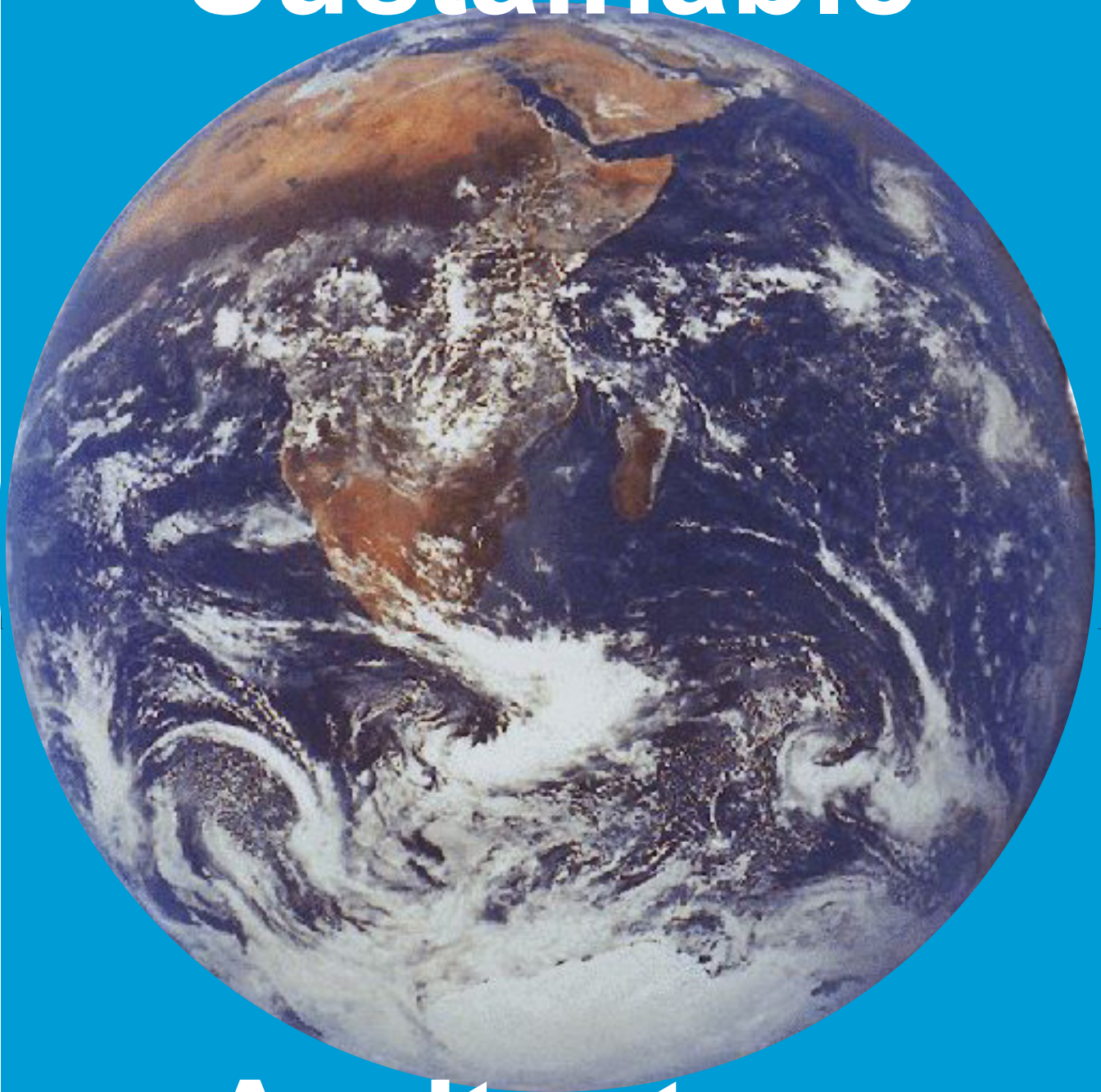


Sustainable



Arcitecture





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School of Architecture
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Architecture is a unifying element within society and when architecture is done right it “works”. I grew up in the 1960’s and saw how modern architecture became disjointed with society. Buildings, structures, roads, bridges, were built and became an element to themselves and ignored how would fit into the surroundings and the affects it would have on a community and what the future The “work” means that architecture understands the surroundings and the impact it has today and tomorrow.

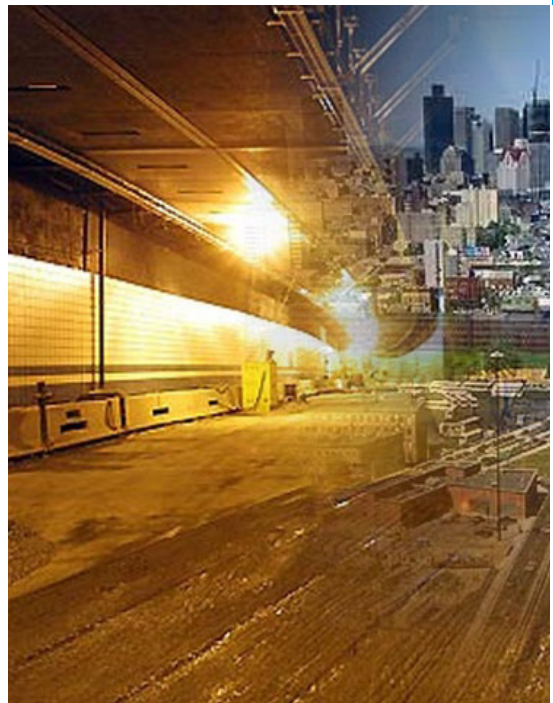
When designing one must understand the past, know the present, and visualize the future. Today I see the resources that have been driving the expansion of our culture are clearly finite. The “Urban Sprawl” will come to an end or needs to. The cost of everything is increasing and natural resources are being depleted. There is utility in density. I see our society moving towards greater density, from the small community to the large cities. I see a movement back to the city and building designs are to be more efficient. To make the design “work’ it must be efficient in space planning, be expandable and changeable, it must fit into the surrounding and meet the needs of the community. My thesis is to introduce an element of “time” into architectural design. With time you must have change. This means that architecture will change with time. Schools, prisons, and medical facility are examples.

A medical facility is my choice to be designed with in a community setting. Because of population growth, an aging society and continually advancing technology hospitals will always be changing.... the architecture must adapt to the change and become "sustainable". The community must evolve with the time to create a sustainable culture, and a wellness component will be integrated into the design.

According to the world commission on environment and development, the Brundtland Commission, (1987)

“the sustainable architecture is the architecture that meets the needs of the present population without compromising the ability of future generations to meet their own needs”.

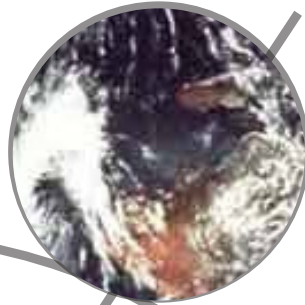
There is a need to create sustainable architecture, in our society. Understanding where we are today and looking at the past for clues is the beginning of the process. Understanding interventions that work and not working while taking advantage when the opportunity is present is the next step. The final step is developing an urban strategy that incorporates human nature and plants a positive seed for change into the structure of a community.





002



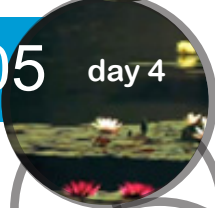
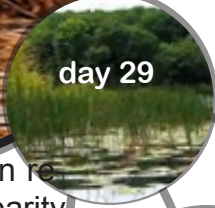
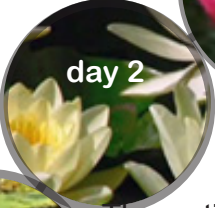


Demands on resources are increasing, populations are expanding and as a society we need to change and adapt to these changes. From the US Census Bureau, January 2010, it is estimated that today the world population is at 6.8 billion people and by the year 2050, the population will grow to 9.2 billion people. The demand on finite resource will intensify and we must look at innovative to meet these future demands.

004



lester brown parity: "the 29th day"



The notion of population growth and demand on resources is best described by Lester Brown in a parity called the "29th Day". It starts with an empty pond representing the earth with no humans on day-1 the first human shows up and is represented as a lily pad in the large pond. Each day the lily pad doubles in number representing consumption and population growth. The pond is teeming and abundant with life until the 29th-day. At that point all appears normal and there is enough to sustain the life of the pond. On the 30th-day when the lily pads doubles for the final time it over takes the pond, and life on the pond changes.

Were in the 29th day and need to prevent the 30th day!

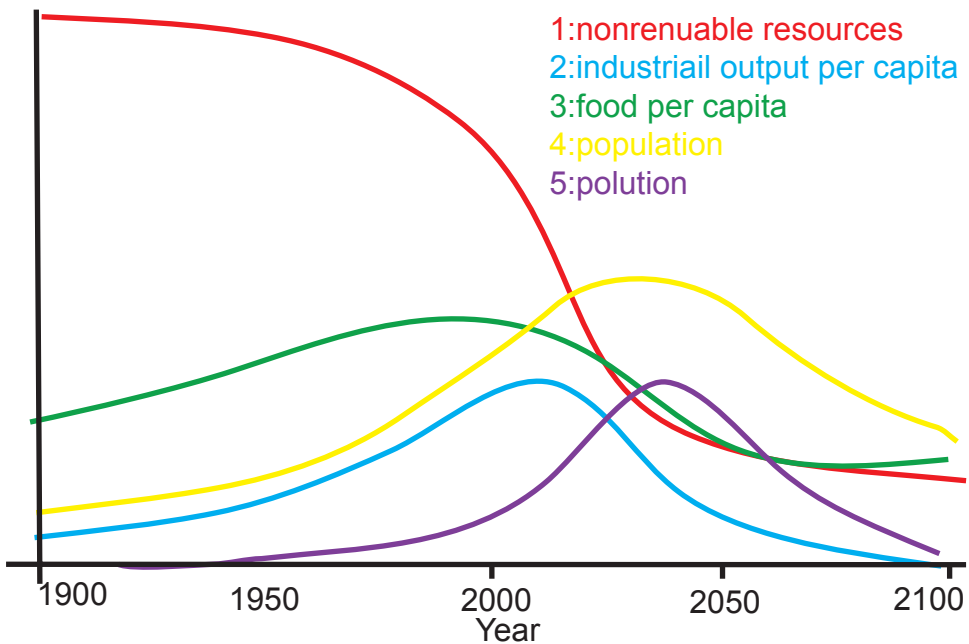
005

computer models

Below are two reproduced computer models from "Beyond The Limits: Confronting Global Collapse, Envisioning a Sustainable" 1992, showing the effects population growth and consumption.

model-1: "Business-As-Usual"

In this model nothing is done, we continue on the path of population growth and consumption of natural resources.

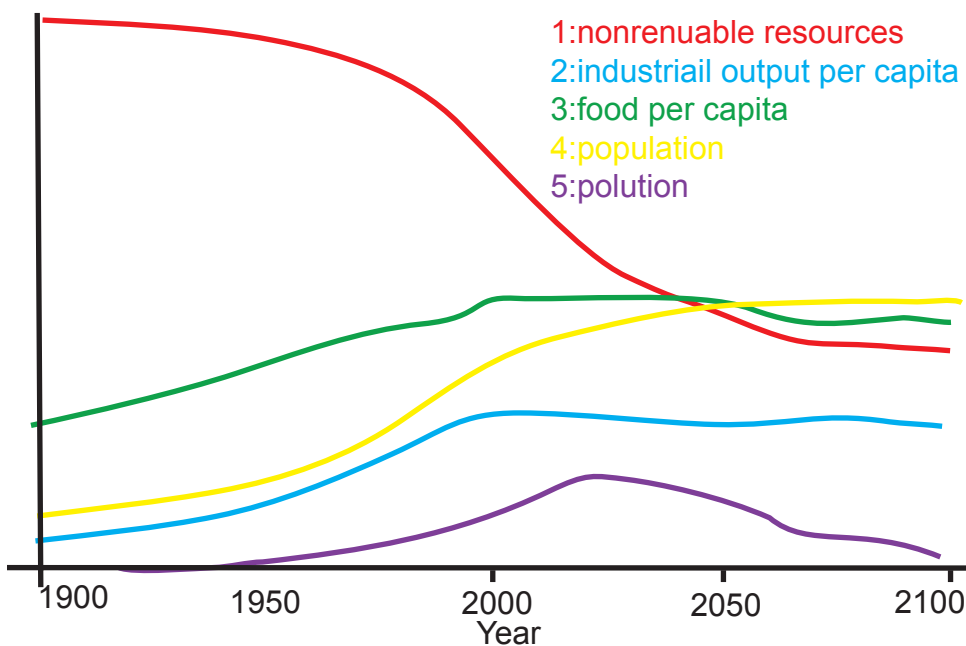


007

As you see renewable resources (2) is on a constant decline, food per capita (3) and industrial output per capita (3) begins to decline at the turn of the century, population (4) and pollution peak then decline before 2050. At that time society as we know it begins to collapse. This model is solely dependent on a nonrenewable resource model. The energy demands on extraction of resources take away other essential investments necessary for a society to prosper. The economy begins to collapse and so do health care, agriculture and consumer goods and services. Population begins to decline through famine, disease and wars fighting over resources.

model-2: "Technology and Consumption"

This model integrates technology and consumption into the cultural behaviors.



008

The demand on renewable resource (1), food per capita (3), population, stabilizes at the same time. This model clearly shows that an intervention of technology and consumption is the key to a sustainable society. The need to integrate technology and consumption into our culture is the basis of my thesis. If we continue down the path of "business-as-usual", the form and structure of our society will change largely and it would not be the same world as we know it.



primitive cultures today

011



Cultural Study:

One cannot predict for certain what our future will be. The laws of nature that we are all bound together by only allow us to see where we came from. Below is a photo of a remote galaxy. and the picture is an instantaneous snapshot. A second shot an instant later and we see a change. The pinwheel shape tells our universe is changing it also tells us that we are part of a whole with a beginning. Today science tells us what we are made of and how we work.

Anthropology as defined in the dictionary is “the study of humankind in all its aspects, especially human culture or human development. It differs from sociology in taking a more historical and comparative approach”. The study of past cultures can provide us answers to what we are made of. It may also gives us clues to how we need to change too.

The study of “Primitive Modern “ cultures A primitive modern culture is a culture that knows about modern society yet chose to maintain its cultures norms and life styles. Today there is a hybrid culture that interfaces with modern cultures and provides additional clues to how modern society affects a culture. Three cultures were studied from different climates in remote places on earth. The studies looked at how each culture adapted to their environment, the food source and the interaction with modern society.

Each culture was different in many ways, yet they had many similarities. They were bound together by adapting to their environment; their food, clothing, housing all were based on the environment they each lived in.

Each culture had a hybrid culture that interfaced with modern society. From understanding the affects that modern society had on each culture was impotent.

013





massasia tribe:

The Massasia, is a central Kenya tribe, a pastoral culture that displays a nomadic way of life. They live at the equator and it is generally sunny and dry most of the year, March thru May and November thru December is the rainy season, it remains hot and dry thru-out most of the year. Cattle are the main food substance and their culture is structured around cattle. A pastoral is a herding culture that is constantly on the move. Their survival depends on finding food sources for the cattle. Protecting the herd is essential to their survival and a ritual for becoming a man is to kill a lion.

The second culture is the Inuit (Eskimo), a culture that is located at the Arctic Circle, above the "tree line". This culture encircles the globe and the common element of the culture is sustaining in a harsh environment and a culture that is a reflection of the harsh environment they live in. The Inuit was left alone until the turn of the century; they lived at the "tree line" the green belt at the Arctic edge. As modern man and because of fur trading moved in modern deacease followed and they chose to move and subside on the harsher Arctic environment.

015



inuit (eskemos):



yanomamo tribe:

The third culture is the Yanomamo tribe that is located in the Amazon tropical rain forest. The Yanomamo are dependent on the rainforest for food and shelter; they use slash and burn horticulture to grow bananas, they gather fruit hunt and fish and frequently relocate to more fertile land every two to three years. The Yanomamo are a violent culture and extremely territorial which causes them to clash with their neighbors over food and territory. Life expediency is low because of the violent nature otherwise they are very healthy. They ignore the outside world in with little interface, the territorial and violent nature keeps western cultures away.

