green.</td>
<td>The opportunities for recreation and outdoor life are limited when the development is condensed and there is more traffic. The area offers much fewer recreation options.</td>
</tr>
<tr>
<td><strong>Prerequisites for safe environments</strong></td>
<td>The proposal will lead to a less satisfactory traffic situation than the current one. No new additions of safe environments.</td>
<td>Go Green involves lighting, orientation signs and expanded walkways and cycle routes. Housing in the construction areas would increase social control. Traffic safety will improve.</td>
<td>The proposal requires new traffic solutions as a result of more intensive land development. No solutions for safe environments have been established.</td>
</tr>
</tbody>
</table>
4. Analysis

Health impact assessment of the three alternatives

The health impact assessment (HIA) below follows the guidelines published by the Institute, *A guide to health impact assessments – focusing on social and environmental sustainability* (4). The choice of environmental objectives is the same as in the environmental assessment. The relevant public health objectives and their determinants, in accordance with SNIPH’s checklist for choosing determinants and indicators, have then been added (10). The assessments take approximately a 15-year perspective, i.e. the same time period as the environmental assessment.

*Figure 9. View of Lövberga Park.*
### ASSESSMENT OF ZERO ALTERNATIVE IN 2020

<table>
<thead>
<tr>
<th>Objectives and determinants</th>
<th>Priority groups</th>
<th>Children</th>
<th>Older people</th>
<th>Chronically ill persons</th>
<th>Persons with disabilities</th>
<th>Socioeco-disadvantaged persons</th>
<th>Entire population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUBLIC HEALTH OBJECTIVES</strong></td>
<td></td>
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<tr>
<td>Participation and influence in society</td>
<td>Access to, between and in buildings</td>
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<tr>
<td>Economic and social security</td>
<td>Availability of housing</td>
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<td></td>
<td>Access to education</td>
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<td></td>
<td>A safe local environment</td>
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<tr>
<td>Healthier working life</td>
<td>Opportunities for recuperation</td>
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<tr>
<td>Healthy and safe environments and products</td>
<td>Risk of accidents</td>
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<tr>
<td>Increased physical activity</td>
<td>Supportive environments for physical activity</td>
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</tbody>
</table>

### ENVIRONMENTAL OBJECTIVES

<table>
<thead>
<tr>
<th>Environmental Objective</th>
<th>Priority groups</th>
<th>Children</th>
<th>Older people</th>
<th>Chronically ill persons</th>
<th>Persons with disabilities</th>
<th>Socioeco-disadvantaged persons</th>
<th>Entire population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced climate impact</td>
<td>Emissions of greenhouse gases</td>
<td></td>
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<tr>
<td>Clean air</td>
<td>Emissions of air pollutants</td>
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<tr>
<td>A non-toxic environment</td>
<td>Impact of persistent organic pollutants or heavy metals</td>
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<tr>
<td>Good-quality groundwater</td>
<td>Impact on groundwater, quality and level</td>
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<tr>
<td>A good built environment</td>
<td>Access to green areas and parks</td>
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<td></td>
<td>Access to cultural environments</td>
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<td>Access to services</td>
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<td></td>
<td>Adaptation to natural cycles</td>
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<tr>
<td></td>
<td>Noise</td>
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</tr>
<tr>
<td>A rich diversity of plant and animal life</td>
<td>Access to a rich diversity of plant and animal life</td>
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</tbody>
</table>

--- = Not relevant  ◆ = Priority group with substantial health gain/risk as a result of the decision

*Figure 10. The matrix shows how the situation in Zero Alternative will have changed by 2020 compared to today.*
Assessment of Zero Alternative in 2020

ENVIRONMENTAL OBJECTIVES

Assessment of determinants for REDUCED CLIMATE IMPACT and CLEAN AIR

- Emissions of greenhouse gases and air pollutants
  Zero Alternative may cause a slight increase in air pollutants. One reason is that the public transport network will not be expanded and road traffic will increase somewhat. Another reason is the lack of a requirement for district heating for any future businesses setting up in the planning area, which in turn may cause more emissions of greenhouse gases and hazardous substances. The most sensitive groups as regards the impact of hazardous substances are children, older people and chronically ill persons.

