

RE-DEFINE URBAN

[INVESTIGATING THE NATURE OF THE RURAL MIDWEST CITIES AND THEIR URBAN ENVIRONMENT]

BY

BRUCE YODER

A TERMINAL PROJECT

PRESENTED TO THE FACULTY OF

THE COLLEGE OF ARCHITECTURE AT THE UNIVERSITY OF NEBRASKA

IN PARTIAL FULFILLMENT OF REQUIREMENTS

FOR THE DEGREE OF MASTERS OF ARCHITECTURE

MAJOR: ARCHITECTURE

UNDER THE SUPERVISION OF PROFESSOR NATE KRUG

LINCOLN, NE

MAY, 2008



## Project Description

The project will be examining the current master plan of Red Oak, IA to focus in on a deteriorating portion of the city just south of the original town square. There are several buildings being placed on the national record for historic buildings and the area surrounding these buildings are in poor condition. The Thomas D. Murphy Calendar Building is one that is currently being renovated into a large assisted living complex and will serve as a catalyst for new development in the surrounding neighborhood.

The Site in question will have a broad master plan performed to identify both the positive and negative aspects of the surrounding area and what recommendations could be made to improve the site. Once the master plan has been generated the project will then focus on a specific project design within the designated site to later be decided. It will set the basic principles that should be used [not necessarily duplicating precisely what is done] in other new construction throughout the site. It should integrate as many active and passive energy conservation techniques as possible to reduce the strain of future energy demands for property owners.

## Objectives to investigate within the project;

The measures needed to create a commercial community [solar/wind/water collection] that is feeding back into the electrical grid, and conserving water resources.

Using the site to its maximum potential for day lighting and thermal cooling and heating.

The creation of a residential complex with shared public spaces.

The design of infill replacement housing rather than a typical structure that wastes energy and does not take advantage of natural lighting and energy conservation techniques.

USGBC LEED for new construction criteria.

The connection to transportation

The site is at a main junction where US Highway 34 and State Highway 48 intersect in Red Oak, IA

## Site Description:

The site is located in Red Oak, IA and is adjacent to a major intersection of roads and railways [US Highway 34 and State Highway 48] which creates an opportunity for potential redevelopment. For the majority of the site it is sloping downward from the south to the north to a creek that separates the specific site from the original epicenter of Red Oak, IA.

The total size of the site is approximately 16 city blocks

It is separated partially by a shallow creek that flooded recently

The future land use plan for the area is zoned as light industrial and residential

The west and south perimeter of the project are adjacent to major transportation routes.

## NAAB Performance Criteria:

**Speaking and Writing Skills:** Ability to read, write, listen, and speak effectively on subject matter contained in the professional curriculum.

**Critical Thinking Skills:** Ability to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test them against relevant criteria and standards

**Graphic Skills:** Ability to use appropriate representational media, including freehand drawing and computer technology, to convey essential formal elements at each stage of the programming and design process.

- Create plans, sections, elevations, models, and renderings to present ideas.

**Research Skills:** Ability to gather, assess, record, and apply relevant information in architectural coursework.

- Gather site topography, imagery, and other information that is applicable to the specific project.
- Apply LEED design criteria gathered from the USGBC where possible.

**Formal Ordering Systems:** Understanding of the fundamentals of visual perception and the principles and systems of order that inform two-and three-dimensional design, architectural composition, and urban design.

**Fundamental Design Skills:** Ability to use basic architectural principles in the design of buildings, interior spaces, and sites.

- Integrate buildings and roads into the site rather than taking the site and grading it completely.

**Use of Precedents:** Ability to incorporate relevant precedents into architectural and urban design projects.

- Research local precedents using either industrial or office park complexes.
- Find an existing complex using sustainable methods to see what level of efficiency some projects have already attained.

**Human Behavior:** Understanding of the theories and methods of inquiry that seek the relationships between behavior and the physical environment.

- Create an environment that integrates the natural and the built landscape into each other.

**Program Preparation:** Ability to prepare a comprehensive program for an architecture project, including assessment of client and user needs, a critical review of appropriate precedents, an inventory of space and equipment requirements, an analysis of site conditions, a review of the relevant laws and standards and assessment of their implication for the project, and a definition of site selection and design assessment criteria.

- Apply relevant building codes applicable to the site typology.
- Research LEED design criteria to coordinate into building design.

**Site Conditions:** Ability to respond to natural and built site characteristics in the development of a program and design of a project.

- Use site conditions to effectively create spaces and mesh the buildings into the topography.



Building System Integration: Ability to assess, select, and integrate structural systems, building envelope systems, environmental systems, life-safety system, and building service systems into building design.

- Select which building systems will be necessary for the selected building within the project.

Comprehensive Design: Ability to produce a comprehensive architectural project based on a building program and site that includes development of programmed spaces demonstrating an understanding of structural and environmental systems, building envelope systems, life-safety provisions, wall sections and building assemblies, and the principles of sustainability

In the selected building within the scope of the project, create 2 and 3 dimensional drawings and models of the building assembly.

Create diagrams on how the selected systems work for the selected building.

Process:

Case Studies

Rocio Romero - Prefabricated Housing - St. Louis, MO

Literature Search

Regional Market Study for Housing by the University of Iowa

Southwest Iowa Planning Council for Housing Development

The Psychology of Housing

Red Oak Strategy Plan

LEED Criteria – USGBC

Site Analysis

Site Investigation [photograph existing site].

Research and generate topographic imagery for the proposed site.

Generate a 3-D model of the existing site.

Using the topographic 3-D model generated, create a physical model of the existing site [scale yet to be determined].

Program General Site Functions

Using the site analysis, prepare a master plan

Plan roads, parking, paths, and park space within the site.

Program at least one building that will be designed

Research and apply LEED design criteria such as the following;

USGBC LEED for new construction criteria-

Fully design at least one building [exterior/interior]

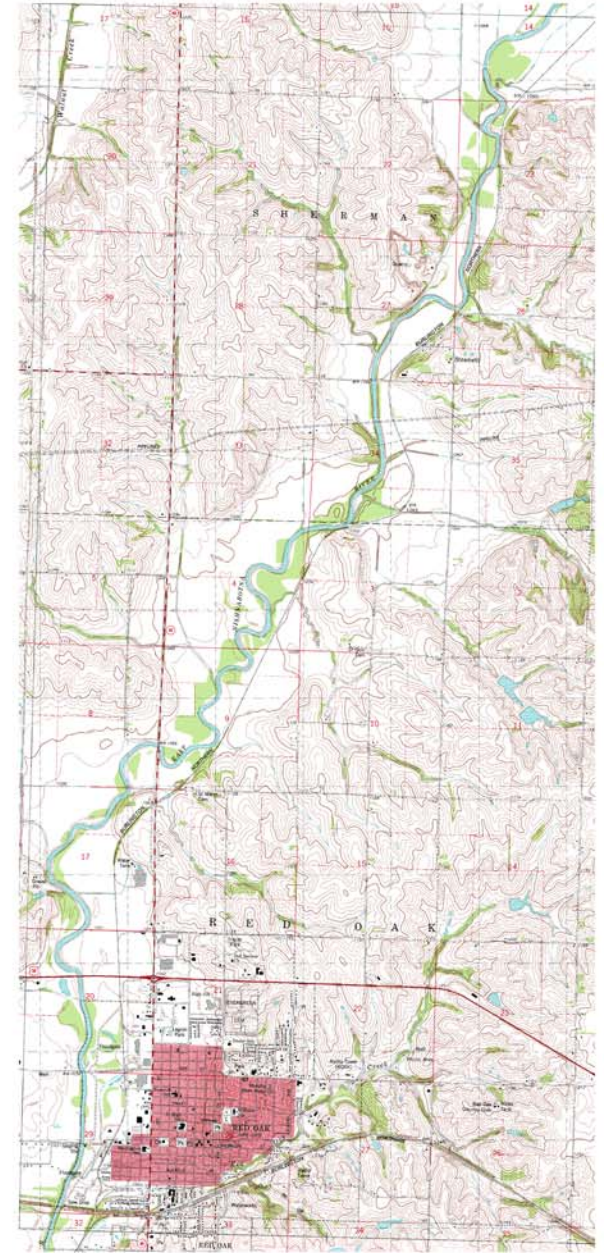
Generate plans, sections, and elevations for the building.

Also generate models and renderings to study the design of the project to ensure it meets the previously stated criteria.



ANALYSIS

SITE SELECTION + RESEARCH



WE SHOULD CONCENTRATE OUR WORK NOT ONLY ON A SEPERATED HOUSING PROBLEM, BUT HOUSING INVOLVED IN OUR DAILY WORK AND ALL THE OTHER FUNCTIONS OF THE CITY

ALVAR ALTO

THE FOCUS OF THE PROJECT IS TO ADDRESS HOUSING CONCERNS THROUGHOUT THE URBAN CONTEXT OF THE RURAL MIDWEST. EACH COMMUNITY WILL LIKELY HAVE TO BE ADDRESSED INDIVIDUALLY DUE TO VARYING REASONS BEHIND POPULATION DECLINE BUT THE MAJORITY CAN BE ADDRESSED UNDER A LARGE BLANKET. HOWEVER, INDIVIDUAL HOUSING CAN NOT BE SUCCESSFUL WITHOUT ADDRESSING EACH NEIGHBORHOOD AND ITS SURROUNDING CONTEXT.

ONE MUST UNDERSTAND WHAT IS HAPPENING AND WHY BEFORE ONE MIGHT MAKE AN INSUFFICIENT CONCLUSION. BY LOOKING AT CENSUS DATA, GEOGRAPHIC DATA, PHYSICAL OBSERVATIONS, AND SITE OBSERVATIONS ONE CAN BEGIN TO REALIZE ALL THE DIFFERENT FACTORS THAT ARE CREATING THE EXISTING CONDITIONS. ONLY THEN CAN A HOUSING SOLUTION BEGIN TO BE PROVIDED.

THE RURAL TOWNS + CITIES NEED TO KEEP YOUTH AND THEIR INTERESTS IN MIND. NEW IDEAS MUST BE INTRODUCED THAT FAR EXCEED WHAT CURRENTLY EXISTS TO REVERSE CURRENT TRENDS. IT IS ESTIMATED THAT 65% OF THE POPULATION USED TO EXIST IN RURAL COMMUNITIES WHILE THE U.S. CENSUS BUREAU ESTIMATES BY 2050 65% OF THE POPULATION WILL LIVE IN CITIES.

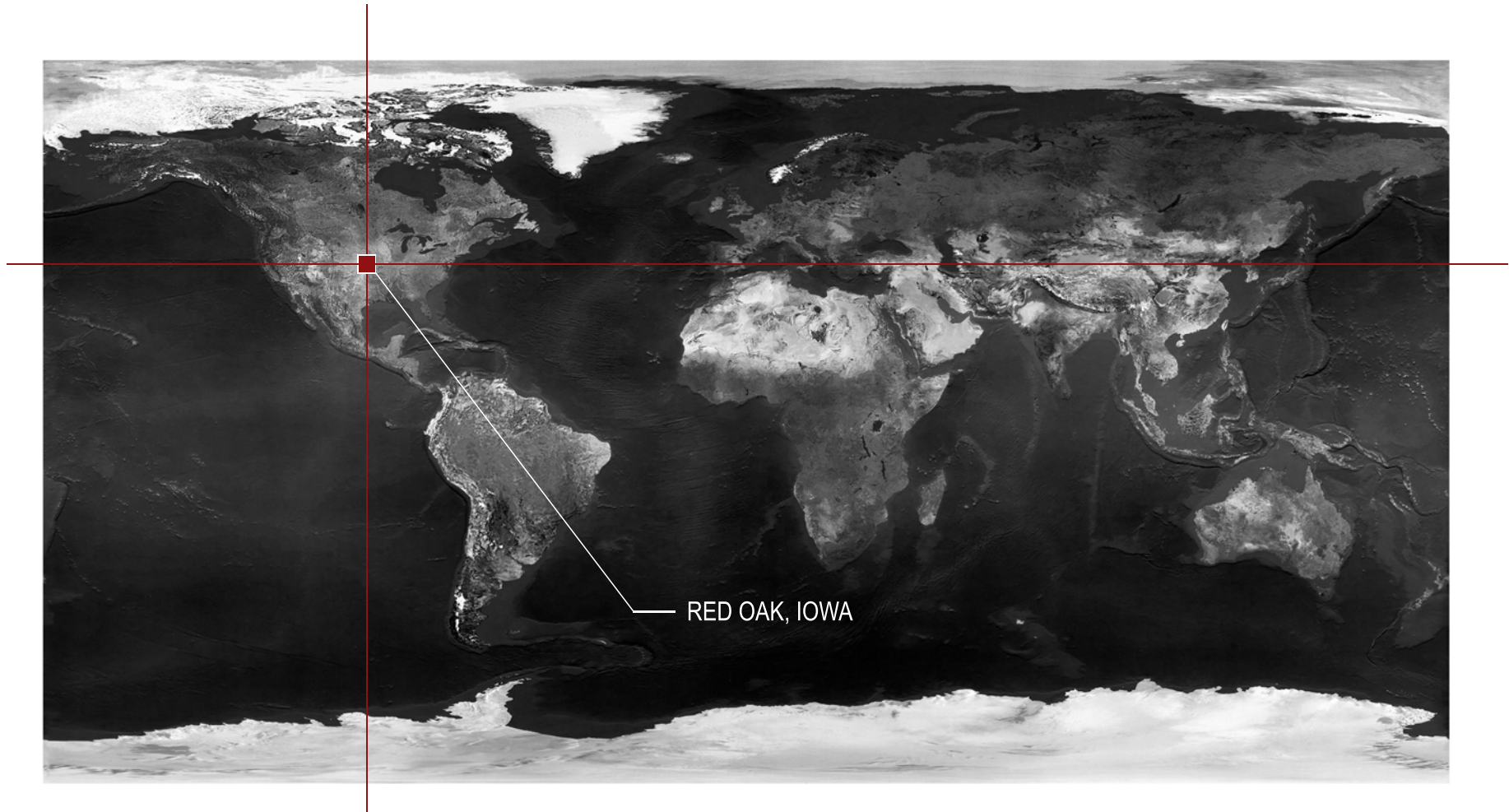
FOR EXAMPLE, IN RED OAK, IA 21.5% OF THE POPULATION IS OVER 65 YEARS OF AGE. ANOTHER 26.3% IS BELOW THE AGE OF 19 YEARS OLD. THAT ONLY LEAVES HALF OF THE POPULATION AS A WORK FORCE OF WHICH ANOTHER 30% EARN LESS THAN \$19,000 PER YEAR.

BETWEEN 1980 AND 1990 THE POPULATION DECREASED BY NEARLY 600 PEOPLE OR 10%. BETWEEN 2000 AND 2004 ANOTHER 200 PEOPLE HAVE LEFT THE COMMUNITY. FOR A POPULATION OF 6000 THESE ARE STAGGERING NUMBERS, AND THIS SAME SCENARIO IS OCCURRING THROUGHOUT THE MIDWEST.

SO THE YOUTH ARE LEAVING FOR THE CITY IN WHICH THEY FEEL THERE IS MORE OPPURTUNITY FOR GREATER INCOME, MORE HOUSING SELECTION, AND MORE CHOICES OVERALL. MEANWHILE, THE ELDERLY POPULATION WANTS TO REMAIN IN THE RURAL COMMUNITY AND THEY WANT THE YOUTH TO STAY, HOWEVER, THEY DO NOT WANT THEIR COMMUNITY TO CHANGE TO SOMETHING UNFAMILAIR TO THEMSELVES.

SO WHAT ARE THE YOUTH GOING TO DO? MANY CAN NOT AFFORD THE ACREAGES THAT SURROUND THE COMMUNITY AND MANY OF THE HOMES WITHIN THE COMMUNITY ARE IN VERY POOR CONDITIONS AND ARE NOT IN DECENT CONDITION FOR A FAMILY TO RESIDE IN. THIS IS WHERE THE COMMUNITY AND ITS LEADERS MUST STEP IN AND MAKE CHANGE HAPPEN RATHER THAN WAITING FOR SOMEBODY ELSE TO MAKE THE CHANGE. THE NEGLECTED AREAS MUST BE ADDRESSED BY SURVEYING WHAT IS CAUSING THIS DESIRE TO LEAVE. THE INFRASTRUCTURE ITSELF [ROADS, SEWERS, PARKS, UTILITIES] IN MANY AREAS ARE IN POOR CONDITION AS ARE THE HOUSES THAT SURROUND MANY PARTS OF THE COMMUNITY.

