



Dynamic Landscape Design

in west Birmingham, AL

Auburn University

Wei Guo

How can dynamic landscape design enable change in an urban system?

Dedications

This book is dedicated to my Mother and Father who have always believed in me and supported me. I am very appreciative for everything they have done for me over the past 27 years. Without them I would not be where I am today. You mean more to me than you will ever know.

Acknowledgments

I am very grateful to many people who supported this project the whole way through. I want to especially thank Rodney Barnett. He changed my views of landscape architecture.

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abstract

Abstract

Dynamic landscape design in Birmingham, AL

Before 1960s, the population and economy of Birmingham, AL, grew very fast. The factory industry was very prevalent in the area. After the 1960s, industry moved out of downtown and people moved away from the city. There are a lot of abandoned industrial areas and residential areas in downtown Birmingham. What was at one point strength in Birmingham is now considered blight, as much of the land is currently unused.

Valley Creek runs through Birmingham providing water to industry and general use water to Birmingham. However, flood water is a big issue for the residential and industrial areas near the creek. There are a lot of structures built in the floodplain areas. The creek floods every year.

The project focuses on how dynamic landscape design may enable change in urban land use. Urban land use change consists of three parts. The first part is urban network change through time. From the 1940s to 1999, the land use of the study site (located in west Birmingham) changed from industrial to abandoned area. From 1999 to 2013, the nearby sports complex, called the Crossplex changed a lot too. The second part is that city planning causes land use change. According to the Birmingham comprehensive plan, the Crossplex area will develop into a small business center. The government also plans to spend 10 million dollars to develop a 'Tigertrail' which connects Crossplex and Railroad Park near downtown Birmingham. The third kind of change is regarding natural process. When Valley Creek floods, plant succession occurs on the concrete surface of abandon industrial areas. Trees grow up.

The project also looks at different urban systems and asks how dynamic landscape design can serve several important systems. The study site is very complicated. It involves many urban systems which are all very important, including social systems, ecological systems and infrastructure systems. The social system includes landowners, workers, residents, children, schools and offices. Ecological systems include hydrology, vegetation such as lawns, woodland, nursery and stream edge etc. Infrastructure systems include railroad, the road system, pedestrian circulation, public transit, bikeways and trails. After analysis of those systems, a set of designs is developed that can permit them to evolve.

Key words: resilience, succession, dynamic landscape

Research question: How can dynamic landscape design enable change in an urban system?

History of Birmingham, AL

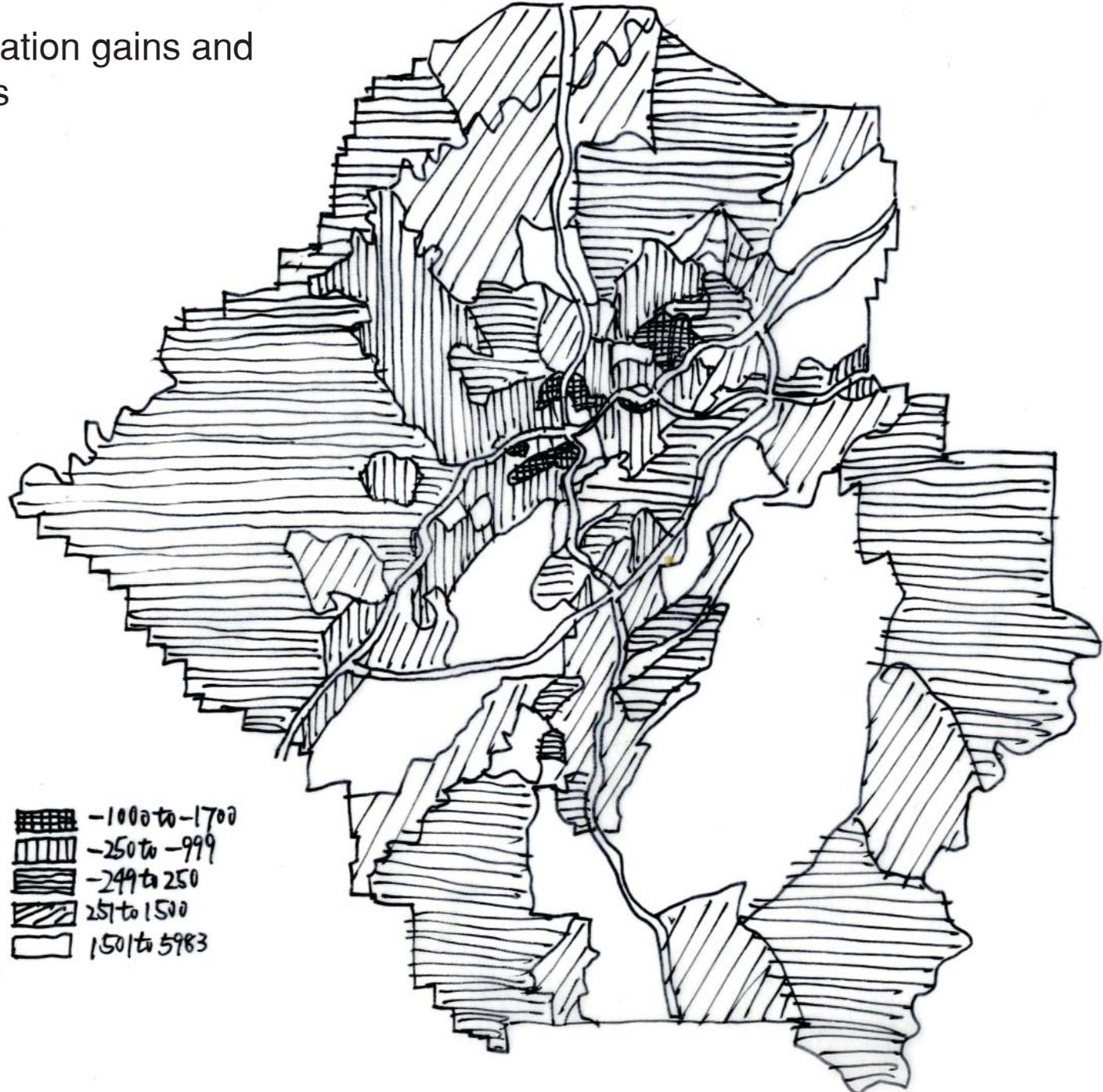


The history of Birmingham, AL

Birmingham, Alabama was founded just after the American Civil War as an industrial enterprise. It borrowed its name from one of the major industrial cities in the UK and quickly became the industrial center of the south. The enormous amount of growth the city experienced around the turn of the 20th century gave it the nickname “The Magic City” and its enormous steel production earned the city the name “The Pittsburgh of the South”. Birmingham’s population in 1880 was around 3000. By 1900 the city had boomed to over 38000 and by 1921 just 50 years after the city’s inception the population had soared to 178000 (Bagget, 2006).

image from <http://theheartofdixie.wordpress.com/2011/07/06/birminghams-decline/>

Population gains and losses



The population changes in birmingham, AL

After industry bloom in the 1960s, people gradually move out of downtown. The population of Birmingham goes down very rapidly, especially in the downtown area. People in the center of Birmingham earn low income, take low years of education and live in old houses. Compare with downtown Birmingham, the south part of Birmingham is better. The population growth and income is higher than downtown area.

The current situation and problems in birmingham city

After people move out of downtown Birmingham, there are a lot of abandoned house and open space. Many commercial business and recreations moved. The urban network and land use has changed, but the landscape did not change. Therefore, more and more people move out of downtown.

image from (<http://document-shredding-destruction-birmingham-al.com/>)



The industrial history in Birmingham

Birmingham was founded in 1871. It grew from there annexing many more of its smaller neighbors, into an industrial and railroad transportation center with a focus on mining, the iron and steel industry, and railroading.

Before the end of the 1960s, Birmingham was a primary industrial center of the South. The period of rapid development for Birmingham, AL is from 1881 through 1920. Birmingham's major industries were iron and steel production, plus a major component of the railroading industry. Rails and railroad cars were both manufactured in Birmingham. Though the manufacturing industry maintains a strong presence in Birmingham, other businesses and industries such as banking, telecommunications, transportation, electrical power transmission, medical care, college education, and insurance have risen in stature. Mining in the Birmingham area is no longer a major industry with the exception of coal mining, Birmingham ranks as one of the most important business centers in the Southeastern United States and is also one of the largest banking centers in the United States.

(http://en.wikipedia.org/wiki/Birmingham,_Alabama)



Concrete pipe factory

Valley Creek

Slicing through the ridges and directly bisecting the main valley runs the railroad corridors which paved the way for Birmingham's role as a steel and iron production powerhouse of the Southeast. (Atkins 1999) Due to the abundant deposits of iron ore, coal, limestone, and dolomite from 1881-1920 Birmingham was one of the fastest growing cities in the country. Early Birmingham entrepreneurs discovered a wealth of these raw materials in compacted arrangements allowing for low production extraction costs. Because of this characteristic, the largest central valley, Jones Valley, would quickly swell with people from all over the country flocking to the promise of prosperity. Birmingham became known for its famous quantities of steel and iron production, along with its rich forest lands and meandering creek systems responsible for draining the valley and along which much of the industrial factories were located (Atkins 1999).

The Valley Creek watershed is in north-central Alabama. Valley Creek originates in Birmingham and flows west to Bankhead Lake, an impoundment of the Black Warrior River. Valley Creek is 46 miles long and has a total drainage area of 257 square miles. Its tributaries include Blue Creek, Fivemile Creek, and Opossum Creek; all of which are designated for Fish and Wildlife (F&W) use with the exception of Opossum Creek, which is designated for Agricultural and Industrial Water Supply (A&I) use.

The biological health of Valley Creek is dependent on good physical and hydrological characteristics, including proper flow, adequate zones, and diverse substrate. The urbanization of the watershed has fostered habitat destruction through erosion, channelization, concrete substrate, and excessive light and heat penetration. (http://water.epa.gov/scitech/swguidance/standards/uses/uaa/valley_creek.cfm#background)

Valley Creek Flow pass the site

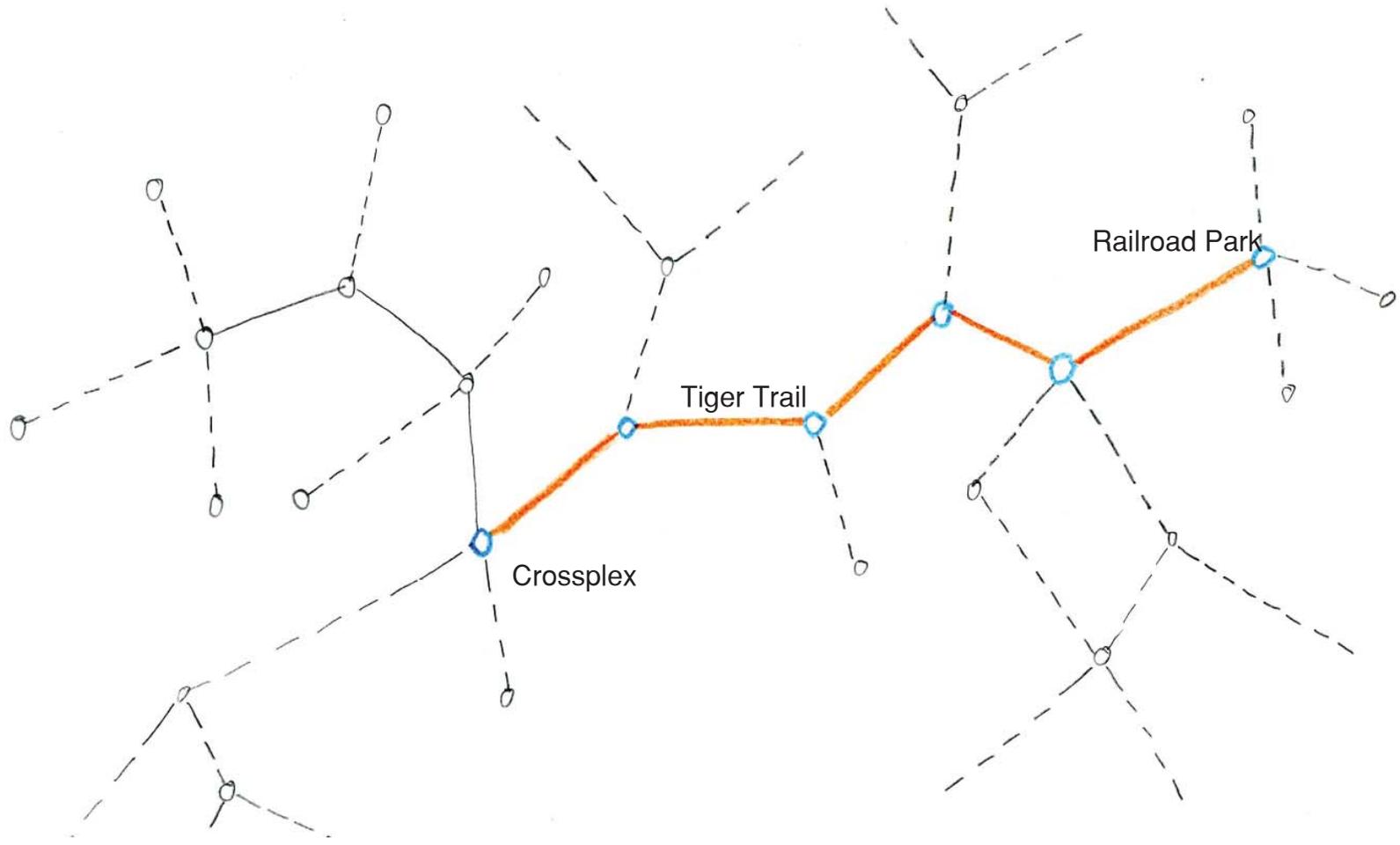


Methodology

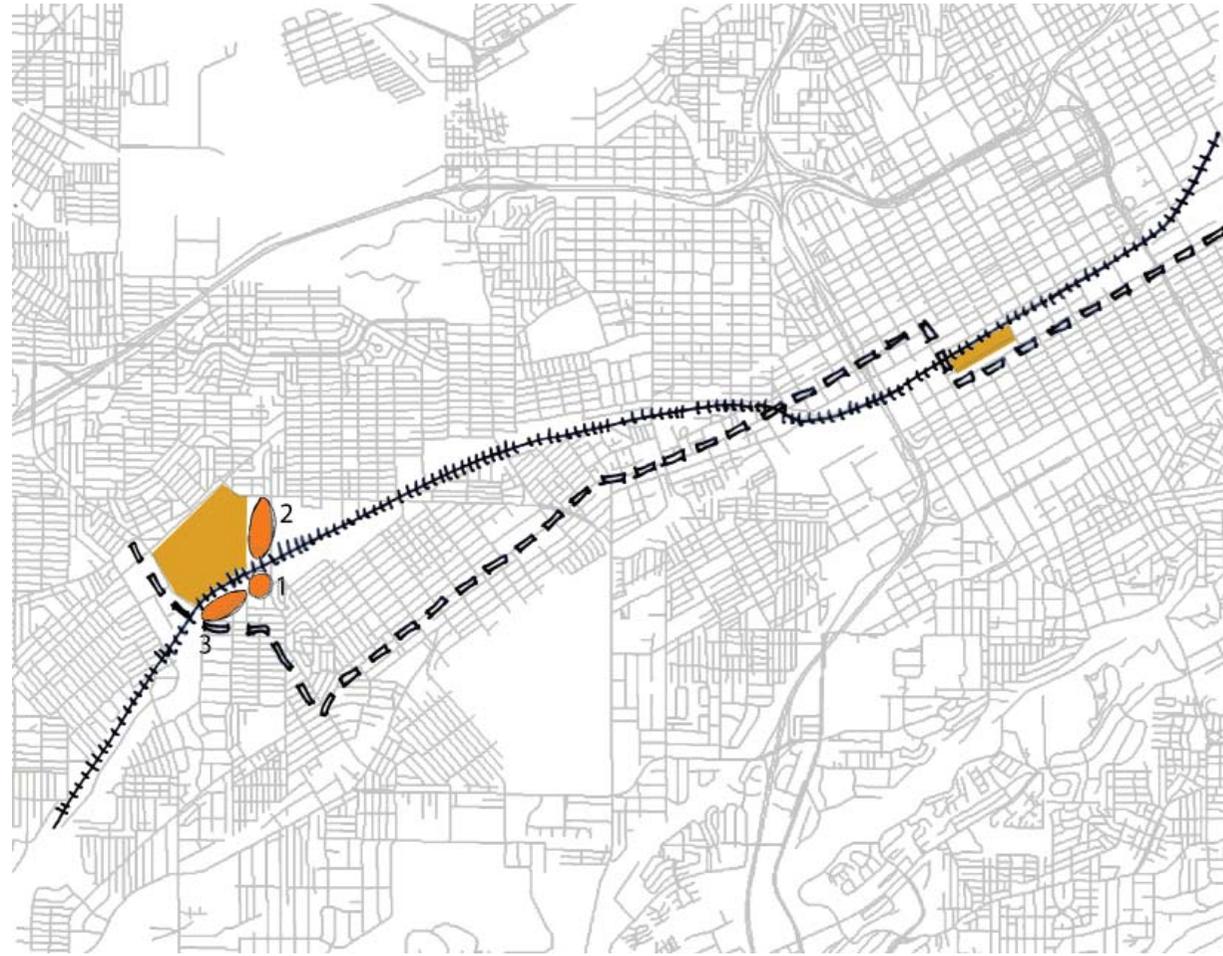
Methodology

A city network includes many nodes and vectors. Citizens do different activities like commercial, recreation, working and education in nodes. And vectors are responsible for connect the different nodes together. Nodes include recreation, commercial, occupation and education. Vectors are all kinds of roads and potential pass ways, such as roads, bus routes, waterways, railroads and pedestrian walkways. In a dynamic system nodes and vectors are always on the more changing in size function and location.

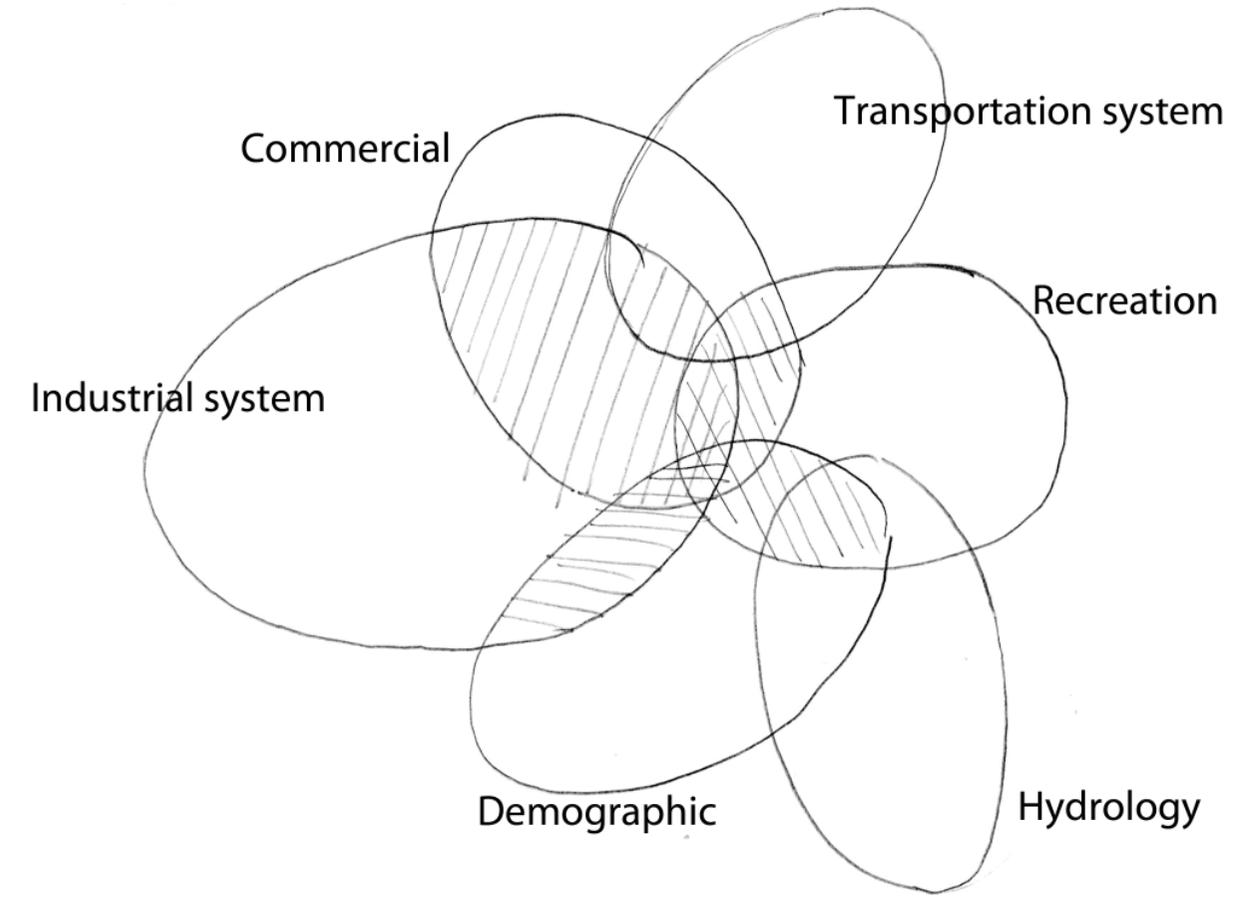
In order to get the final idea, my project process is, first select a site in Birmingham, AL, according to the analysis of different urban network systems, second, make a network map of the site to show how the site is connected to the city, to the holistic system, including ecological and social systems, third, find out how and why the urban network changes, four, do one or many dynamic designs that change through time, according to the analysis. Five, integrate all the designs to make site designs, and evaluate this in terms of the network. Six, ask two questions. How does the design change the urban network? And how does the urban network change the design through time? Finally, do a model for one part of the project site to test the function, space, feelings of touch, smell, look and so on.