Assessment of determinants for A NON-TOXIC ENVIRONMENT

- Impact of persistent organic pollutants/heavy metals
  The area is contaminated as a result of previous military activities, affecting the Non-toxic environment objective. The pollutants that have accumulated in the soil may in time leak out. Bearing in mind the existing plans for soil testing and remediation, the risks of hazardous substances is deemed to be relatively unchanged.

Assessment of determinants for GOOD-QUALITY GROUNDWATER

- Impact on groundwater, quality and level
  The construction areas are relatively limited in terms of surface area and the quality and level of the groundwater is therefore not expected to change very much compared to the current situation. Children are the most important risk group as regards hazardous substances in the soil and water.

Assessment of determinants for A GOOD BUILT ENVIRONMENT

It is mostly children, older people and those with disabilities who are affected by the outcome of the Good built environment objective.

- Access to green areas and parks
  Zero Alternative implies a slight deterioration since access to green areas will decrease because some of them will be utilised for university buildings. No additional green areas (in the form of parks, tree plantations, etc.) will be created.

- Access to cultural environments
  Access to valuable cultural environments may decrease since none of the cultural buildings in Talldungen Grove will be safeguarded. Remonthagen will be kept open but none of the cultural environments will be restored.
Access to services
Access to services such as food shops, public transport, preschools and schools will not be affected since mostly university buildings will be added.

Adaptation to natural cycles
Adaptation to natural cycles will be accomplished by recommending waste separation at source in the comprehensive plan. Existing buildings can be utilised using temporary planning permission, but this may lead to sub-optimal use of resources since no investment can be made (resource efficiency in accordance with the Environmental Code).

Noise
Noise will increase as a result of more road traffic (in Fyrvalla with its new university buildings) since no investment will be made in more public transport or new entrances (no change of plan).

Assessment of determinants for A RICH DIVERSITY OF PLANT AND ANIMAL LIFE

Access to a rich diversity of plant and animal life
Most of the unique green “wedge” will be preserved, which creates space for both flora and some fauna close to the city. No new greenery that would promote biological diversity will be planted. Red-listed species within the area may be jeopardised and an inventory should therefore be performed. The situation is expected to be unchanged in 2020.

PUBLIC HEALTH OBJECTIVES

Assessment of determinants for PARTICIPATION AND INFLUENCE

Access to, between and in buildings
Participation and influence are assessed in terms of access between, to and in buildings. The situation in Zero Alternative is expected to be unchanged compared to the current situation since temporary planning permission will be granted.

Assessment of determinants for ECONOMIC AND SOCIAL SECURITY

Availability of housing
Availability of housing in Zero Alternative is expected to be unchanged since the planned expansion is for university activities. A shortage of housing can have a negative affect especially on socioeconomically disadvantaged groups if the cost of housing increases when the shortage occurs.

Access to education
Access to education will increase as a result of more university buildings and more university activities being created.
A safe local environment
The local environment will not be as safe as a result of the military zone, which was previous patrolled by guards and was fenced in, will in future be transferred to civilian use. There will be no systematic directional lighting or signage on some roads. An unsafe local environment especially affects women but also older people.

Assessment of determinants for HEALTHIER WORKING LIFE

Opportunities for recuperation
This refers to the chance to recuperate in an attractive outdoor environment, which can combat stress (11). Since only a small part of the area will be developed, opportunities for recuperation are expected to be relatively unchanged.

Assessment of determinants for SAFE ENVIRONMENTS AND PRODUCTS

Risk of accidents
The risk of accidents is expected to rise. New activities and temporary planning permission generate visitors and traffic, but the traffic environment cannot be changed without an amendment being made to the plan, which would produce a less than satisfactory traffic situation. Children, older people and persons with disabilities are especially vulnerable in unsafe traffic environments.