Conclusion:

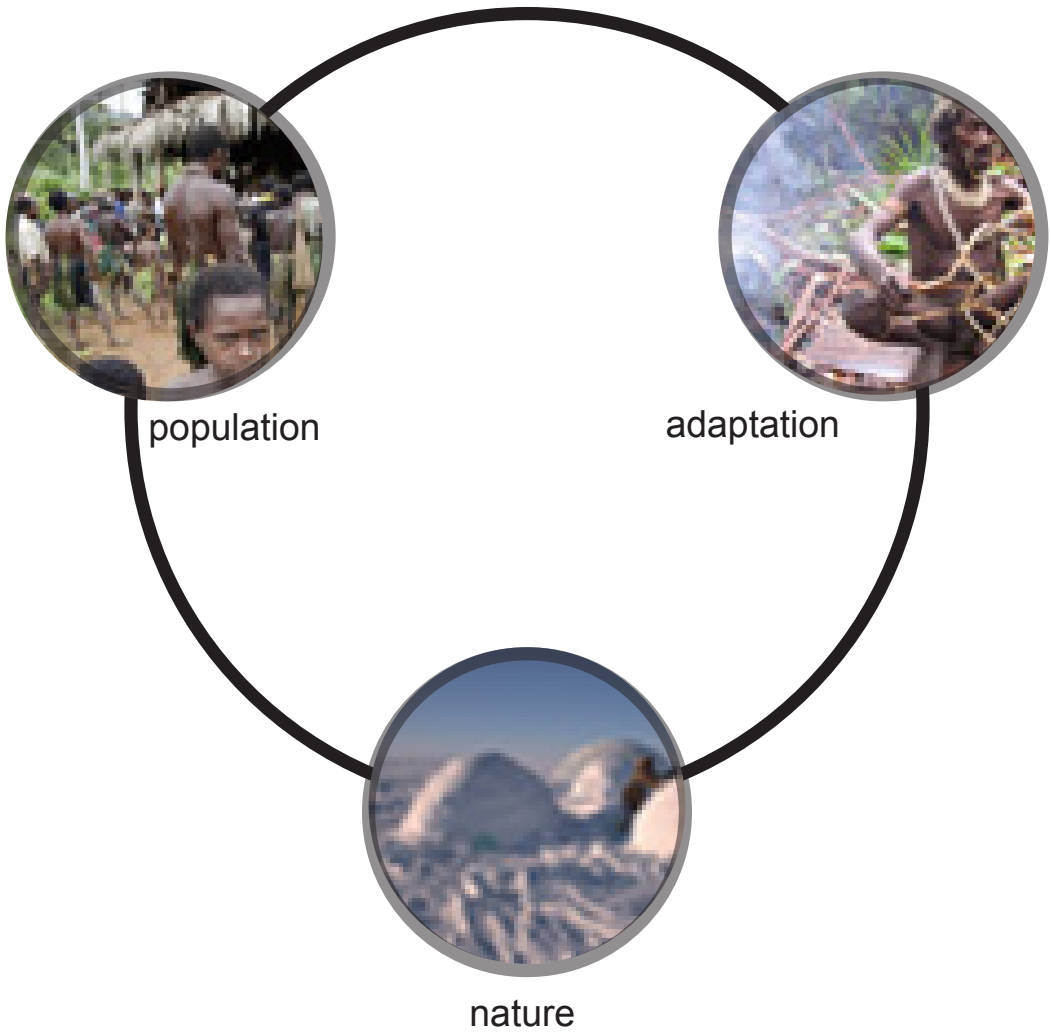
Each cultures lived in completely different environments and food sources were also different. From the harsh arctic to the Brazilian rain forest. The food source and diet varied with the environment each lived in. The tools to live and housing were also based on the environment.

Each culture had contact with the outside world a yet chose to live in an traditional way. And each had hybrid culture that interfaced between the traditional culture and the modern society. The hybrid cultures chose to use modern technology and make it a way of life. They each lived a more comfortable lifestyle and consumed modern foods. As modern technologies was introduced into their lives the hybrid the people experienced many of the modern societies problems. From employment to marriage and modern diseases.

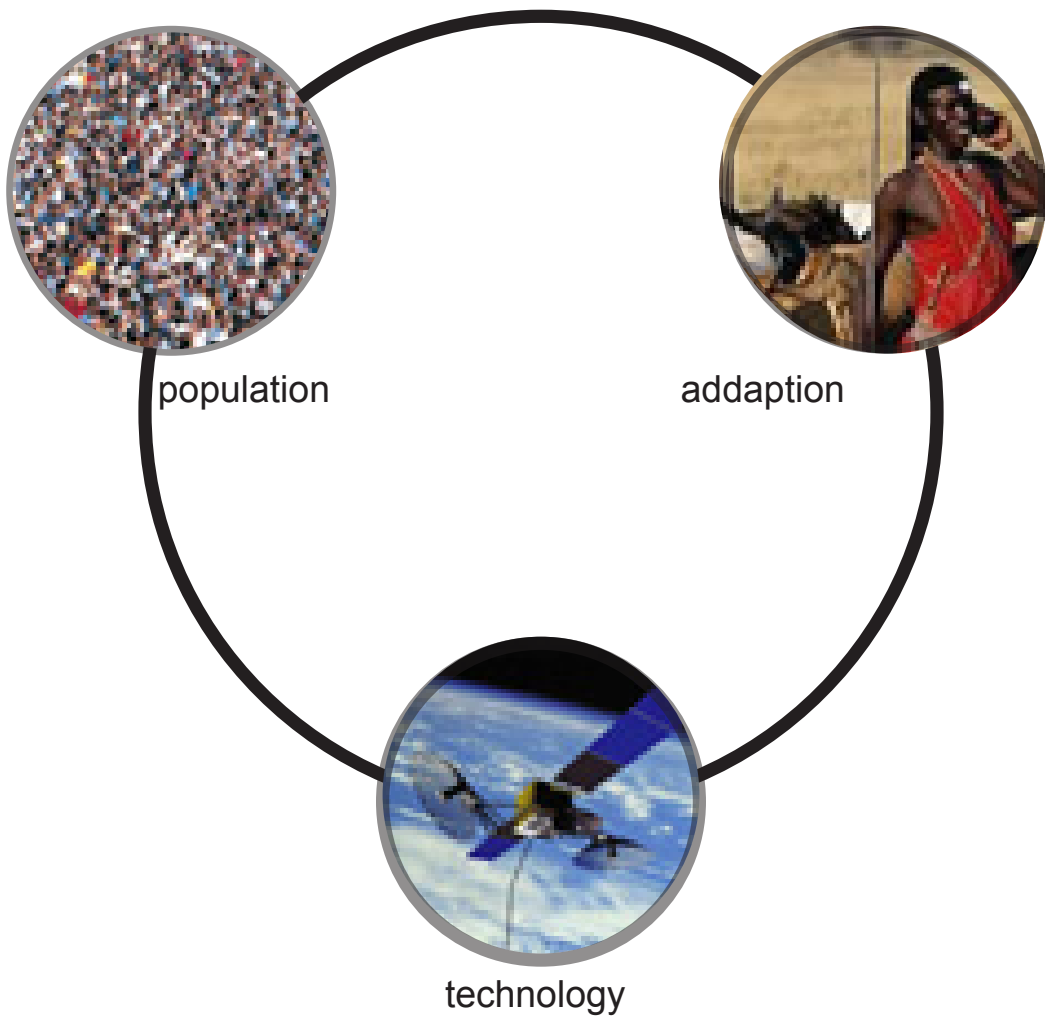
A sustainable lifestyle was the common thread of the primitive culture. They each lived a life that used its natural resources and technology to adapt and live within the bounds of their environment. They lived in such a way that life death and even marriage was integrated into the culture. Each culture had their own life cycle with nature; each consumed different natural food yet was healthy and did not exhibit modern diseases Health care was not a necessary for their survival and was integral component in their life cycle and consumption.

In contrast, today our society has harnessed the environment, and is more inconvenienced by it. Modern society is surrounded by nature yet their goal was to harness it for their own good. Modern man uses technology to make their way of life easier yet health care and wellbeing is not a product of the life they live. Today we have modern decease that is a product of our society and is consuming a greater and greater amount of our resource.

We need to rethink how we live and what the future may become. To use technology to enhance our lives in more than just a conveniences.

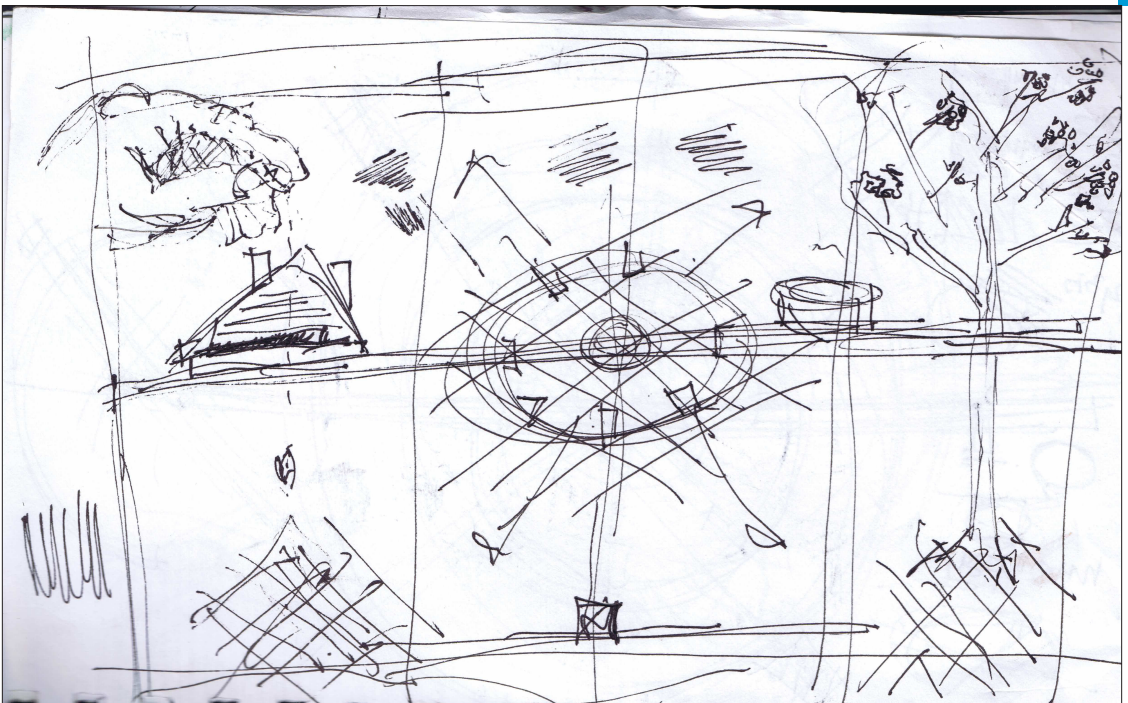


primitive life cycle



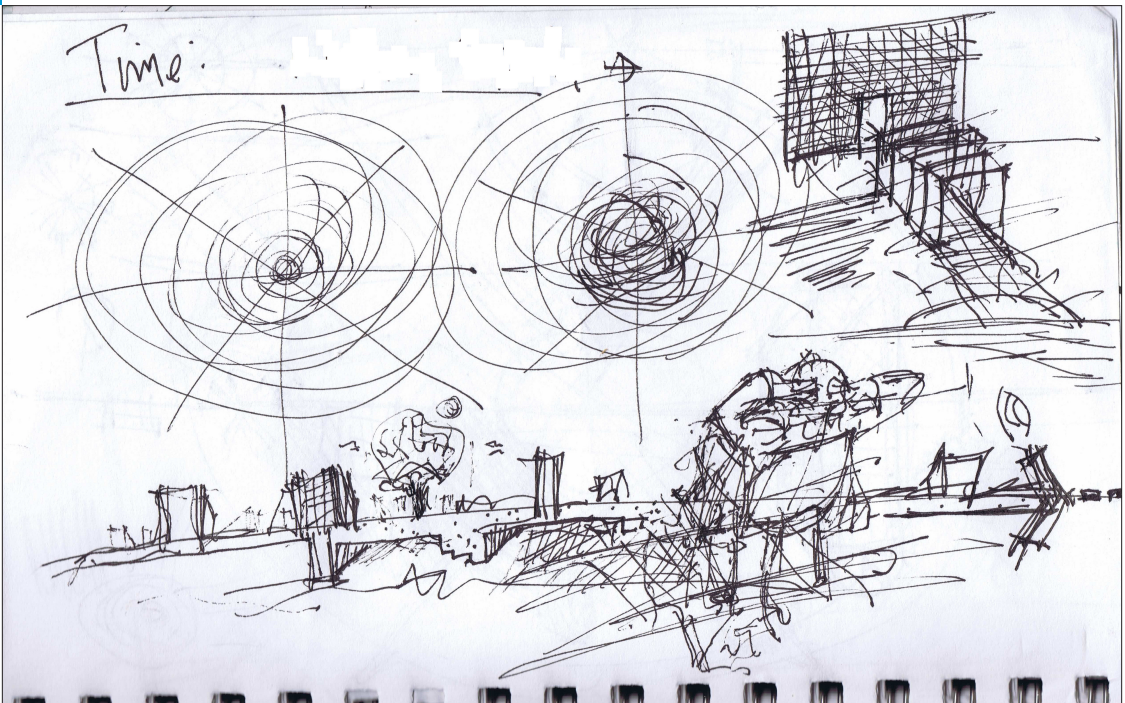
modern life cycle

① For a sustainable urban strategy to work, it needs to be first a thread that binds the cultural fabric together. Examples are learning and knowledge, order and justice, health and wellbeing. Each culture chooses how these will be woven into the culture but it is a common for all cultures. In our culture they have in become iconic symbols and architecture. Learning and knowledge becomes a school; order and justice becomes courts and prisons; health and wellbeing become hospital and clinics.



② The second component is to integrate “change” into it. Change is important without it the future needs of a community may not be met. Technology has been the driving force behind cultural changes. Primitive cultures used technology to adapt to their environment, their culture was sustainable. Today technology is changing our culture, an example is social networking. Years ago social networking was done thru Sunday drives to family gatherings. Technology has allowed for people to live far away and still maintain contact. We cannot turn the clock back on technology, but needs to be embraced and become an integral component in change. When left unchecked it has the ability to change life as we know it and create an non sustainable culture.

021

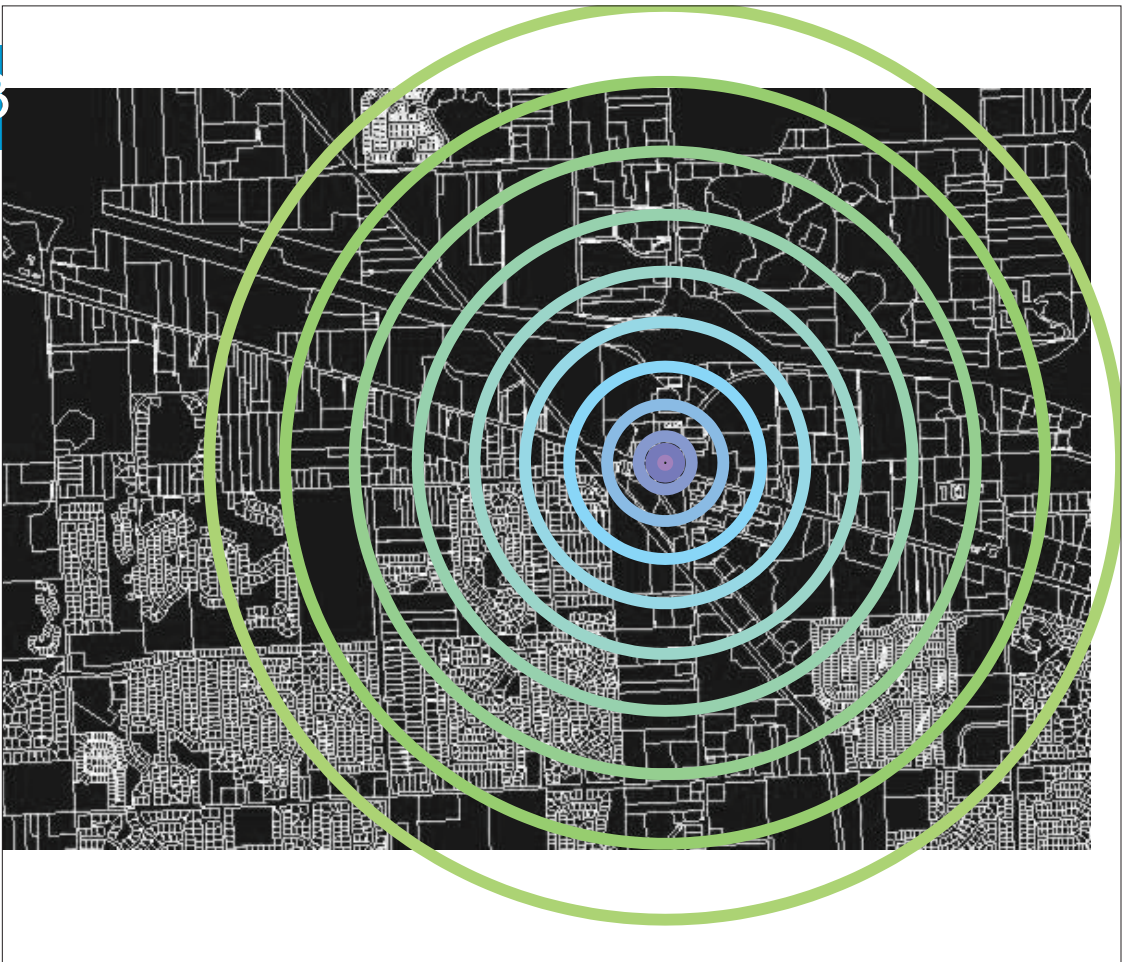


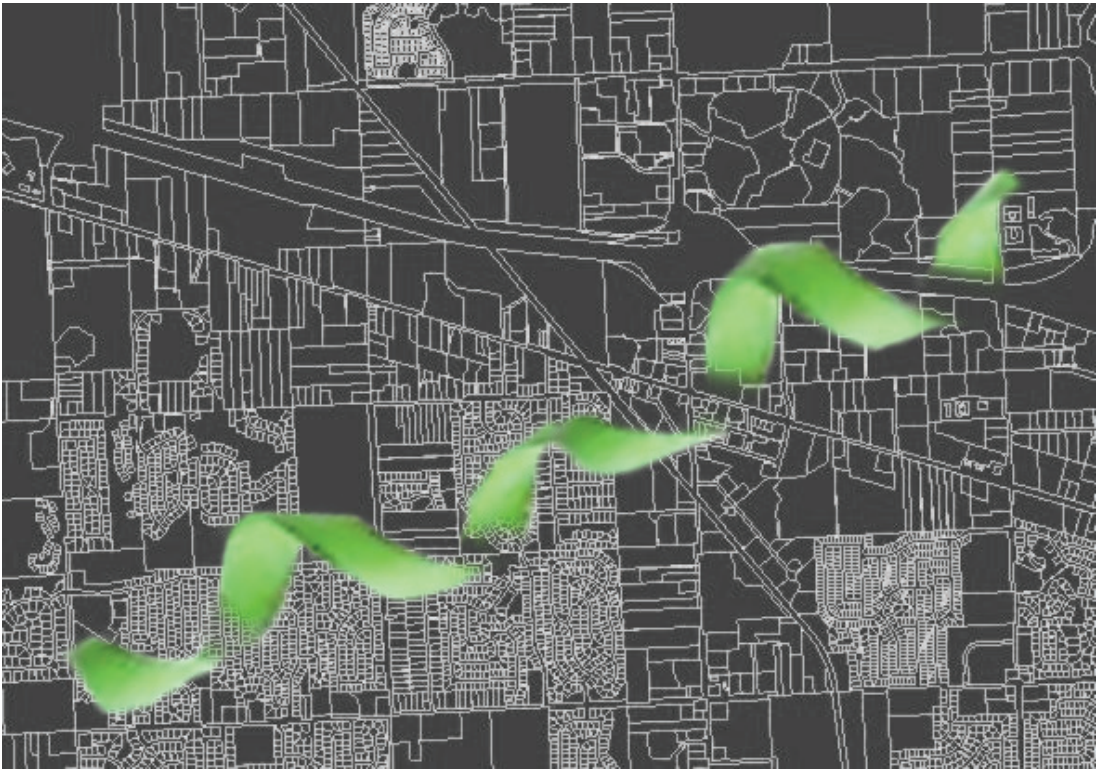
③ The third component is designing for sustainability. To design for sustainability means to create a balance. There needs to be a balance with consumption and population and future growth. Today the automobile has shaped the face of the city and has in some cases as in Detroit been a catalyst for its decline. The amount of resources that are needed to build and operate the automobile will only keep expanding. Resources are finite and in “time” society will be unable to maintain the level of consumption. When a culture has a choice between the old way versus the new with “time” they choose the new. We are in a global economy, in “time” third world people will become greater consumers. They will forge their own way; a sustainable culture will provide them with a path that will benefit all.