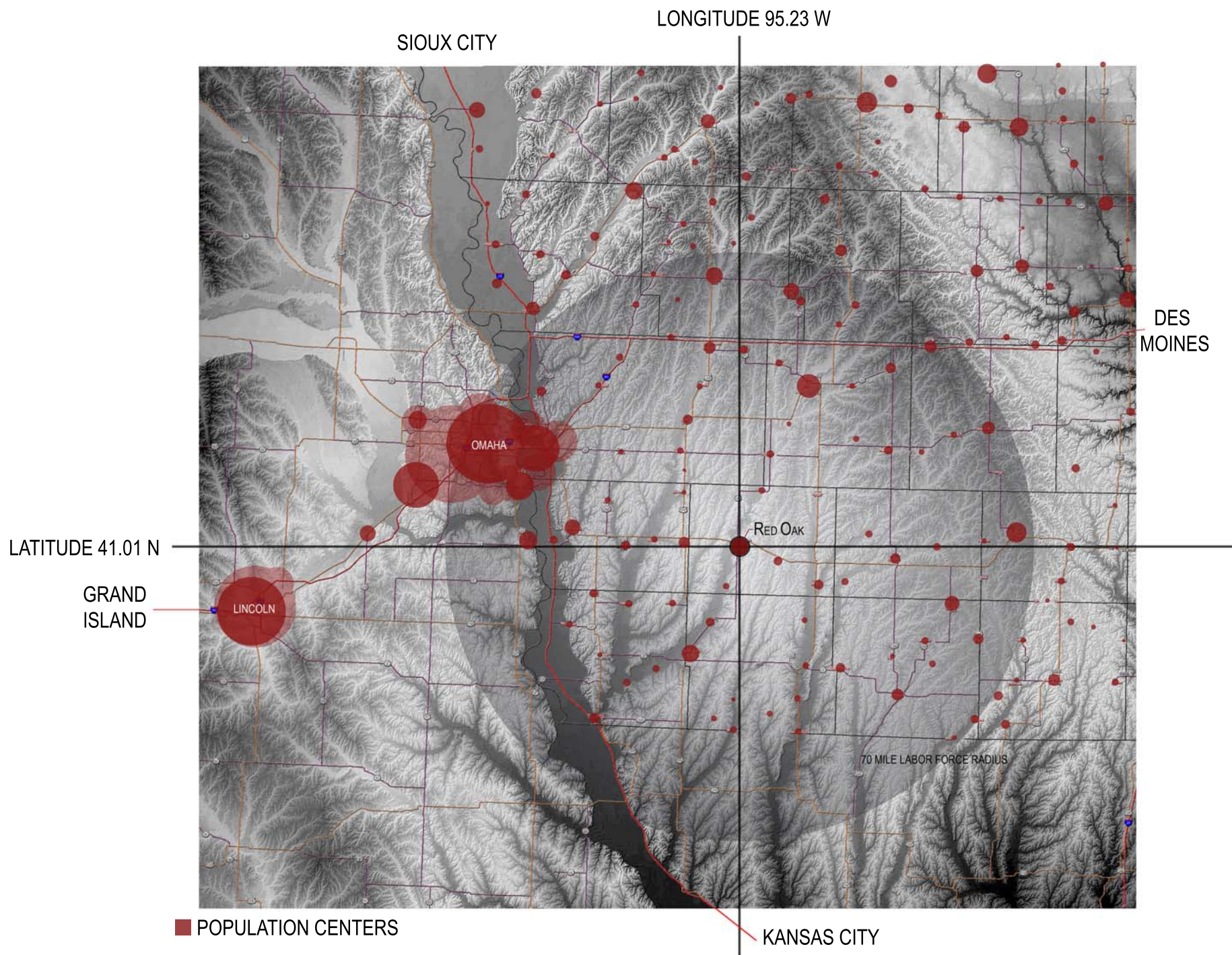
ONE EXAMPLE OF CHANGE IS THE TOWN OF KENESAW, NE [POP. 800] THAT DECIDED TO TAKE ACTION AGAINSTY THEIR DECLINING POPULATION. THEY DECIDED TO GIVE AWAY LAND TO ENCOURAGE NEW RESIDENTS TO MOVE IN AND BUILD A NEW HOME, AND SEVERAL COMMUNITIES IN NEIGHBORING STATES ARE TAKING SIMILAR ACTION.



## RED OAK, IOWA

THIS IS THE SELECTED CITY LOCATION FOR THE TERMINAL PROJECT. IT IS AN AVERAGE SMALL TOWN OF THE MIDWEST WHERE THE COMMUNITY REVOLVES AROUND AGRICULTURE AND MANUFACTURING. IT WAS FOUNDED AS A PIONEERING TOWN IN THE WESTWARD MOVEMENT AND SURVIVED ALONG THE RAILROAD THAT ONCE MADE IT SO VIABLE. WITHOUT THE PUBLIC TRANSPORTATION OF THE RAILWAY AS A MAJOR MODE OF TRANSPORTATION COMBINED WITH THE BYPASS OF THE INTERSTATE FURTHER NORTH COMBINED WITH YOUNGER POPULATIONS MOVING TO LARGER METROPOLITAN AREAS IT IS FACED WITH A POTENTIALLY DECLINING POPULATION THAT MANY COMMUNITIES ARE BEING FACED WITH. THE MAJORITY OF THESE POPULATIONS ARE NEARING RETIREMENT OR ARE IN NEED OF ASSISTED LIVING WHILE THE YOUTH LOOK FOR HOPE OF MORE OPPORTUNITY OF A LARGER COMMUNITY. THIS HAS BEEN AN ONGOING DISCUSSION FOR SEVERAL DECADES BUT NOW IS GOING TO BECOME EVEN MORE PREVALENT AS A NEW GENERATION ABANDONS THEIR HOMETOWNS AND MAY NOT HAVE THE POPULATION BASE TO SUSTAIN THE FUNCTIONS THAT A COMMUNITY NEEDS TO STAY AFLOAT.









## BIO

THE CITY OF RED OAK WAS ESTABLISHED ON MARCH 20, 1876

## POPULATION

- \_ RED OAK [6,000]
- \_ MONTGOMEREY COUNTY [12,000]

## INDUSTRY

- \_ AGRICULTURE IS RED OAK'S LEADING INDUSTRY
- \_ THERE ARE 10 MANUFACTURING PLANTS IN THE COMMUNITY
- \_ LAST INDUSTRY LOCATED IN 2007
- \_ THE LABOR FORCE IS DRAWN FROM A 70 MILE RADIUS

## TRANSPORTATION

- \_ IT IS LOCATED AT THE INTERSECTION OF U.S. HIGHWAY 34 AND IOWA HIGHWAY 48
- \_ THE CITY IS ALSO SERVICED BY RAILROAD AND AN AIRPORT

## HOUSING

- \_ THE AVERAGE FOR NEW HOUSE CONSTRUCTION IS \$105/ SQ. FT.
- \_ THERE ARE **2,978** HOUSES AND **308** ARE VACANT
- \_ THE MEDIAN EXISTING HOME VALUE IS \$56,600
- \_ 165 HOMES ARE LISTED IN POOR CONDITION

## INCOME

- \_ 1/3 OF THE POPULATION EARNS LESS THAN \$40,000/ YEAR
- \_ 1/6 OF THE POPULATION IS RETIRED
- \_ MEDIAN HOUSEHOLD INCOME IS \$30,098
- \_ 1/12 OF THE POPULATION IS BELOW THE POVERTY LEVEL

## SOURCES

- \_ U.S. CENSUS BUREAU
- \_ DEPOT HILL HISTORIC DISTRICT 2007
- \_ CITY OF RED OAK HOUSING DEVELOPMENT PLAN 2007
- \_ DOWNTOWN PROFESSIONALS NETWORK 2002



## EXISTING PHOTOS

THIS IS THE VISUAL SURVEY OF THE BUILDINGS  
OF RED OAK, IOWA.

THE IMAGES DISPLAY THE EXISTING CHARACTER  
OF WHAT THE CITY IS TODAY AND ALSO WHAT IT  
ONCE WAS.





THE PHOTOS SHOW A PROSPEROUS CITY THAT WAS FOUNDED IN THE LATE 1800's AND PROSPERED FOR MANY DECADES EXACTLY AS IS. IT SHOWS A CITY THAT NO LONGER HAS USE FOR THE BUILDINGS THAT WERE OCCUPIED THROUGHOUT ITS FOUNDING YEARS AND HOW MANY PROPERTIES HAVE BEEN NEGLECTED OVER TIME. HOWEVER, THERE ARE STILL GREAT STRUCTURES DISPERSED THROUGHOUT THE COMMUNITY, ALTHOUGH AS NEGLECT CONTINUES THE VIABLE STRUCTURES BECOME FEWER.









THE PHOTOS ALSO SHOW A CITY IN NEED OF NEW QUALITY HOUSING TO REPLACE THE ONES THAT ARE NO LONGER WORTH REHABILITATING. WHILE THERE ARE MANY HOUSES IN FAIR CONDITION, THERE ARE 300 VACANT HOMES OF WHICH MANY ARE IN DISREPAIR AND SHOULD BE CANDIDATES FOR INFILL HOUSING.











ROCIO ROMERO AND HIS SERIES OF PRE-FABRICATED HOMES. THEY ARE DEVELOPED AS A SERIES OF DIFFERENT FLOOR PLANS AND ARE OFFERED AS A KIT OF PARTS. SIDING TYPES ARE VERY CUSTOMIZABLE BUT THE KIT ITSELF DOES NOT INCLUDE MUCH OF THE LABOR AND ALSO DOES NOT INCLUDE GLAZING SYSTEMS. PLUMBING, AND ELECTRICITY. EVERYTHING IS PREDRILLED AND SET UP FOR VERY QUICK CONSTRUCTION BUT IT DOES NOT OFFER ACTUAL CONSTRUCTION AND THE COSTS THAT ARE INCLUDED IN SUCH A SITUATION.

THESE UNITS ALSO DO NOT OFFER ANY TYPE OF SOLAR SHADING DEVICES AND ARE NOT BEING DESIGNED FOR ENERGY EFFICIENCY SO MUCH AS THEY ARE AS A PIECE OF ARCHITECTURE. ALSO, ALL UNITS HAVE A STANDARD WIDTH AND ONLY VARY IN LENGTH, WHICH CAN OFFER MANY LIMITATIONS.









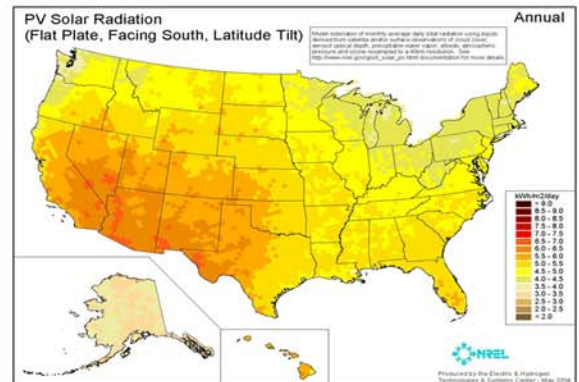
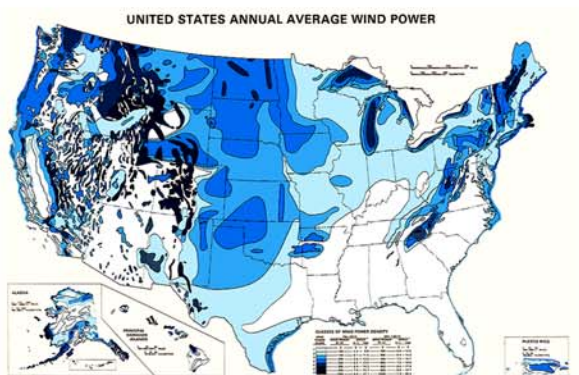
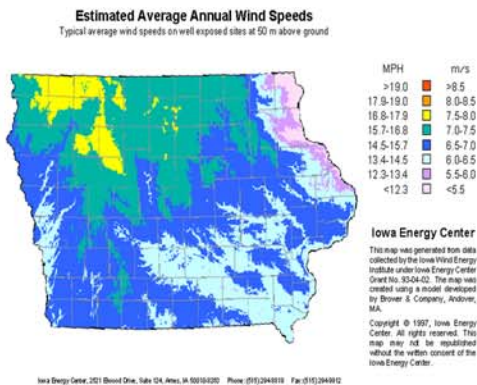
WITH AN AVERAGE WIND SPEED OF 12-18MPH WIND IS THE OBVIOUS CHOICE OF CAPTURING THE EARTH'S ENERGY. IOWA ALSO HAS A LARGE INCENTIVE PROGRAM FOR WIND ENERGY.

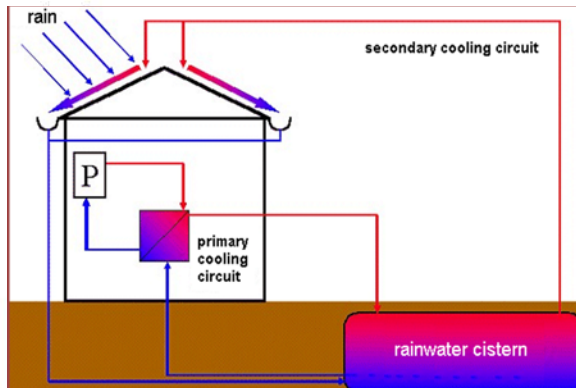


PHOTOVOLTAICS IS A POTENTIAL CANDIDATE FOR ENERGY WITHIN THIS REGION, HOWEVER WITH A LOWER WINTER ANGLE AND AVERAGE NUMBER OF OVERCAST DAYS IT DOES CAUSE A REDUCTION IN ENERGY PRODUCTION. IT IS STILL A VERY VIABLE LANDING IN ZONE 3 [OUT OF A 1-5 SCALE] FOR PV SOLAR RADIATION.



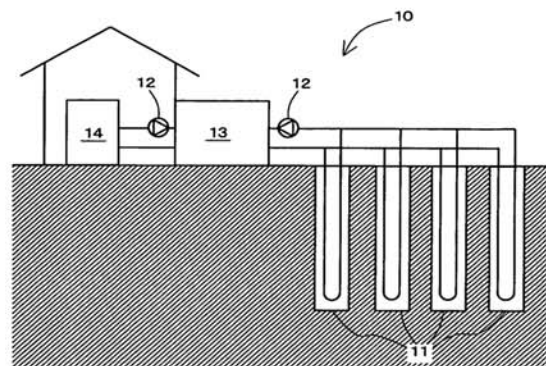
SOLAR HOT WATER IS AN EASY CHOICE FOR WATER HEATING SINCE THE SUN IS AN ABUNDANT SOURCE OF ENERGY AND EASILY PROVIDES ENOUGH ENERGY FOR THIS TECHNOLOGY.





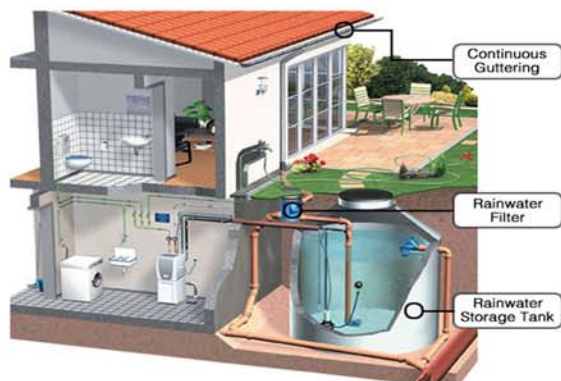
OVERALL, RED OAK LANDS IN A MEDIUM ZONE FOR GROUND SOURCE HEATING/COOLING. BASED ON COST SAVINGS OVER TIME, HOWEVER, IT IS STILL WELL WITHIN A RANGE TO CREATE HUGE ENERGY SAVINGS OVER TIME .

RED OAKS ANNUAL RAINFALL IS OVER 36" PER YEAR. THE POTENTIAL OF CAPTURING THIS SOURCE OF WATER IN WHAT IS A LOW LYING FLOOD AREA IS VERY BENEFICIAL. IT CAN REDUCE STORMWATER RUN-OFF AND PROVIDE WATER FOR LAWNS AND GARDENS.

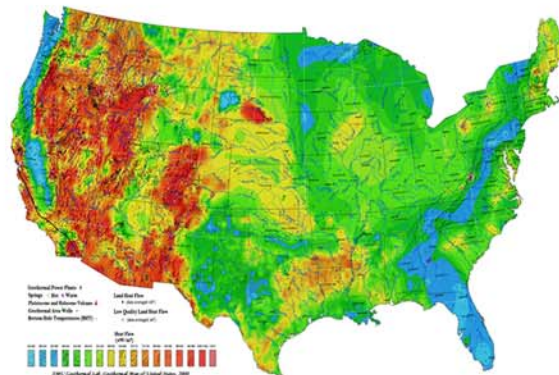


ALL OF THESE OPTIONS FOR ENERGY REDUCTION ARE EXAMINED DUE TO THE NATURE OF MONTHLY OPERATING EXPENSES OF A HOUSEHOLD. REDUCING THE MONTHLY EXPENSES CAN GREATLY INCREASE THE QUALITY OF LIFE FOR A LOWER -INCOME HOUSEHOLD, SO THAT IT IS NO LONGER A MONTHLY BURDEN.