Assessment of determinants for INCREASED PHYSICAL ACTIVITY

Supportive environments for physical activity
The conditions for physical activity will be changed partly because the Fyrvalla area will be developed, and partly because no investment in walkways and cycle routes will be made. Supportive environments for physical activity are important for all groups in the assessment.
## ASSESSMENT OF THE GO GREEN ALTERNATIVE IN 2020

<table>
<thead>
<tr>
<th>Objectives and determinants</th>
<th>Priority groups</th>
<th>Children</th>
<th>Older persons</th>
<th>Chronically ill persons</th>
<th>Persons with disabilities</th>
<th>Socioeco. disadvantaged persons</th>
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</tr>
</thead>
<tbody>
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<td><strong>ENVIRONMENTAL OBJECTIVES</strong></td>
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Compared to current situation: Improvement (Light Green), Unchanged (Light Yellow), Deterioration/Change for the worse (Light Orange).

--- = Not relevant  ♦ = Priority group with substantial health gain/risk as a result of the decision

*Figure 11. The matrix shows how the situation in the Go Green Alternative will have changed by 2020 compared to today.*
Assessment of Go Green in 2020

ENVIRONMENTAL OBJECTIVES

Assessment of determinants for REDUCED CLIMATE IMPACT and CLEAN AIR

- Emissions of greenhouse gases and air pollutants
  As regards the environmental objectives Reduced climate impact and Clean air, Go Green will lead to relatively unchanged road traffic as a result of investments in public transport, walkways and cycle routes. A slight increase in energy use is to be expected, but there is a requirement for district heating to be used in the planning area, which will combat any increase in emissions otherwise. The impact on emissions is expected to be relatively unchanged compared to the current situation. The most sensitive groups as regards the impact of hazardous substances are children, older people and chronically ill persons.

Assessment of determinants for A NON-TOXIC ENVIRONMENT

- Impact of persistent organic pollutants/heavy metals
  The area is contaminated as a result of previous military activities, affecting the Non-toxic environment objective. The pollutants that have accumulated in the soil may in time leak out. Bearing in mind the existing plans for soil testing and remediation, the risks of hazardous substances is deemed to be relatively unchanged.

Assessment of determinants for GOOD-QUALITY GROUNDWATER

- Impact on groundwater, quality and level
  There is expected to be no major change in groundwater quality and levels compared to today. Only a limited area will be extended. Children are the most important risk group as regards hazardous substances in the soil and water.

Assessment of determinants for A GOOD BUILT ENVIRONMENT

- Access to green areas and parks
  Go Green will lead to about a 9-percent reduction in access to green areas. Many of the areas to be developed are not of particularly good quality since they have previously been used for military exercises. High-quality green areas will increase as a result of planting, strengthened distribution corridors for plant and animal life and the fact that Lövberga Park will be connected up to Remonthagen. The overall assessment is that access to green areas will be improved.
Access to cultural environments
Access to cultural environments will be safeguarded as a result of the cultural buildings in Talldungen Grove being preserved. Historical connections to Östersund as a garrison town will be safeguarded by leaving Remonthagen open.

Access to services
Access to services such as shops, public transport, preschool and school will improve to a certain extent by extending the public transport system and with regard to the distance between the newly built housing units and relevant services.

Adaptation to natural cycles
Adaptation to natural cycles will be achieved by recommending waste separation at source in the comprehensive plan. Existing buildings and infrastructure will be reused. This will lead to improvements.

Noise
Noise levels are expected to remain relatively unchanged within the planning area since investments will be made in more public transport, walkways, cycle routes and new entrances.

Assessment of determinants for A RICH DIVERSITY OF PLANT AND ANIMAL LIFE

Access to a rich diversity of plant and animal life
Most of the unique green “wedge” will be preserved, creating space for both plants and some animal life close to the city. Improved distribution corridors as a result of planting and by locating new buildings so that green passages are preserved. There are redlisted species in the area and an inventory should be carried out to strengthen and increase their populations. The situation in 2020 is expected to be improved.

