ACTIVE DESIGN: TOWARDS HEALTHY COMMUNITIES

Using urban design to promote healthy lifestyles and physical activity in one Swedish suburb.

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INTRODUCTION

Today over 50 percent of the world's population live in cities – they have become the dominant "human habitat." The design of this habitat will determine how its residents use it – what are we designing for? It seems very often today that cities are designed around consumption or efficiency, but what if instead of this, communities were designed as Aristotle put it, with health as the most important consideration. What if our goal was to create environmentally, socially, and physically healthy cities with vibrant street life and close-knit communities? What role does urban design play in individual behaviors; how can urban design promote physical activity and therefore more healthy lifestyles? What is the best approach to incorporate active design strategies into projects of all scales?

"We ought to plan the ideal of our city with an eye to four considerations. The first, as being the most indispensable is health."

(Aristotle in Politics, ca.350BC)[1]

The goal of this work is to explore the possibilities in healthy community design and ways in which we can design our cities in order to encourage physical activity in our populations. To begin this study I completed a literature review of relevant books and journal articles with the aim of gaining a better understanding of the history and background to the role of the built environment on health and to understand current thoughts and strategies to achieve more active communities. A summary of the collected information makes up the first section of this thesis.

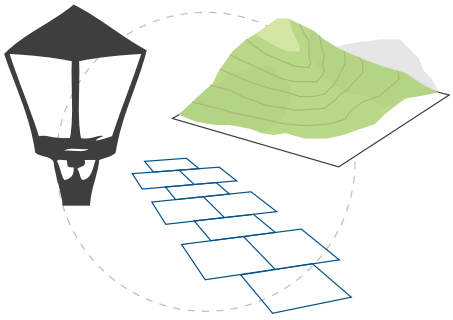
The next section discusses strategies to designing healthy communities with a focus on physical changes to the community and divided into seven categories: density; diversity; design; destination accessibility; distance to transit; exposure to green space; and exposure to recreation.

In the final section I have applied these strategies to a case study in Farsta, a suburb of Stockholm, Sweden.

Striving for the design of healthier communities is an important topic and will become more important as more and more of our population mores to the city and as those cities become larger and denser. Sustainability and how this growth will affect our environment is a hot topic, but equally important is how this growth will affect the health of our people.

Research → Toolbox → Case Study







HEALTH TRENDS TODAY

Chronic disease – cancer, diabetes, and cardiovascular disease (heart disease and strokes) - is the largest killer of our day, with cardiovascular disease overtaking infectious disease as the foremost cause of death globally. The leading risk factors for these diseases are physical inactivity, poor diet, obesity, and smoking.[4]

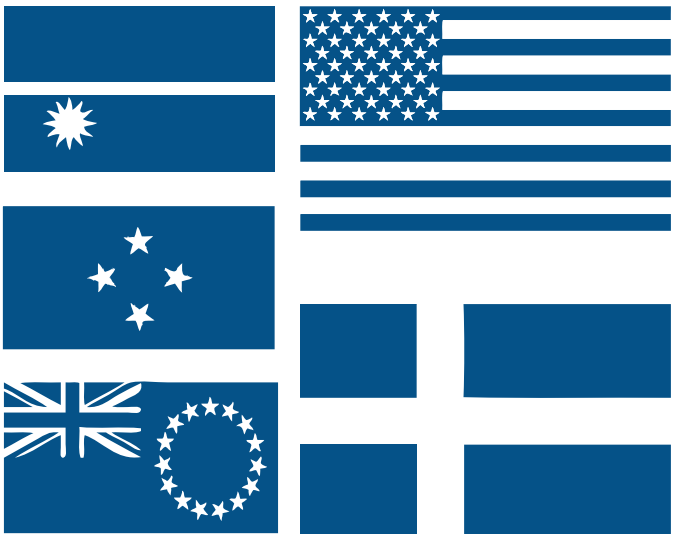
The focus of this text will be to discuss the health trends today in relation to one of these risk factors; physical inactivity. Besides the above mentioned chronic diseases, obesity is another major corollary of physical inactivity with its own list of consequences including: high blood pressure (hypertension), arthritis, osteoporosis, asthma, depression, anxiety, and increased risk of diabetes, cardiovascular disease, and some forms of cancer.*[5] In fact, the risks associated with being physically inactive are just as high as those associated with smoking, high blood pressure, or high cholesterol, but are far more common.[6]

The obesity rate in the US has jumped from 24 percent of the population being overweight in 1960 to 60 percent being overweight and 31 percent obese in the year 2000.[7] Between 1970 and 2008 the rate of obesity in children alone has jumped from seven to 20 percent.[8] Although these statistics are from the US the rate of obesity is growing rapidly worldwide. The rate of increase of overweight/obesity is being compared in spread and severity to that of an infectious disease epidemic.[9]

Lifestyle is associated with this increase in physical inactivity and overweight/obesity. Our daily life today requires few if any physical demands. Technology has eased our physical burden with escalators, elevators, washing machines, dryers, dishwashers, leaf blowers, vacuum cleaners, etc. Our post industrial lifestyle means we spend 90 percent of our time indoors[10] with our workday being spent sitting at a desk.[11] Physical activity now requires a conscientious effort and planning as a part of leisure time rather than a part of daily life. In the US just over one in four adults reports leisure time physical activities.[12] In Stockholm 35 percent report physical activity as a regular part of leisure time, 47 percent report moderate activity, and 17 percent sedentary or no activity.[13] Studies suggest that physical inactivity rates are higher among minorities, the poor, and women.[14]

World's Fattest Countries

Percentage of population over 15 years of age



#1 Nauru 94.5%
#2 Micronesia 91.1%
#3 Cook Islands 90.9%

#9 USA 74.1%
#90 Sweden 49.7%

Source: Forbes Magazine

22YEARS
The number of years taken off life expectancy when diagnosed with diabetes before 40

7% > 20%
The jump in childhood obesity from 1970 to 2008 in the US

31% OBESE
In the US obesity rates have jumped from 24% of adults overweight in 1960 to 60% being overweight and 31% being obese in 2000

75 PERCENT
of children categorized as overweight will stay in that category into adulthood

* It is important to note that obesity is a result of physical inactivity and low physical fitness. The concerns revolving around physical inactivity are not just for those who look overweight or obese, but for all of those with low physical fitness.

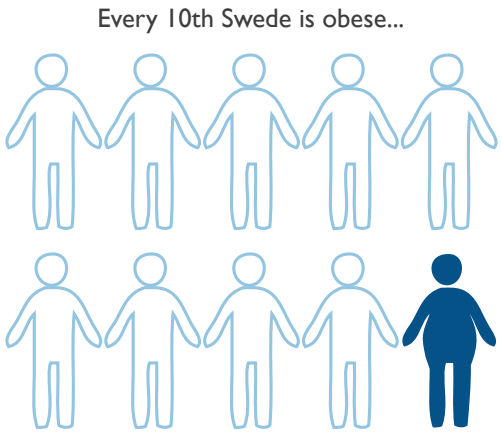
Children are an especially vulnerable group when it comes to physical inactivity. If recreation areas do not exist in their neighborhood they have no other options – they cannot jump in the car and head to the gym or get across town to the nearest play area. 75 percent of children who are categorized as overweight or obese will stay in that category into adulthood.[15] The lifestyle we provide them with as children will set them up for the rest of their lives.

Medications prescribed for inattentiveness and hyper activity in children and depression in both children and adults have become more prevalent in our society. The number of children being treated for inattentiveness or hyperactivity in the US tripled between 1987 and 1997.[16] Also in the US, since 2000, have antidepressants become the most prescribed medicine[17] being the second largest medication expense in health care.[18] Physical activity and time spent outdoors are beneficial and preventative to these conditions and requires a simple change in lifestyle rather than costly medications.

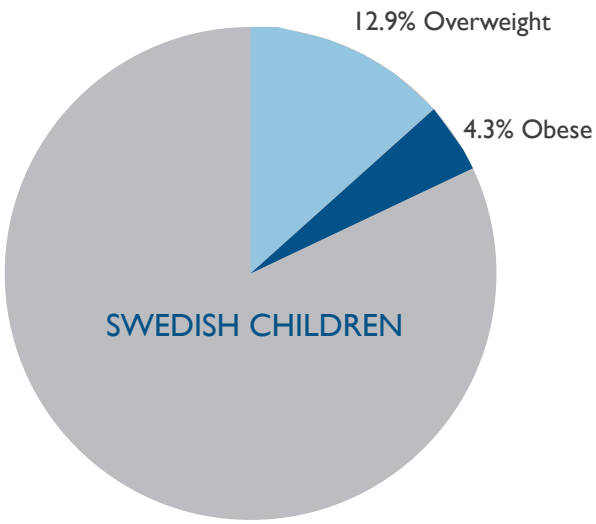
Diabetes is another growing issue related to physical inactivity and obesity and has nearly doubled in recent years.[19] "It is estimated that roughly one in three males and two in five females born in the US in 2000 are at risk of being diagnosed with diabetes during their lifetimes. The estimated lifetime risk is even higher among minority populations, with Hispanic females having a roughly one in two risk." (City of New York 2010, p.14) This comes out to one in three Americans born today being diagnosed with diabetes.[20] If one is diagnosed with diabetes before the age of 40 their life expectancy will decrease by 14 years or by 22 years if quality of life is taken into consideration.[21]

Today, infectious disease epidemics are rare, but in the US alone, hundreds of thousands die each year of preventable chronic disease exacerbated by lifestyle choices.[22] If we continue down this road today's generation will be the first generation of Americans to have a shorter life expectancy than their parents.[23] In this, there is opportunity – physical inactivity is one of the most common and most preventable patterns of behavior. We can drastically shift our quality of life and life expectancy with simple lifestyle changes. This, however, is not solely dependent upon the individual; our cities need to reflect the changes we hope to achieve.

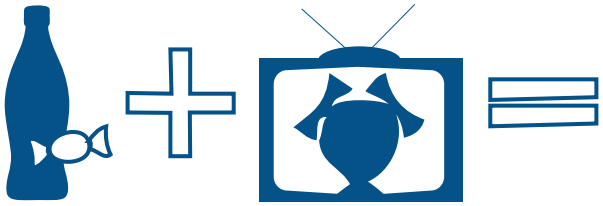
Swedish Statistics:



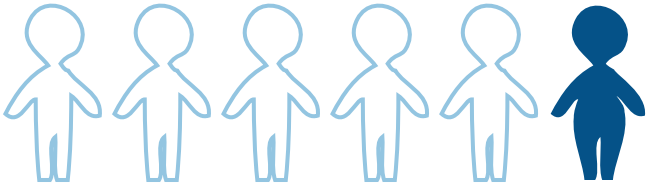
Source: Statistiska Centralbyrån



Source: Statistiska Centralbyrån



Unhealthy, sugary diet and physical inactivity



One of every six Swedish children is obese

Source: thelocal.se

RECOMMENDATIONS FOR WHAT IS HEALTHY

Different sources suggest varying levels of what it means to be regularly physically active, but in general 30 minutes of moderate physical activity five days per week, is recommended for adults. These 150 minutes of moderate physical activity can be in the form of brisk walking, or cycling. The US department of Health offers an alternative suggestion of 75 minutes of vigorous activity weekly for those who prefer activities such as running.[31] For young people 60 minutes of moderate to vigorous daily activity is recommended.[32]

In the US only 26.2 percent of adults meet the above recommendations[33] and it is estimated that only one in 20 get enough physical activity daily.[34] Because of this there has been a shift in attitude in promoting physical activity to focus more on moderate forms of activity in order to reach a broader audience. It has been shown that exercise, such as walking or stair climbing, incorporated throughout daily activities have equal levels of long term health benefits as more vigorous alternatives. The many benefits of moderate activity include: maintaining normal muscle strength and joint structure and function; lowering high blood pressure; relieving depression or anxiety; maintaining healthy weight; and is necessary for normal skeletal development during childhood.[35] For example, cycling 15 minutes, or four kilometers, twice daily (less than the average commute) is enough to burn the equivalent of four and a half kilograms each year and prevent the risk factors associated with being overweight.[36]

Walking is the most common, popular, accessible, and safe form of moderate activity.[37] The 30 minutes of recommended daily exercise does not need to be all in one go; dividing it into three ten minute walks each day has equal benefits.[38] This will require only a small change in lifestyle and it is never too late to start; an inactive person will actually see more drastic and immediate health benefits when beginning than their fit counterparts.[39] Diabetes patients who incorporate two hours of walking per week (less than 20 minutes per day) reduce their death rate by a drastic 40 percent.[40] Among women, those walking ten blocks each day have a 33 percent lower risk of developing cardiovascular disease.[41]



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For young people 60 minutes of moderate to vigorous daily activity is recommended.

"Exercise does not need to be done on a treadmill or 'health club' machine; it is less costly and has the same benefits when spread throughout the day in the form of walking, stair climbing, and carrying packages. The trouble is that in the last half century, we have effectively engineered physical activity out of our daily lives."

(Dannenberg et al. 2011, p.xvii)



Image Source: http://www.halsosparet.se

"Few if any other health interventions are this broadly beneficial and have so few unwanted side effects…"
(Dannenberg et al. 2011, p.34)



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BENEFITS OF PHYSICAL ACTIVITY

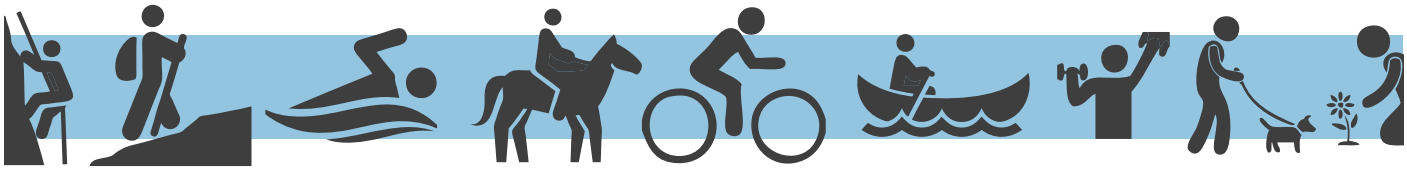
According to the Centers for Disease Control, regular physical activity can improve health in the following ways:

- Reduces risk of dying prematurely
- Reduces the risk of dying from heart disease
- Reduces the risk for developing diabetes
- Reduces the risk for developing high blood pressure and helps to reduce high blood pressure in those who already have it
- Reduces the risk for developing colon cancer
- Reduces feelings of depression and anxiety
- Helps control weight
- Helps build and maintain healthy bones, muscles, and joints
- Helps older adults become stronger and better able to move about without falling
- Promotes psychological well-being

Other benefits to regular physical activity:

- Proactive against osteoporosis[24]
- Prevents cognitive decline in the elderly[25]
- Can both prevent and is one of the most effective forms of treatment for depression[26]
- Associated with improved sleep[27]
- In combination with healthy diet it is safer, cheaper, and a better way to lose weight than medications[28]
- When taken place in natural settings it is shown effective in reducing inattentiveness or hyperactivity in children[29]
- Delays onset of disability from chronic disease providing longer active-life in elderly:[30]
    - If regularly active, women aged 65 and over, have 12.7 year longer active-life expectancy, and 18.4 years longer if very active
    - This also delays the loss of independence associated with cognitive decline

WHAT IS PHYSICAL ACTIVITY?



Physical activity can be divided into two categories, recreational and utilitarian:

Recreational Physical Activity

Activity which we chose to participate in during our free time, such as running, going to the gym, or playing team sports. [42]

Utilitarian Physical Activity

Activity that is undertaken in order to accomplish another purpose, such as walking to the store or cycling to work or school - improving health though exercise is merely a by-product to utilitarian activities.[42]

Recreational activity requires high levels of motivation and access to equipment and proper facilities.[43] When discussing how the built environment can encourage physical activity the focus is on utilitarian activities and how design can facilitate such activities while eliminating barriers. This will reach a broader audience as it is worked into daily life and people have less time for recreational activities.[44]

Two barriers to overcome when altering physical activity patterns are adoption and adherence:

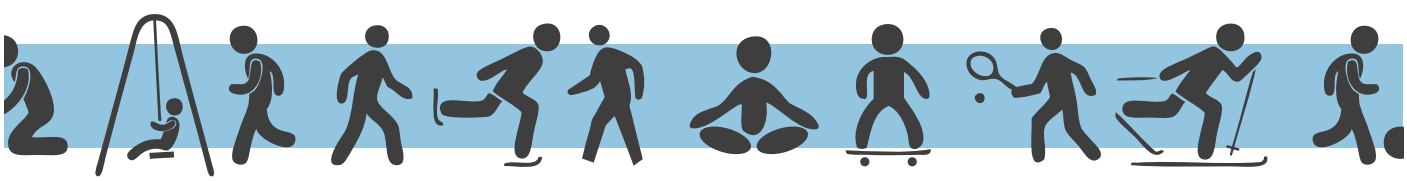
PERSONAL BARRIERS

- **Adoption**: when one begins a physical activity regimen.[45]
- **Adherence**: sticking to this regimen over time.[45]

Structured settings, such as the gym, can be too costly, time-consuming, or embarrassing for many to adopt or adhere to.[46] Whereas activities that require lower exertion, have little to no cost, take less time, and have practical applications can be adopted easily and completed while working towards other goals.[47] These "lifestyle activities," such as gardening, walking to do errands, or cycling to work, have more inherent meaning than pedaling a stationary bike to nowhere and can be more easily incorporated into daily life.[48]

There are also personal versus environmental barriers which discourage physical activity.[49] Lack of time is the most common personal barrier with fatigue, lack of motivation, and lack of financial resources being other examples.[50] Environmental barriers include obstacles by the built and natural environments, such as availability of facilities, distance to get there, the ease of crossing streets, sidewalk and bike lane continuity, street network characteristics, topography, and weather.[51] Environments which encourage and facilitate physical activity are also those environments that will present the fewest barriers; and it is therefore the aim of Healthy community design to eliminate as many environmental barriers as possible.





WHAT DOES IT MEAN TO DESIGN A HEALTHY COMMUNITIY?

Creating a healthy community means more than just providing sidewalks and cycling networks. The World Health Organization's "Healthy Cities Project" defines a healthy city as:

> "One that is continually creating and improving those physical and social environments and strengthening those community resources which enable people to mutually support each other in performing all the functions of life and achieving their maximum potential."
>
> (Frumkin et al. 2004, p.203)

Healthy places include elements in the built environment as well as social factors in the community.[52] If we want to design cities and streets for people to improve well-being, than we need to embrace healthy community design not only in the built environment, but as part of an overall public healthy strategy.[53] This will be an ongoing practice to continually improve the well-being of populations, places, and policy making processes in a community.[54] The challenge is to find ways to grow our cities with our population in ways that are healthy and in ways that ensure residents can incorporate physical activity into their daily lives.[55]

Designing actively means to design environments which encourage stair climbing, walking, cycling, transit use, active recreation, and healthy eating.[56] These actions alone, however, will not ensure that we create healthy communities; we need to reconnect planning and design processes with public health and policy making processes, which will include many actors from multiple agencies that blur the lines of public and private.[57] Many of these actors include: architects; landscape architects; urban designers; transportation planners; engineers; project sponsors; policy makers; government agencies; building owners; private developers; building managers; local health specialists; user groups; community coalitions; bicyclists; city residents; etc.[58] It is important to build partnerships between these actors and find reinforcement for healthy community design within local groups.

Government spending and policy agendas across transportation, public health and land development are significant tools in the creation of healthy communities.[60] Spending in support of active modes of transportation (transit, cycling, or walking) can allow for better and more extensive networks to be created rather than spending more money on highway development.[61]



Image Source: http://www.asla.e...

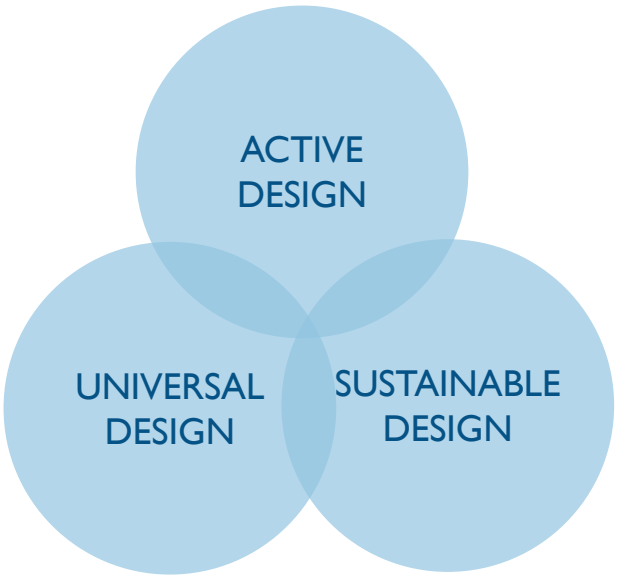
> "Physical changes to places without accompanying political and institutional change will ultimately fail to improve the health of… cities."
>
> (Corburn 2009, p.2)

WHAT ARE THE BENEFITS BEYOND HEALTH?

Beyond improving quality of life, designing for healthier communities has a direct affect on health care costs to the individual and to governments as well as furthering goals of sustainable and universal design.



Economically speaking the lack of healthy community design costs the economy in the form of rising health care and disability costs and declining productivity and workforce availability.[62] In the last ten years the average number of days that an American worker has felt unwell or sick has increased by one day per month totaling 12 days per year, or more than the vacation time of a new employee.[63] In 2007 the US spent 16 percent of its GDP on health care, or two to three trillion dollars.[64] Coronary heart disease, diabetes, cancer and other illnesses related to physical inactivity costs the US more than $150 billion per year in direct and indirect costs such as hospital/nursing home service, medications, and lost productivity.[65] If the current rate of obesity continues the total health care costs attributable to obesity are anticipated to double every decade, reaching $860 to $960 billion by 2030.[66] Although these numbers are from the US, the rises of health care costs are being felt across the world; in 2009, Sweden spent 9.9 percent of its GDP on health care equaling 3,690 dollars per capita.[67]



"A diverse, active, and healthy population are synergistic"
(City of New York 2010, p.7)]

Healthy community design "promises benefits not only for public health, but also for the environment and for advancing universal design." (City of New York 2010, p.7) Active design decreases energy consumption and green house gas emissions[68] while promoting more energy efficient buildings.[69] One example of this is the promotion of stair use over elevators; stairs climbing burns calories and is good for cardiovascular health and eliminating or reducing the use of elevators can decrease the energy consumption of a building from three to ten percent.[70]

Making small changes to our lifestyles will create a shift in our demands on the planet. The built environment causes problems for health and the environment with more air pollution from cars and trucks, as well as water related birth defects and pollution from runoff due to impermeable surfaces.[71] Promoting walking and biking as lifestyle activities will result in fewer car trips and therefore less carbon dioxide released in the atmosphere. Gardening is another lifestyle activity that can be designed to increase biodiversity and provide food sources for people, insects, and birds.[72]



Healthy community design will also further the goals of universal design. The goal of healthy community design is to make utilitarian and recreational activity accessible to all populations, including vulnerable groups such as the elderly, children, or those with special needs. Slowing elevator door speeds is one small example that will further both healthy and universal design; those who do not need the elevator are inconvenienced by the slow speeds and will take the stairs as a faster alternative, while those who need the elevator have ample time to get on and off without stress. Widening stairs and having fewer steps per flight will also allow those who have a less extreme disability to continue using the stairs.[73]

It is important to make the point here that when referring to physical activity that not everyone can participate in the same types of activities, such as those with physical limitations. In this thesis, I refer most often to walking, cycling, and running as forms of physical activity, however this is not to leave out segments of the population, but only to act as examples of activities that are accessible to a large part of the population. The most important factor in striving for a healthier lifestyle is to find a way to move your body which improves cardiovascular health, irrespective of ability level. Providing facilities and eliminating barriers for the three mentioned types of activities will act as an umbrella which should catch most of the barriers

The image to the left, taken from the City of New York's Active Design Guidlelines, shows an example of motivational signage that illustrates the many benefits to healthy community design.

for those participating in other activities.

