

# RECREATIONAL PLANNING OF A RIVER ENVIRONMENT

Case study of an environmental development project of the  
River Kauhavanjoki

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## Abstract

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Abstract <p>The River Kauhavanjoki flows through urban centre of Kauhava, joins to the River Lapuanjoki, and finally flows to the Gulf of Bothnia at Nykarleby. The water quality of the River Kauhavanjoki is defined as poor, current recreational possibilities of the river environment are tenuous, and the river landscape is overgrown by vegetation. The recreational potential of the river is, however, excellent and because of the central location the river is easy to access for local residents. The target is to set the River Kauhavanjoki and its surroundings in a state that is more valuable and explore its utilities as a recreational area. All these factors together gave rise to the environmental development project of the River Kauhavanjoki, which was carried out in 2014.</p> <p>This thesis introduces the process of the environmental development project of the River Kauhavanjoki and the features of the river, such as land use plans and natural values. In the thesis, it is attempted to explore how the river environment should be developed for recreational use. The target is to create sustainable design principles for recreational development of the river environment and to prepare a master plan for the river area of the urban centre of Kauhava. One significant tool in the planning process is the participation of the local residents and parties.</p> <p>A literature review has been conducted on design principles of recreational development and quality matters of the river environment in the perspective of recreation. In the Case of Tikkurila in Vantaa, a planning process has been studied where recreational development is one of the main targets. In addition, a literature review has been carried out on the principles of public participation in the planning process to achieve good and sustainable results for planning processes.</p>		
Keywords Outdoor recreation, sustainable landscape planning, public participation, river environment		

## Tiivistelmä

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Tiivistelmä <p>Kauhavanjoki kulkee Kauhavan keskustaajan lävitse, yhtyy Lapuanjokeen ja virtaa lopulta Pohjanlahteen Uusikaarlepyystä. Kauhavanjoen veden laatu on määritelty heikoksi, nykyiset jokiympäristön virkistysmahdollisuudet ovat olemattomat ja jokimaisema on umpeenkasvanut ja epäsiisti. Joen potentiaali virkistyskäytössä sen sijaan on erinomainen ja sijaintinsa puolesta se on paikallisille asukkaille helposti saavutettavissa. Kauhavanjoki ja sen ympäristö halutaan asettaa parempaan arvoon ja sen hyödyt virkistysalueena halutaan selvittää. Nämä tekijät yhdessä käynnistivät Kauhavanjoen ympäristön kehitysprojektin, joka toteutettiin vuonna 2014.</p> <p>Tämä opinnäytetyö esittelee Kauhavanjoen ympäristön kehittämisprojektin eri vaiheet ja alueen ominaisuudet maankäyttösuunnitelmista jokiympäristön luonnon arvoihin. Opinnäytetyössä pyritään selvittämään, kuinka ja millä keinoilla jokiympäristön virkistyskäyttöä tulisi kehittää. Tavoitteena on luoda kestävä suunnitteluperiaatteet jokiympäristön virkistyskäytön kehittämiselle ja valmistaa yleissuunnitelma Kauhavan keskustaajaman jokialueelle. Yksi merkittävä työkalu suunnitteluprojektissa on paikallisten asukkaiden ja toimijoiden osallistaminen.</p> <p>Kirjallisuustutkimus on tehty virkistyskäytön suunnittelun periaatteista ja hyödyistä sekä jokiympäristön laadullisista seikoista virkistyskäytön näkökulmasta. Lisäksi on tutkittu Case Tikkurilan suunnitteluprosessi Vantaalla, jossa jokiympäristön virkistyskäytön kehittäminen on otettu yhdeksi päätavoitteeksi. Tämän lisäksi, kirjallisuustutkimus on tehty osallistamisen keinoista suunnitteluprosessissa, jotta voidaan saavuttaa hyviä ja kestäviä tuloksia suunnittelun tueksi.</p>		
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## 1 INTRODUCTION

There is a wide potential to develop river environments as recreational areas. River environments have attracted settlements, urban centres, agriculture and other industry throughout history, but river environments as versatile recreational areas are still waiting for its development in many places. All-time favourite elements in good nature experiences are green infrastructure, water element and the landscape itself. River environments held many recreational activities in water and onshore.

Nature and green spaces affect people's health and wellbeing psychically reducing stress, relaxing and restoring, and physiologically adding physical activity. There are evidences that healing process is faster, and people do not need so much painkillers if they have an opportunity to be in contact with landscape or nature scenes during the process. There is an evidenced relationship between outdoor activity in green spaces and emotional wellbeing. Any sport activity itself reduces blood pressure, increases self-knowledge and it has the ability to improve mood. However, pleasant landscape scenery with sport activity increases self-knowledge better than the sport activity itself.

When planning larger recreational areas, it is reasonable to create a master plan for developing the whole area at once. In good sustainable planning practice, public participation, protection of natural values, adaptation of the design to existing topography, minimization of negative effects during implementation and the use of natural and local resources, are the keys to get sustainable results.

Water quality is in a key role in water-based recreation. Agriculture, forestry and different needs of soil modification impair the water quality. In addition, barriers in water bodies, for example, dams prevent fish from accessing the upper reaches to spawn. In recreational development, good water quality and a natural state of water bodies are important principles to creating diverse and sustainable recreational area.

The planning process of recreational area is often a complex path to achieving the best result, which satisfies the local people as well as landowners and decision makers. It is important to define how to involve participants the way that it is valuable for the project. An open participation process, where information and ideas are being shared both ways have a good chance of engaging interested parties in results. Using the right interacting tools and enough of them to involve participants of different ages improves the equality of participants.

Main research questions are mentioned below:

- What are the specific principles and values of planning river environment?
- What are the mental, physical and cultural benefits of developing river environment for recreational use?
- What are the good practices of public participation in planning process?

The background of this master's thesis is the real time project in Kauhava called the recreational development project of the River Kauhavanjoki. The project was launched because of a deep need of bringing the river environment to a central position and a good condition in Kauhava. There was also a big need to create recreational green areas for local people, as the current state of Kauhava is a rural town with no workable pedestrian and green area network. The author chose this topic because river environments in Finland could be better exploited for recreational use. There is a great value and potential in these environments especially for local use. The author chose this topic because the project includes a wide chance of public participation and it is interesting to involve local people in the planning process to create a pleasant environment for them. The recreational development project of The River Kauhavanjoki was an EU project and 70% EU funded. The Centre for Economic Development, Transport and the Environment (ELY) acted as financier and supervised the project.

The aim of this master's thesis is to introduce the basis of designing outdoor recreational areas. The aim is also to explore the development of river environments for more functional recreational use in consideration of the dominant land use regulations and other base information and limiting conditions.

Another intention of this master's thesis is to introduce good practices of public participation in planning process. Local people and other interested parties are good experts of their environment and many times the best ideas come from the local people. Public participation is also a tool to engage residents and policy-makers to the results.

The selected research methodology is based on an analytical review of the literature available and the use of one case of similar type to conclude the main case study.

The case study research technique was used for understanding the problem, defining the problem in forms of questions, selecting suitable cases and analyzing the results. The case study was carried out in the following phases:

- Definition of the problem
- Identification of the research questions

- Data collection
- Questionnaire survey and analysis of the results
- Master planning of the case study
- Results discussion

## 2 OUTDOOR RECREATION

Sport and nature recreation have become increasingly popular. People have more free time than before, and especially senior citizens and pensioners, who live longer and are healthier nowadays, have started to use outdoor recreational services. Nowadays, people have increasing pressure from working life, and outdoor recreation is a great way to get fresh air and a feeling of being away from it all. Therefore, it is a good way to reduce stress. (Bell 1997, 1.)

Outdoor recreation is free and therefore available to everyone despite the social class or age. The whole family can exercise, go outdoors and spend time together in one place. Therefore, recreational areas should be designed for different people with different needs, possibilities and interests. Outdoor recreational areas should be multifunctional places with good accessibility. A nearby recreational area should be easy and safe to access, so it can be an everyday or weekly habit to visit the area. The area should be so easy and safe to access that children can use the area without adults needing to be concerned about them. (Bell 1997, 1.)

Nature and ecological issues should not be forgotten when designing outdoor recreational areas. In order to minimize possible conflicts between users and wildlife, enough studies and research of nature should be performed before planning. (Bell 1997, 6.)

In Finland, many state-owned forests and waters offer good opportunities for outdoor recreation and a wide range of activities. In Finland the "Everyman's rights" are extensive. Nevertheless, some recreational activities and water activities require a permission. (Metsähallitus 2016.)

### 2.1 Studies of outdoor recreation

There have been several studies about recreational usage and how it has evolved. Visiting public parks and green areas has always been popular, and it still is. Outdoor activities like hunting and fishing are declining; also, the popularity of camping and swimming has decreased. However, viewing, photography and studying nature have grown strongly since 2000. In addition, popularity of visiting beaches and natural areas, driving off-road vehicles, kayaking and snowboarding are growing. (Manning 2011, 29.)

The relationship between demographic and socioeconomic variables like age, income, gender and education, and participation in specific recreational activities has been studied. It was found out that age is strongly related to recreational activities, which require physical strength and good endurance. Income affects only a few activities that have high



cost thresholds. Gender is related to recreational activities that have always been associated with masculinity, such as hunting. Education is frivolously related to only some recreational activities like sailing, golf and cross-country skiing. Stage of family cycle is highly intercorrelated with age so that its effects on recreational activities are similar. The future use of outdoor recreation can be estimated with these studies. It is easy to deduce, which way outdoor recreational trends are going and what are people's interests in the future. Of course, new activities and sports are coming all the time and those are not so predictable. (Manning 2011, 37.)

A questionnaire survey about recreational use in Finland has been carried out. The survey was repeated two times for the sake of comparison. The first survey was carried out in 1998-2000 and the second one in 2009-2010. In the survey, the quality and quantity of recreational activities of almost 9000 Finnish people were measured. According to the latest results, 96 % of adult population of Finland exercise outdoors and 4 % of the population has not exercised outdoors in the last 12 months. 91% of the oldest age group of ages 65-74 are exercising outdoors but compared to the results 10 years ago, when the same result was 88%, it seems that older people are in increasingly better condition. Finnish people exercise outdoors on the average 2-3 times a week. Women exercise outdoors 177 times a year, while men do so 163 times a year. (Sievänen & Neuvonen 2011, 125.)

Most of the Finnish people have versatile opportunities for outdoor recreation near their homes. The average distance to a nearby forest is 700 metres, but half of the Finnish people are living only 200 metres away from the forest. Half of the population is living not more than one kilometre away from waterfront or a field. The opportunity to use leisure homes such as summer cottages brings wide opportunities for outdoor recreation such as fishing, swimming, boating and berry picking. 41% of the Finnish population has access to leisure homes regularly. Almost all the Finnish adult population has basic skills in skiing (98% of the adult population), swimming (97%) and berry picking (97%). Most of the population has acquirements of boating (85%), fishing (88%), camping (89%) and mushroom picking (76%). 27% of the population has hunting skills. In generally the basic skills mentioned above has remained unchanged or increased slightly in ten years. (Sievänen & Neuvonen 2011, 129.)

### 2.1.1 Outdoor recreation and emotional well-being

There are many studies on the relationship between outdoor activity in green spaces and emotional well-being. Especially people who live in an urban environment find it important

to spend free time in parks, nature or in other green spaces. There is evidence that nature-based outdoor recreation enhances mood and mentality and therefore it reduces stress and depression. (Korpela 2013.)

Korpela, Borodulin, Neuvonen, Paronen and Tyrväinen investigated in their research whether there is a relationship between the average time used for nature-based recreation and emotional well-being. They found out that there is a clear and significant relationship, and results reflect the importance of feeling of getting new spirit and vitality for the everyday routines, forgetting worries, clearing thoughts and just being away from it all. (Korpela 2013.)

There are several national health problems in Finland such as high blood pressure, diabetes and cardiovascular diseases. One of the ways to prevent these disorders is physical exercise. For example, 90 per cent of type 2 diabetes could be avoided with changing dietary habits, having enough physical exercise and quitting smoking. Regular exercise for example thirty minutes of walking several days of the week keeps an aging person active and reduces the risk of contracting the diseases mentioned earlier. Physical exercise has a positive impact to weight control and mood, and it can reduce depression and tension. On the other hand, the deficient amount of physical exercise is known to be in a connection of many different diseases. (Talent Vectia, 2013, 8, 10-11.)

Nature and green spaces affect people's health and wellbeing for example psychically reducing stress, relaxing and restoring, and physiologically adding physical activity. In addition to that, nature has an ability to increase social interaction among people and a feeling of implication. Impacts of nature are experienced through senses and especially sense of hearing, sight and smell are the tools of good nature experiences. Any sport activity itself reduces blood pressure, increases self-knowledge and it has ability to improve mood. However, pleasant landscape scene with sport activity increases self-knowledge better than sport activity itself. There are researches that healing process is faster and people do not need so much painkillers if they have ability to watch landscape or nature scene during the healing process. In addition, anger feelings were reduced when sport activity was done in a pleasant landscape. (Talent Vectia, 2013, 13.)

## 2.2 Recreational planning

Recreational usage has changed in several ways over the last decades. The number of visitors has increased, and the population structure is changing so that older, retired people with more free time have possibilities to use recreational services. In addition, the number of single people and couples without children has increased. Secondly, people

have new activities and ways to use recreational services. For example, nowadays trail biking or Frisbee golf are new and highly popular exercise forms. (Bell1997, 6-8.)

Landscape is an important element people go to look in recreational areas. Facilities and functions in the landscape encourage people to use it and complete the experience. Therefore, recreational areas should be planned in such a way that people's different goals and expectations on what a landscape can provide would be fulfilled. Different circumstances, for example soil, climate, season and changing possibilities should be considered in planning. These different circumstances can offer different alternatives to use to the same area. (Bell 1997, 9-11.)

A sustainable landscape design concept should be a part of any outdoor design project. It is a concept of balancing the environment, resources, nature, culture and energy, and reducing negative human impact. There is a fitting definition of the concept of sustainable landscape design:

*The concept of sustainable landscape design can be defined as the art of using natural, structural, cultural and scientific data to create outdoor spaces in line with resource conservation and development principles, within the framework of aesthetic rules (Salici 2017, 436).*

To maintain sustainable landscape design, there are several ways to achieve sustainable public outdoor areas - environmental, social-behavioural and aesthetic outcomes. The first target is to adapt the design in existing topography. If the topography has been changed much there can be a costly result for example for water ecology. Secondly, an important target is to minimize negative effects during construction. Land quality and protection of natural plants can weaken if the construction work has done recklessly. Thirdly, the effective use of resources is important in sustainable landscape design. Protection of natural land is the key to good recreational use, with aesthetic qualities and nature-setting functions. Fourthly, use of natural and local resources and materials for minimizing the damages in environment, energy consumption and water consumption. (Salici 2017, 436-438.)

One way to create sustainable design is to protect existing plants, which are in a good shape. It is ecologically important, but it also reduces the costs and makes the design more impressive from the beginning after implementation. In addition, choosing local natural plants in design is one way to further advance sustainability. Using natural plants increases the probability of success of the plant and it is also economically important and helps to keep balance in natural ecosystems. Usually the maintenance of natural plants is easier and does not cause that much costs. (Salici 2017, 439.)