② The fourth component of the strategy is “time” it’s the element that binds everything together. It is a way to look into the past and predict the future. Looking through the prism of time into the past gives us the tool to predict the future. Time is important because the rules of the universe are measured by time. There is only one constant, and that is “change” and must take place with “time” the tool we use.

unifying the community

023





inside out strategy with health care integration

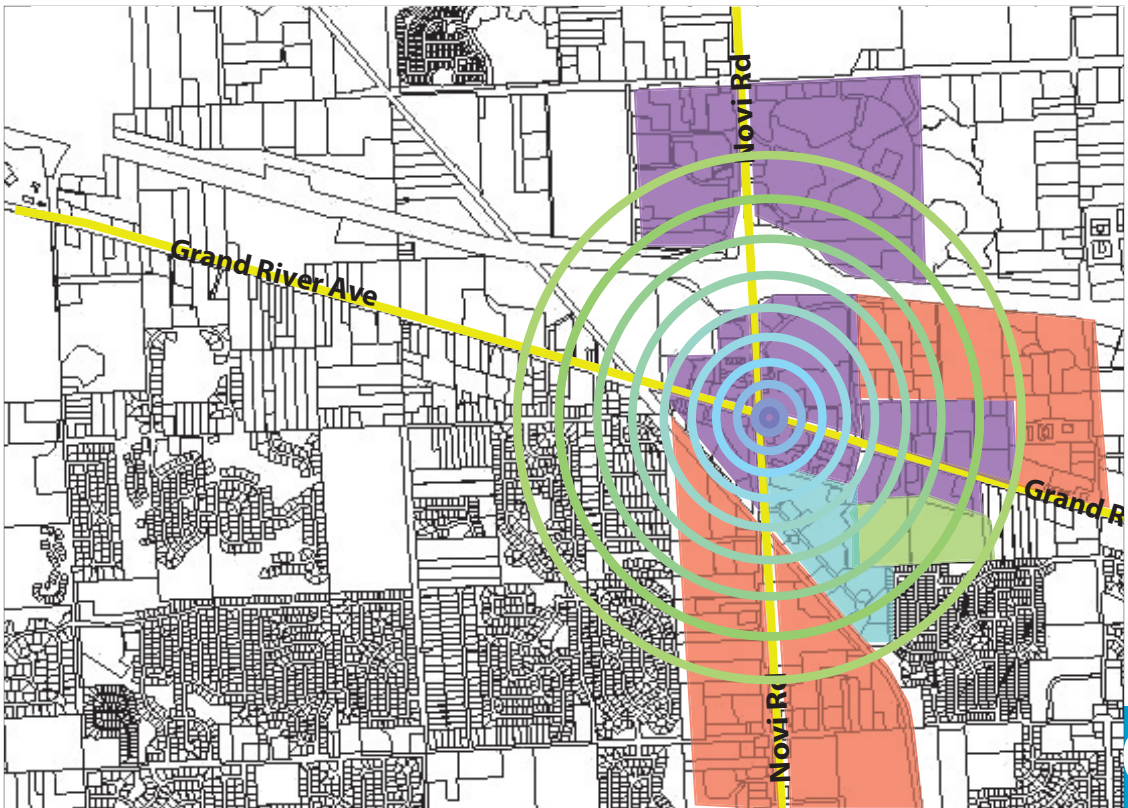
site study

novi, mi

Outside growth

025





inside growth

-  health care
-  retail
-  housing
-  manufacturing

Novi Road and Grand River and I-96- Novi was first studied as an example of how to choose the right location can unify a community and a wrong location can push a community apart. A new Hospital was built two miles from downtown at the intersection of Beck Rd and Grand /River Ave. This started a new growth area away from downtown forcing the community to grow in two areas. This site looked as an ideal location from a future mass transit node because Grand River Ave travels between Lansing and Detroit and Novi Rd connects to Northville at Eight Mile Rd. Twelve Oaks mall is located just north of the downtown Novi. The strategy would have linked this area with downtown connecting it walking path and potentially integrating a health food component



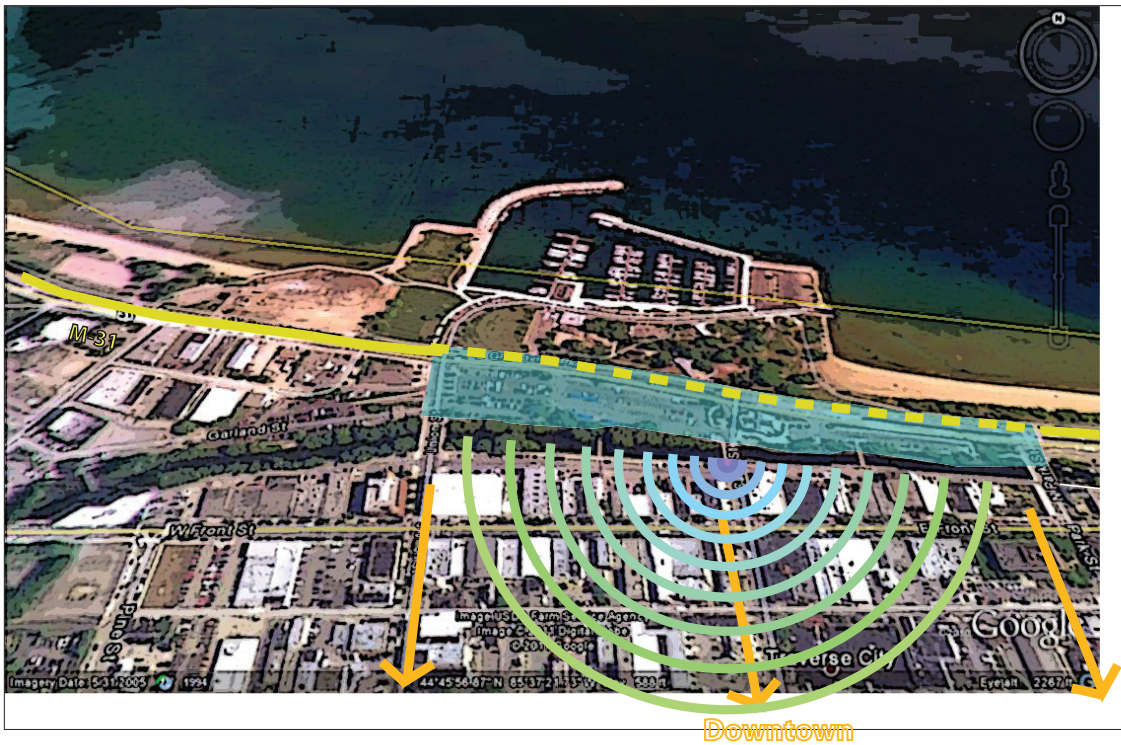
027

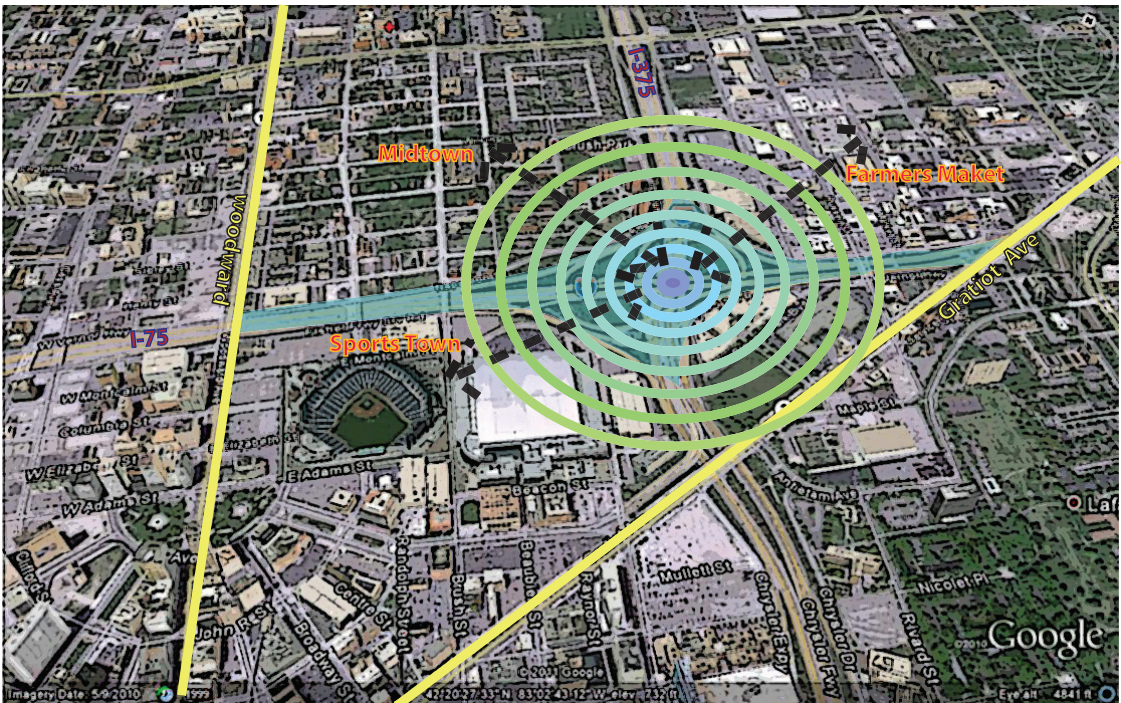
michigan sites

Site selection was important in implementing the urban strategy. The need for health and wellbeing are equally weighted in the choice of sites. The need to unify the community and possibly bring an identity to a community was also a factor. The location had to be located on a vacant lot and or building on top of a freeway. Transportation was the key in my site selection and having the site be located at a mass transit node was essential. In choosing a site locating in Michigan was important for me to be able to visit and feel the scale and ambience. Four locations were evaluated based on the above criteria they were.

Traverse City Michigan: M-31 and Downtown- With the component of "time" and "change" Traverse City could become a major growth area. Technology will drive this, in the future more professionals will be able to work from their home and they will begin to choose based upon the area and what it offers and not how close they are too work. M-31 separates the Downtown from the Grand Traverse Bay; the site would build over M-31 bridging the two areas providing a recreation link to the water. This site in the future would provide a mass transit link on the coast west coast of Michigan and potentially linking into Grand Rapids Michigan.

traverse city, mi



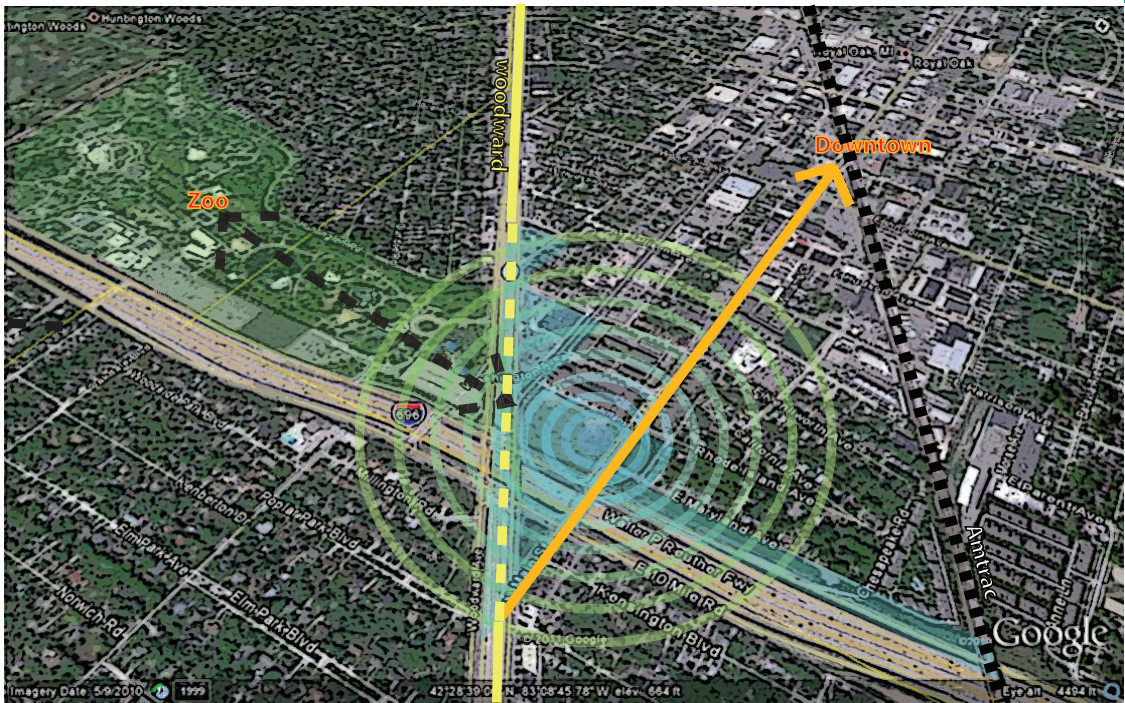


029

detroit, mi

Detroit Michigan: I-75 and I-475 intersection- This was appealing because it could begin a healing process for Detroit. The location would stitch together the Farmers Market with Entertainment/Sport area and a portion of Mid Town to Down Town. The Farmers Market provides a healthy food is a component that is important to health and wellbeing. It could provide an east west mass transit/ walking path between Woodward and Gratiot Ave. In the future this would extend further east and west to another plaza built over the I-75 I-96 intersection. This adds Cork Town to the above and further completing the stitching between Mid Town and Down Town. The east west walking path/ mass transit system would now connect Michigan Ave. and Grand River to Gratiot Ave. with a Woodward Ave. transit stop.

Royal Oak Michigan: I-696, Woodward Ave., Main Street and Amtrak - Royal Oak is a suburban community that is heavily residential community that has a vibrant down town. The City is known for its association with the Detroit Zoo. The site has an empty lot that provided an opportunity to unify the community. The lot has Main Street on the east edge and is adjacent to the Detroit Zoo, a fitness center and is linked to Amtrak by vacant strip of land. This site is ideal from a mass transit node location Main Street intersects Woodward Ave. and connects to Troy Michigan, to the north. Main Street can also be viewed as Livernois Ave., with the potential to connect Royal Oak to the Detroit River. The city is dived into even mile segments at 11 mile, 12 mile and 13 that also has potential to become future mass transit routes. The mile segmentation allows the residence to have for a maximum half mile walking distant to mass transit line to be incorporated into the urban strategy. The strip of land linking Amtrak to the site is located on the north side edge of I-696 and is ideal to link a rail road station and providing a source of solar and geothermal energy.



Change to a community can be in two forms, either it will be man made or from a natural disaster, either way it's an intervention that changes the fabric of a community. Man made changes can have positive or a negative effect and natural disasters can provide the opportunity for a community to make positive changes.