Whether striving for healthy community design or sustainable design it is imperative to success to be able to demonstrate the human and financial benefits to involved actors (building owners, policy makers, etc). Often short-term costs are off-set by long term savings in the form of increased productivity, reduced long-term health care costs, energy savings, and a healthier community.[74] The world's population is growing, and "no-growth" is not an option.[75] Therefore we must strategically plan for the future taking the environment, economics, and the health of the increasing population into consideration.

"Our 'footprint' should be a benefit, not a detriment – our legacy must be an improvement in overall social and ecological systems."
(Dannenberg et al. 2011, p.xix)





Image Source: http://maxcdn.fooyoh.com

HOW THE BUILT FORM AFFECTS HEALTH - A BRIEF HISTORY

"The influence of place, neighborhood, or context is increasingly recognized as a major if not the most important, determinant of human well-being."
(Corburn 2009, p.13)

Where people live, work, and play, how they get around, what they are exposed to, and what amenities they have access to, are a direct result of how communities are designed.[76] The built environment controls our access to a healthy diet and physical activity which help to combat obesity and its related diseases.[77]

Design of the built environment can have a crucial and positive influence on improving public health[78] – "…if some design decisions (urban-sprawl) are toxic, then the reverse is also true: some design decisions are healthy." (Frumkin et al. 2004, p.201) Often the design of buildings, streets, and neighborhoods acts as a barrier to achieving an active lifestyle irrespective of an individual's motivation.[79] "It is unreasonable…to expect people to change their behaviors when the environment discourages such changes." (Schmid, Pratt, and Howze 1995 in Frank et al. 2003, p.60)

The modern problems of obesity, inactivity, depression, and loss of community have not happened to us, it has been legislated, subsidized and planned in that way.[80] The history of planning proves changes will be difficult and incremental,[81] but if we choose to, we can change these practices and plan for cities of health promotion and disease prevention.

The effect of the built environment on heath through history has transitioned from an age of infectious disease due to poor living conditions to an age of man-made disease caused by routine behavior and daily habits.[82] At the turn of the 19th century cities were unhealthy due to poor infrastructure and sanitation. The streets were dark and crowded as were the housing conditions. Clean air and water were scarce.[83] The streets were the main public spaces filled with activity, but were also

Then:



Age of Infectious Disease

Now:



Age of Man-Made Disease

the main spaces for dumping sewage and waste. American's third president, Thomas Jefferson stated that cities were "pestilential to the morals, the health, and the liberties of man…" and on the same topic, Benjamin Rush, a founding father of the United States, stated cities are "reservoirs of all the impurities of a community."[84]

A response to these conditions came about in the mid 19th century in the form of sanitation reform and the emergence of modern city planning with the goal of improving the health of the least well off residents.[85] Environmental strategies were used to help combat infectious disease.[86] In addition to this, movement away from dense urban cores began. Fredrik Law Olmsted and Ebenezer Howard were both proponents of abandoning dense cities in favor of more open space. Olmsted believed that the two great agents of disinfection were sunshine and foliage and that laying out cities with much larger open spaces would let the sunshine and all of its benefits in.[87] Howard's Garden City movement created small cities dotting the landscape surrounding a central city in order to provide the advantages of urban life but also the fresh air and open space of rural life. Unfortunately the strategies used to solve the problems of the 19th century are what have given us our problems today.[88] As often, these communities to escape the urban core have turned into suburban developments, and suburban sprawl, with an emphasis on the car rather than the health of its residents.

"We must include physical inactivity and poor health among the list of consequences that have accompanied our strategies for building cities, oriented as they have been around a narrow pursuit of largely technocratic goals.

We have neglected thousands of years of historical precedent with respect for building healthy, enjoyable, and sustainable places."
(Frank et al. 2003, p.198)

Today chronic disease has replaced infectious disease as the leading killer globally.[89] These chronic diseases are tied to the over-consumption of calories and under-expenditure of human energy, both of which are shaped by our built environment.[90] As described earlier, in the last half century we have taken out the need for physical exertion from daily activities and as a result have to fit activity into our free time or get none at all. We have made a shift from "urban form" to "urban function" with a focus on making the flows of people, traffic, and goods most efficient rather than enjoyable or healthy.[91]

Today our cities are designed horizontally compared to history.[92] Sprawl has become a common occurrence creating disconnected developments with separate functions.[93] In sprawling areas, people drive more, pollute more, and weigh more.[94] In the US these car-oriented developments have increased the time stuck in traffic from one to 28 hours per year in the past 20 years.[95] Creating a built environment where driving is not just a choice, but a necessity restricts those who cannot drive including children, teenagers, the elderly, and those who cannot afford a car.[96] Sprawl has developed from the need to escape the unhealthy urban core and from the principle of zoning. Originating from Germany, zoning was a way to control development after industrialization.[97] Originally "mixed use" zones were incorporated into these plans, but often today uses are separated completely making it difficult or impossible to get around without a vehicle.

With healthy community design we can design our future to include walkable cities that encourage healthy lifestyles.



THE IMPORTANCE OF STREETS

"Streets and their sidewalks, the main public places of a city, are its most vital organs. If a city's streets look interesting, the city looks interesting; if they look dull, the city looks dull."
(Jane Jacobs in Frank et al. 2003, p.154)

Streets contribute to the built environment and connect destinations; they are where a great deal of activity happens within a community.[98] Street networks consist of the street for vehicular travel, but also the immediate surroundings including sidewalks, planting, and street furnishings.[99] The buildings, parks, and squares along the street define its basic qualities, give frame of reference, and influence behavior.[100] The street is a multidimensional space and only one of these dimensions is vehicular travel.

Historically, before the automobile, streets were legitimate public spaces for multiple uses.[101] More recently streets have become dominated by the motor vehicle often having little or no space for pedestrians or alternative forms of travel. Peter Calthorpe has been quoted as saying, "pedestrians are the catalyst which makes the essential qualities of communities meaningful…Their absence in our thinking and planning is a fundamental source of failure in our new developments." (Frank et al. 2003, p.74) It is important to remember that the street has two main purposes; moving people and goods between destinations, and serving as a stage for social interaction.[102] Having inviting, well-designed streetscapes is important to set the stage for this socialization as well as to promote walkability. The desirability of streetscapes to the pedestrian is formed in two ways, perception of safety and perception of physical and social attractiveness of the street and surrounding area.[103] Safe, attractive, and walkable streets will encourage more active use.[104]

In order to facilitate this active environment, existing levels of traffic need to be addressed and streets need to be designed for people, not for cars. Traffic calming strategies will discourage driving while keeping connectivity in place. Applying calming strategies on a large scale will reduce levels of traffic instead of just diverting it to another area. [105] It is important to increase the inconvenience (in time or cost) of travelling in individual vehicles while improving the ease of travel on foot or bicycle.[106]

Cars need space. They travel at high speeds and perceive less detail in passing. These facts have resulted in street networks with architecture and details within the built environment being scaled up to accommodate traffic.[107] Large billboards and widely spaced buildings with solid concrete facades are not inviting to pedestrians. Motorists care about getting from point A to point B and the aesthetics of the road are secondary to fast travel, but to the non motorist the details of the street network are hugely important and determine the desirability to walk or bike on that street.[108] "Human senses are adapted to the speed at which humans move through space under their own power (i.e. walking)." (Frank et al. 2003, p.161) To distinguish the details in our environment the ideal speed is five miles per hour or under[109] (eight kilometers per hour) and we need to design our streetscapes to accommodate this principle.





A TOOLBOX FOR DESIGN

From this research I have extracted different strategies, or tools, in order to implement the goals of healthy community design. These strategies come in intangible and tangible forms. For the purpose of this thesis I will only give a definition for intangible tools, but go into further detail for the tangible. This is not to place a greater importance on the tangible over the intangible as both forms need to be used in order to successfully implement healthy community design.

Intangible Tools



Intangible tools include the **actors and agents** who form policy as well as the **awareness** programs that are created in order to educate, market, and promote healthy lifestyles and initiatives that will transform the urban form with a new emphasis on active design. Examples of intangible tools can be found in many of the reference projects at the end of this document.

Tangible Tools

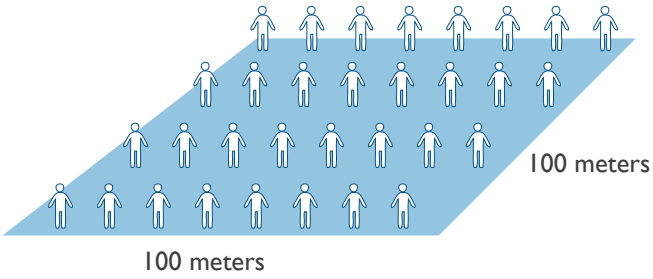


The tangible tools can be broken down into the five D's and two E's, which are strategies to design healthy communities and include: Density; Diversity; Design; Destination Accessibility; Distance to Transit; Exposure to Green; and Exposure to Recreation.

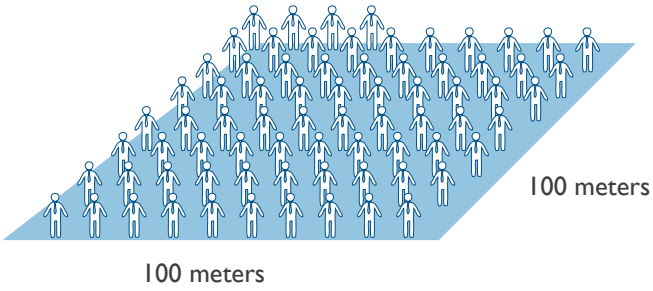
The first three D's were coined by Robert Cervero and Kara Kockelman as tools to analyze the relationship between urban design and travel habits.[110] Destination Accessibility and Distance to Transit are important considerations with active modes of travel as the built environment will determine the ease and type of access between destinations.[111] I have added the two E's, Exposure to Green and Recreation, to the traditional 5D's as strategies to increase the levels of both utilitarian and recreational physical activity. **Using a range of strategies will yield the best results** as each of these strategies will complement one another. Each of these strategies is described in the following sections.

DENSITY

Density refers to the number of people, households, or employers over a given area (square miles or kilometer).[112] Having the right level of **density is synergistic to make walking more feasible and transit more viable.**[113] Areas with higher density tend to have more destinations closer together to reduce trip length.[114]



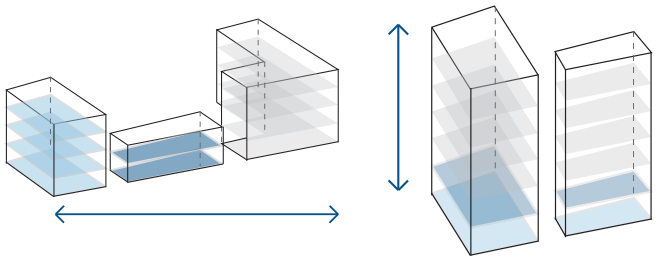
Studies have shown that there is an increased number of trips taken on foot or by transit when a density of 13 people per acre (32/hectare) is reached.[115]



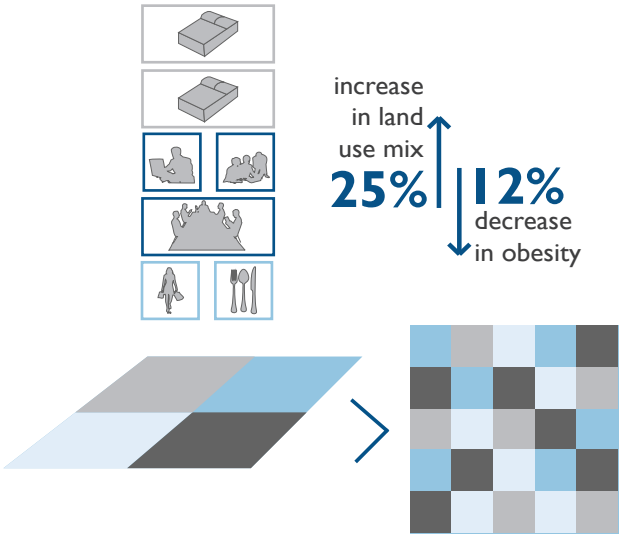
Other studies have shown that reaching employment densities of 30 employees per acre (74/hectare) showed a decrease in automobile use with huge drops at 75 employees per acre (185/hectare).[116]

DIVERSITY

Diversity is the number, variety, and balance of land uses in the area.[117] Uses that are appropriate for mixing are those that have a benign influence on surrounding uses – in



general it is agreed that uses such as heavy industrial should not be mixed with uses such as housing.[118] Land uses can be mixed vertically and/or horizontally and will determine the degree of proximity between origins and destinations.[119] Land use mix can have a coarse or fine grain; the grain is determined by the "shape, size, and texture of various zones of activity," with finer grains resulting in more physical activity.[120] In fact, each quartile increase in land use mix is associated with a 12 percent reduction in the likelihood of obesity.[121] Healthy community design should work towards the goal of an integrated community containing housing, shops, work places, schools, parks, and facilities necessary for everyday life.[122]



The number of different uses in an area is a good predictor for the amount of utilitarian activity with the amount of parks or open space in that area predicative of recreational activity.[123] Full service grocery stores can act as destinations for pedestrians and should be placed within walking distance of all residential areas.[124] Centrally located schools are also destinations that will encourage physical activity for students who can walk or cycle to school and those who can use their recreational facilities after school hours.[125] The number of retail, restaurants, and office buildings is highly correlated with utilitarian walking – the number of different type of uses should be the focus of a healthy community, not necessarily just the land area devoted to specific functions.

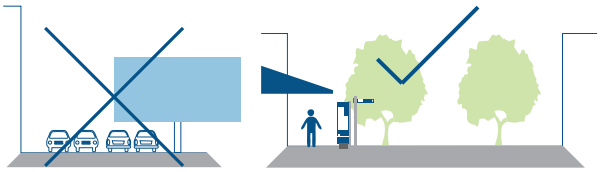


Having a diversity of housing types is also an important factor in healthy community design. This enables citizens from all economic levels and age groups to live in the same area with the same available amenities.[126]

DESIGN

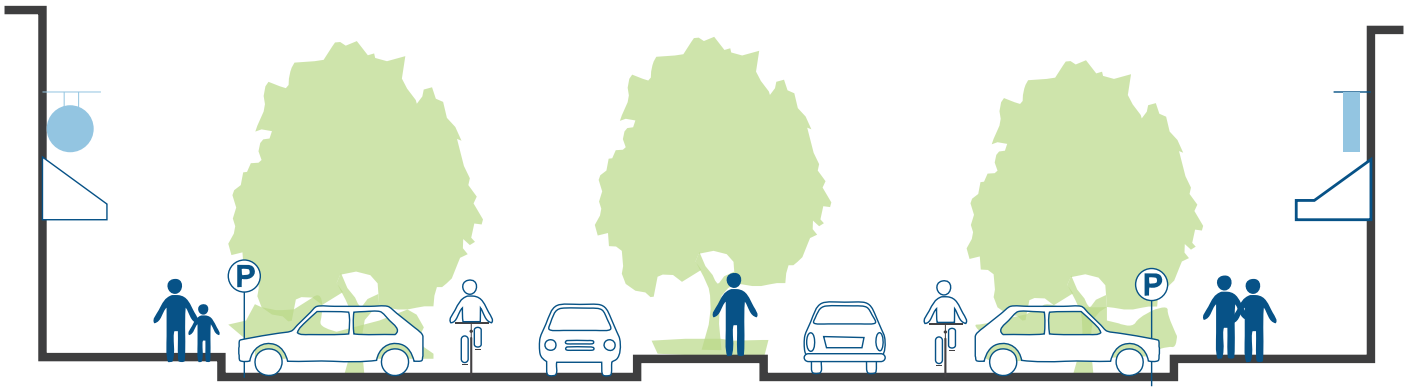
"Streets, pedestrian paths, and bike paths should contribute to a system of fully connected and interesting routes to all destinations. Their design should encourage pedestrian and bicycle use by being small and spatially defined by buildings, trees, and lighting; and by discouraging high-speed traffic."
(Frumkin et al. 2004, p.)

Design in the built environment has a huge effect on how spaces are perceived; it contributes to the basic attractiveness of places for physical activity.[127] In general, at the neighborhood level, the built environment should be oriented to the needs of pedestrians and cyclists rather than cars.[128] Those traveling by foot or on bicycle are unsheltered from all elements in their environment including design elements.[129] Pedestrians and drivers perceive the built environment differently; drivers, traveling at high speeds, cannot perceive as much detail and thus need large signs and buildings, but conversely, pedestrians need to have a high level of detail in order to desire and feel comfortable walking in a space.[130] When deciding to walk or cycle a person will consider: safety; attractiveness; number and width of traffic lanes; type of pavement; location and marking of crosswalks; size and extensiveness of sidewalks; and types and sitting of miscellaneous objects on and around the street (tree plantings, benches, etc.).[131]



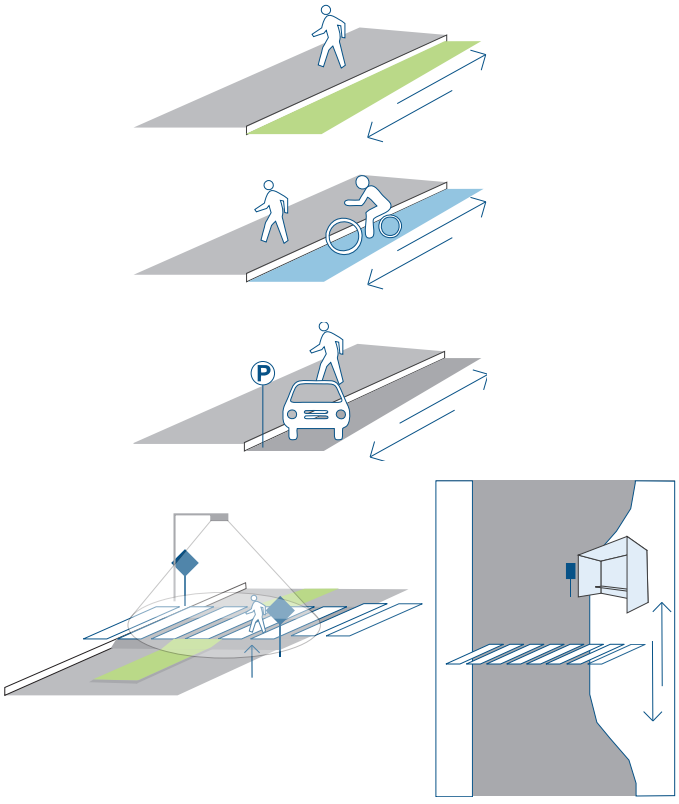
The Robert Wood Johnson Foundation's Active Living Research Program has identified five design qualities critical to good pedestrian environments:

- **Imageability:** Qualities that make a place distinct, recognizable, or memorable. Physical elements should capture attentions, evoke feelings, and create a lasting impression
- **Enclosure:** Streets should be visually defined by buildings, walls, trees, and other vertical elements
- **Human Scale:** The size and texture of physical elements should be in proportion to people and correspond to the street
- **Transparency:** The ability one has to see objects or activity beyond the street's edge
- **Complexity:** The visual richness or variety of a place[132]

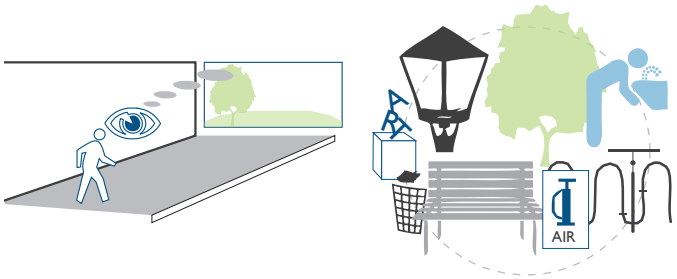


"The street that is ideal for non-motorists – narrow with abrupt changes, and a high level of detail along its edges – will not allow for safe automobile travel at higher speeds." (Frank et al. 2003, p.163) When designing streets in a community it should be remembered that the street is for pedestrians, cyclist, and vehicles and it should be designed with all three in mind; complete streets are streets that allow for vehicular travel and transit, as well as providing bicycle lanes and wide sidewalks for pedestrians. Complete streets are lined with trees, which in addition to providing desirable pedestrian environments, clean the air, reduce asthma rates in hotter months, and mitigate the heat island effect.[133]

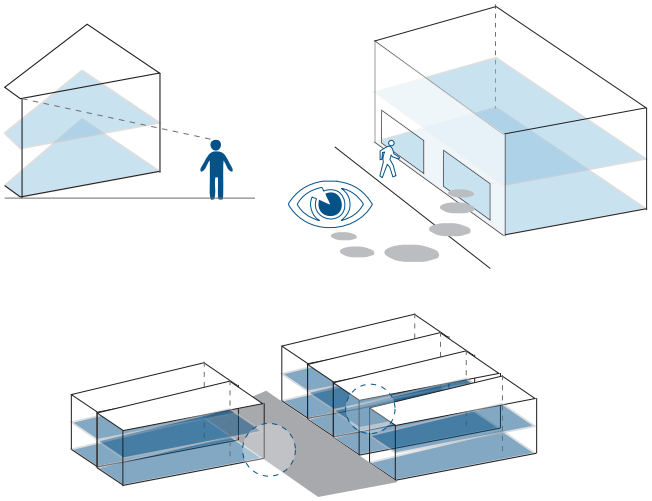
For pedestrians it is important to provide wide sidewalks with a buffer from traffic lanes.[134] The width of the sidewalk and any parking lanes, bicycle lanes, or plantings can act as buffers.[135] Curb extensions, near transit stops or crosswalks, where people tend to gather are important to maintain the flow of people while also keeping this separation from traffic.[136] Well-marked and raised crosswalks with pedestrian friendly medians will make crossing streets safer and proper street and crosswalk lighting will encourage the attention and presence of people at all hours of the day and night.[137]



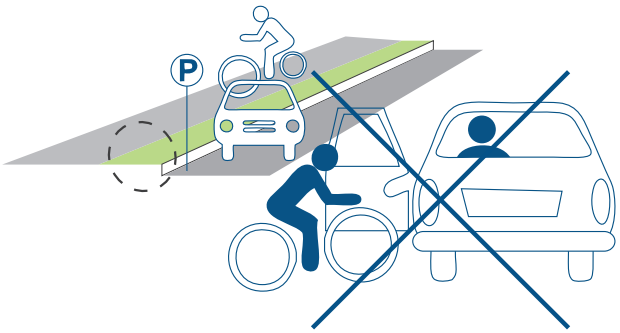
Having the basic infrastructure is not enough to encourage pedestrian activity, "we need community designs that seduce people into traveling on foot and by bicycle…" (Frumkin et al. 2004, p.23) Orienting sidewalks toward interesting views and incorporating temporary or permanent art installations will create a more engaging environment.[138] Providing street furniture, such as seating, fountains, restrooms, plantings, etc, will add to the aesthetic value of the street and allow for more and longer trips.[139] Plazas should be incorporated into the street network to provide pedestrians respite from the street and to provide a gathering and activity space.[140]



Buildings are important site elements which give streets context. A street with bland architecture and long featureless horizons is less interesting for pedestrians and gives the perception of longer distances between destinations.[141] Buildings should be of an appropriate scale for pedestrians and not have any set back from the street.[142] The façade should have intricate details which encourage activity between the interior and exterior (doors, windows, porches, etc.).[143] Buildings should have complimentary, but not uniform architecture with little to no gaps between them. This will concentrate destinations and as a result increase pedestrian activity.[144]