ALTHOUGH THE INITIAL COSTS UP-FRONT CAN BE MUCH MORE EXPENSIVE, THE COST OVER TIME UTILIZING MULTIPLE SYSTEMS OF THESE TYPES CAN GREATLY DECREASE OR ELIMINATE UTILITY BILLS AND IN SOME CASES OFFER TAX INCENTIVES AND REVERSE METERING BY UTILITIES. ULTIMATELY, IT CREATES MORE INDEPENDENCE ON THE OWNERS BEHALF.



RAINWATER HARVESTING



GEO-THERMAL GROUND SOURCE





PROPOSAL FOR 20 - YEAR PLAN FOR THE NEIGHBORHOOD  
DIRECTLY SOUTH OF RED OAK'S ORIGINAL TOWN SQUARE.





## CURRENT STRATEGY

THIS DIAGRAM ILLUSTRATES THE CURRENT PLANS FOR RED OAK, IOWA WITH MUCH OF THE ATTENTION POISED TOWARDS THE HIGHWAY RUNNING FROM NORTH TO SOUTH IN WHICH 2 MARKETPLACES ARE PROPOSED. IT ALSO DISPLAYS THE PLANS TO DEVELOP THE LAND NORTH OF THE DOWNTOWN IN CONTRAST TO THE SELECTED THESIS SITE SHOWN IN RED.

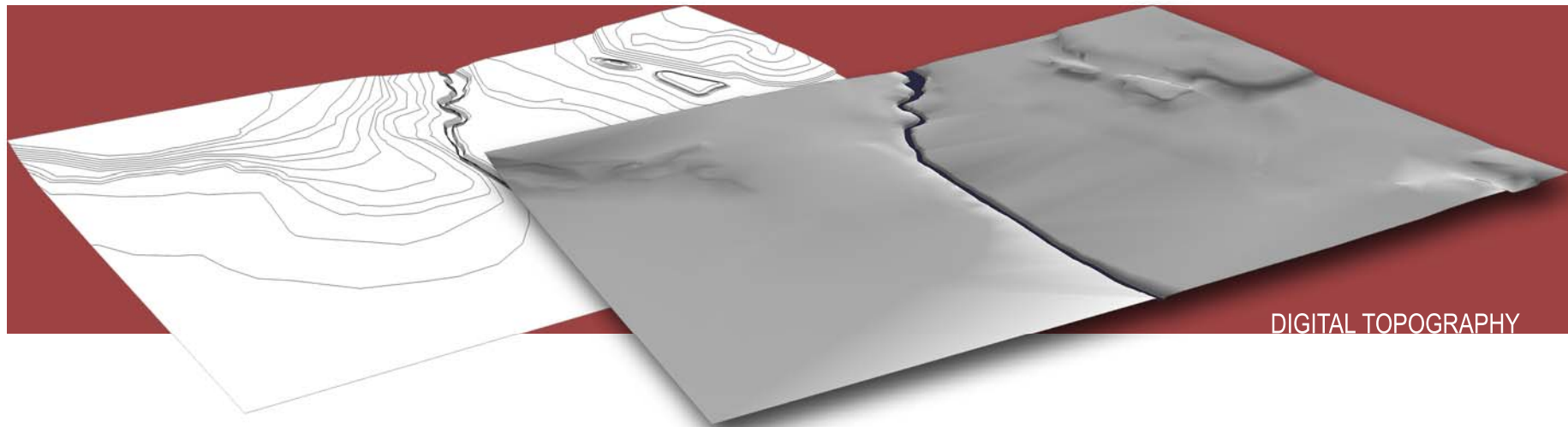
THIS DISPLAYS HOW IT IS SEEN IN TOWNS BEST INTEREST TO PULL AWAY FROM THE ORIGINAL TOWN WHERE SOME OF THE FOCUS SHOULD BE PLACED. THIS PRIOR PROPOSAL CREATES A MORE DISTANT CONNECTION TO THE CITY AND CREATES MORE NEED FOR AUTOMOTIVE TRAVEL RATHER THAN PEDESTRIAN.

\*ORIGINAL STRATEGY CREATED BY THE 'DOWNTOWN PROFESSIONALS NETWORK'

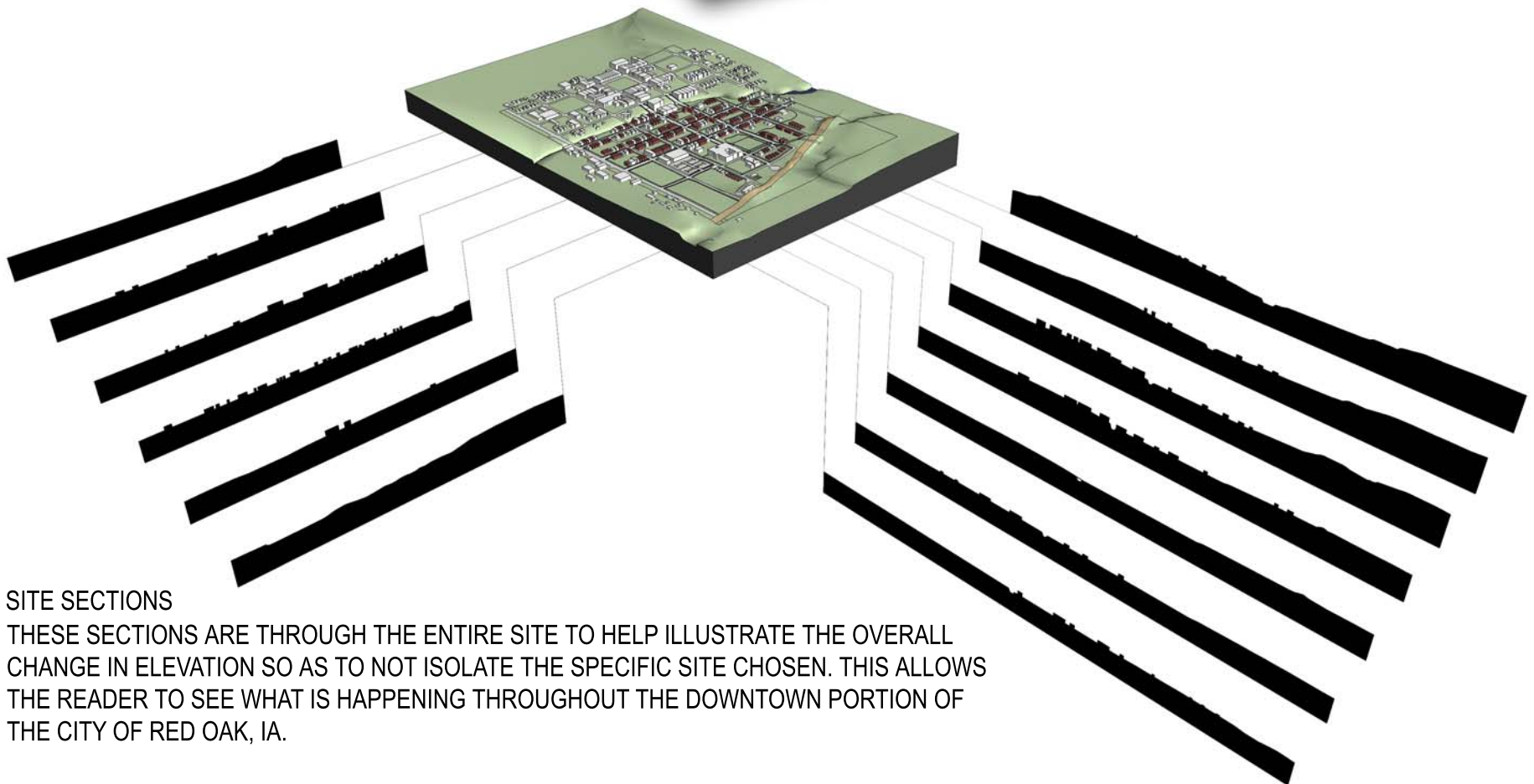
THIS CURRENT STRATEGY FOCUSES MOST OF THE ATTENTION TO THE HIGHWAY AS FAR AS LARGE RETAIL AND COMMERCIAL DEVELOPMENT ARE CONCERNED. THERE IS SOME ATTENTION PAID TOWARDS THE ORIGINAL TOWN SQUARE ITSELF BUT IT NEGLECTS TO MENTION THE AREA SOUTH OF THE TOWN SQUARE.







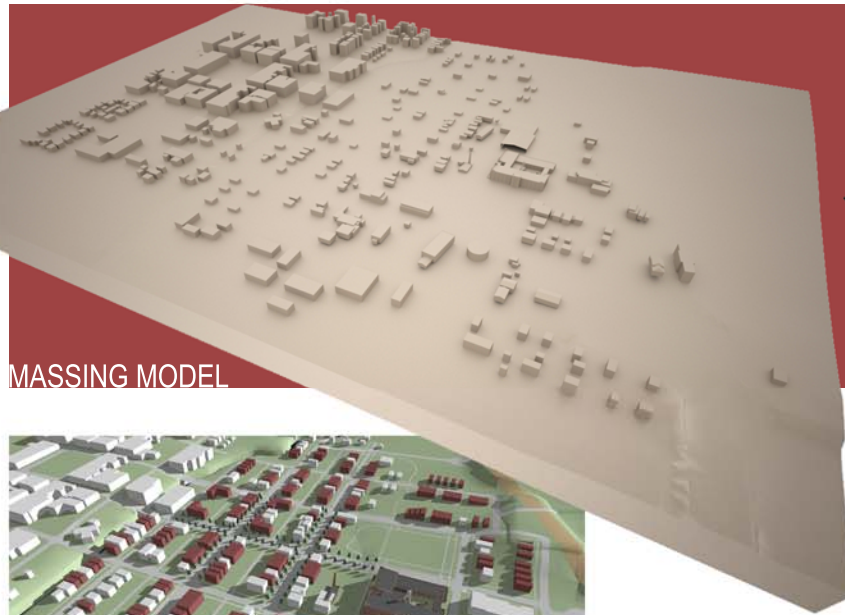
DIGITAL TOPOGRAPHY



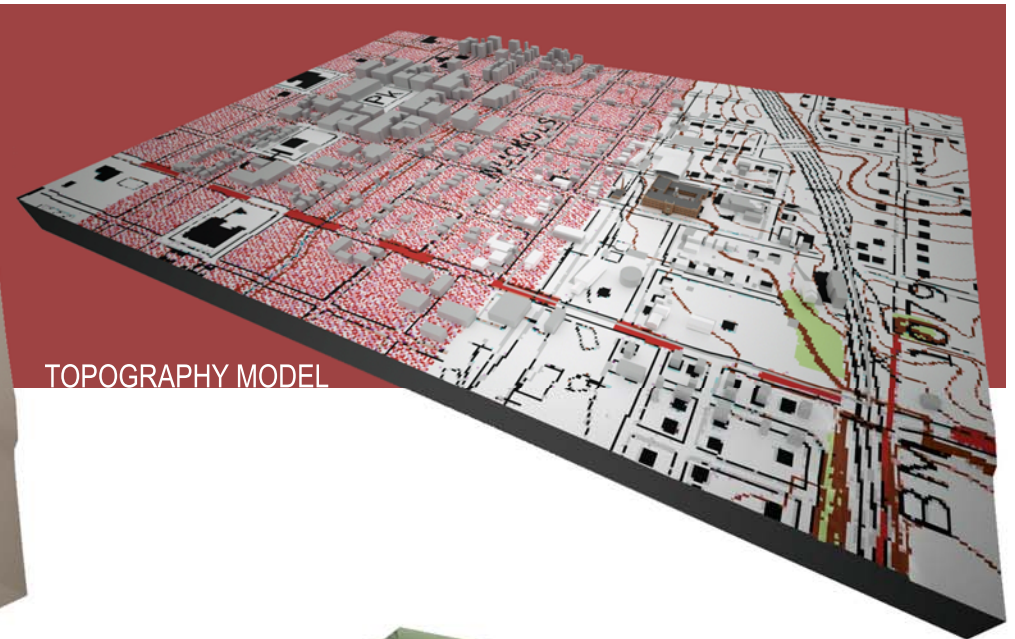
#### SITE SECTIONS

THESE SECTIONS ARE THROUGH THE ENTIRE SITE TO HELP ILLUSTRATE THE OVERALL CHANGE IN ELEVATION SO AS TO NOT ISOLATE THE SPECIFIC SITE CHOSEN. THIS ALLOWS THE READER TO SEE WHAT IS HAPPENING THROUGHOUT THE DOWNTOWN PORTION OF THE CITY OF RED OAK, IA.

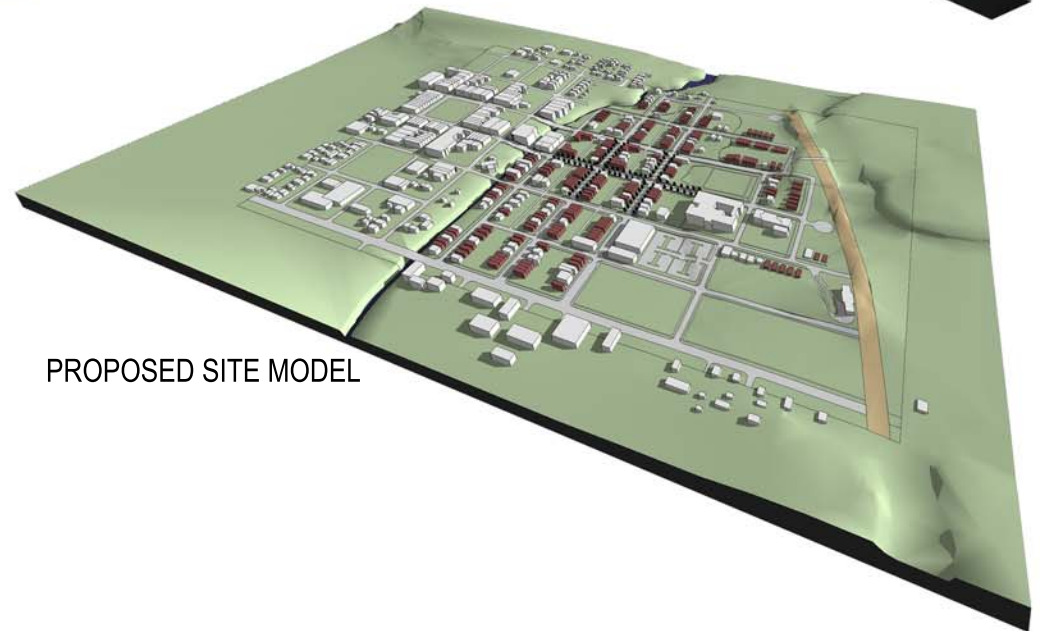




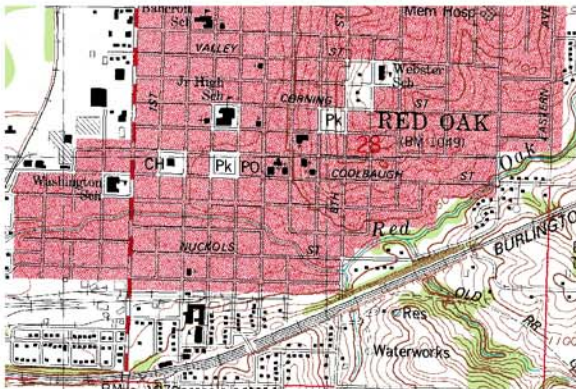
MASSING MODEL



TOPOGRAPHY MODEL



PROPOSED SITE MODEL



THE DIGITAL PROCESS OF MAPPING ALLOWS THE EXAMINATION OF THE SAME MODEL WITH DIFFERENT FEATURES BEING EMPHASIZED. THIS ALLOWS THE USER TO SEE HOW TOPOGRAPHY, STRUCTURES, AND MASTER PLANNING DATA CAN DEMONSTRATE DIFFERENT CHARACTERISTICS WHEN OVERLAYED ON ONE ANOTHER.