When planning a recreational area, it is important to use the available resources to optimise the potential. The area should be also planned so that it is easy to maintain and build with realistic costs. Nowadays, especially maintaining issues are important to consider because municipalities have limited financial resources, and therefore they need to prioritize their services. In addition, it is not wise to invest too much if there is no money to maintain the area. Sustainable planning with usage of available resources and building with reasonable costs is needed. (Bell 1997, 18.)

There are recommendations for planning recreational trails in Finland. It is written that the need for recreational trails should be considered already in land use planning to avoid conflicts with other land use forms and to promote continuity of the network of trails. The need of the trails should be considered carefully and extensively. It means that the purpose of use and the target group is defined. For example, if the trail is for skiers, cyclists, walkers or disable people, there are different quality criterions of planning the trails. The planning should be made together with all interested parties such as landowners, local people and associations. (Suomen latu 2015.)

Finnish land use and the building act and The Finnish nature conversation act have regulations for recreational planning. The aim of The Nature conversation act is to “maintain biological diversity, conserve the beauty and scenic values of nature, promote the sustainable use of natural resources and natural environment, promote awareness and general interest in nature and promote scientific research”. In addition, in The Land use and building act there are regulations that promote a safe, healthy, pleasant and socially functional environment and equality of people. The aim is to create environments that provide the needs of different population groups such as children, elderly people and the handicapped. Protection of the cultural values, natural values and beauty of the built environment are also mentioned in Land use and building act. (Land Use and Building act 132/1999, Section 5) (Nature Conservation act 527/2014, Section 1.)

### 2.2.1 Water-based recreation

Water is an attractive feature in the landscape and an important recreational element for people. Lakes, rivers, ponds and seas are important because of their aesthetic qualities and recreational possibilities, for example fishing, bathing, boating and kayaking. However, the use of the water elements can be lange, and those areas are usually sensitive, therefore it is important to plan the use carefully, so that it will not destroy the environment. (BELL 1997, 150.)

When planning recreation on a river shore it is important to consider accessibility and how it should be controlled. It is good to control the access to vulnerable places like wetlands, stream mouths and very steep banks. If the inventory of the planning area is carried out well, it is easier to design the plan, implement the place and yet, maintain it. (BELL 1997, 152.)

There are few opportunities to protect vulnerable riverbanks, rockwork walls and timber edges. In northern parts of the world, during winters and spring times when the ice is melting and moving it can be really powerful and brake structures out of its way. Therefore, especially timber edges should be planned carefully and make them strong or moveable so that those structures can be moved safe place before winter and then install them back again in spring time. (BELL 1997, 152.)

Boating, kayaking, canoeing and rowing are popular and activate people to use water elements. Therefore, also boat facilities should be planned properly. It is not just jetties for boats, but different boats need different kinds of jetties or places to launch the boat. Also parking areas with proper facilities should be considered carefully. Motor boats need boat launching-ramps and special need for parking area so that car and trailer vehicle combination have enough space to turn, reverse, launch and park in the area. Special low jetties are needed for kayaks and canoes as it can be seen from picture 1. (BELL 1997, 152.)



PICTURE 1. Special low jetty for canoes and kayaks (Yle 2014).

### 3 THE RIVER ENVIRONMENT

Rivers have a great impact of a local landscape. Many cities and villages have been established in connection with rivers or other waterbodies. Rivers have been used for fairways of transportation, electricity production and agricultural need. Nowadays rivers are used for recreational use also (The USGS water science school 2016.)

River environments are changing slowly because flowing water erodes riverbanks continually and transport soil and sediment. During millions of years the topography of the river landscape can be changed significantly. Last decades people has changed river nature and landscapes by building dams to harness the rivers. Nowadays dams are no longer built in Finland, but more natural structures are popular. It must be ensured that fish can move freely in the river. (The USGS water science school 2016, Finnish Environment Institute SYKE 2018.)

#### 3.1 Water quality

Water quality of the surface waters such as lakes, rivers, and coastal waters are defined in terms of ecological status in Finland as can be seen in figure 1. Surface waters are classified in five different ecological classes: high, good, moderate, poor and bad. In generally, lakes in Finland are in good condition as can be seen in figure 2. Classification of ecological status is studied in the first instance by biological quality factors. The biological factors of plankton algae, diatoms, aquatic flora, zoo benthos, and fish in a waterbody are compared to conditions in which human activity has not affected these organisms. The Ecological status of the surface waters is better when there is less human impact. In addition to biological factors, there are also estimated physical and chemical quality factors of water such as nutrients, visibility, pH and migration obstructions. The significance of these physical and chemical factors is lower than biological factors when defining the ecological status of surface waters. (Ympäristöhallinto 2016) (Finnish Environment Institute SYKE 2013.)

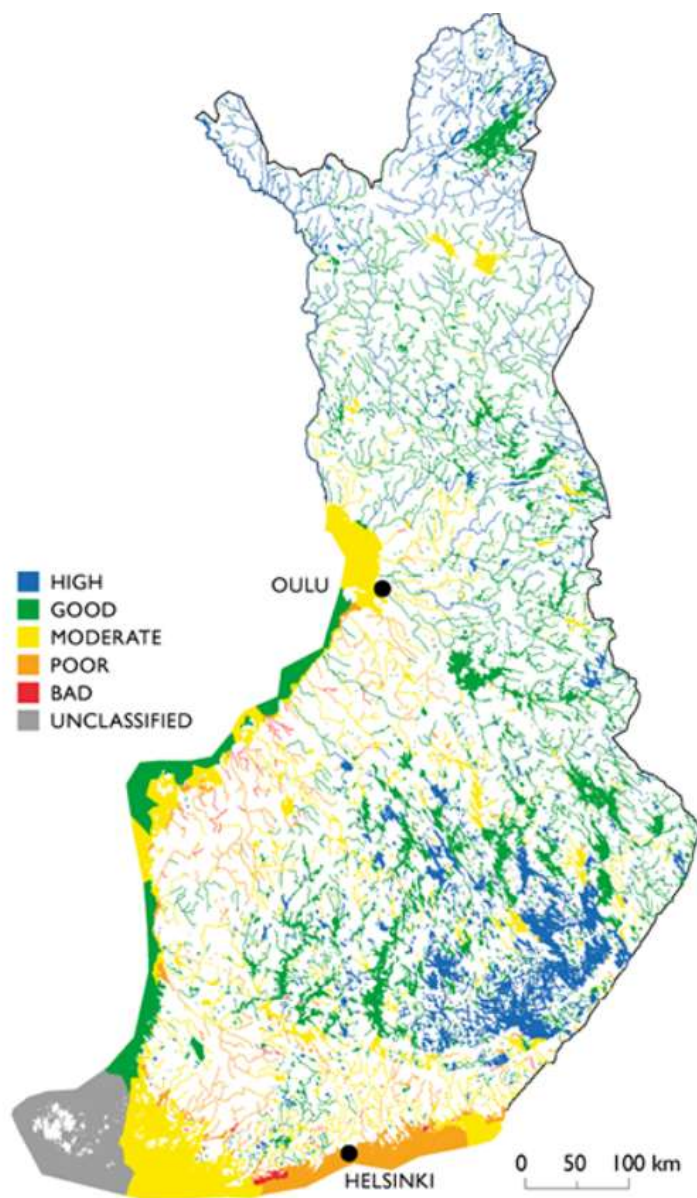


FIGURE 1. Ecological status of surface waters in Finland (Finnish Environment Institute SYKE 2016).

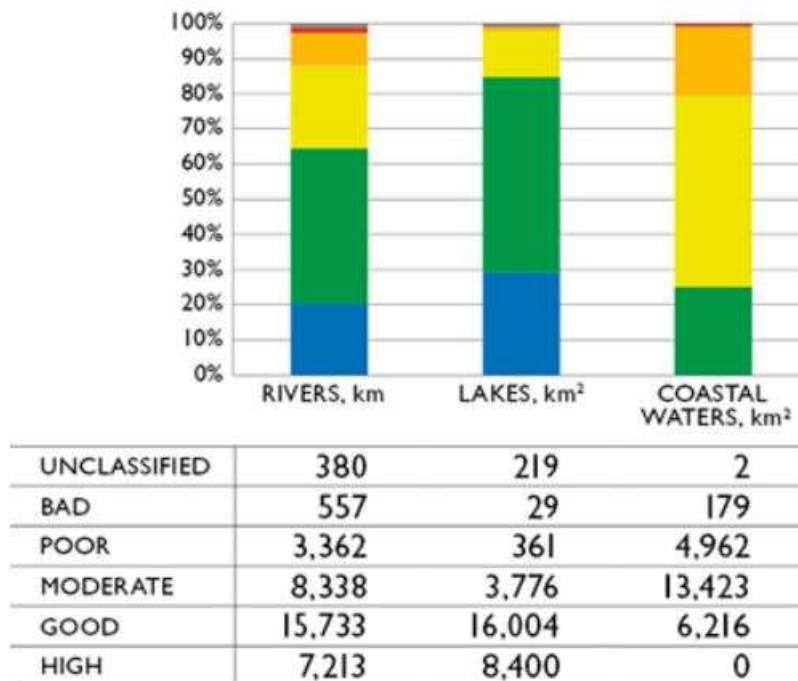


FIGURE 2. Ecological status of the rivers, lakes and coastal waters in Finland in 2013. Red colour on the bar chart illustrates a bad water condition and orange colour illustrates a poor condition. Yellow colour as a moderate, green is good and blue illustrates a high quality condition of water (Finnish Environment Institute SYKE 2016.)

Most of the problems of water quality come from contaminated stormwater. The most common contaminants of stormwater are solids, nutrients, metals, chloride, oils and fats and some other organic compounds such as polycyclic aromatic hydrocarbons and pesticides. In addition, stormwater usually have high quantity of enterobacterium. Substances in storm waters that are impairing the quality of ground water, are for example pesticides, de-icing chemicals and methyl tert-butyl ether. (Hulevesiopas 2012.)

Contaminants are ended up to stormwater from exhaust gas of traffic, corrosion of vehicles and building materials, erosion of road asphalt concrete and de-icing chemicals. Leaving lead away from fuels, it has affected to a use of methyl tert-butyl ether in large quantity as an additive in petrol. Enterobacterium are ended up to stormwater from excrement of animals and from leakage of sewage drainage. Other sources of contaminants are erosion of the ground, garbage and fertilizer and pesticides that are used in green areas and agriculture. (Hulevesiopas 2012.)

When designing freshwater bathing areas, it is important to make sure that the place fulfils hygiene requirements. Finnish Ministry of Social Affairs and health has passed an act



which deals with special quality requirements for public bathing places. The most important requirement is that the water quality should be good, and water cannot induce health problems for swimmers. Therefore, it is important and necessary that water quality is studied regularly during the swimming season. (Sosiaali- ja terveystieteiden ministeriön asetusyleisten uimarantojen uimaveden laatuvaatimuksista ja valvonnasta 177/2008, 3-4§.)

### 3.1.1 Solutions to improve water quality

In Finnish law there is a requirement for municipalities to make stormwater management plan in connection with the city planning. In Finland there is also a demand to protect groundwater from pollution and this is needed to take account in local stormwater management. (VTT 2016, 15.)

Solutions to improve water quality and ecological status of surface waters such as lakes and rivers are often water constructions, which aim to reduce harmful impacts of human activities on water bodies. The possible aims are also to improve recreational use opportunities or return and reconstruct area to its original condition. It is important to survey the whole catchment area to sort out the land use and land cover of the area and to define the main problems and polluters of the area. When surveying a large area, for example, a long river area, it could be needed to study smaller parts of the catchment area to qualify the selected solutions better. (Suomen ympäristökeskus 2003, 10-11.)

Stormwater management means to manage surface water runoff. It can be used in rural areas, but it is more useful in urban areas where waters cannot infiltrate into soils because of the impermeable surfaces. The objectives of urban stormwater management are to reduce flooding, protect the groundwater and surface waters such as rivers, lakes and seas. Solutions to manage stormwater in urban areas are storage type devices such as green roofs, constructed wetlands, detention and retention ponds. Infiltration type devices are, for example, infiltration trenches, grass filter stripes, grassed swales, pervious pavements and infiltration basin. (SSWM 2017) (VTT 2016, 15.)

In rural areas stormwater management is needed to prevent erosion, flooding and water pollution. Applicable tools to improve water quality are for example wetlands, sediment basins, dams and renovation of streams. These solutions also stabilise the water level and prevent erosion and flooding. The natural shape of stone dams provide free passage of fish in rivers as can be seen in picture 2. (SSWM 2017.)



PICTURE 2. The bottom dam with fishway in The River Hirvihaara (Ympäristöhallinto 2014).

An increasingly common solution to control the quantity and quality of urban stormwater runoff is biofiltration. Biofiltration means utilizing plants together with engineered soil systems in a process of filtration, infiltration, adsorption and biological uptake of pollutants. It has become one of the most common solutions in reducing peak flows, runoff volumes and pollutant loads. Biofiltration systems are also a practical option for urban areas and green areas because of their aesthetic values, relatively small size and ability to sustain biodiversity. Vegetation and microbes in biofiltration systems mitigate pollution, degrade organic pollutants, and are involved in the uptake of macronutrients and heavy metals, as can be seen in figure 3. In addition to that, plants support microbial communities to secrete organic substrates, increase retention time of soil water and possibly modify pH of water and soil. Plants can also slow down water flow and prevent erosion. (VTT 2016, 57.)

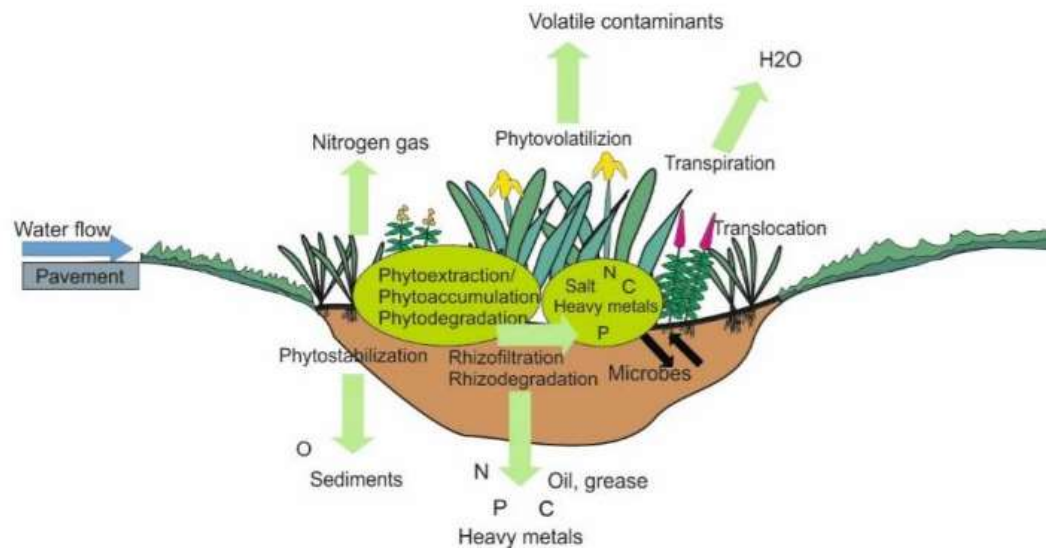


FIGURE 3. A biofiltration system treats pollutants with plants and microbes (VTT 2016, 58).

### 3.2 Case Tikkurila

Tikkurila is a suburb of Vantaa in Finland. The River Keravajoki has flowed through an open landscape long before the city of Tikkurila was built around it. Rapids of the river have brought the first settlement around it and later the national railway was built right next to it. Later rapids were harnessed for energy production. As it is, Tikkurila has become as a landscape hub over the decades and it is growing all the time becoming a significant center after Helsinki. Now it is intended to use riverside areas as functional recreational green areas. There is also an aim to release the harnessed rapids to return them to more natural state. (Vantaa 2016.)