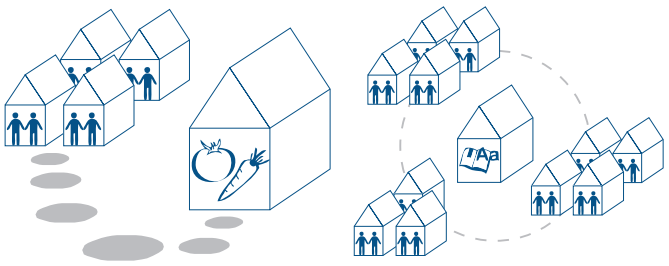


After pedestrian's needs are considered, the best possible continuity should be created for cyclists.[145] Cyclists need their own lanes that are separate from vehicular traffic and protected from opening car doors.[146] The separation from traffic can be in the form of a vegetated buffer or a separate lane that is reinforced with on street markings and signage.[147] High quality facilities for cyclists, such as bike storage and maintenance stops, will convey a community's support for active transit as a legitimate form of transport.[148] Bike share networks and stations are other facilities that can encourage utilitarian activity.[149]

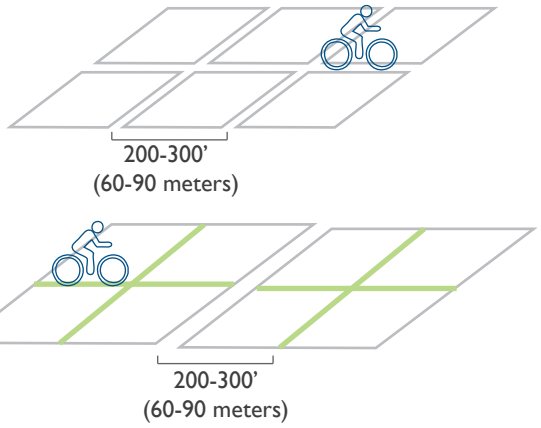


DESTINATION ACCESSABILITY

Destination accessibility refers to the ease of travel to business districts or other destinations.[150] Healthy communities are designed in a way so that "housing, jobs, daily needs, and other activities are within easy walking distance of each other." (Frumkin et al. 2004, p.2) This idea also applies to the ease of travel by bicycle as in general people will accept a 30 minute commute on bike.[151] When walking and cycling are considered a part of greater transportation networks, social discrepancies of access are reduced.[152]

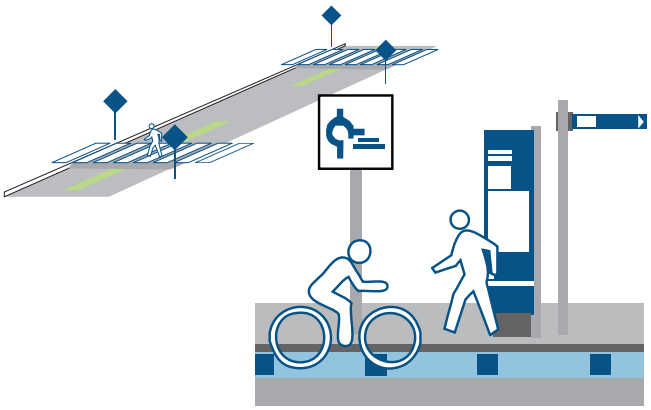


To increase the level of access, communities should be designed with destinations close together and a grid like street network.[153] Having more street linkages results in better connectivity and having smaller block sizes will increase the amount of linkages[154] which is associated with higher levels of pedestrianism.[155] Having many route options will increase the "perception of



access."[156] It is recommended that intersections are provided every 200-300 feet (60-90 meters).[157] In a community designed with active transport these intersections do not necessarily need to be in the form of streets. Providing pedestrian or cycle paths through existing blocks will increase connectivity and make these forms of travel more convenient than vehicular travel. Adding these connections is a good way to retrofit existing communities to increase connectivity.[158]

In addition to having many connections it is important to provide street level characteristics that improve access or the "perception of access." Dense sidewalk networks with many cross-

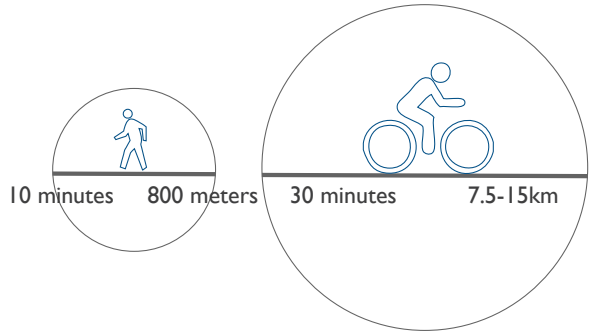


walks that are well-designed and take vulnerable groups (i.e. the elderly or children) into consideration are one example of this.[159] Informational or motivational signage at intersections or points of decision can improve way finding and prompt people to make healthier decisions in their travel habits. This signage can provide information about route, distance, and time to the next or nearest transport mode or destination as well as information such as calories burned.[160]

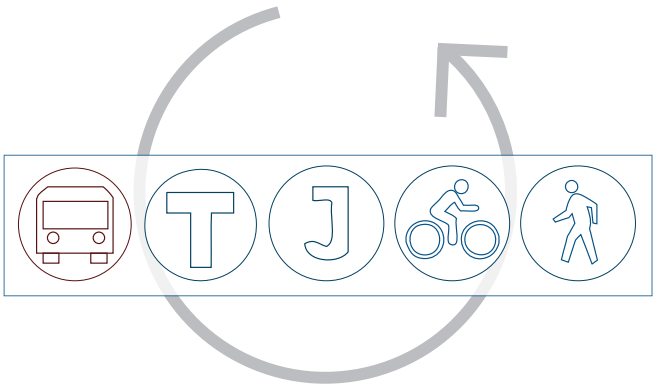
Randall Crane, professor at UCLA Department of Urban Planning, has determined that the decision to drive versus walking or cycling is associated with personal preference and the cost of each mode of travel. The cost of travel can refer to monetary cost to individuals, as well as time spent, or the amount of hassle to one's day.[161] The goal of healthy community design is to decrease the cost of active forms of travel (walking or cycling) and increase the cost of vehicular travel.

DISTANCE TO TRANSIT

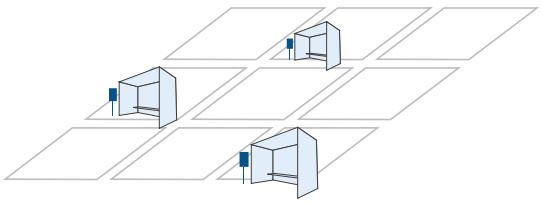
Distance to transit is the average distance from work or home to the nearest bus or rail station.[162] The "law of constant travel time" shows that people will travel between 60 and 90 minutes per day no matter the mode of transport. This statistic has been relatively stable over the last several decades and means that **the more time spent in the car is less time someone will be willing to walk.**[163]

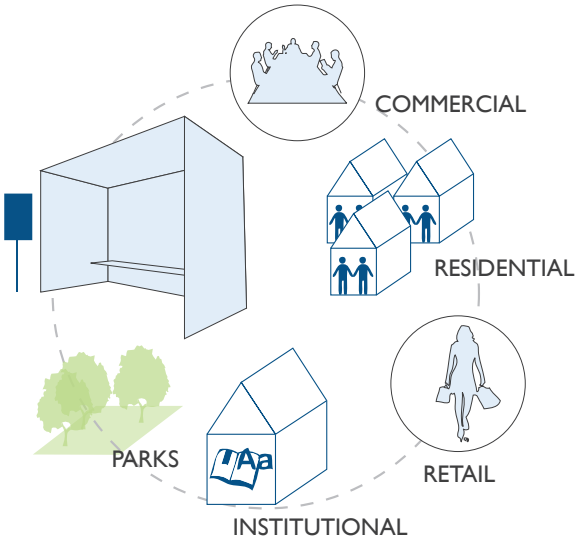


People will generally accept a 10 minute walk or a 30 minute commute by bike. Using average walking and cycling speeds results in acceptable active transit distances of 800 meters and 7.5 to 15 kilometers respectively. A transportation network should provide many links between places which decreases the distance one has to travel. The ease of these linkages will create a shorter perceived distance.[164] A seamless network of transit that is related to the road and other forms of transportation (walking or cycling) is important to increase usage.[165] Increased neighborhood density



along with the addition of transit stations will increase levels of transit use and decrease automobile use[166].

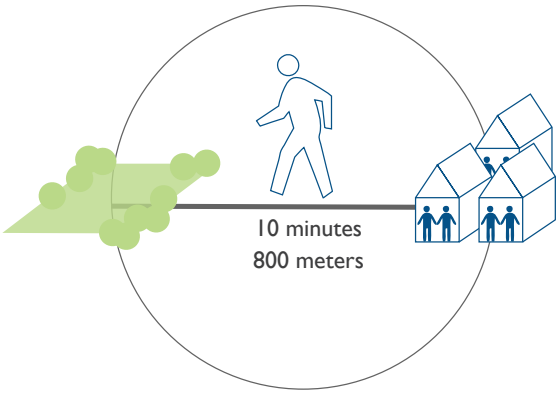




As many activities as possible should be integrating near transit stops to increase use.[167]

EXPOSURE TO GREEN SPACE

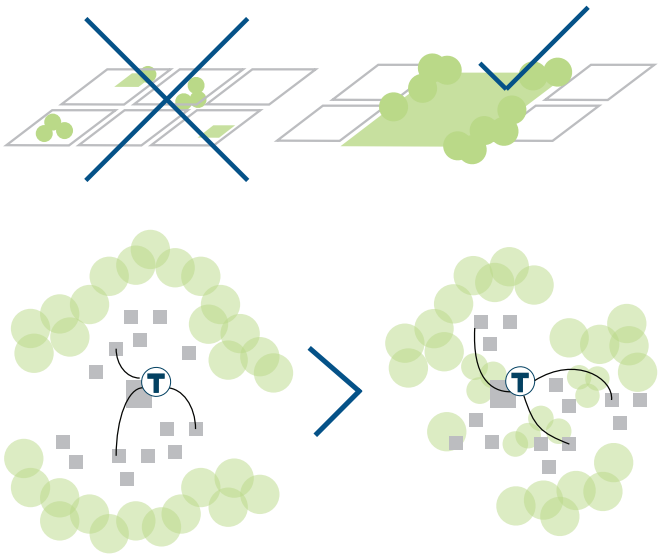
Providing an ample supply of open space in the forms of squares, green, and parks is important for encouraging recreational physical activity.[168] The placement and design of these open spaces should encourage use;[169] **it is recommended that an open space or park be located within a 10 minute walk of every home.**[170] This will improve the



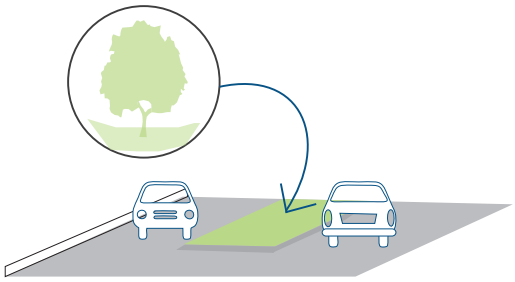
access and exposure to these to all populations including children who cannot go far from home. This is important as the more time children spend outdoors, the more physically active they are.[171]

When planning open space in communities it is recommended that small patches of open space are consolidated into larger open spaces that can accommodate multiple forms of recreation and all age ranges.[172] It is also suggested, when possible that **natural terrain or vegetation should be preserved** in the form of parks or greenbelts.[173] This will increase the amount of

"everyday green" exposure: the exposure of green spaces when completing daily activities and not specifically for recreation.



Exposure to green has many health benefits beyond encouraging physical activity.[174] The "adaptively relevant environment versus the environment of evolutionary adaptedness" concept by William Irons (1998) concludes that all organisms (including humans) thrive best in settings that resemble those in which they evolved.[175]



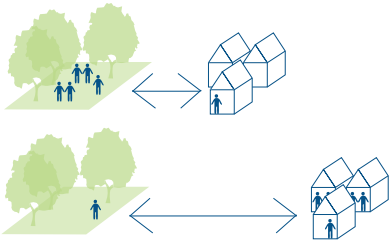
Contact with nature has also shown to: reduce stress levels; improve attention; relieve depression; control pain;[176] and plays a large role in wholesome child development in that perceptual and expressive skills, imagination, and moral judgment are improved with contact with nature. (Louv, 2005 in Dannenberg et al. 2011, p.231) This contact with nature can be in the form of plantings, views, biophilic building design, community gardens, parks, and green space.[177]

"New research demonstrates that just being outside provides physical and mental health benefits. Interacting with nature improves cognitive ability, provides a range of social benefits (like making people nicer), and shortens rehabilitation times among those recovering from illnesses."

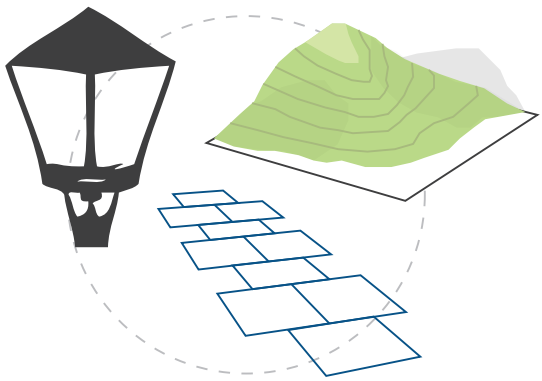
(ASLA: Designing for Active Living)

EXPOSURE TO RECREATION

Exposure to recreation can include the open spaces discussed in the Exposure to Green section as well as other recreational facilities such as gyms, sports fields, community gardens, and walking/cycling paths. When it comes to exposure to recreation the bottom line is that the facilities need to be high quality, perceived as safe and easy to reach.[178] The proximity of recreation facilities to one's home or workplace is directly correlated to one's ability and desire to participate in recreational physical activity;[179] living close to parks, trails, and recreation facilities is related to greater use of facilities and more recreational physical activity.[180] Due to this, the goal in healthy community design is to have recreation space within a ten minute walk.[181]



Recreational facilities for children can be created out of most spaces – courtyards, gardens, and roofs can all be designed for active use by children. Providing play area lighting allows for spaces to be used for more hours of the day. Ground markings are also recommended for children's play areas, as they have shown to stimulate play.[182] "Natural playscapes at schools have been found to benefit children's creative play and their environmental development" (Evans et al. 2001, in Dannenberg et al. 2011, p.107) – and therefore natural terrain should be preserved in children's play areas.[183] Quantity is important in exposure to recreation for children or youth as increased numbers of recreational facilities has been associated with lower obesity and greater levels of physical activity.[184]



The greater number of the described strategies that are applied to a site is directly related to the success of the site to eliminate barriers and encourage healthy lifestyles and physical activity. While the tools listed are physical changes to the environment, a combination of tangible and intangible tools will need to be implemented to develop a new standard that encourages and enables healthy lifestyles.

A CASE STUDY IN STOCKHOLM, SWEDEN

The concepts discussed in this text have been applied on the following case study in Farsta, a suburb of Stockholm, Sweden. In this case study many of the tools are applied at the large scale, such as providing transport stations within walking distance of destinations and providing street connections every 200-300 feet (60-90 meters). In addition, four unique sites were selected in order to perceptibly apply one or two tools to the extreme and explore how they may translate physically.

The goal of this design is not to force people to change their behavior, but to allow for the opportunity of choosing a more active lifestyle in a neighborhood that brings health to the forefront.

In the following pages you will find some introductory information about Farsta, a site inventory and analysis, and existing potentials and opportunities in the area finishing with the design proposal for each area.

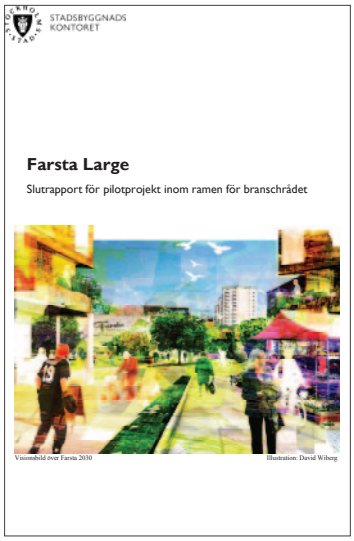


Farsta is included in *Promenadstaden*, the Stockholm Comprehensive plan, as an important node. How this node is to be developed exactly is unclear, but the city of Farsta has their own vision for the city that includes the following points:

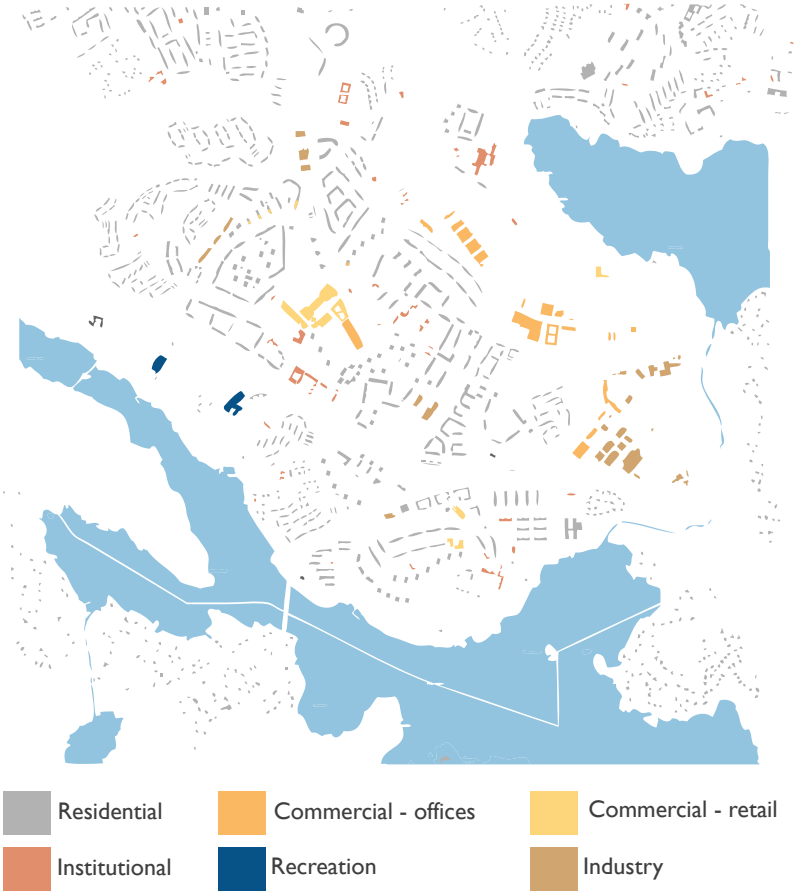
LONG TERM
- Job Creation
- Schools for all ages with high standards
- Develop Farsta Centrum so that it: is attractive to all ages; has good services and availability; is active during evening hours

- Create clear sports profile with high quality sports facilities

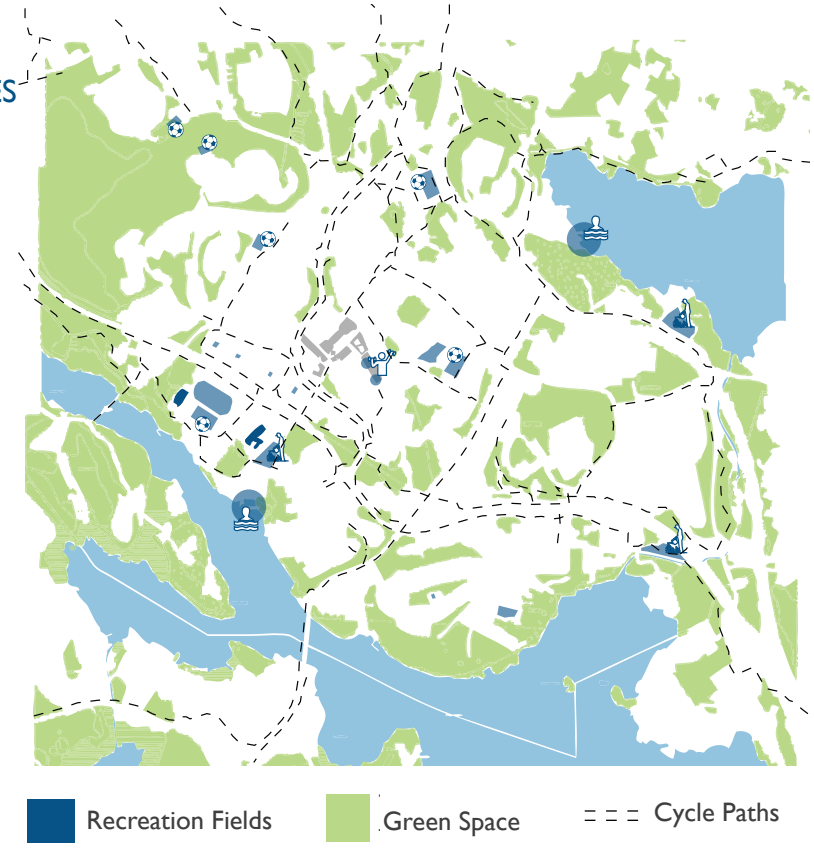
SHORT TERM
- Attractive center with public square for various activities
- Create more high quality indoor sports facilities
- Improvement of walking trails along Magelungen