031

negative change:

detroit, mi... freeway

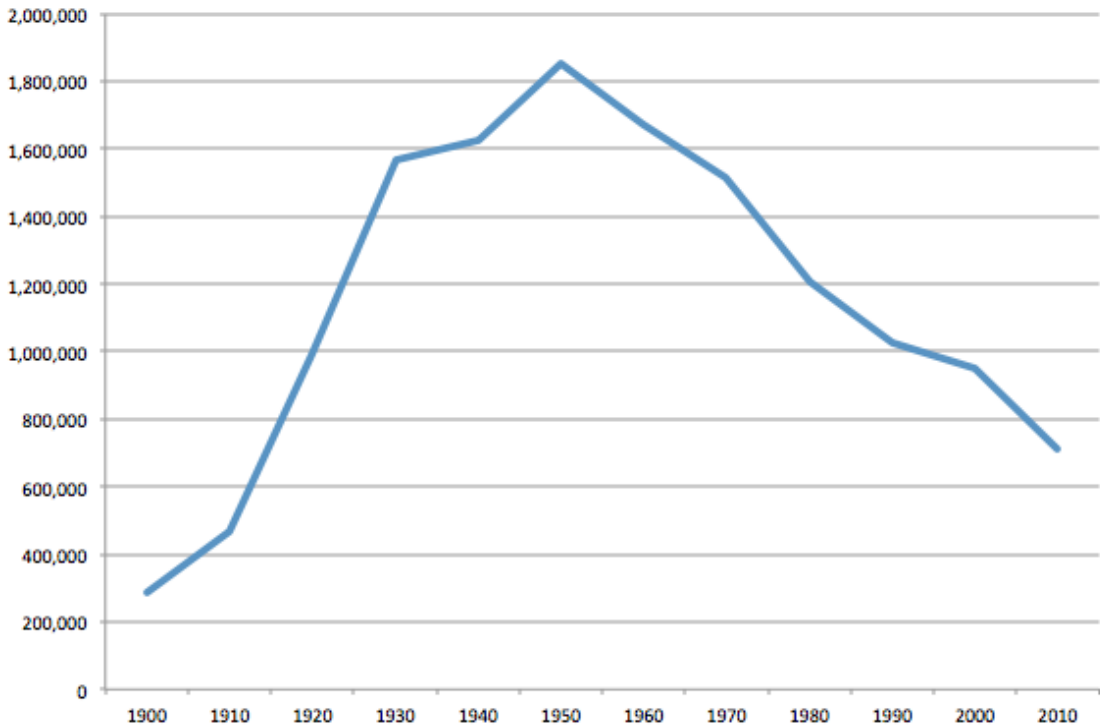


detroit- 1892....detroitrasnithistory.info



Detroit was the gem of manufacturing and was prospering through the 1940's till the 1950's. The city engineers designed and implemented a massive freeway system. Many public housing units were destroyed. Residents were expelled in the process of the city creation and refugees were left with no plan for relocation. The cities middle income began to shift to the suburbs. Today we see the affects of this decision.

Decline of Detroit's Population



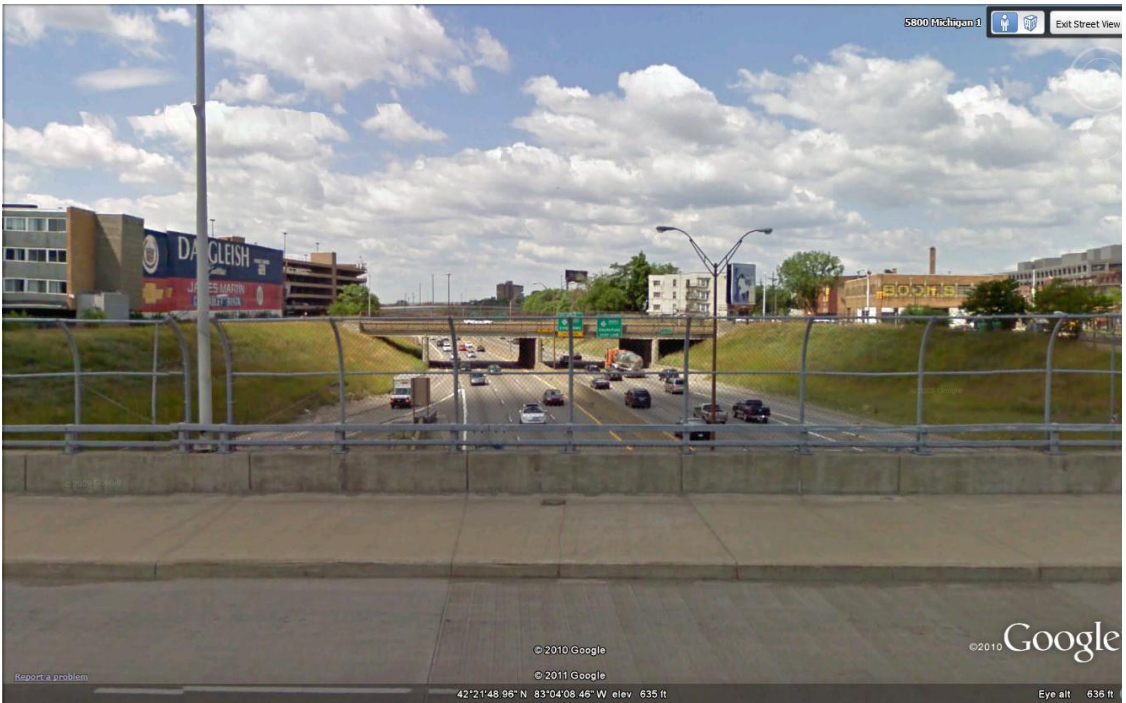
detroit population decline....graemeeyre.inf

analysis:

Detroit peak population was in the mid 1950's, and at a time the freeway system was cutting through neighborhoods and displacing residents. The seeds were planted in 1942 and the city is in decay today.



1st freeway detroit 1942....jamesgram.com



city divided I94 overpass todaygoogle image



stairway to no where 1959, I94....
detroittransithystor.info

conclusion:

Man made interventions that cut into the fabric of a community, can cause greater harm than good. Detroit is an example of this.

positive change:

boston, ma...big dig

1.45 mile green walkway www.architecturerecord.com

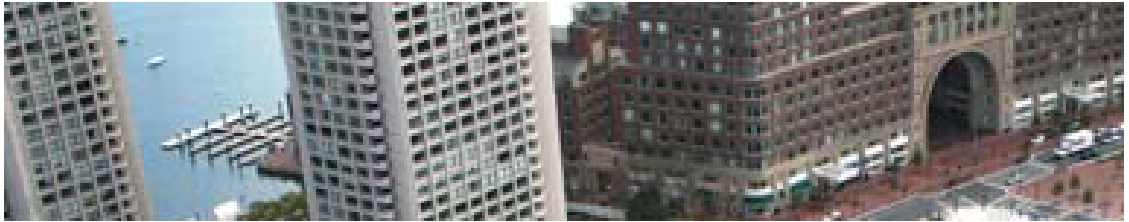


urban park...[bostonnaked.files.wordpress](http://bostonnaked.files.wordpress.com)

035



before 2002....top5pidia.com





new urban growth...[bostonnaked.files.wordpress](http://bostonnaked.files.wordpress.com)

037





a tunnel..matterwork.net

038

analysis:

A successful urban project, that united a divided city by an unattractive highway. The project created new parks, property values have increased, and the city is beginning to re-fuse the neighbor hoods that were divided. A positive seed for positive growth an inspiration for others to follow.

positive change:

new york, ny...high line park
architect: diller scofido & renfro



1.45 mile green walkway...
architecturerecord.com

039



green space...evogonic.com





brianrose.com

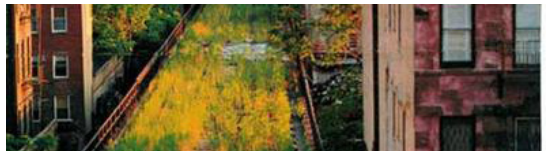


brianrose.com

041



nyc-architects.com



nyc-architects.com



walking space...wikipedia.com

042

analysis:

From railway to walkway an urban project that utilized an abandoned rail and created a 1.45 mile walking nature trail on the west side of New York City. It was a collaboration of many architects to accomplish this project. The walkway is an abandoned urban space that incorporates a green space and a walking space from an old elevated rail. The vegetation is a naturalized planting that are self seeding and were growing on the tracks. As you walk along the tracks you have multiple views of the Hudson river. A successful urban strategy that is creating positive growth while utilizing and existing asset.

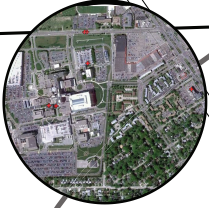
royal oak, michigan

THIRTEEN MILE RD.

ELEVEN MILE RD.

WOODWARD AVE.

MAIN STREET





Royal Oak is the site choice; it has all the components to implement a sustainable urban strategy into a community. The location can give the city an identity, provides an opportunity for the city become a part of the Detroit Zoo, have a connection with a fitness component and is ideal for a transportation node and from energy strategy.

A health and wellness seed will be planted into this site as the intervention to bring a health and wellbeing urban stainable strategy into the city of Royal Oak. Time, change, health and wellness will be incorporated to the architecture.

Royal Oak Michigan: I-696, Woodward Ave., Main Street and Amtrak - Royal Oak is a suburban community that is heavily residential community that has a vibrant down town. The City is known for its association with the Detroit Zoo. The site has an empty lot that provided an opportunity to unify the community. The lot has Main Street on the east edge and is adjacent to the Detroit Zoo, a fitness center and is linked to Amtrak by vacant strip of land. This site is ideal from a mass transit node location Main Street intersects Woodward Ave. and connects to Troy Michigan, to the north. Main Street can also be viewed as Livernois Ave., with the potential to connect Royal Oak to the Detroit River. The city is divided into even mile segments at 11 mile, 12 mile and 13 that also has potential to become future mass transit routes. The mile segmentation allows the residence to have for a maximum half mile walking distant to mass transit line to be incorporated into the urban strategy. The strip of land linking Amtrak to the site is located on the north side edge of I-696 and is ideal to link a rail road station and providing a source of solar and geothermal energy.











045





Royal Oak Michigan-Site Strategy Plan:
Scale: 1"=300'



- | | |
|---|---|
|  Residential & Apartments |  Fitness Center |
|  Commercial /Manufacturing |  Detroit Zoo |
|  Parks/ Green Space |  Vacant Land |
|  OCC Campus |  Elevated Walking Path |
|  Public Parking |  Site Boundary |

047





Site Strategy:

The strategy must begin by unifying and not dividing. Woodward Ave separates the community from the Detroit Zoo. The first step is to link them together along with the fitness center by building a plaza over Woodward. To bring a wellness and health component the site is to be designed as a walking park (Wellness Park). Main Street will travel below the plaza as well. The design will integrate an elevated walking path at the edge of the Zoo. The community can now enjoy the Zoo have access to it and become healthier because of the walking and a connection with nature.

049





050





ground form:

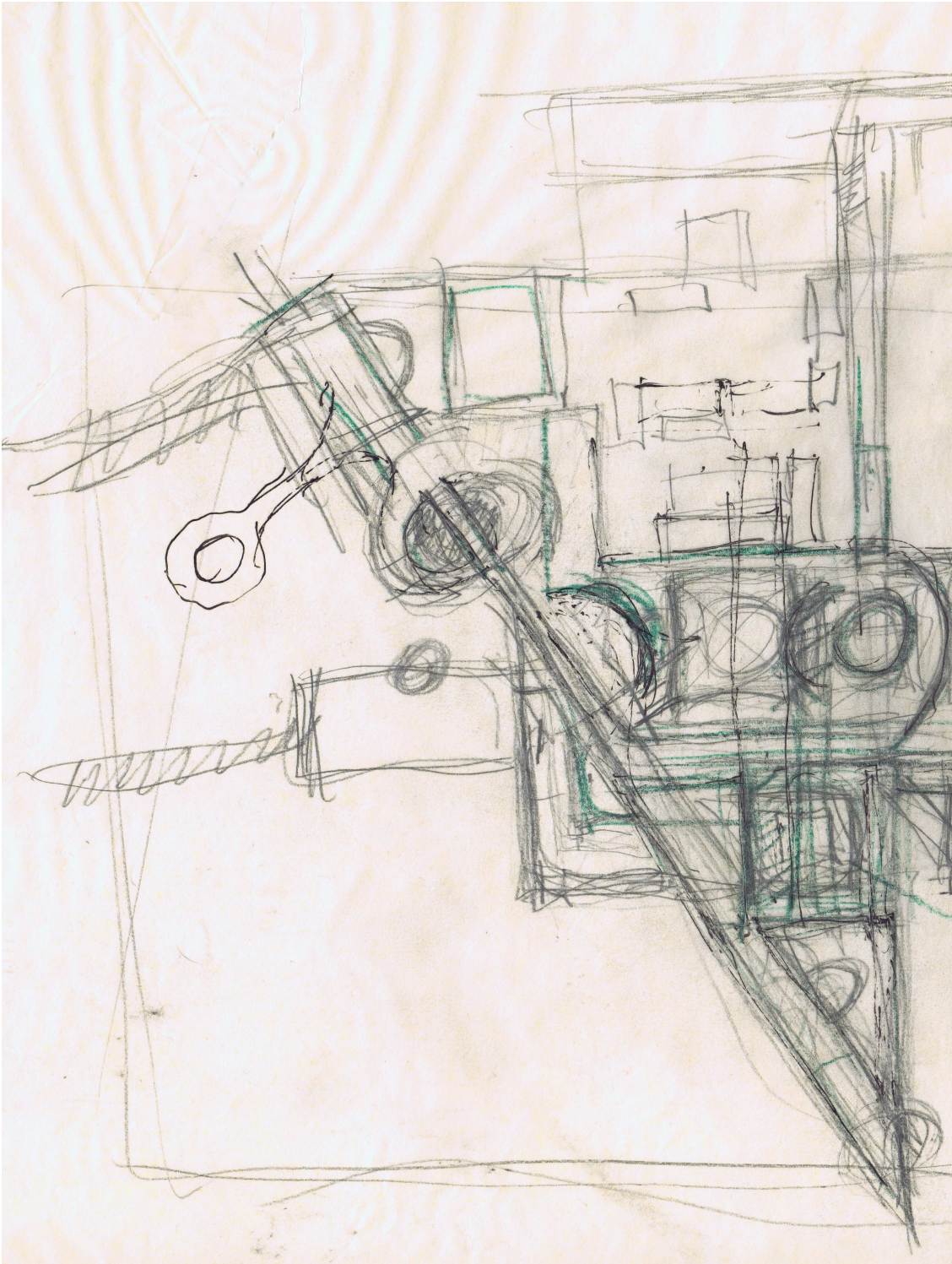


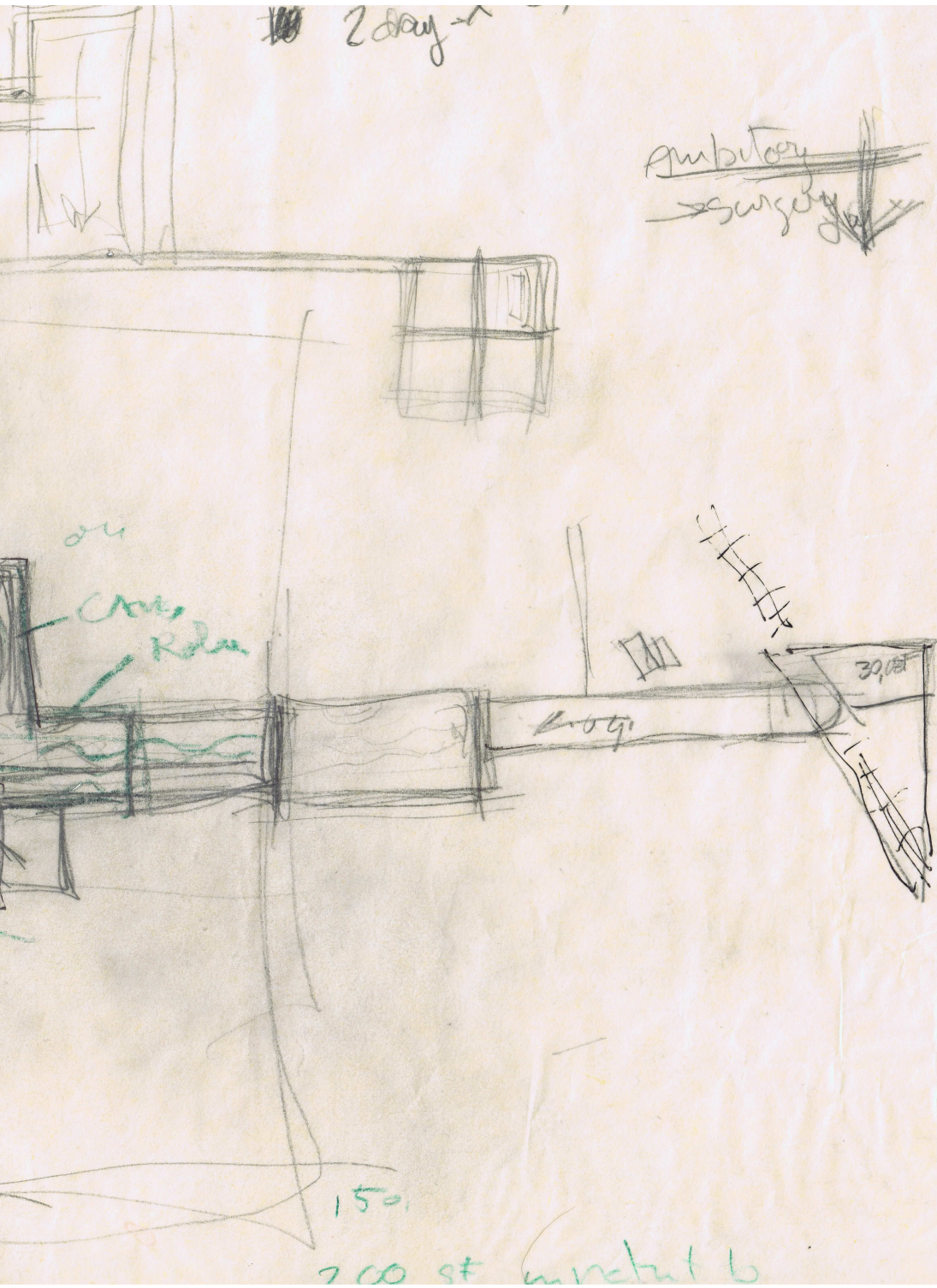
twelve mile rd.