The planning process of the Tikkurila riverside has started with a landscape architecture competition. The next step was to create master plan of the area and involve local residents and other interested parties in the planning process. The renovation plan of the old dam and rapids was also made. (Vantaa 2017.)

#### 3.2.1 Landscape architecture competition of Tikkurila riverside

In 2015-2016 The City of Vantaa arranged a Landscape architecture competition to find good ideas for developing the river environment. The winning competition entry was named "Keidas" ("Oasis"). This proposal was made by landscape architect office Loci maisema-arkkitehdit Oy from Finland. (Vantaa 2016.)

In the winning proposal Keidas, the competition jury appreciated its strong and innovative vision which is a mixture of natural values, high level environmental engineering and modern technical solutions. The competition jury liked also the overall approach, adaptivity to the local environment and feasibility, which can be seen also from the master plan of the winning suggestion in figure 4. (Vantaa 2016.)



FIGURE 4. The winning plan of the Tikkurila riverside (Vantaa 2016).

In the winning proposal Keidas the riverside will be developed into a balancing green area for the urban structure of Tikkurila. The main idea of the Keidas is to put together the diversity of nature and sustainable environmental engineering. In the proposal there are new functions, for example a riverside cafeteria, a seating terrace and kayak renting as can be seen in figure 5. There are also a wider beach area, a stage, an area for events, a new playground for kids and fitness equipment for adults. In the winning suggestion there are also better pedestrian and bicycle roads, new light traffic bridges and riverside paths. As can be seen from figure 6 in the proposal there is an easy solution of riverside path under the narrow railway bridge. (Vantaa 2016.)



FIGURE 5. Illustration of new functions at Tikkurila riverside (Vantaa 2016).



FIGURE 6. Suggested riverside path under a narrow railway bridge (Vantaa 2016).

### 3.2.2 Master planning of Tikkurila riverside

After the idea planning competition, the City of Vantaa decided to continue Tikkurila riverside planning to more detailed planning. The winner of the competition, Loci maisema-arkkitehdit Oy has been selected to prepare the master plan of the Tikkurila riverside. The planning area is 10 hectares in size, and it includes the green areas of the riverside, square and street areas and a few old buildings with their courtyards. (Vantaa 2017.)

During the master planning process there was interaction with local residents and other interested parties. A questionnaire survey was organized in the internet and a planning workshop in Heureka museum. Both were open to everyone. 89 responses were received from the survey and 29 people took part in the workshop. The starting point for both in-

teractions was the proposal plan of the Tikkurila riverside. The general opinion of the participants was that the Tikkurila riverside recreational area is important because of the river itself and easily accessible location, but also because of its natural and recreational values. Nevertheless, half of the participants thought that this area is not pleasant in its current condition because of untidiness of vegetation and the lack of services. (Vantaa 2017.)

In general, participants liked the presented plan of the area. They were happy about the renovation plan of the old dam, opening the river landscape, new connections and a bicycle bridge, new functions and places to spend time and relax. The participants were unhappy about the lack of swimming spots, the location of the beach, the lack of fitness equipment and the amount of new construction in the plan. The participants were asked about events in which they would like to participate in the area, and most likely they are interested in events that are happening regularly such as different music concerts, open-air cinema, flea market, the restaurant day, park yoga or other exercise and lighting art events. The participants were also interested in new functions such as a restaurant, a cafe, a theatre, a sauna and a possibility to rent a kayak. In addition to this, residents were requesting new free functions such as a playground for kids, fitness equipment for adults and a trampoline. Especially new functions and events were requested for young people. (Vantaa 2017.)

In the master plan the wishes and the feedback of the interaction were widely considered. In addition to that, the master plan is much more than recreational plan of the area. It contains also a large amount of technical planning about storm water management, studies and planning of ecosystem services, planning of increasing natural values and versatile of vegetation. The master plan is also about the branding the riverside with a great amount of landscape science and art, visualizations and communications. (Vantaa 2017.)

Vantaa is one of the forerunners of storm water management in Finland. In the master plan, a wide amount of different ways to manage the storm waters have been introduced to improve water quality in the river. The water catchment area is 70 hectares of dense inhabited area. According to storm water calculations of the catchment area there are over 3000 kg of solids and 10 kg of phosphorus formed every year. In addition to that, there are lots of adverse bacteria and other contaminants that are hampering the recreational use of the area. The storm waters which are passing through the planning area are planned to be detained and cleaned before running the waters into the river. The planned solutions to manage storm waters are biofiltration, flow regulation, sand separation and different micro solutions such as stone streams, dents and miniature dams. With these suggested solutions can be sought more swimming qualified water and reduced solid and nutrient loads

of river. According to storm water calculations these solutions will reduce approximately 2500 kg of alga in the Baltic Sea every year. The aim is to make Tikkurila riverside an exemplary city park regarding to storm water management in the future. (Vantaa, 2017.)

The total cost to implement the master plan is approximately 12 million euros. The technical commission of Vantaa has determined 3th October 2017 to approve the master plan and the introduced costs. Implementation planning has been started and it will be complete during spring 2019. It is intended to start implementing the plan in year 2020. Dissolution of the old dam will be start in summer 2019. (Vantaa 2017, Vantaa 2018.)

### 3.2.3 Renovation plan of old Tikkurila dam

Concurrently with master the planning of Tikkurila riverside there has been planned the renovation of the rapids and the dam of the Tikkurilajoki river. This renovation plan was carried out by Ramboll Oy. (Vantaa 2017.)

The existing dam was been built in 1912-1913 and it is in bad condition and in a need of renovation. The planning process of the renovation started in 2015 with a preliminary study, where different options for renovation were considered. The planning process was continued with one option where the existing dam is partially dismantled from the center, the remaining parts of the dam are renovated and the rapid is reconstructed to its natural shape, as can be seen in figure 7. The master planning of the renovation project was started in the end of 2015. In connection with the work there were studies on soil, natural values, sediments and the channel have been carried out. There was also made a groundwater model and a hydraulic model of the channel, whereby the impacts of new functions can be modeled, as can be seen in figure 8. (Vantaa 2017.)



FIGURE 7. The old dam is proposed to be partly dismantled to return it to a more natural shape (Vantaa 2017).



FIGURE 8. The master plan of the renovation of the rapid. The light gray area represents the water area in normal conditions. Colored lines are expressing the modeled elevation of different quantity of the floods. Blue line represents the flood situation which occur once in 250 years. (Vantaa 2017.)



## 4 PUBLIC PARTICIPATION IN A PLANNING PROCESS

### 4.1 Reasons for participating residents in a planning process

In the Finnish local government act it states that municipalities are obligated to encourage residents and service users of the municipality to participate in a planning process. It is said that residents have the right to participate and influence the functioning of the municipality. The city council has the responsibility for diverse and effective participation possibilities. In the Local government act, there are several ways mentioned how to promote public participation processes. Municipalities can arrange civil jury and different kind of discussion sessions and sort out the opinions of interested parties before decision-making. Different services can be developed and planned together with the service users and they can be chosen as a part of the city boards. (Kuntalaki 410/2015, 22§.)

In all kinds of city planning, master planning and detailed planning processes it is important to involve people and the interested parties in the process. City planners need to understand the fact that they are creating the city for the people and people are the experts of their own neighbours. When participating is possible and people get involved in the process, they can be engaged better with the results and decision that is made. Otherwise, people who are affected by a decision will complain more easily and the planning process slows down. (Involve 2005.)

Participation in the planning process is one way of realization of democracy. It increases the equality among the people. It is important that everyone can take part despite the social class or other classifications. (Involve 2005.)

When people are involved in shaping their local surroundings, the benefits can be more than positive. It can include additional resources of local people, a source of local knowledge, building community, democratic credibility, creating people's confidence in the municipality and in its ability to co-operate. There is also an opportunity to get more appropriate results when involvement allows proposals to be tested and refined before adoption. When professionals are working closely with local people it helps to gain a greater insight into the communities they seek to serve and therefore they work more effectively and product better results. People gain a better understanding of the options realistically available and are likely to start thinking positively rather than negatively. Therefore, time-wasting conflicts can often be avoided, and faster results can be reached. People also feel more attached to an environment they have helped to create. People will appreciate their environment more and therefore for example that can reduce vandalism. (Wates 2000, 5.)

## 4.2 Principles of public participation

Public participation has several values and principles in order to achieve a pleasant outcome for all parties. First, those who are influenced by a decision have a right to be part of the decision-making process. It is expedient to seek out those who are possibly affected by or interested in a decision. The public participation process should be open, information of the project will be shared openly, and the participants should know how to participate in a meaningful way. (International Association for Public Participation 2017.)

It is important that opinions of the public should influence the decision, otherwise the participation process is fake and will not lead to the best outcome. Participants should know how their input will affect the decision. It is a mutual benefit of public participation to produce sustainable decisions, so that all needs and interests of all participants, including decision makers will be recognized. (International Association for Public Participation 2017.)

There are principles of participation that will help designers to relate to the process. It is important to understand that people have different agendas to participate, for example, fear of change, an interest in nature protection, socializing, financial gain or curiosity. Designers should accept limitations of the effect of community planning. Usually the involvement process cannot solve all the problems but that is not a reason to neglect to carry it out. (Wates 2000, 5.)

Designers and professionals should remember some practical principles how to be in touch and meet people. Professionals should use plain language and avoid jargon. It is important that local people who participate feel equal and fair treatment. (Wates 2000, 5.)

The City of Vantaa has a concept called "Involved Vantaa" which is a new and renewable way to participate residents in planning and decision-making processes. City of Vantaa organized workshops for residents to solve out how residents should be involved in different processes. It turned out that the right way of timing is important in the participation process. It is important to involve residents at the early state of the process and exploit effectively the information which is obtained by the residents. There is a need to organize regularly arranged events but also case-specific meetings, for example region-specific events, forums, workshops, city walks and other informal brainstorming events. It is also needed to develop communication in the participation process. The planning process should be open, and the required information should be easy to get. The participation process, participation possibilities and the impacts to the participation should be clearly described.

There is a definite need of interaction confluence of residents, decision makers and employees of the City but also electronic interaction tools should be developed. (Vantaa 2017.)

### 4.3 Classical vs co-design planning process

In Classical user-centered design process the user, the researcher and the designer are passive objects. The user brings information and the researcher brings knowledge from the theory. The designer then receives this information and adds an understanding of technology and the creative thinking to carry out the final idea or concept. The designer plays large role in the classical design process. (Sanders & Stappers 2008.)

In co-design the roles of the user, the researcher and the designer get mixed up and are equal as can be seen in figure 9. The person who will eventually be served through the design process is given the position of 'expert of his/her experience', and the researcher supports that experience by providing tools for ideation and expression. The designer and the researcher collaborate on the tools for ideation. The designer and researcher can be the same person. The designer still plays a critical role in giving form to the ideas. Sometimes the users can play co-creating roles throughout the design process, i.e. become co-designers but it depends on the level of expertise, passion, and creativity of the user. (Sanders & Stappers 2008.)

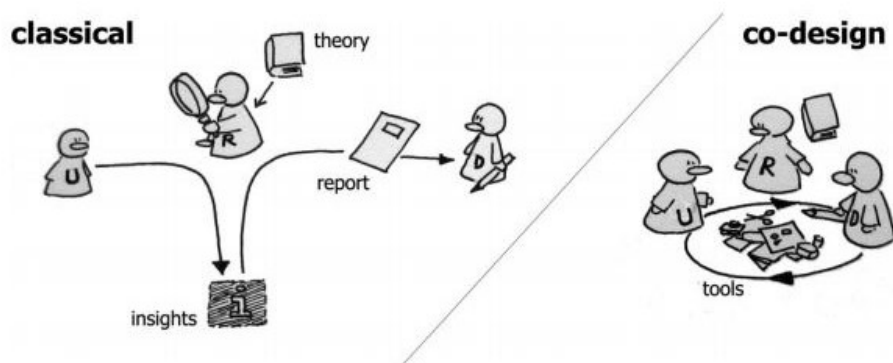


FIGURE 9. Roles of users, researchers and designers in classical and co-designing processes (Sanders & Stappers 2008).

### 4.4 Participation types and tools

Each project needs different amount of participation and it is important to plan the process well and find right ways to involve local people. There are several participation levels from low participation to full participation. The levels of participation reflect the rights of citizens

in the process. The right to be informed, the right to be heard, the right to affect to the decision that is directly relate to participant's living condition. These rights can be implemented with consultation events, public conversations, surveys, meetings, workshops and committees. One of the key principles is to make sure that citizens receive enough information about the project. The levels of participation are information, consultation, deciding together, acting together and strengthening community initiatives. Full participation covers all these levels mentioned above. Different types of projects may need only some of these levels of participation and it must be considered on a case-by-case basis. A high level of participation should be start always at the early state of the project. (UN-Habitat 2014.)

In Information level is a concept where citizens are informed about the project and process. It is a one-way communication where information about the project is shared with citizens and stakeholders. Methods for sharing the information are for example publish on the websites, in local newspapers, in information boards of public places or institutions of the city and in Social media. Also, public events for sharing the information are useful. The consultation level of participation is a concept of two-way communication, where citizens have an opportunity to give development ideas and express their concerns. Methods for consultation level are for example surveys, consultation events, public discussions and methods of commendation of the plan. (UN-Habitat 2014.)

The third level of participation is the concept of deciding together where individuals have ability to choose and affect directly to the activities that are related to their living conditions. The usable methods for deciding together level are for example workshops, brainstorming, face-to-face meetings and online surveys for voting to set the strategic priorities. The Action together level is about bringing together all the groups, stakeholders and organizations with different interests. In this level the information is shared equally with all the stakeholders. The methods for action together are for example team building exercises, design exercises and working of steering group. (UN-Habitat 2014.)

The highest level of participation is strengthening community initiatives where citizens and other stakeholders are taking a full responsible for projects and are helped to create their plan. This level of participation is suitable for projects where community activity is seeing as a good thing and where there is enough community activity. Good methods for this level of participation are for example workshops, visit to similar projects, commitment planning and team building exercises. (UN-Habitat 2014.)

When planning the participation process, it is important to take into account all the social groups, for example young people, seniors and parents with kids. That is why there must be different ways to communicate with people. The Internet is a great tool, but it does not

reach all the interested parties. It is needed to think about where people typically go and where they spend their time. After this kind of line of thought there might be new ways found to advertise the planning process and to communicate with people. (U.S. Environmental Protection Agency 2017.)

## 5 CASE OF THE ENVIRONMENTAL DEVELOPMENT PROJECT OF THE RIVER KAUHAVANJOKI

Kauhava is a small city located in Ostrobothnia region in Western Finland. Kauhava consist of three small centres with overall 17.000 inhabitants. The biggest centre area is named the conurbation of Kauhava and it has approximately 7500 residents. The River Kauhavanjoki flows for 40 km all the way from Lake Kauhajärvi and the border of Lake Lappajärvi, and it is surrounded by agricultural fields, forests and urban center of Kauhava, as can be seen in picture 3. On the way, there are two dams and a water power plant. The River Kauhavanjoki joins to the River Lapuanjoki and finally flows to the Gulf of Bothnia at Nykarleby. (Kauhavan Kaupunki 2014.)