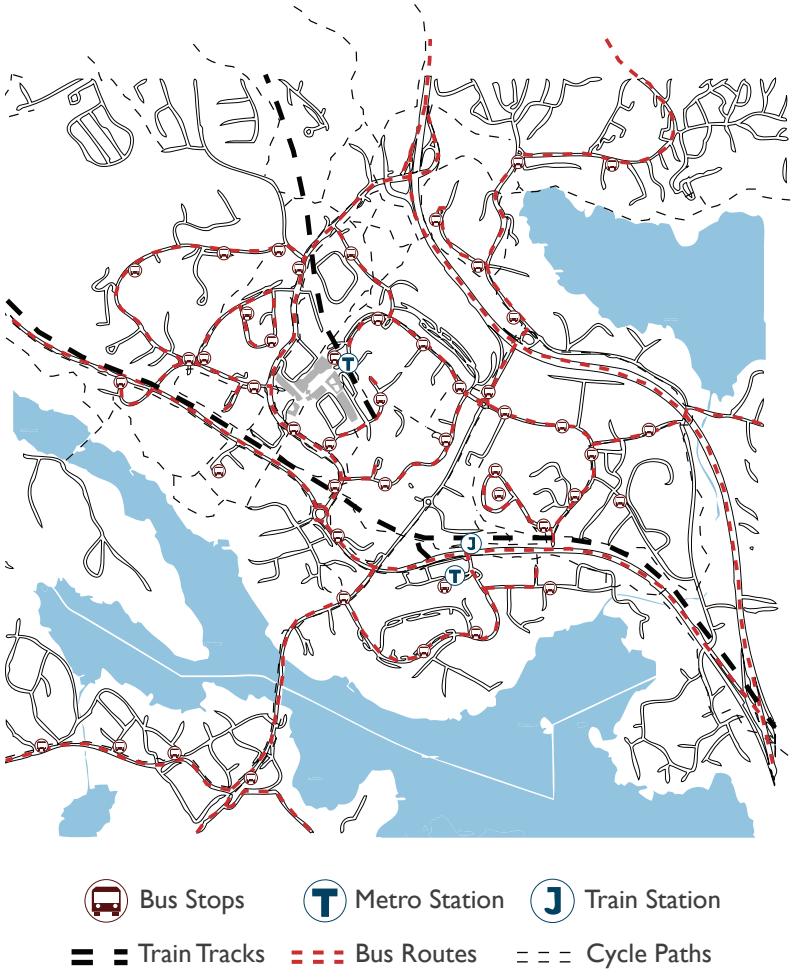
EXISTING LAND USE



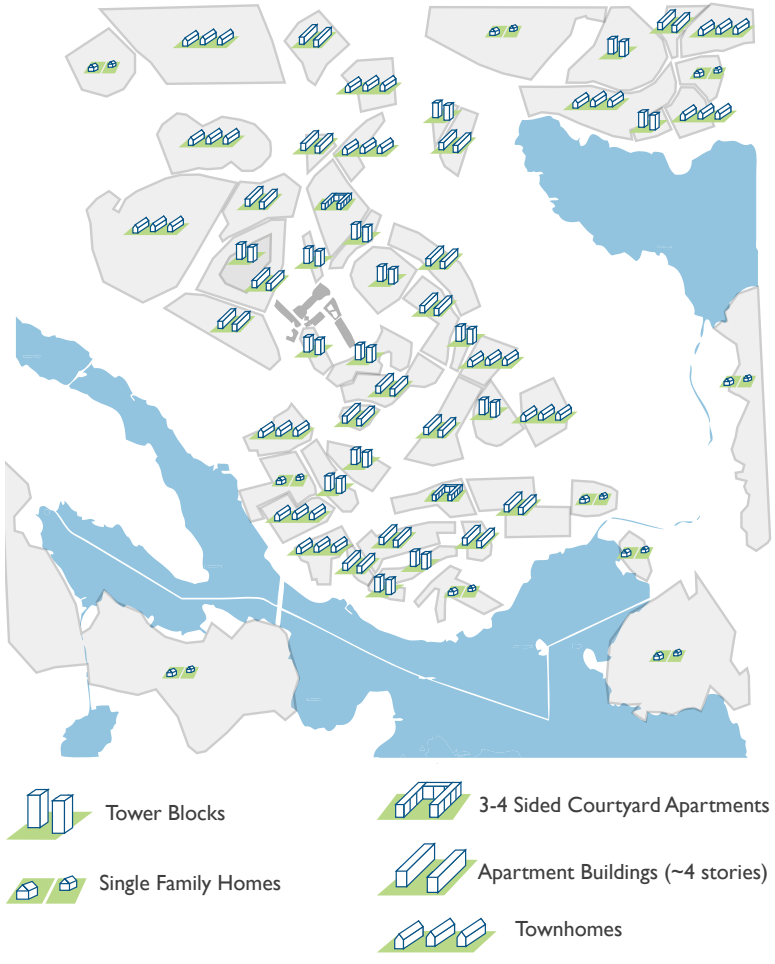
EXISTING RECREATION OPPORTUNITIES



EXISTING TRANSPORTATION ROUTES



EXISTING HOUSING TYPOLOGIES



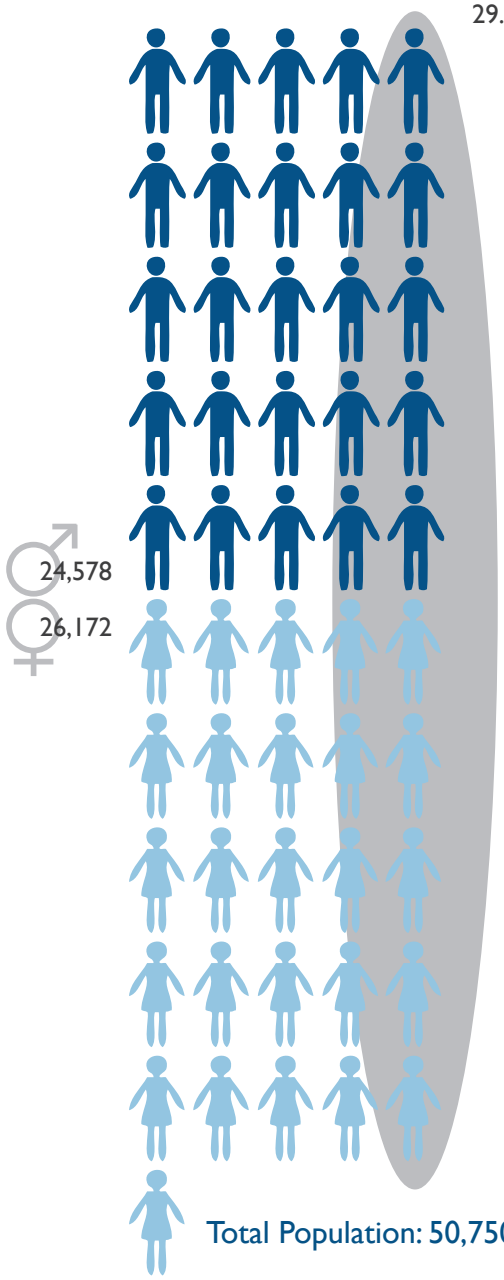
STATISTICS ON FARSTA

On this page you can see some statistics highlighting the Farsta demographic and gain a better understanding about the community's population.

On the opposite spread existing opportunities and barriers in the area are highlighted (top) that may come into play when exploring design solutions to making Farsta a healthier community. The bottom image illustrates four distinct areas or nodes within Farsta that were identified after the inventory and analysis and site exploration.

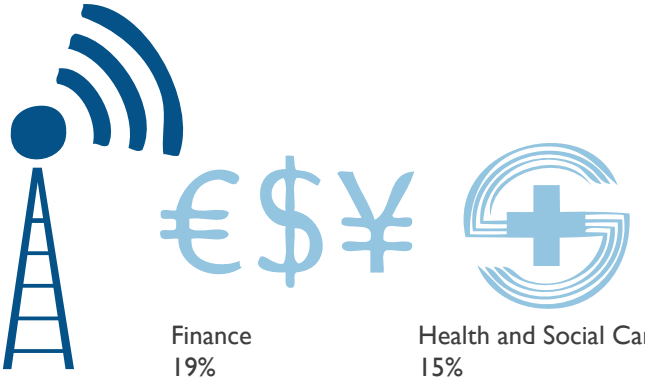
Population Demographics

Inhabitants with Foreign Background
(Foreign Born or with two Foreign Parents)
29.8% 15,146



Total Population: 50,750

Largest Employment Fields

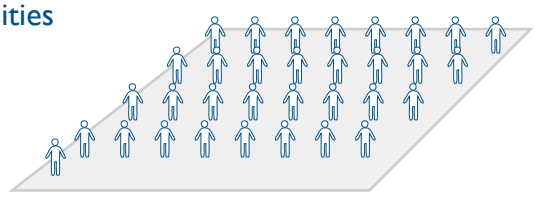


Finance
19%

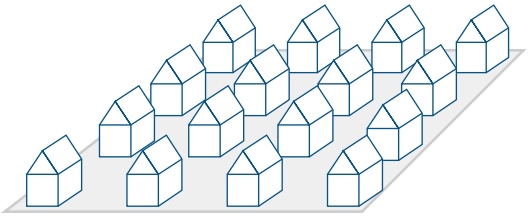
Health and Social Care
15%

Trade and Communications
30%

Densities



- Total Population: 50,750
>33 people per hectare



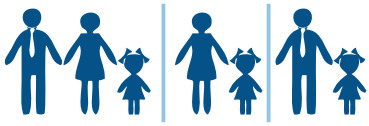
- Total Dwellings: 25,465
>16 dwellings per hectare

Household Profiles

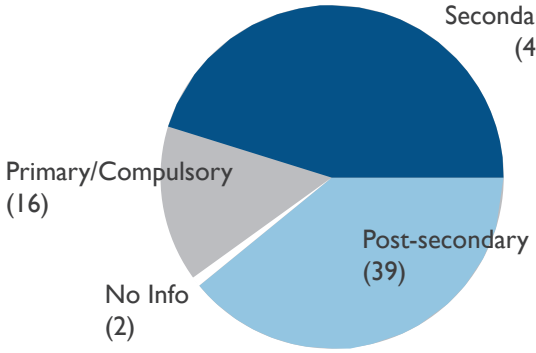


25,465 dwellings
1.99 inhabitants per dwelling

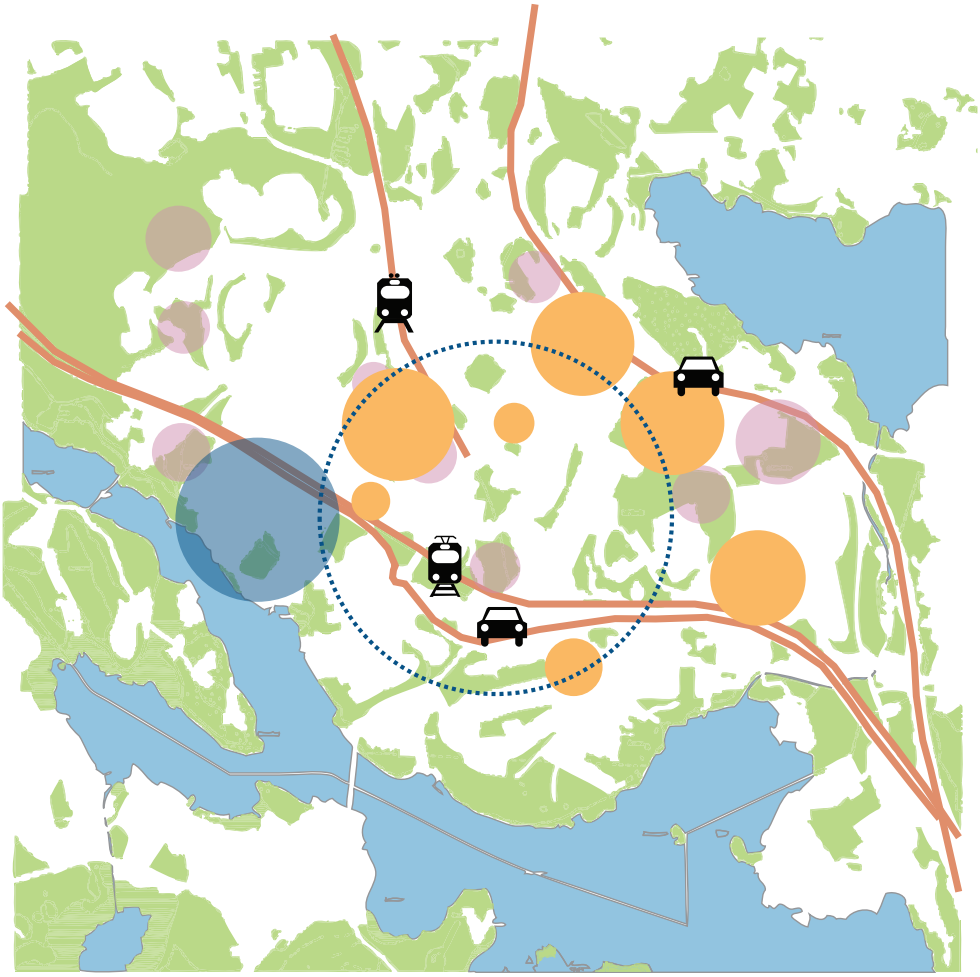
5,869 Families with Children

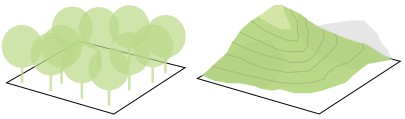


Highest Education Achieved (Age 25-64)



Farsta Total: 27,303





Dense Vegetation & Hilly Topography

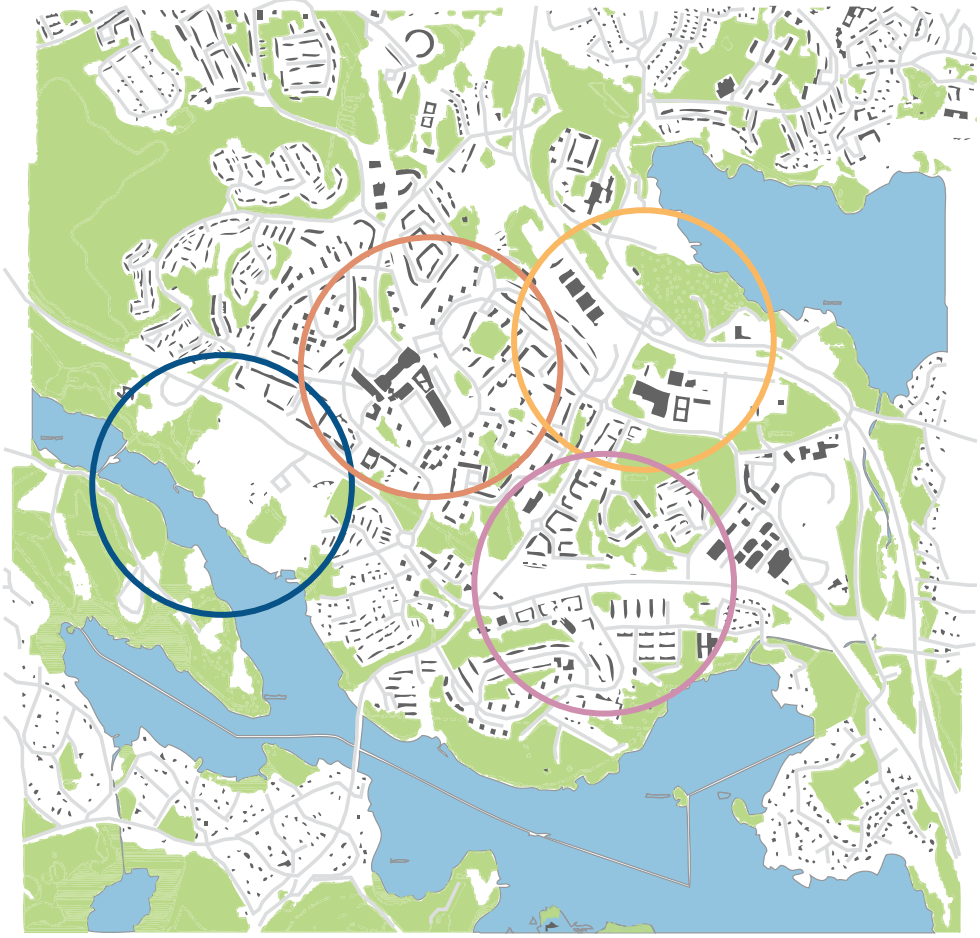
The recreation area along the Magelugen Lake and the large vegetated area provide opportunities for development

These highlighted areas show unused areas that would be favorable for densification

Major commercial or employment centers which can act as the anchors and destinations within the healthy community to be designed

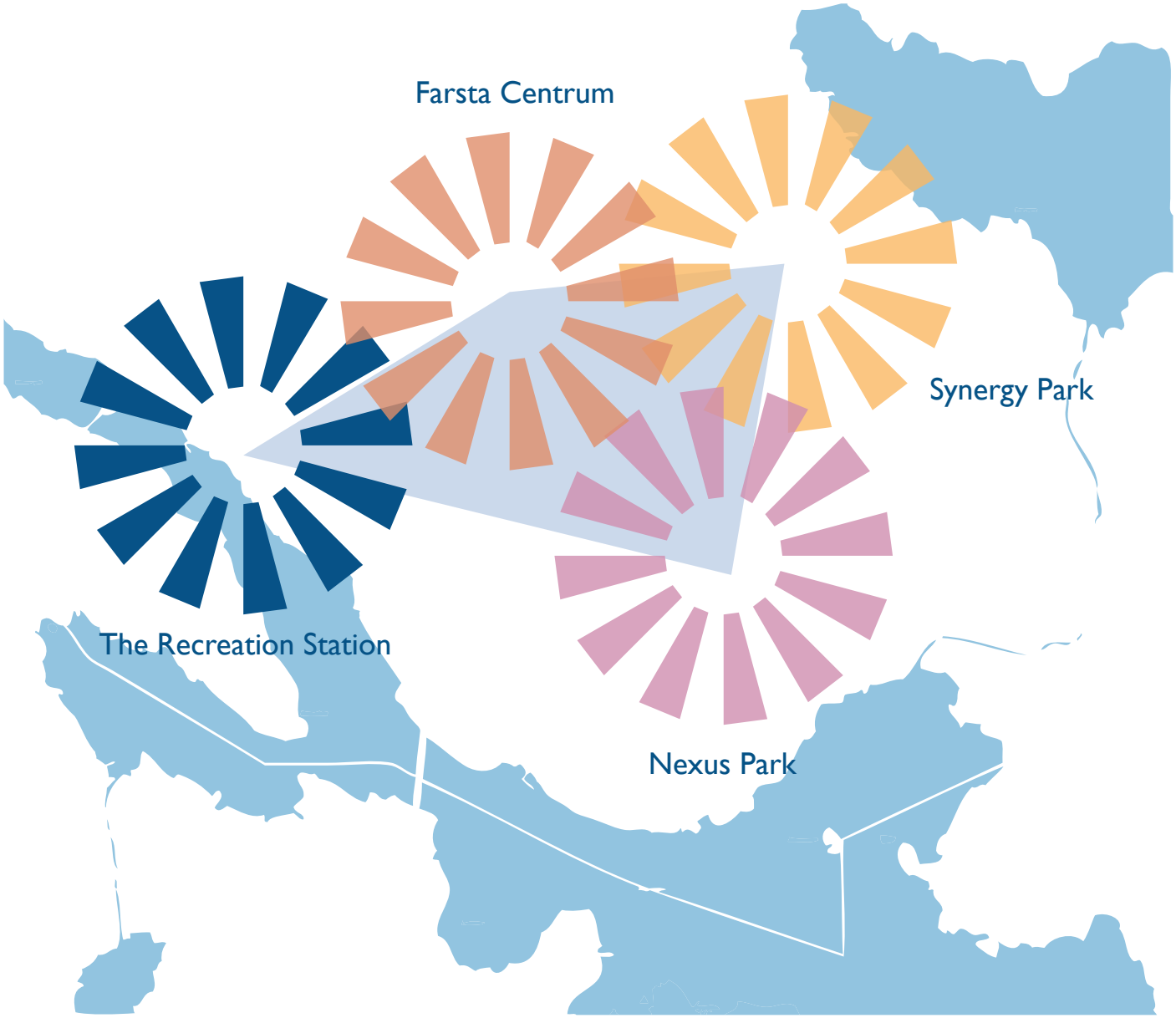
The green areas shown are in close proximity to other uses which make them favorable for recreation and development

Major Roadways and Train Tracks



As identified in the tool box for design it has been shown that people are willing to walk around ten minutes or about 800 meters to any given destination. Using this idea and the completed inventory and analysis, four 800 meter systems were identified for further development towards the goal of creating Farsta as a healthier community.

FARSTA AS A HEALTHY COMMUNITY...

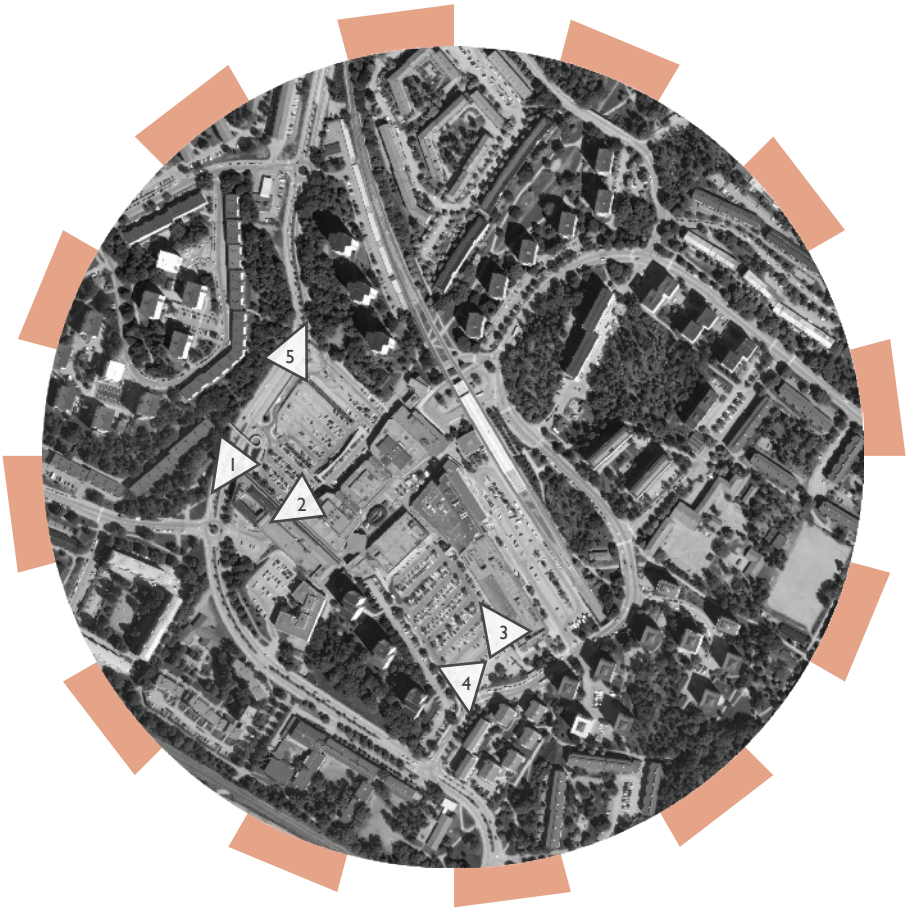


Designing Farsta as a healthy community will use physical activity as a theme with a combination of recreation and utilitarian activities throughout the city.

800 meter systems will be developed to create a network of distinct neighborhoods covering Farsta. These systems will be designed to strengthen existing characteristics of the neighborhoods, while using the outlined strategies to promote healthy lifestyles and physical activity.

The goal of this design is not to force people to change their behavior, but to allow for the opportunity of choosing a more active lifestyle in a neighborhood that brings health to the forefront.

THE CENTRUM













The Centrum is already a destination in Farsta and in greater Stockholm. It acts as a point of first impression to many who come from the outside by public transportation or by car. For this reason, if Farsta wants to become a healthy community the Centrum is where these goals need to be apparent. The Centrum also acts as a place to encourage utilitarian activity, using active transportation methods to complete your shopping trip. In order to accomplish this, the existing barriers (mainly the sea of parking lots) need to be overcome and the density needs to be increased. Doing this will bring more destinations closer together which has been shown to increase the levels of utilitarian activity.

Pedestrianism also needs to be nurtured in order to get people out of their cars. The existing mall is looking inward and is closed off to the outside. To improve pedestrianism the buildings need to become more transparent on the first level and allow for passage through the space. This, along with the addition to the new buildings will create a more urban environment where walking regarded as the best way to get around.

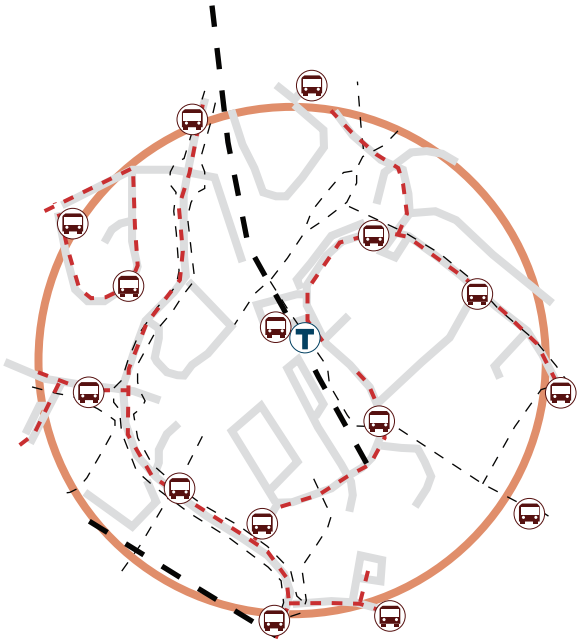
Site Inventory:

The initial inventory and analysis of the site (above) shows the existing land use, recreation facilities, transportation, and residential typologies. The function of this area as a destination and as the first impression of the community is what prompted the selection of this site.