Nodes and Vectors



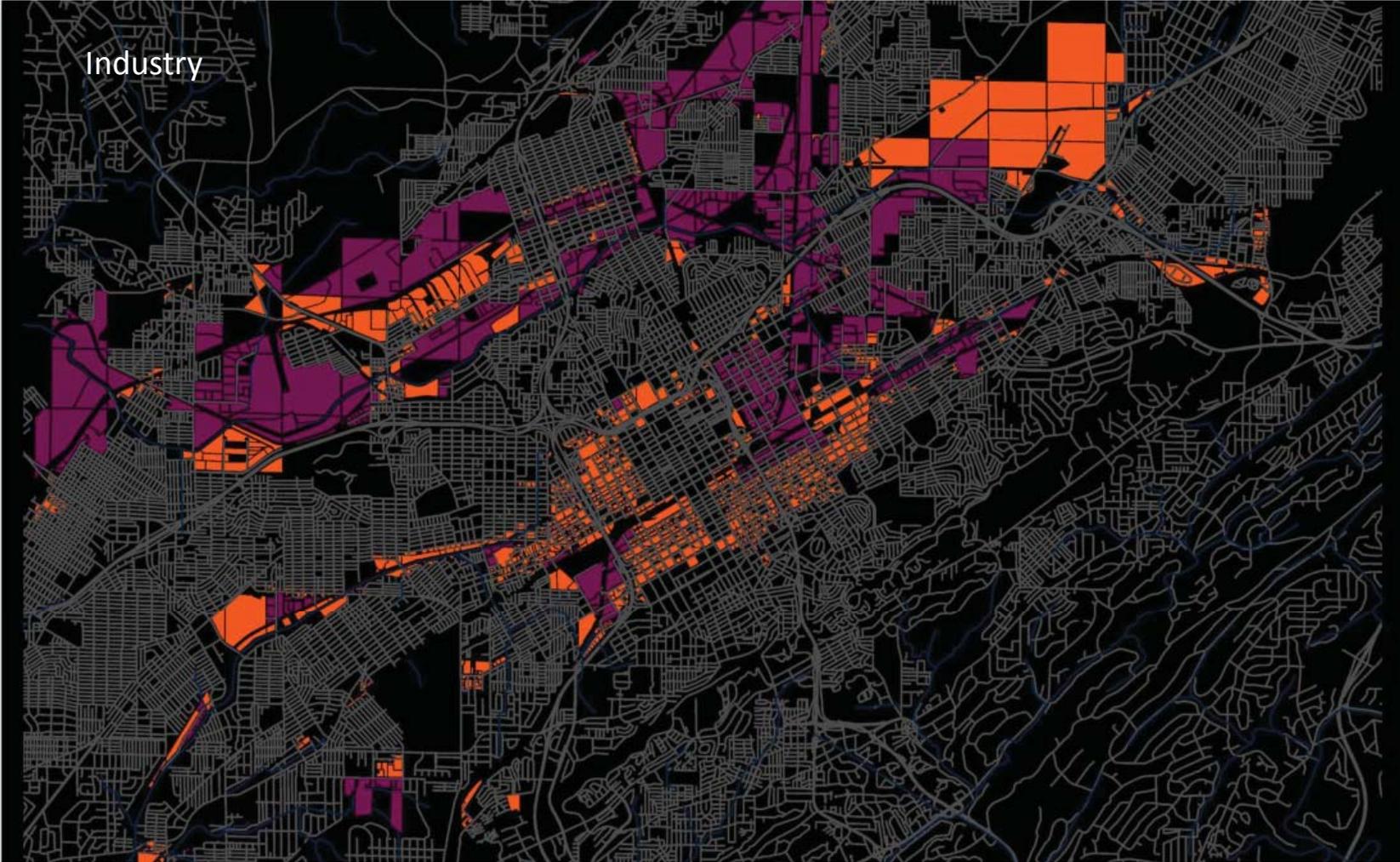
In Birmingham, AL, the Crossplex area and Railroad Park are important nodes. They gather people to recreation, commercial and education. There are many vectors connect them in different ways. One of the vectors is Tiger Trail which enables people to ride bicycle from downtown Birmingham to the west Birmingham area. Another vector for this area is the proposed bikeway which was used to be an abandoned railroad. The project site is located on the intersection of these two vectors, so it is very important for the development of Crossplex area, bikeway, and the whole urban systems.



The project site involved with many urban systems, including commercial, transportation, recreation, industrial, demographic and hydrology. Different systems interact with each other, so in the process of design, when I make some design for one system, I need to consider the influence of design to other systems involved.

Site Selection

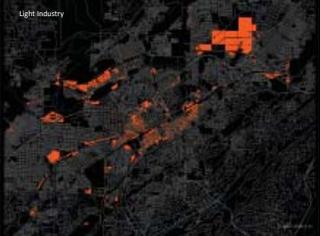
Industrial Mapping



Heavy industry is located in the north part of the city, while the light industry is located in the east and downtown area of Birmingham city. There is no industry in the south part of the city. Related to hydrology and topography, in the north part, the Village Creek passes through the heavy industrail area. In the downtown area, the Valley Creek passes through the light industrail area. And in the south part of Birmingham, there are a lot of hills, so there is no industry in this area.



Heavy industry



Light industry

Transportation Mapping



The railroad system is mainly located in the north part and downtown area of Birmingham. Gas stations are located near highway. Bus stations are located all over the city.



Railroad

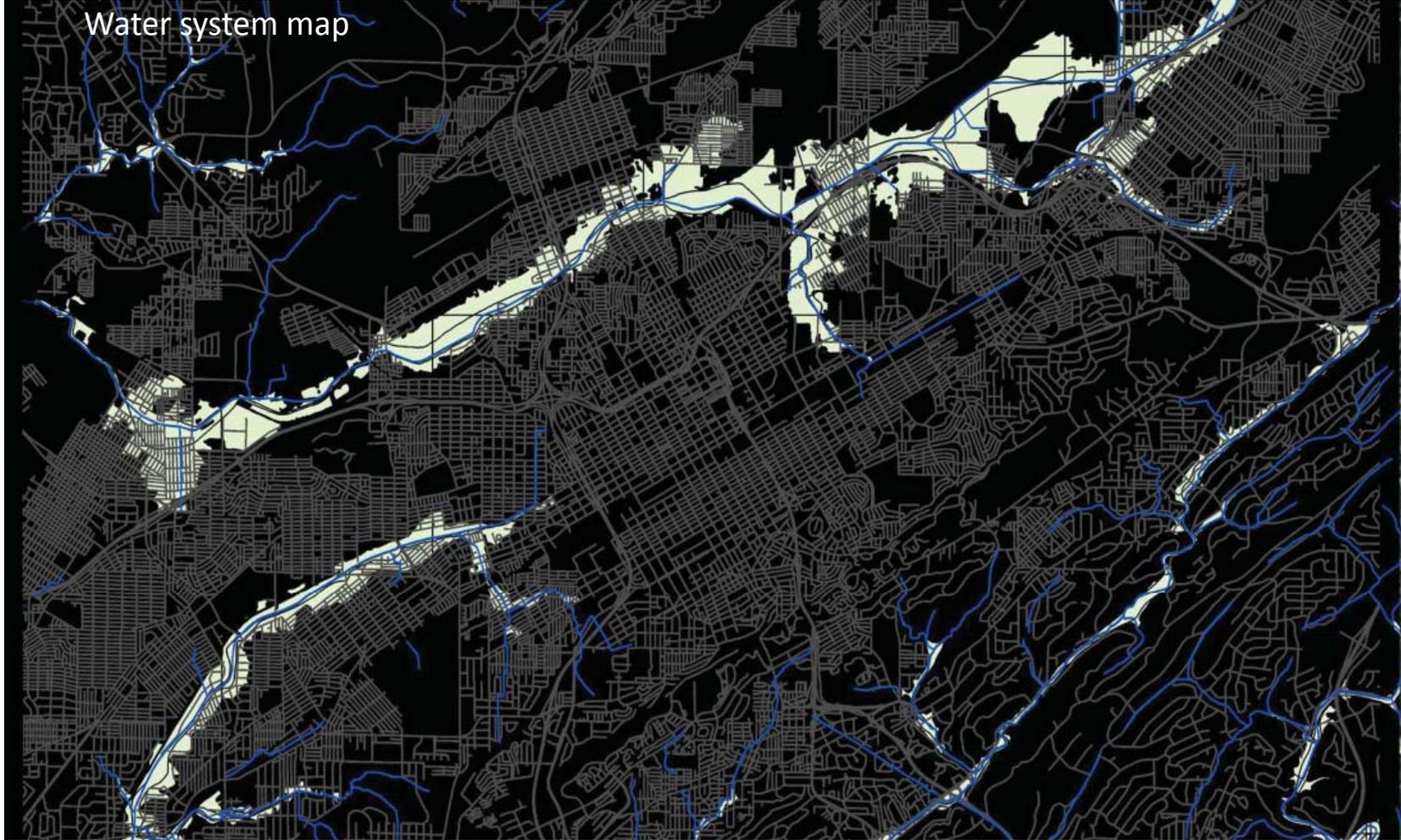


Bus station



Gas station

Hydrology Mapping



There are two major creek systems in Birmingham. They are Village Creek which is located in the north Birmingham, and Valley Creek in the west Birmingham. The flood plains are around those two creeks.

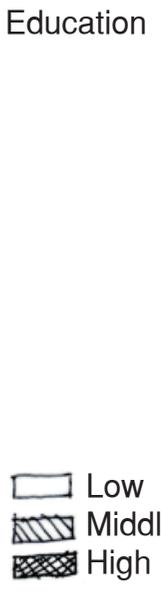


Creek



Flood plain

Demographic Mapping



Find areas of opportunity in Birmingham from demographic mapping process

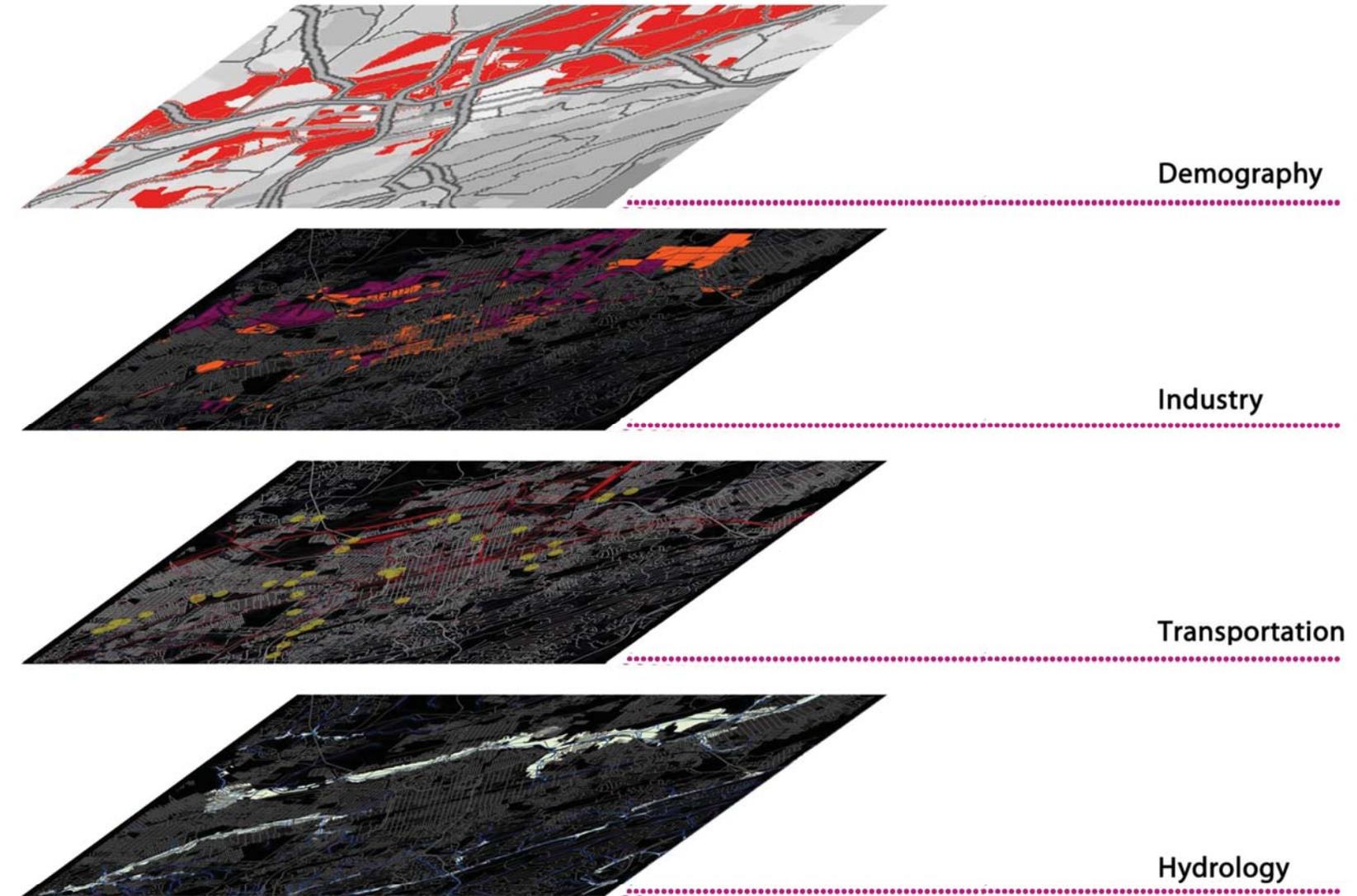
I overlaid them to make one demographic gradual change map. According to my analysis, the lightest areas have highest population growth, family income, education years, and youngest houses, so there will be less problems. And the darkest areas have lowest population growth, family income, education years, and oldest houses, so there are biggest problems in the city.

So, I chose all the darkest areas from demographic analysis, overlaid with transportation system, commercial system, industrial system and hydrology system to find my site. From this process I found one area which is in an abandoned industrial area. It is in a flood plain, close to the transportation system, and surrounded by some commercial development. The demographic analysis shows that the local citizens of this area have low income, low education, low population growth and older houses.

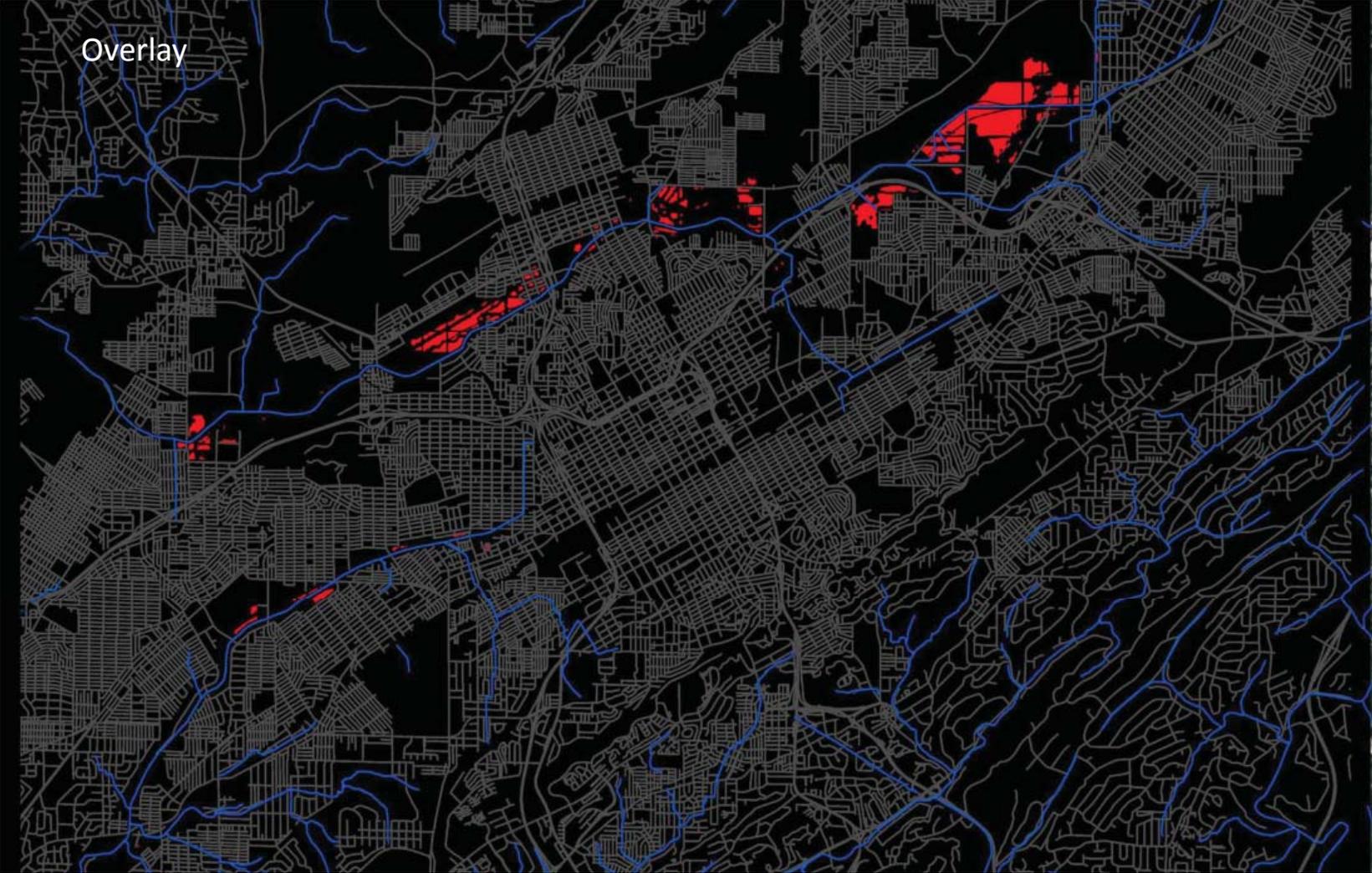
Site choose



Overlay the Demographic mapping with hydrology and social urban systems



Find potential sites



After I overlay different systems, including, demographic, industry, transportation and hydrology system, I got several possible sites. They all involved in many systems. They have some problems in urban systems and big opportunities for landscape architect.



city owned property



tdps



from Railroad Park to Crossplex

The Tiger Trail

After mapping analysis, I found another opportunity to find a project site. The Birmingham government wants to use \$10 million to develop a green way, called Tiger Trail. Tiger Trail is a proposed bikeway which connects Sloss, Railroad Park and Crossplex area. Birmingham government wants to use the Tiger Trail bring more people to west Birmingham and develop Birmingham. As a trail head of the Tiger Trail, Crossplex will develop into a small business center, according to Birmingham Comprehensive Plan. This is a big opportunity for the post industrail area around Crossplex. It may get some funding to develop, and more people will migrate to these area. There is one site from the mapping analysis which is near Crossplex area, so I decided to choose this site as my project site.

Land use context



Context Analysis

The project is surrounded by community buildings. Most of the residences are low income people. The Crossplex area which is in the west of the project site is an area for people to watch games. Big areas of parking lots provide visitors enough places to park their cars. In the east of the project site, there are many metal recycle factories and car repair shops. Most of the commercial area around Crossplex area is located in the Bessemer road in the north and the west areas of Crossplex.

Existing and potential connection to Tigertrail



Connection With the Tiger Trail

The project site can connect with Tiger Trail in many ways. People can go north from Fayette Avenue and go around the Crossplex area to the Tiger Trail. People can also go south from Fayette Avenue to Woodland Avenue to arrive the Tiger Trail. There are other potential connection between the project site and the Tiger Trail. There are entrances from the west of the site, and abandoned railroad is another entrance. However, those entrances are blocked by fences right now.



Site land use Analysis

The project site was a concrete pipe company, but abandoned for many years. It is mainly covered by concrete. The big industrail building is located in the south part of the site. The machines and building damaged to some extent, because they have been abandoned for many years. Some other abandoned buildings are located on the north of the site. There are concrete materials on the site, such as concrete pipes and concrete bricks.

An abandoned railroad passes through the site. This abandoned railroad will develop into a bike way which connects Crossplex area to Railroad Park after 2025. Valley Creek is another corridor which passes the site. Most of the vegetation grows on these two corridors.



Site edges condition Analysis

The site is surrounded by many kinds of edges. In the east and north, Fayette Avenue and Lomb Avenue separate the site and communities. In the west of the project site, woods separate the project site with Crossplex area. There is fence around the big industrial building. Valley Creek is the south edge which separates the site and community.

Existing buildings

There are several industrial buildings in the project site. The biggest one in the south is a factory building. It belongs to the concrete pipe company. There is a concrete making machine outside building. The building and machine has been abandoned for many years, the surface of them damaged to some extent. There is fence around the building.

Inside the building, the columns and structures still very good, but some of roof is broken.



exterior of Concrete pipe company building



inside of Concrete pipe company building

Materials

There are several kinds of materials around the project site. In the north part of the site, there are a lot of concrete pipes of different size and forms. Some of them decay to small pieces. The open spaces in the site are all concrete. The abandoned railroad can provide recycled steel and woods.