PICTURE 3. The aerial view of the urban centre of Kauhava in 2014 (Kauhavan Kaupunki 2014).

Typical rivers in Ostrobothnia have straight forward shape and the soil is clay. The topography of Ostrobothnia in general is flat and the water catchment areas are extensive. Therefore, the flooding is a problem and it happens usually every spring. The flooding risk area can be seen in figure 10. In addition, the River Kauhavanjoki is a typical river of Ostrobothnia. Moreover, the riverbanks of the River Kauhavanjoki are mostly steep and the erosion is typical.

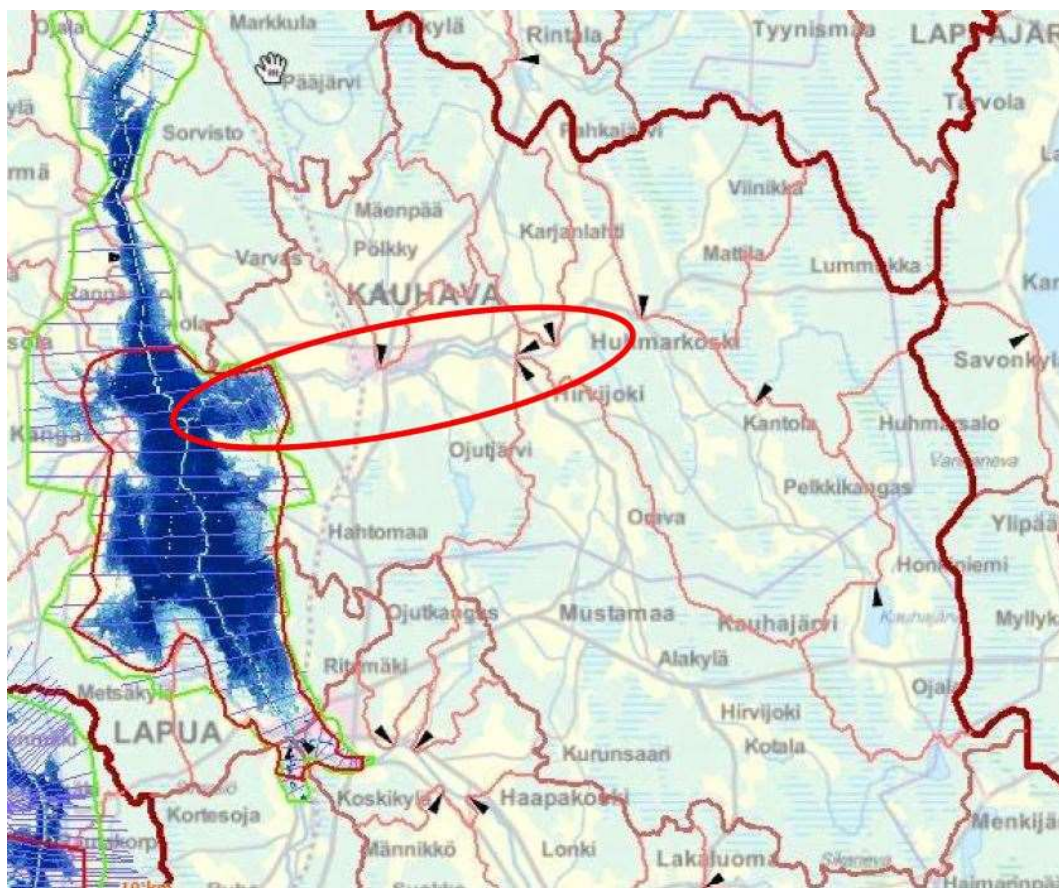


FIGURE 10. Dark blue area reflects the flooding risk area and medium-thick brown line reflects the catchment area of the River Kauhavanjoki. The red oval reflects the central extent of the River. (SYKE 2012.)

Currently there are not many recreational areas and possibilities in Kauhava. Only in central part of urban settlement area of Kauhava, there are sidewalks next to driveway but most of the roads are without sidewalks and street lighting. From the view of recreation, there are no possibilities to exercise safely outdoors in urban center area of Kauhava. 6 kilometres from conurbation of Kauhava there is Lake Ojutjärvi which is part of the water area of the River Kauhavanjoki. The Lake is only 2 meters deep from the deepest point and the content of humus is rich. Nevertheless, there are trekking path around the lake and, a beach for swimming.

The River Kauhavanjoki has been part of the human life for decades. In the past, the industry of living used to be from grazed fields and livestock. During that time, riverbanks were in good condition and river landscapes were open as can be seen in picture 4. Nowadays riverbanks and the landscape is overgrown of vegetation because there are no livestock to pasture and keep the vegetation down anymore.



PICTURE 4. The River Kauhavanjoki with surroundings from the 1920s (Kirjasalo).

### 5.1 Objectives and process of the project

The environmental development project of the River Kauhavanjoki aim is to create a master plan for developing the river environment for recreational purposes in the conurbation of Kauhava. Now the river environment is not in recreational use but there is a great potential waiting to be used. Altogether, the aim of the project is to improve the residential satisfaction and that is why the public participation has a big part of the project. The aim of the project is also to improve water quality of water.

The process of the project started with objective setting and data collection. Data was collected mostly from municipality of Kauhava, but also from the Centre of Economic Development, Transport and The Environment (ELY). Some data collection about water quality was made from Pohjanmaan vesi ja ympäristö ry.

Public participation was one objective of the project. There was held a seminar event for local people. The purpose of the seminar was to inform local people about the development project. There were also specialist speeches about water quality, water level stabilization and sewerage project of Kauhava. The project was presented to many local associations and communities. The aim was to catch up as many residents and other actors as possible and distribute the information of the project. There was a questionnaire survey organized to collect information for the development of the river environment.



The process of the Environmental development project of the River Kauhavanjoki is the following:

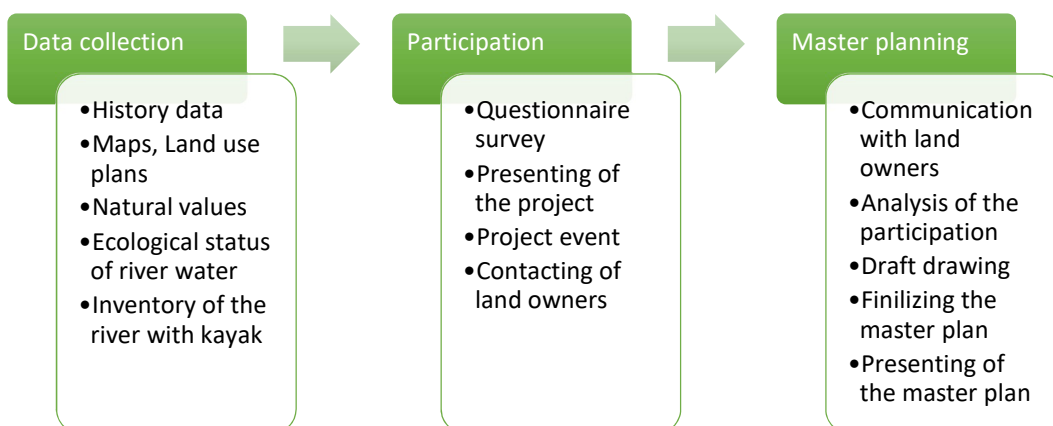


FIGURE 11. The process of the project.

## 5.2 Land-use planning and the situation in Kauhava

In the regional plan, the River Kauhavanjoki and the River Lapuanjoki play a large part where river environments are valuable cultural environments and landscapes. In figure 12 the valuable cultural environments and landscapes are described with vertical blue line pattern. The green line represents attraction area of tourism and it involves also recreational development of the area. (Regional council of South Ostrobothnia 2006.)

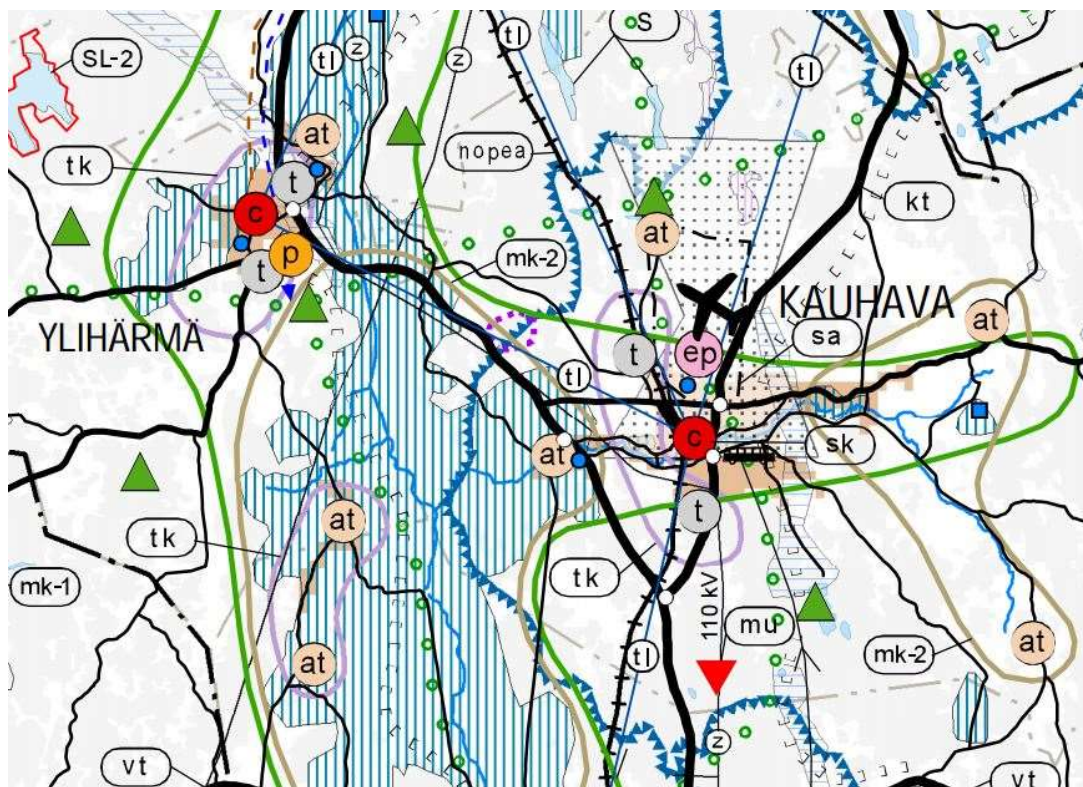


FIGURE 12. The regional plan of South Ostrobothnia (Regional council of South Ostrobothnia 2006).

The local master plan of Kauhava for 2020 and local detailed plan are together in line and have not much difference in green areas. Usually the Local detailed plan is more defined but in Kauhava the green areas in the local master plan are just as accurate as in the local detailed plan, as can be seen in figures 13 and 14.

The riverbanks both side of the River Kauhavanjoki are marked as green areas. Addition to that, green areas are mostly in places where it is hard to think anything else, for example, where is wetland or ditch there is green area.

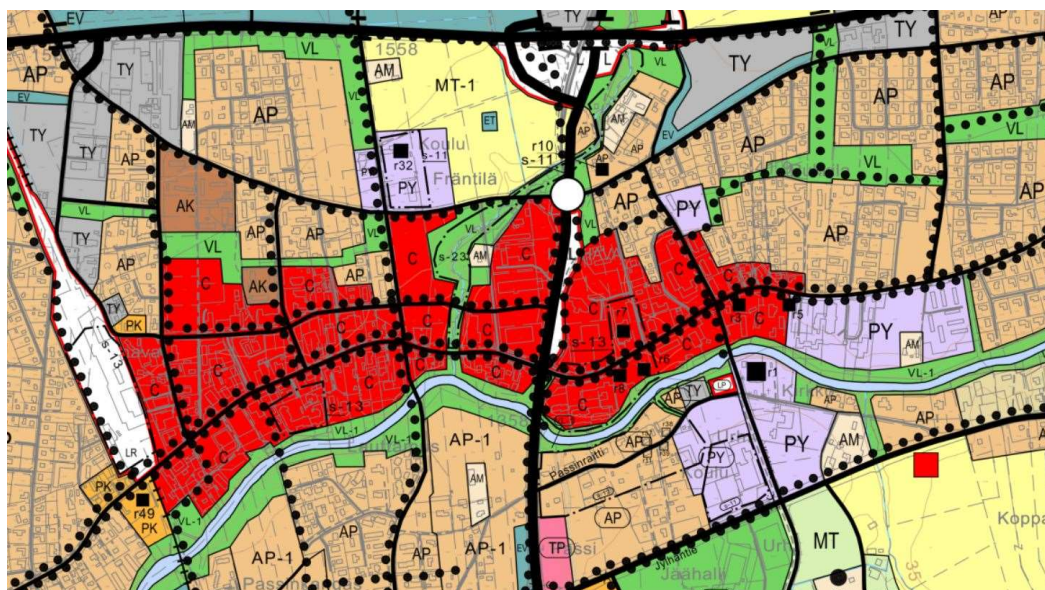


FIGURE 13. Local master plan of urban center area of Kauhava for 2020 (Kauhavan kaupunki 2018).

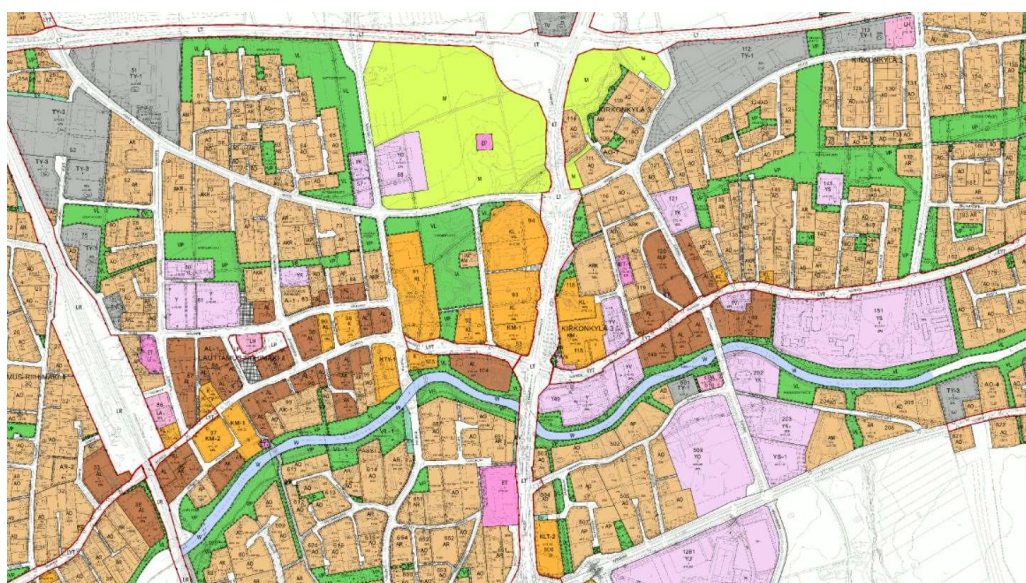


FIGURE 14. The local detailed plan of urban center area of Kauhava (Kauhavan kaupunki 2018).

The strategic land use plan of Kauhava for 2025 was created and approved in 2014. It is elaborated to guide future community structure, functions and land use for 2025. During the process a questionnaire survey was organized for residents to get ideas and opinions about what kind of Kauhava they want to have in the future. In the survey, residents were pointing out that one of the most important development needs in Kauhava is environmental comfort and visibility. (Kauhavan kaupunki 2014)

In strategic land use plan, one proposed structural model is based on waterbodies in Kauhava. In that model, building and recreational development among the river environment Of The river has been taken as an orientation of development. In strategic land use plan it is pointed out that the development of The river Kauhavanjoki should be take as a central element when developing the whole central Kauhava. Especially it is pointed out that the recreation paths and open landscapes are important links to other structures of central Kauhava. (Kauhavan kaupunki 2014.)