EXISTING SITE

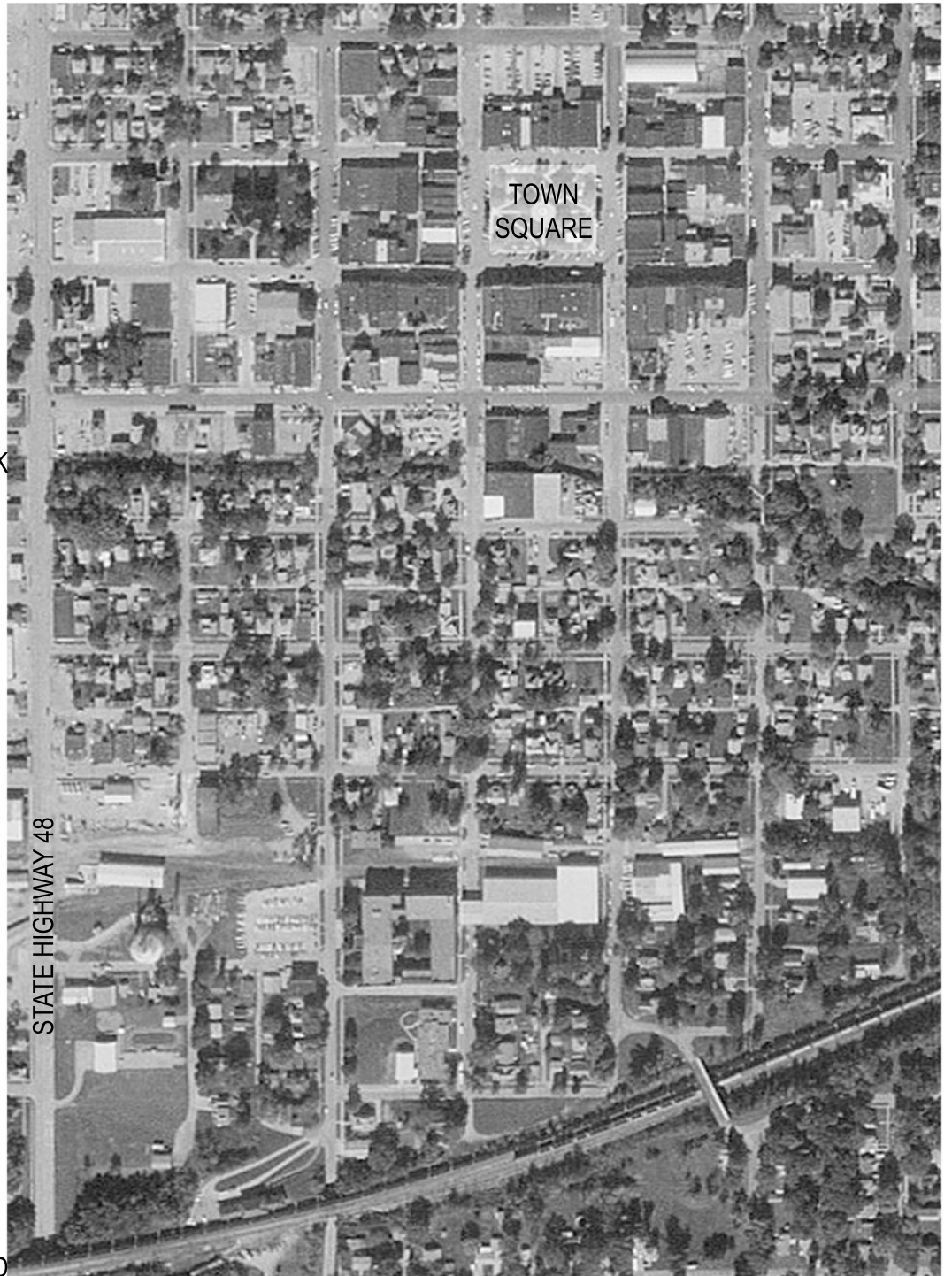
THIS MAP SHOWS THE EXISTING CONTEXT  
OF DOWNTOWN RED OAK, IOWA.

CREEK

STATE HIGHWAY 48

RAILROAD

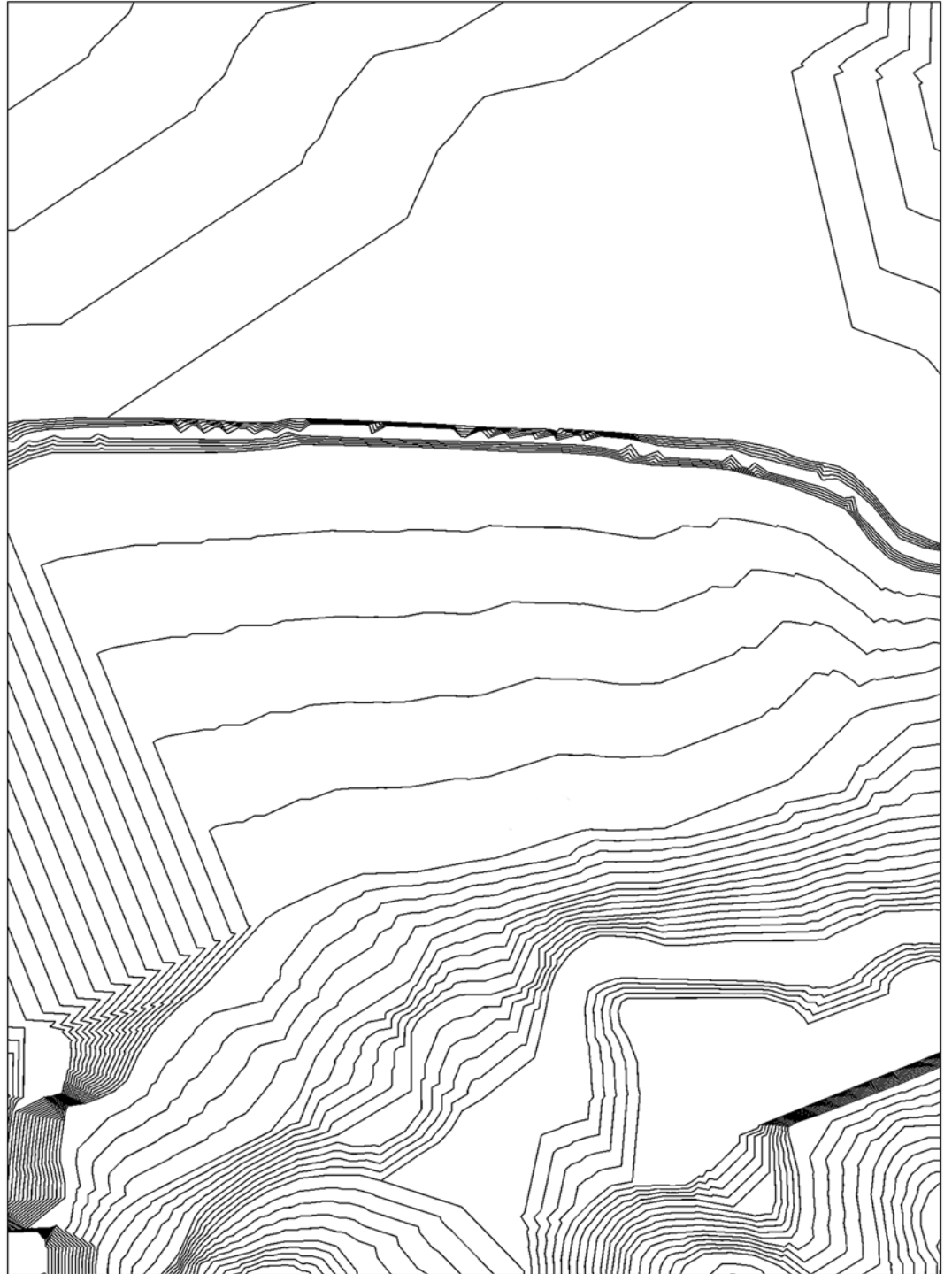
TOWN  
SQUARE





EXISTING CONTOURS

THIS IS THE EXISTING ONE FOOT CONTOUR  
MAP OF RED OAK, IA.



## EXISTING ZONING

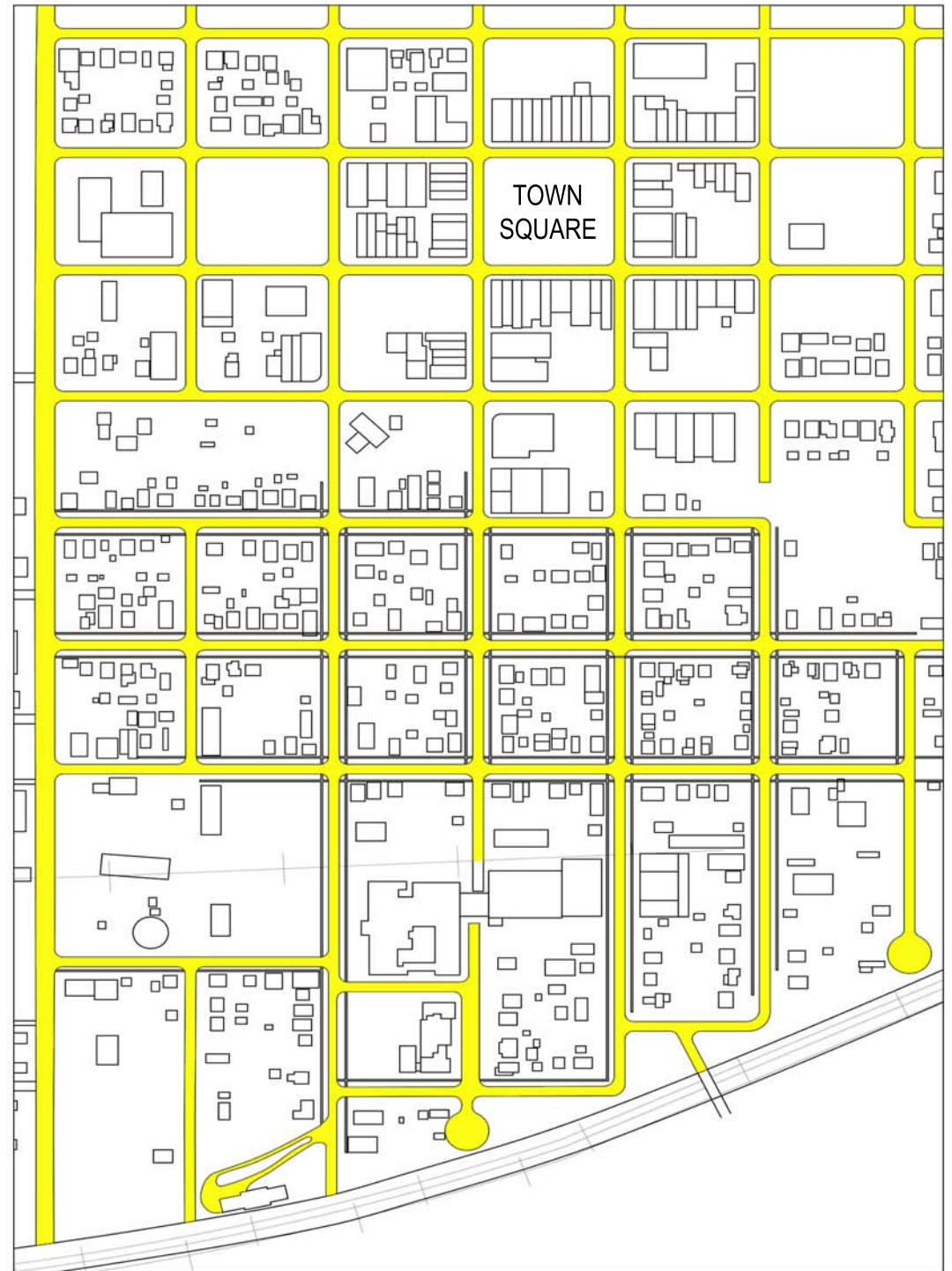
THIS MAP ILLUSTRATES THE EXISTING ZONING OF RED OAK, IA IN COMBINATION WITH THE ORIGINAL PLAT IN THE UPPER PORTION OF THE MAP. THIS IS WHERE THE ORIGINAL EPICENTER OF THE TOWN WAS WHEN IT WAS FIRST FOUNDED AND NOW HAS THE MONTGOMERY COUNTY COURT-HOUSE WITHIN THIS SITE.

- A-1 LIMITED AGRICULTURAL
- R-1 RESIDENTIAL
- R-2 RESIDENTIAL
- R-3 RESIDENTIAL
- R-4 MOBILE HOME PARK
- C-1 HIGHWAY COMMERCIAL
- C-2 PLANNED COMMERCIAL
- C-3 CENTRAL BUSINESS DISTRICT
- M-1 LIMITED INDUSTRIAL
- M-2 GENERAL INDUSTRIAL



## EXISTING ROADS

THIS DISPLAYS THE EXISTING NETWORK OF ROADS IN CONTEXT WITH THE EXISTING BUILDINGS OF RED OAK. MANY OF THE ROADS IN THE LOWER PORTION OF THE MAP ARE BECOMING VERY POOR AND ARE IN NEED OF IMPROVEMENT AS ARE THE BRIDGES CONNECTING THESE STREETS.

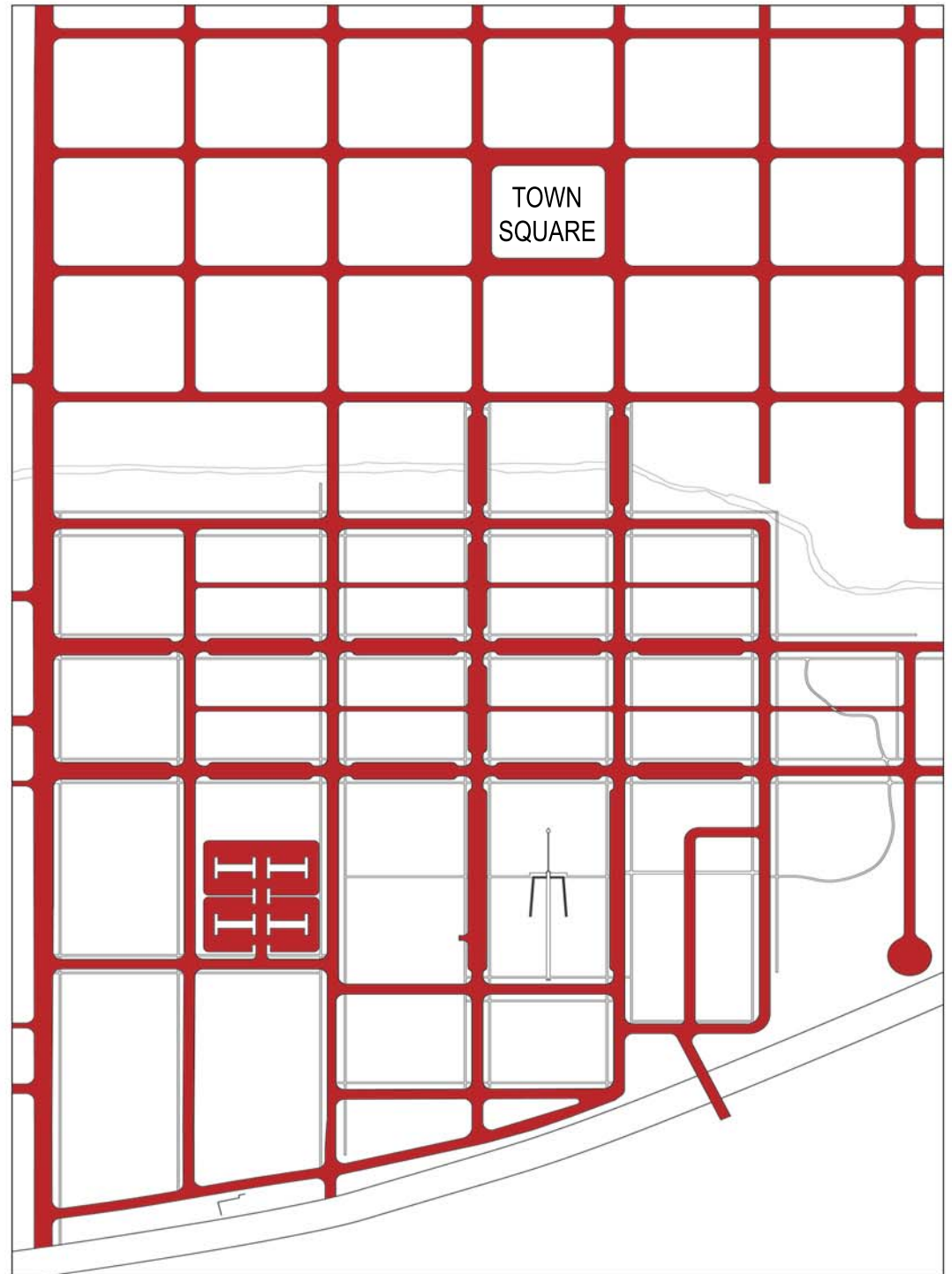




## PROPOSED ROADS

THIS MAP DISPLAYS WHERE PROPOSED NEW ROADS ARE PLACED AS COMPARED TO THE PREVIOUS EXISTING ROADS MAP.

THE NEW/IMPROVED ROADS WOULD HAVE A DRAMATIC IMPACT ON THE SITE DUE TO THE CURRENT POOR CONDITIONS OF SEVERAL OF THE ROADS AND BRIDGES AND THE VITAL CONNECTION THEY HAVE TO THE EXISTING TOWN SQUARE OF RED OAK.