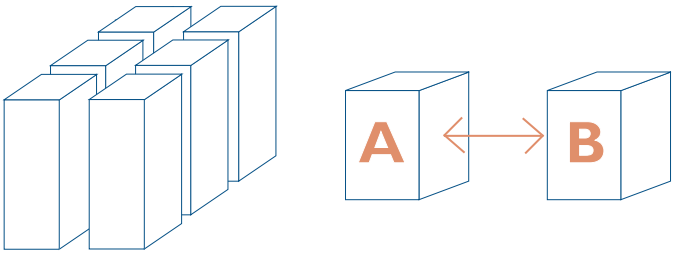




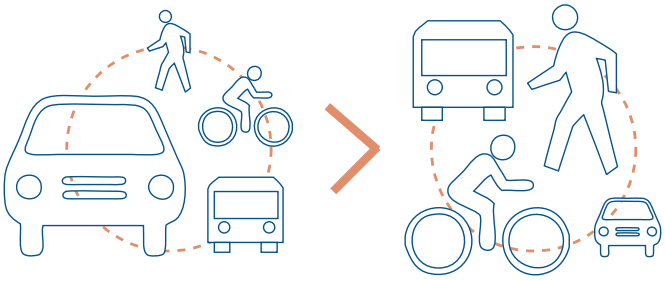
Residential
Commercial - offices
Commercial - retail
Bus Stops
Metro Station
Train Station
Institutional
Recreation
Industry
Train Tracks
Bus Routes
Cycle Paths

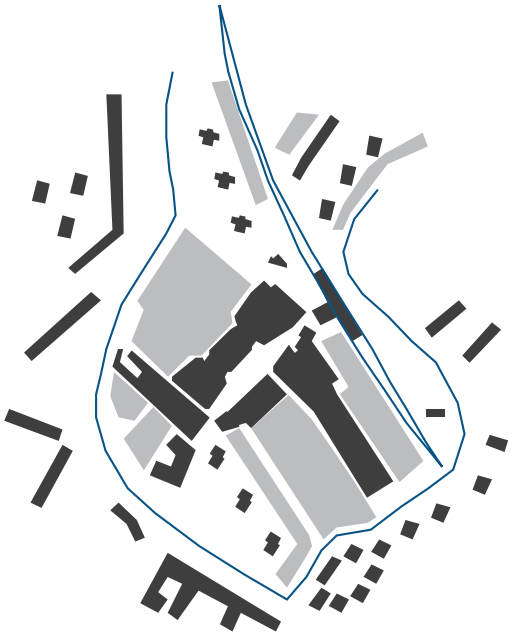




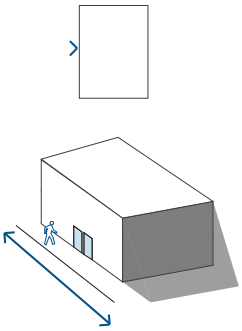


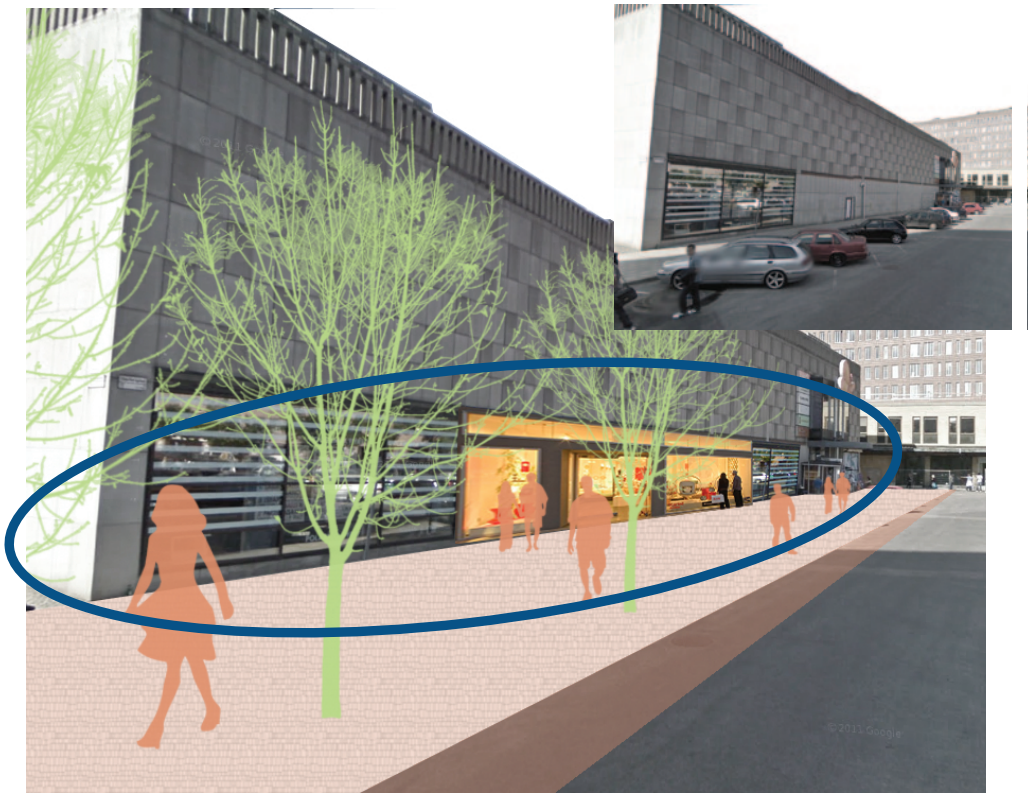
Increasing density near the Centrum will create more destinations and bring them closer together therefore increasing utilitarian activity in the area.

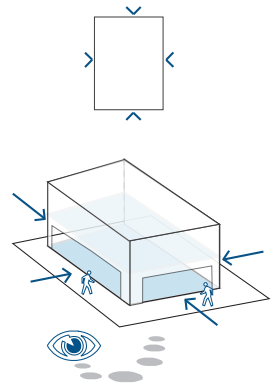


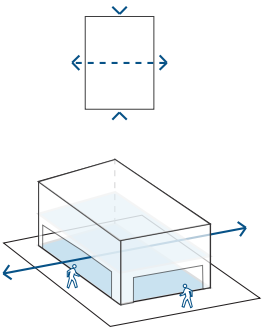


The more destinations you have closer together results in an increase in utilitarian activity. This was the major concept used when developing the Centrum as one site for developing Farsta as a healthy community. The existing figure ground (above right) shows the relationship between the built area and the amount of parking lots on the site – the large parking lots are acting as barriers that divide the destination of the shopping mall from the surrounding community. In order to overcome this, the parking lots will be removed (with most of the parking moved underground), replaced with the construction of a pedestrian and cycle friendly development that houses commercial, residential, recreational, and cultural functions. The figure ground on the opposite page shows this change in building density.

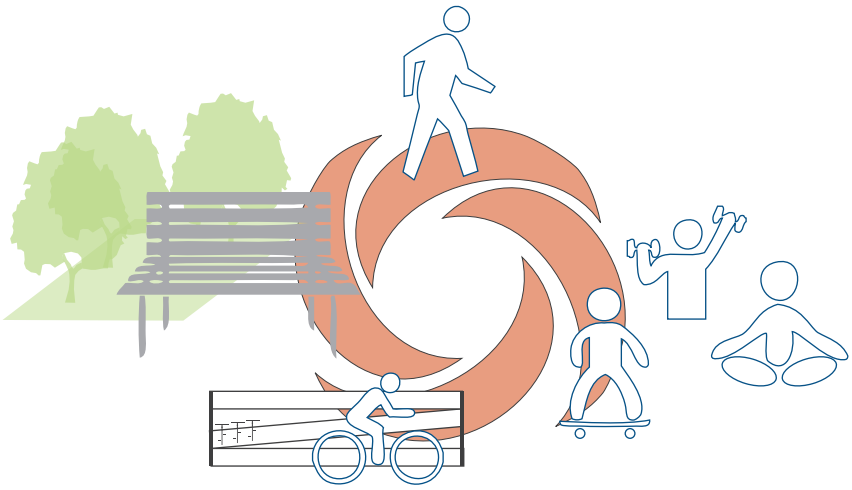


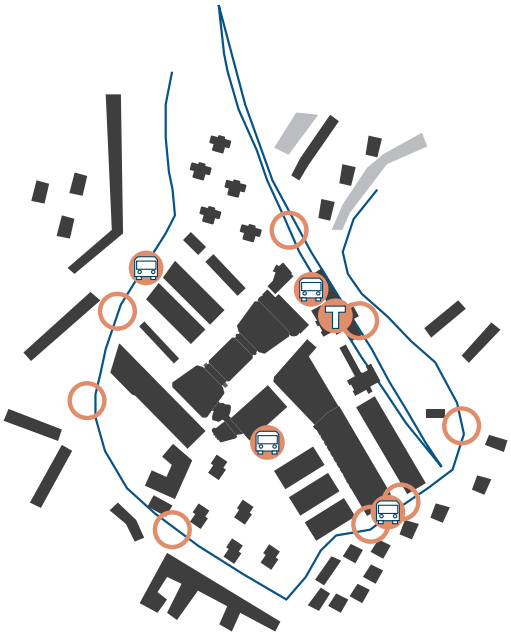






The south side of Farsta Centrum currently acts as a parking lot and back entrance. The solid walls and lacking sidewalks make for a poor pedestrian environment. With added windows and entrances this wall can be broken through to create another 'front' to the mall.





The existing Centrum, like many shopping malls, has many 'back sides' as well as few points of transparency (the entrances). In order to make this a utilitarian friendly place the transparency needs to be increased on the street level with windows and store entrances rather than mall entrances. This will create interplay between inside and outside and improve the pedestrian/cycle experience.

It is also important to be able to pass through the mall - this should be treated the same as an urban grid structure with intersections every 60 to 90 meters. Opening the ground floor around the perimeter, removing the sea of parking lots, and introducing a wider range of functions in the area will increase the levels of utilitarian activity and result in a healthier community.

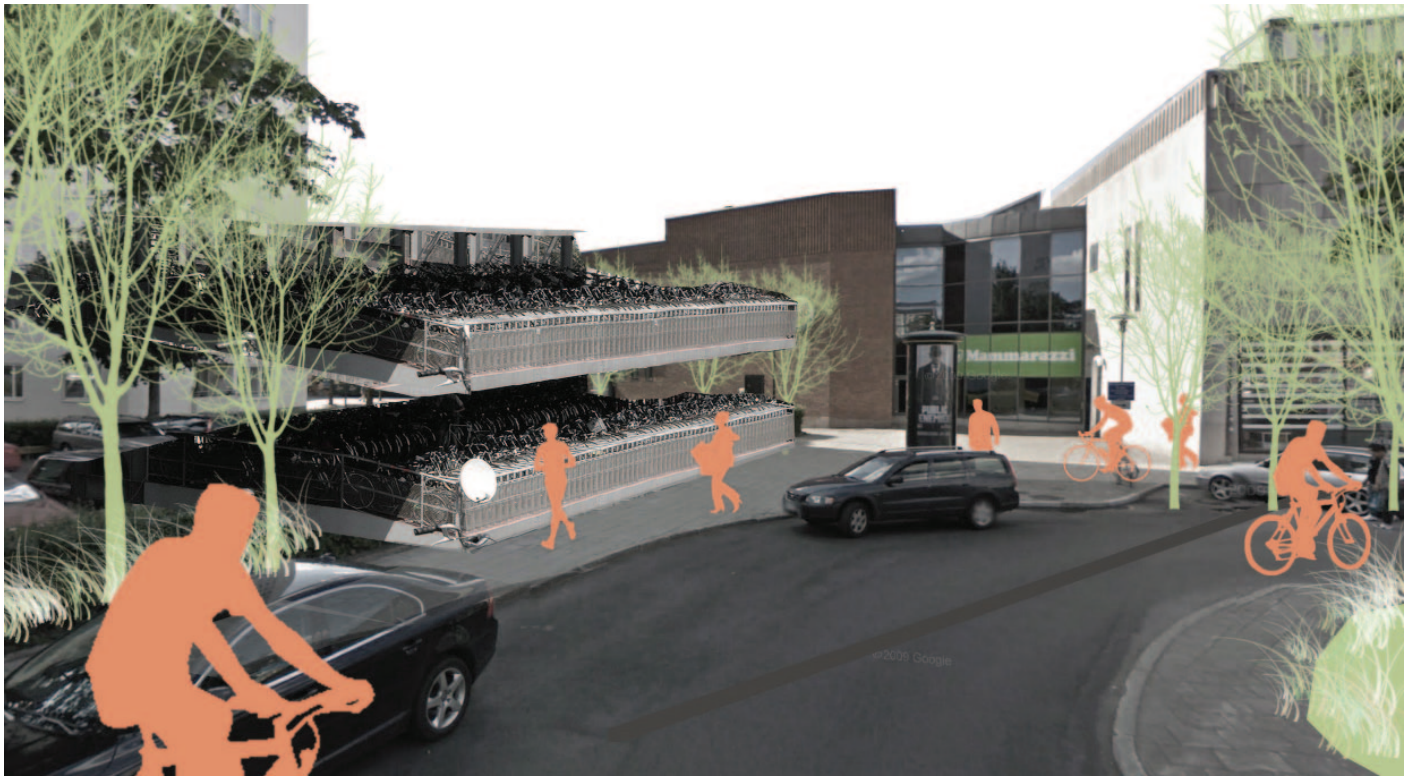
In addition to the shopping, working, and living opportunities at the Centrum, features including a combination of urban recreation, cycle amenities, walking paths, and green or open public space will act as anchors to the Centrum as part of a healthy community. These anchor points will be associated with the various entrance points to the site highlighted in the diagram to the right. Recreational activities appropriate for the Centrum will be of the type you find in an urban core; private gyms, yoga studios, skate parks, etc. The Centrum was chosen as a site because it already acts as an entrance and first impression to the city. Therefore introducing this combination of amenities will physically represent the goal a healthier community.

HEALTH PROMOTING MALLS

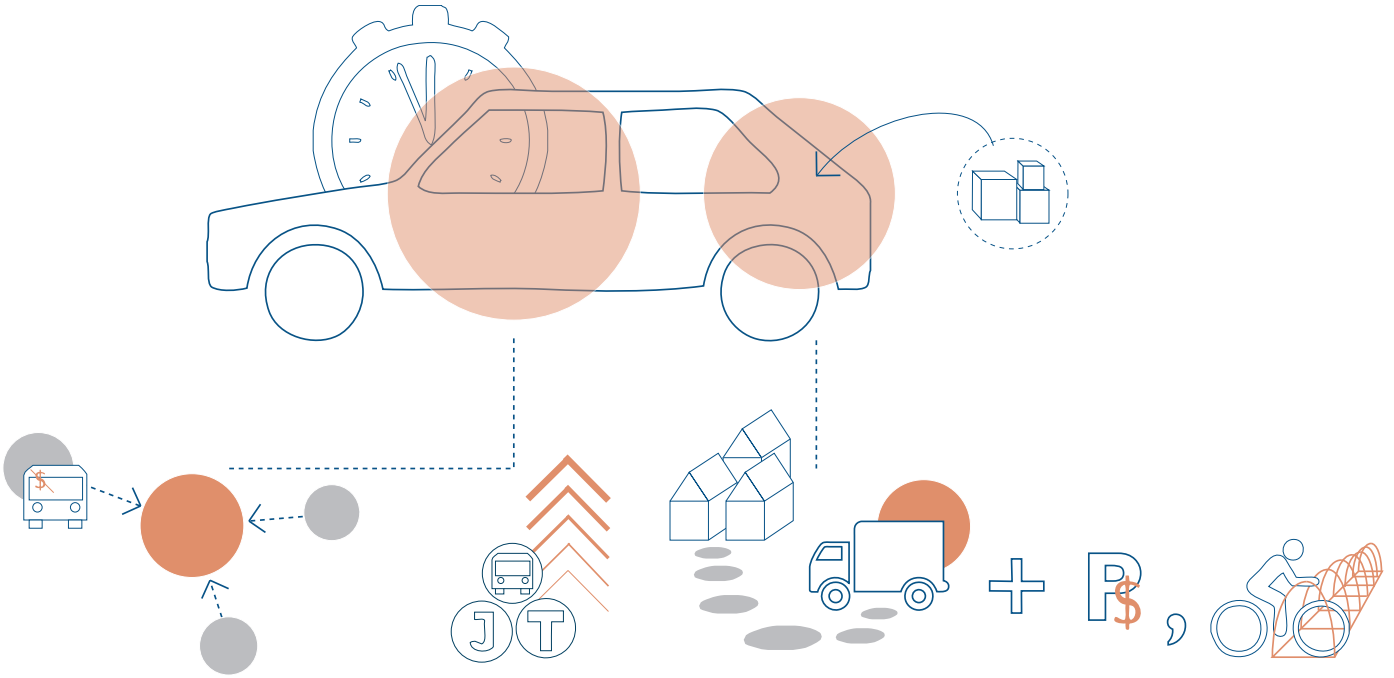
"The Health Promoting Mall concept is the first of its kind in the world to leverage on creating supportive environments for healthy activities... Promoting healthy lifestyles and activities in a shopping mall environment makes it easier for public participation, and keeps health awareness at the top of consumers' minds.

HPMs provide a variety of services, products and activities such as mall walks, quit smoking counselling in the pharmacies, lower-calorie meals in the food courts and restaurants and personalised tours to meet the shopping needs of customers in the supermarkets."

(Source: http://www.hpb.gov.sg)



Encouaging Utilitarian Activity...



FREE BUS TRANSPORT FROM KEY NEIGHBORHOODS

IMPROVED PUBLIC TRANSPORTATION ACCESS

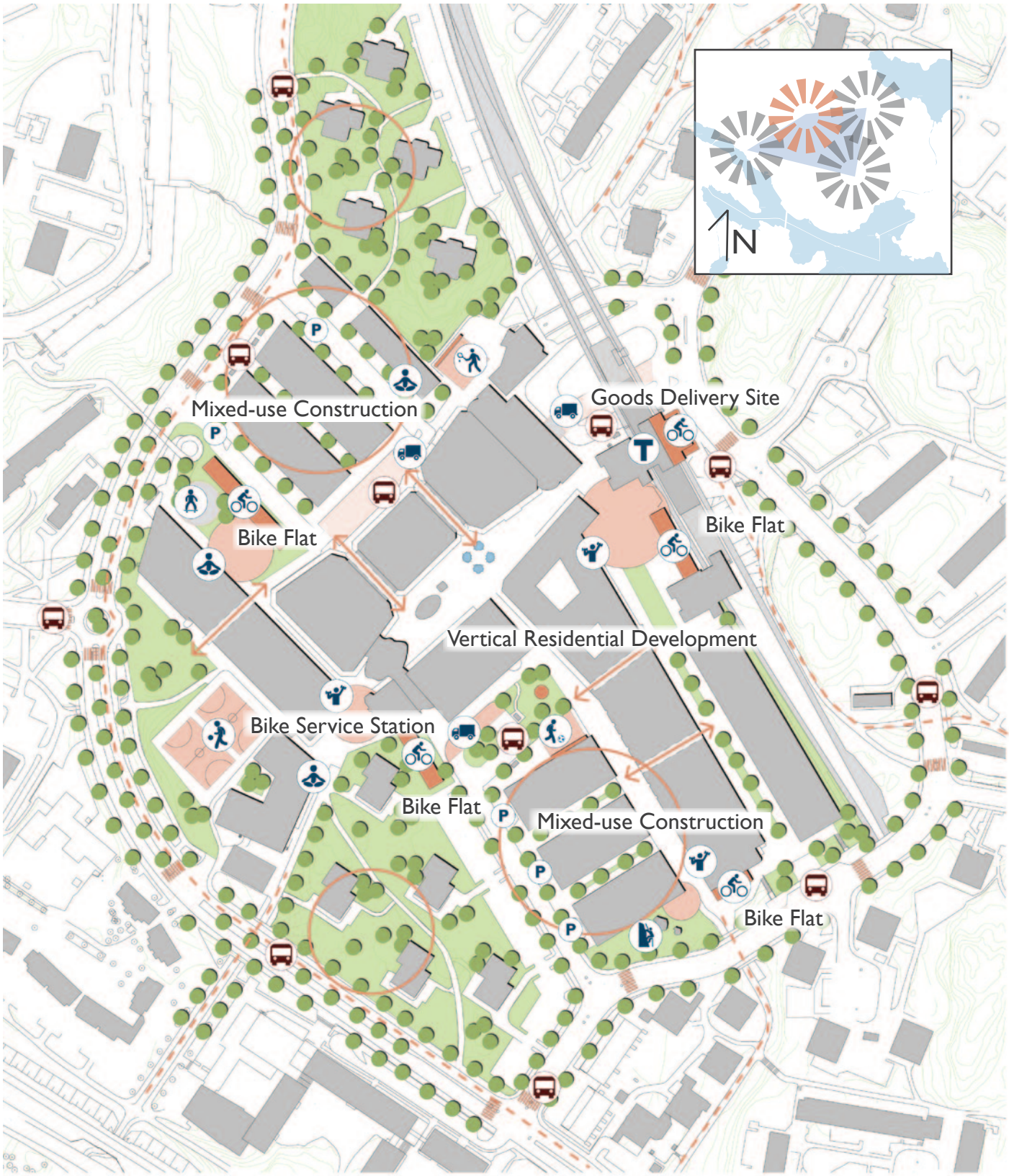
DELIVERY OF LARGER PURCHASES

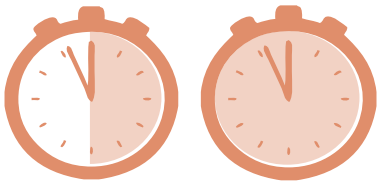
PAID AND REDUCED PARKING

IMPROVED AND PRIORITIZED CYCLING AMENITIES

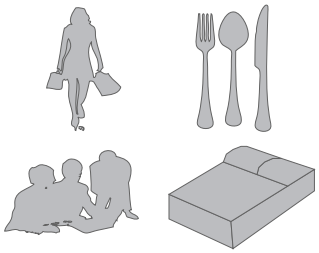
In order to encourage utilitarian activity to and within the Centrum the existing dependence on cars and vehicles for personal use needs to be addressed. In order to explore the possible systems that could eliminate the need for individual motorized transportation, the benefits of cars was considered and includes: the convenience of coming and going as desired; the comfort of driving in your own vehicle over a crowded bus or train; and the convenience of getting your purchases from the store to home.

When removing a large portion of available parking space in order to encourage more active forms of transportation, these benefits of using a car need to be accounted for. For this I propose a few new systems for Farsta Centrum, including: a free bus system, similar to that used for IKEA, connecting key neighborhoods to the area; improving the quality and quantity of existing public transportation systems including the buses, metro, and commuter train; and establishing a delivery system to easily have your larger purchases delivered to your home. In addition to these systems the amount of parking will be reduced and the remaining parking will cost a small fee and cycling will be prioritized with improved access and amenities. Through these actions as well as the densification of the area I feel that the level of utilitarian activity will increase greatly.





The addition of residential, cultural, recreational, and educational functions, as well as managed parks and public squares and supplementary retail and commercial amenities will result in The Centrum having activities throughout the day and into the evening hours. Thus increasing the amount of people moving through the site and increasing the comfort level of those people to walk or cycle rather than take their car.



SYNERGY PARK













The Synergy Park area is currently an office park along highway 73 with the Telia offices among others. The proposal for this site is to: incorporate recreation and green elements as these have been proven to increase productivity in the workplace and; to introduce a university element which coincides with Farsta's 2030 vision to provide education for all ages. The design creates an active campus that will enable the connection between the university facilities and the workplaces. This combination of programs, including possible housing opportunities for students and accompanying amenities such as restaurants and services, will extend the hours of use in the area from the daily working hours to all hours of the day and night.

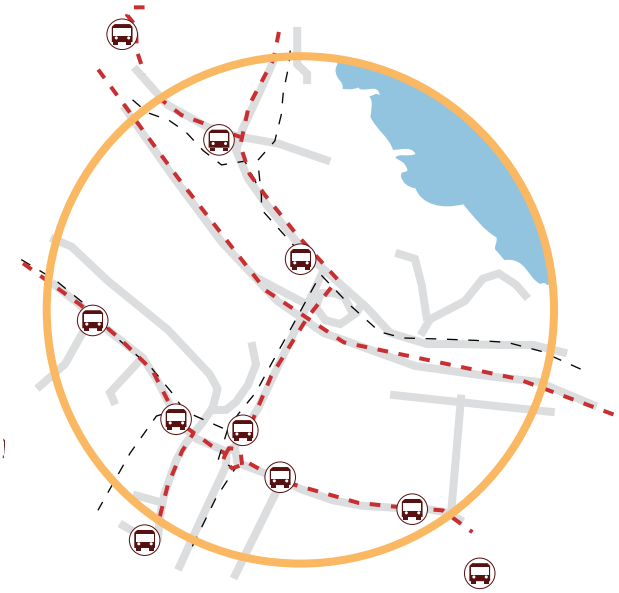
Another element to this design is to overcome the highway which cuts off the area from the Drevviken waterfront. Pedestrian overpasses will be built to create a continuous walking path through the site and to provide access. The central overpass will be a large green park, moving the highway underground. This overpass park will provide flexible recreation space for the workers, students, and public.