PUBLIC HEALTH OBJECTIVES

Assessment of determinants for PARTICIPATION AND INFLUENCE

Access to, between and in buildings
Go Green will lead to a general improvement in access compared to the current situation for persons with disabilities as well as for older people and children. Walkways and cycle routes, lighting, signage and new buildings adapted to the needs of disabled persons will contribute to this.

Assessment of determinants for ECONOMIC AND SOCIAL SECURITY

Availability of housing
Availability of housing is expected to increase as a result of three areas being developed. A shortage of housing can have a particularly negative effect on socioeconomically disadvantaged groups if housing costs go up.
Access to education
Access to education will increase slightly as existing buildings will later be used for educational purposes.

A safe local environment
People will feel safer in the local environment than they do today as a result of Remonthagen-Fyrvallavägen being better lit. Orientation signs, walkways and cycle routes will also be erected/built. New housing will increase social control. An unsafe local environment especially affects women but also older people.

Assessment of determinants for HEALTHIER WORKING LIFE

Opportunities for recuperation
This refers to the chance to recuperate from work in an attractive outdoor environment. Investment in attractive green areas and the fact that Remonthagen will be connected up to Lövberga Park will increase access to environments for recuperation.

Assessment of determinants for SAFE ENVIRONMENTS AND PRODUCTS

Risk of accidents
The risk of accidents is expected to decrease as a result of road traffic investments such as a new entrance road, roundabouts and lower speed limits. Walkways and cycle routes will also be built in the area. Children, older people and persons with disabilities are especially vulnerable in unsafe traffic environments.

Assessment of determinants for INCREASED PHYSICAL ACTIVITY

Supportive environments for physical activity
The supportive environment for physical activity will be improved. The incentive for this is the same as under Healthier working life (see above). Supportive environments for physical activity are important for all groups in the assessment.
### ASSESSMENT OF THE BUILD MORE ALTERNATIVE IN 2020

#### ENVIRONMENTAL OBJECTIVES

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<tr>
<th>Objective</th>
<th>Priority groups</th>
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<th>Chronically ill persons</th>
<th>Persons with disabilities</th>
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#### PUBLIC HEALTH OBJECTIVES

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Compared to current situation  
- Improvement  
- Unchanged  
- Deterioration/Change for the worse

--- = Not relevant  ♦ = Priority group with substantial health gain/risk as a result of the decision

*Figure 12. The matrix shows how the situation in Build More will have changed by 2020 compared to today.*
Assessment of Build More in 2020

ENVIRONMENTAL OBJECTIVES

Assessment of determinants for REDUCED CLIMATE IMPACT and CLEAN AIR

- Emissions of greenhouse gases and air pollutants
  Build More, with its higher degree of development, will generate more emissions of air pollutants and greenhouse gases. This high degree of development in Build More will generate more road traffic and more emissions of air pollutants. More energy is likely to be used, although the requirement for district heating in the planing area will ensure that the increase does not exceed applicable environmental quality norms. The most sensitive groups as regards the impact of hazardous substances are children, older people and chronically ill persons.

Assessment of determinants for A NON-TOXIC ENVIRONMENT

- Impact of persistent organic pollutants/heavy metals
  The area is contaminated as a result of previous military activities, affecting the Non-toxic environment objective. The pollutants that have accumulated in the soil may in time leak out. Bearing in mind the existing plans for soil testing and remediation, the risks of hazardous substances are expected to remain relatively unchanged.

Assessment of determinants for GOOD-QUALITY GROUNDWATER

- Impact on groundwater quality and levels
  There is expected to be no major change in groundwater quality and levels compared to today. The situation is not expected to change. It should be noted, however, that Build More is more likely to lead to the establishment of industrial operations, which may increase the risk of pollution. Children are the most important risk group as regards hazardous substances in soil and water.

Assessment of determinants for A GOOD BUILT ENVIRONMENT

It is mostly children, older people and those with disabilities who are affected by the outcome of the Good built environment objective.