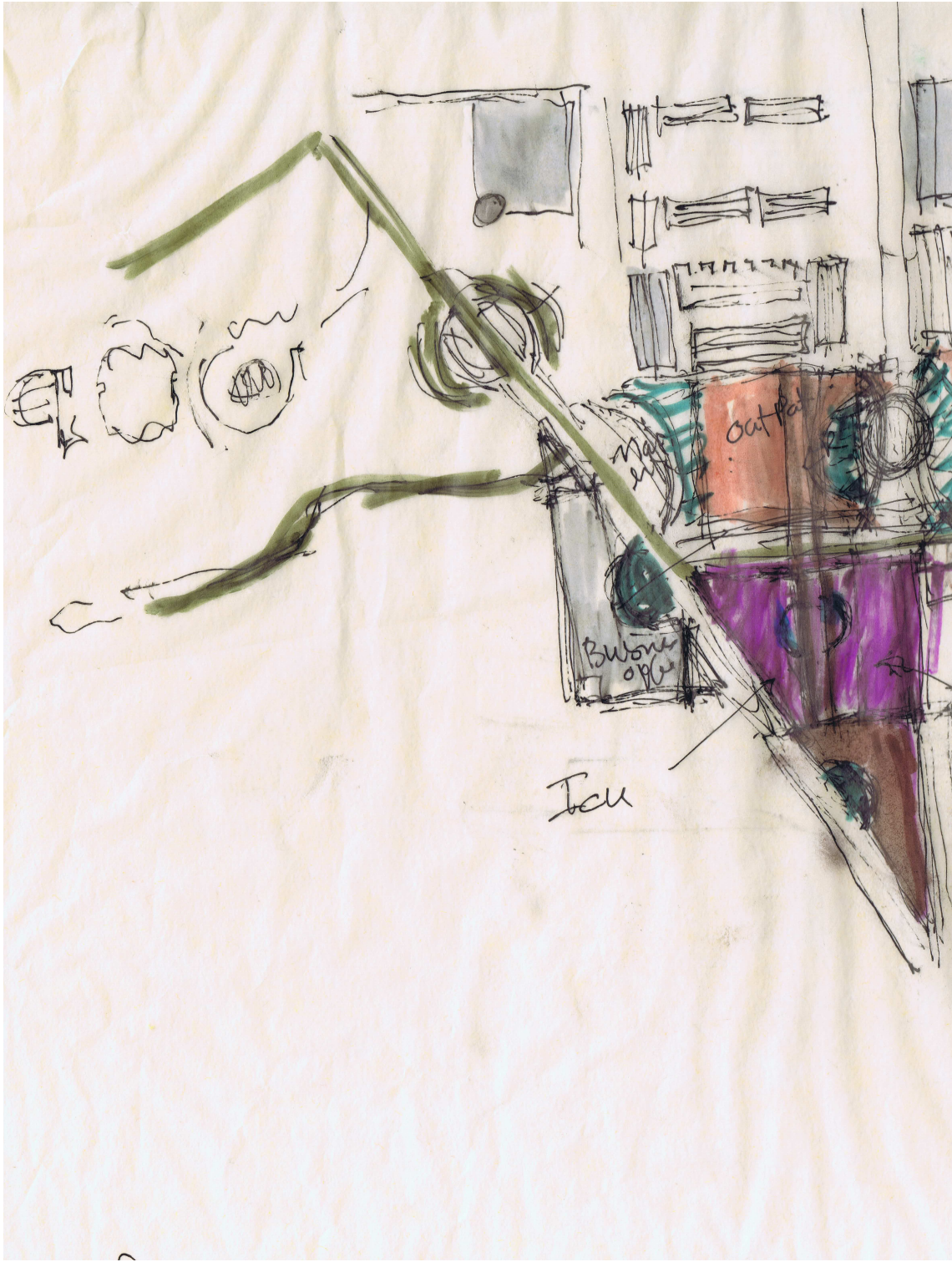
Woodward ave

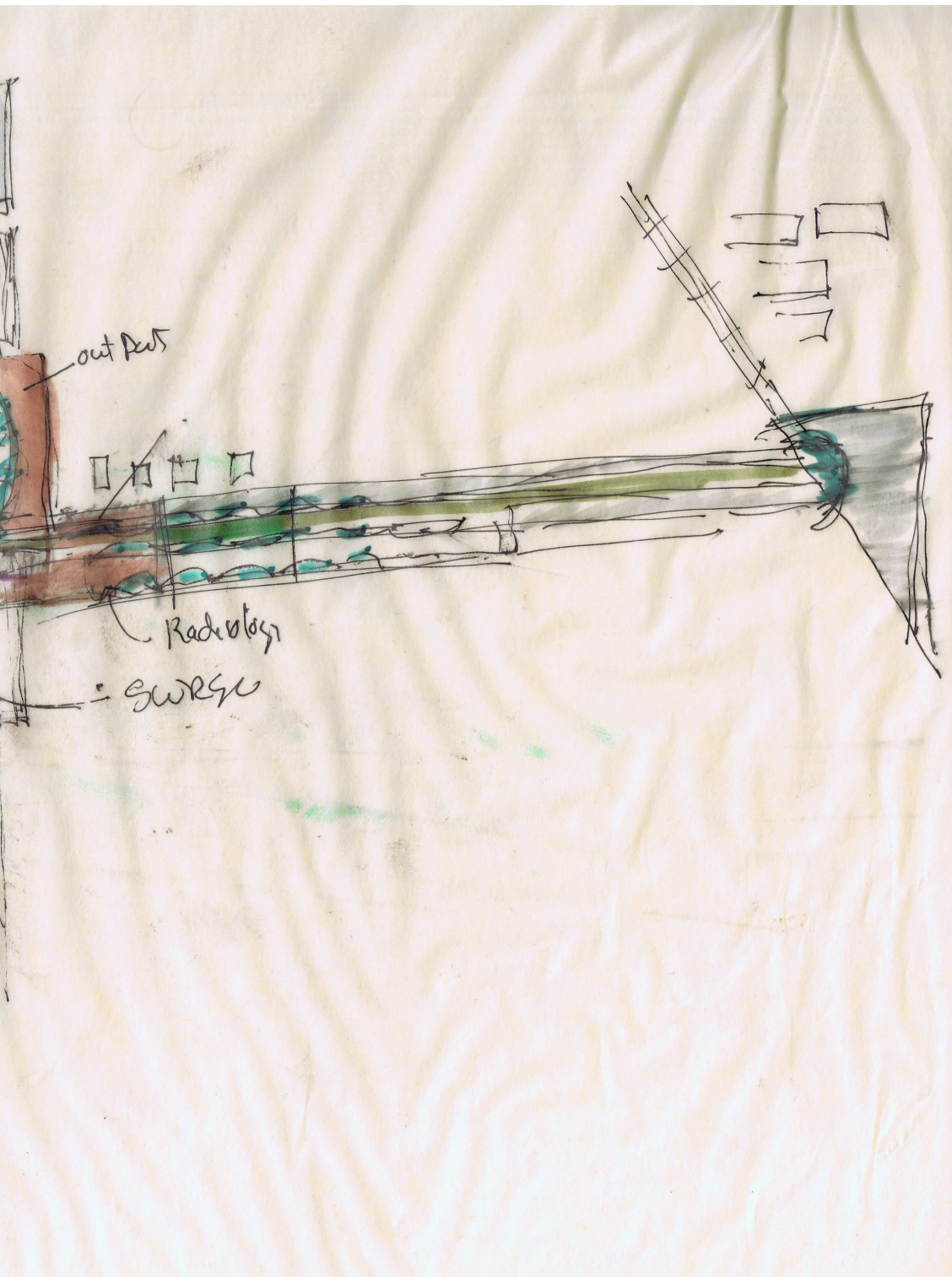
amtrak

-  future green space
-  vacant land
-  fresh food market
-  fitness center
-  zoo
-  train warehouse
-  transit system
-  walking path









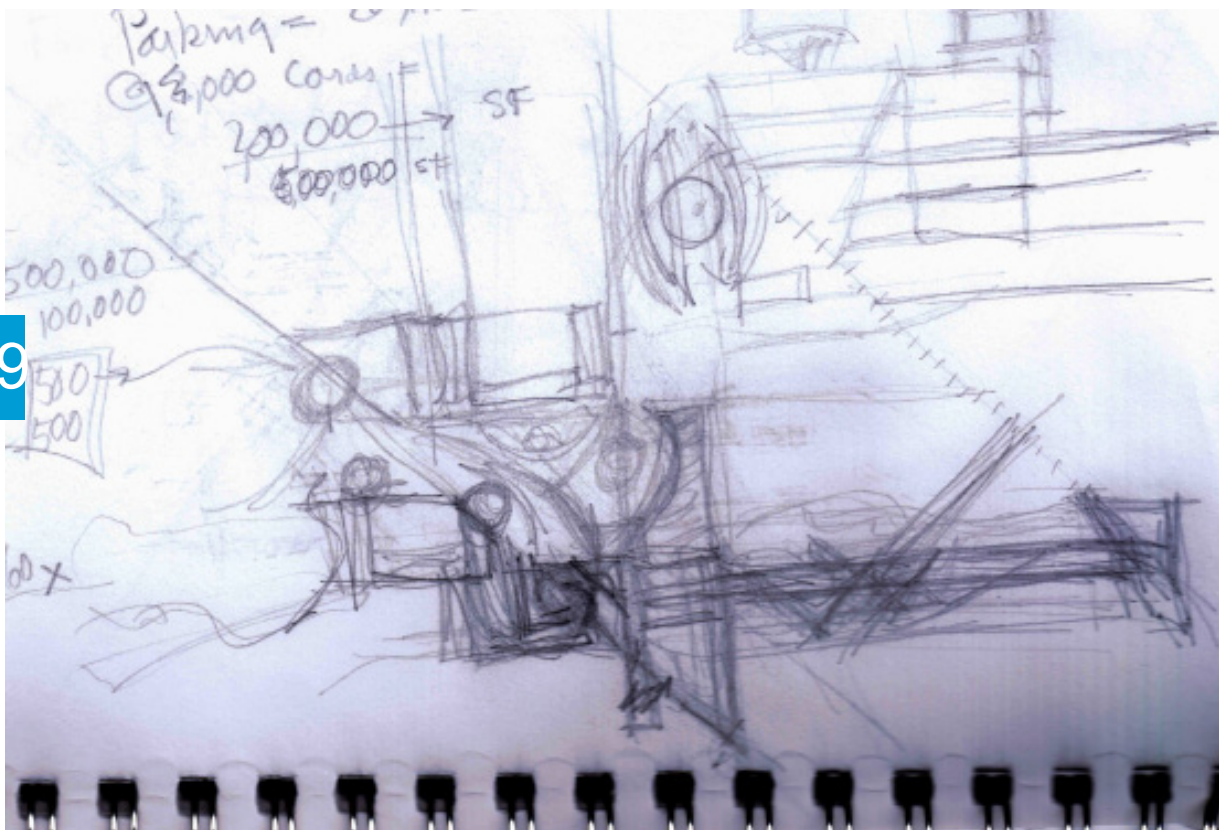
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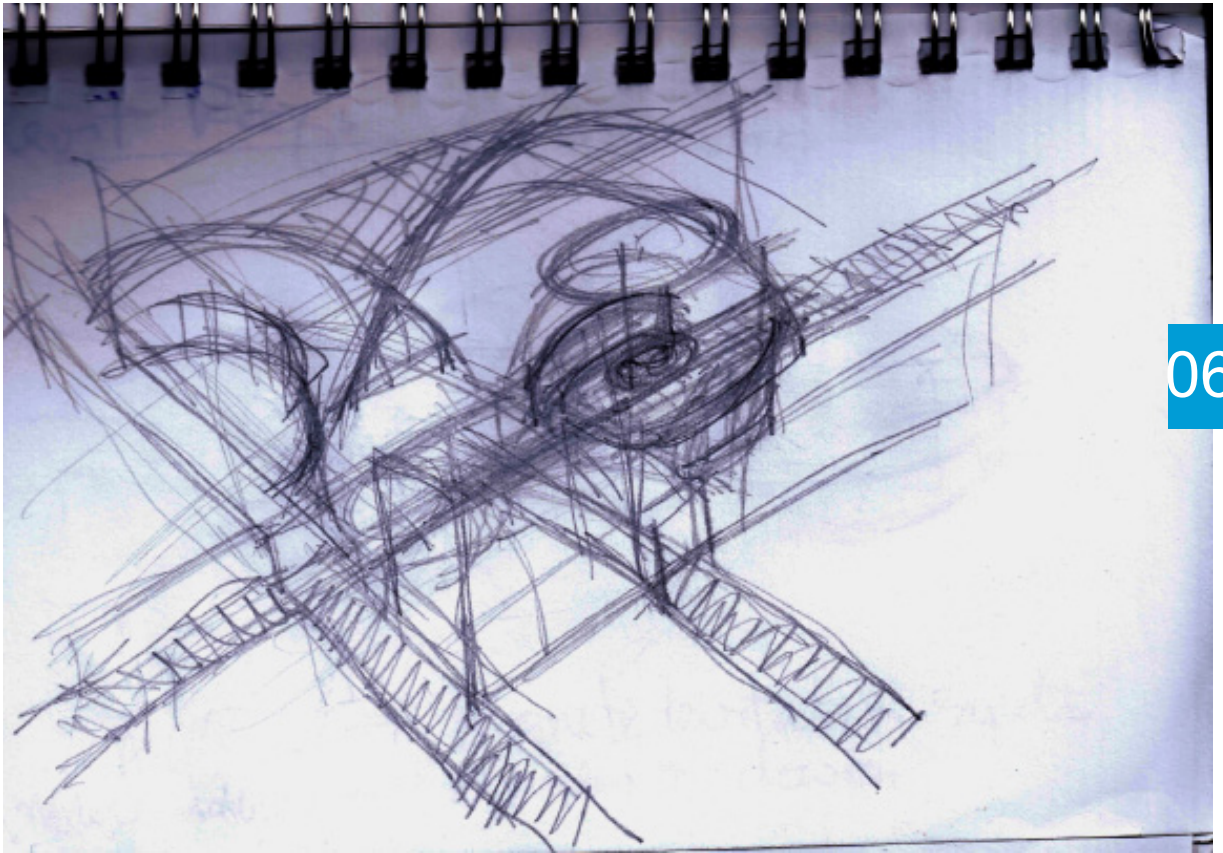