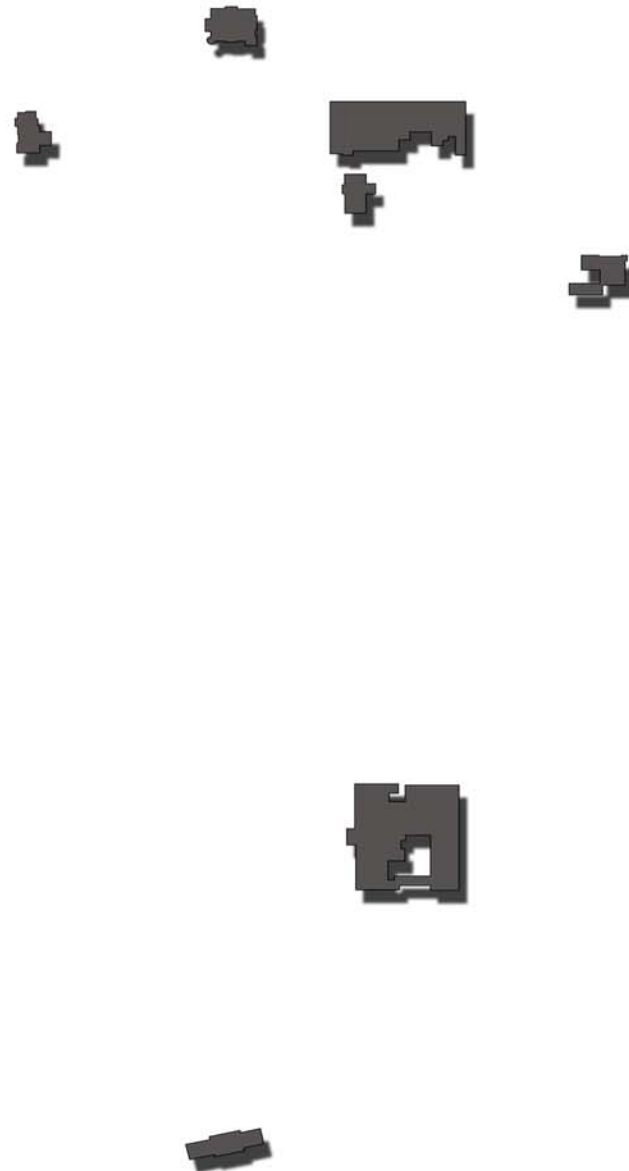
## EXISTING BUILDINGS

THIS MAP IDENTIFIES ALL OF THE EXISTING STRUCTURES THAT CURRENTLY EXIST WITHIN THE NEARBY CONTEXT OF RED OAK. THIS INCLUDES ALL STRUCTURES DESIGNATED AS HISTORIC AS WELL AS NON-HISTORIC STRUCTURES. IT WAS KEY TO IDENTIFY ALL THE STRUCTURES IN ORDER TO DESIGNATE WHICH BUILDINGS WOULD BE RECOMMENDED TO STAY AS WELL AS THOSE THAT SHOULD BE REPLACED.



## EXISTING HISTORIC BUILDINGS

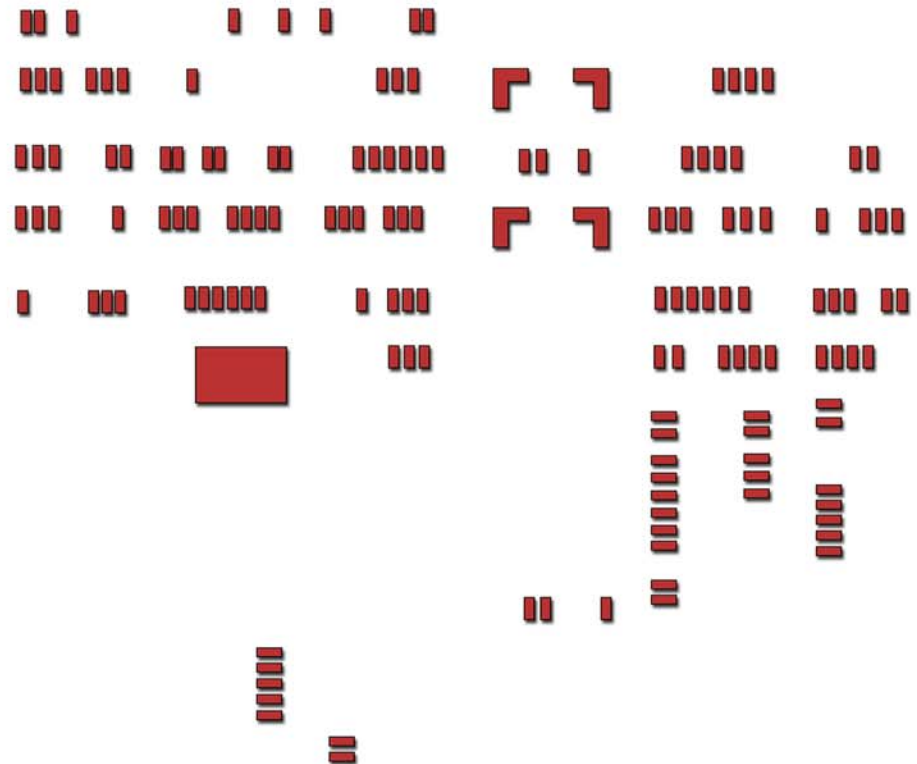
THIS DISPLAYS STRUCTURES LOCATED  
WITHIN THE CONTEXT THAT ARE DESIGNAT-  
ED ON THE NATIONAL HISTORIC REGISTRY.





## PROPOSED NEW BUILDINGS

THIS MAP IDENTIFIES THE RECOMMENDED NEW STRUCTURES TO REPLACE THE BUILDINGS THAT CURRENTLY RESIDE ON THESE PROPERTIES.



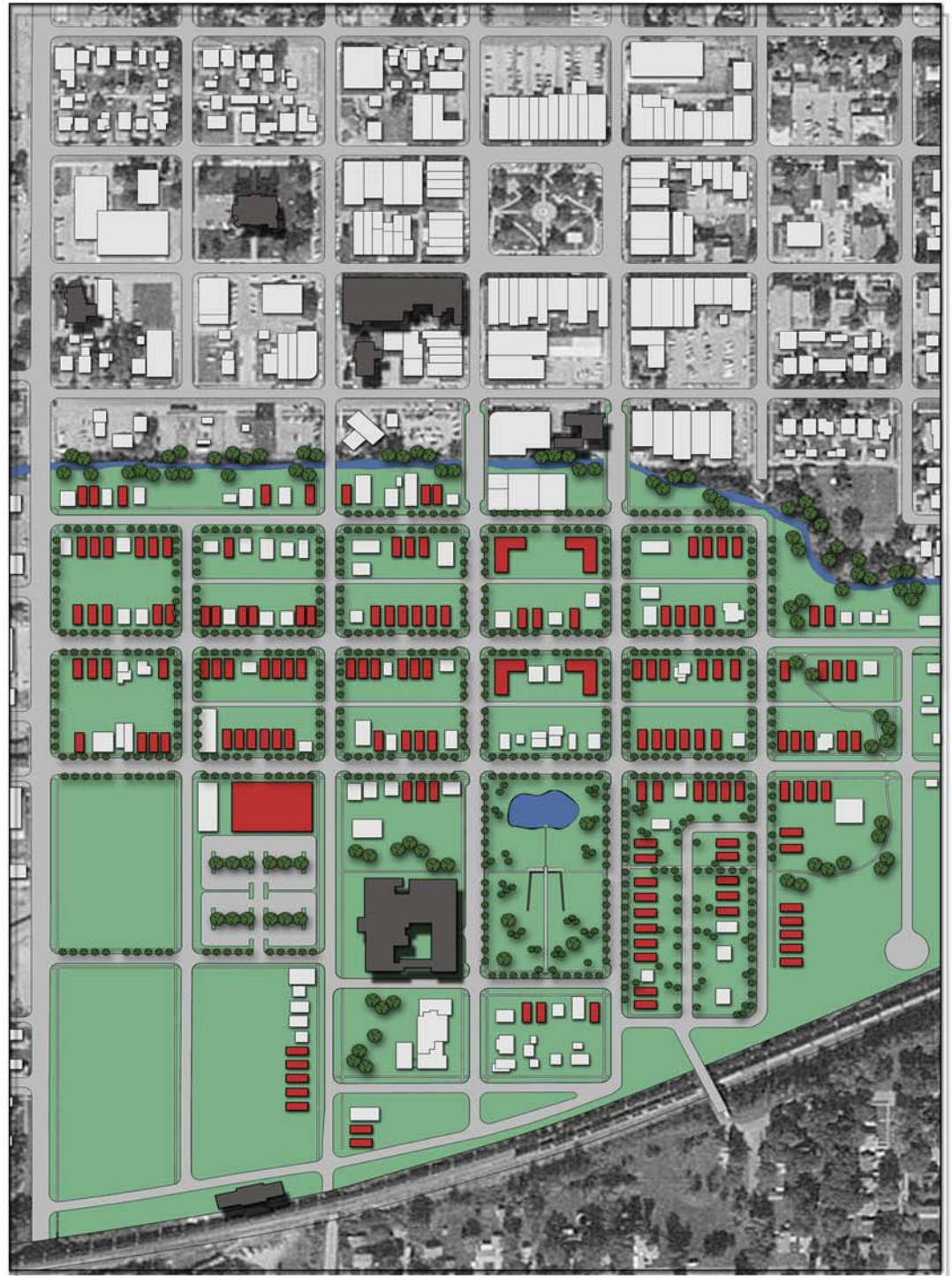
## EXISTING REFERENCE UNDERLAY

THIS IS AN EXISTING AERIAL IMAGE OF RED OAK.



## PROPOSED 20 YEAR PLAN

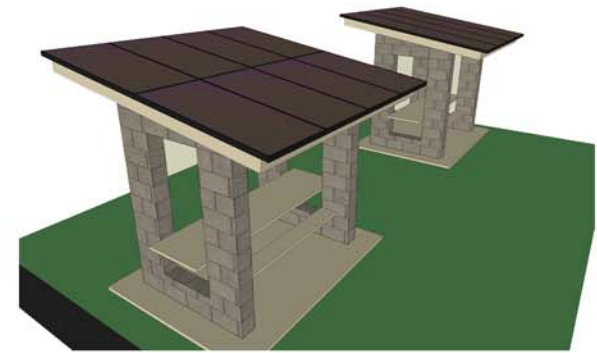
THIS MAP DISPLAYS THE PROPOSED 20 YEAR PLAN IN ITS ENTIRETY. IT COMBINES THE NEW ROAD PROPOSAL AND DISPLAYS HOW IT INTERACTS WITH THE EXSISTING ROADS ALREADY IN PLACE. IT ALSO SHOWS THE COMBINATION OF THE EXISTING AND THE PROPOSED STRUCTURES ALONG WITH A POTENTIAL LANDSCAPE PLAN.



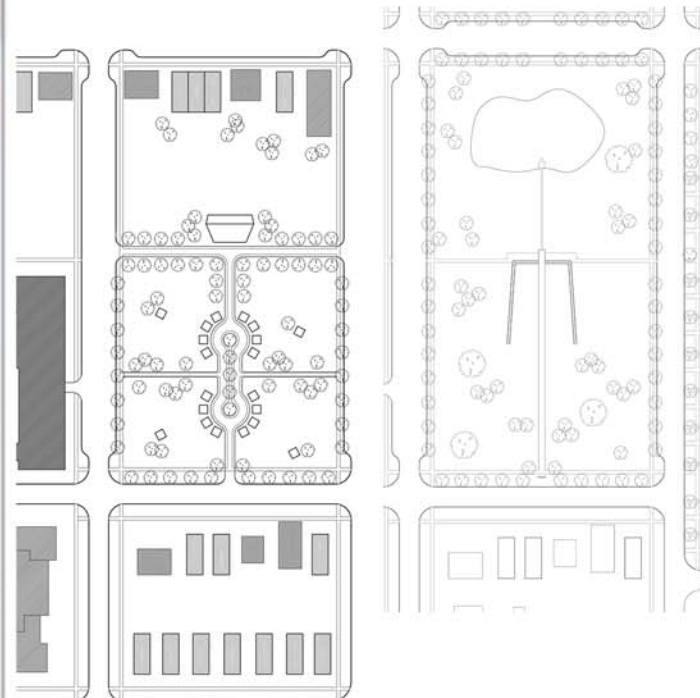


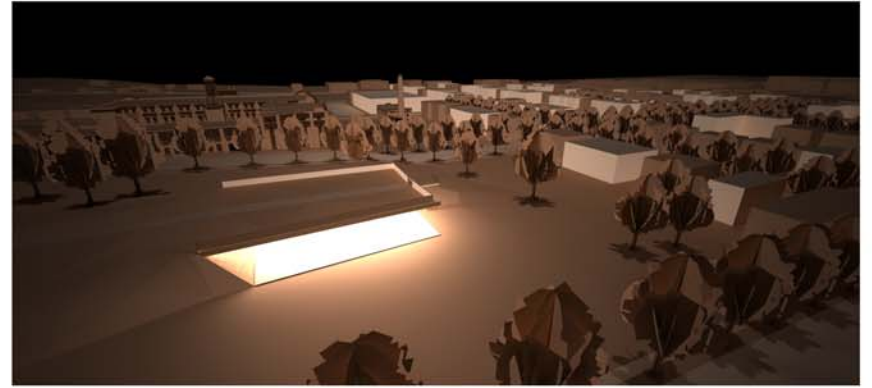
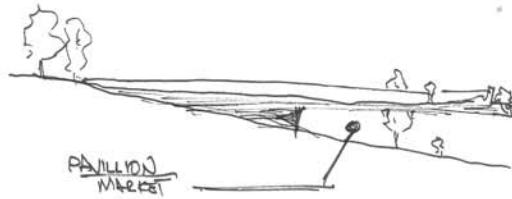
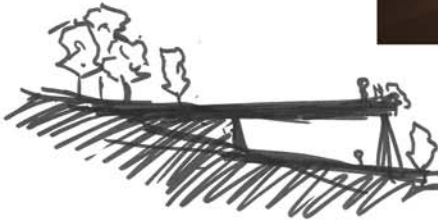
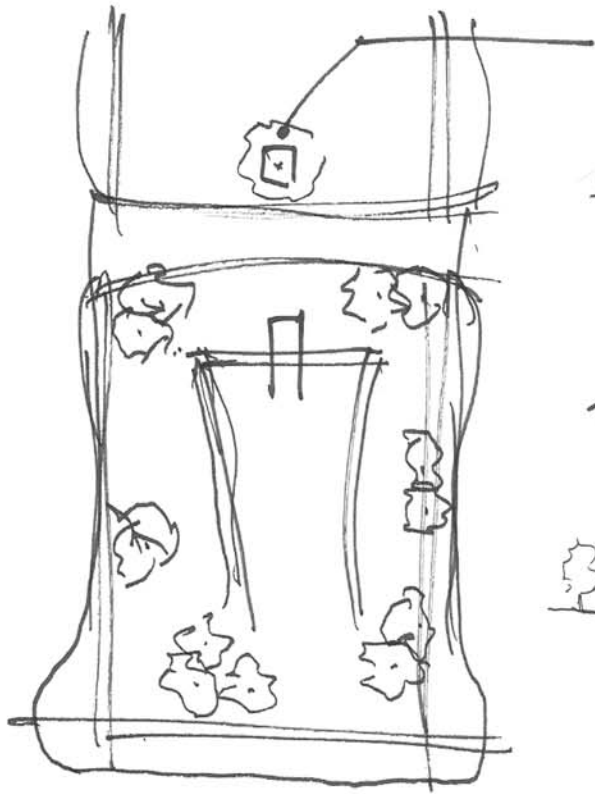




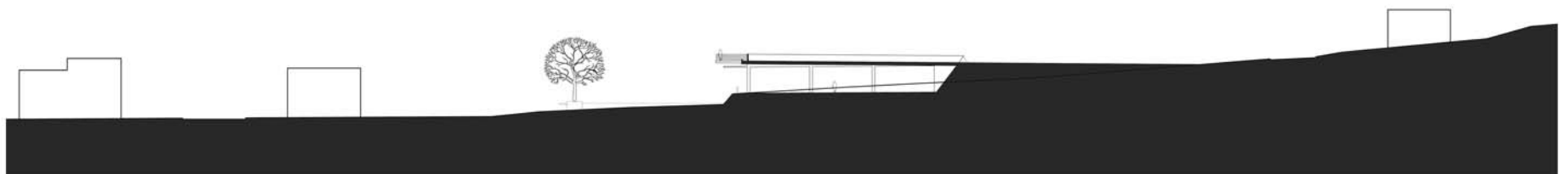


EXPLORATION OF THE PARK LOCATION TO THE EAST OF THE THOMAS D. MURPHY CALENDAR BUILDING [SOON TO BE ASSISTED LIVING] WITH THE SELECTED HOUSING INFILL DIRECTLY TO THE EAST. MANY REVISIONS WERE WORKED THROUGH TO EXPLORE BOTH FORMAL AND INFORMAL PARK SPACES AS A CHARETTE DESIGN PROCESS.