Abandoned railroad



Concrete pipes

Valley Creek

Valley Creek passes through the project site. The factory concrete surface drains runoff water to Valley Creek by concrete pipes. Valley Creek floods every year. There is a line of signal on the creek bank which can show the deep of annual water. The 25 years flood plain shows that the big flood water will flow into surrounding industrial areas and communities.



Valley Creek

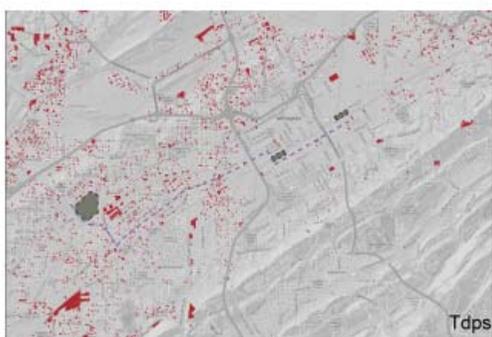
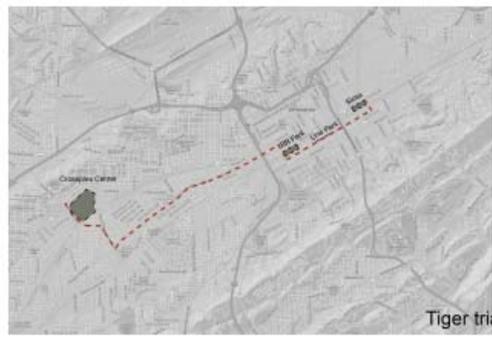
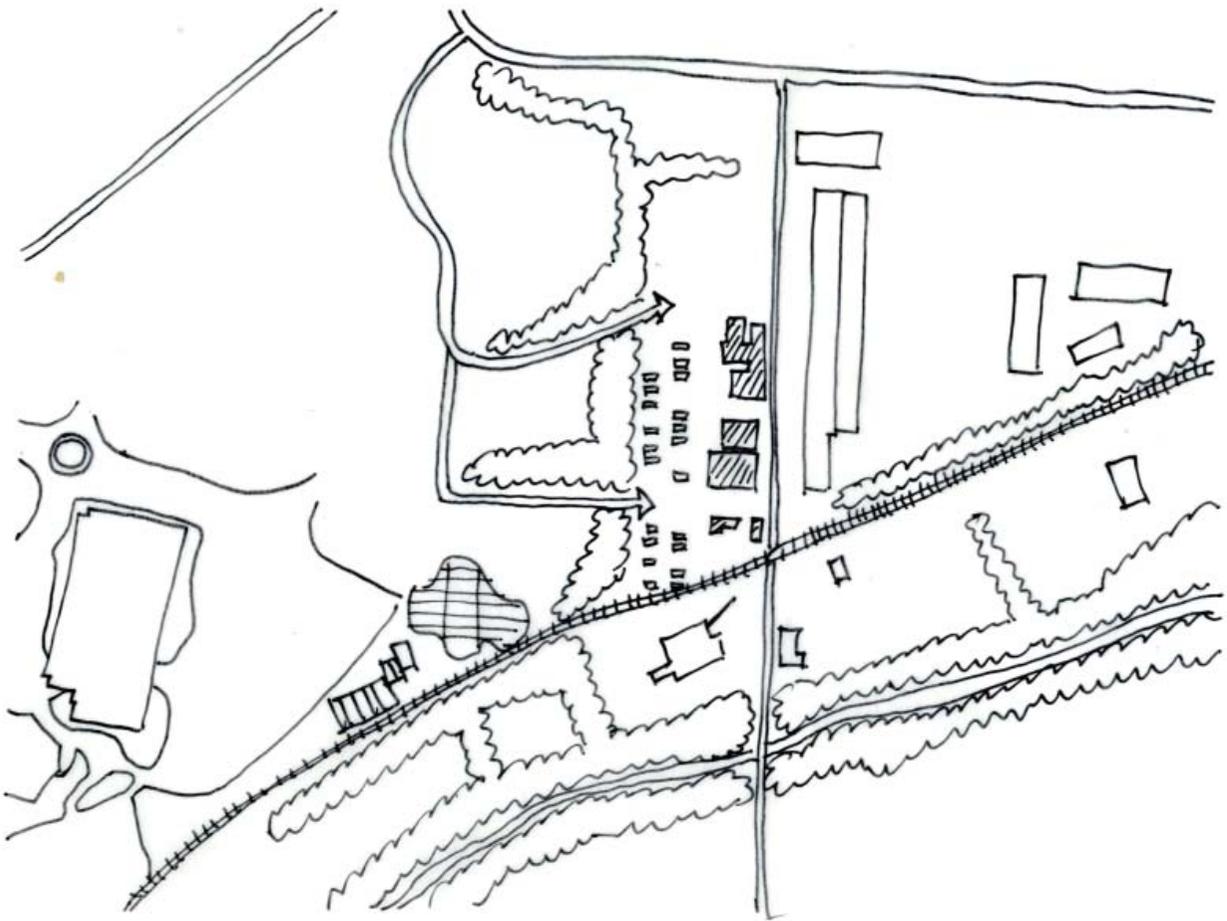
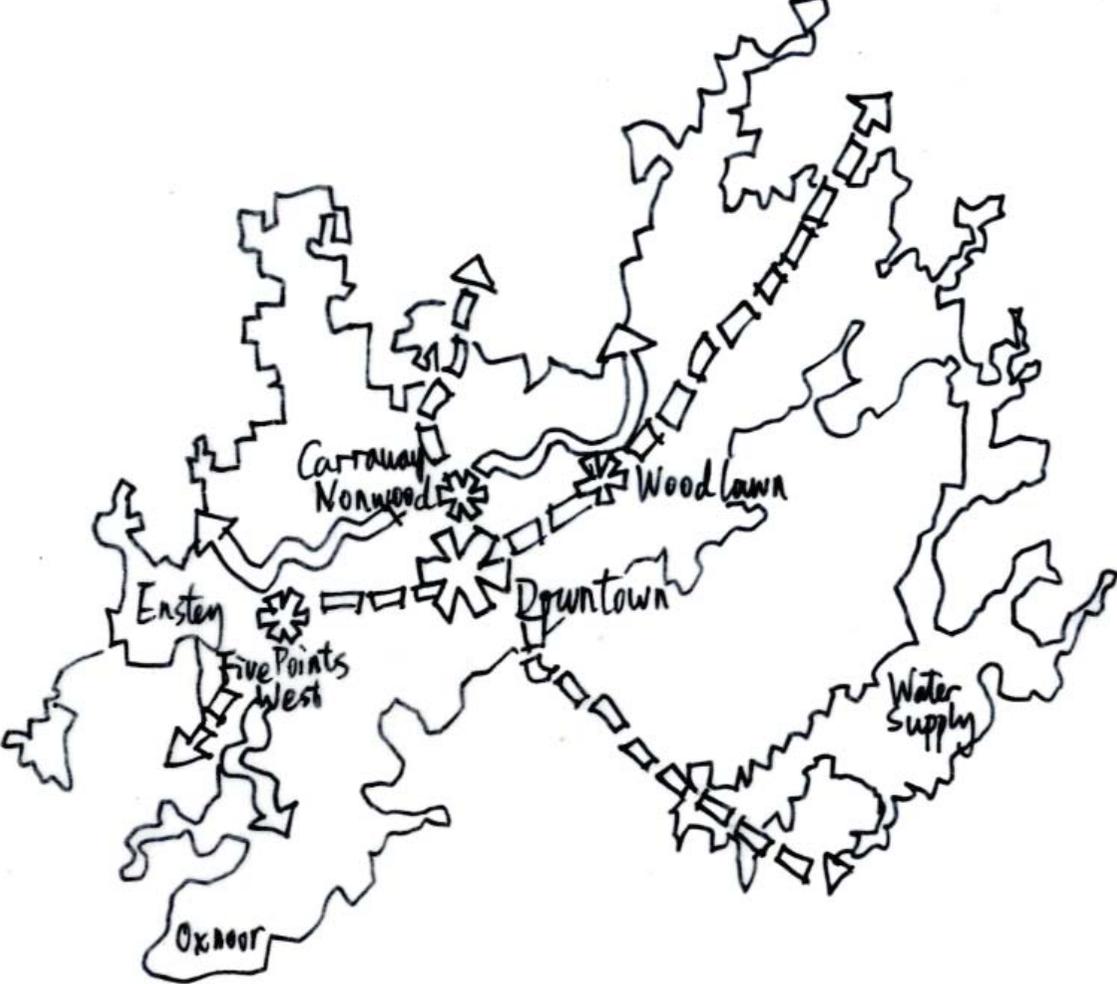


Drainage from factory

Design integration

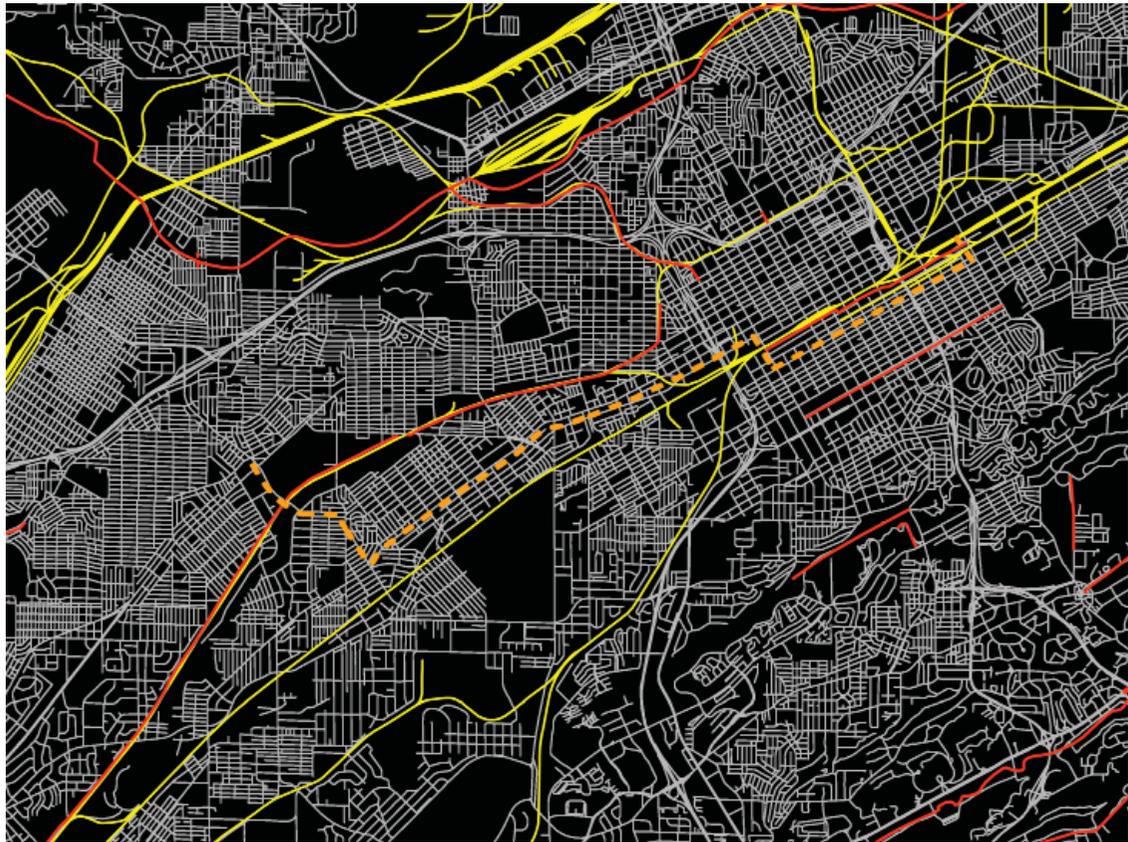
Production system

The first investigation is the Production Park. There are a lot of economically disparaged people and tax delinquent properties around the Crossplex area. So the local people need jobs. Moreover, the Tiger trial and road system enable the Crossplex area to connect to downtown Birmingham. The idea is to use the buildings located in the site to develop restaurants and food production, and to sell the food to downtown Birmingham or to the visitors who come to Crossplex for sport. And the existing nursery and pond can be used to produce organic vegetable and fishes.



The intention is that the Production Park can improve the local economy by providing jobs to local residents. And it can also provide food to visitors and give them an opportunity to observe the process of growing organic food.

Infrastructure system



The second design more includes infrastructure. As mentioned, the abandoned railroad which goes across the site will be developed into a bikeway.

The idea is to use the area between the railroad corridor and Valley Creek corridor to design a public area that supports the bikeway, such as some restrooms and restaurants. And this area could also be designed for different community events, such as some students' outdoor classrooms, pumpkin carve, outdoor sport, home-made sale and so on.

- Tiger Trail
- Railroad
- Bikeway

Art system



The third design is an art park. There are a lot of concrete pipe and concrete materials on the project site, and there are many steel and other metal materials on the site to the east that belong to the recycling company. So the idea is to hire local people and artists to use those materials to make art installations. Eventually the art park could provide job opportunities for local people and attract visitors to the Crossplex to appreciate the industrial history and love the area.

Material

Concrete pipe company



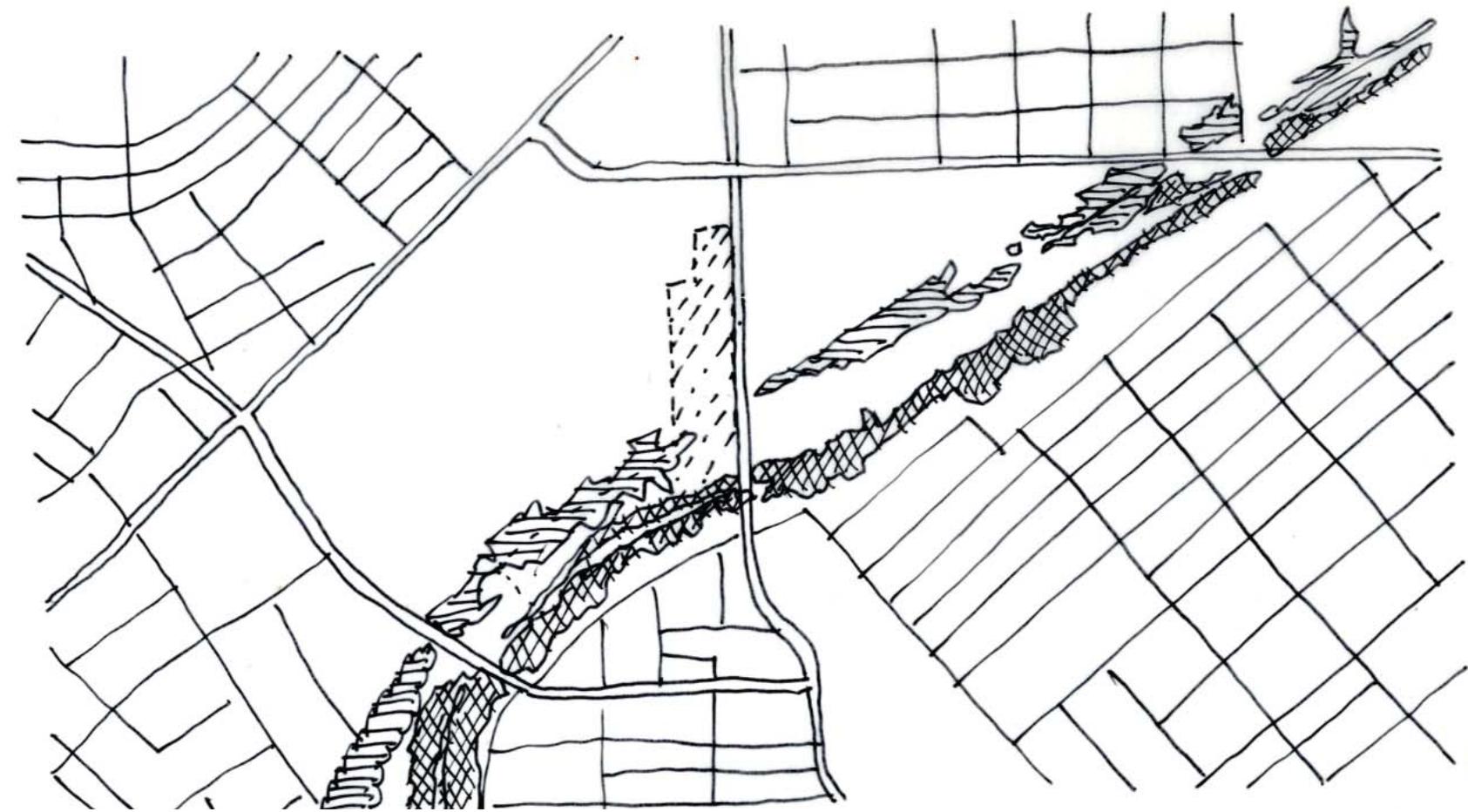
Car recycle company

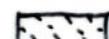


Landfil company

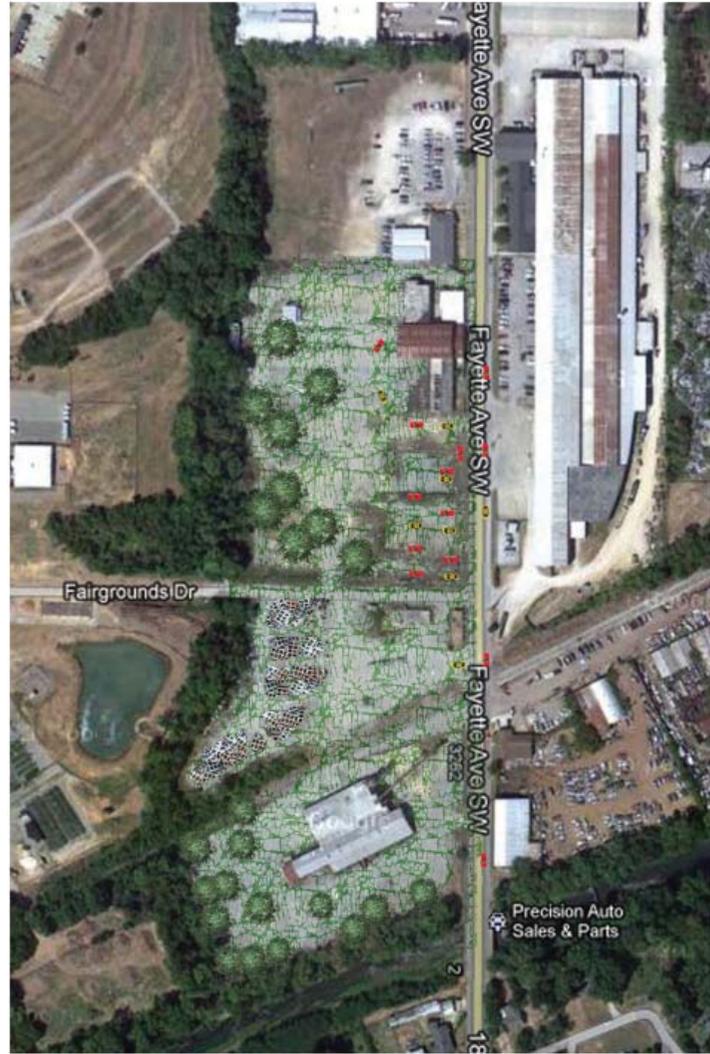


Habitat system



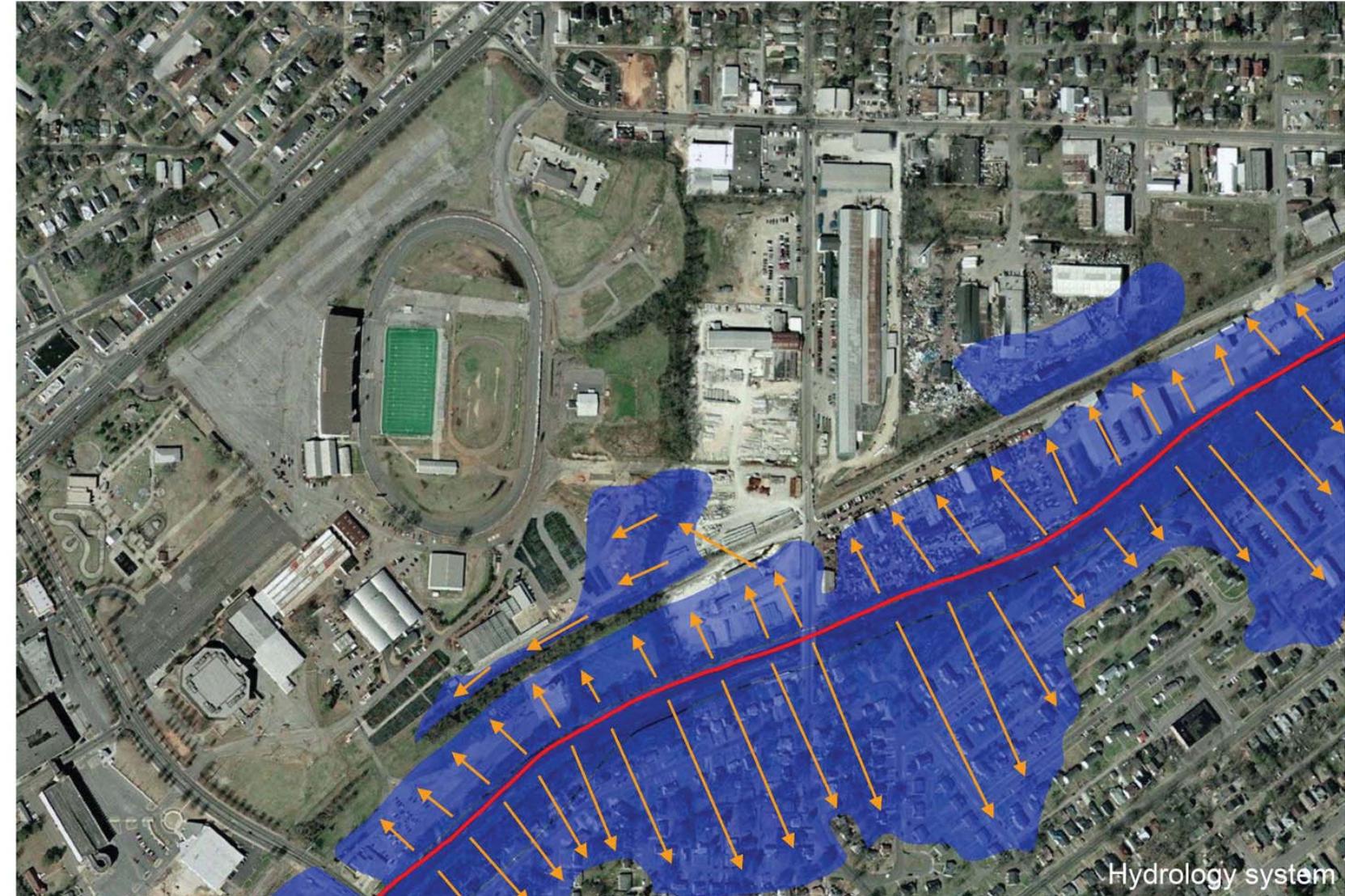
-  Valley creek corridor
-  Railroad corridor
-  Project site

Valley creek corridor and railroad corridor



The forth design initiative is about habitat. Because the site is located near a railroad corridor and Valley Creek, there are a lot of trees and small animals here. And the concrete surfaces are beginning to break and enable vegetation to grow there. So the idea is to break some of the concrete surface to make more channels on the ground to enable easier succession and use the concrete pipe covering some soil to make some microclimates and form habitat for small animals.