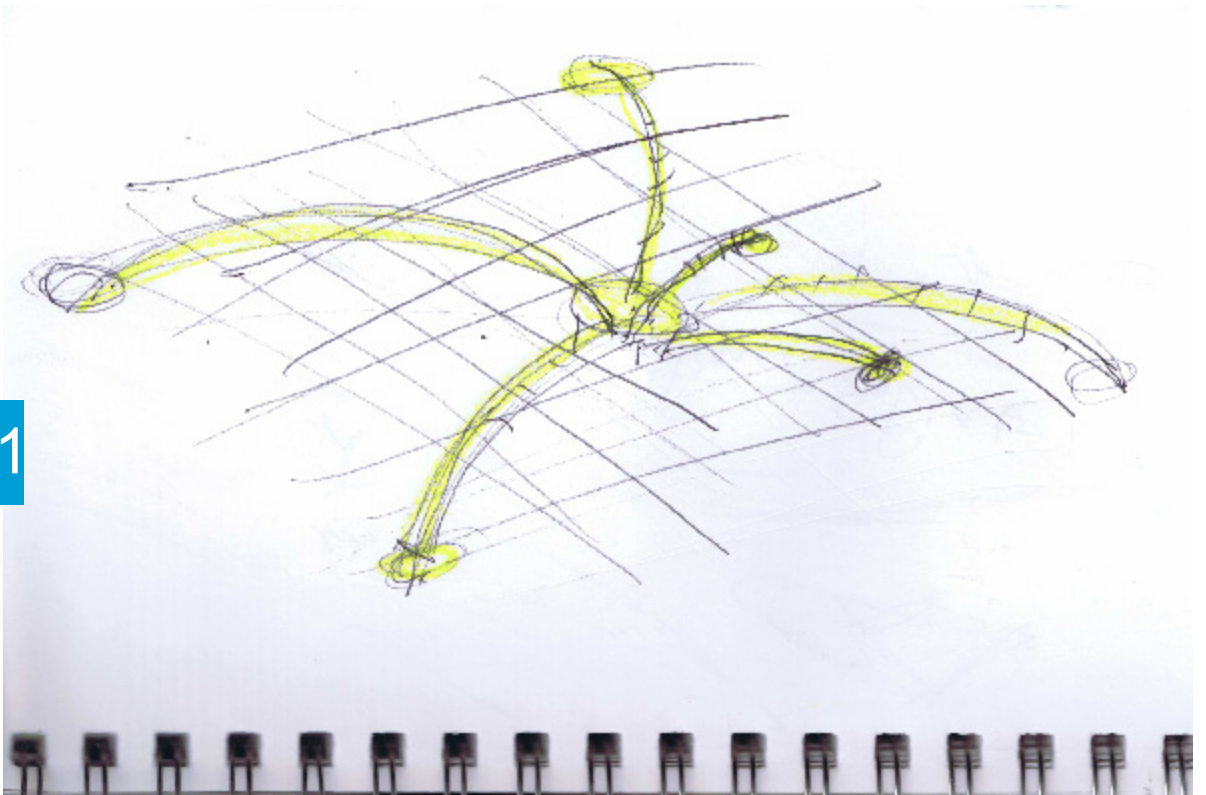
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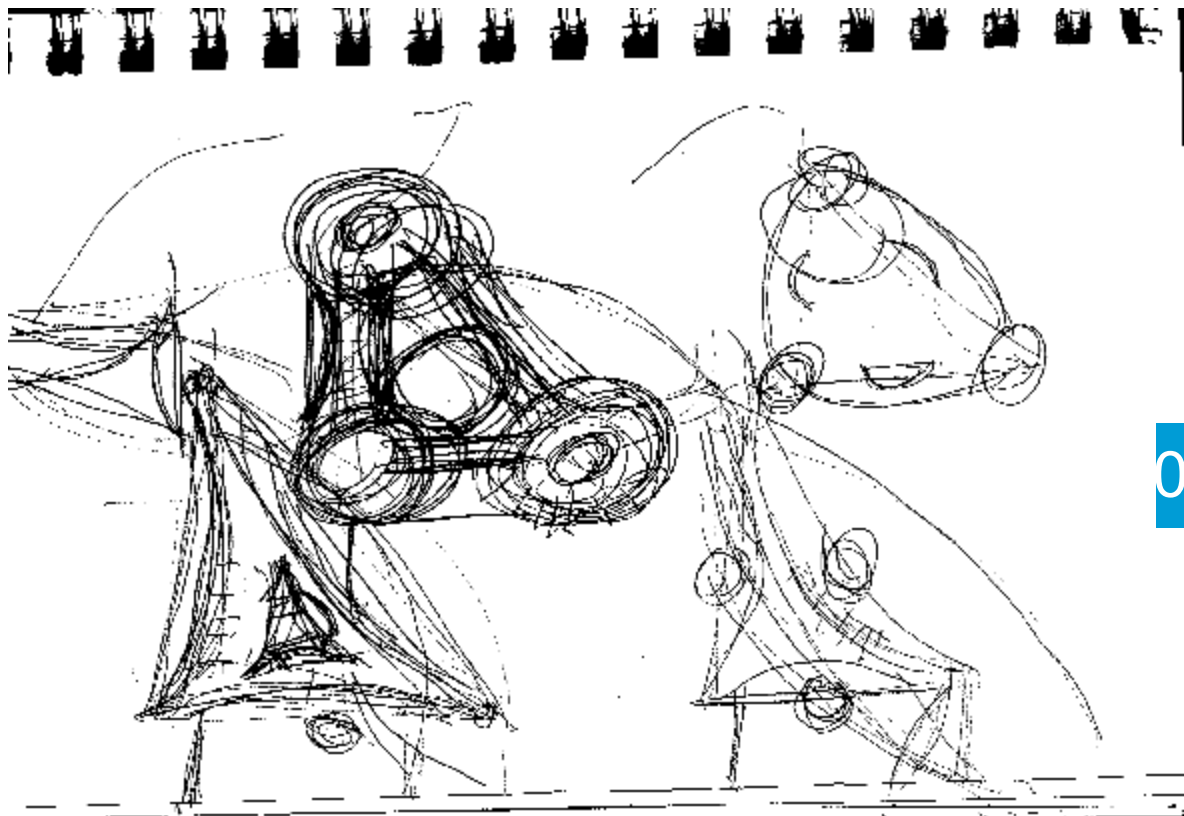
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061





063



Phase-1 Build Wellness Park & Transit Node



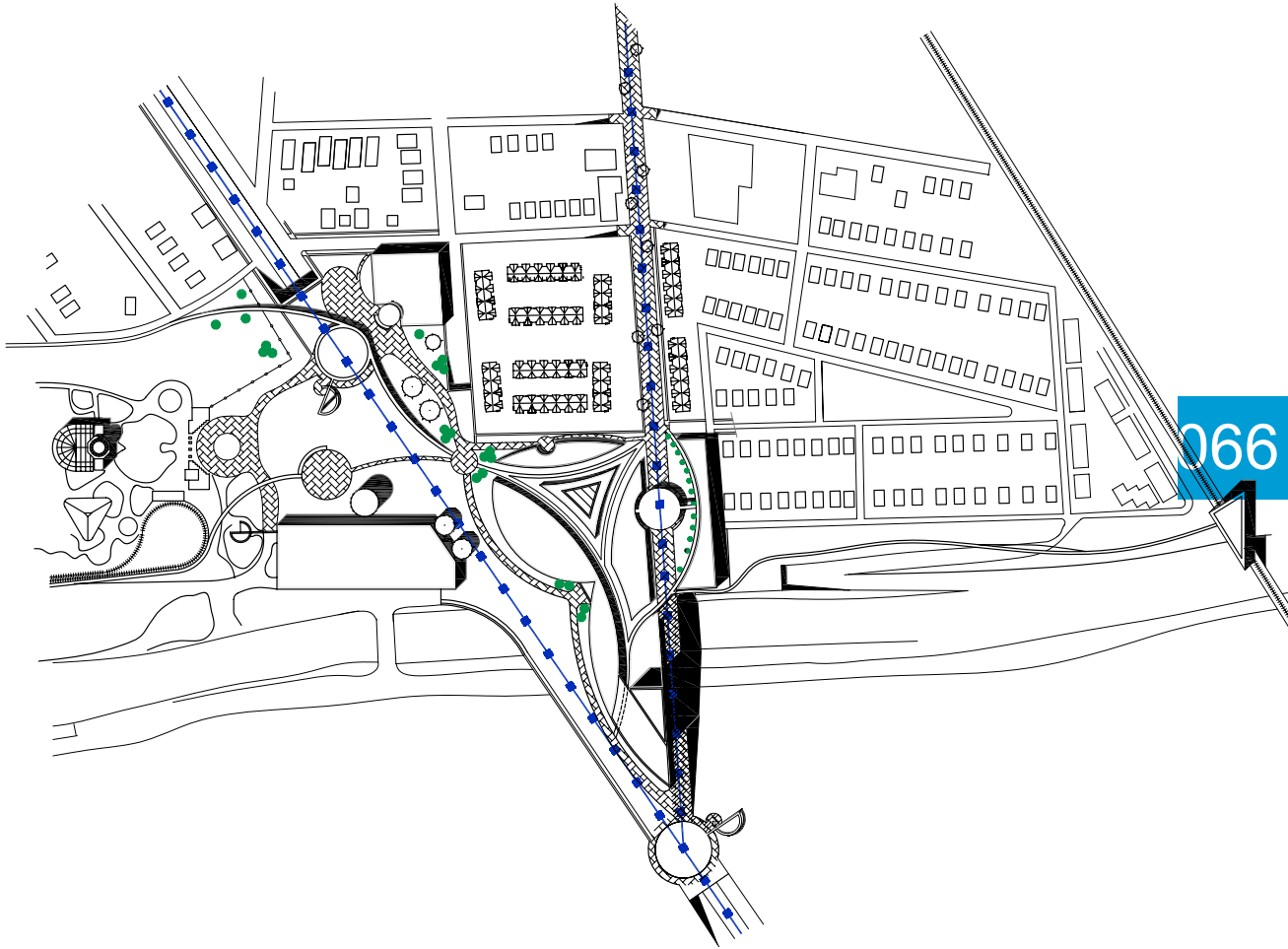
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065



Phase-2..... Build Medical Center



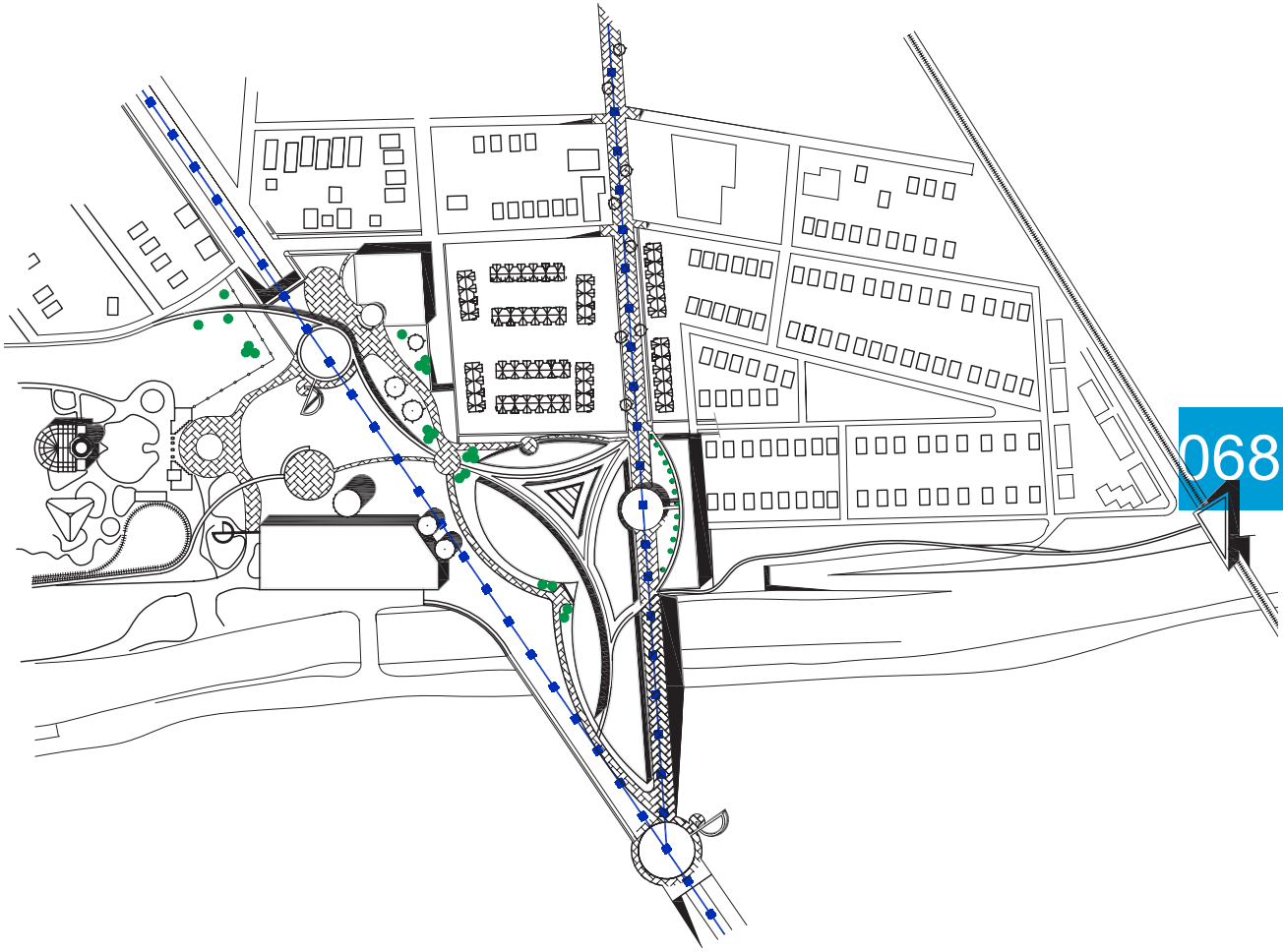
066



067



Phase-3..... Medical Center Reduction & Distributor

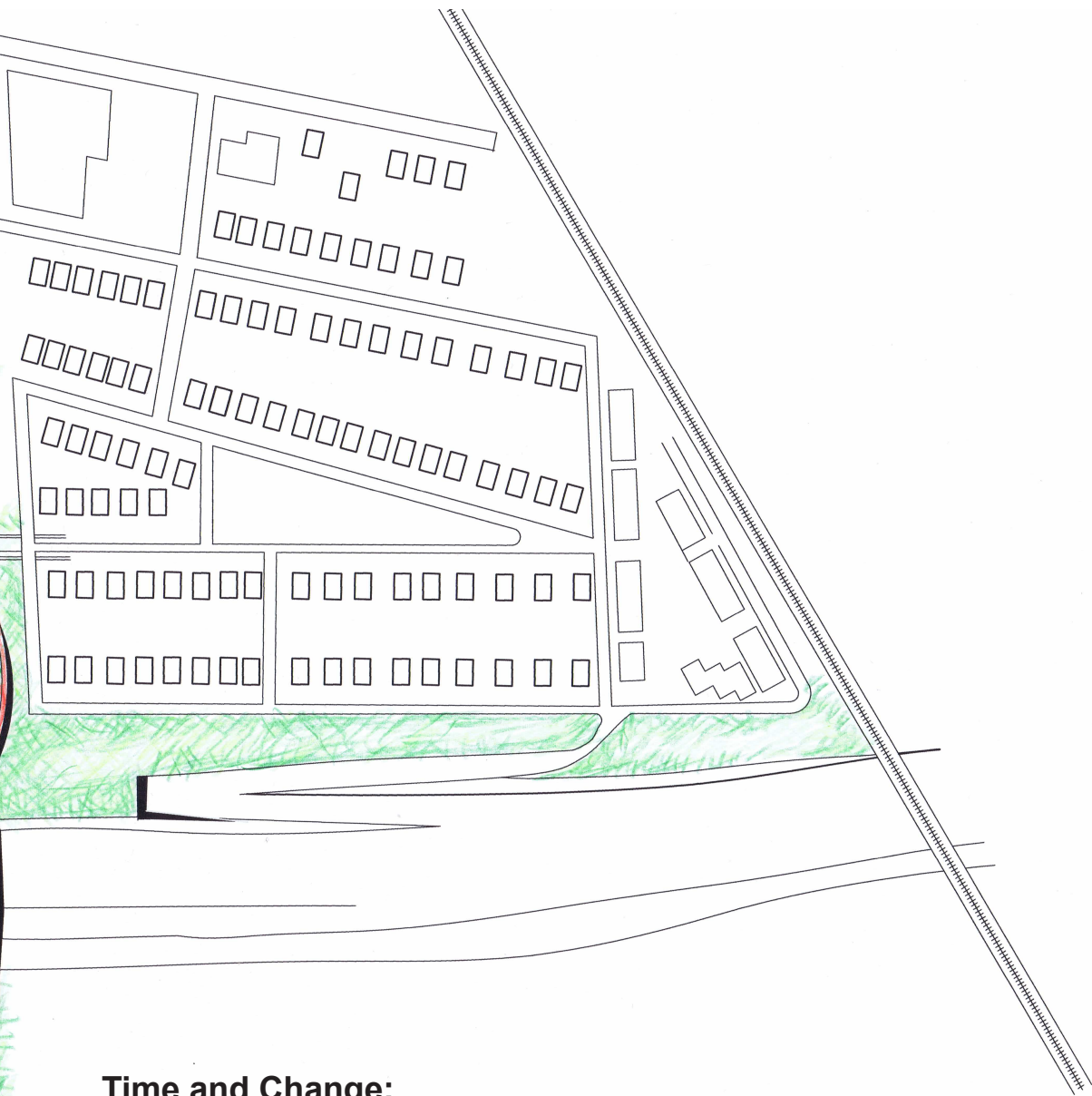


068





wellness park: phase I



Time and Change:

To incorporate "time" and "change" the park needs to be designed to become both a transportation node and a Health Care Facility. The below ground structure needs to be destined to accommodate parking and to support the supper structure of a Health Care Facility. An aging population and the need to have a technologically advanced health care will be necessary in the future.





health care & transportation: phase II



Health Care Facility and Transportation:

The next step is to build an advanced Health Care Facility and a transportation node on the site. A link to a train station on the strip of land will also be built. The train station will double as a warehouse to bring goods into the facility. The strip of land will have a series of geothermal wells drilled and a bank of solar panels to power the facility. A mass transit line is to be designed into Main Street by diverting traffic below it and become a walking green space that connects downtown with Wellness Park. The need for the automobile becomes diminished and public parking lots become pockets of green space.