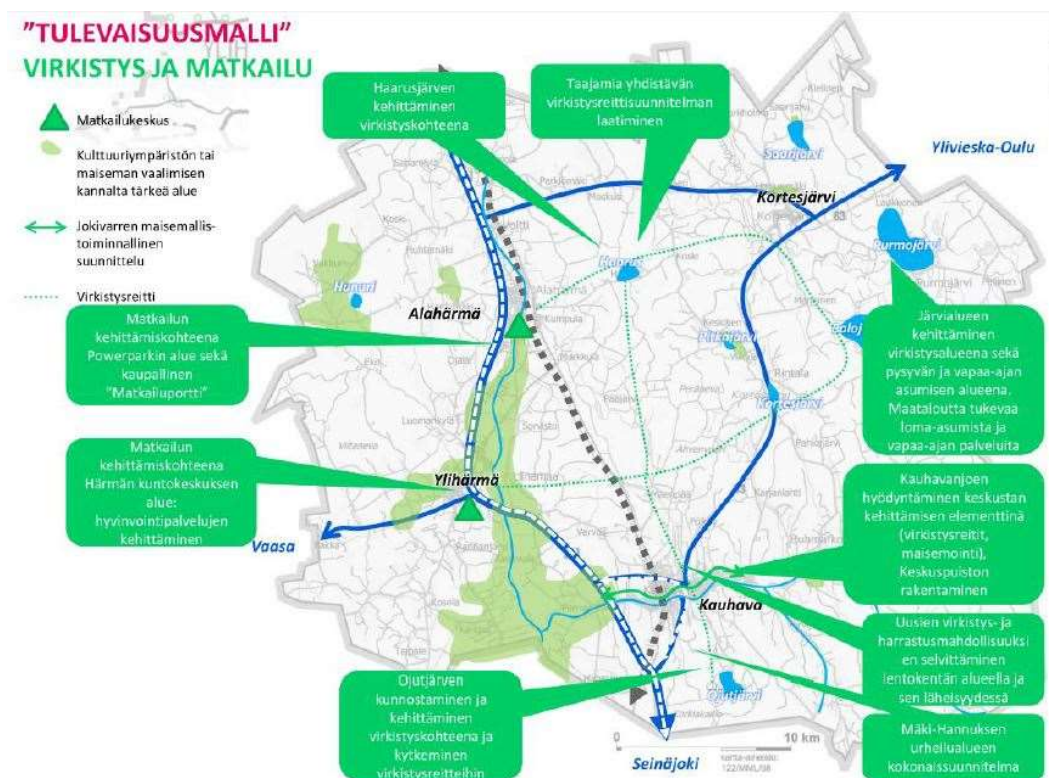


FIGURE 15. In strategic land use plan, one proposed structural model is based on waterbodies in Kauhava (Kauhavan kaupunki 2014).

When developing the river environment, one problem is that the municipality of Kauhava does not own all riverbanks. Mostly owners are private, and their property is close to the water line of the river. In addition, there are several exceptions, for example, the municipality of Kauhava owns riverbanks in new residential area on the south side of the river and some public properties close to river, and therefore those areas are easy to refurbish as river parks. In addition, the church of Kauhava is located along the river and it owns the riverbanks next to church.

Mostly, the space between properties and the river are narrow, which makes it difficult to develop and modify. The riverbanks of the River Kauhavanjoki are mostly steep which makes things even harder. However, there is a great potential and need for recreation in

this area and the solution of this problem is to create paths and activities where it is possible to implement and make detours to avoid too steep riverbanks.

### 5.3 Important natural and landscape values of river environment

There was made a research study of important natural and landscape values of the river Kauhavanjoki. The research was carried out including a survey of natural habitats, plants species and harmful invasive species. The research area was 19 kilometers long and 150-300 meters wide on both sides of the river, excluding fields and if there is a road going next to the river, the research was made up as far as the road. The River Vääräjoki flows into The River Kauhavanjoki in the center of Kauhava and it was researched for a length of 1,5 kilometers. Private inhabited properties were left outside the research. Side streams which were in their natural state was surveyed 200 meters from the River Kauhavanjoki . (Ala-Risku 2014, 1.)

In the research area there were detected 240 native plant species or species that are well settled in nature. There were not any national endangered plant species found. A couple of plant species were found that are regionally endangered in Ostrobothnia, such as *Geranium pratensis*, *Stachys palustris* and *Trifolium spadiceum*. These plants are species of traditional biotopes, which means they are traditionally growing in low and rugged meadows, pastures and edges of the fields. These kinds of biotopes have survived only little in research area. (Ala-Risku 2014, 1-2.)

Plant species of herb-rich forests were only few and probably they are not native species and they have been planted into the river environment says Ala-Risku. Plant species of coastal vegetation was not found any specifically rare species. Unfortunately, harmful invasive species such as *Impatiens glandulifera* has conquered lots of riverbanks and has taken living space from natural coastal vegetation. Hydrophyte plant species were also surveyed and for example, in central area of Kauhava there was found *Nymphaea alba subsp. Candida* that is needed to preserve. (Ala-Risku 2014, 2.)

Natural habitats were researched from the River Kauhavanjoki environment. There was found several herb-rich forests with *Alnus incana* which have diverse flora and they are important for birds. For example, in central area of Kauhava there was found nine herb-rich forests with *Alnus incana* which are needed to conserve in their natural state. However, it is possible to clear small paths to improve the recreational use of these forests. Herb-rich heath forests are found especially in upstream of the river. There is also one original birch swamp which needs to be conserved as a historical curiosity. (Ala-Risku 2014, 2.)

Mown beaches and meadows are found from built properties but not much outside of them. Next to the railway bridge there is a park-like area and the riverbanks of the church and the knife factory are well-kept and quite diverse meadows. There could be much more mown meadows along the river, as they have a positive impact on biodiversity, the river landscape and recreational use. It is important that these meadows are mown up to the water border. Grazed riverbanks are found only from the upstream of the river in Huhmarkoski. The area is a locally valuable traditional landscape. There were beaches found that used to be grazed and now have become eutrophic. The number of grazed riverbanks should be increased. In the central area of Kauhava there are multiple untreated park-like riverbanks, which are blocking the view to the river. For example, the riverbank from the Institute of Enterprise Management to the youth association house is easy to refurbish as a natural park. Brooks and ditches that are draining into the river often have trees in a relatively natural state. These brooks and ditches are naturally worth keeping. (Ala-Risku 2014, 4-6.)

There are several harmful invasive species in the River Kauhavanjoki environment. The most harmful species are *Impatiens glandulifera*, *Heracleum persicum* and *Calystegia sepium* as they spread easily, destroying living space from other species and are difficult to eliminate. The surest way to avoid spreading is to mow open landscapes and keep canopies of forests closed because, for example, *Impatiens glandulifera* cannot bloom in the shade. (Ala-Risku 2014, 6-8.)

### 5.3.1 Water quality of the River Kauhavanjoki

The water quality of the River Kauhavanjoki is qualified as poor. Ecologically the water quality is defined as poor as can be seen in figure 16. The ecological status is defined through a set of biological factors like fish stock, aquatic vegetation, benthic fauna, but also water quality and other factors such as structural changes like embankments. (Ympäristöhallinto 2015.)

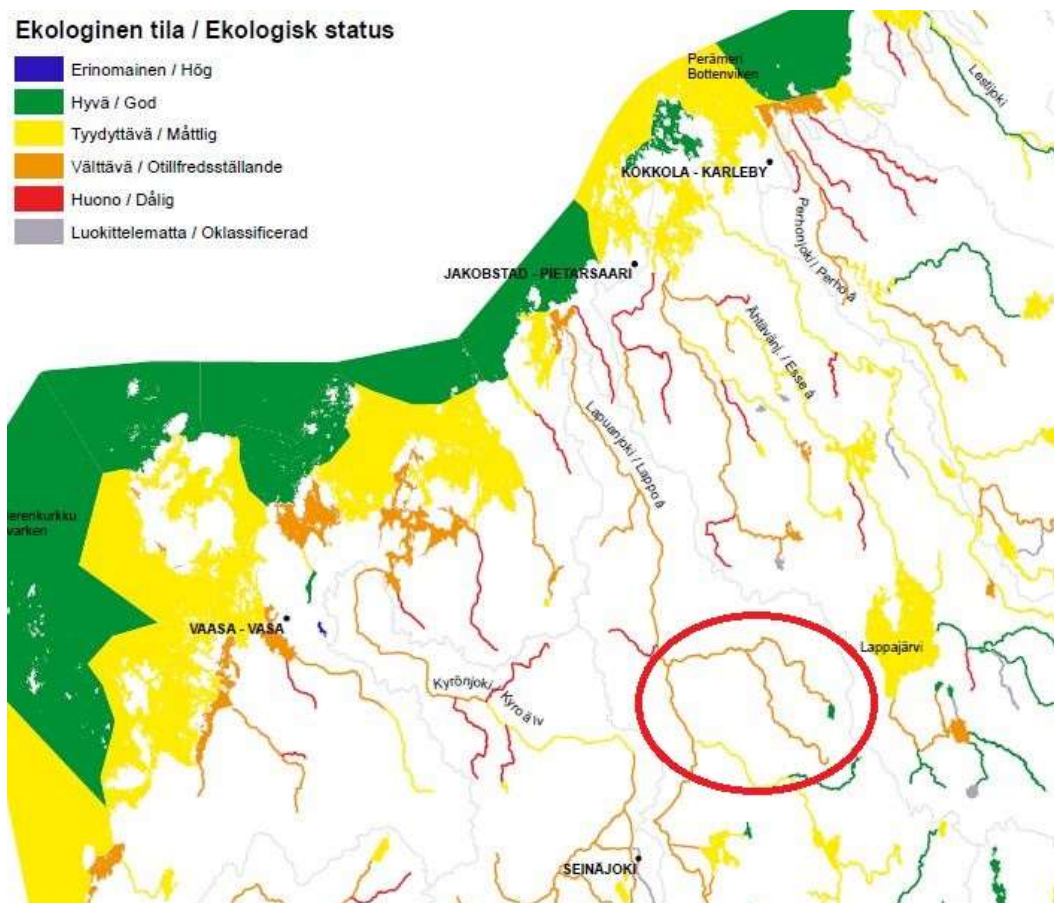


FIGURE 16. Red oval reflects the location of the River Kauhavanjoki. The ecological status of the River Kauhavanjoki is defined as poor. (Ympäristöhallinto 2015.)

Especially eutrophication, solids, soil acidity and the structural changes are weakening the status of the waters. Solids and nutrients are mostly coming from agriculture, dispersed settlements, forestry and peat production. Also, the point sources of pollution and fur farming influence the water quality locally. (Ympäristöhallinto 2015.)

Acid sulphate soils are located mostly in Ostrobothnia, and the area of the River Kauhavanjoki is part of their sphere of influence. The problems arise when these soils are modified, then the acid ions break surface and rainwater rinses them into the river. If the pH of the water is under five, the fish do not survive. The pH of the River Kauhavanjoki is intermittently under five, especially after heavy rain or in springtime when the river is flooding. (Ympäristöhallinto 2015.)

There are different methods to neutralize acid soils and reduce oxidation in soils and in rivers. The ways to reduce sulfide oxidation are for example a bottom dam, a dam pipe, a drainage system, a pumping station or lower drying depth. The methods to neutralize acidity of soils are liming the soils of catchment area and liming the dug-up soils. There are also methods how to deal with acid waters. Just to mention a few, methods to improve

water quality are creating wetlands, filtering with different systems for example with a dam or dike and with lime. (Suomen ympäristökeskus 2015.)

#### 5.4 Public participation of the project

In the environmental development project of the river Kauhavanjoki there have been public participation activities to involve local people and interested parties in the planning process. The aim of the participation is to get ideas and feedback on how the river environment should be developed. The aim of the participation process was also to engage local people and decision makers into the decisions that are being made.

The interested parties of the project are particularly the residents of Kauhava and the potential recreational users of the planning area. Landowners and businesses of the area are also important interested parties. There are village and residential associations and the Development Association of Kauhava, which are important developmental units in such a countryside town like Kauhava. The people of Kauhava are very active and interested in what is happening in the area.

There were different ways to enable people to participate in the project. There was a seminar event organized in spring 2014. A personal letter was sent to all landowners of the river environment. The letter was an invitation to the event and also it had basic information about the project. In addition, there were invitation emails sent to decision makers of Kauhava.

During the project, information of the project was published on the Internet pages of Kauhava and there have been published notifications in local newspapers such as *Komiatilehti* and *Lakeuden Aviisi*.

The village and Residential associations and local Development association have arranged meetings where there has been an opportunity to present principles about the project and collect their ideas and opinions about what should be done in the planning area. In addition, information about the project has been presented to the city administration and to the city technical board. Also, there was a questionnaire survey arranged to collect development ideas of the residents. The survey was open for a 30 days period on the Internet.

##### 5.4.1 Questionnaire survey

The survey was made with Harava map questionnaire tool. The aim was to make a fast survey, which is easy to answer for all age groups. Survey was available for responses for



a 30 days period over the internet. The questionnaire was advertised via local newspapers and internet pages of Kauhava.

The questionnaire was divided into three sections. In the first section, there were questions about general information of the respondents. Secondly, there were map queries of the existing situation where respondents were asked to review the current state of the river environment. In the third section of the survey, there were questions about development and expectations for the river environment. The questions of three sections were set as follows:

1. General Information of respondent:
  - a. Gender
  - b. Age
  - c. Place of living
    - i. Centre of Kauhava
    - ii. Suburb of Kauhava
    - iii. Surrounding areas of Kauhava
2. Map Queries of existing situation:
  - a. Point to the map, what are the most beautiful existing landscapes of the River Kauhavanjoki ?
  - b. Point to the map, what is the most important development areas of the River Kauhavanjoki ?
3. Questions about development:
  - a. How the River Kauhavanjoki should be developed? (open question)
  - b. How development ideas should be implemented? (it is possible to choose one or several options)
    - i. The municipality needs to take care of and clean the riverbanks which are owned by the municipality
    - ii. Voluntary work party for cleaning the river banks
    - iii. Private property owners should take care of their river environments

All the survey queries were optional to answer and therefore, participants had the chance to choose what questions they wanted to answer.

#### 5.4.2 The results of the survey

There were 94 responses in the survey and there were equally men and woman participants, as can be seen in Figure 17. 44 out of 94 participants were women and 45 of the participants were men. Five participants did not indicate their gender. Most of the participants were living in central Kauhava or the suburbs of Kauhava. 54 out of 94 participants informed that they were living in central Kauhava and 26 out of 94 participants were living in the suburbs of Kauhava. 14 out of 94 participants informed that they were living in other villages and surroundings near Kauhava, as can be seen in Figure 18. The age distribution of the respondents was balanced except children and teenagers were missing, as can be seen in Figure 19. One out of 94 respondents were in the age group 15 and under. 21 participants were in the age group 16-30 and 22 participants were in the age group 31-45. From 46-60 was the largest age group with 37 respondents. 13 participants were in the age group 61 and over.