Site Inventory:

The initial inventory and analysis of the site (above) shows the existing land use, recreation facilities, transportation, and residential typologies. The mono-programmatic nature of the site and the duality of the water front and the work place is what prompted the selection of this site.

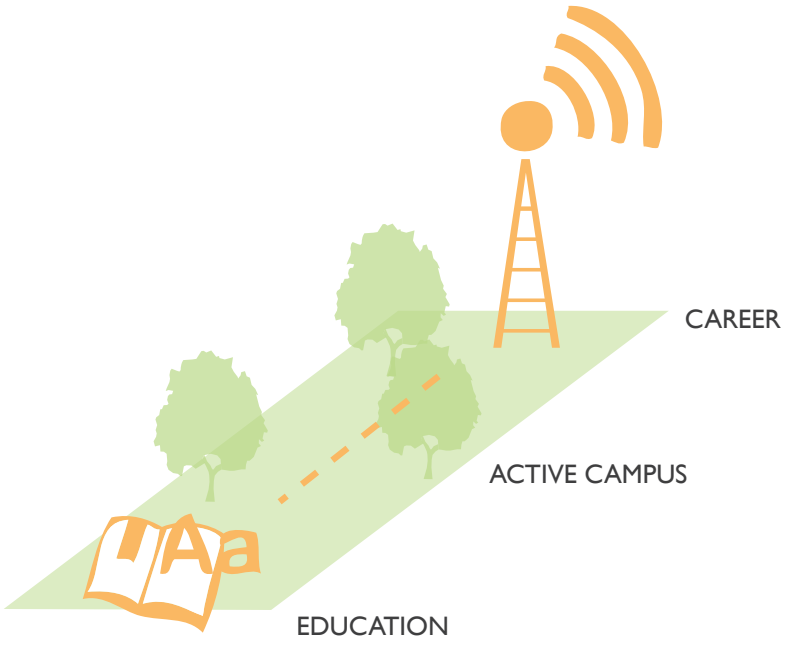


Residential
Commercial - offices
Commercial - retail
Bus Stops
Metro Station
Train Station
Institutional
Recreation
Industry
Train Tracks
Bus Routes
Cycle Paths



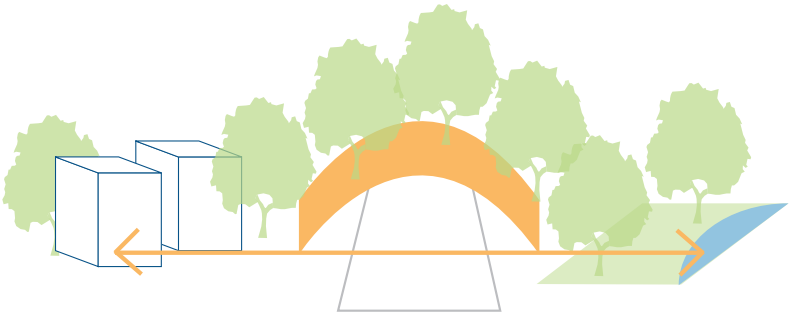


The Synergy Park area was selected in order to apply the concept that exposure to green and physical activity throughout the day will increase productivity in the work place. This site was ideal as there is an existing office park that will be expanded and opened to create more of a campus feeling where one can seek reprieve from stress by walk throughout the area and to the water's edge before, after, or during the working day.

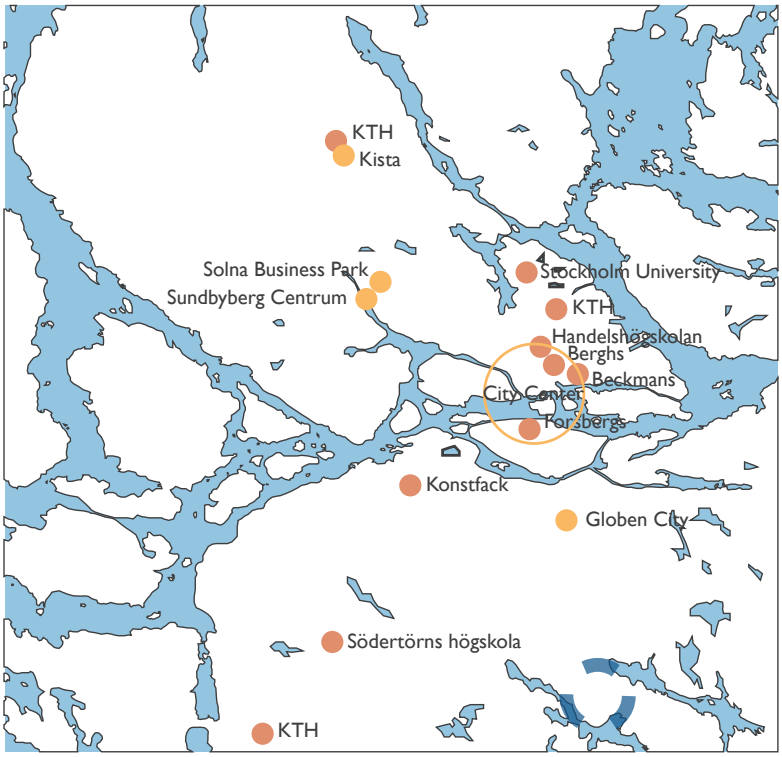


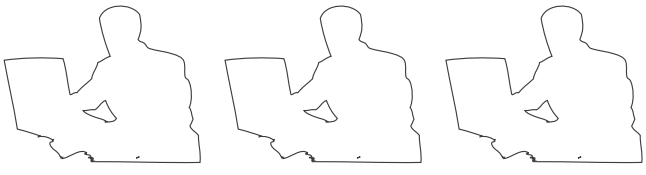
The campus will act as an intermediary to relationships between places of higher education and businesses.

In order to overcome the highway as a barrier it will be put underground. In its place a new green space will be created that will connect the two sides, act as a central green to the campus, and act as a city park.



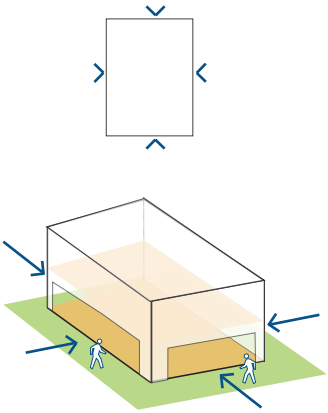
The majority of companies in Farsta work in communications and business, finance; for this reason, the university facilities will focus on the same subjects in order to create a relationship between the two. The existing universities and office parks are show in the map to the right. You can see that Farsta acts as a southern entry point to Stockholm and expanding this campus area will provide more job centers in the South.



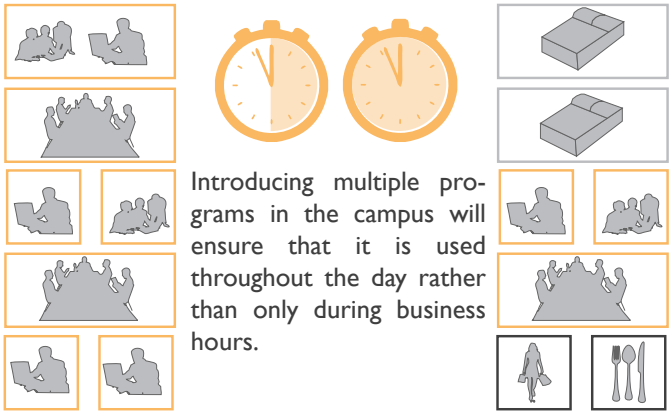




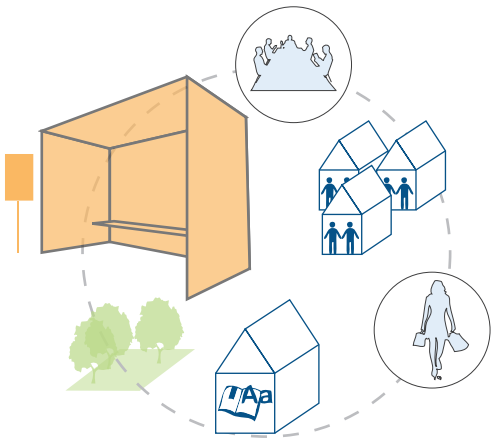
Worker productivity has been proven to increase when green spaces are incorp-orated into working environments.



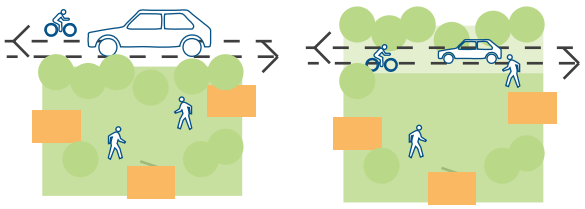
The buildings on the campus should be accessible from all sides. There should be no backsides in order to create a true campus environment. The current buildings will need to be retrofitted to ac-commodate this need.



Introducing multiple pro-grams in the campus will ensure that it is used throughout the day rather than only during business hours.

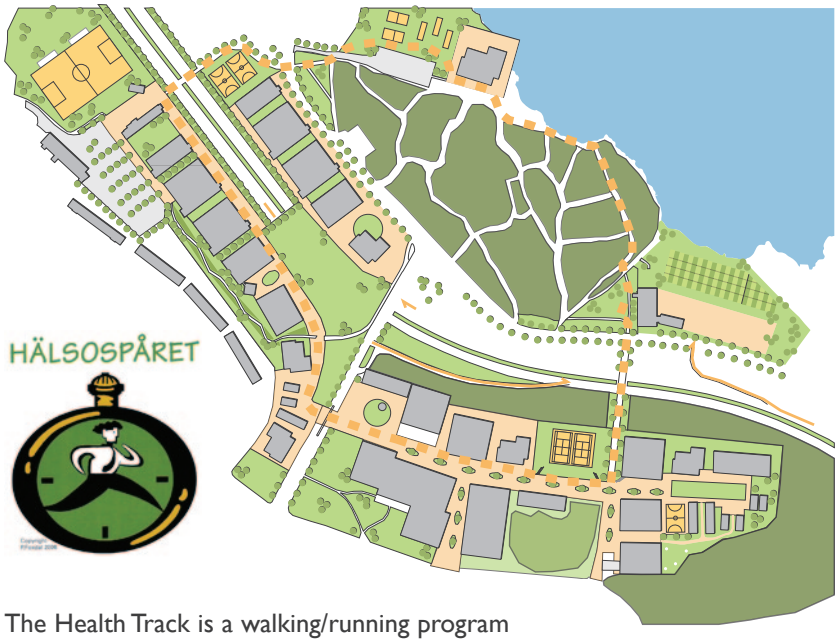


To encourage the use of public transit and make it a viable from of transportation stations needs to be placed close to many destinations.



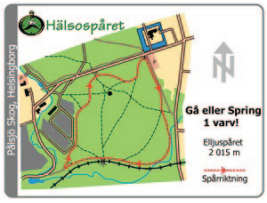
Complete streets will be introduced to all streets on the pe-riphery and moving through the campus. This will make the street a part of the campus rather than it acting as a barrier.

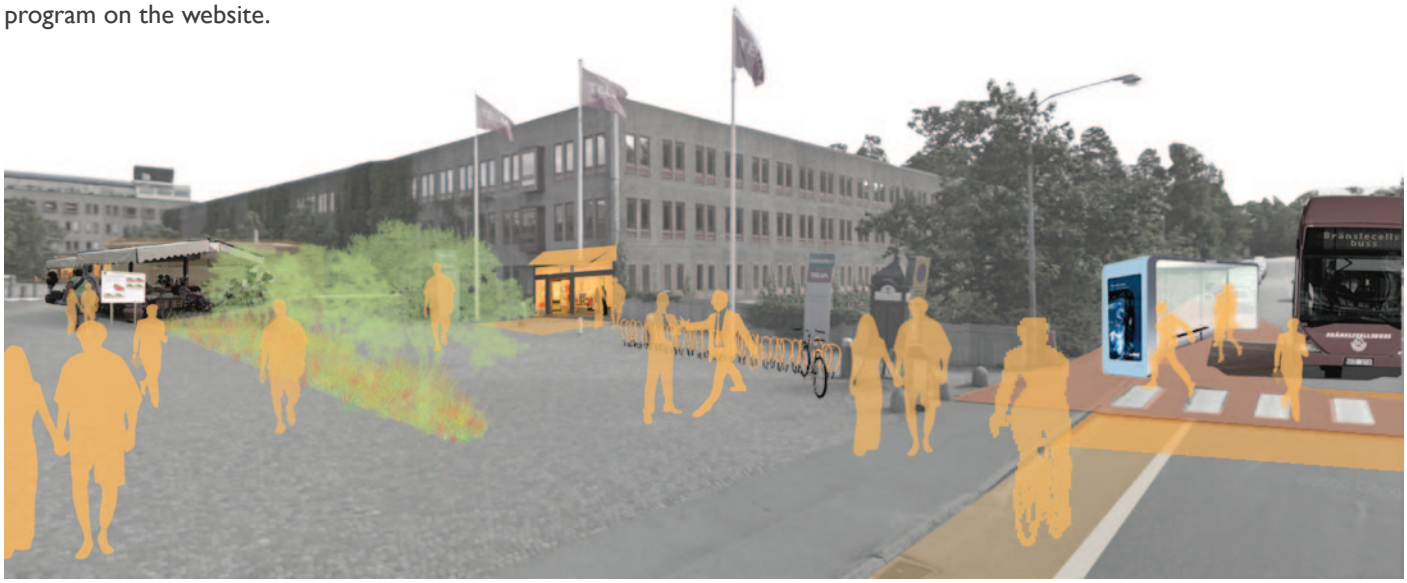






The Health Track is a walking/running program that can be added to existing paths or used to create new tracks where people mainly live, work or spend their free time. The Health Track features offer users a unique approach to self test and monitor fitness in a simple and cost effective manner. A fitness test and analytical tools measure current physical fitness from which users can find an individual exercise program on the website.

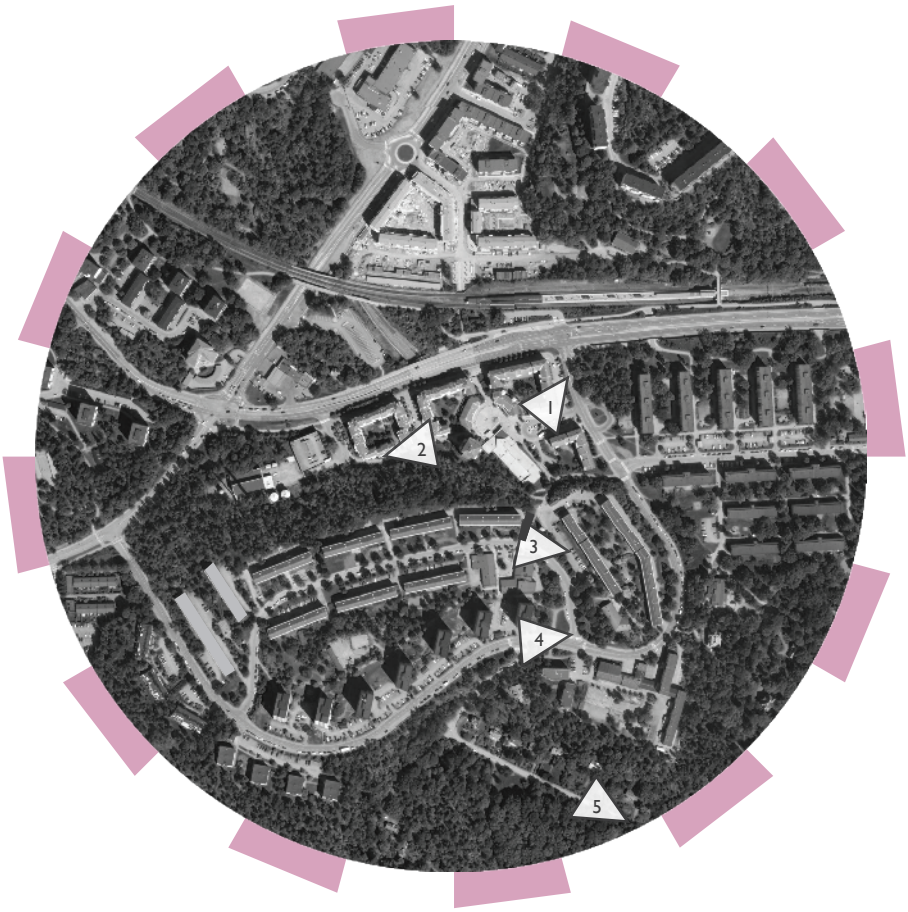




To encourage use during more times of the day and to people outside of the offices, additional programming such as restaurants, cafes, and service shops will be incorporated into the first floor to open the site up to the public and increase the levels of pedestrian activity.


Volleyball Courts
Boule Courts
Cafe/Restaurant/Bar
N
Forest Walk
Park Overpass
Allotment Gardens
Garden Center
Central Bus Terminal
Pedestrian Overpass
Community Recreation Center
Activated Pedestrian Promenade
Strength Training

NEXUS PARK













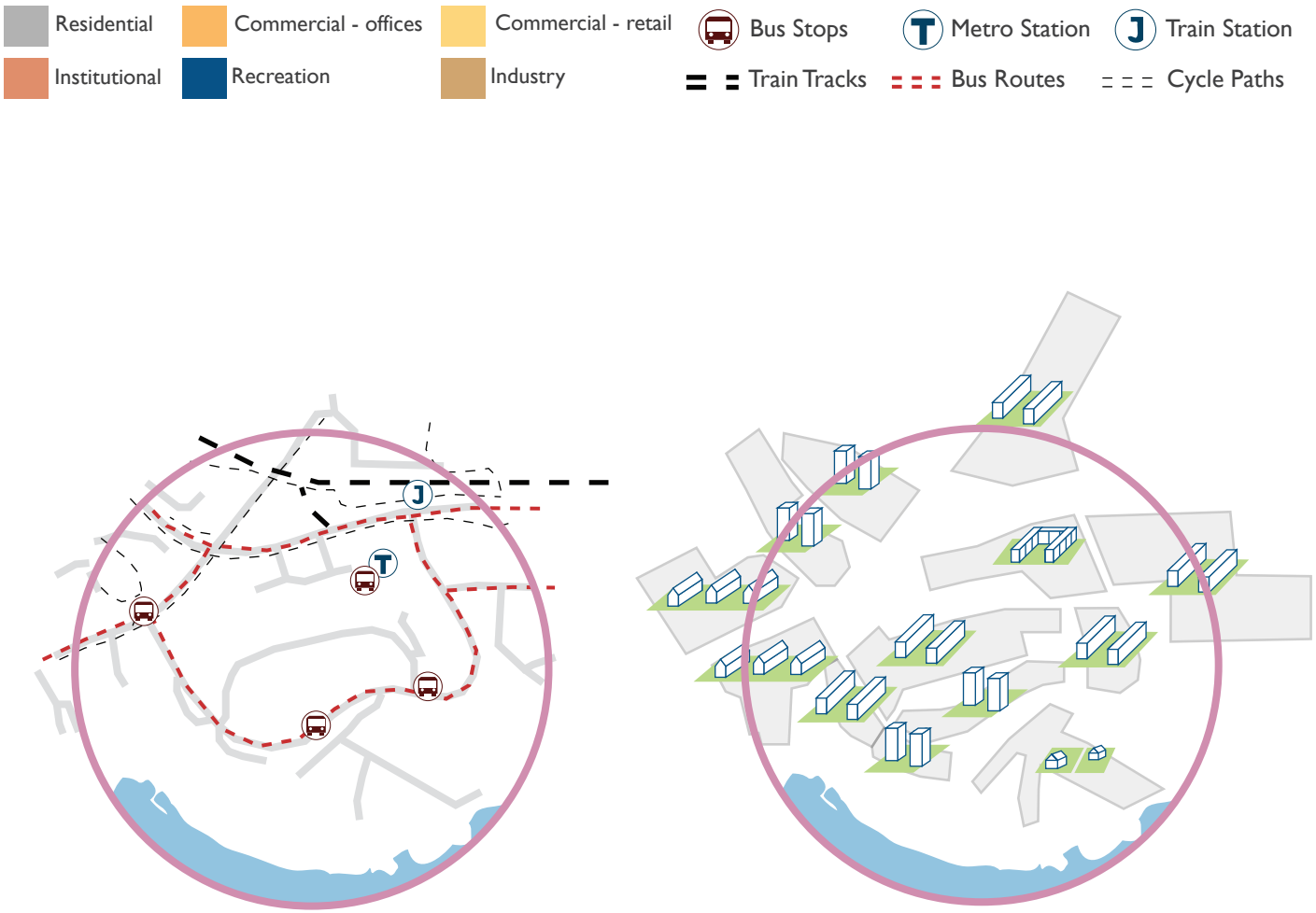
The Nexus Park will become a large functioning playground incorporating topography, ground markings and light features to encourage physical activity in a playful way. This site is ideal for this purpose as it is a residential neighborhood and in contrast to the Centrum has a more leisurely environment. The park will be incorporated into the forested area between two residential blocks and adjacent to Farsta Strand. This can act as a connection for the neighborhoods as well as create an activity destination. The existing site already provides natural topography that allows for creative play opportunities. If managed, the wild forested area can facilitate a series of play areas with new discoveries throughout.

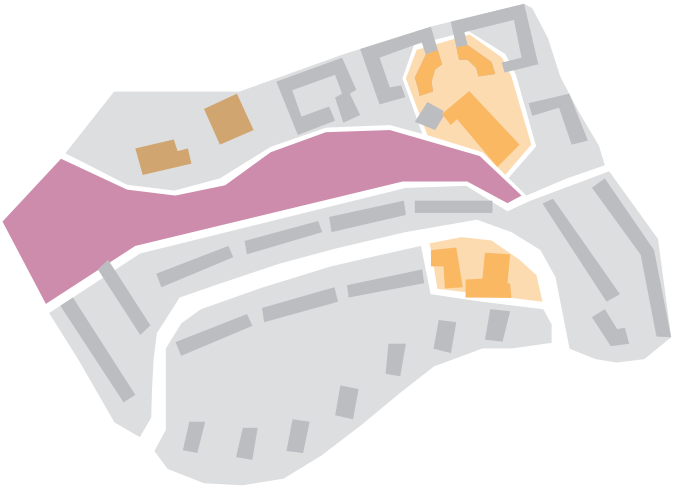
As one moves through the park different play areas will be revealed through the trees. Some spaces will be flat and open to the sky while others will use the tree canopy to create a special contrast between light and dark or open and closed spaces. The play areas will extend out to the streets surrounding the area to draw people in and to slow down vehicular traffic to create a healthier and more active friendly neighborhood rather than just an isolated park.

Site Inventory:

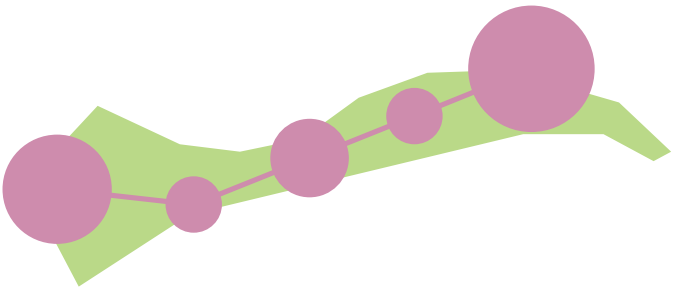
The initial inventory and analysis of the site (above) shows the existing land use, recreation facilities, transportation, and residential typologies. The residential nature of the area allowed for the opportunity to create a neighborhood scale park to increase activity.




Residential
Commercial - offices
Commercial - retail
Bus Stops
Metro Station
Train Station
Institutional
Recreation
Industry
Train Tracks
Bus Routes
Cycle Paths



The park will be located on an existing hilly vegetated areas between two residential areas and adjacent to Farsta Strand.