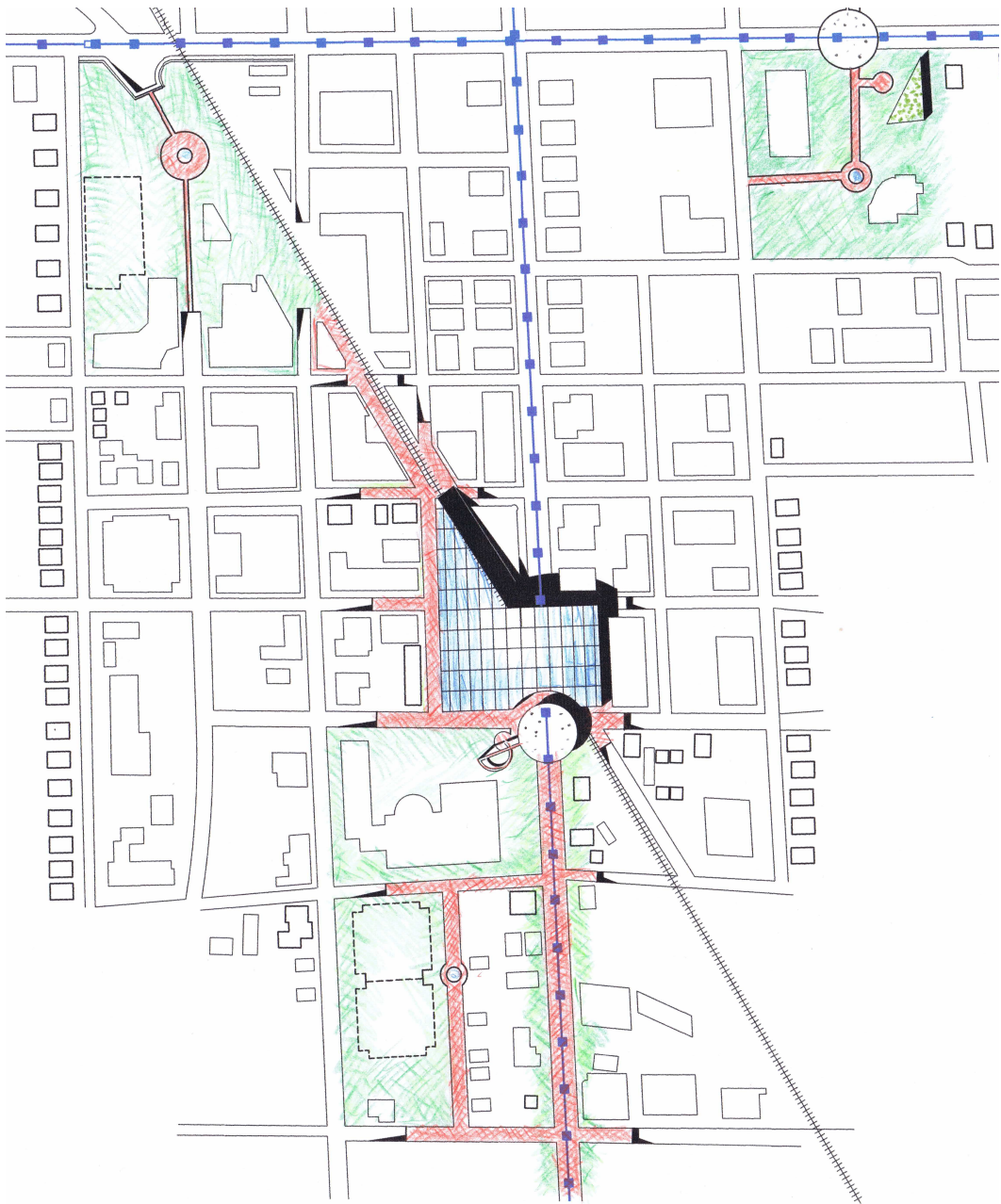


building reduction & community integration: phase III



Reduced Floor Plan:

The architecture needs to be designed to change over time. As the community becomes healthier and technology becomes more advanced the demand on health care will begin to diminish. The building must now adjust to changes. The type of care will become more specialized treatment and emergent care. The long term care will be done at home for two reasons the cost and being with family is better for healing. Technology and knowledge will make health care an individual thing. Testing can be done by simple home device that can be viewed by a health care person any ware. The building foot print is reduced.



Community Integration:

The last phase of the strategy is to decentralize health care and move it into the community. For education and minor treatment that cannot be performed at home. As the building is re-sized to meet the reduced demands on health care the removed components from the building will be used to build the new remote buildings. The community adapts to and becomes a walking healthy community.

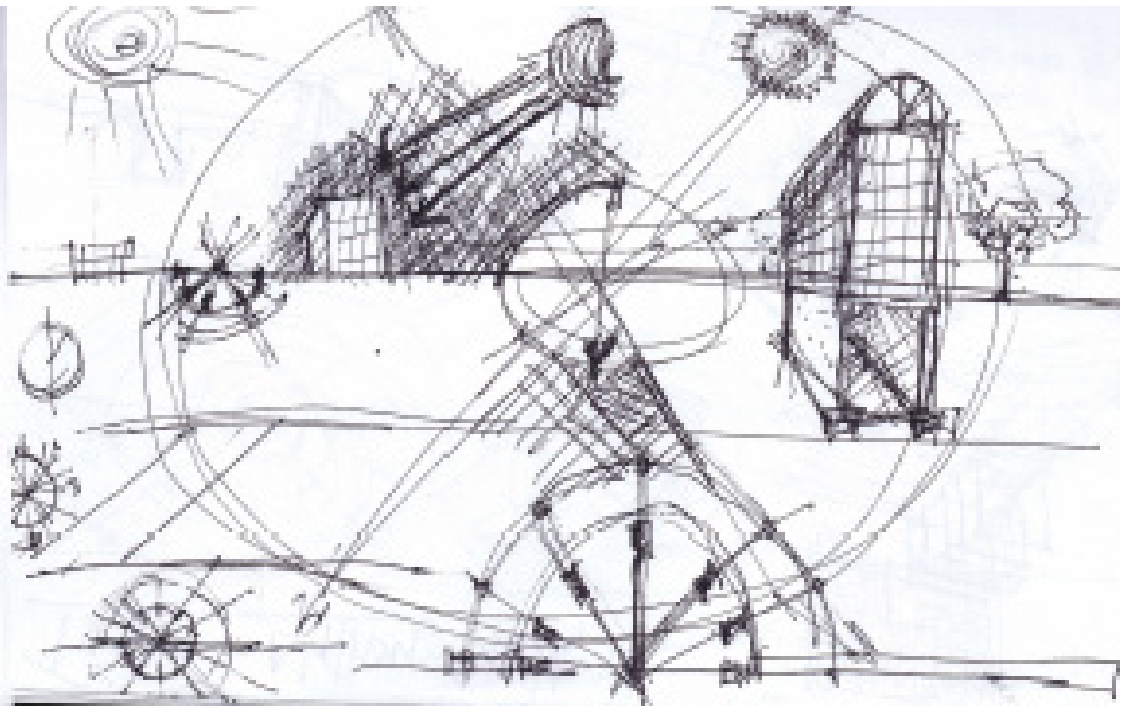
Architecture Design:

The designed health care facility will have a central circulation spine that connects all departments together. The best example of this is St. Joseph Hospital in Ann Arbor, Michigan. The initial plan had a patient tower on one end with the Doctors Offices connected on the other end. Visitors traveled along the spine on the first level to a support function. The second level was the clinical level patients and staff moved along this spine to the clinical space. On the outside there was a loop road that you drove around until you found the correct entrance. The only negative in the design was no interstitial space for mechanical distribution. The architecture can be looked at from two forms the wellness, and the changeability.

076



st. joseph mercy hospital,
ann arbor, mi

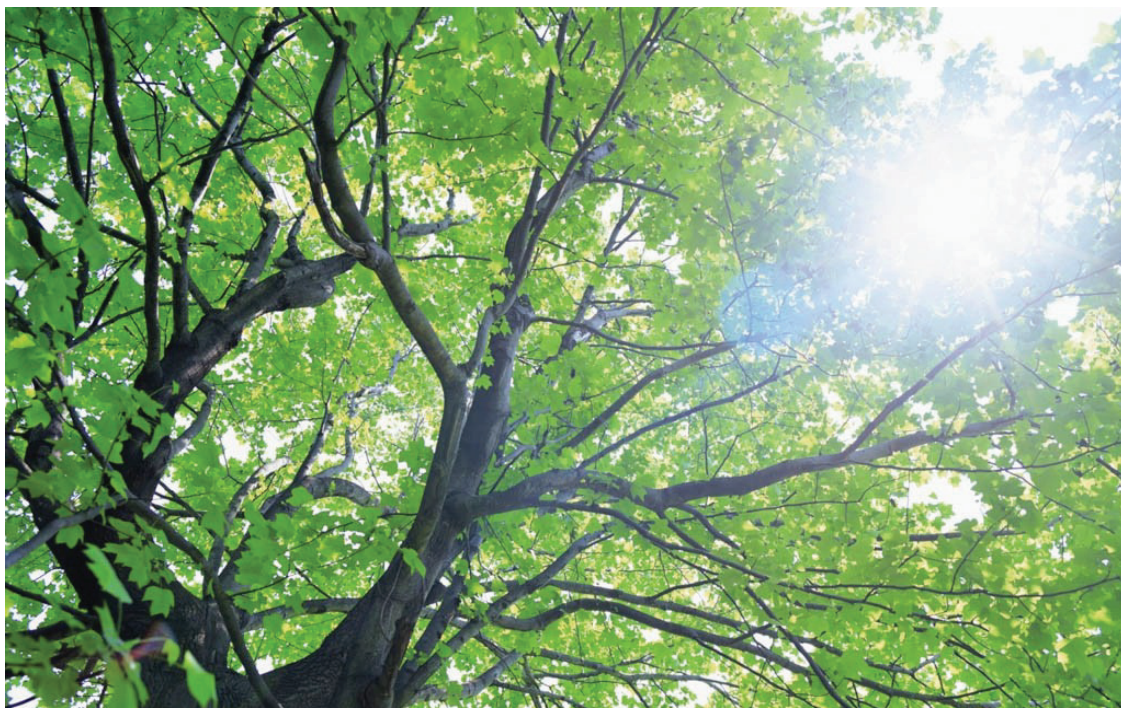


077

Wellness:

“The condition of being in good physical and mental health”.

light space: Spaces that light become important for healing and general well being. A waiting room, office space, patient rooms and ICU patient rooms are examples.



green space: Green space is a way of bringing a nature into a person's life. That's what made The Big Dig and the High Line architecture so successful. 't mind getting more involved with the community.

green space

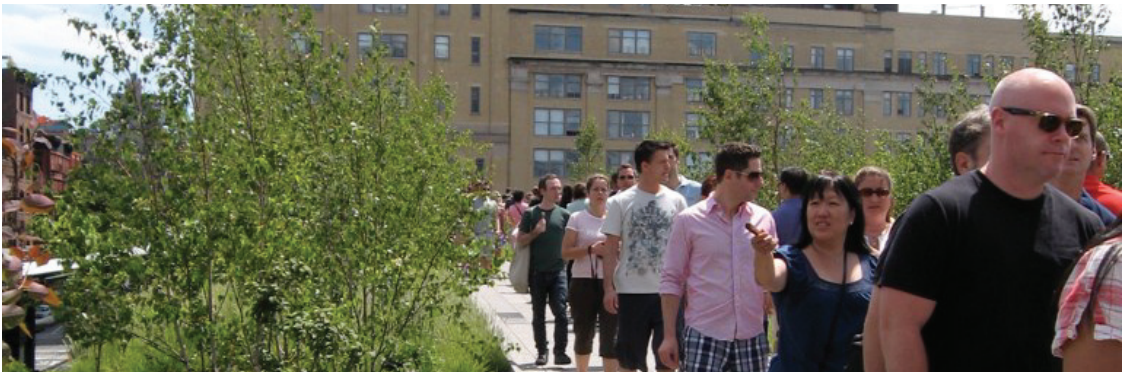


079

nature space:



Inature: Nature has healing properties. The community will have a means to directly experience in nature, thru the green spaces and the zoo connection.



walking space

walking space: Walking is activity, something that is not a way of life for the modern man. Primitive man was more active in their daily life and was a reason for them being healthier.

080



community connection: As the community feels that the government is working for them and providing opportunities to be better, the trust and sense of being part of something will be very powerful. People won't feel as isolated and won't mind getting more involved with the community.

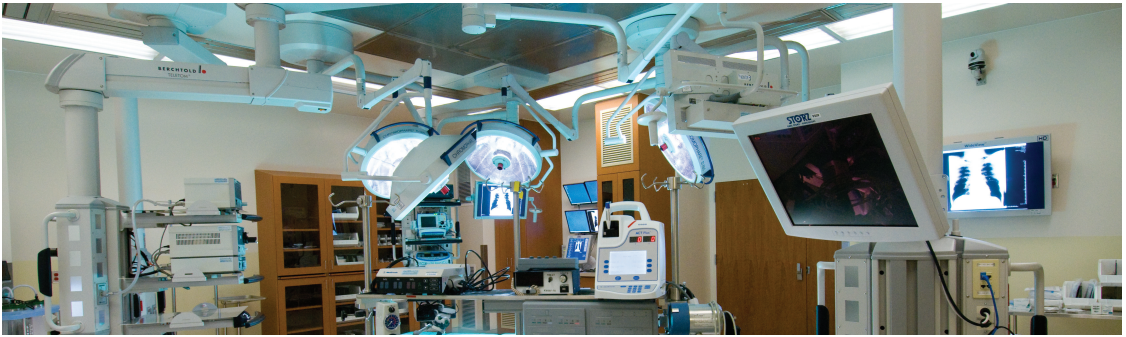
Changeable Architecture:

The spaces and their relationship together create a sustainable health care architecture.

081

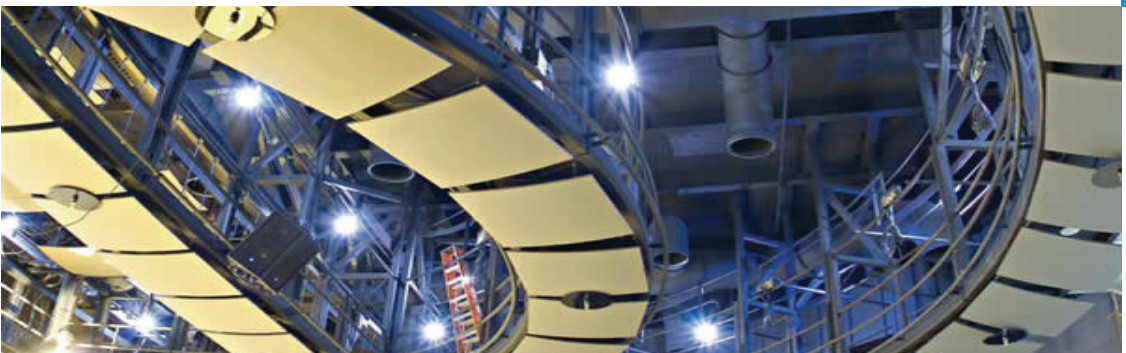
soft space: A non clinical space easily expanded into and relocated for a lesser cost is a flexible space that clinical spaces grow into.





hard space: A Clinical space that is expensive to relocate.

082



mechanical space: Health care is heavily mechanical and electrical dependent and to accommodate changes an interstitial space allows for easy change.

phase I: The final solution includes “Wellness Park” and Transit node with a plaza over Woodward Ave. This connects the Detroit Zoo and fitness center and a walking path around the Detroit Zoo. Huntington Woods and Pleasant Ridge are connected together by a park.

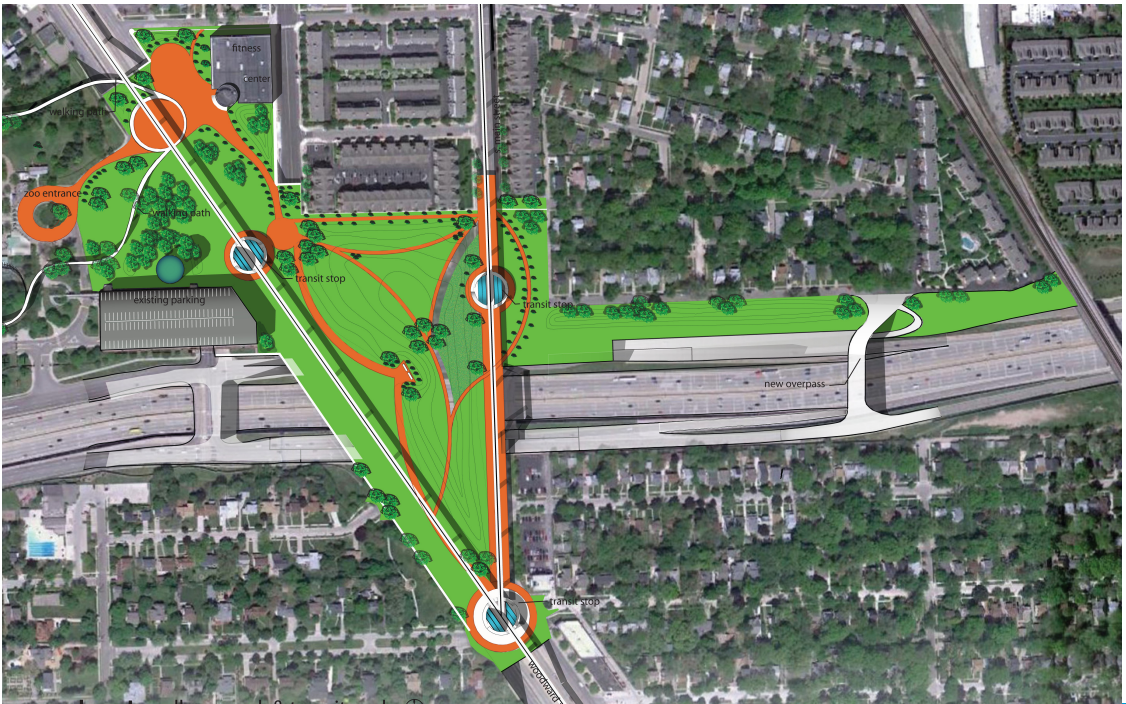
phase II: the medical facility and train station is built.

phase III: Inpatient tower changes to an apartment/ hotel.