Hydrology system



H25 years flood plain

The fifth design initiative is about hydrology. The Valley Creek floods yearly. Some of residential area is in the floodplain. The research explores the idea of doing moats in the abandon concrete area and growing wetland plants in moats. The moats would be connected to Valley Creek. When the flood water comes water will go into the moats first, then, in a controlled way into the residential areas. The surface of the platform is made from pieces of concrete and recycled materials from abandoned buildings. The platform is multi-functional. It can be used for commercial purposes for outdoor movies, presentation, dance and so on.



Normal before design



Flood after design

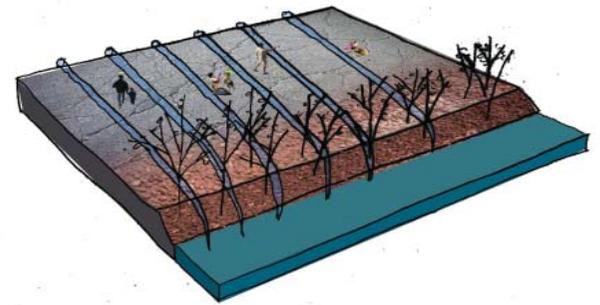


Sections of the creek, when it flood and not flood

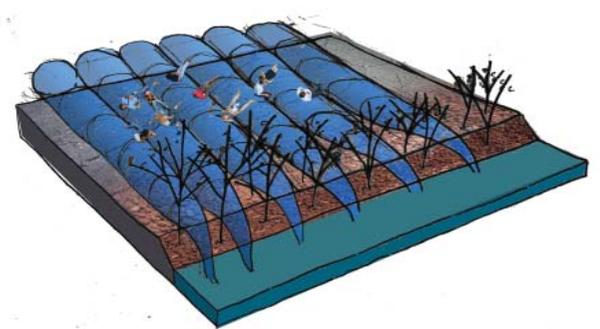


Alluvial Sponge Comb

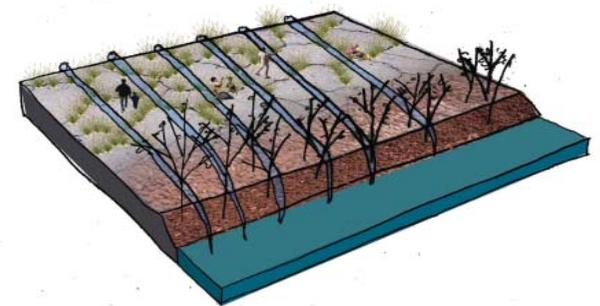
2015 Normal



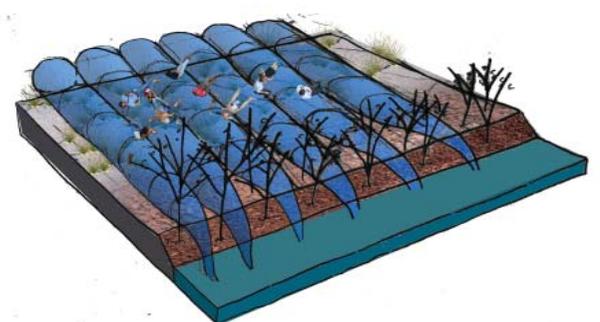
2015 Flood



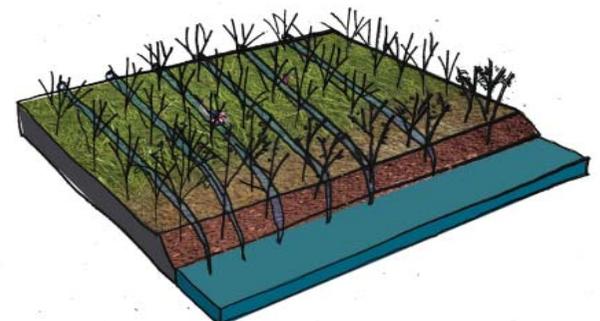
2035 Normal



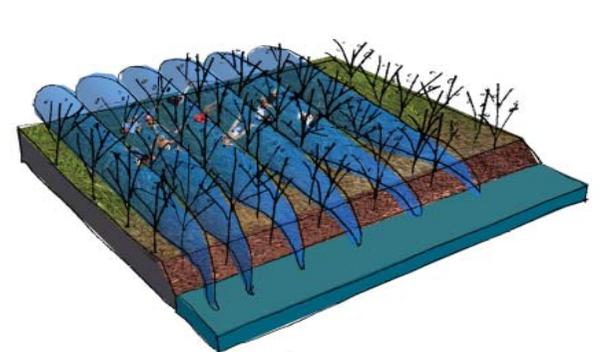
2035 Flood



2065 Normal



2065 Flood



The sponges can be use to flood water treatment. They can absorb water when it floods and release water when the flood water leave. The sponges can also make different space for people's activities. People can use them as seats. Trees can grow between sponges.

Integrated Design

The final, integrated design will come from those five initial designs. I will design moats in the abandon concrete factory area. The moats surround platforms which are multifunctional, for use by local residents and visitors. The buildings of the concrete company will be used for small commercial and food production. The buildings will help to develop local commercial enterprises, and assist with the development of the Crossplex into a small commercial area. In the area between the abandoned railroad and Valley Creek, I designed sponges which can absorb water when it floods and give the water back when flood waters go away. The shape of sponges will change according to how much water they absorb. Different shapes of sponges will make different space and different texture, soft or hard, will enable different kinds of activity to occur on the site.



Year 2015



Year 2035

Year 2035



Year 2065

Year 2065

Case Study

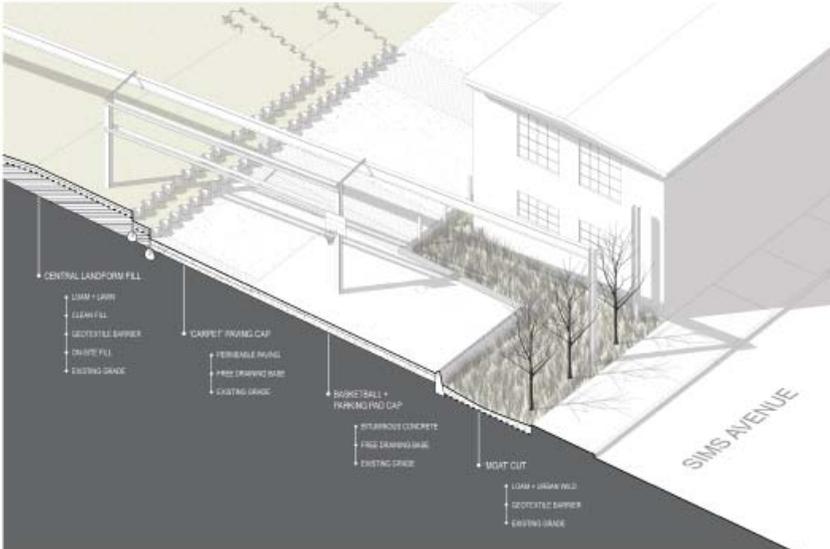
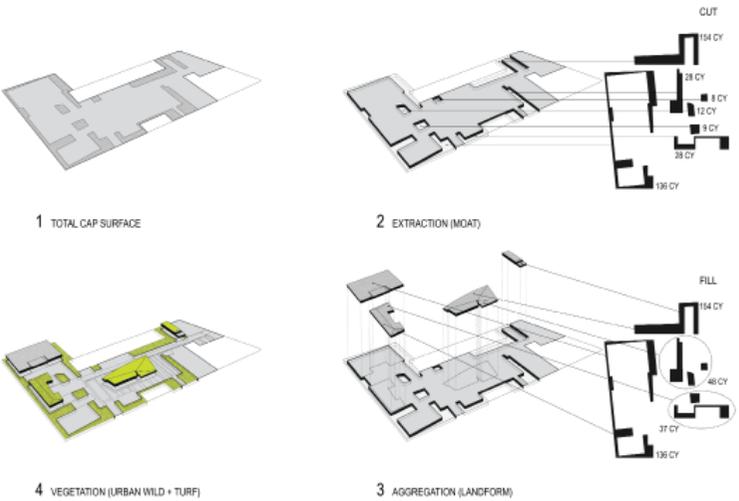
Case Study1: The Steel Yard

Remediation Strategy

Material recycle and reusing of building

Idea of Moat for water treatment

Multi-function use of open space



CAP SECTION

Idea of Moat for water treatment

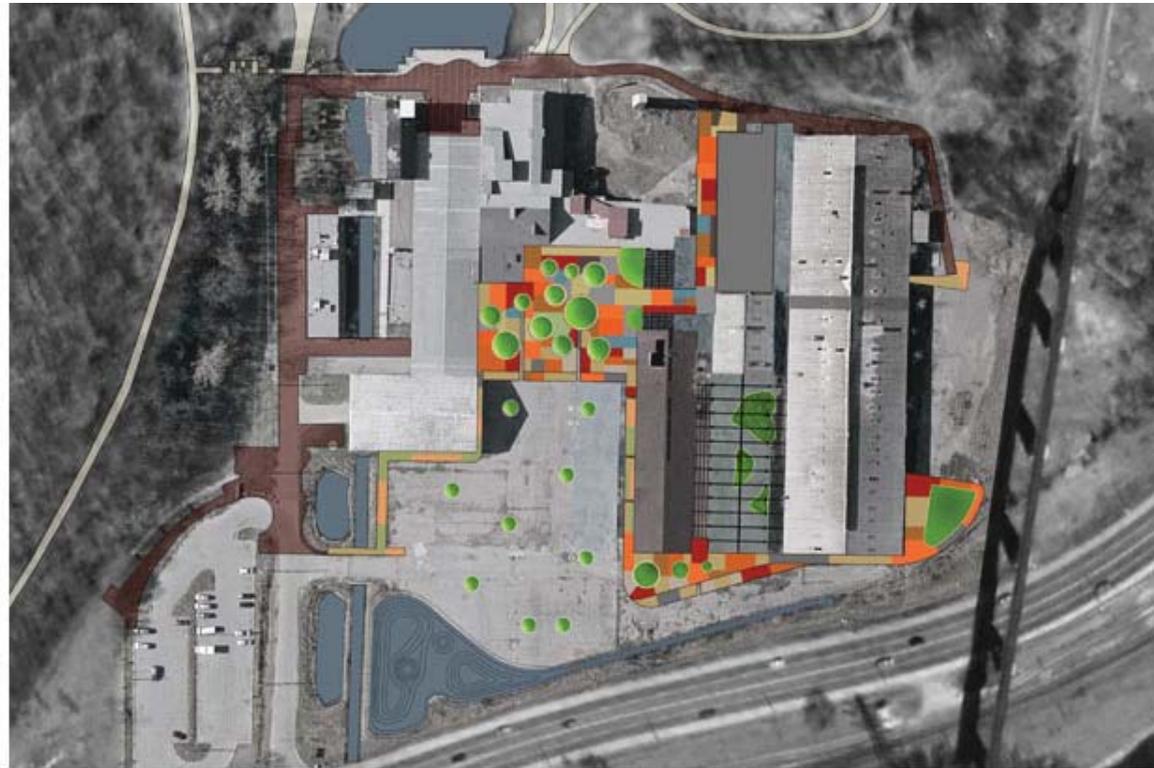
images from <http://www.asla.org/2011awards/183.html>



Multi-function use of open space

images from <http://www.asla.org/2011awards/183.html>

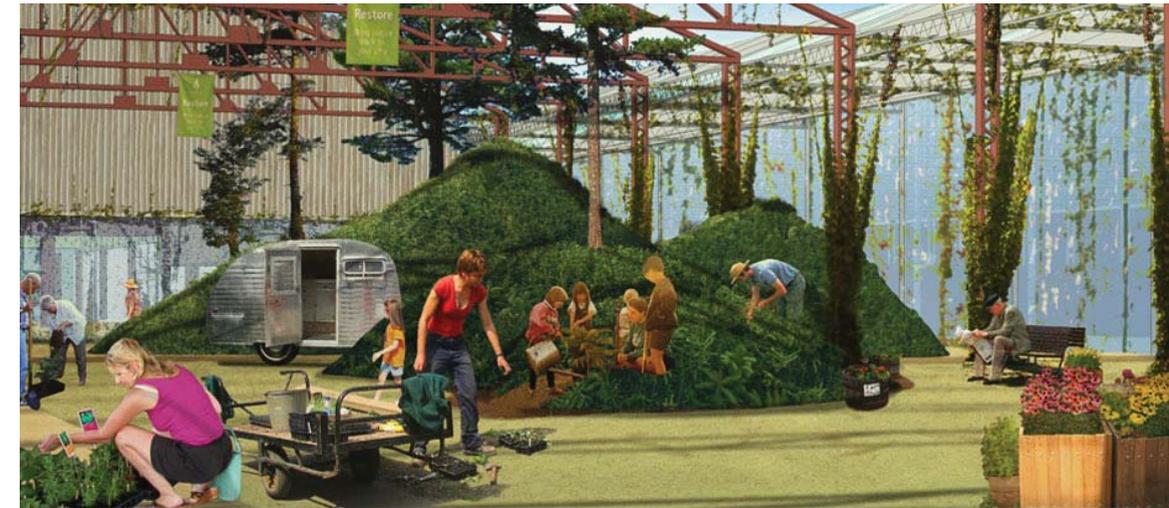
Case Study2: evergreen/brick works



The case study of evergreen/brick works is mainly about turning a post-industrial site to green space in a creative way and still keeping the industrial heritage. The idea is connecting nature, individuals, and cities. The industrial building becomes gardens and a nursery, a children's discovery area, conference and event facilities, skating surfaces, an organic farmers' market, spaces for an array of socially conscious organizations, and continued development within the existing 40-acre wetlands and meadows park.

The conceptual approach focuses on the transformation of this post-industrial ruin into a 'green' site. Seeking to transcend the overused term "sustainability," the proposal emphasizes the idea of trajectories of movement through the site - of water, cars, electricity, trains, and wildlife. The plan addresses a need for higher site porosity as a means to create a free-flowing system of sustainable components in, around, and through the area.

(<http://www.claudecormier.com/project/evergreen-brick-works>)



indoor garden



perspective

images from <http://www.claudecormier.com/project/evergreen-brick-works>

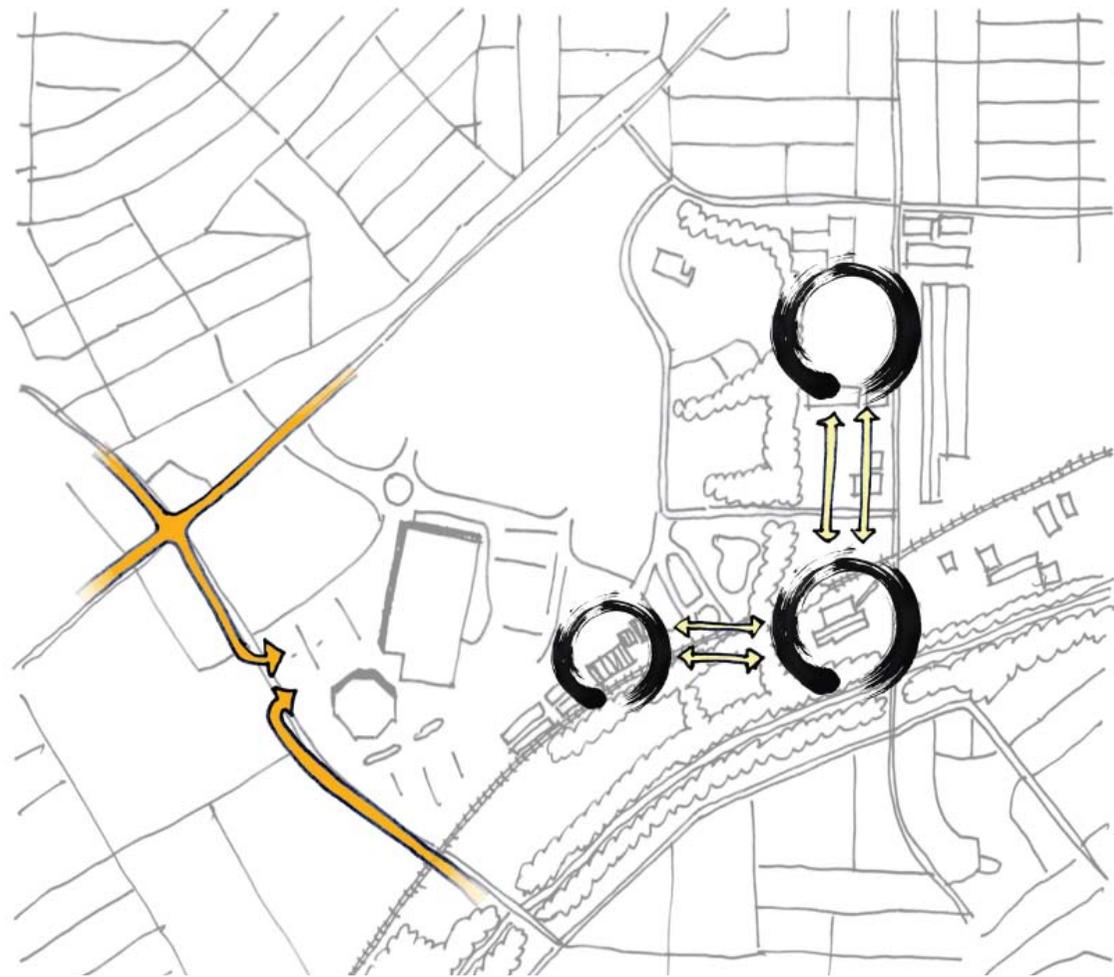
Site Design



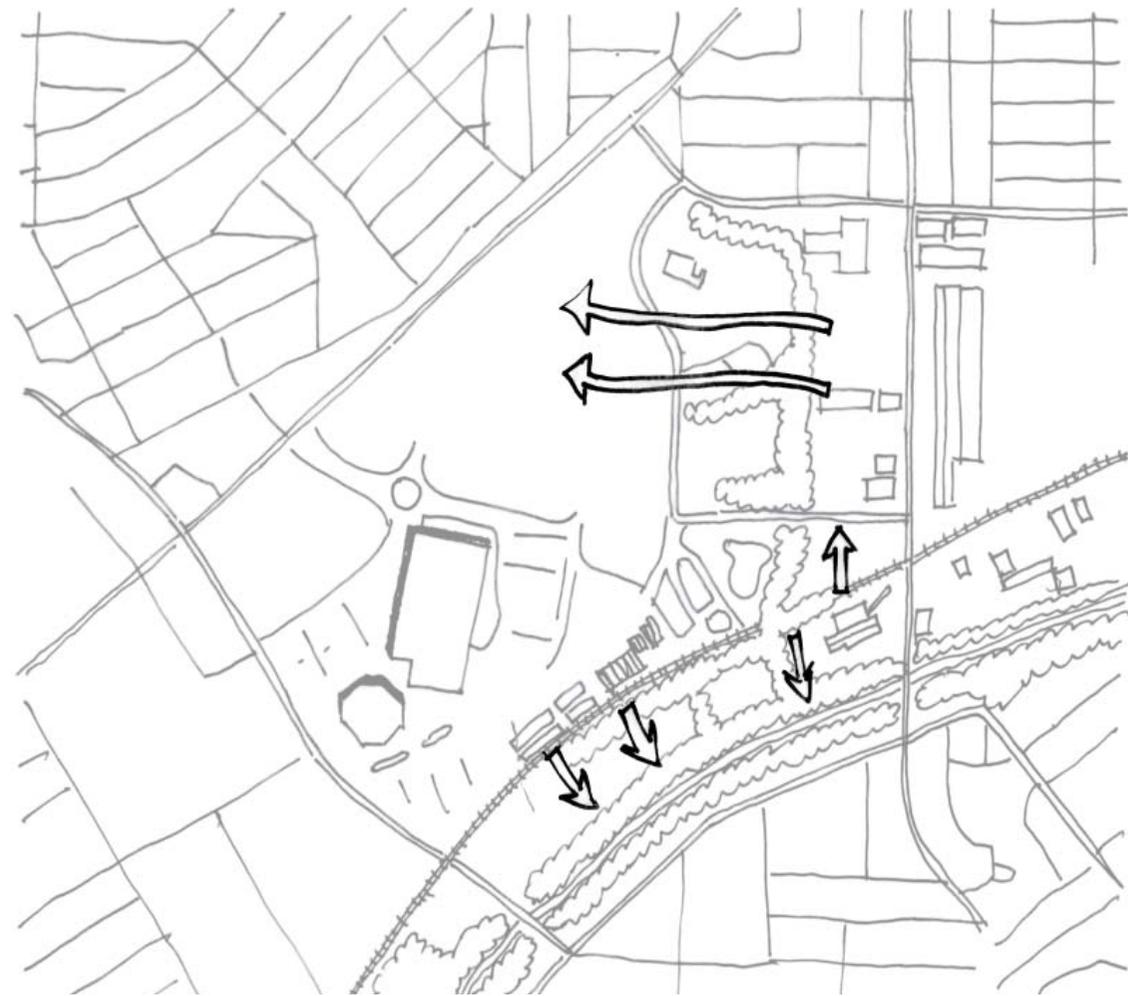
Site A Concrete factory building and machine
 I will think about the idea of art gallery and entrance of bikeway.
 Site A and B Concrete pipe company
 I will think about the idea of small business center.
 Site A and C The area between railroad and Valley Creek corridor
 I will think about the idea of water garden and water treatment.