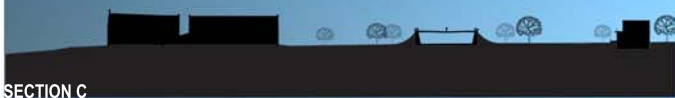
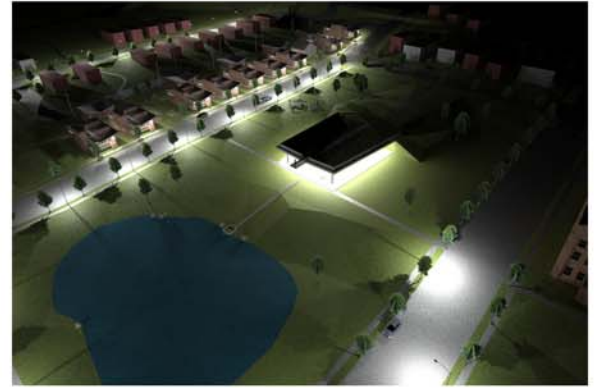
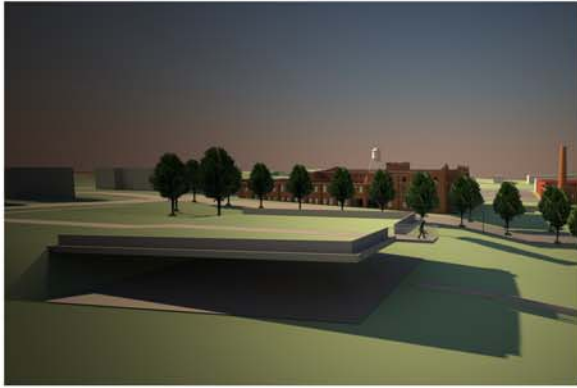




THE PARK THEN BECAME A PART OF THE LANDSCAPE AS IT UNFOLDED AND SEPERATED FROM THE DOWNWARD SLOPING SITE. IN DOING THIS OPPURTUNITY AROSE FOR PAVILION SPACE/ PICNIC SPACE/ AND WINTER ICE SKATING IN THE SPACE IN THE OPENING. ABOVE THIS WOULD BE A WATER COLLECTION SYSTEM THAT ACTS AS A ROOF FOR THE PAVILION BELOW AND CREATES AN OPPURTUNITY TO DOUBLE THE OUTDOOR SPACE OF THE PARK.

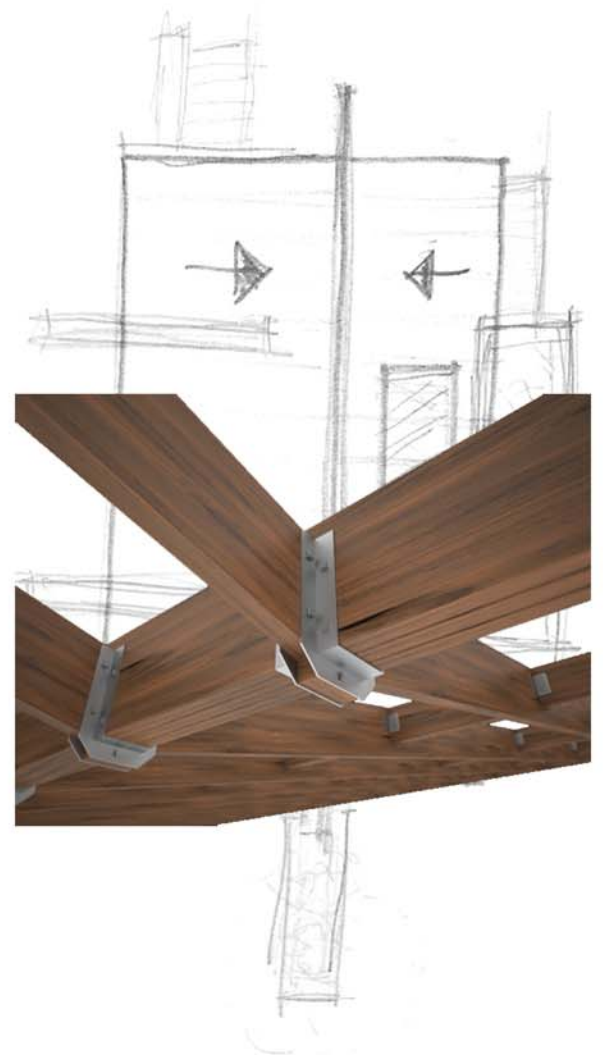
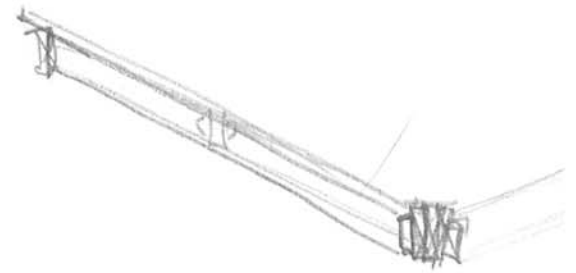






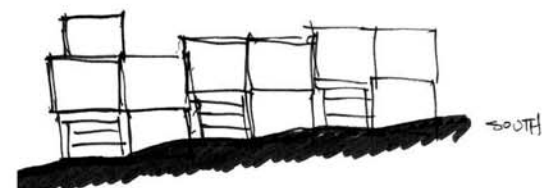
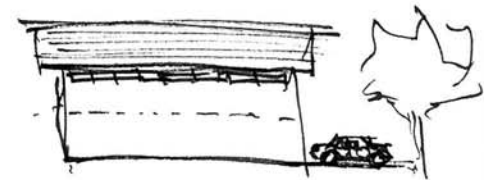


## PROCESS DOCUMENTATION



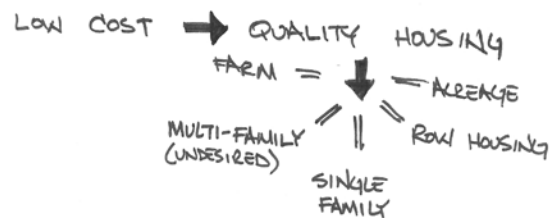
## INITIAL CONCEPTS

- \_ADJUSTABLE SPACES IN BOTH LENGTH AND HEIGHT BASED OFF OF A 3 DIMENSIONAL GRID
- \_ENERGY EFFICIENT, COMPACT HOUSES
- \_DAYLIGHTING AND PASSIVE SOLAR
- \_CAN ADJUST TO FIT EITHER 1 PERSON TO 6 PEOPLE
- \_PASSIVE SOLAR HEATING AND COOLING
- \_HALLWAYS IN COMPACT HOUSING MUST BE AVOIDED
- \_IF IT IS NEW CONSTRUCTION FROM NEW MATERIALS THEN IT SHOULD APPEAR TO BE NEW RATHER THAN MIMICKING ITS PREDECESSOR
- \_NOT EVERY FAMILY FUNCTIONS OR IS STRUCTURED THE SAME
- \_SIMPLE YET FLEXIBLE
- \_SINGLE FAMILY
- \_USE TECHNOLOGY BUT DO NOT DEPEND SOLELY ON TECHNOLOGY



RED OAK'S AVERAGE NEW HOUSE CONSTRUCTION COST IS \$105/SQ. FT. THIS IS WELL BELOW THE NEARBY METROPOLITAN AREAS COST THAT TYPICALLY BEGINS AT \$116/ SQ. FT. AT THE LOW END. THESE PRICES WILL BE FOR HOMES BETWEEN 1,100 SQ. FT. AND 1,500 SQ. FT.. HOWEVER, MONTHLY UTILITY COSTS AND ENERGY CONSUMPTION IN THE TYPICALLY LOW COST CONSTRUCTION IS USUALLY VERY HIGH DUE TO LOW COST MATERIALS AND CONSTRUCTION METHODS. THIS IS WHAT LED TO PREFABRICATION AS A POSSIBLE SUBSTITUTE, ALTHOUGH MOST TYPES [MOBILE AND TRAILER HOUSES] ARE SELDOM OF HIGH QUALITY. THE EMPHASIS IS TO CREATE THIS HOUSING TYPE IN A METHOD THAT PRODUCES A FAIR QUALITY HOUSE WITH VERY LITTLE CONSTRUCTION WASTE, LOW ENERGY CONSUMPTION, AND DESIGNED WITH WEATHER CONDITIONS AND LOADS OF THE MIDWEST PUT INTO CONSIDERATION.

## SAMPLE MARKET FOR NEW HOUSING

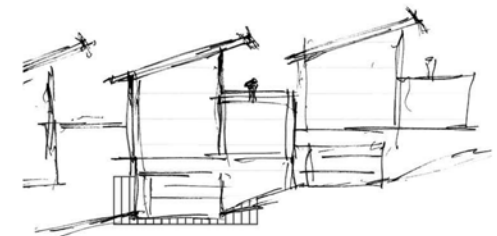


\$134,000	-	1300 SQ. FT.	\$103/SQ. FT.
\$150,000	-	1400 SQ. FT.	\$107/SQ. FT.
\$124,000	-	FIRST 900 SQ. FT.	BASEMENT 500 SQ. FT.
			\$124/SQ. FT.
			\$77/SQ. FT.

- PRE-FABRICATED
- ON-SITE CONSTRUCTION

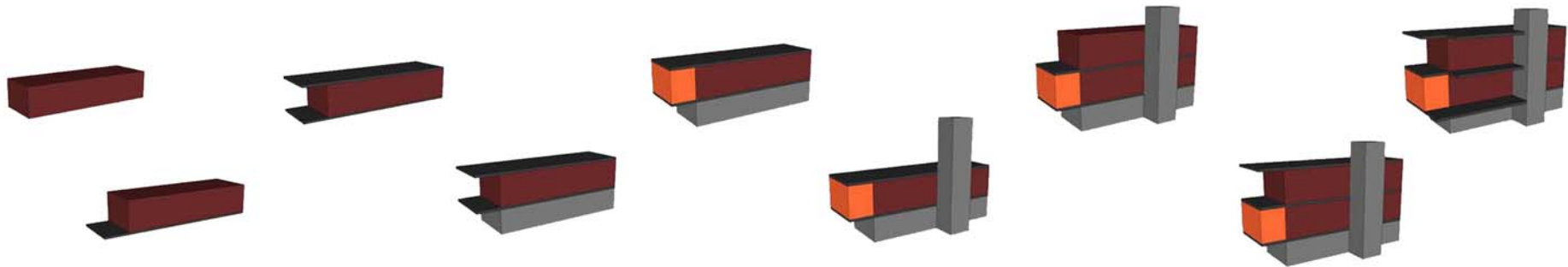
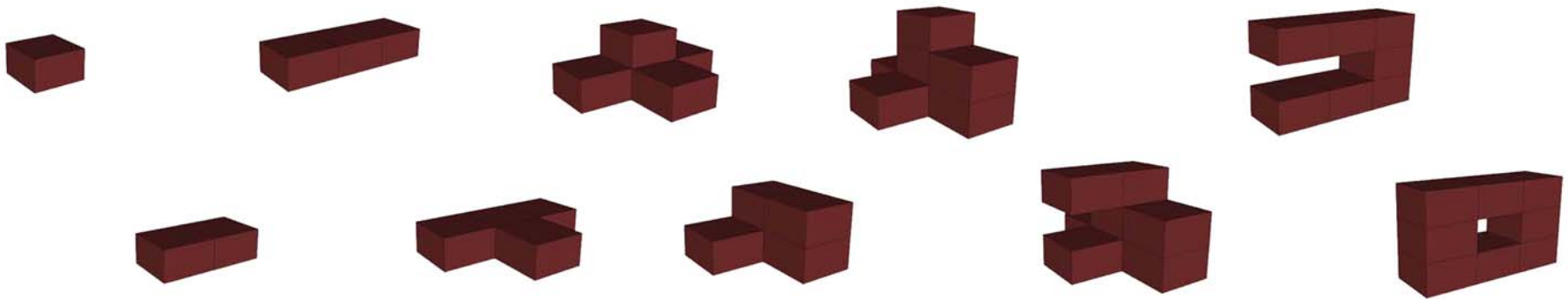
HOUSEHOLD 1  
YOUNG HUSBAND AND WIFE WITH 1 CHILD. THEY BOTH HAVE JOBS AT LOCAL MANUFACTURING PLANTS AND EARN A COMBINED INCOME OF \$55,000/ YR. THEY ARE PLANNING ON HAVING ANOTHER CHILD AND DON'T FEEL THAT THEIR CURRENT HOUSING IS ADEQUATE. THEY WOULD LIKE TO BUILD A NEW HOUSE BUT THEY CAN NOT AFFORD THE ACRES ON THE OUTSKIRTS OF TOWN AND ENJOY THEIR CURRENT COMMUNITY.

HOUSEHOLD 2  
YOUNG HUSBAND AND WIFE WITH ONE CHILD AND A SINGLE INCOME OF \$33,000/ YR. THE FAMILY CURRENTLY LIVES IN A 780 SQ. FT. HOUSE AND BILLS CAN SOMETIMES BE VERY DIFFICULT. THE WIFE WORKS TEMPORARY JOBS WHEN THEY ARE AVAILABLE BUT IT MAKES IT DIFFICULT TO WORK WHEN DAYCARE IS NOT IN THE BUDGET.



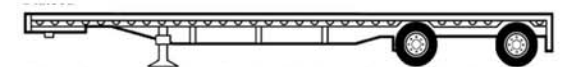
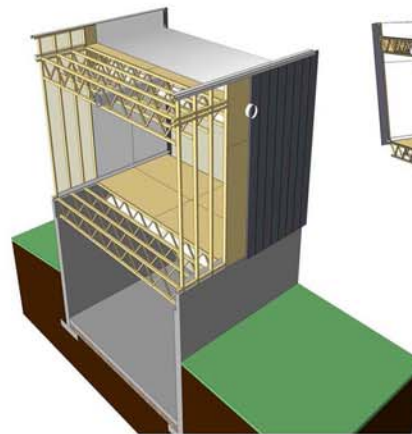
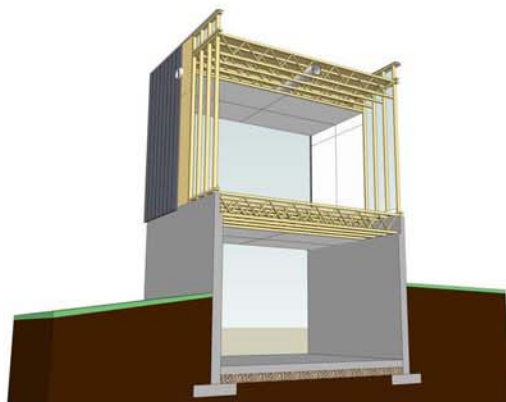


## PREFABRICATION



POTENTIAL FOR PREFABRICATED DESIGNS.

CAN POSSIBLY GIVE FLEXIBILITY OF BOTH SPATIAL AND AESTHETIC DESIGN.



This trailer accommodates freight with the maximum legal weight and dimensions shown below.

**Max. Freight Weight**

48,000 lbs.

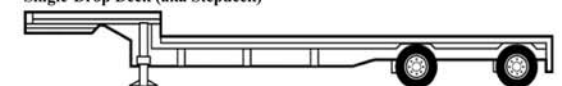
**Maximum Freight Dimensions**

Length 48 feet

Width 8.5 feet (102")

Height 8.5 feet (102")

**Single-Drop Deck (aka Stepdeck)**



This trailer accommodates freight with the maximum legal weight and dimensions shown below.

**Max. Freight Weight**

48,000 lbs.