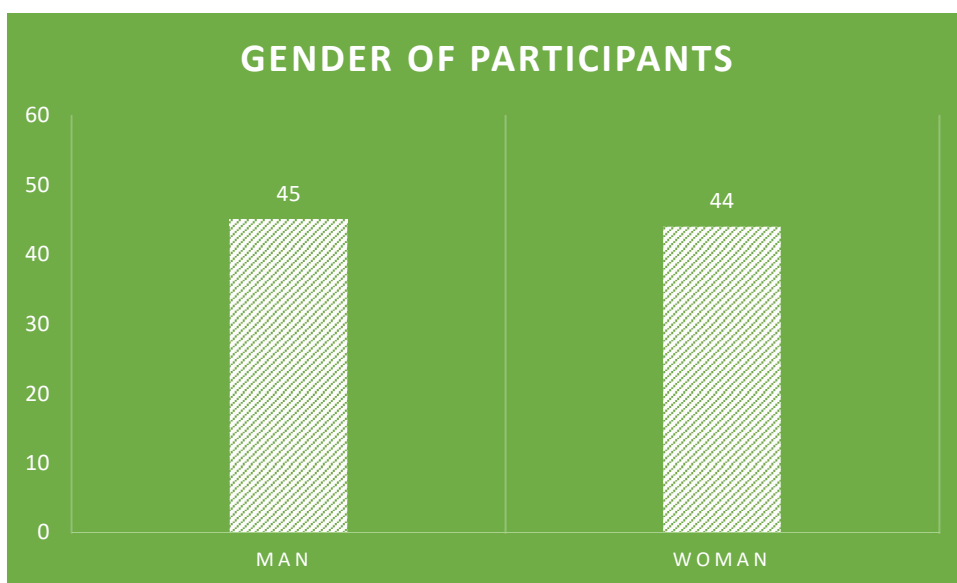


FIGURE 17. The gender of participants.

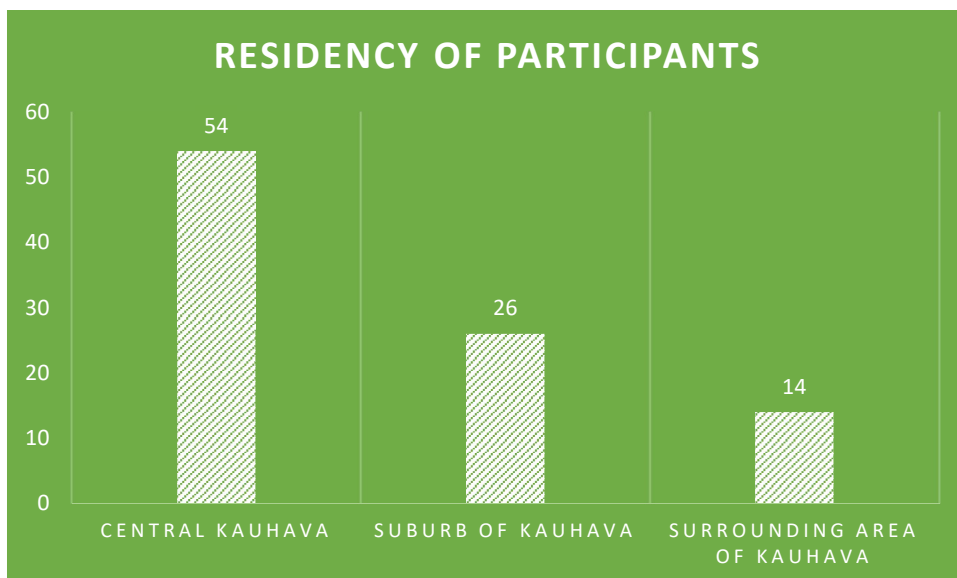


FIGURE 18. Place of living



FIGURE 19. Age distribution of respondents.

In the second section of the survey it was asked about the most beautiful landscape of the River Kauhavanjoki environment, most of the answers considered the landscape that is modified by humans. The respondents think that the most beautiful landscapes of the River Kauhavanjoki are the environment of the Jylhä rapids, the field landscapes, the treated surroundings of Kauhava Church and park-like riversides in central Kauhava.

Another question in the second section was about important development areas of the River Kauhavanjoki and again, the surroundings of Kauhava Church were mentioned. There were suggestions that in general the riversides of downtown areas should be developed and improved. There were also many individual development ideas along the entire river.

In the third section of the survey there was a question about development ideas of the River Kauhavanjoki. The most supported ideas were the riverside parks and walking paths with benches, as can be seen in Figure 20. Boating and canoeing possibility with landing states and platforms were seen as an important issue too. The need for water level stabilisation and open and clean river views were also mentioned as important development targets. Other less mentioned development ideas were events such as different competitions and concerts, a water fountain like there was used to be in the past, a café or kiosk, prevention of invasive species and water quality improvement. In addition, there were development ideas with only one or a few mentions such as improving fishing facilities, nature trail, bird watching tower and campfire place.

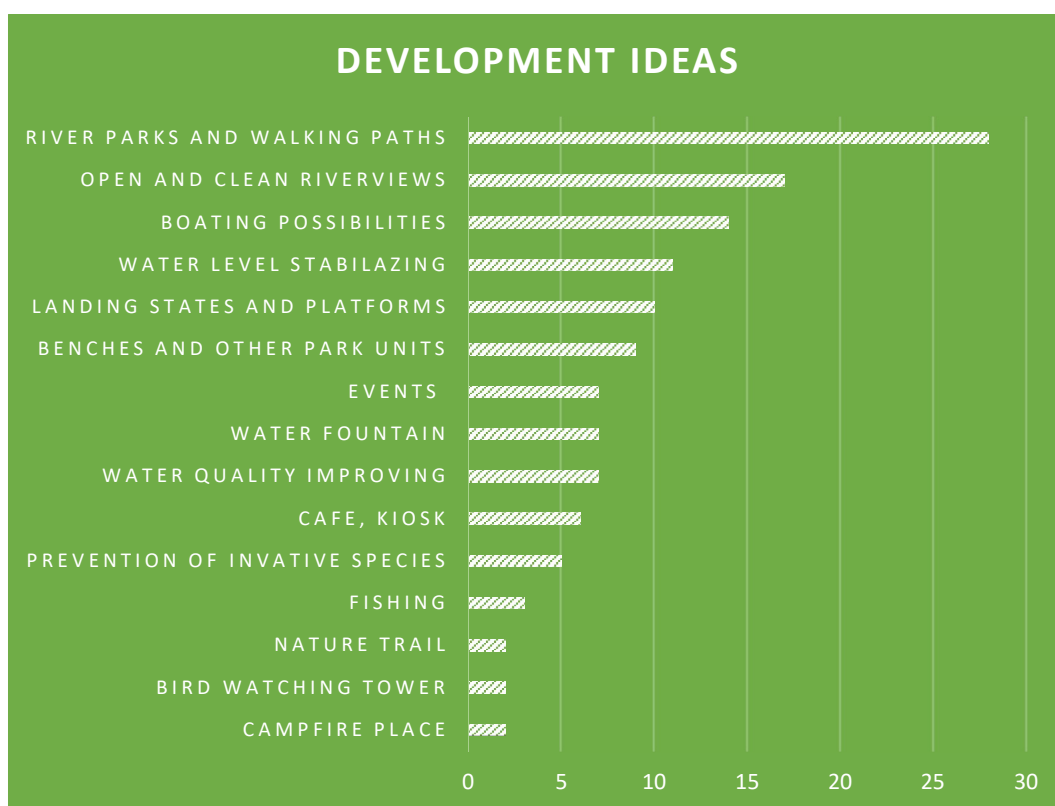


FIGURE 20. Development ideas and their popularity.

Finally, there was a question about how development ideas of the river environment should be implemented. There were set three options to vote and there was a chance to choose between many options. 40% of the respondents think that municipality of Kauhava should refurbish and treat its own river environment. 34% of the respondents think that private landowners of the river environment should take care of their own riverbanks. 26% of the respondents think that there should be volunteer events organized for light cleaning works of the riverbanks. In addition, there was the opportunity to give other ideas and

comments under this question, and it was commented that central and the most visible areas such as surroundings of the bridges should be restored first. There was also comments that it is important to leave some riverbanks in their natural state.

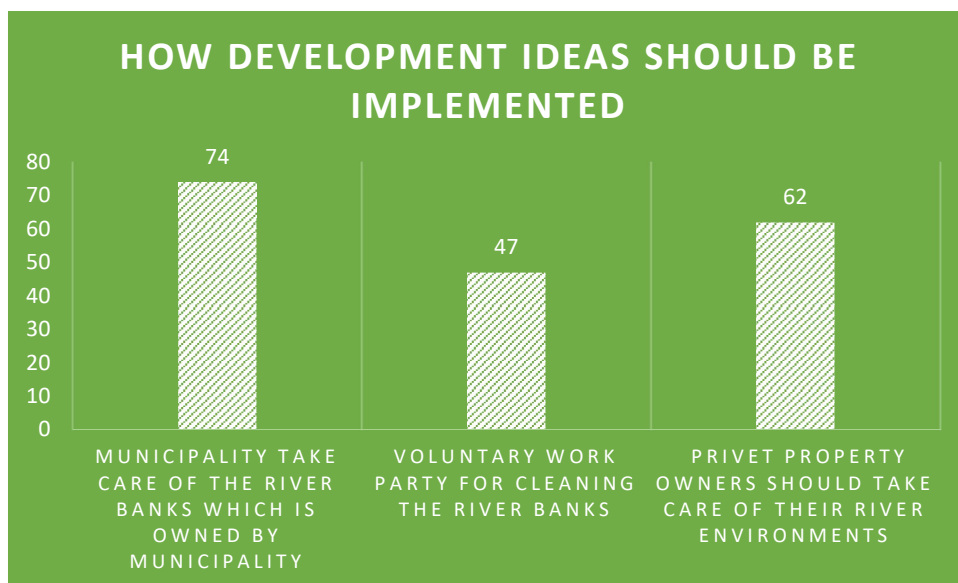


FIGURE 21. Number of opinions in question of how development ideas should be implemented.

## 5.5 Master planning

The Objectives of the master planning is to create a coherent riverside park with versatile functions, which offers a great place for recreation. River environment is a green belt in the middle of central Kauhava with plenty of local natural and landscape values. These values need to be strengthened. One goal is that the river environment offers ideal living conditions for all species also in the future. One objective of the master planning is also to bring river landscape into a key role in urban structure of Kauhava.

Master planning is performed with consideration of local land use plans, previous development plans, objectives of the municipality of Kauhava and participation of the residents and local companies. There were also carry out a report of natural values of the river environment and a study of restrictive issues of the catchment area, which needed to take into account when planning recreational functions for river environment of Kauhava.

The planning area of the project is defined to be a conurbation area of Kauhava. The length of the planning area is 4,3 kilometres and it covers both sides of the river. Mostly riverbanks are unused and untidy with vegetation. Most of the riverbanks are poorly maintained, but there are also exceptionally well-maintained waterfront areas.

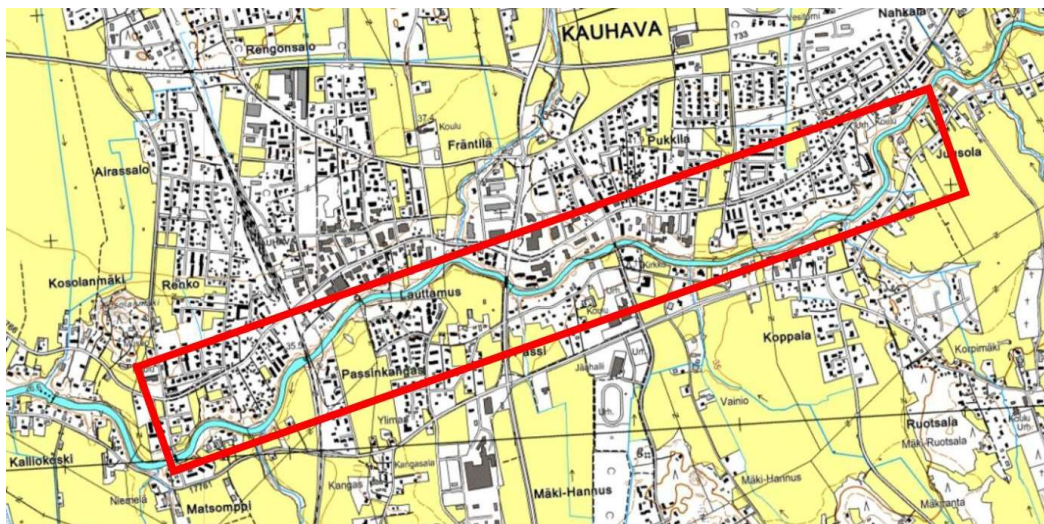


FIGURE 22. The planning area of the project

The master planning is made in green areas according to the local detailed plan. Most of the immediate environments of the river are defined as green areas and their size varies from narrow to slightly wider. In many places, a narrow walking pathway is the only considered option and other functions follow when there is more space for them.

In master planning all the riversides that it is possible to develop were surveyed. Firstly, all the properties owned by municipality was researched. As can be seen in Figure 23, only few of the riversides in centre area of Kauhava are owned by municipality which does not make it easy to develop. The problem is that Kauhava used to be an old rural village and the local master plan and local detailed plan are relatively new and dividing properties has been carried out much earlier. In both land use plans, there has been established green areas both sides of the river. Therefore, landowners need to be very receptive for the developing their own lands for public use. There are many properties that are owned by companies or associations and with them it is easier to negotiate the development of riversides for public use. There are a couple sections of the riversides in central location which are owned by private owners. These properties are next to each other so there is no other option to bypass the properties or just accept the fact that in some parts river parks on both sides are not possible. Some of the riverbanks are also so narrow and steep that it is impossible to build them.



FIGURE 23. Pink areas reflect the riversides owned by Kauhava municipality.

During the project, there was plenty of interaction with local people. Every landowner of the river environment got a letter and invitation to the project seminar. Some people could not participate in the seminar, but they were active and contacted to discuss about project and plans. In turn of this, there were also landowners who were cautioned about the plans of the project. Mostly the riverbanks in central Kauhava are owned by municipality but there are couple of exceptions. For example, there are an old family property in southern side of the river as can be seen in Figure 24. Their property extends down to the river and therefore they were worried about the plans. Under the circumstances, planning the coherent riverside park is partly challenging. There were discussions with the landowners and that municipality will not expropriate the land needed for park and passage. The property can be bypassed via roads at the first step. The riverside park will be drawn into the master plan in any case for the future development. Other than these landowning problems, there were no any other difficulties or problems during the project, or the problems were so small that they were solved easily.



FIGURE 24. Private property in Eteläranta is extending down to the river and is therefore blocking the riverside park connection.

### 5.5.1 The master plan

The objective of the master plan is to develop center of the River Kauhavanjoki as a recreational green belt with versatile functions for local people. The target is to create river parks in both sides of the river but land use of Kauhava is partly obstructed for that. That is why, river parks have been developed only other side of the river in some parts. After all, there was able to create uninterrupted green belt in central area of Kauhava.

There are multiple principles of the master plan that are firstly prioritised. These principles are formed as results of public participation in this project, the observation of case studies and research of literature sources. The principles in the master plan of the River Kauhavanjoki are:

1. To create walkable river parks and green connections whenever it is possible to create coherent walking paths with resting benches next to the.
2. To create a comprehensive network of recreational functions for all ages. Functions for kids are, for example, a playground with sporting equipment or a playing field for different outdoor games. Functions for adults can be, for example, outdoor fitness equipment. There are multiple functions that are popular for every age



group, such as a barbeque area, a bird watching tower, a pavilion and outdoor theater.