My ideas include 3 stages. The first stage is turning the big industrial building to a greenhouse. There is a greenhouse nursery in the west of this area. The existing greenhouse provides plants for the city development project. And when the city begins to develop the Crossplex area, they will use much more plant materials. So the proposal greenhouse can provide some trees and shrubs to the development of the Crossplex area. The proposal greenhouse will be operated by the same owner of the existing greenhouse nursery.



The second stage is developing the small business area and turning the greenhouse to an eco-restaurant. In the Birmingham Comprehensive Plan, it is said that the Birmingham government wants to develop the Crossplex area as a small business center. My idea is designing the abandoned factory area for a small business area first, because there are existing open spaces and buildings. After greenhouse provides plants, it will develop as an eco-restaurant. There will be a functional connection with the small business area.



The third stage is that, after the Crossplex area is ready to develop a small business center, the small business in the small business area will move to the Crossplex area, and the small business area will become multi-functional open spaces. And in 2025, the abandoned railroad will develop as a bikeway. I will develop the area between the railroad corridor and the Valley Creek corridor as a water garden.

Eco-restaurant area

This area is located in the southeast of the project site. It is in the west of Fayette Avenue, and north of Valley Creek. The existing condition is a big factory building, machines and concrete surface. The building and machines have been abandoned for many years. The surface of the building is very poor, but the structure is still good. There is some plants succession on the concrete surface.



Industrial building



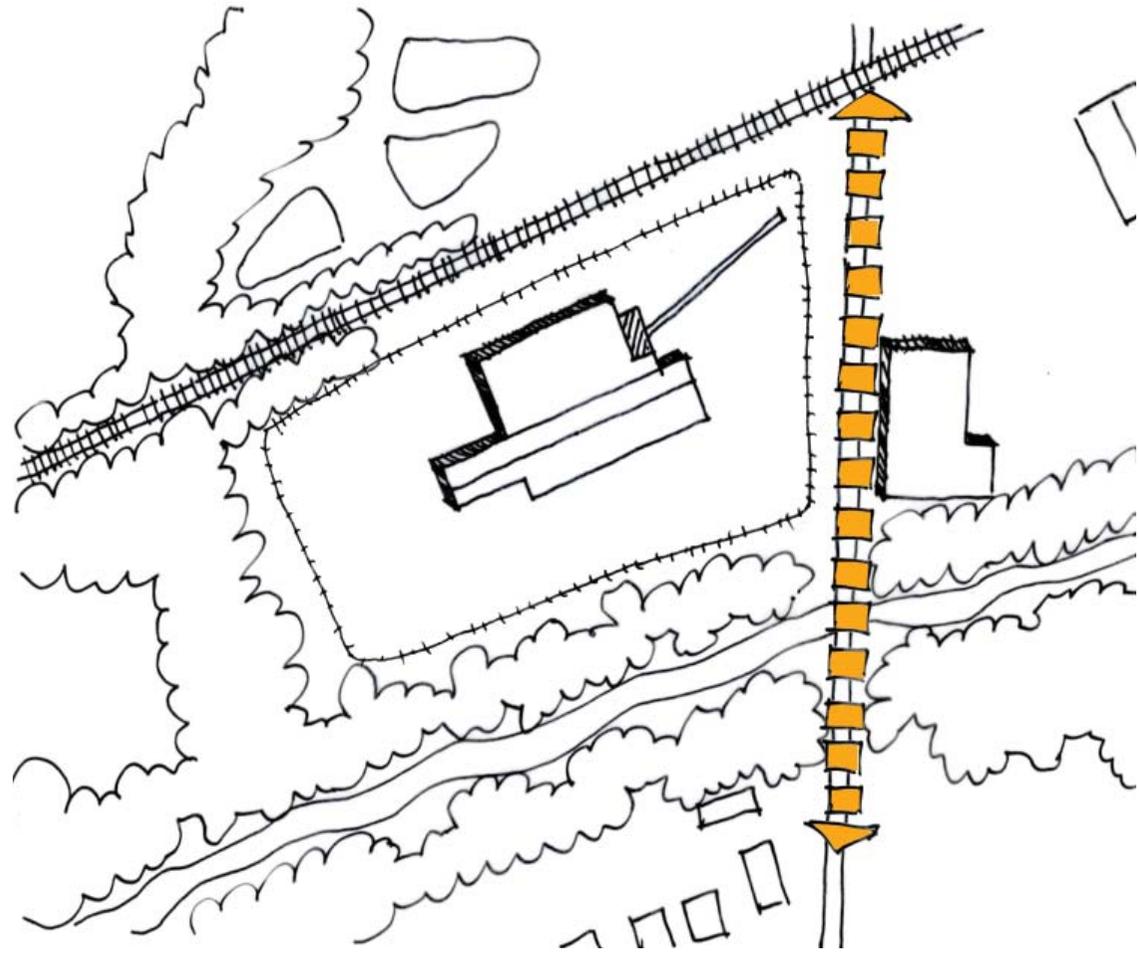
Structure of building



Surface of building



Concrete surface



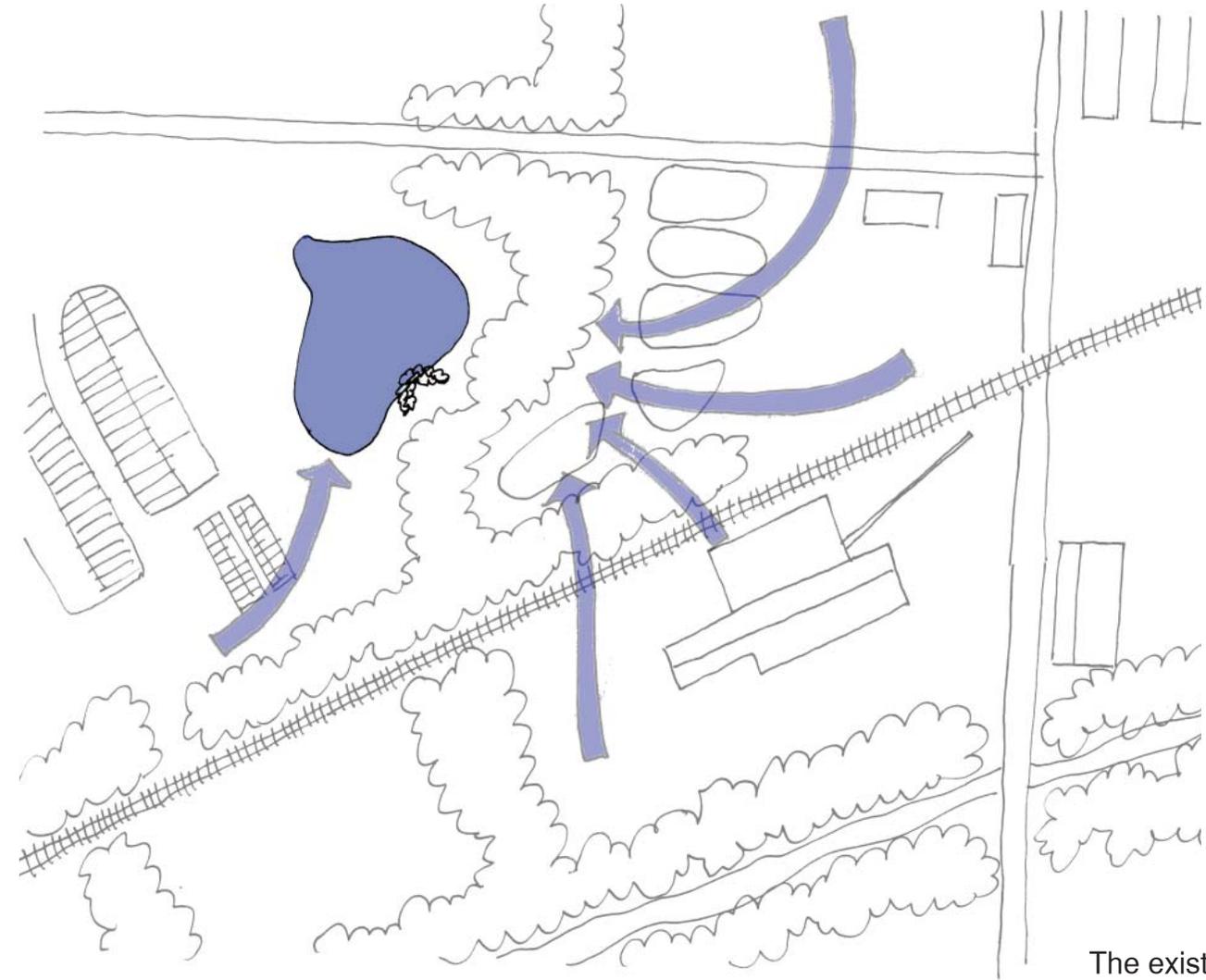
There is a fence around the factory building. People and cars move along Fayette Avenue. No other commercial building, except car repair shops, is on Fayette Avenue. There are no recreation or commercial activities in this area.



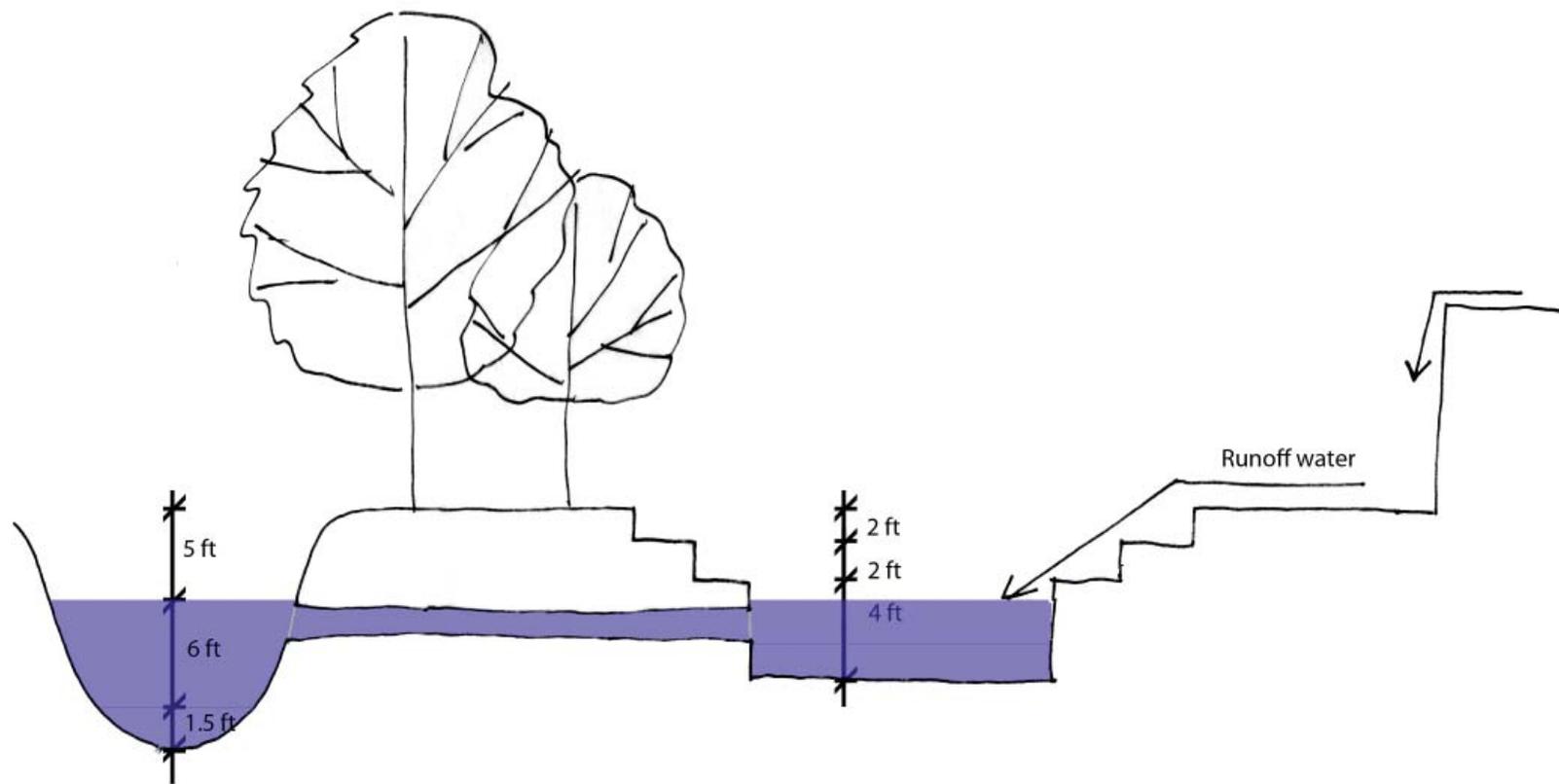
Stage one for this area is taking off the fence and turning the building into a greenhouse. The greenhouse can provide plants for the Crossplex development. The commercial and working activities will happen near the greenhouse.



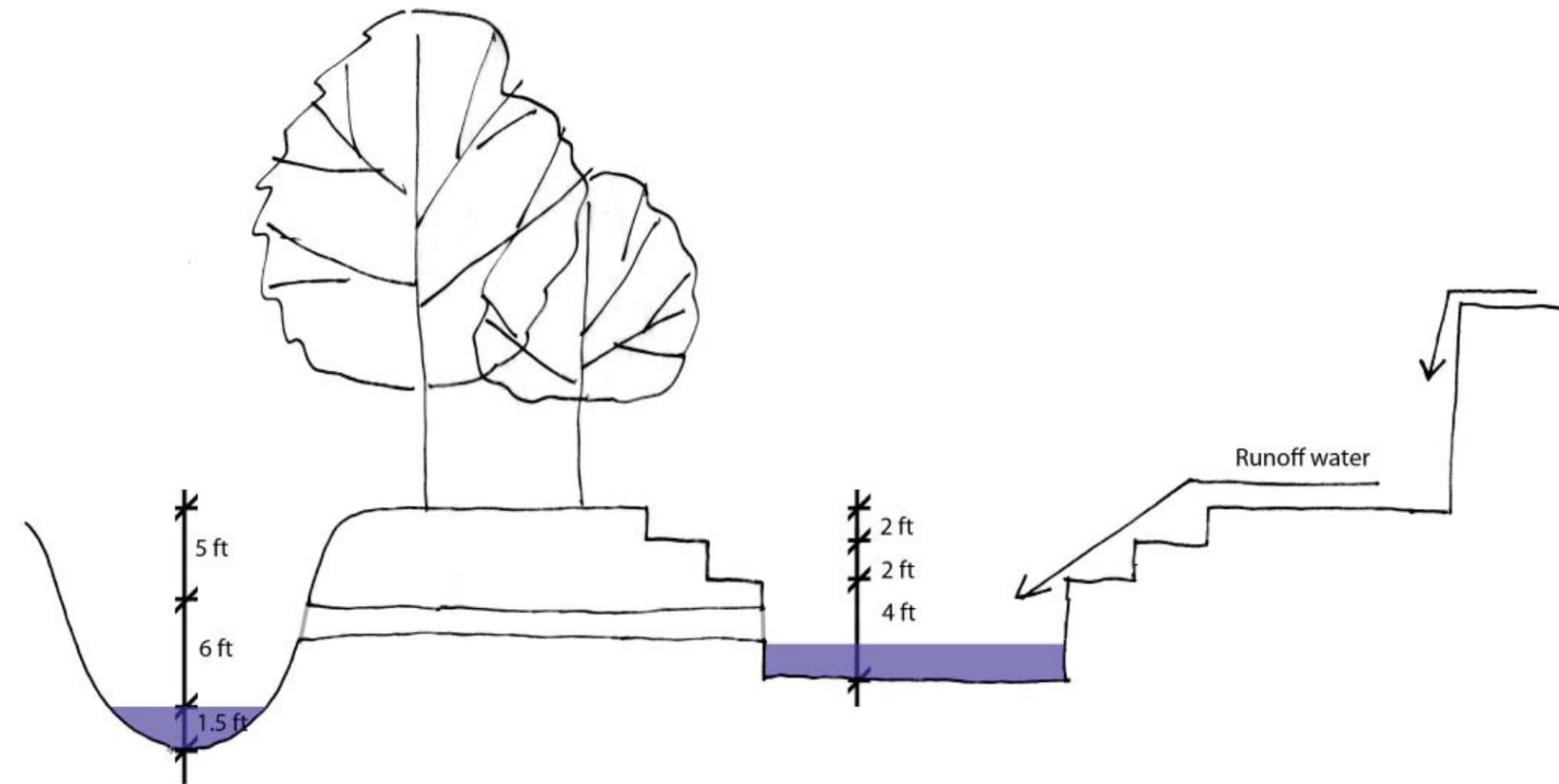
Another issue is floodwater. From the signal found on the creek bank, the annual flood water level is 6 feet higher than the normal water level. And the 25 years flood plan shows that the flood water will go to surrounding community and factory area.



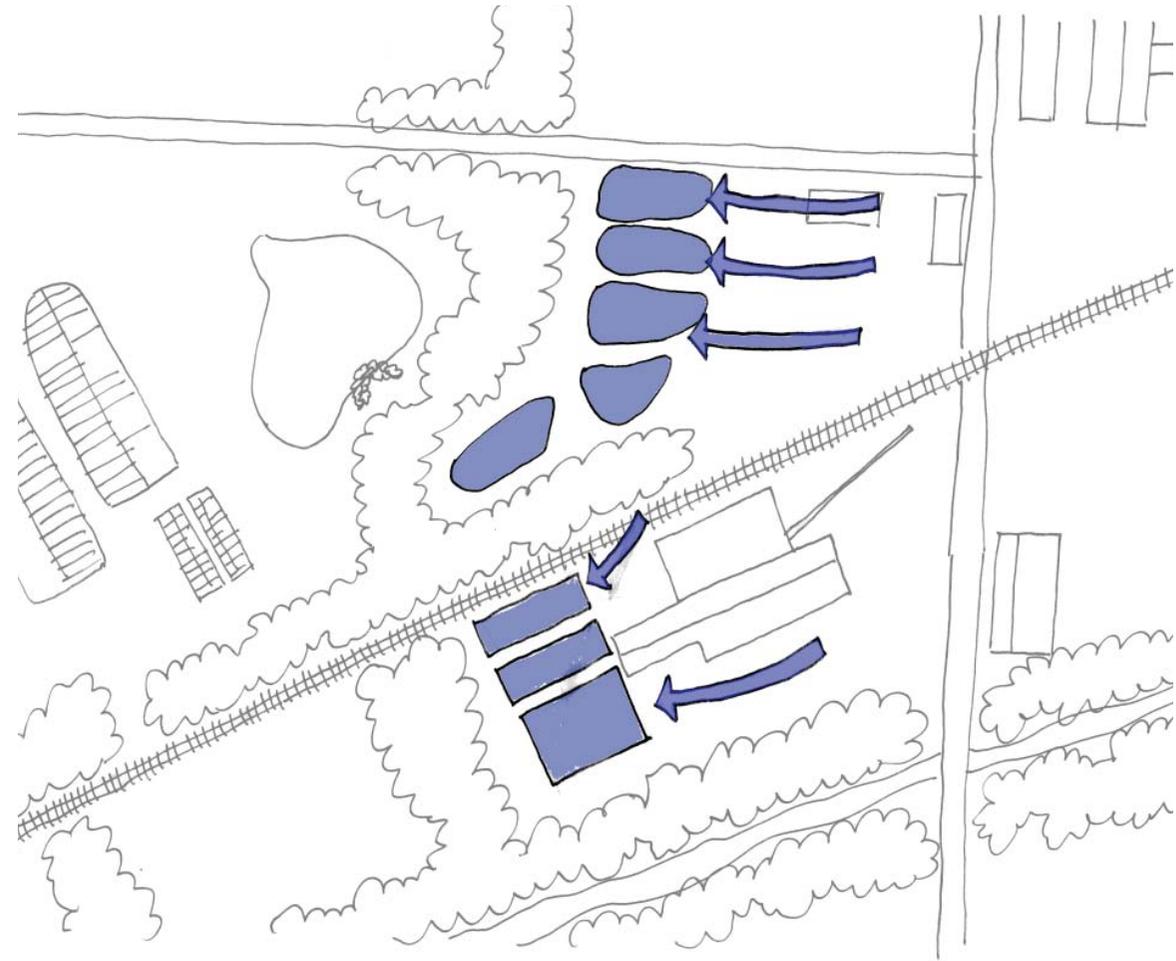
The existing runoff water from buildings and open spaces goes to a lower area which is located at the west of the small business area.