**Maximum Freight Dimensions**

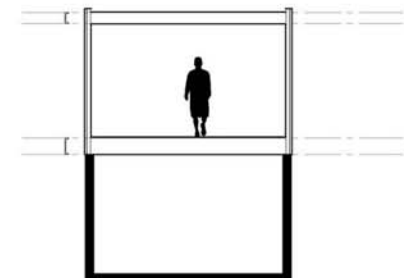
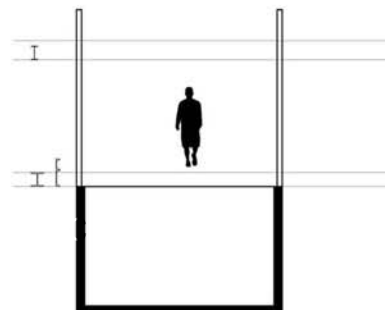
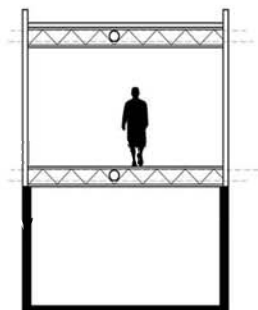
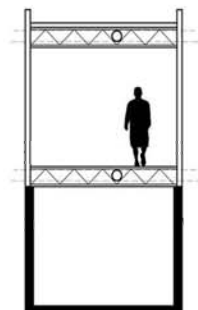
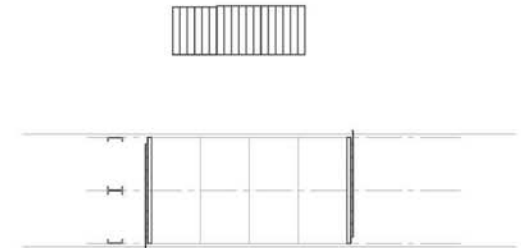
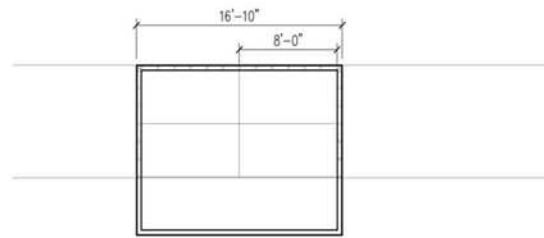
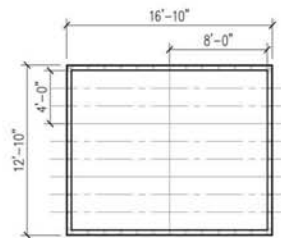
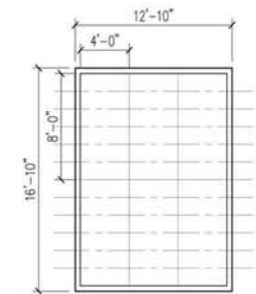
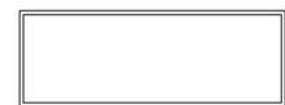
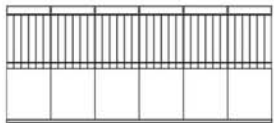
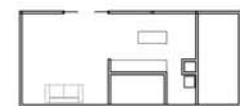
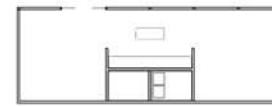
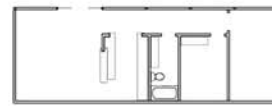
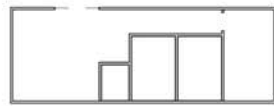
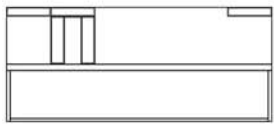
Main Deck	Max. Dims.	Front Deck	Max. Dims.
Length	37 feet	Length	11 feet

## SCHEMATIC FOR MODULAR CONSTRUCTION

USING THE CONSTRAINTS PLACED ON SEMI TRANSPORTATION THIS UNIT GIVES THE POTENTIAL FOR PREFABRICATED CONSTRUCTION THAT COULD BE PLACED ON A POURED FOUNDATION. THERE ARE MANY RESTRICTIONS USING THIS METHOD THAT JEOPARDIZE VIABILITY OF THIS TYPE WITHOUT INCREASING COST OF TRANSPORTATION FOR MODULAR UNITS. ROUTE RESTRICTIONS, WEIGHT RESTRICTIONS, AND PERMIT RESTRICTIONS ALL EFFECT THE TRANSPORTATION ASPECT AND HIGHWAY AND INTERSTATE LAWS ALSO EFFECT THE PHYSICAL DIMENSIONS OF THE PREFABRICATED PIECES.

## PREFABRICATION

DESIGN CONSTRAINTS OF THE PREFABRICATED MODUL FORCED THE EXAMINATION OF DIFFERENT CONSTRUCTION METHODS. EACH METHOD HAD BOTH POSITIVE AND NEGATIVE EFFECTS ON THE DESIGN, ALTHOUGH TYPICALLY THE MOST BENEFICIAL CONSTRUCTION METHOD WAS ALSO THE MOST COSTLY AS WELL.



WOOD TRUSS

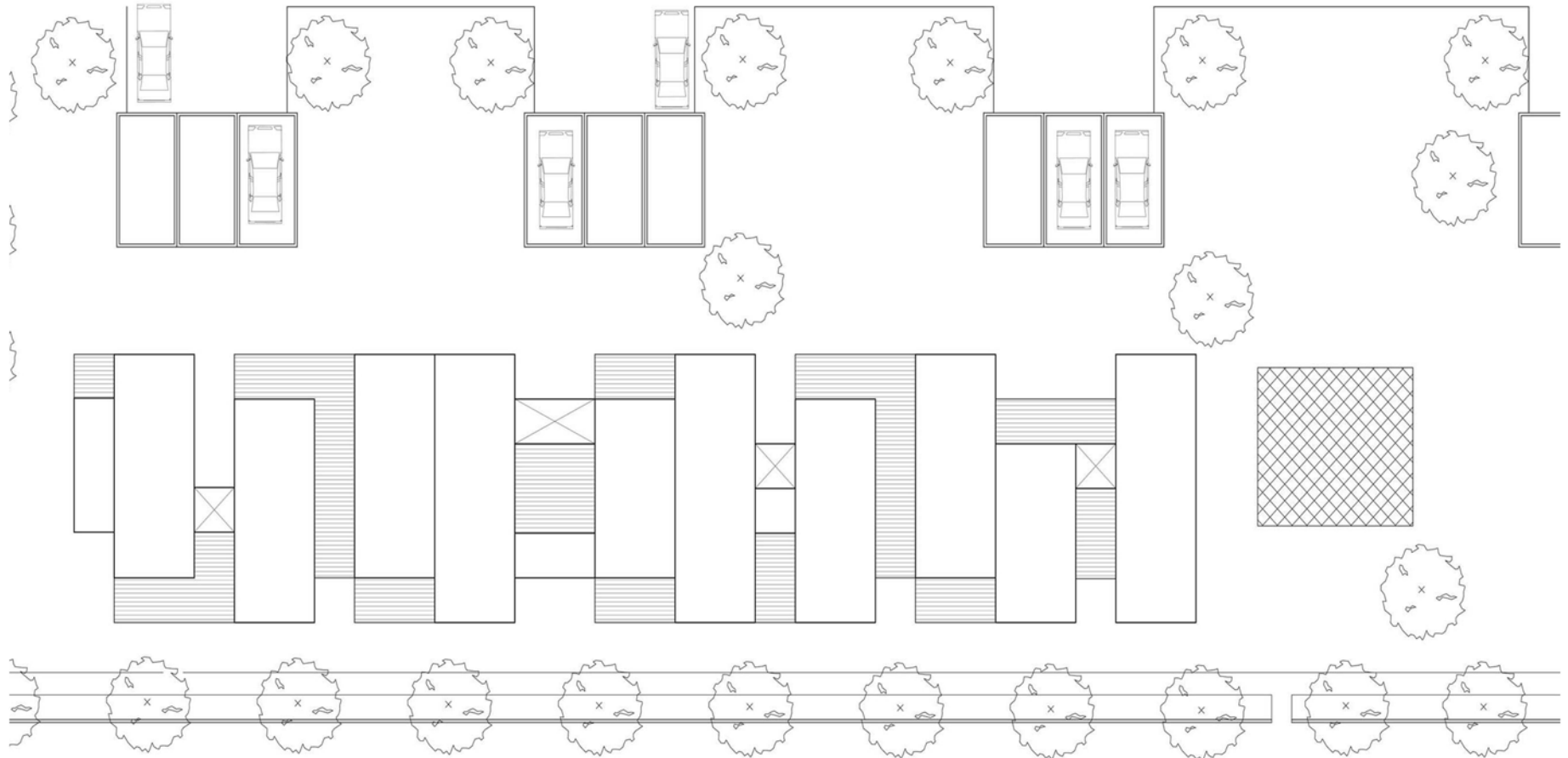
WOOD TRUSS

W-BEAMS

C-BEAM

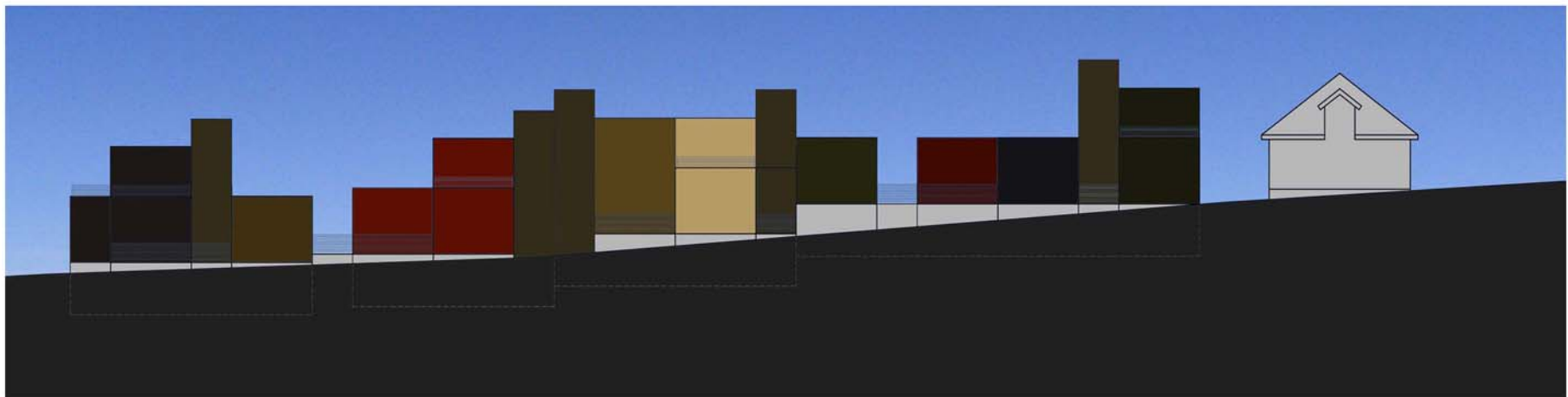
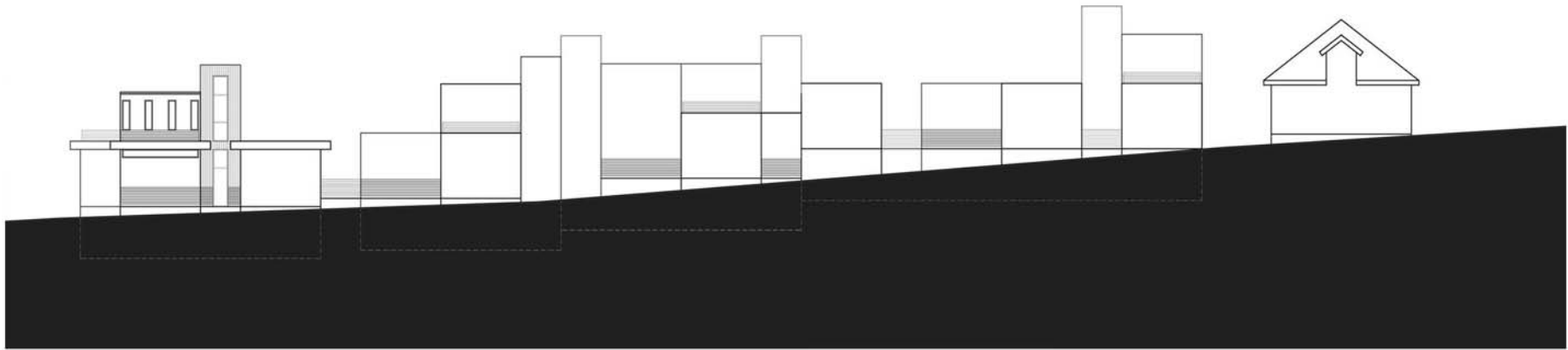


DIAGRAMATIC LAYOUT OF THE PREFABRICATED UNITS BEING MANIPULATED INTO THE SITE CONSTRAINTS.  
THE DIFFICULTY WAS TO DEVELOP PATTERNS WITH THE PREFABRICATED METHOD THAT COULD OFFER  
BOTH DIMENSION AND A VARIETY OF PLAN TYPES FOR DIFFERENT SIZE FAMILY REQUIREMENTS.



## PREFABRICATION

GRAPHIC CONCEPTUAL ELEVATIONS DISPLAYING THE POSSIBILITY OF STACKABLE TWO STORY AND SINGLE STORY MODULAR UNITS.



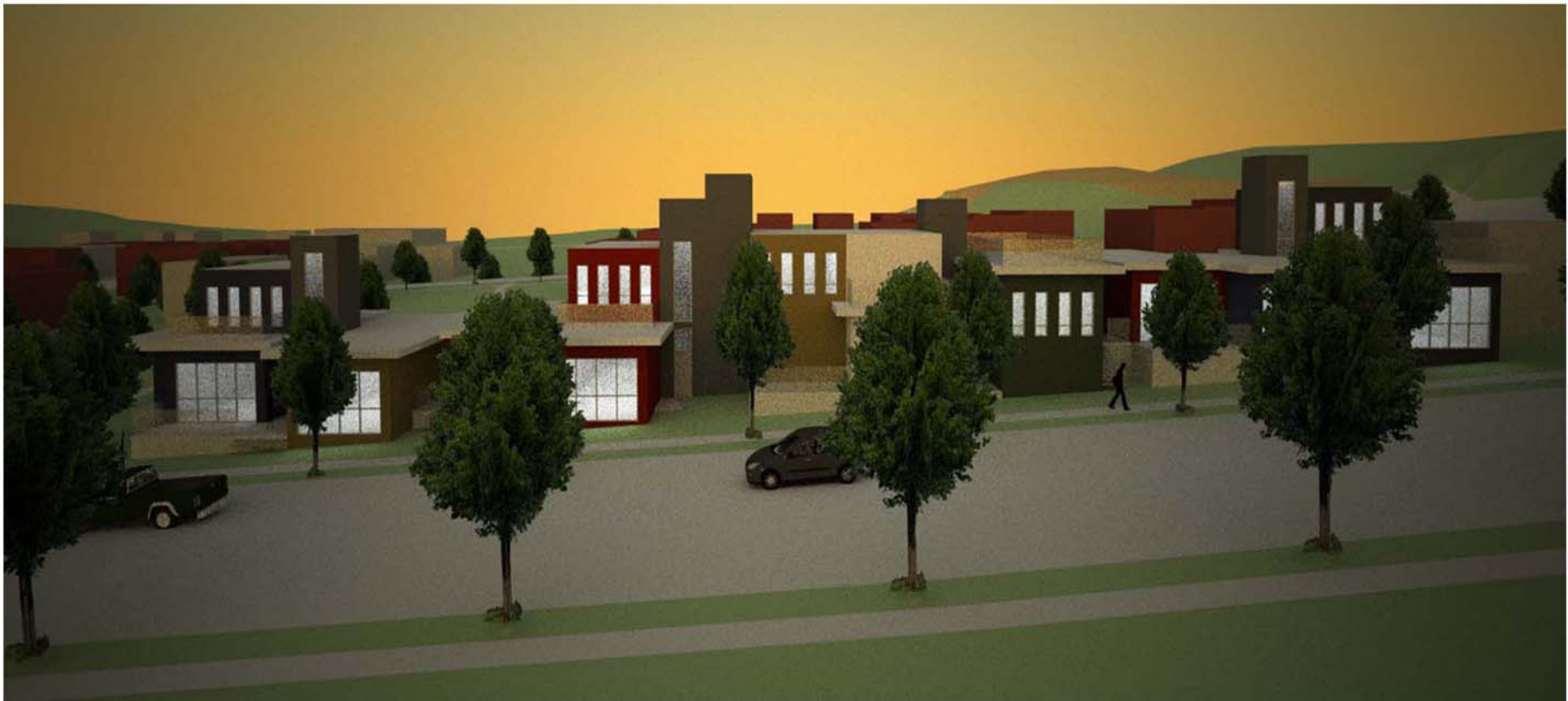
CONCEPTUAL RENDERING OF MODULAR UNITS PLACED TOGETHER