083



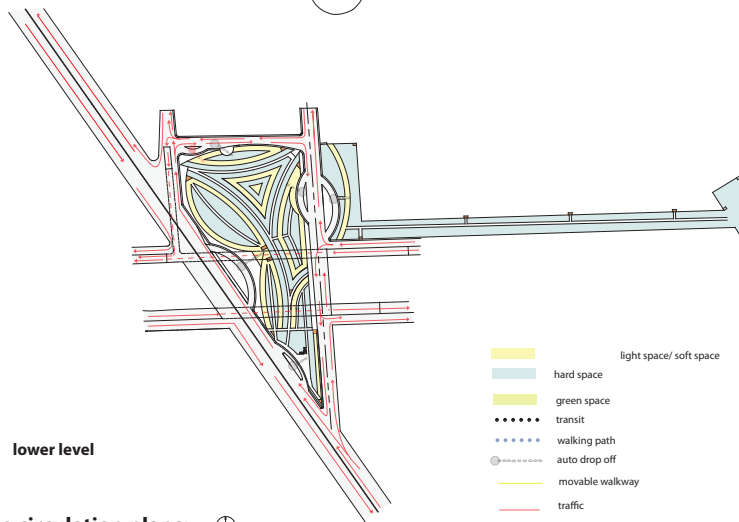
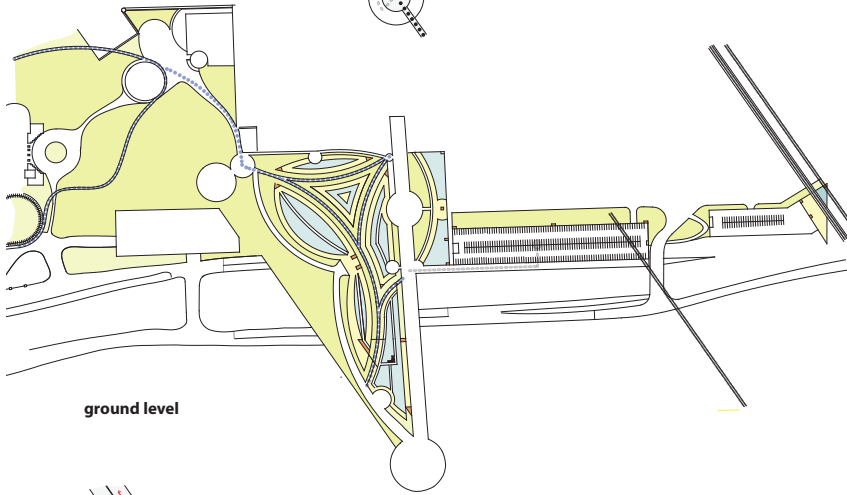
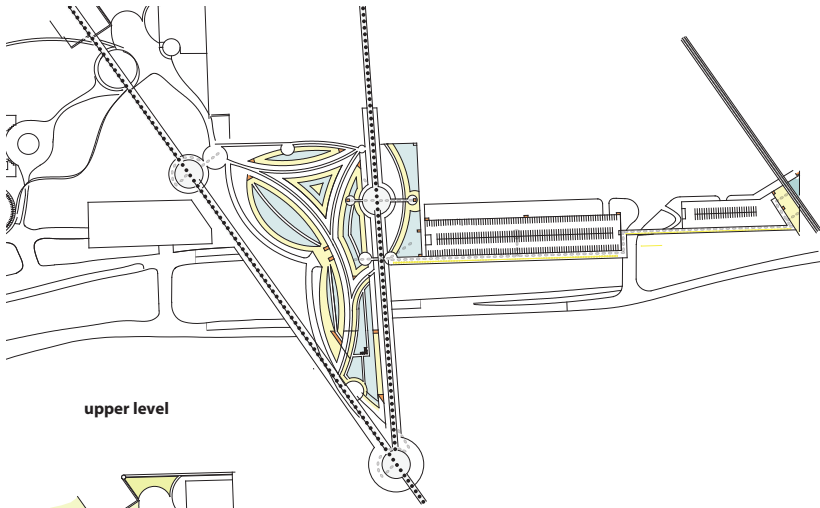
site plan:



phase I: wellnes park



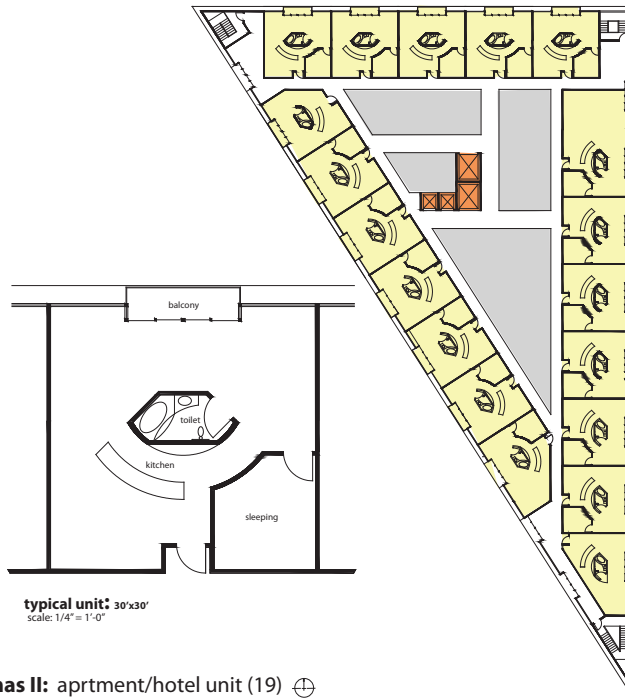
phase II: health facil-



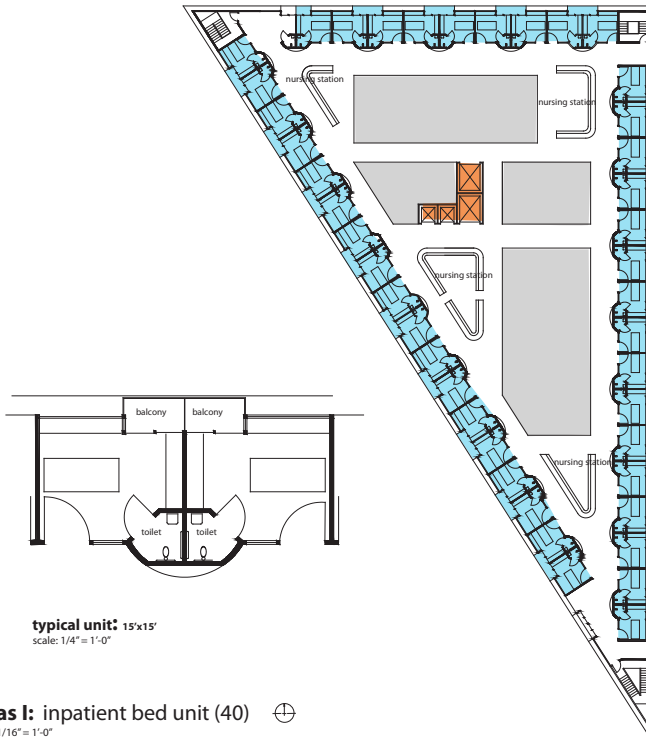
site circulation plans: ⊕

scale: none

- light space/ soft space
- hard space
- green space
- transit
- walking path
- auto drop off
- movable walkway
- traffic
- rail

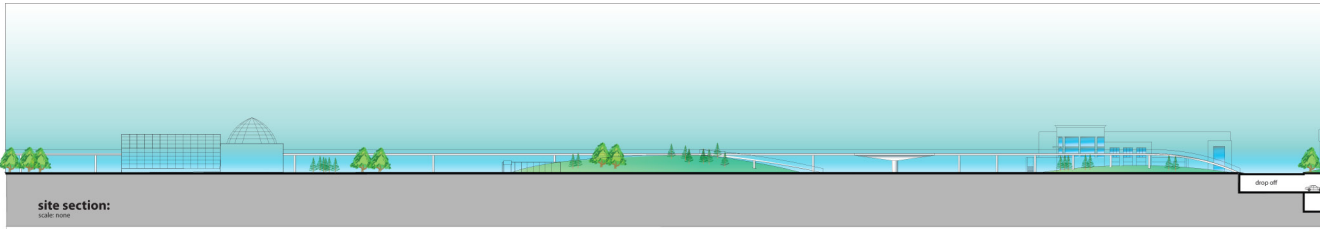
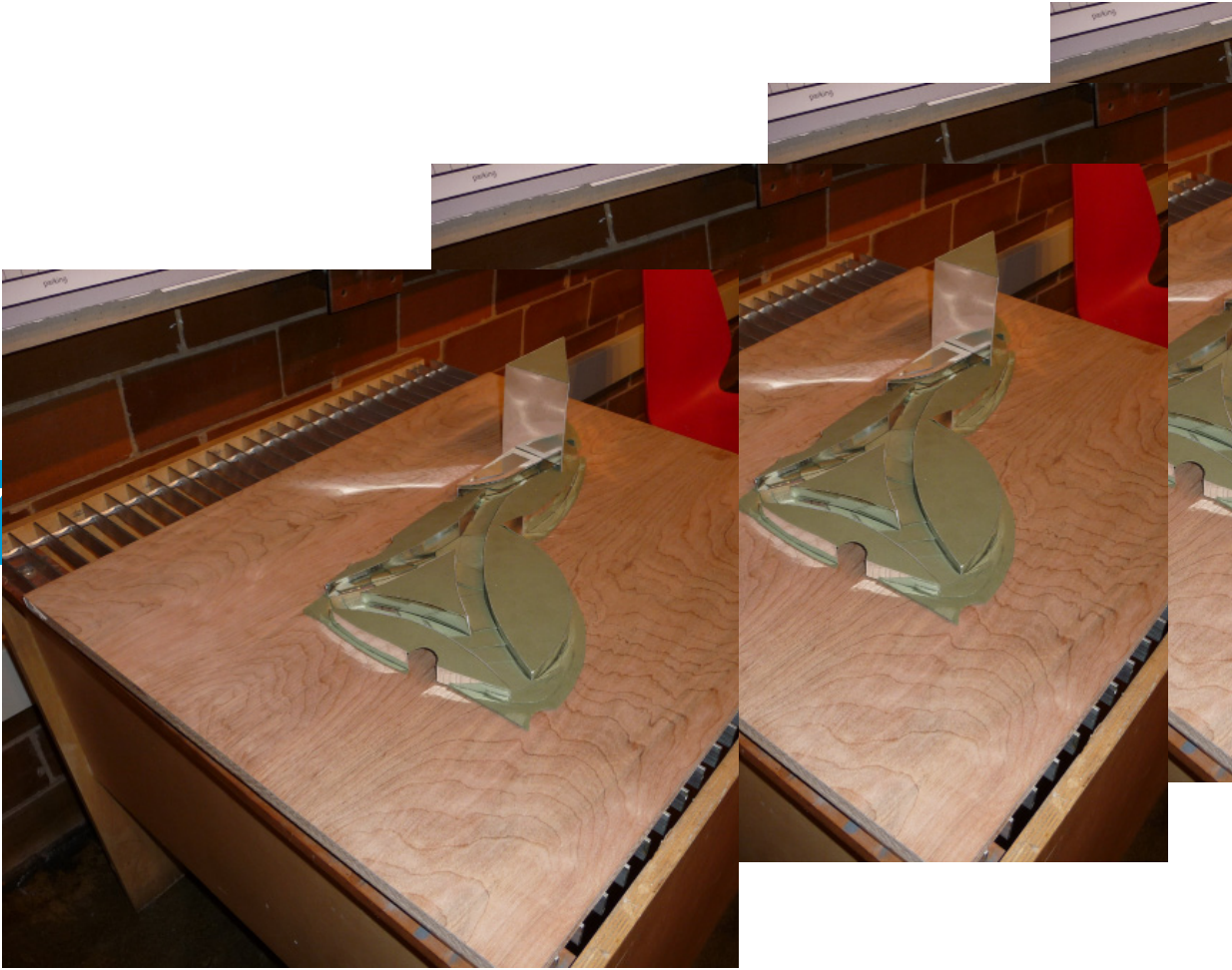


phas II: aptment/hotel unit (19) ⊕
scale: 1/16" = 1'-0"



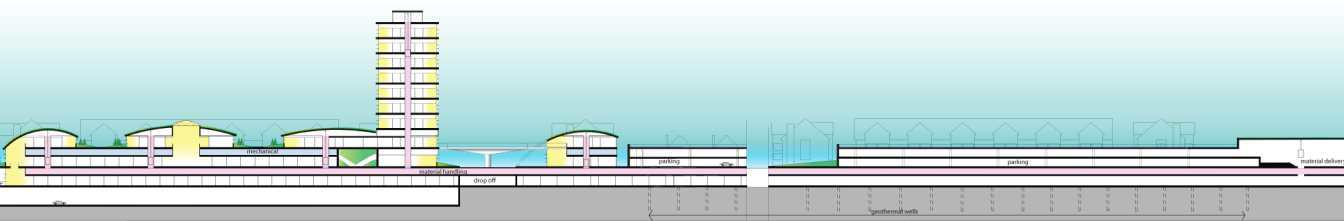
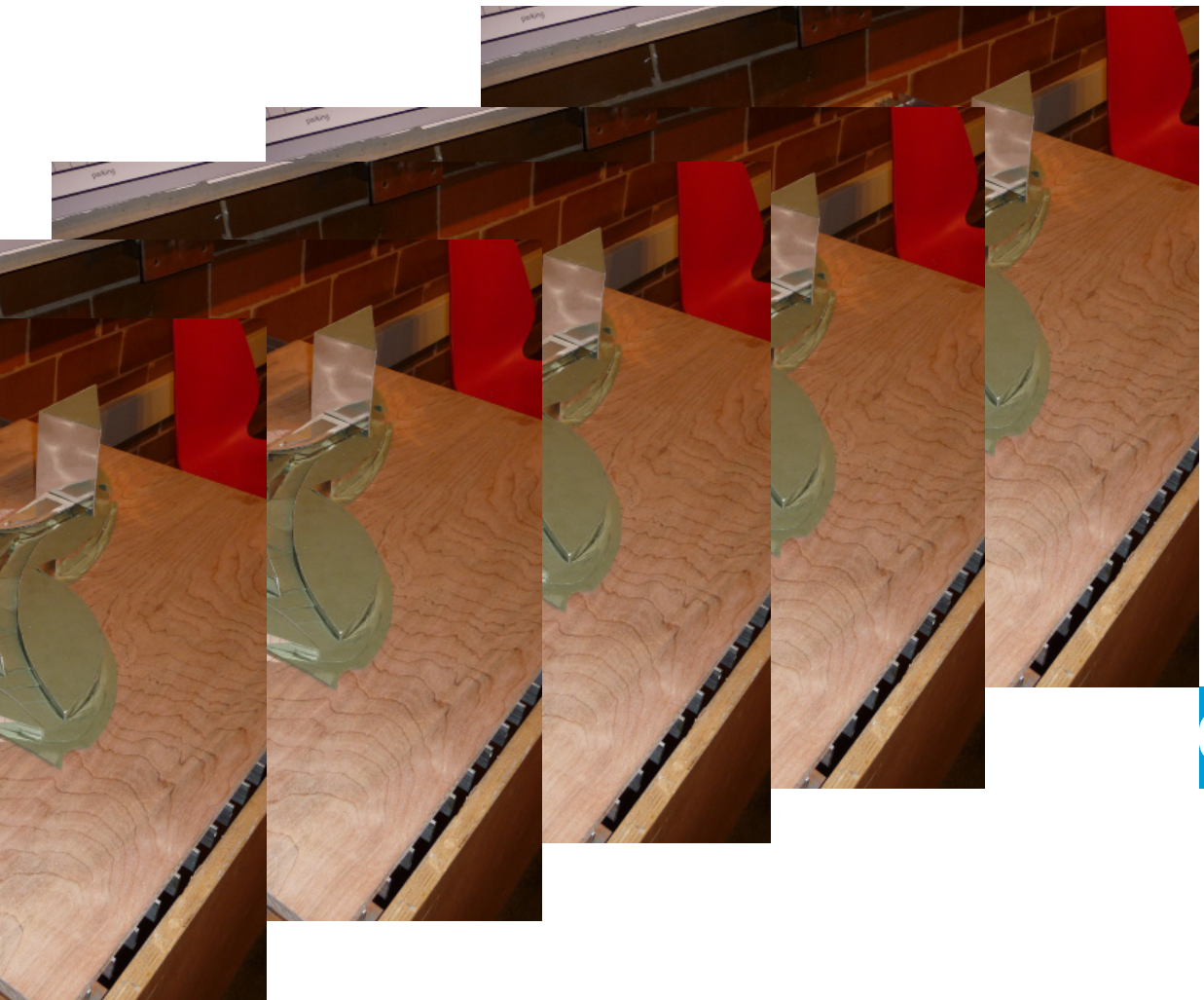
phas I: inpatient bed unit (40) ⊕
scale: 1/16" = 1'-0"

087



site section:
scale: none

stop-off



sustainable architecture: creating a balance that we all can live with



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