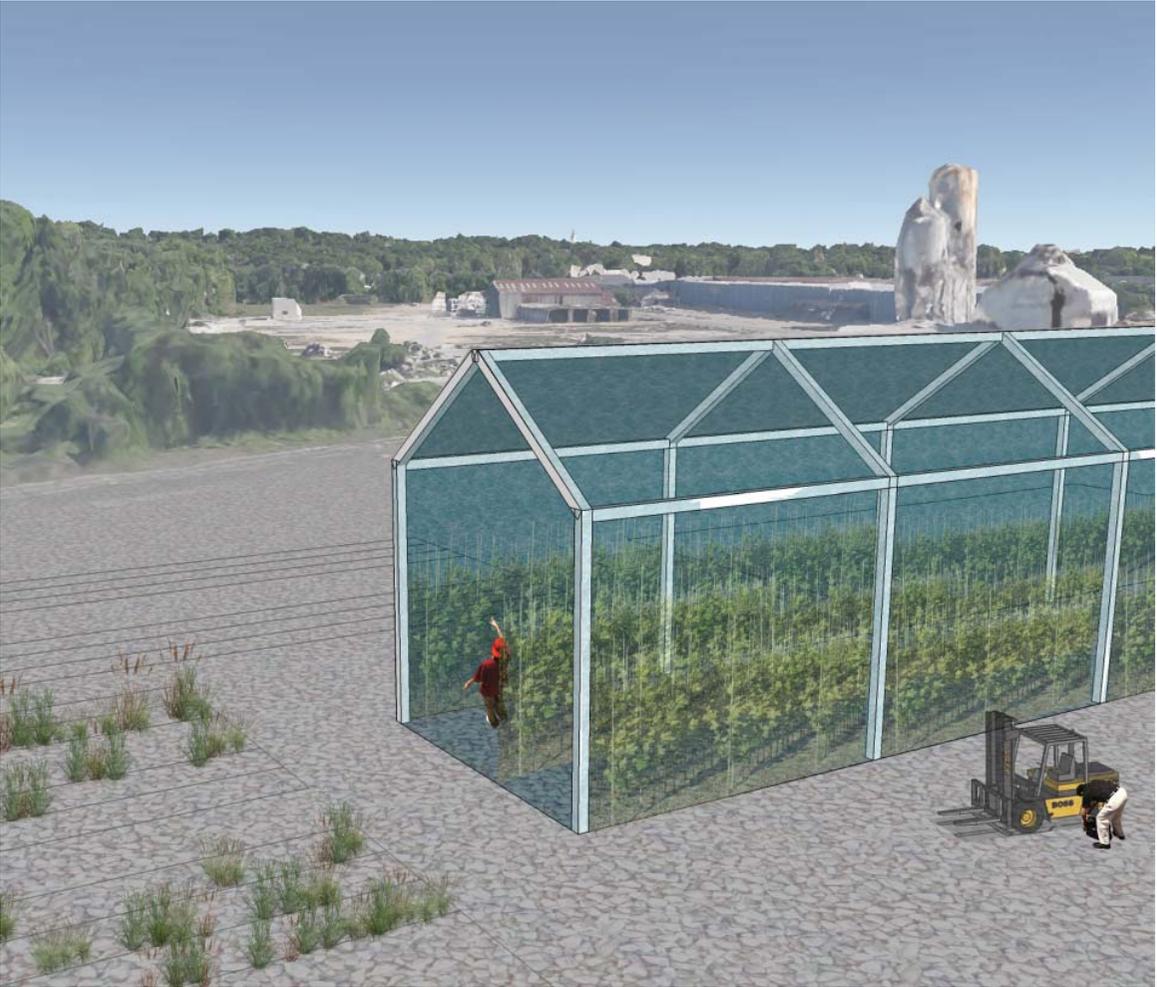
My idea is to design construction wetlands. When the flood water comes, the water will come to construction wetlands from the creek though concrete pipes. And when the flood water goes away, water will flow back to Valley Creek. The distance between the top of the bank to the bottom of the creek is 12.5 feet high. The normal water level is 1.5 feet high from the bottom of the creek. The annual flood water level is 5 feet higher than the normal water level. The construction wetland has 3 layers. The first two layers are 2 feet deep each. The third layer is 6 feet deep.



The concrete pipe drains are 2 feet higher than the bottom of the construction wetland. Even when the flood water leaves, there will be 2 feet of water left in the bottom layer of the construction wetland. Every time it rains, the runoff water from buildings and concrete surfaces will go to the construction wetland, then go to the creek from concrete pipe.



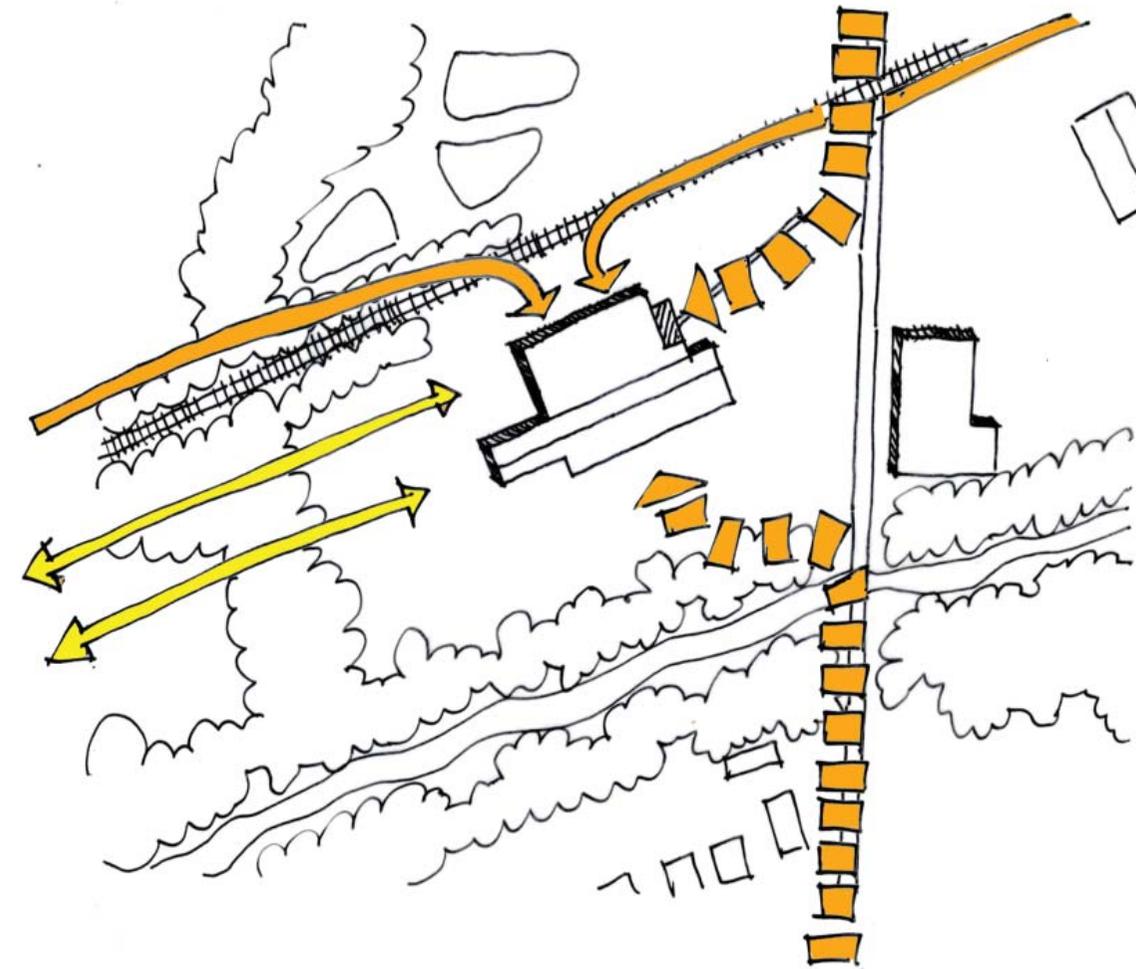
After design, all the runoff water will flow to the construction wetlands and moats.



After the first stage of the design in the eco-restaurant area, the big factory building will become a greenhouse. This area will functionally connect with the existing nursery. More people's activities are involved with this area, such as commercial and working. The ecological effect is that more people's activities will make the plants easier to succession on the concrete surface.



The second stage for this area is turning the greenhouse into an eco-restaurant. After the greenhouse provides plants for the development of the Crossplex area, the greenhouse will be used as an eco-restaurant. Near the eco-restaurant, I design construction wetland which can be use as water treatment and education. After designing the eco-restaurant and construction wetland, this area will become a center to gather people to use the bikeway. There will be a lot of activities, such as commercial, recreation and education.



This area will connect with surrounding areas in a different way. People will go to this big industrial building from Fayette Avenue and the bikeway. And there are potential connections with the water garden area in the west and the small business area in the north.

Small business area

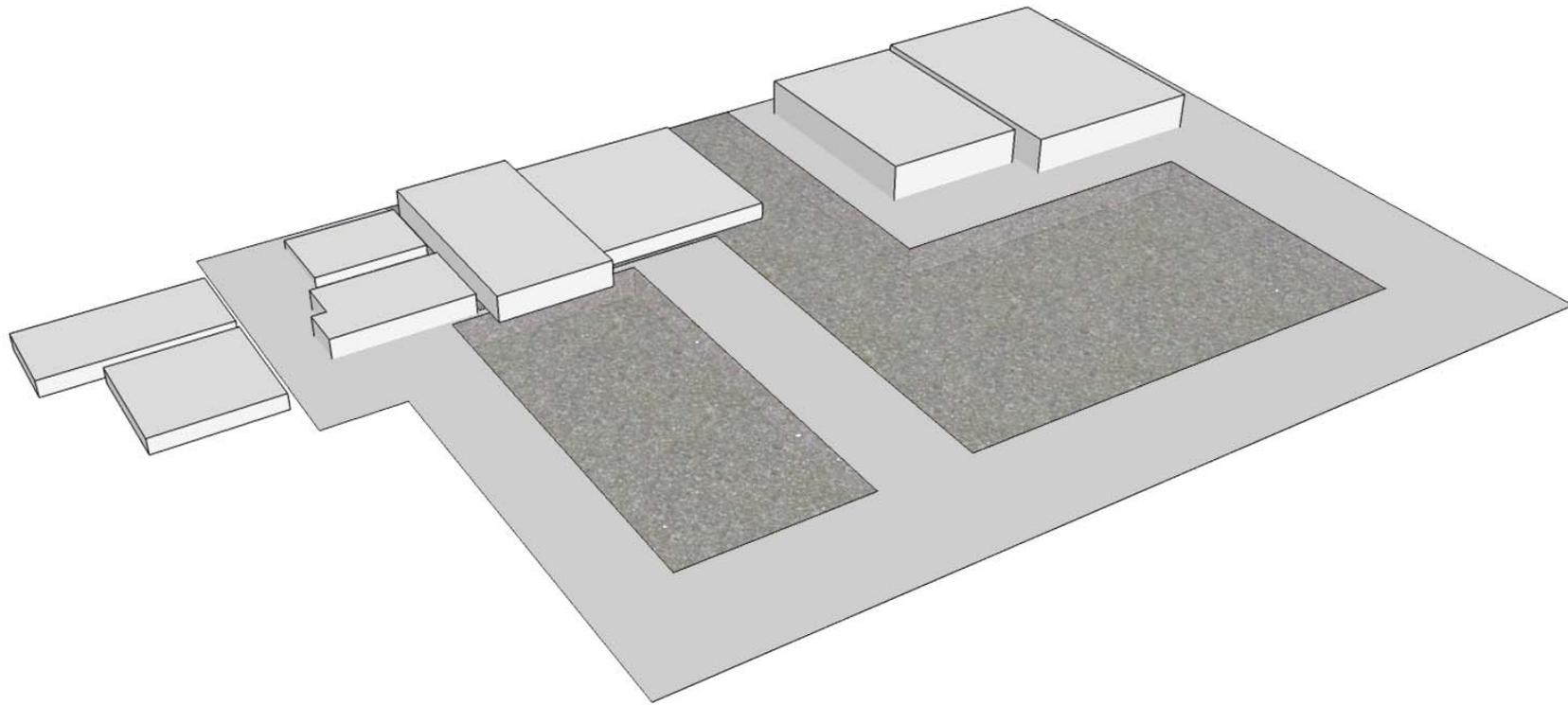
The small business area is located in the north of the eco-restaurant area. This area belonged to the same concrete pipe company that owned the eco-restaurant area. In this area, there are big concrete surfaces, abandoned buildings, and concrete pipes. There is no fence around this area, but no people's activities here. There is a fence in the west, between the Crossplex and this area. A lot of vegetation succession exists on the concrete surface of this area. The idea is to design this area as a small business area, using the existing buildings to do some commercial business, using the concrete surface as a multi-function open space, designing moats to treat flood water and runoff water issues.



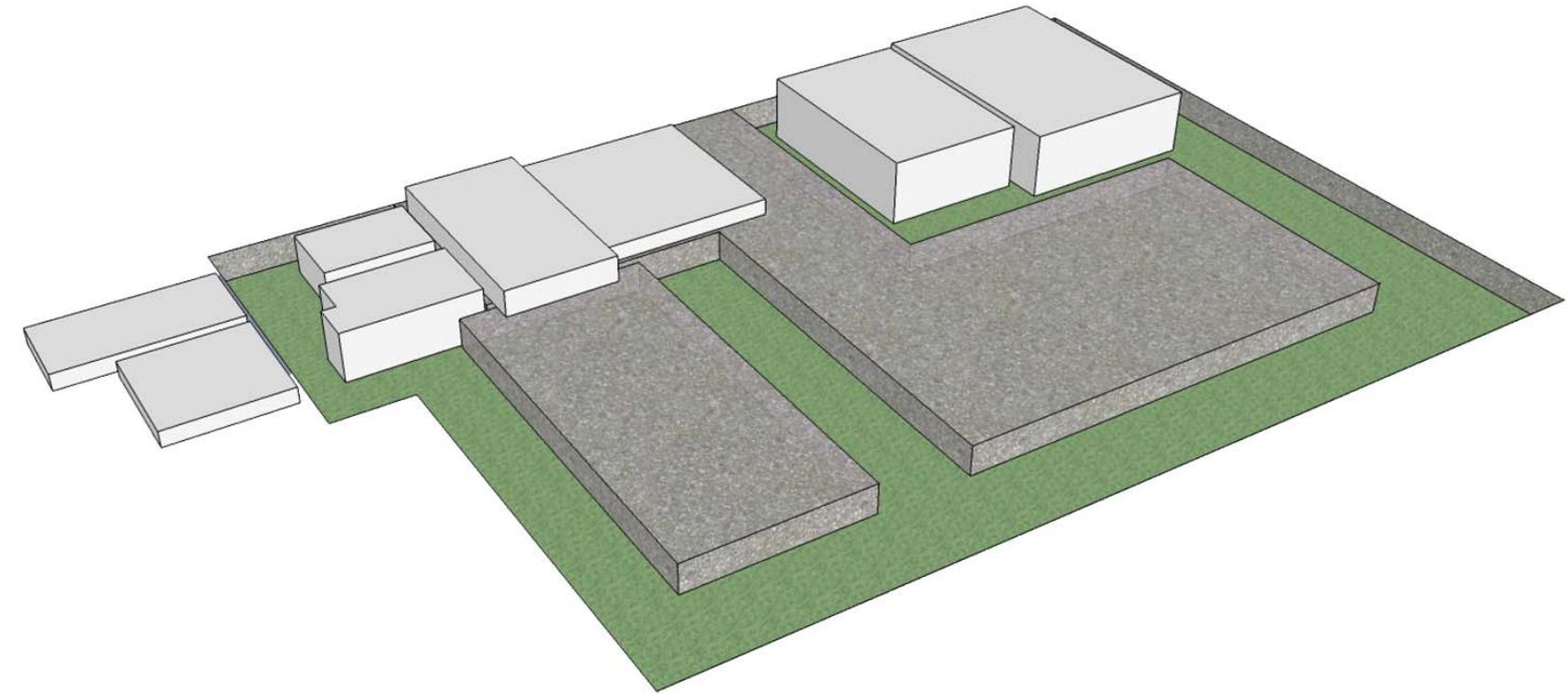
Concrete surface



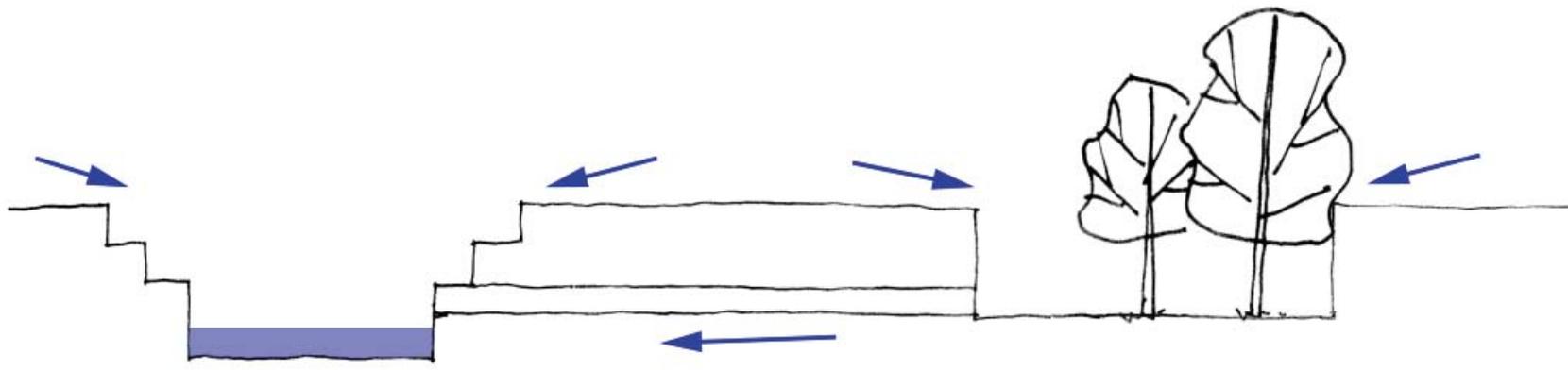
Existing buildings



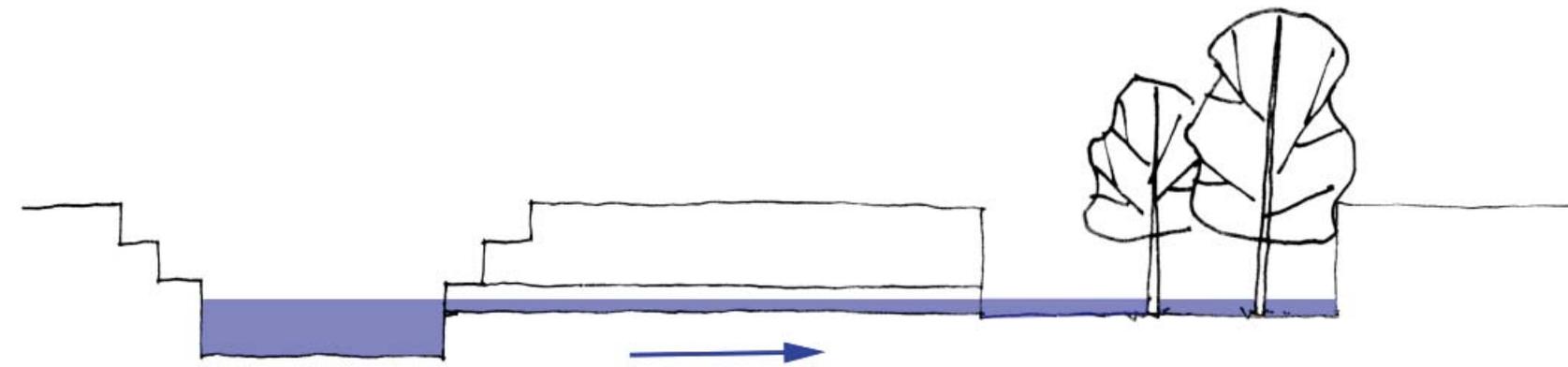
The first stage for this area is carpet. Using the existing concrete pieces material and the material from abandoned buildings makes a carpet, become impermeable surface to permeable surface. People will use the carpet to do different events.