- Access to green areas and parks
  Access to green areas will be severely restricted as a result of the major land developments. The green “wedge” into the city will be cut off. The park environment will not be improved. There is a risk that Gröntorget square at Fyrvalla will be used for parking. The overall assessment is that access to green areas will deteriorate.
Health impact assessment in physical planning

Access to cultural environments
Access to cultural environments will deteriorate as a result of Remonthagen being eradicated as a historical link to Östersund as a garrison town. The cultural buildings in Talldungen Grove may be preserved as it is less likely that this area will be developed.

Access to services
Access to services such as shops, public transport, preschool and school will improve when the city becomes more densely built-up.

Adaptation to natural cycles
Adaptation to natural cycles will be accomplished by recommending waste separation at source in the comprehensive plan. The existing buildings in Fyrvalla can be reused. Otherwise, new development will take place.

Noise
Increased development will probably lead to more traffic flows with more noise, despite new road traffic solutions.

Assessment of determinants for a rich diversity of plant and animal life
A high degree of development reduces both the scope of plants and animals to spread and their access to natural habitats. Red-listed species within the area may be jeopardised and an inventory should therefore be performed. The situation in 2020 is expected to have deteriorated.

Public health objectives

Assessment of determinants for participation and influence
Access to, between and in buildings
In Build More, it is anticipated that new areas and the new building stock will be easily accessible in accordance with the relevant legislation, which is positive for persons with disabilities as well as for older people and children.

Assessment of determinants for economic and social security
Availability of housing
Availability of housing is expected to increase with the new extensive development. A shortage of housing can have a particularly negative effect on socioeconomically disadvantaged groups if housing costs go up.

Access to education
Access to education within the planning area is expected to be unchanged compared to the current situation.
A safe local environment
The local environment will be safer as a result of most of the area being developed, which will increase social control. An unsafe local environment especially affects women but also older people.

Assessment of determinants for HEALTHIER WORKING LIFE

Opportunities for recuperation
‘Recuperation’ here refers to recuperation in an attractive outdoor environment. The fact that extensive green areas will be developed and the city’s green wedge will be cut off will reduce access to important environments for recuperation. This alternative will lead to a deterioration compared to the current situation.

Assessment of determinants for SAFE ENVIRONMENTS AND PRODUCTS

Risk of accidents
The risk of accidents is expected to be relatively unchanged. Road traffic will no doubt increase in the area but this will be compensated by new road traffic solutions which will improve safety. Children, older people and persons with disabilities are especially vulnerable in unsafe traffic environments.

Assessment of determinants for INCREASED PHYSICAL ACTIVITY

Supportive environments for physical activity
The supportive environment for physical activity will deteriorate based on the same premise as under Healthier working life (see above). Supportive environments for physical activity are important for all groups in the assessment

Variation in outcome
As regards Zero Alternative, it was assumed that the municipality would buy the land outside the gates. If this did not happen, the land outside the gates would probably be sold on the open market. This means that the land would probably be developed along the same lines as the Build More alternative and the assessments in Zero Alternative would have a similar outcome to Build More.
The process – submitted comments and how they have been taken into consideration

The comprehensive plan for Fyrvalla-Remonthagen was circulated for consultation between 1 November and 9 December 2005. The consultation documentation was made up of a description of the plan with an accompanying foldout map. The planning documentation was sent to authorities, associations and private individuals who have a significant interest in the plan’s design. The planning documentation was also on public display and a consultation meeting was also held, in which about 20 people participated. The Committee for Environmental and Social Affairs received 31 written comments. Some of these were negative and some were positive about the proposal. Several commented on the construction areas in Go Green and a majority were positive to the proposed development expansion plans, especially regarding housing. Comments were also received regarding traffic issues. Requests were also submitted for more expansion opportunities for e.g. business areas, cemeteries and more housing.