3. To evolve water sport facilities such as boating and canoeing; only one boat launch is needed but platforms are needed more along the river so that canoeists can rest during their way and platforms can be used for other functions also.
4. To open the river landscape from overgrown vegetation, as it was when the farm animals took care of the river landscape back in the old days. Nowadays, the use of farm animals is possible only in a few spots, but the riversides need to be taken care of by the municipality or private property owners. This is the way in which the value of the river environment will rise.
5. To suggest such solutions which are following sustainable landscape designing principles and are easy to implement with a small budget, are good quality investments and yet, easy to maintain.

There are several main principles when creating sustainable landscape design in the River Kauhavanjoki environment. Firstly, even though the riverbanks are very steep at some points, the design should be adapted in existing topography. Acid sulphate soils are located mostly in Ostrobothnia, and partly in the area of the River Kauhavanjoki the problems arise when these soils are modified, then the acid ions break surface and rainwater rinses them into the river. If the topography is been changed much there can be costly results for water ecology and the pH level, which can be deadly for fish and other organisms. In addition, protection of natural plants can weaken if the construction work is done recklessly. Secondly, using natural and local resources and materials for minimizing the damages in environment, energy consumption and water consumption. Using the local labour force and material resources improves local economy also. Thirdly, it is important to protect existing plants, which are in a good shape. It is ecologically important, but it also reduces the costs and makes the design more impressive from the beginning after implementation. If it is needed to plant new plants, it is important to choose locally natural plants, that increases the probability of success of the plant, and it is also economically important and helps to upkeep the balance in natural ecosystems. In the River Kauhavanjoki environment, selected plants could be for example birch (*Betula pendula*), aspen (*Populus tremula*) and rowan (*Sorbus aucuparia*). The birch works well in riverbanks, where it is intended to keep the landscape open, because under the birches grass grows poorly, vegetation stays low and the river landscape stays open.

The master plan covers over a four kilometre long area in the centre of Kauhava. That is why the master plan is divided into three smaller important sections, as can be seen in figure 25. The first section is Helmiranta – Eteläranta. The second section is the riverside of Yrittäjäopisto Institute which is The Institute of Enterprise Management. Third section is the riverside of Kauhava Church



FIGURE 25. Overview of the master plan from centre of Kauhava and three important development spots of the master plan.

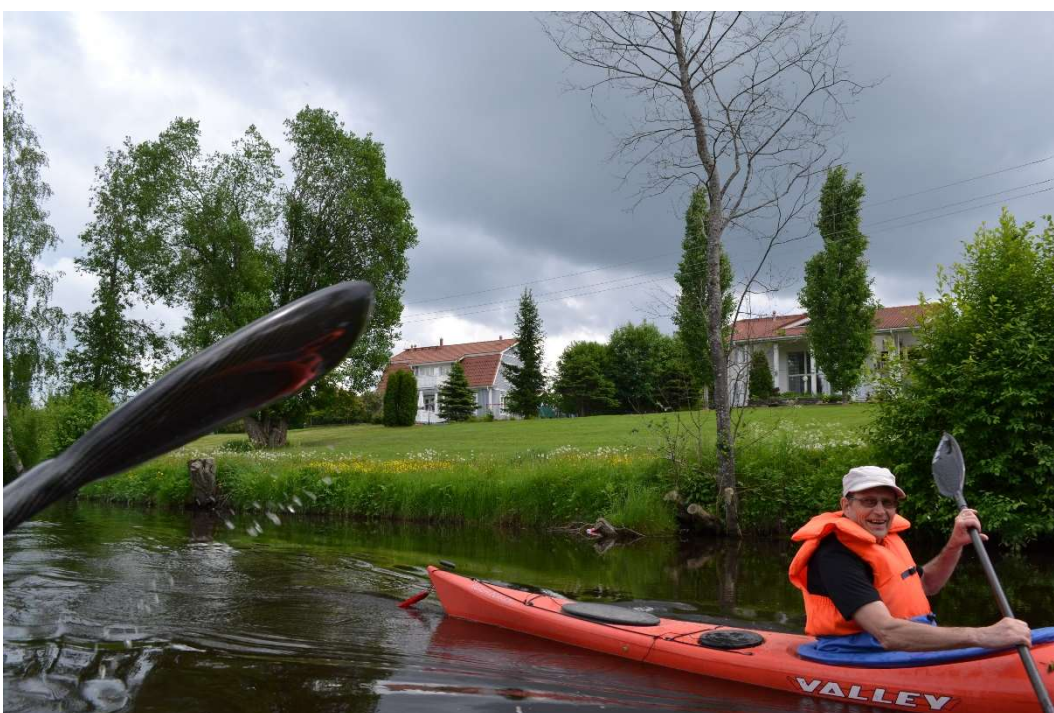
#### 1. Eteläranta and Helmiranta

The first important development spot of the River Kauhavanjoki is Eteläranta and Helmiranta. They are opposite riverbanks next to the railway. Eteläranta is the south side of the river and Helmiranta is the north side of the river. Eteläranta is a new residential area consisting of relatively new town houses and row houses. Some of the houses are still under construction in the process of master planning. The locally familiar name Helmiranta comes from the name of the retirement home on the north side of the river. Between Eteläranta and Helmiranta, there is a pedestrian bridge over the river. This is a valuable element for mobility between neighbourhoods on both sides of the river and considering the future recreational use of the riversides. On the north side of the Helmiranta, there are the centre area of Kauhava. The railway station, outdoor market place and many commercial services of Kauhava are located here. Therefore, the pedestrian bridge is also an important link for local services.

One part of Eteläranta was started to be developed during the project. In connection with infrastructure works of a new housing area, there was also a riverside park with a walking path built. It is much easier to build riversides before the houses and their residents. It is harder to do it afterwards, because of the different opinions and intents of residents. The area of Helmiranta property is well-kept before development project, but other properties next to it are in a bad shape. Helmiranta has a roofed boat dock, an open well-kept landscape and a small outdoor auditorium for events, as can be seen in Picture 5.



PICTURE 5. Helmiranta is well-kept property next to the river.



PICTURE 6. New housing area of Eteläranta from the perspective of kayak.

In the master plan of Eteläranta and Helmiranta there are not many functions, but the target was to create a riverside landscape park with pathways, a platform for water functions and relaxing facilities such as sun bathing. In one spot on the southern side of the river, there are activity functions too, as in the area there are living lots of young families with

kids. There is an exercise park with a beach volleyball court, a playground for kids and outdoor exercise equipment for adults. On the southern side of the river, there is a coherent riverside pathway, but on the northern side of the river, it is possible to create only a partial pathway from the pedestrian bridge to the east along the Helmiranta shoreline.

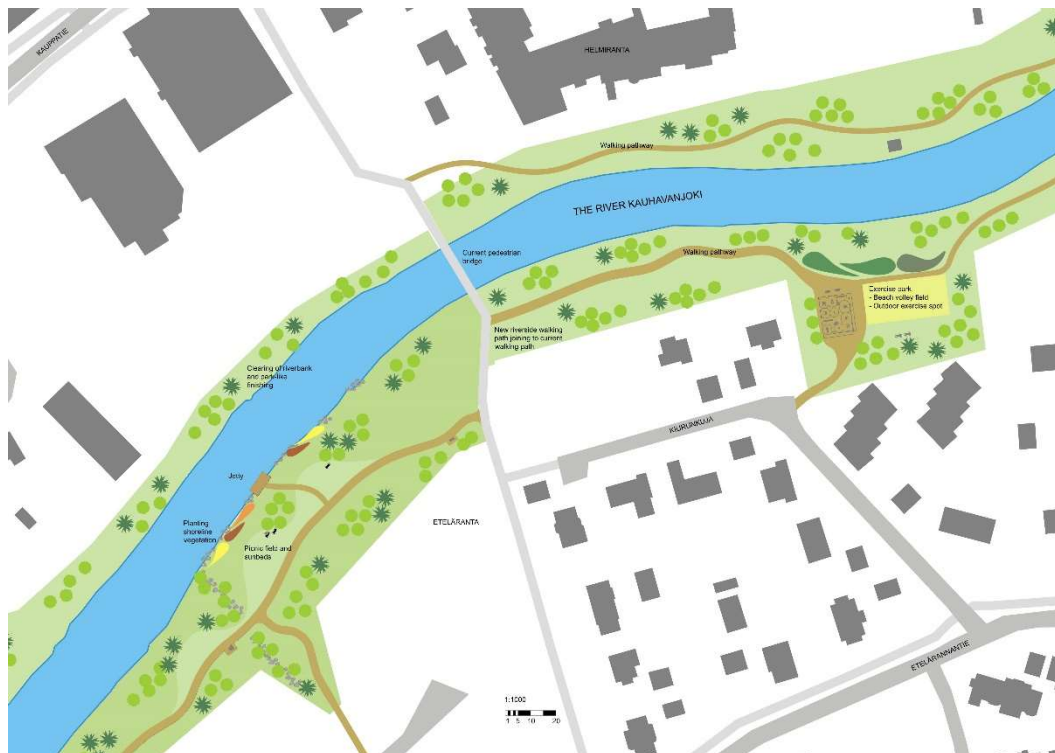


FIGURE 26. The Master plan of the river environment of Eteläranta and Helmiranta.

## 2. The riverside of Yrittäjäopisto Institute

The second development spot of the River Kauhavanjoki is the riverside of Yrittäjäopisto Institute. Yrittäjäopisto is an active Institute of Enterprise Management with four dormitory buildings. There are also central government of municipality of Kauhava and services such as a restaurant and a movie theatre. Next to the building complex, there is the local history museum and youth association house. These three properties are sharing a joint riverside with a lot of potential to develop. On the west side of these properties, the main entrance road of Kauhava called Kauhavatie Road crosses the river and the central area of Kauhava. Kauhavatie Road bridge has also a pedestrian road which gives an opportunity to create a workable connection between riversides and a coherent riverside park. On the south side of the river, there are only private properties and no chance to constitute a public riverside park.

In the master plan of Yrittäjäopisto Institute and its surroundings, there are lots of functions for recreational use of riverbanks but also a diverse river view for passing cars. On



has been a church over 250 years. The property of the church has a riverside of approximately 260 metres and it is partly well-kept, as can be seen in picture 7. On the west side of the church, there are Kirkkotie Road and bridge over the river. On the east side of the church there is a small park area which is owned by the municipality and the following properties are private single-family properties, and therefore it is not possible to continue the riverside park further. Opposite the river, there is the health centre of Kauhava. This is a public property and has its own riverside approximately 230 metres. Between the property of the health centre and Kirkkotie Road, there are a private housing property and a small part of riverside next to the bridge, which is owned by municipality. On the east side of the health centre there are two private properties and then a park area owned by municipality. The church and the private housing properties are willing to development their riverside to create coherent public riverside park. (Kauhavan seurakunta)



PICTURE 7. Kauhava Church and the riverbanks in front of it are well kept.

In master plan of Kauhava Church and the health centre it is possible to create a coherent riverside pathway on the northern side of the river. On the northern side of the river, there is only narrow space for a riverside park, and it is not possible to add many other functions other than a pathway. The health centre area contains a retirement home, and therefore in the master plan there is a pavilion and an outdoor exercise spot for old people and rehabilitees. In front of the pavilion and exercise spot there are beach plants and perennials to create a more diverse and beautiful landscape to explore. The flowing water of the river and the green landscape have an ability to heal and combined with light exercise or social





## 6 RESULTS

The aim of the research was to indicate the values and benefits of recreational areas and the main principles that should be considered when planning river environments for recreational use. The aim was also to research public participation and successful ways to involve people in recreational planning processes. The aim of this thesis was to find out the applicability and suitability of findings in practice. In the case study of the environmental development project of the River Kauhavanjoki the methods and findings are being tested.

The main research question in this thesis were:

*What are the specific principles and values of designing river environment for recreational use?*

*What are the mental, physical and cultural benefits of developing river environment for recreational use?*

*What are the good practices of public participation in planning process?*

According to the literature study of the subject, there are several principles and values of designing a river environment for recreational use. Water and nature itself have their own requirements. Water quality is one big issue for water-based recreational use. Swimming and fishing are such activities where water quality plays a great role. The target for the ecological status of the river water is good, but if it is defined as poor or bad, human impact has changed the water quality disturbingly from its natural state. This affects living conditions of fish and therefore, it affects fishing opportunities also. Swimming waters need to be clean enough to fulfil special hygiene requirements. Moreover, water-based functions such as boating, kayaking, canoeing and rowing are not so dependent on water quality demands, but also these activities are more attractive if the water is clean and without an unpleasant smell. In addition, the above-mentioned functions need certain platforms and launch structures, such as jetties. Functions and structures are handy to provide in locations with easy access and good parking facilities.

The river environment has a great potential for ground-based recreation. River environment provides a great potential to create a green network inside the city. Areen network offers green connections for flora and fauna, but also for recreational use. A River as a green hub of an urban centre provides easy access from a wider area, and that offers extended recreational opportunities. Walking paths along the river and various functions for every age group are the basis for the recreational facilities. The concept of sustainability and sustainable landscape design form the top principles for designing and implementing

a river environment. Reduction of human impact and balance of environment, nature, resources, culture and energy are the key principles of sustainable landscape design. Conservation of nature and culture values with framework of aesthetics are values that are important when developing a river environment for recreational use. The protection of existing plants that are in good condition, and using natural plants increases the probability of success of the plants and helps to keep up a balance in natural ecosystems.

According to Case Tikkurila river project, recreational planning is just one layer of the master planning of the river environment if the target is also to manage stormwater quality and quantity. A large amount of technical planning is needed and studies of ecosystem services, natural values, stormwater management and the catchment area. The master planning is also branding the river environment and therefore, a great amount of landscape science and art, visualisation and communication are needed. Public participation brings more value, especially for recreational planning and the results of involvement are, without exception, valuable and useful.

According to the literature review, there are plenty of mental, physical and cultural benefits of developing a river environment for recreational use. Nature, landscape and the water element itself have positive mental and physical effects for recreational users. The nature-based landscape itself has several positive benefits, but together with sporting activities, the profit for an individual's well-being is undisputed. Good recreational facilities increase physical activity and social interaction among people. Nature and the green landscape affect people's health and well-being, reducing stress and depression, relaxing and restoring. In addition, the healing process can be faster, and people do not need so much painkillers if they have the ability to explore or just watch a green landscape or a nature scene during the healing process. In addition, nature-based activity reduces blood pressure, increases self-knowledge and improves mood.

There are several cultural benefits of developing a river environment for recreational use. The fact is that a well-kept environment increases the value of its neighbourhood. Recreational areas are for everyone, regardless of their socio-economic status, and therefore these areas increase equality among people. Visiting parks and green areas has always been popular and it still is. The popularity of different sort of activities are changing all the time. For example, during the last twenty years, the popularity of visiting beaches and natural areas, kayaking, viewing, photographing and studying nature have all been growing.

According to the literature review, there are numerous good practices of public participation in the planning process and using them widely is the key to sustainable results of participation. There should be open and equal opportunities and easy access to participate in

the planning process to achieve a pleasant outcome for all parties. When people are involved in shaping their own surroundings, they feel more attached to an environment they have helped to create, and are likely to start thinking positively rather than negatively. In addition, time-wasting conflicts can be avoided with a good and open involvement process.