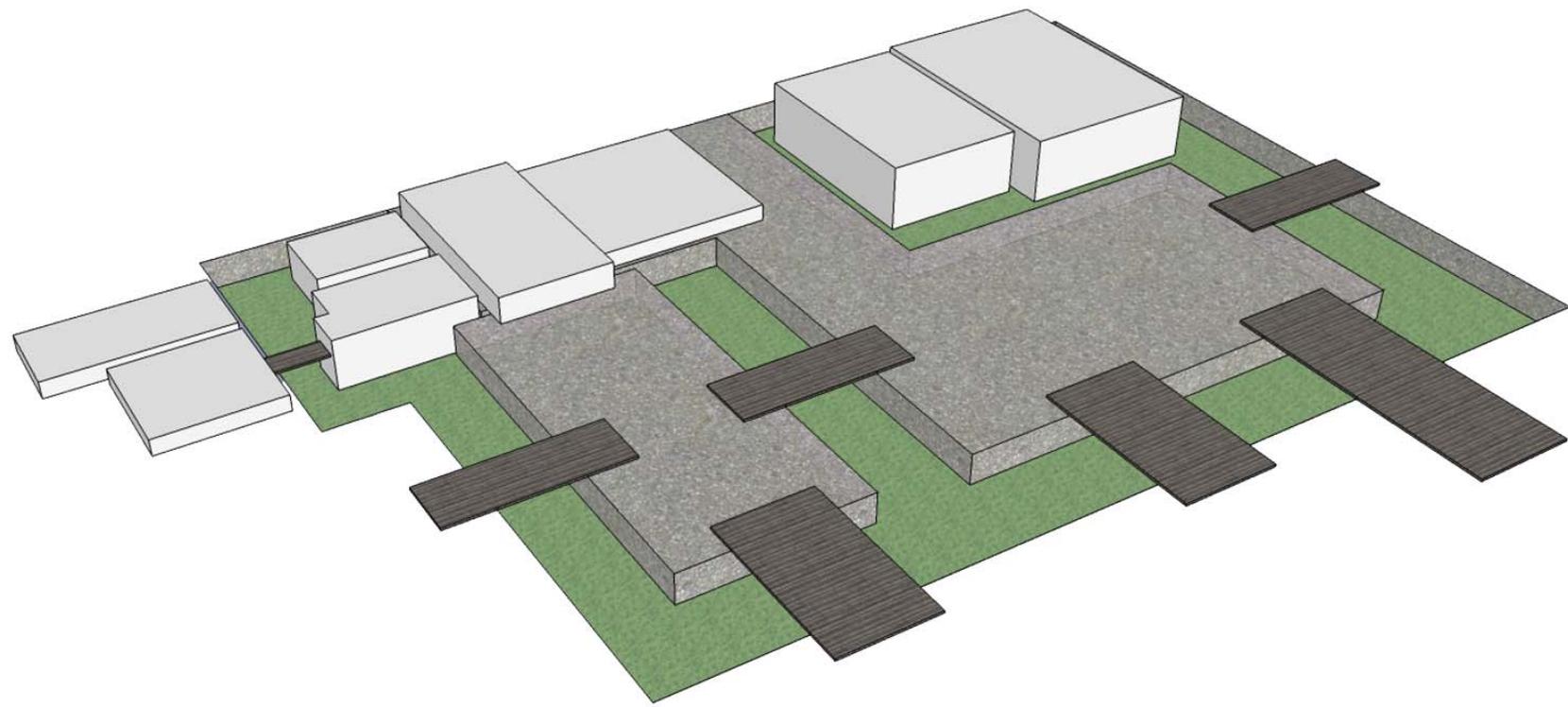
There will be moats around the carpet. Pioneer and volunteer species will be introduced in the moat, as well as, native vegetation successions.



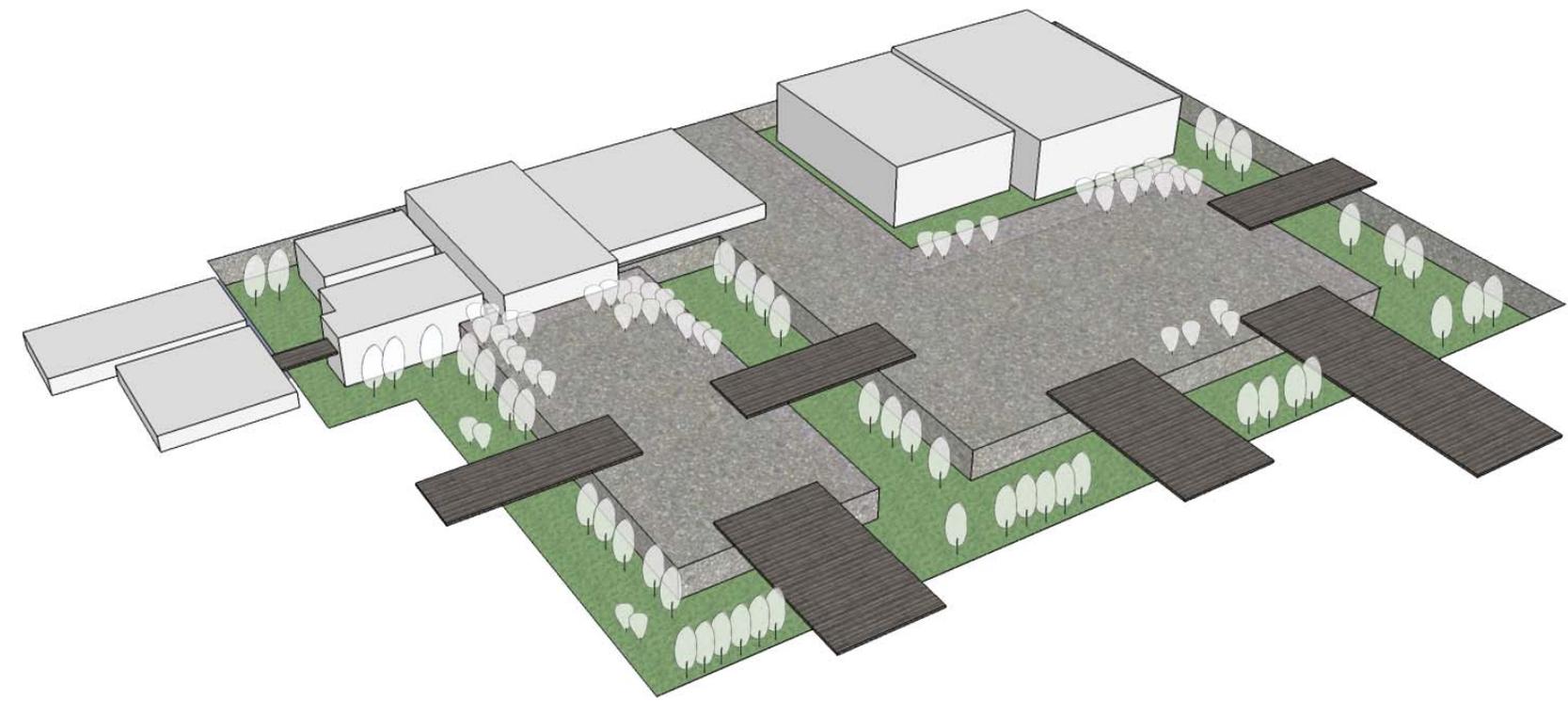
The moats are connected with construction wetlands with concrete pipes. Runoff water goes to the moats and construction wetlands. Normally, there is no water in the moats, because the elevation of the bottom of construction wetlands is lower than the elevation of the bottom of the moats.



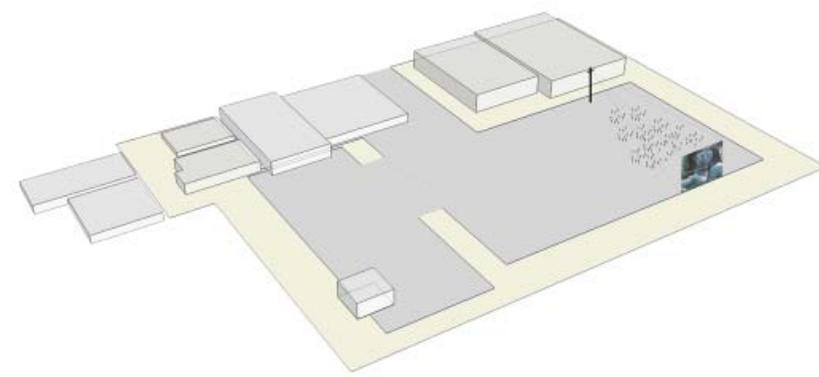
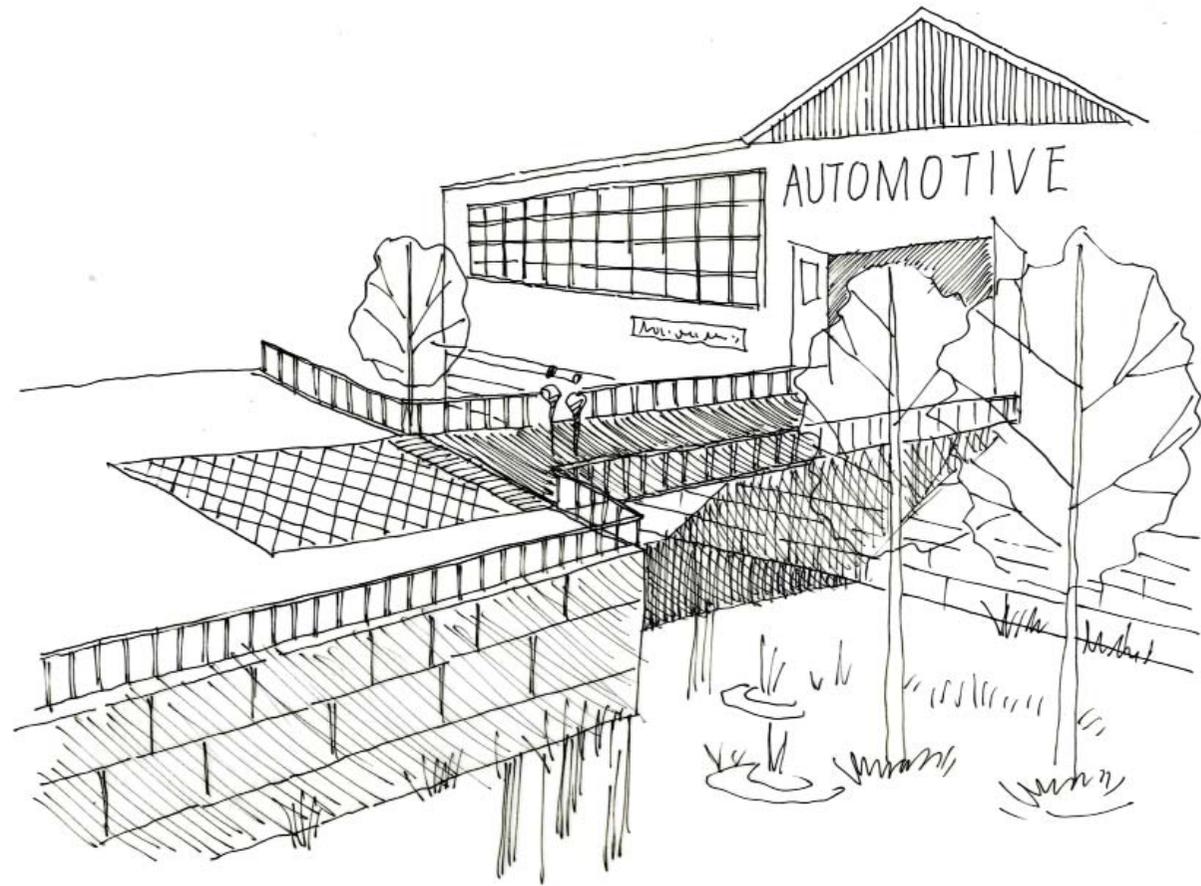
In flood season, flood water from Valley Creek will flow into construction wetlands and then flow into moats through concrete pipes. The construction wetlands and moats provide water and habitat resilience to the creek and micro-climate. In a big flood year, like it is showed in the 25 year flood plan, the construction wetlands and moats will reduce the amount of water flow into surrounding communities.



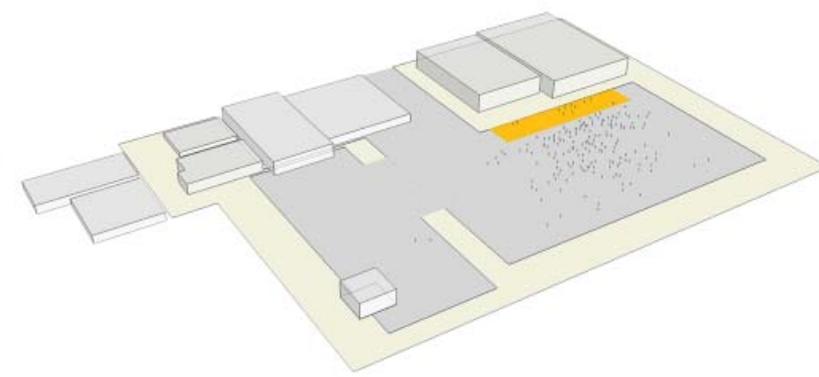
Then I will design the bridges to connect buildings, open spaces and other areas.



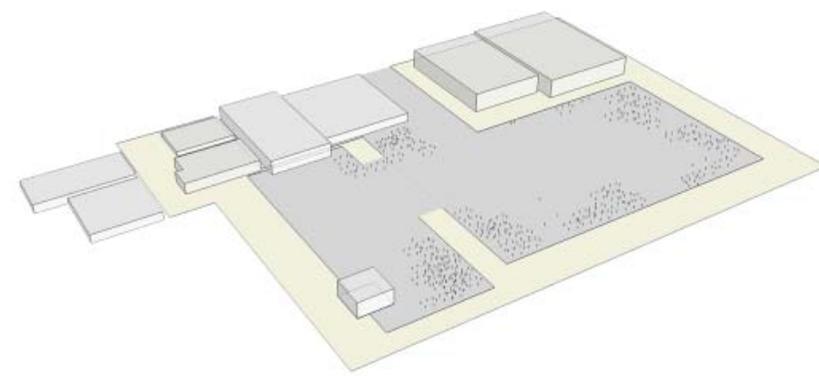
Vegetation will succession in moats. Pioneer and volunteer species can deal with the poison in runoff water.



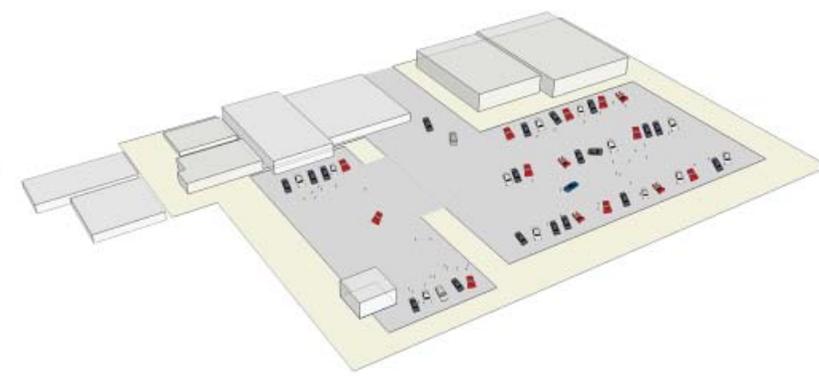
Movie Night



Outdoor Presentation



Outdoor Education



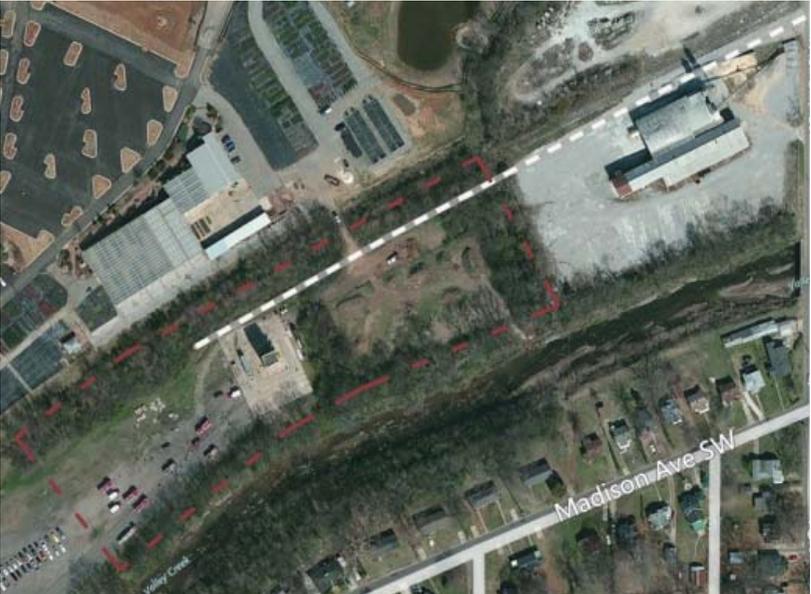
Game Day

Event Diagram

The perspective shows the relationship of buildings, bridges, moats, carpets, vegetation and people. The carpets in this area can be used as multi-function open spaces, at day time or night, on game day or no game day. In the day time, people can use it for many outdoor events, such as outdoor presentation, outdoor classroom. At night, it can be used for movie night or dance. In the game days, the carpet can be used as a parking lot. When it is not a game day, people can do commercials on the open space.

Water Garden area

Water garden area is located in the west of eco-restaurant area. This area is between railroad corridor and Valley Creek corridor. There is a fire station in the west of water garden area. The existing condition is a big area of concrete surface with vegetation succession. Some people use this area as a parking lot. There is a flood water line signs on the bank of the Valley Creek. Under this signal line, there is no vegetation grow. So, it is marked the annual flood water level.



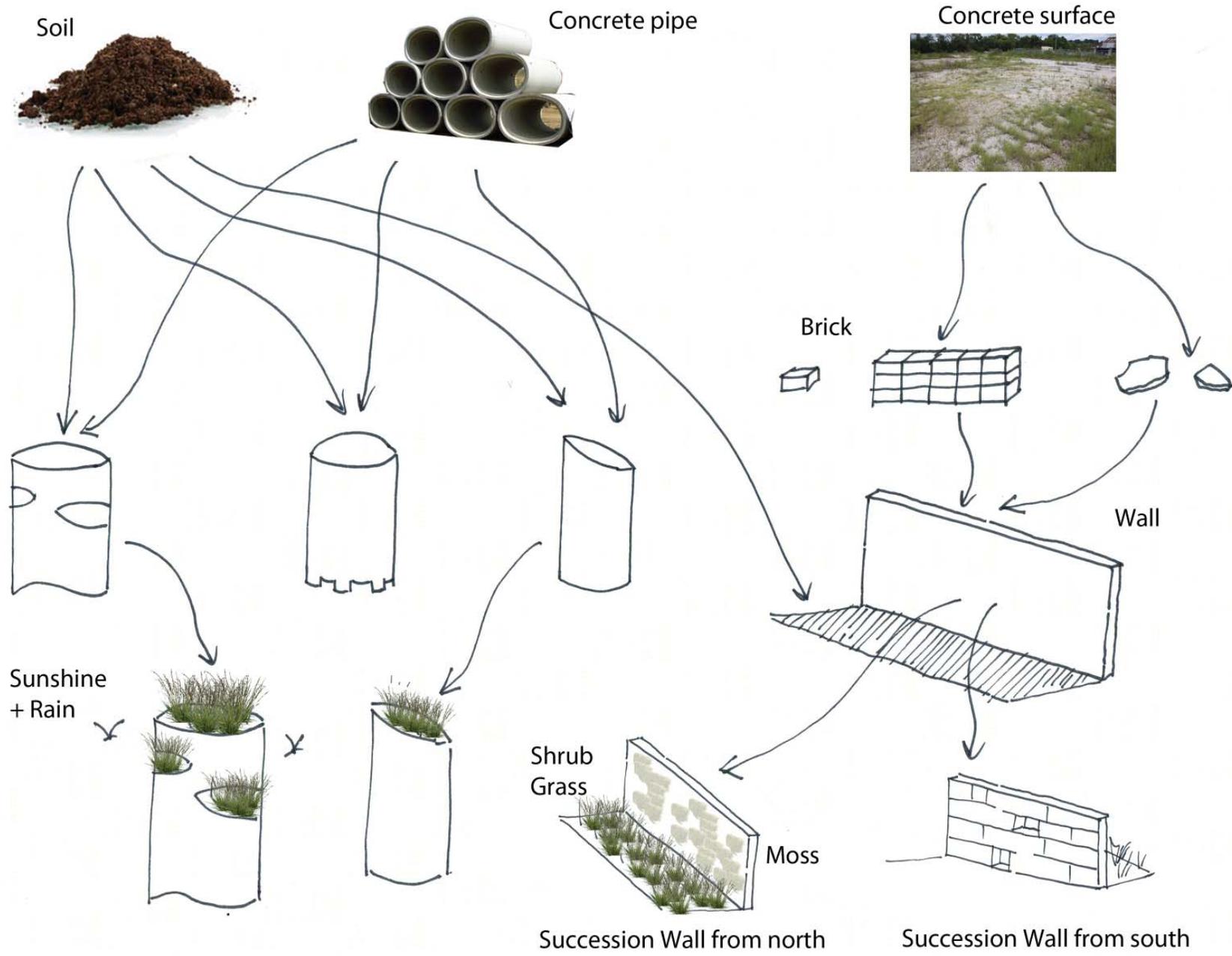
Location

Railroad corridor



Concrete surface

Valley Creek

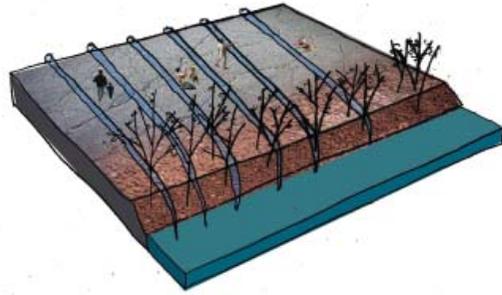


Another is using recycle material to make small habitat and succession wall. There are a lot of concrete pipe material in the small business area and eco-restaurant area. And there is big area of concrete surface. Vegetation grows in more and more area in the concrete surface. I want to speed up this process. The idea is making the concrete pipes stand up and put soil in them to make a concrete planter. I want to make concrete pipes different forms and different directions to different micro-climate. For example, I cut some of the top of the concrete pipes 45 degree angle, and the higher side is in south. So, it will provide shade areas for vegetation and small animals. I cut small pieces of oval concrete on some of concrete pipe and put dry barks and leaves on the top of soil. So birds and other small animals like squirrels will use the materials to make their nests. People can see, hear, smell and feel the existing of those small animals.