A few examples of views connected to health and how they have been considered in the planning process are given below:

- Data were supplied about the occurrence of red-listed species within the planning area and these have been added to the documentation. The 16th environmental quality objective (A rich diversity of plant and animal life) has therefore been incorporated.
- Detailed historical information about the area has been included in the proposal.
- Requests for more detailed traffic studies concerning safe walkways and cycle routes, public transport and the entrance road from Stuguvägen have been submitted. These will be considered during the detailed planning stage.
- Information about contaminated land in the form of test results and analysis will be produced.
- More cultural information on Lövberga Park and its surroundings has been added.
- Public transport planning with proposed routes, feasible bus-stops etc., has been proposed by the municipality.
- Proposals about good accessibility and orientation aids (signs, etc.) for persons with disabilities also being important in housing and amenity areas have been incorporated.
- The proposal mentions that there is considerable public interest in centrally located sports facilities.

After being supplemented, the plan was also on public display between 1 July and 8 September 2006. The exhibition was advertised in the local press on the 1 July 2006. The exhibition comprised a description of the plan with an accompanying fold-out map and consultation documents. Fifteen comments were received during the exhibition period (13). Examples of further revisions associated with health that were made after the exhibition include:

- A high level of ambition regarding accessibility for all people has been added to the text.
- A more detailed description of health and safety has been added to the plan.
5. Summary of results, conclusions and recommendations

Comparing the three alternatives

Comparison between Zero Alternative and Go Green in 2020

ENVIRONMENTAL OBJECTIVES

In 2020, Zero Alternative will lead to an unchanged situation or deteriorations (compared to the current situation) as regards environmental impact, see the matrix in Figure 10. Go Green will on the other hand lead to improvements as regards A good built environment (noise unchanged) and A rich diversity of plant and animal life, whilst the situation will be unchanged for the other environmental objectives, see the matrix in Figure 11.

PUBLIC HEALTH OBJECTIVES

A comparison of the matrices in Figures 10 and 11 shows that Go Green will lead to improvements for most of the determinants whilst Zero Alternative will lead to deteriorations or an unchanged situation. Only in one respect, access to education, is Zero Alternative better than Go Green.

An overall assessment is that Go Green is better than Zero Alternative as regards all the determinants except for one. Children, older people and persons with disabilities stand to gain the most from the positive outcome of Go Green.

Comparison between Zero Alternative and Build More in 2020

ENVIRONMENTAL OBJECTIVES

In 2020, Zero Alternative will lead to an unchanged situation or deteriorations (compared to the current situation) as regards environmental impact, see the matrix in Figure 10. Build More will on the other hand lead to more deteriorations than Zero Alternative as regards environmental impact, see the matrix in Figure 12. As regards access to services and adaptation to natural cycles, however, Build More is better than Zero Alternative.
PUBLIC HEALTH OBJECTIVES

A comparison between the matrices in Figures 10 and 12 show that Build More is better than Zero Alternative as regards determinants that concern accommodation, availability of housing, access to and in buildings and a safe local environment.

On the other hand, Build More is worse than Zero Alternative as regards access to supportive environments for physical activity and opportunities for recuperation between work shifts. The latter mostly applies to people who work or attend educational programmes in or near to the planning area and can use the green areas for recuperation. Build More is also worse than Zero Alternative as regards access to education.

An overall assessment is that Build More is better than Zero Alternative as regards several determinants concerning accommodation, but worse than Zero Alternative when it comes to access to green areas, education and a number of factors that cause environmental impact. Children, older people and persons with disabilities will be most affected by both positive and negative changes.

Conclusions

Go Green provides a lot more health benefits than Build More. Go Green only partly satisfies the increasing need for housing in Östersund. The scope for developing other areas for housing needs therefore to be further examined before Go Green can be recommended as the best alternative from a public health point of view.

Conflict of interest – availability of housing versus access to green areas

Large, centrally located areas in Östersund have been freed up due to the closure of military facilities. There is also a general desire to live in the centre of the city with a view or in close-by areas. Until recently, relatively few new buildings have been constructed in Östersund. As a result, a considerable need, in particular for housing, has built up. The municipality are constantly receiving requests to develop land and have a long waiting-list (12). The benefit of developing Fyrvalla-Remonthagen is that it will give more Östersund inhabitants the chance to live or work closer to the centre of the city and have beautiful views. The central location will also bring them closer to public services and amenities.