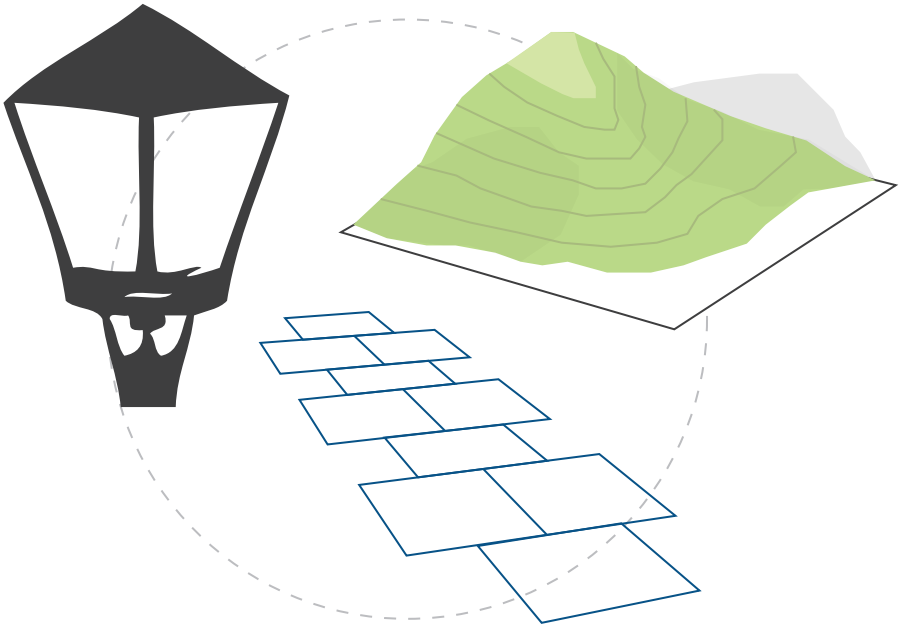
The park in the south will consist of a series of play areas that exemplify the characteristics listed above.



These play areas will be nestled into the existing wooded area to create a sense of discovery when moving from one to another.



The play areas will "spill" out into the surrounding commercial and residential areas to act as entrances to the park as well as to draw attention from passersby.



The characteristics that have been proven to encourage play in children include topography, ground markings, and light features. These characteristics will be applied at the neighborhood scale to create a large playground that encourages physical activity for all ages.

The two reference projects below played a large role in the development of the design proposal for this site. The Superkilen in Copenhagen incorporated the above mentioned characteristics on a large scale as well and makes a good case for using ground markings to make a statement. The Woonerf Living Yard is a good example of how to transform streets into a part of parks, friendly to pedestrians and children, rather than acting as a barrier.

SUPERKILEN

The Super Kilen in Copenhagen, designed by BIG and Topotek 1architects, uses open space as a physical framework to bring together the many cultures of the area. A red, black, and green square were designed to create a "universal garden"

(Source: http://www.topotek1.de)



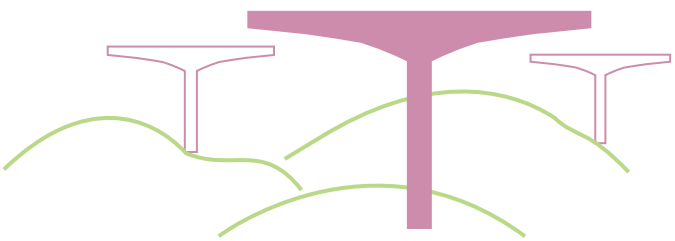
WOONERF "LIVING YARD"

This 1960's Dutch town turned the street back to pedestrians by introducing obstacles in the road so cars have to slow down the weave through the obstacles, people, and cyclists. Was proven very successful, but too expensive to apply at a large scale.

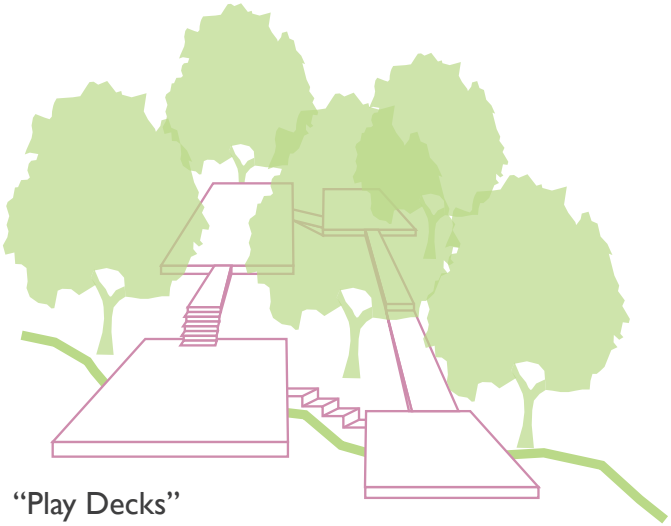
(Source: Health and Community Design: The Impact of the Built Environment on Physical Activity)





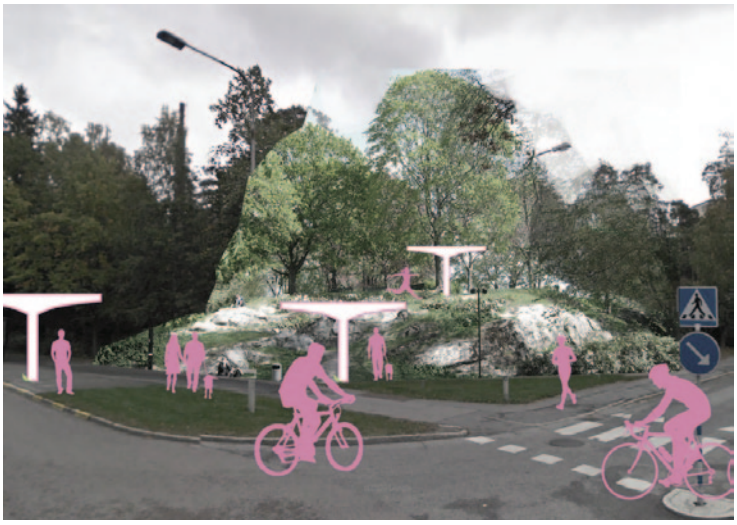


Mushroom Field



"Play Decks"

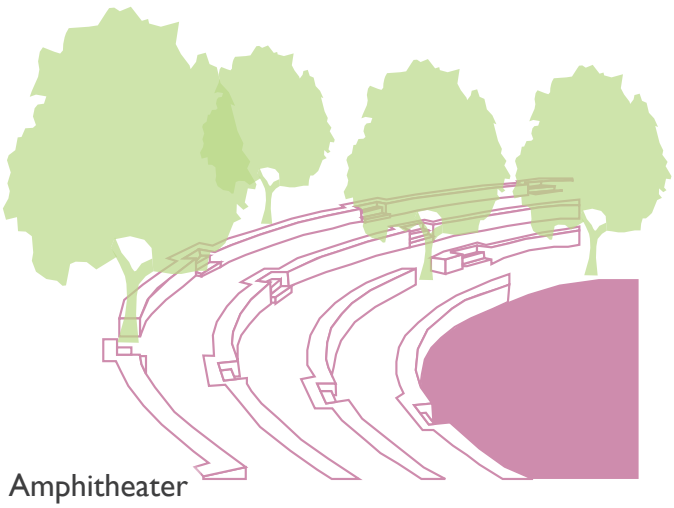






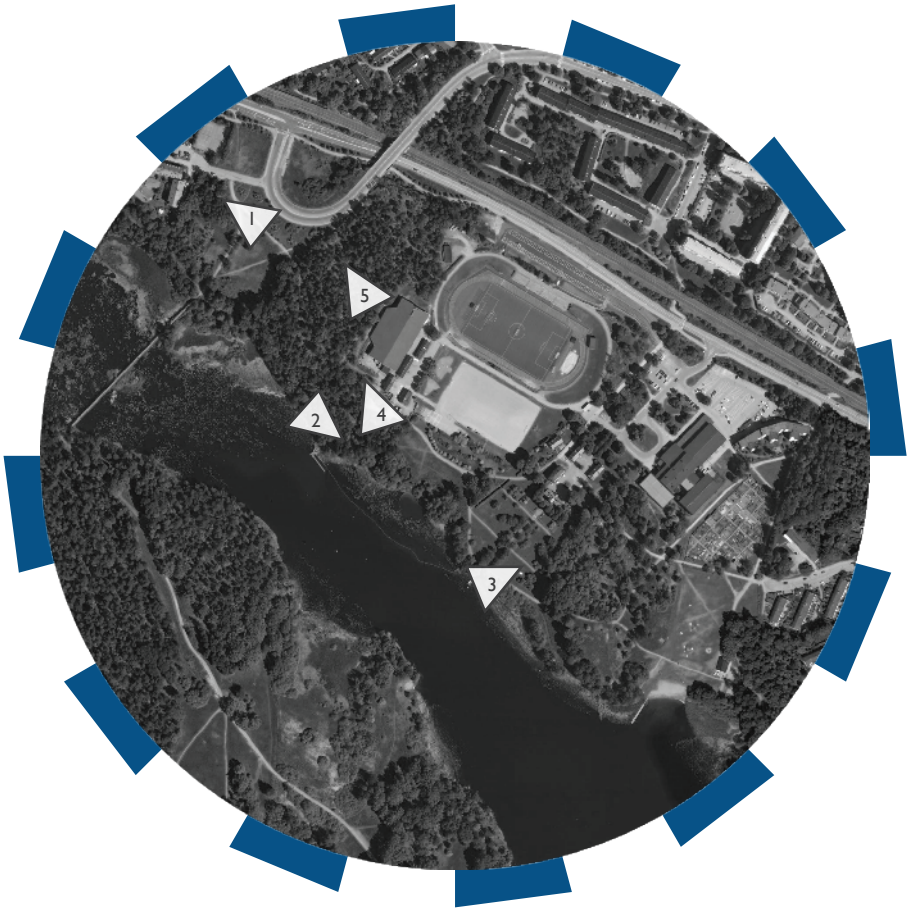


Playground



Amphitheater

THE RECREATION STATION













The theme of this area is sports emersion. There are existing sports and recreation facilities, but the area itself is segregated by rails, a highway, vegetation, and topography. In order to overcome these barriers the recreation facilities will be improved upon and intensified in order to create a destination so strong that it breaks through the barrier of location - making it the place to be not a place to try to get to. This being said, the access to the area will also be improved upon by creating better pedestrian, cycle and bus connections. The pendeltåg station at Farsta Strand will be moved to the area where it can better serve this area and the centrum.

The goal of the design is to take the existing conditions and build on them. The existing facilities will be improved in terms of quality and additional facilities will be added such as: a summer sports camp; archery; additional walking and running trails; tennis courts; basketball courts; sailing; orienteering opportunities; outdoor strength training equipment; hiking and skiing amenities; and plenty of flexible use spaces for spontaneous activity.

Site Inventory:

The initial inventory and analysis of the site (above) shows the existing land use, recreation facilities, transportation, and residential typologies. The existing recreation facilities showed a great opportunity for expansion in this area.

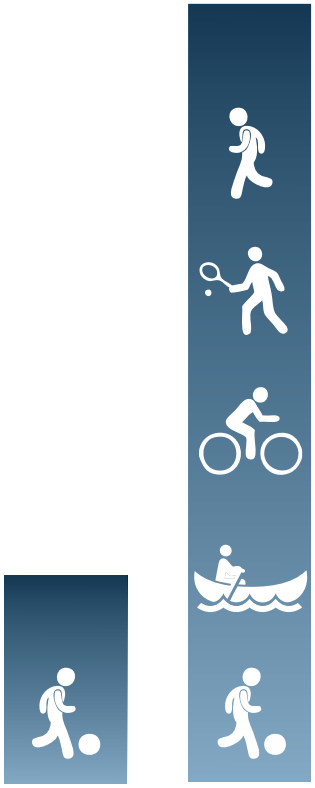




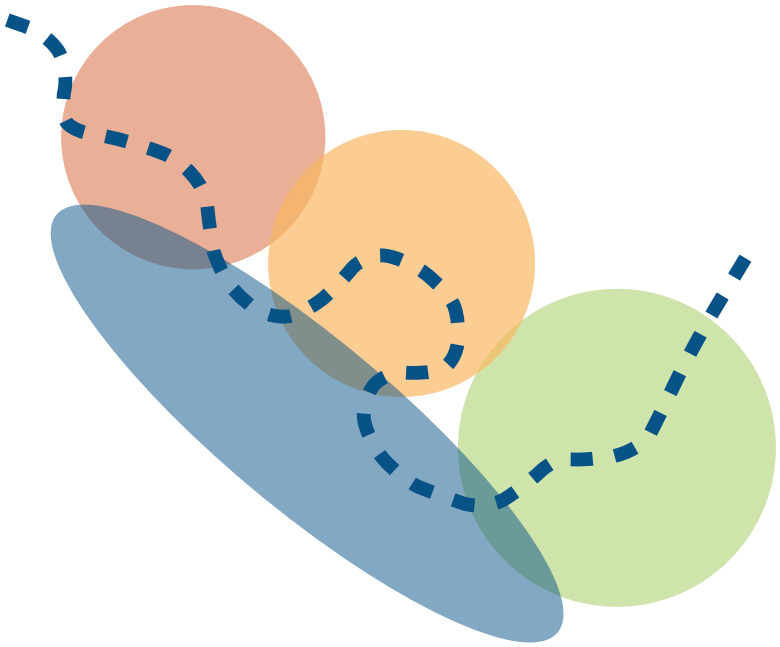
Residential
Commercial - offices
Commercial - retail
Bus Stops
Metro Station
Train Station
Institutional
Recreation
Industry
Train Tracks
Bus Routes
Cycle Paths





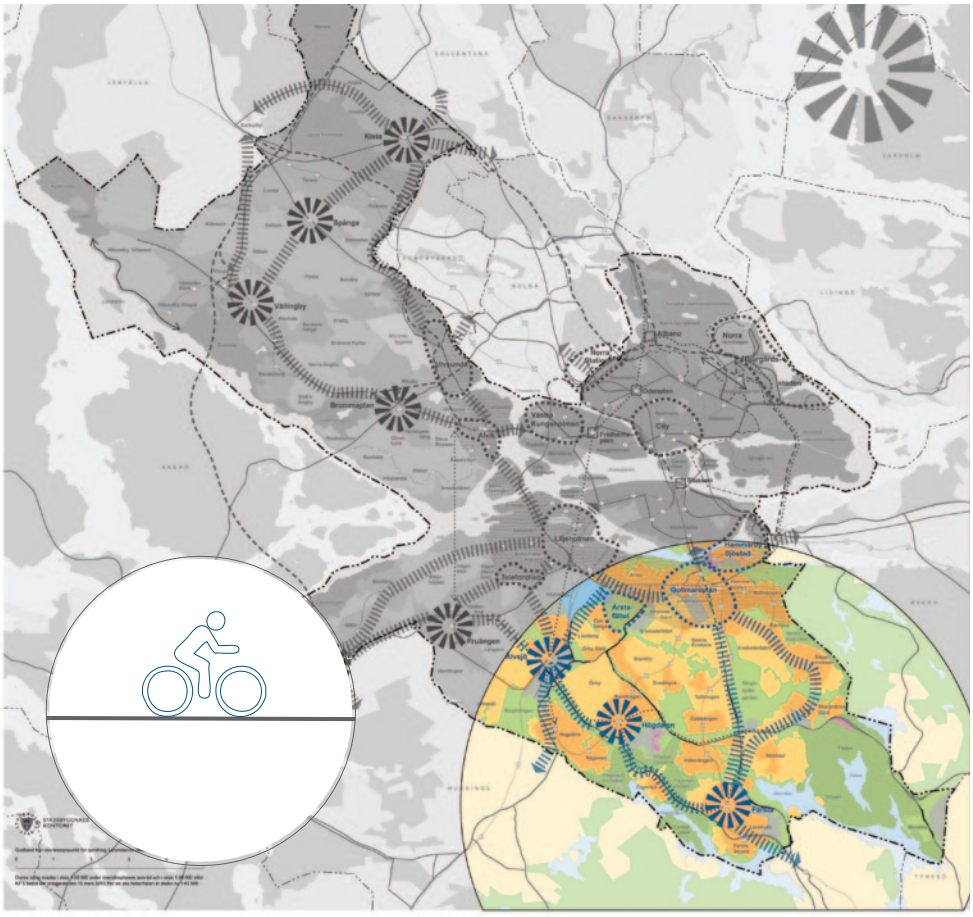


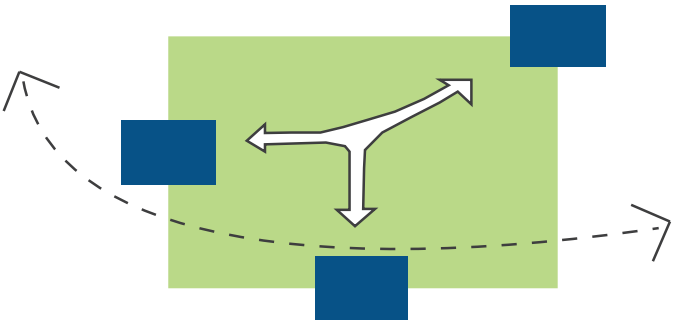
The recreation in the area will intensify the existing recreational activities and create a destination for greater Stockholm. This intensification will include increasing the quantity of activities as well as improving the quality.



There will be four different recreation areas within the site. One (green)with leisurely activates such as gardening, putting greens, and swimming.; another (orange) with sports activities such as soccer, track, basketball etc.; one (blue) along the water with activities such as swimming, canoeing, and sailing and the final (red) are will have more outdoor/adventure sports such as amenities for Nordic skiing, orienteering, archery etc.

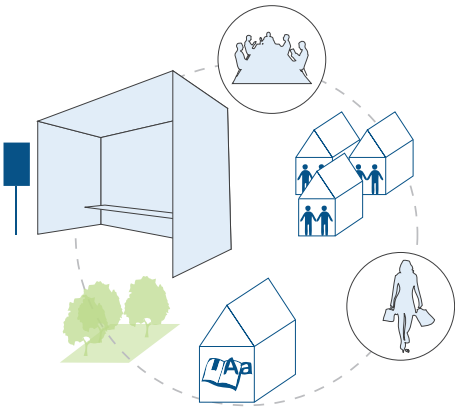
People will generally accept a 30 commute by bike which averages to 7.5 to 15 kilometers. With the appropriate connections this means that one could bike from Farsta to, for example, Södermalm or vice versa.



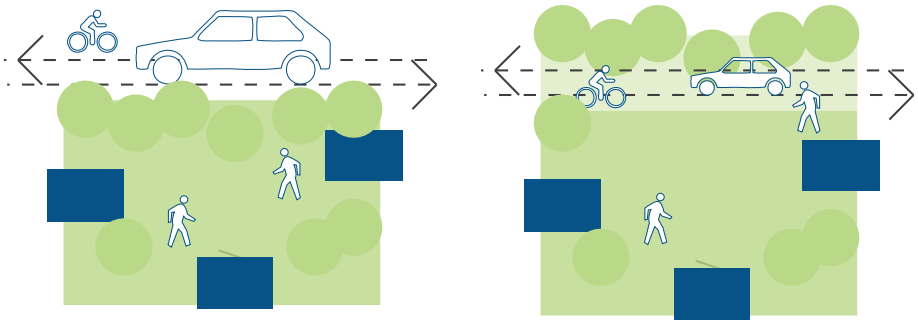


This recreation area will contain paths within the site as well as connections to greater destinations beyond Farsta.

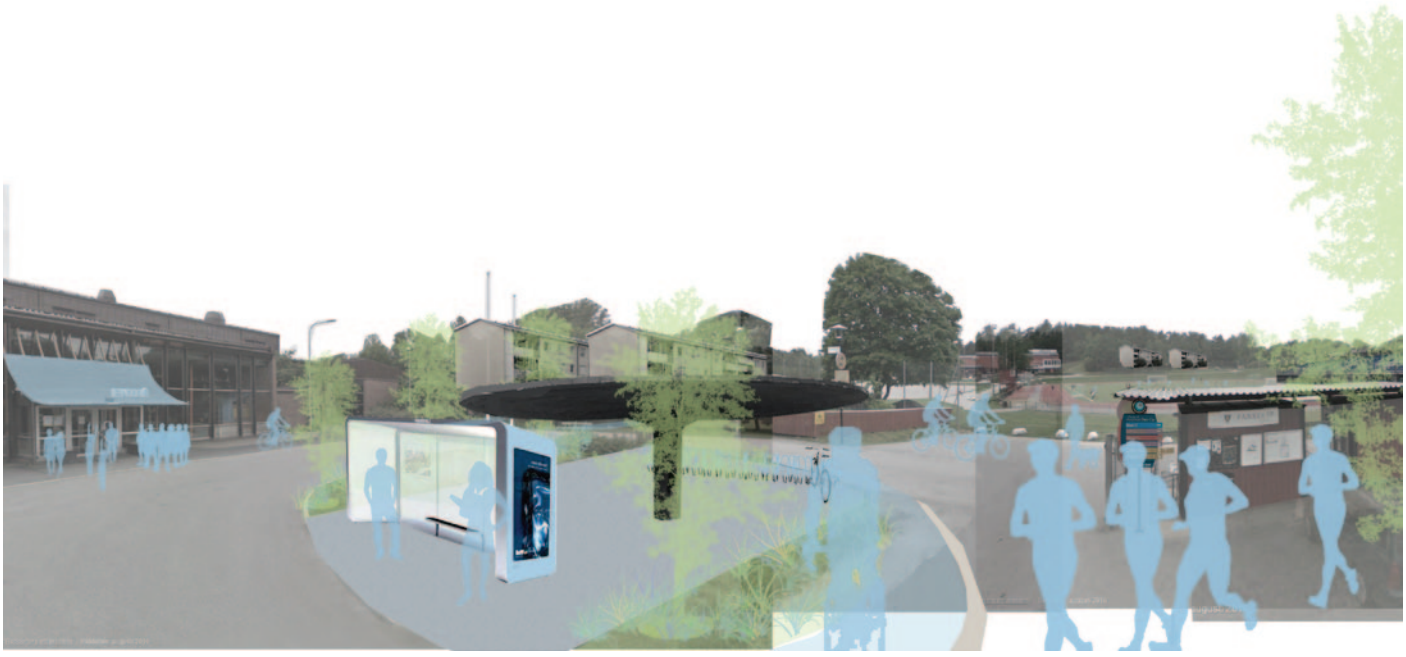
People will generally accept a 30 commute by bike which averages to 7.5 to 15 kilometers. With the appropriate connections this means that one could bike from Farsta to, for example, Södermalm or vice versa.



Public transit stations should be placed near major destinations. For this recreation area to become a destination for greater Stockholm, and for people to reach it through active transport modes, a transit station should be added and bus connections should be improved.



The street along the west recreation area will be considered as a part of the park. It will be transformed into a complete street allowing for pedestrian and cycle recreation.




Connection North
Indoor Tennis Facilities
Hiking and Nordc Ski Center
Indoor and Outdoor Rock Climbing
Space for Summer Sports Camp
Tennis Courts
Canoeing
Preserved Wooded Area with Orientiering Markers
Youth Sailing
Triathalon Swim Training
Putting Greens
Swimmng and Sauna Facilties



Here on can see how the previous diagrams come to light in the physical plan. You can see the four different areas and the activities that are included. The concept behind this site is to push recreational activities to the max; to fit in as many programmed activities as possible and allot space for spontaneous activity or play space. The existing facilities will be utilized, but the key to making this site successful is to have all of the facilities at the highest possible quality so that people from Farsta and outside will associate The Recreation Station as a destination for premier recreation.

REFERENCE PROJECTS

HIGH POINT COMMUNITY DEVELOPMENT

"High Point is a 100-acre master planned community with a beautiful mix of homes, 20 acres of parks, playgrounds and services. Wide, tree-lined sidewalks and front porch architecture encourage walking and make it easy to meet your neighbors."