During the participation process, several participation tools and methods should be used, because different age and social groups are naturally willing to use different ways to participate. Organising workshops and events are useful ways to participate and share information about the project, but for example, families who are having their rush years, the easiest way to participate is to take part in a questionnaire survey when they feel they have time. The basic way to communicate is to publish a notification in a local newspaper and to post a notification or create an event in Facebook. In addition, public offices and places where people spend time, such as libraries, are good places for advertising. It depends on the nature of the planning area how large a group of people should be involved. Sometimes, sending a personal letter is an effective and personal way to communicate. The participation process and individual events should always be well planned and prepared. It is important to involve residents at the early state of the process and always find the best tools to get intended results of participation.

## 7 CONCLUSIONS

The results of the literature and case studies were quite coherent. The methods used were suitable for this kind of study. Corresponding cases were difficult to find. There were many cases in the United States or in China, but not in Finland or other similar countries. Kauhava is a small rural town and the River Kauhavanjoki has its own special features such as clay soil and steep-edged riverbanks. Many found cases had shallow riverbanks and were situated in larger cities, which bring more opportunities and financial resources. Case Tikkurila was useful because in the process of the project public participation was used and the results of the architectural competition were insightful and practical.

The results of the literature review were practical and therefore they are easy to apply in practice. There are many layers of the planning process, such as water quality, which defines the functions that can be designed. In addition, every river environment has its own special features and development targets but the design concept of environmental development of a river is possible to copy and implement to any river in Finland. If the concept is being copied to other countries, country-specific legislation needs to be studied.

The case study of environmental development project of the River Kauhavanjoki was a one-year project. The project started with data collection and an inventory of nature values. The project continued with the involvement of local people and presenting the project. The final state of the project was the master planning. The project period was intensive and the target of creating the master plan for developing the recreational use of river environment was appropriate. The uncertainty factor of the case study and the literature study was the water quality and how to improve it. Reviewing the target setting of the project, the target of improving water quality for such a one-year project was too ambitious. Plenty of research and technical planning would have been needed to achieve this target. Water quality is an important issue and it affects many functions and possibilities when developing a river environment into a recreational area. But water quality and its improvement are such big issues themselves that in this project, they could be handled only superficially, and the master plan of the River Kauhavanjoki is concentrated only on recreational development. The issue of water quality is important and therefore it is necessary to continue the development with a new project, which would aim at the improvement of water quality of the River Kauhavanjoki.

The results of public participation in the environmental development project of the River Kauhavanjoki were good and sufficient. There were 94 respondents in the survey. The population of Kauhava was 16900 (2014) and population in the urban centre and suburbs

in Kauhava was approximately 5600. From that point of view, 94 respondents are a reliable outcome and the results are statistically significant. Nevertheless, the advertising of the questionnaire could have been better and more comprehensive. For example, different age groups could have been reached better with various advertisement methods. Children and teenagers do not possibly read local newspapers or internet pages of municipality. Therefore, social media and contacting schools and different hobby groups would have been successful.

The results of the questionnaire survey were good and mostly as expected. The questionnaire survey was performed with the Harava tool in the internet and it is a workable tool, but it was seen that working with maps and computers is not familiar to everyone. Therefore, workshops and city walks could have been effective and useful methods alongside to the survey. Young people were also missing in the participation process; therefore, workshops for youth could have been useful also.

In the survey there were asked about the most beautiful landscape of the River Kauhavanjoki and it is notable that historical and traditional landscapes such as the church environment, the dam with rapids and the open field environment were mentioned in this regard. Also, the park-like river environment in centre of Kauhava was mentioned, which reflects the new trend of using the river environment in Kauhava. In generally, open landscapes seem to be the most popular. In addition, there were asked about important development spots of the river environment and also here the church environment was mentioned as one of the most important locations. Equally, the river environment in central Kauhava was an important spot. It seems that places with more people around are naturally more important spots to develop.

In the results of the survey, it was significant that the proposals of participants were mostly practical and easy to implement. Most of the development ideas were about river parks, walking paths, boating facilities and cleaning of river views. These ideas were expected, and also targets of the city of Kauhava. Built river parks with benches and walking paths along the river are the most wanted development ideas. In addition, a clean and open river landscape is important. The next most significant ideas were boating possibilities with landing jetties and boat launches. Thirteen percent of the development requests were about water quality improvement and water level stabilisation. In addition, there were many other wishes with less support. It is possible that the popularity of some development ideas could have been bigger if participants could have seen the previous answers of other participants. It is possible that some respondents need inspiration from other peo-

ple to get ideas rather than creating their own ideas. In addition, the age distribution reflects the trend of the questionnaire results. It is the most probable that there could have been different kind of results if there would have been more younger participants.

Overall, the questionnaire survey was a good tool for involving local people in the planning process. Questionnaires are easy for most of the people and they are flexible with timing. In this project, the results of the survey were predictable. The most important part was when it was asked about the development ideas and almost all the ideas were something the project group had thought of also. Only a cafeteria or a kiosk was a new idea.

After completion of the environmental development project of the River Kauhavanjoki, there have been some implementations carried out according to the master plan. The riverbanks of Kauhava Church are being cleaned from overgrown vegetation and a wooden jetty has been constructed, as can be seen in picture 8. In addition, many public and private riverbanks have been cleared of overgrown vegetation. Hopefully, riverside paths will be planned to be implemented in the near future, because they are a key element for larger recreational use and development.



PICTURE 8. Kauhava Church and restored riversides (Maaseudun tulevaisuus 2015).

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## APPENDICES

- APPENDIX 1      The master plan of river environment of Eteläranta and Helmiranta
- APPENDIX 2      The master plan of river environment of Yrittäjäopisto Institute
- APPENDIX 3      The master plan of river environment of Kauhava Church



KAUPPATIE

HELMIRANTA

THE RIVER KAUHAVANJOKI

Walking pathway

Current pedestrian bridge

Walking pathway

Exercise park  
- Beach volley field  
- Outdoor exercise spot

New riverside walking path joining to current walking path

Clearing of riverbank and park-like finishing

Jetty

Planting shoreline vegetation

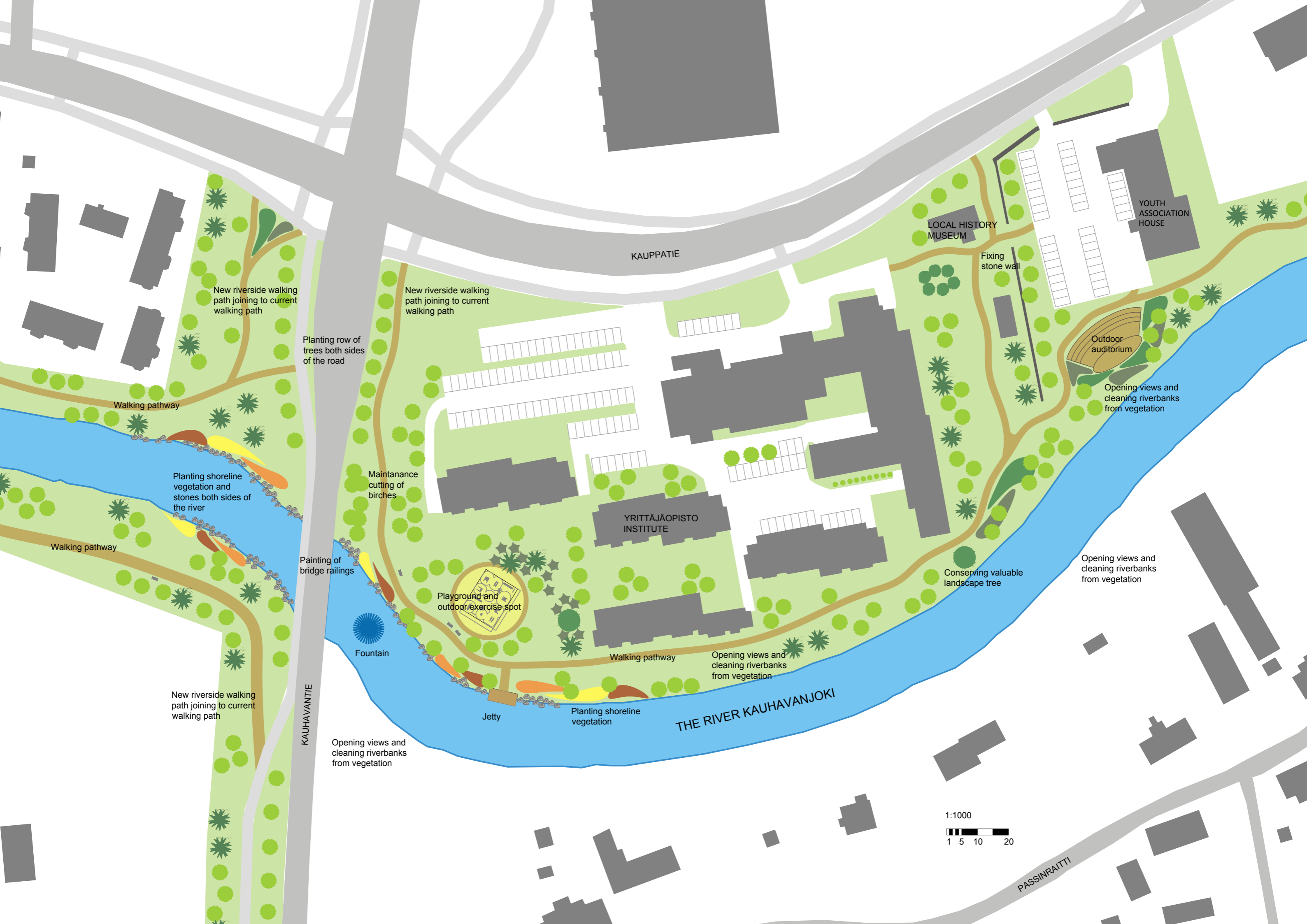
Picnic field and sunbeds

ETELÄRANTA

KIURUNKUJA

ETELÄRANNANTIE

1:1000  
1 5 10 20



KAUPPATIE

LOCAL HISTORY MUSEUM

YOUTH ASSOCIATION HOUSE

YRITTÄJÖPISTO INSTITUTE

THE RIVER KAUHAVANJOKI

PASSINRAITTI

New riverside walking path joining to current walking path

New riverside walking path joining to current walking path

Planting row of trees both sides of the road

Walking pathway

Planting shoreline vegetation and stones both sides of the river

Walking pathway

Painting of bridge railings

Maintenance cutting of birches

Playground and outdoor exercise spot

Fountain

New riverside walking path joining to current walking path

Opening views and cleaning riverbanks from vegetation

Jetty

Planting shoreline vegetation

Walking pathway

Opening views and cleaning riverbanks from vegetation

Fixing stone wall

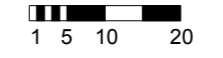
Outdoor auditorium

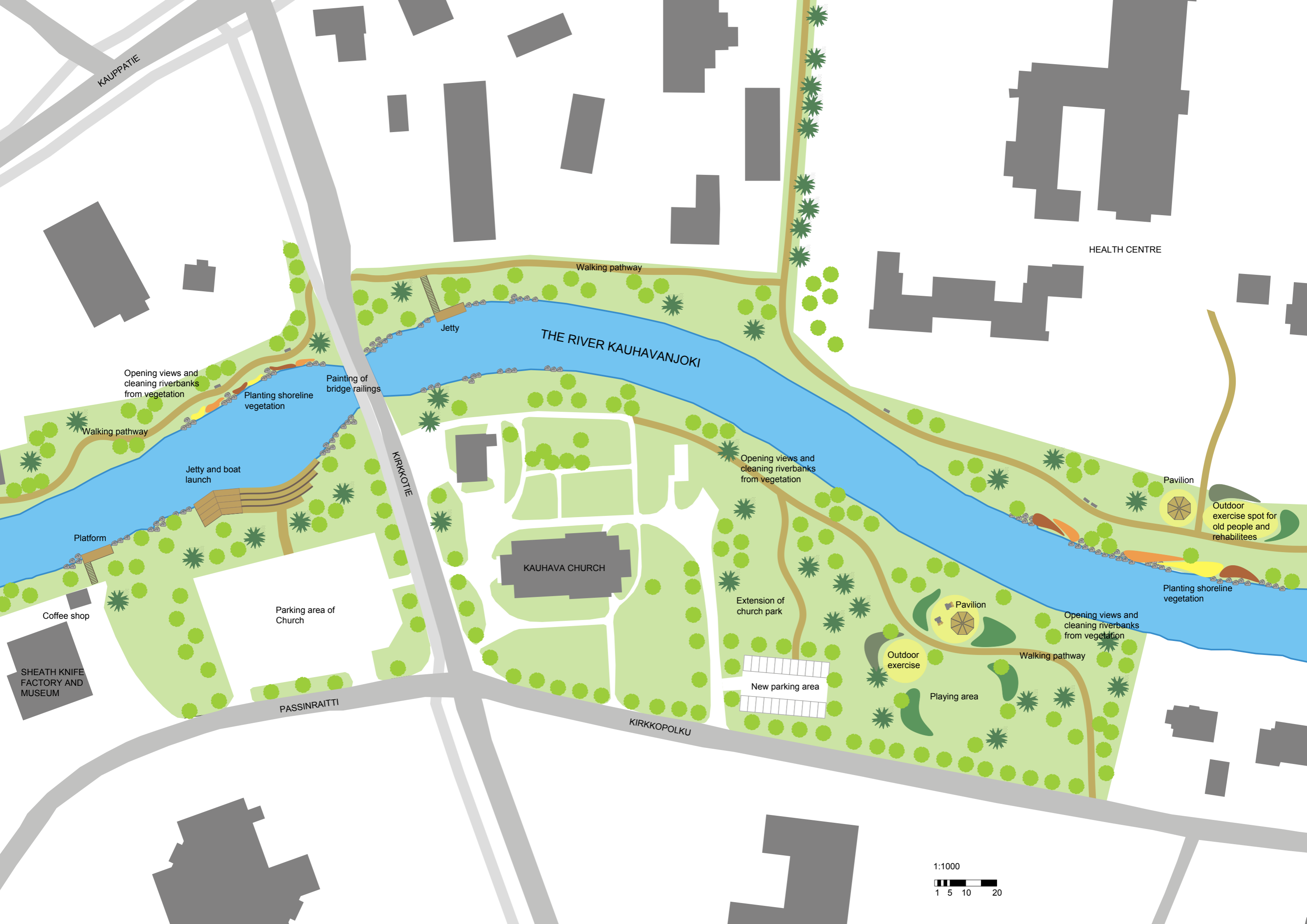
Opening views and cleaning riverbanks from vegetation

Conserving valuable landscape tree

Opening views and cleaning riverbanks from vegetation

1:1000





KAUPPATIE

HEALTH CENTRE

THE RIVER KAUHAVANJOKI

Walking pathway

Jetty

Opening views and cleaning riverbanks from vegetation

Planting shoreline vegetation

Painting of bridge railings

Walking pathway

Jetty and boat launch

Opening views and cleaning riverbanks from vegetation

Pavilion

Outdoor exercise spot for old people and rehabilitees

Platform

KAUHAVA CHURCH

Planting shoreline vegetation

Coffee shop

Parking area of Church

Extension of church park

Opening views and cleaning riverbanks from vegetation

SHEATH KNIFE FACTORY AND MUSEUM

PASSINRAITTI

New parking area

Outdoor exercise

Playing area

Walking pathway

KIRKKOPOLKU

1:1000

1 5 10 20