The municipality is currently offering plots of land in a number of smaller areas like Frösön. Frösön is about 7 km from the centre of Östersund. Furthermore, several developments are planned on land that has been transferred from military to civilian ownership, including the former I 5 barracks to the north of the city. Housing will also be built on these areas. There are then several alternative areas in Östersund that can be developed, where the negative impact on recreation, outdoor life and cultural environment will not be as great as in Fyrvalla-Remonthagen (14).
Equity and gender equality in health

The groups that stand to gain the most in terms of health from the positive effects of Go Green are children, older people and persons with disabilities. This can be seen in the health matrices.

As regards gender equality, Go Green will lead to improvements for women. Firstly, investments in safer traffic environments will reduce the risk of injuries, where women are overrepresented. And secondly, improvements in the green area (lighting, signage) will make it a safer place to be and women will be less afraid to be outside after dark. More buildings in the form of three construction areas in Go Green may help to make society safer.

Recommendation

Go Green is the best alternative as regards health-promoting factors in the local environment. Furthermore, many people in the local environment outside Fyrvalla-Remonthagen will benefit a great deal from the green and cultural areas that will be preserved. The drawback is the relative lack of new housing close to the city centre in comparison with Build More. However, there are other areas in Östersund that can be developed, where the negative effects will not be as great as in Fyrvalla-Remonthagen.
6. Experiences

Some experiences gained from this case study:

- **HIA in a comprehensive plan** must be limited, both regarding the number of determinants, and regarding the degree of detail in the assessments, to ensure the analysis remains practicable. As regards this HIA, qualitative assessments are sufficient. In plans where there are serious conflicts of interests, one might need to go into more detail and make quantitative assessments.

- A comprehensive plan is often very extensive. Environmental and social consequences in various areas may result in totally different outcomes depending on how land will be developed/utilised in the future. The planning area in a comprehensive plan should therefore be divided up into a suitable number of “sub-areas”, each of which should be analysed separately. To consider cumulative effects, however, one needs also to look at the whole area.

- Performing an HIA as part of physical planning requires not only people who are knowledgeable about the planning area itself, but also people who have expertise in the environmental and public health fields as well as social issues. Knowledge of how individual determinants are influenced by different proposals and of how vulnerable groups will be affected is essential. It is therefore important to ensure the HIA team possesses the “right” expertise and cooperates well when performing the assessment. An architect, a public health planner and an Agenda-21 coordinator, all from Östersund Municipality, have participated in this case study.

- Smaller municipalities may run into particular problems if they do not have a public health expert on their staff. Some municipalities also have to hire planning experts. Such problems can be solved by municipalities and county councils working together, with the county council providing the necessary public health expertise. County administrative boards may also be able to provide support to municipalities in their HIA work, since they have been tasked by the government to start applying HIA.

- One experience of the case study is that it is useful to have policy decisions at management level if HIA is to be applied. This increases the chances of different disciplines and units in an organisation working together. Interdisciplinary cooperation also enhances the quality of the assessment work.

- An HIA using the Health Matrix tool covers many different municipal policies including the UN Convention on the Rights of the Child, gender equality aspects, integration policy and equity aspects. The HIA process is simplified when there is just one tool, the Health Matrix, that covers all important policies.
In Go Green, the municipality has highlighted the “green wedge” that runs into the city as a valuable recreation area, thereby focusing on the importance of outdoor life for people’s well-being. A municipal recreation plan can be established to develop and manage the area (15).

The choice of names for the planning alternatives is an important factor when it comes to understanding. It is beneficial if a name that characterises a certain alternative can be chosen. For this reason, the municipality’s “planning alternative” has been given the name “Go Green” in this report.

One of the advantages of the Health Matrix is that it gives a good overview of the analysis. The determinants assessed in the matrix may be of varying importance for health, however. Those determinants that have been the deciding factor as regards choice of alternative should always be specified. Other comments that have emerged are that the Health Matrix should always be supplemented with texts about the reasoning behind the assessments.