Located in West Seattle (Washington, USA) the High Point includes a large central commons park, pocket parks, medical and dental clinic, a neighborhood center, library, a market garden, art installations, and integrated open space.

The neighborhood also includes one of the first "complete streets" in Seattle. Complete streets provide equal access for pedestrians, bikes, cars, and transit.

Allergen-free landscape guidelines for Breathe-Easy™ Homes help to reduce asthma, bringing the emergency room visit rate down 67 percent.

The High Point P-Patch Market Garden is a partnership between in-city gardeners and consumers resulting in weekly deliveries of high-quality, farm-fresh, organic produce during the growing season and a weekly on site farm stand. In 2010 Seattle P-Patch Market Gardens provided produce for approximately 53 households over 20 weeks.

The combination of complete streets which allow for safe pedestrian and cycling access and the orientation of the buildings to the street make physical activity at High Point an inviting and convenient choice.



Where: Seattle, USA
Who: City of Seattle; several Architecture firms; community groups; home owners
More Info: http://www.thehighpoint.com/
What to take away:
Complete Streets; 'Front Porch' residential design; Market Garden Program

HÄLSOSPÅRET (THE HEALTH TRACK)



The Health Track is a walking/running program that can be added to existing paths or used to create new tracks where people mainly live, work or spend their free time. The Health Track features offer users a unique approach to self test and monitor fitness in a simple and cost effective manner. A fitness test and analytical tools measure current physical fitness from which users can find an individual exercise program on the website. The Health Track hopes to offer a method to provide opportunities for everyone to have access to regular fitness testing in a simple and accessibility manner when they can and want.

The process of testing your fitness is described below:



You can complete the fitness test either by running or walking. If running you should keep a pace that feels somewhat exhausting. This corresponds to a respiratory rate of 35 breaths per minute. You should be able to say 3-4 words on each breath and be able to run 1-2 yards after the finish without getting tired. If walking, you should go as fast as you can.

- Start/Finish on the trail where it best suits you.
- Warm up about 10 minutes
- Run or walk the health track as described above
- Take time for 1 lap (minutes and seconds)
- Log in at www.halsosparet.se
- Register your values
- Calculate your physical activity index
- Create your exercise program

(Translated from the Hälsospåret website)

Where: Across Scandinavia and other parts of Europe
Who: Hälsospåret AB; Interested community members; schools; work places
More Info: http://www.halsosparet.se
What to take away:
Incorporating simple ways to test fitness can motivate individuals to maintain regular physical activity

PAVEMENT TO PARKS



San Francisco's streets and public rights-of-way make up 25% of the city's land area, more space even than is found in all of the city's parks. San Francisco's new "Pavement to Parks" projects seek to temporarily reclaim these unused swathes and quickly and inexpensively turn them into new public plazas and parks. The program has been inspired by the recent success of similar projects in New York City - where plazas and seating areas have been created in excess roadway simply by painting or treating the asphalt, placing protective barriers along the periphery, and installing moveable tables and chairs in order to transform them into much more inviting and pedestrian-friendly spaces.

Each Pavement to Parks project is intended to be a public laboratory where the City can work with the community to test the potential of the selected location to be permanently reclaimed as public open space. Materials and design interventions are meant to be temporary and easily moveable should design changes be desired during the trial-run. Seating, landscaping, and treatment of the asphalt will be common features of all projects.

The trials have shown an increase in pedestrian activity (up to 44% in some areas), pedestrian satisfaction, and people's sense of community character. There has also been an increase in biked parked in each location.

Locations for Pavement to Parks projects are selected based on the following criteria:

- Sizeable area of under-utilized roadway
- Lack of public space in the surrounding neighborhood
- Pre-existing community support for public space at the location
- Potential to improve pedestrian and bicyclist safety via redesign
- Surrounding uses that can attract people to the space

Where: Seattle, USA
Who: City of Seattle; several Architecture firms; community groups; home owners
More Info: http://www.thehighpoint.com/
What to take away:
Complete Streets; 'Front Porch' residential design; Market Garden Program

HIGH LINE PARK

The High Line Park in New York City USA is an urban park on an abandoned elevated industrial train track. The park adds a one and-a-half mile long green space in the heart of the city, promoting active lifestyles and re-purposing existing infrastructure.



The High Line was built in the 1930s, as part of a massive public-private infrastructure project called the West Side Improvement. It lifted freight traffic 30 feet in the air, removing dangerous trains from the streets of Manhattan's largest industrial district. No trains have run on the High Line since 1980. Friends of the High Line, a community-based non-profit group, formed in 1999 when the historic structure was under threat of demolition. Friends of the High Line works in partnership with the City of New York to preserve and maintain the structure as an elevated public park.

The High Line is located on Manhattan's West Side. It runs from Gansevoort Street in the Meatpacking District to West 34th Street, between 10th & 11th Avenues. Section 1 of the High Line, which opened to the public on June 9, 2009, runs from Gansevoort Street to West 20th Street. Section 2, between West 20th and West 30th Streets, opened June 8, 2011.

When all sections are complete, the High Line will be a mile-and-a-half-long elevated park, featuring an integrated landscape combining meandering concrete pathways with naturalistic plantings. Fixed and movable seating, lighting, and special features are also included in the park.

Access points from street level will be located every two to three blocks. Many of these access points will include elevators, and all will include stairs.



Where: New York City, USA
Who: Friends of the High Line; City of New York; James Corner Field Operations LAs; Diller Scofidio+Renfro Arch.
More Info: http://www.thehighline.org/
What to take away:
Urban infastructure redevelopment to promoting active lifestyles; transforming underutilized spaces

RAILS TO TRAILS

Rails-to-Trails Conservancy is dedicated to the creation of a nationwide network of trails. Further, Rails-to-Trails Conservancy is committed to enhancing the health of America's environment, transportation, economy, neighborhoods and people—ensuring a better future made possible by trails and the connections they inspire.

Begining on February 1, 1986 Rails to Trails now supports 20,000-plus miles (about 32,000 kilometers) of trails throughout the US. Rail-trails are multi-purpose public paths created from former railroad corridors. Most often flat or following a gentle grade, they traverse urban, suburban and rural America. Ideal for many uses, such as bicycling, walking, inline skating, cross-country skiing, equestrian and wheelchair use, rail-trails are extremely popular as recreation and transportation corridors.



Rail-trails create healthier places for healthier people. They serve as wildlife conservation and historical preservation corridors, stimulate local economies by increasing tourism and promoting local business, offer safe and accessible routes for work and school commuting, and promote active lifestyles for all ages.

Rail-with-trails can also provide a unique opportunity for connecting non-motorized transportation with public transportation, such as when a trail leads to a train station.



rails·to·trails conservancy

In most cases the local, state or federal government agency that buys the corridor builds the trail as well. In a few cases, groups of citizen volunteers have constructed a trail. Trails are generally managed by public agencies, but some are operated by other types of organizations, including nonprofit "friends of the trail" citizen groups, land trusts and community foundations.

Where: Throughout USA
Who: Local, state, or federal government; nonprofit citizen groups
More Info: http://www.railstotrails.org
What to take away:
Transforming space on or along along existing rails as regional trail systems; forming community partnerships

UNDERPASS PARK

Underpass Park will transform the derelict and underused space into a bright, new, urban neighborhood amenity and key pedestrian connection and passageway. The park innovatively re-engineers the area under the overpass to create an inviting public space that connects the two parts of the West Don Lands, contributing to the vibrancy of the neighborhood.

The design maximizes the unique site conditions imposed by the massive concrete overpasses to convert a neighborhood liability into a welcoming and distinct public space. The design embraces the infrastructure to create opportunities for activities and planting in the open air and covered areas as well as



in the unusual spaces resulting from large concrete beams and columns.

One of the park's defining design features will be a series of long, narrow ribbon-like strips made from a palette of concrete and wood. These ribbons, located throughout both the covered and uncovered areas of the park, will rise from the ground creating both directional cues for pedestrians as well as informal park benches and gathering spaces.

This area will be defined by recreational space such as ball hockey and basketball courts, adult recreation facilities and playful climbing structures for all ages. It will also include flexible community space that can be used for markets, festivals and community events.

Public art will play a critical role in Underpass Park as will Community gardens, which make up a part of the southwestern edge of the park providing additional opportunities for residents to interact with each other and nature.

Where: Toronto, Canada
Who: Phillips Farevaag Smallenberg; The Planning Partnership; Paul Raff; City of Toronto; Government of Canada
More Info: http://www.waterfrontoronto.ca
What to take away:
Transforming underutilized spaces in the community to create interesting places for activities and gathering

iWALK PROGRAM

"International Walk to School Month (October) gives children, parents, school teachers and community leaders an opportunity to be part of a global event as they celebrate the many benefits of walking. In 2009, millions of walkers from around the world walked to school together for various reasons — all hoping to create communities that are safe places to walk."

International Walk to School is more than just getting together with children and going for a walk to school as a special event. This is certainly important, but the event's greater aim is to bring forth permanent change in communities across the globe. Below are just a few of its goals:

- Encourage physical activity by teaching children the skills to walk safely, how to identify safe routes to school, and the benefits of walking
- Raise awareness of how walkable a community is and where improvements can be made
- Raise concern for the environment
- Reduce crime and take back neighborhoods for people on foot
- Reduce traffic congestion, pollution, and speed near schools
- Share valuable time with local community leaders, parents, and children

Over 40 countires participate in International Walk to School Month with hopes to inspire change in their communities.



iwalk International Walk to School in the USA

Where: Worldwide
Who: Schools; community members
More Info: http://www.iwalktoschool.org

What to take away:
The importance of showing children the value of physical activity; The power of communities to inspire and demand change in their communities

COMPLETE STREETS COALITION



Instituting a complete streets policy ensures that transportation planners and engineers consistently design and operate the entire roadway with all users in mind. Complete Streets are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.

There is no singular design prescription for Complete Streets; each one is unique and responds to its community context while balancing safety and conveiniece for all users. A complete street may include: sidewalks; bike lanes (or wide paved shoulders); special bus lanes; comfortable and accessible public transportation stops; frequent and safe crossing opportunities; median islands; accessible pedestrian signals; curb extensions; narrower travel lanes; roundabouts; and more.

Complete Streets improve the efficiency and capacity of existing roads by moving people in the same amount of space – getting more productivity out of the existing road and public transportation systems.

An existing transportation budget can incorporate Complete Streets projects with little to no additional funding, accomplished through re-prioritizing projects and allocating funds to projects that improve overall mobility.

Complete Streets encourage walking and bicycling for health. The Centers for Disease Control and Prevention recently named adoption of Complete Streets policies as a recommended strategy to prevent obesity. One study found that 43% of people with safe places to walk within 10 minutes of home met recommended activity levels.



Where: Throughout USA
Who: National Complete Streets Coalition; Policy makers; local governments
More Info: http://www.completestreets.org/
What to take away:
Designing streets for all users will increase productiviy and make communities healthier; reprioritized funding can cover the cost and encourage use

LET'S MOVE INITIATIVE

Let's Move! is a comprehensive initiative, launched by the First Lady, Michelle Obama, dedicated to solving the problem of obesity within a generation, so that children born today will grow up healthier and able to pursue their dreams.

Let's Move! is about putting children on the path to a healthy future during their earliest months and years. Giving parents helpful information and fostering environments that support healthy choices. Providing healthier foods in our schools. Ensuring that every family has access to healthy, affordable food. And, helping children become more physically active.



At the launch of the initiative, President Barack Obama signed a Presidential Memorandum creating the first-ever Task Force on Childhood Obesity to conduct a review of every single program and policy relating to child nutrition and physical activity and develop a national action plan to maximize federal resources and set concrete benchmarks toward the First Lady's national goal. The Task Force recommendations focus on the five pillars of the First Lady's Let's Move! initiative:

- Creating a healthy start for children
- Empowering parents and caregivers
- Providing healthy food in schools
- Improving access to healthy, affordable foods
- Increasing physical activity

Everyone has a role to play in reducing childhood obesity, including: parents and caregivers; elected officials from all levels of government; schools; health care professionals; faith-based and community-based organizations; and private sector companies. Everyone's involvement is key to ensuring a healthy future for our children.

Where: Throughout USA
Who: First Lady Michelle Obama; United States Government; Let's Move Initiative
More Info: http://www.letsmove.gov
What to take away:
The importance of instilling active living in children so they can carry it into adulthood; the many actors involved in creating healthy communities

CRITICAL MASS

Critical Mass is a cycling event typically held on the last Friday of every month in over 300 cities around the world. The ride was originally founded in 1992 in San Francisco, USA, but critical mass-like cycling tours took place in Stockholm, Sweden in the early 1970s. Critical Mass is a bike ride plain and simple. A Critical Mass is created when the group of riders comes together for a few hours to take back the streets of our city. Events can be as small as 20 riders offering safety in numbers to participants in the thousands in places like Budapest.



Critical Mass is a worldwide community. There is no hierarchy and the organization is decentralized. There are no leaders or member, it is meant to be a spontaneous event. The only necessity for an event to occur is to have sufficient participants to create a critical mass, or a presence, on the street. A route may be decided on ahead of time and distributed to riders or whoever is in the front of the pack can chose the route. Riders are welcome to join or leave the mass as they please.

Many view the rides as "the monthly protest by cyclists reclaiming the streets." Critical Mass participants, however, have insisted that these events should be viewed as "celebrations" and spontaneous gatherings, and not as protests or organized demonstrations.



Where: Worldwide event
Who: Decentralized community action groups
More Info: http://en.wikipedia.org/wiki/Critical_Mass

What to take away:
Ability of community action groups to have an influence; the importance of designing our streets for all forms of transport

REFERENCES WITHIN TEXT

LITERATURE

City of New York. *Active Design Guidelines: Promoting Physical Activity and Health in Design*. New York City, New York: City of New York, 2010.

Corburn, Jason. *Toward the Healthy City: People, Places, and the Politics of Urban Planning*. Cambridge, MA: MIT, 2009.

Dannenberg, Andrew L., Howard Frumkin, and Richard Jackson. *Making Healthy Places: Designing and Building for Health, Well-being, and Sustainability*. Washington, D.C.: Island, 2011.

Frank, Lawrence D., Peter O. Engelke, and Thomas L. Schmid. *Health and Community Design: The Impact of the Built Environment on Physical Activity*. Wash ington, DC: Island, 2003. Print.

Frumkin, Howard, Lawrence D. Frank, and Richard Jack son. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. Washington, DC: Island, 2004. Print.

FURTHER READING

World Health Organization Ottawa Charter for Health Promotion
< http://www.who.int/hpr/NPH/docs/ottawa_ charter_hp.pdf>

WEBSITES

Centers for Disease Control and Prevention
<http://www.cdc.gov>

"Active Environments." *Physical Activity Resources for Health Professionals*. Centers for Disease Con trol and Prevention, 10 May 2010. Web. Jan. 2012. <http://www.cdc.gov/physicalactivity/profession als/environment/index.html>.

American Society of Landscape Architects
<www.asla.org>

"Creating Healthy Human Habitats." *The Dirt*. American Society of Landscape Architects, 08 June 2011. Web. Jan. 2012. <http://dirt.asla. org/2011/06/08/creating-healthy-human- habitats/>.

"Designing for Active Living." *Designing Our Future: Sustainable Landscapes*. American Society of Landscape Architects. Web. Jan. 2012. <http:// www.asla.org/sustainablelandscapes/Vid_Active Living.html>.

"Infrastructure for All." *The Dirt*. American Soci ety of Landscape Architects, 13 June 2011. Web. Jan. 2012. <http://dirt.asla.org/2011/06/13/infra structure-for-all/>.

"Statistik Om Stockholm." USK. SWECO, Stockholm Stad. Web. Jan. 2012.
<http://www.uskab.se/index.php/startsida.html>.

"Hälsostatistik." Hälsostatistik. Lidingö Stad, 30 June 2010. Web. Jan. 2012.
<http://www.lidingo.se/toppmeny/stadpolitik/ varumarketlidingo/>.

World Health Organization
"Sweden." Country Statistics. World Health Organization. Web. Jan. 2012.
<http://www.who.int/countries/swe/en/>.

NOTES

1. Frank et al. 2003, p.1
2. Dannenberg et al. 2011, p.367
3. City of New York 2010, p.22
4. City of New York 2010, p.13, 112
5. Frumkin et al. 2004, p.xi; City of New York 2010, p.14
6. Frank et al. 2003, p.41
7. Frumkin et al. 2004, p.xi
8. Dannenberg et al. 2011, p.xvi
9. Frank et al. 2003, p.45
10. City of New York 2010, p.68
11. Frumkin et al. 2004, p.90
12. Frumkin et al. 2004, p.91
13. ASLA: Design for Active Living
14. Frumkin et al. 2004, p.93
15. Frank et al. 2003, p.79
16. Dannenberg et al. 2011, p.xvi
17. Dannenberg et al. 2011, p.xvi
18. Frumkin et al. 2004, p.xii
19. City of New York 2010, p.14
20. Frumkin et al. 2004, p.xi
21. Frumkin et al. 2004, p.xi
22. Frank et al. 2003, p.38
23. Dannenberg et al. 2011, p.xvi
24. Frumkin et al. 2004, p.94
25. City of New York 2010, p.16
26. Dannenberg et al. 2011, p.106; Frumkin et al. 2004, p.159
27. Dannenberg et al. 2011, p.34
28. Dannenberg et al. 2011, p.xvi
29. Dannenberg et al. 2011, p.xvi
30. Frank et al. 2003, p.47
31. City of New York 2010, p.16
32. Dannenberg et al. 2011, p.34
33. Frumkin et al. 2004, p.91
34. Frank et al. 2003, p.4
35. Frank et al. 2003, p.40
36. City of New York 2010, p.17
37. Frumkin et al. 2004, p.xv
38. Frumkin et al. 2004, p.93
39. Frank et al. 2003, p.41
40. Frumkin et al. 2004, p.xv
41. Frumkin et al. 2004, p.94
42. Frank et al. 2003, p.56
43. Frumkin et al. 2004, p.92
44. Frank et al. 2003, p.58
45. Frank et al. 2003, p.50
46. Frank et al. 2003, p.52
47. Frank et al. 2003, p.55
48. Frank et al. 2003, p.51
49. Frank et al. 2003, p.59
50. Frank et al. 2003, p.59
51. Frank et al. 2003, p.176
52. Corburn 2009, p.14
53. Frumkin et al. 2004, p.202,222
54. Corburn 2009, p.6,9
55. Frumkin et al. 2004, p.202; City of New York 2010, p.4
56. City of New York 2010, p.6
57. Corburn 2009, p.5
58. City of New York 2010, p.8; Dannenberg et al. 2011, p.3; Corburn 2009, p.2; ASLA: Creating Healthy Human Habitats
59. City of New York 2010, p.30,110
60. Frank et al. 2003; Dannenberg et al. 2011, p.34
61. Frumkin et al. 2004, p.211
62. City of New York 2010, p.14
63. Frumkin et al. 2004, p.xii
64. Dannenberg et al. 2011, p.xvii
65. Frank et al. 2003, p.48
66. City of New York 2010, p.14
67. World Health Organization
68. City of New York 2010, p.7
69. Dannenberg et al. 2011, p.229
70. City of New York 2010, p.16
71. Frumkin et al. 2004, p.xv
72. ASLA: Designing for Active Living
73. City of New York 2010, p.122
74. City of New York 2010, p.122
75. City of New York 2010, p.116
76. Frank et al. 2003, p.1
77. Frank et al. 2003, p.8
78. City of New York 2010, p.12
79. City of New York 2010, p.16; Frank et al. 2003, p.2
80. Frumkin et al. 2004, p.xiv
81. Corburn 2009, p.207
82. Frumkin et al. 2004, p.64; Frank et al. 2003, p.36
83. Frumkin et al. 2004, p.44-46
84. Frumkin et al. 2004, p.44-45
85. Frank et al. 2003, p.13; Corburn 2009, p.1
86. City of New York 2010, p.12
87. Frank et al. 2003, p,15
88. Frank et al. 2003, p.36
89. City of New York 2010, p.13
90. City of New York 2010, p.6
91. Frank et al. 2003, p.153
92. Frank et al. 2003, p.12
93. Frumkin et al. 2004, p.2
94. Frumkin et al. 2004, p.xvi
95. Frumkin et al. 2004, p.xiii
96. Frumkin et al. 2004, p.xiii
97. Frank et al. 2003, p.22
98. Frank et al. 2003, p.154
99. Frank et al. 2003, p.155
100. Frank et al. 2003, p.172
101. Frank et al. 2003, p.158
102. Frank et al. 2003, p.156
103. Frank et al. 2003, p.154

104. City of New York 2010, p.22
105. Frank et al. 2003, p.168
106. Frank et al. 2003, p.109
107. Frank et al. 2003, p.163
108. Frank et al. 2003, p.111
109. Frank et al. 2003, p.161
110. City of New York 2010, p.22
111. Frank et al. 2003, p.99
112. Frank et al. 2003, p.139
113. Frank et al. 2003, p.148; Frumkin et al. 2004, p.180
114. Frank et al. 2003, p.102
115. Frank et al. 2003, p.148; Frumkin et al. 2004, p.12
116. Frumkin et al. 2004, p.11
117. City of New York 2010, p.22
118. Frank et al. 2003, p.143
119. Frank et al. 2003, p.137
120. Frank et al. 2003, p.146
121. City of New York 2010, p.17
122. Frumkin et al. 2004
123. Frank et al. 2003, p.182
124. City of New York 2010, p.36
125. Dannenberg et al. 2011, p.218
126. Frumkin et al. 2004
127. Frank et al. 2003, p.171
128. Frank et al. 2003, p.194
129. Frank et al. 2003, p.152
130. Frumkin et al. 2004, p.21
131. Frank et al. 2003, p.103
132. City of New York 2010, p.23
133. ASLA: Designing for Active Living
134. City of New York 2010, p.40
135. Frank et al. 2003, p.165
136. City of New York 2010, p.41
137. Frank et al. 2003, p.165; Frumkin et al. 2004
138. City of New York 2010, p.43
139. Frank et al. 2003, p.165; City of New York 2010, p.40
140. City of New York 2010, p.34
141. Frank et al. 2003, p.163
142. Frumkin et al. 2004, p.207; Frank et al. 2003, p.173
143. Frank et al. 2003, p.173
144. Frank et al. 2003, p.174
145. City of New York 2010, p.44
146. Frank et al. 2003, p.105
147. City of New York 2010, p.45
148. City of New York 2010, p.58
149. ASLA: Designing for Active Living
150. City of New York 2010, p.22
151. Frank et al. 2003, p.73
152. City of New York 2010, p.28
153. Frumkin et al. 2004, p.18
154. Frumkin et al. 2004, p.7
155. City of New York 2010, p.37
156. Frumkin et al. 2004, p.101
157. City of New York 2010, p.37
158. Frank et al. 2003, p.109
159. Frumkin et al. 2004, p.18; Frank et al. 2003, p.89
160. City of New York 2010, p.28
161. Frank et al. 2003, p.108
162. City of New York 2010, p.22
163. Frank et al. 2003, p.109
164. Frank et al. 2003, p.100
165. Frank et al. 2003, p.100
166. Frumkin et al. 2004, p.11
167. Frumkin et al. 2004, p.3
168. Frank et al. 2003, p.180
169. Frumkin et al. 2004, p.8
170. City of New York 2010, p.118
171. City of New York 2010, p.32
172. City of New York 2010, p.30
173. Frumkin et al. 2004, p.12
174. Frumkin et al. 2004, p.104
175. Dannenberg et al. 2011, p.231
176. Dannenberg et al. 2011, p.231; Frumkin et al. 2004, p.139
177. Dannenberg et al. 2011, p.229
178. Frank et al. 2003, p.57
179. Frank et al. 2003, p.56
180. Dannenberg et al. 2011, p.31
181. City of New York 2010, p.26
182. City of New York 2010, p.32
183. City of New York 2010, p.32
184. City of New York 2010, p.17