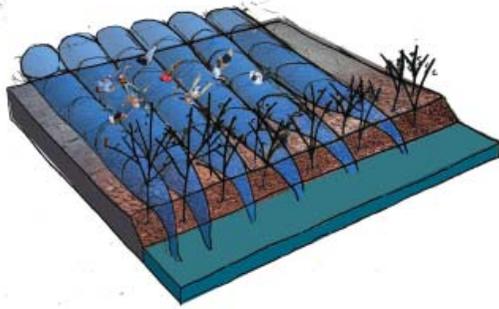
The other idea is to turn the concrete surface to succession walls. Firstly, I will break the concrete surface to small pieces and concrete bricks, then layout the concrete wall in east to west direction. So in the north side of walls, moss and vines will grow on the wall. The layout of the succession walls will make different feel of spaces. I also use the concrete pipes to connect bikeway with Valley Creek corridor. People will have different feelings to light, space and sound.

Alluvial Sponge Comb

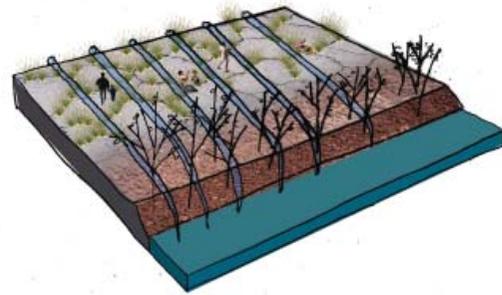
2015 Normal



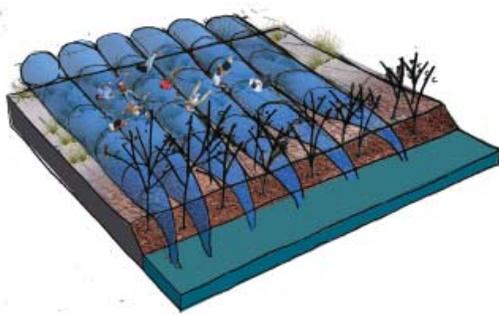
2015 Flood



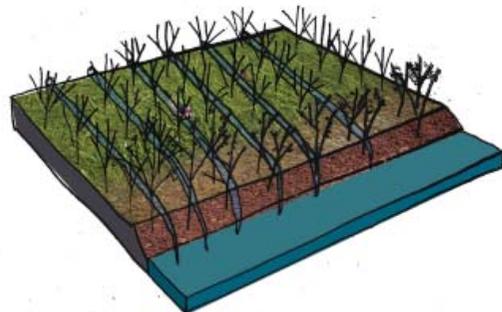
2035 Normal



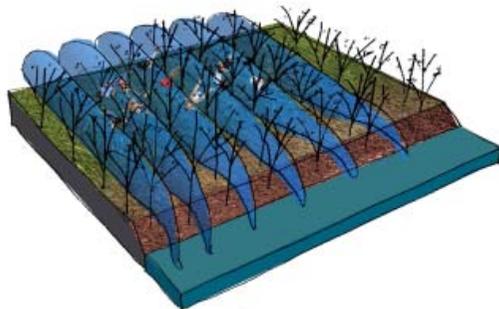
2035 Flood



2065 Normal



2065 Flood



One of the ideas is putting sponges along the bank of Valley Creek. One side of the sponges is in the water. So, when the flood water comes, the sponges can absorb water from creek. And the shape of the sponges becomes bigger. It can change the feel of open space. People can do different events when the creek flood or not flood. They can use the sponges as benches to sit or lay on them, or fishing. As the time goes, trees and shrubs will succession between sponges. The sponges and people's activities can make the process vegetation succession easier. The concrete surface will finally become grass and woods after 50 years.



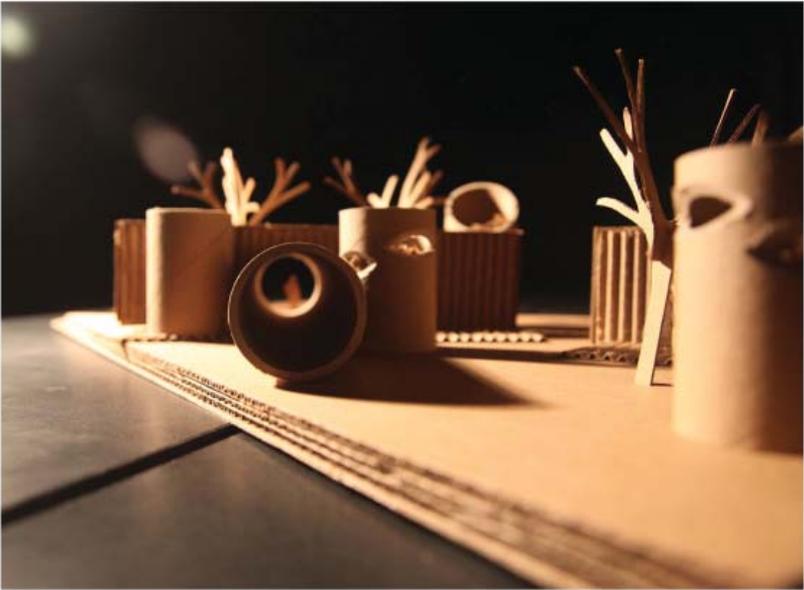
Sponges



Succession Wall

Model test

The model test shows that the succession walls can make different space. Different forms of concrete planters make kinds of habitats. The different texture shows on the north and south side of walls. Tree canopies grow between sponges. People can sit on the sponges chatting or fishing. People can go through concrete pipes to Valley Creek. People of all the ages can do recreation and education activities in this area.



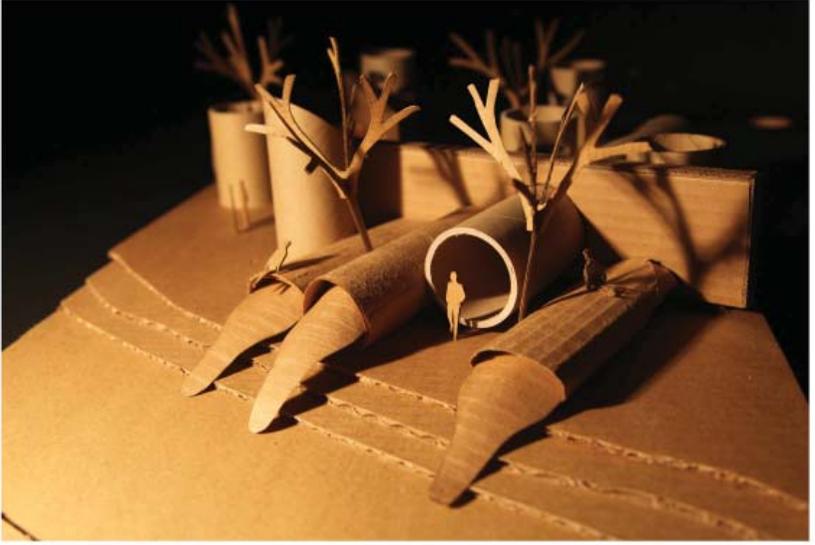
Pipes connect bikeway with creek



Water Garden with creek



Concrete pipe habitat



View from south to north

Master plan of the Water Garden area

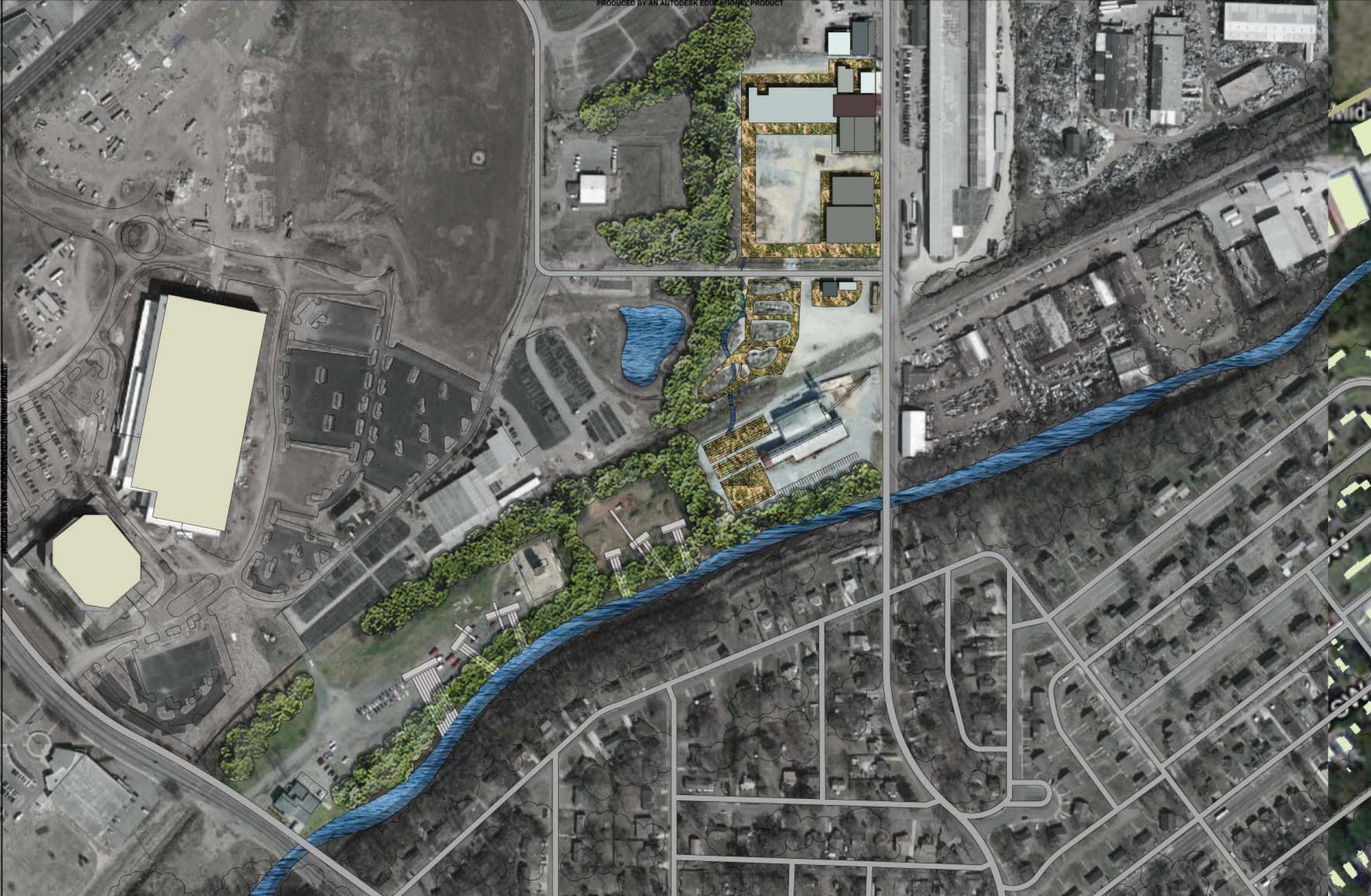
In the water garden area, there are three main goals. The first one is helping vegetation succession on the concrete surface. The second one is creating an open space gathering people to use the bikeway in the future. The third one is providing a resilience landscape in this area to treat flood water for the project site and surrounding community.

After design, the succession wall and small habitats will help the concrete surface in this area gradually cover with grass and trees, which give people a good open space to do some outdoor events. The sponges will treat seasonal flood water and create a dynamic landscape for visitors.



Master Plan

The design of the project site is bringing recreation, education and commercial to the project site, making people to reuse the post industrial area. I was also trying to look at dynamic landscape in this area, how my design change through time, how my design change through season, and how the city development plan and my design change each other. My strategy for ecosystem is trying to find a right way to treat flood water and runoff water. The design of the construction wetlands, the moats and the sponges is also considered for people's activities, such as recreation and education.



Conclusion

The first important conclusion is related to land use change and change of people's activities. The existing condition is most of the surface is abandoned concrete with some plant succession in the edge areas and creek areas. Most of the existing vegetation is existed in the water garden area which is near the Valley Creek. There is no any people's activity happening in the project site.

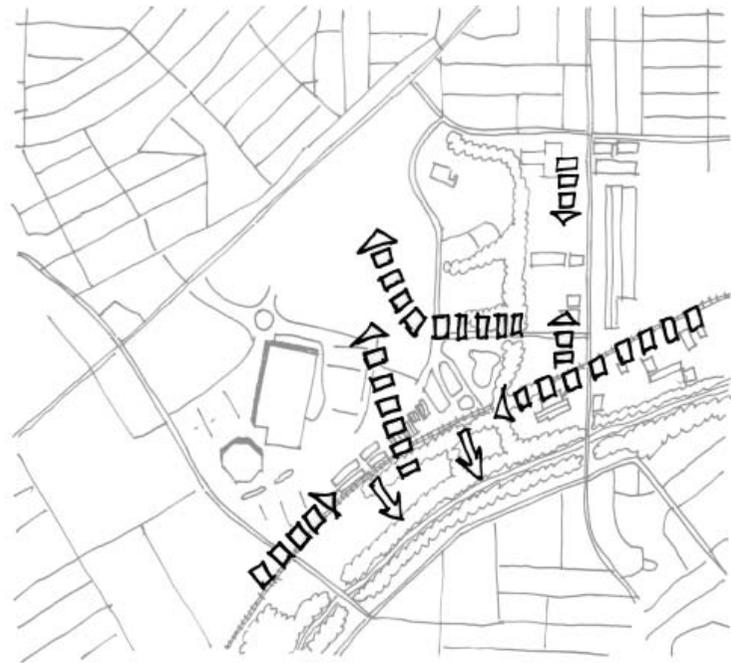
In the first stage of design, year 2018, the big concrete factory building is turning to a greenhouse. The area of green space becomes larger. People can use the greenhouse to work and do commercial business. The small business area and water garden area is still the same in this stage, but more plants will grow in these two areas.

In the second stage, year 2025, construction wetlands will be developed. So, there will be more water surfaces and green spaces. As a result the greenhouse becomes an eco-restaurant. People can do multiple activities here, such as education, eating, commercial business and recreation. In the small business area, I design moats and multi-function open spaces. There will be more water surfaces and green spaces. People can do recreation, education and commercial activity here.

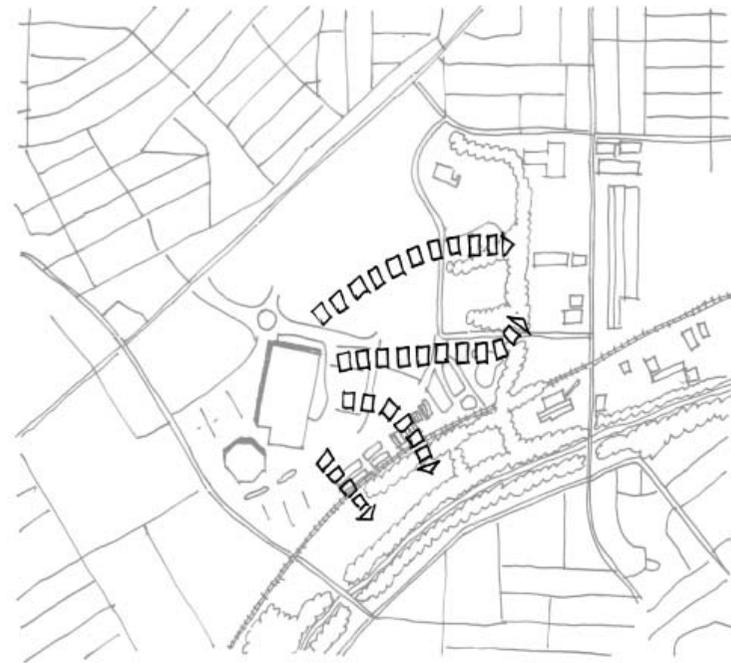
In the third stage, after 2025, I design sponges and succession walls in the water garden area. The area of concrete surface becomes smaller. Green space and water surfaces become bigger. And in 2025, the abandoned railroad will become a bikeway. People will do multiple activities here.



The project site will connect with the surrounding communities, Crossplex, the Tiger Trial and bikeway in different ways. Firstly, three areas in the project site will be connected by roads and invisible paths. The eco-restaurant is a center area of my project site. Secondly, people from bikeway will come to the site. The eco-restaurant is a trial head of the bikeway. People can have a rest or eat here. People can also have some outdoor events like picnic, outdoor class, chatting and sitting in the small business area and the water garden area. The site is also connected with the Crossplex area. In the city scale, the project site connects with Railroad Park by Tiger Trial and the proposed bikeway.



On game days, people drive from other areas to Crossplex to watch games. They can park their cars in the small business area and water garden area. After games, they can have a meal in the eco-restaurant, or go to some outdoor events in the water garden area and the small business area.



When it is not a game day, people flow is mainly from the Tiger Trail and bikeway. After they enter the site, they will do the activities they want, and also they can go to the Fair Park which is located in the center of the Crossplex area.



The first master plan shows the Crossplex area in 2040. The three areas of the project are fit into the dynamic urban system. It provides people a place to do different events.



The second master plan shows the Crossplex area in 2060. The Birmingham government starts to develop the Crossplex area as a small business center. Some of the small business, like small retail shops, car repair shops and restaurants start to move into the Crossplex area. The other area will be covered with more and more vegetation through time.



The third master plan shows the Crossplex area in 2100. At this time, the post industrial area of concrete factory is totally covered by canopies, shrubs and grass. All the impervious surfaces will have become pervious surfaces. As one of the important nodes in the urban system, the ecological and social effects of the project site play more and more important roles in the surrounding community and the city.

What did I discover about:

1. Dynamic landscape design

From doing this thesis project, I found that the dynamic landscape design is involved in a lot of urban systems. Those systems influence with each other. In this thesis project, I classify the systems as the ecological systems and social systems. The dynamic landscape involves many issues, ecological processes, city develop plans, and the interaction of different systems. For most of the time, it is hard to know what will happen in the future. Sometimes, when one thing changes a little, everything will change a lot. My design is one of the possibilities for the project site.

2. The west Birmingham area

The west Birmingham area is involved with many systems. In the process of dynamic landscape design, I need to consider the relationship between different systems. The city plan plays a very important role in the future development of west Birmingham. The dynamic landscape design should include the city plans. For example, three things will happen in the west Birmingham area according to the Birmingham Comprehensive Plan. One is the Birmingham government wants to develop the Crossplex area as a small business center. The second thing is that the abandoned railroad in the project site will become a bikeway which will connect the Crossplex area with Railroad Park. The third thing is that Birmingham government wants to use \$10 million to develop the Tiger Trial which connect Railroad Park with the Crossplex area. Those three city plans are important for me to design my dynamic landscape.

3. The process

In the beginning, I was trying to work on all the urban systems that I could find around the project site. But after the design process, I found that I cannot consider all of them at the same time. In the analysis process, I realized that I cannot analyze all the systems. For some systems, I do not know how important they are. For example, there is a food system around the project site. But it is hard to value how important they are. Some other systems are very big compare to my project site, such as the global climate system. It is important to the project site, but I cannot change it through my design. My process is designing different for systems first as much as I can, and testing the opportunities by making models, sections and perspectives, and choosing the important systems to make the site designs.

4. What worked?

One thing I think that worked in my project is thinking about dynamic change of natural processes and people's activities processes. The natural processes include flood water, vegetation succession and small animal habitats. The people's activities processes include recreation, commercial business and education.

The other thing is thinking about how different systems interact with each other. For example, in the small business area, I design the moats. The moats can treat runoff water, flood water and vegetation succession, and they are also involved with education. Students can learn the knowledge of flood water, habitat and vegetation.

5. What did not work?

The project design provides one of the possibilities of the site development, but there are many. If something changes, like the city plan, it will be totally different. So in the process of dynamic landscape design, it is hard imaging what will be exactly happened in the future. I have a lot of people's movement and people's activities in my analysis, and some of my designs are based on those analysis. For example, in the process of designing the water garden area, I want to develop this area as a recreation space for visitors. This idea is based on the abandoned railroad will develop as a bikeway in 2025 according to the Birmingham Comprehensive Plan. If this plan changed, or they cannot find enough funding to do this, everything in my design of this area will be changed. Since this area is related to other areas, the function of other areas will change to some extent.

Other things which are not worked out are mainly details. This thesis project is focusing on how to design dynamic systems and how different systems interact. I did not test the details, forms and materials too much. Some to details may not work so well. For example, I do not really know how long the sponges in the water garden area can be used. Maybe they can be used there for 10 years or 50 years, but I am not sure. For the eco-restaurant area, I found that the structure of the building can be used as a structure of the greenhouse, but I did not doing more research to prove it. Maybe the factory building can turn into a greenhouse, but it will take a lot of work.

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