The reference group has submitted comments pointing out that the housing forms and land development have not been adequately concretised and that there was a need for this so that the effects on health of the different alternatives could be more clearly determined. According to Östersund Municipality, such aspects will not be concretised until the detailed planning stage. The comprehensive plan and this case study only deal with the main focus for land and water use. For this reason, it may also be of interest to perform HIA in the detailed planning stage.

The terminology regarding environmental assessment is slightly different to the terminology used in health impact assessments. Comments submitted show that it is important to have concordant terminology. Discussions aimed at harmonising the terminology are ongoing.

It is often difficult to get citizens involved in the consultation process. One way of increasing participation in consultation may be to contact schools as well as disabled persons’, pensioners’ and immigrants’ organisations.
Overall conclusions

Physical planning based on the Swedish Planning and Building Act is an important tool in our efforts to reach the environmental objectives and achieve long-term sustainable development. Supplementing an environmental assessment with an assessment of social sustainability, i.e. a health impact assessment, in a comprehensive plan does not involve a great deal of extra work and such an analysis may be of considerable significance as it may lead to substantially more attractive living environments being created at the local level.

Consideration of the social dimension in planning work is also very much in line with the Government’s sustainable development strategy and the requirement for sustainability assessments of important political decisions.

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2. An environmental assessment involves identifying, describing and assessing the likely environmental impact of a plan or programme being implemented or changed on e.g. the population and human health (Chapter 6, Section 12 of the Swedish Environmental Code).
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Glossary

Environmental assessment
A process involving consultation and the drawing-up of an environmental report. The concept of “the environment” is here a wide one and includes aspects such as population, human health, buildings and cultural heritage. An environmental assessment involves identifying, describing and assessing the likely environmental impact of a plan or programme being implemented or changed.

Environmental report
The product of an environmental assessment is an environmental report – a document identifying, describing and assessing the significant environmental impact of the proposed plan or programme.

Health determinant
A factor that influences health or other characteristics studied.

Health impact assessment (HIA)
The equivalent of an environmental assessment or an environmental impact assessment in public health terms. A combination of methods through which political decisions, a programme or project are assessed based on their potential effects on health in a population and on the distribution of these effects among the population. To this end, assessments of health determinants in an HIA are to contain a description of how various groups are affected; both groups that already suffer from ill-health and those that are at risk of doing so. Aspects that must always be taken into consideration, if relevant, include: age, sex, disabilities as well as ethnic and socioeconomic background and sexual orientation. The process involves consultations.

Noise
Unwanted sound that can hurt or disturb people.

Zero Alternative in environmental assessments
In accordance with the Swedish Environmental Code, the Zero Alternative shall describe how things would develop should the plan, programme or amendment not be implemented (Chapter 6, Section 12 of the Swedish Environmental Code).
References

(all these publications are only available in Swedish unless otherwise stated)


According to the Swedish Government, all political decisions shall be formulated so as to take their long-term social, environmental and economic impact into consideration. The Swedish National Institute of Public Health sees health impact assessments (HIA) as an excellent tool in order to highlight how decisions contribute to the attainment of social sustainability. This report shows how an environmental assessment can be supplemented with a health impact assessment when municipalities are doing their physical planning, in this case an in-depth comprehensive plan. A very common conflict of interest is highlighted; the choice between building housing and preserving a green area close to the city centre. The example shows that an HIA can supply new and valuable arguments when such a decision is to be taken.

The report is intended for investigators and planning personnel at central agencies, county administrative boards, county councils and municipalities in Sweden.

The Swedish National Institute of Public Health’s task is to promote health and prevent disease and injury – primarily by providing the Government, central agencies, municipalities and county councils with knowledge. The Institute’s activities are pursued on a scientific basis.

Health impact assessment in physical planning

In-depth comprehensive plan for the Fyrvalla-Remonthagen area, Östersund

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