## PREFABRICATION

### CONCEPTUAL RENDERING OF MODULAR UNITS PIECED TOGETHER

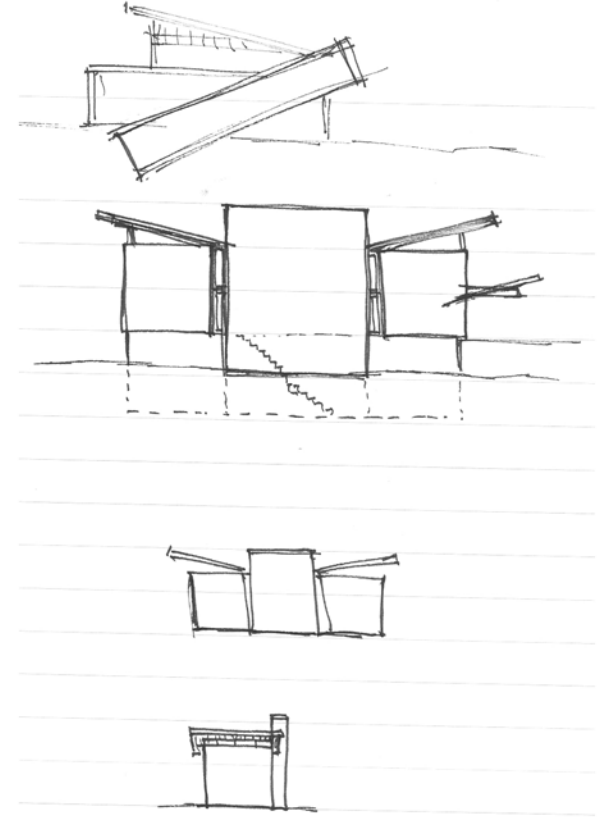
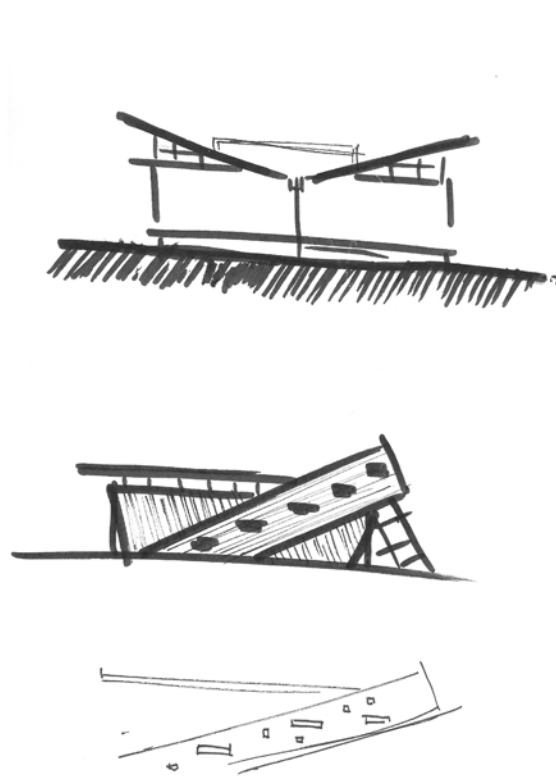
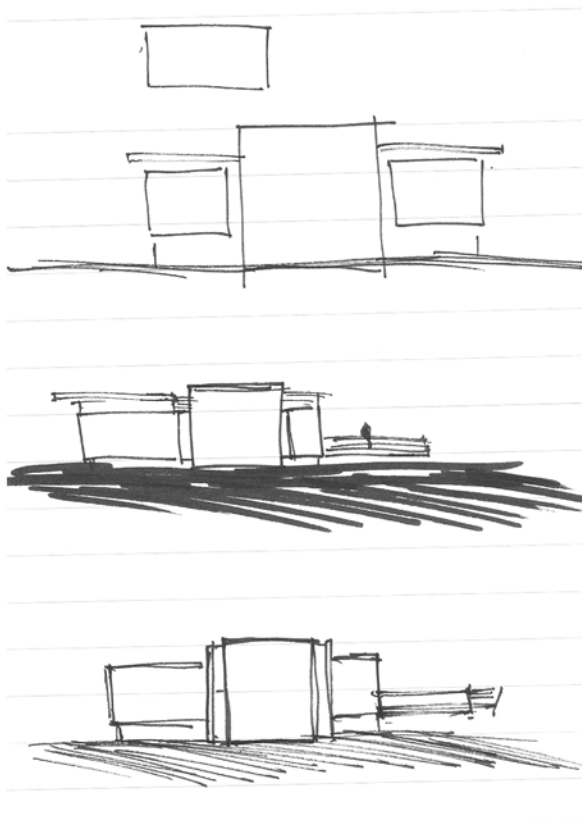


THE POTENTIAL FOR PREFABRICATED DESIGN MAY NOT CURRENTLY WORK DUE TO CONFLICTS IN TRANSPORTATION THAT EFFECT THE UNITS SIZE AND COST. ALTHOUGH, THIS DOES NOT COMPLETELY ELIMINATE THE POTENTIAL FOR THIS CONSTRUCTION TYPE, IT JUST REDUCES THE POTENTIAL OF THIS TYPE BEING USED.

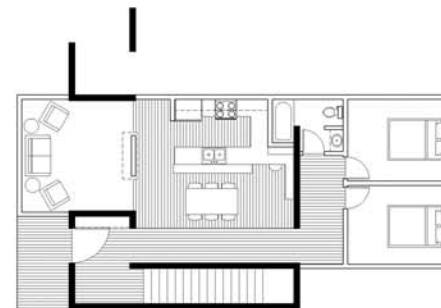
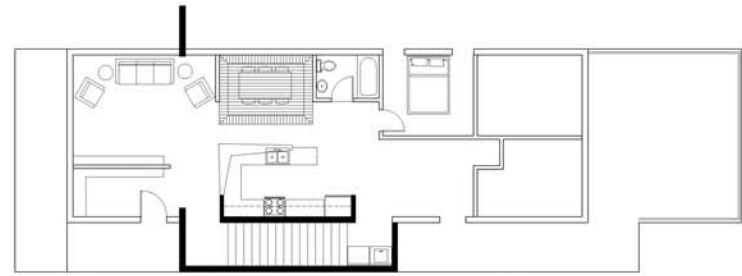
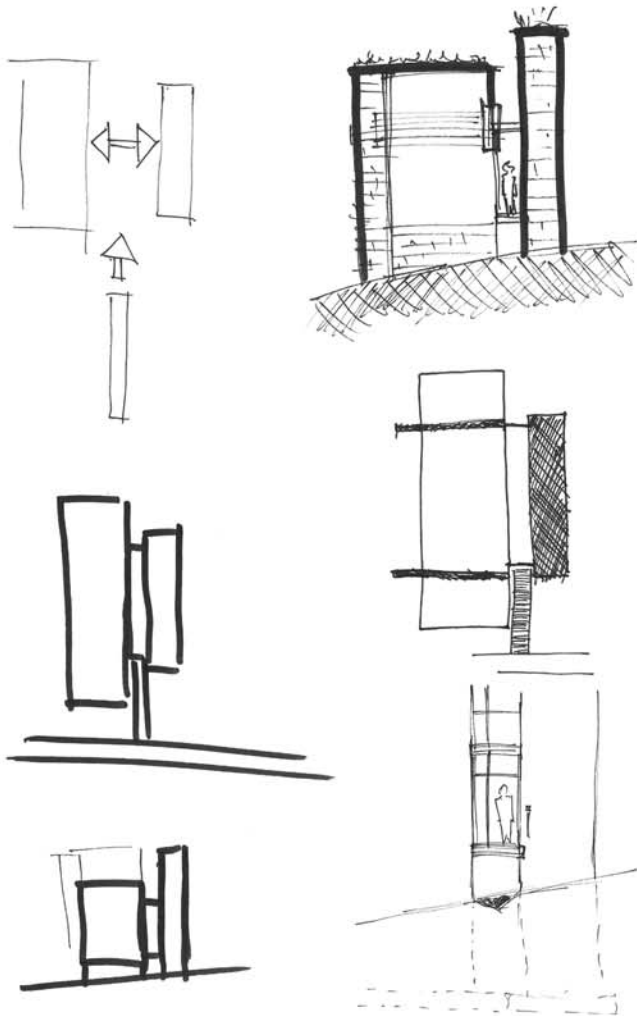
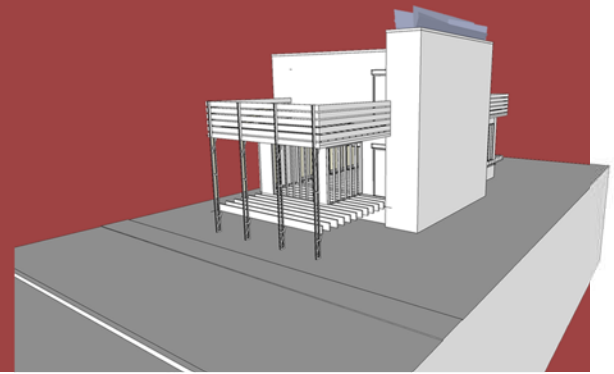


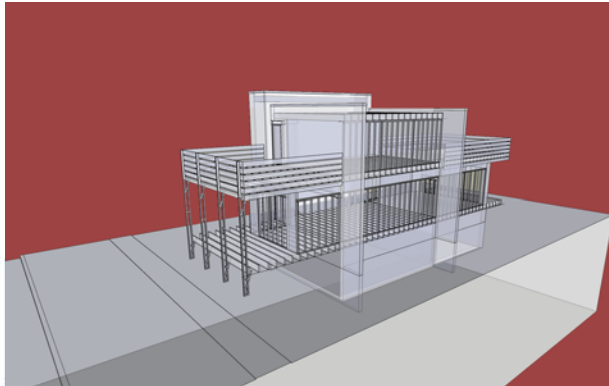




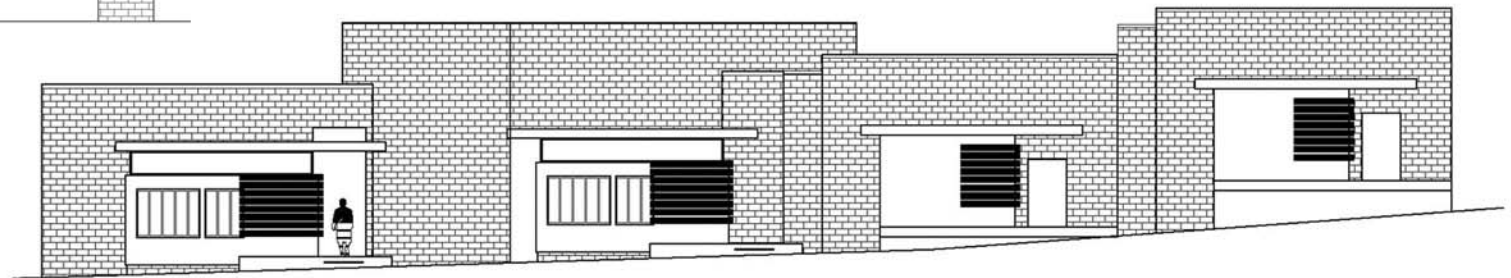
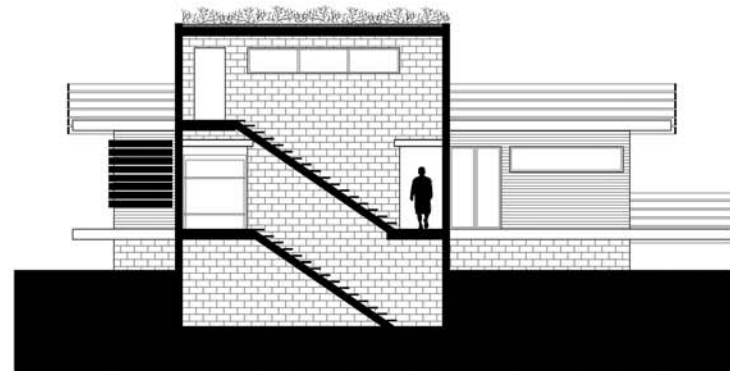
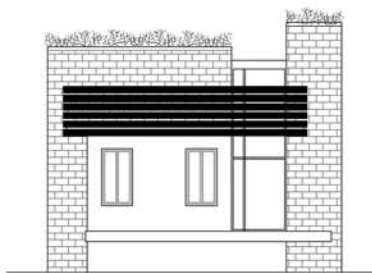
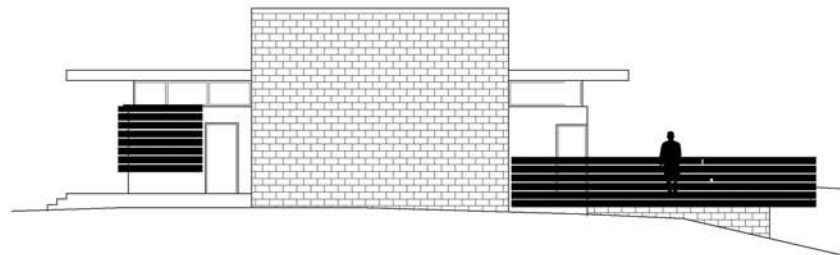
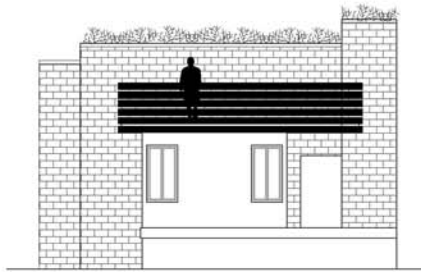


ON-SITE CONSTRUCTION  
PROCESS





WORKING IN PLAN/SECTION/ AND ELEVATION TO DISCOVER WHAT IS HAPPENING WHEN A CHANGE IS MADE FROM ONE DRAWING TO THE NEXT AND HOW EACH SPACE INTERACTS WITH THE NEXT.

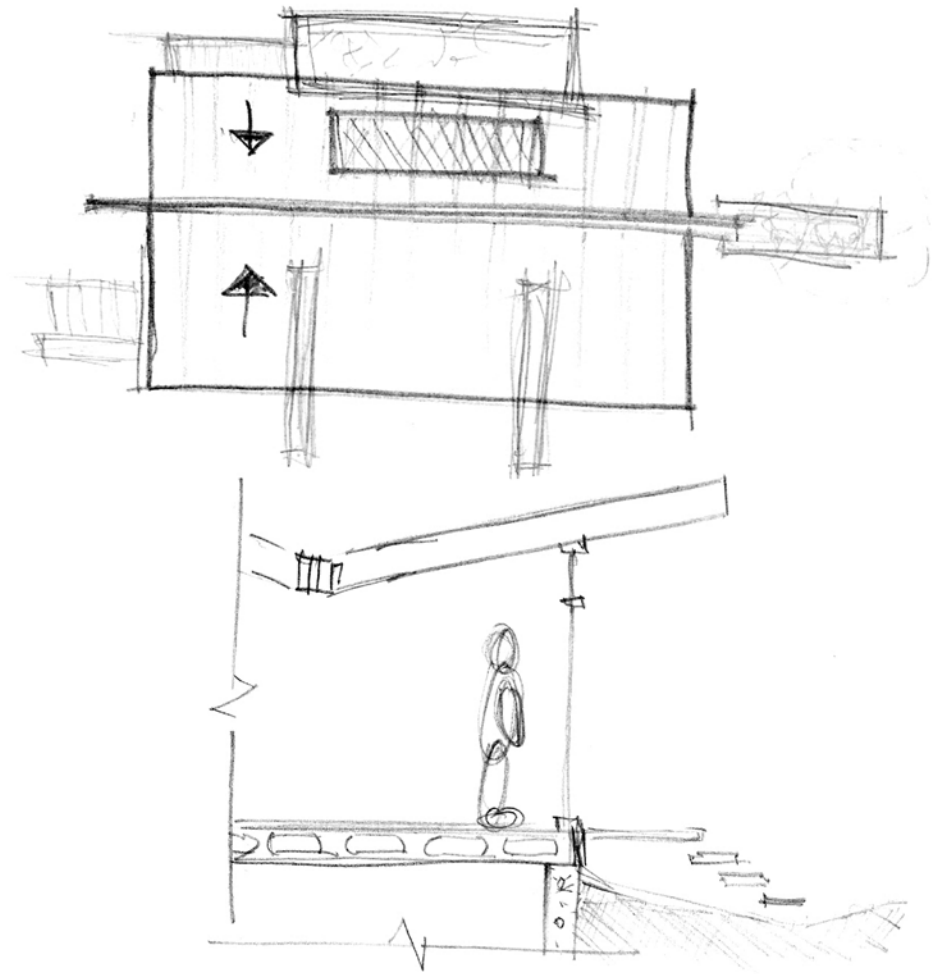
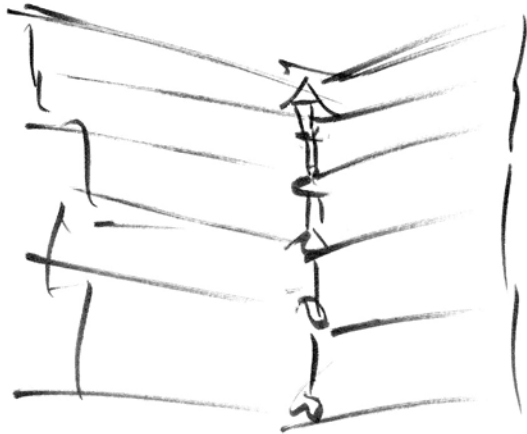




ON-SITE CONSTRUCTION

FINAL DESIGN

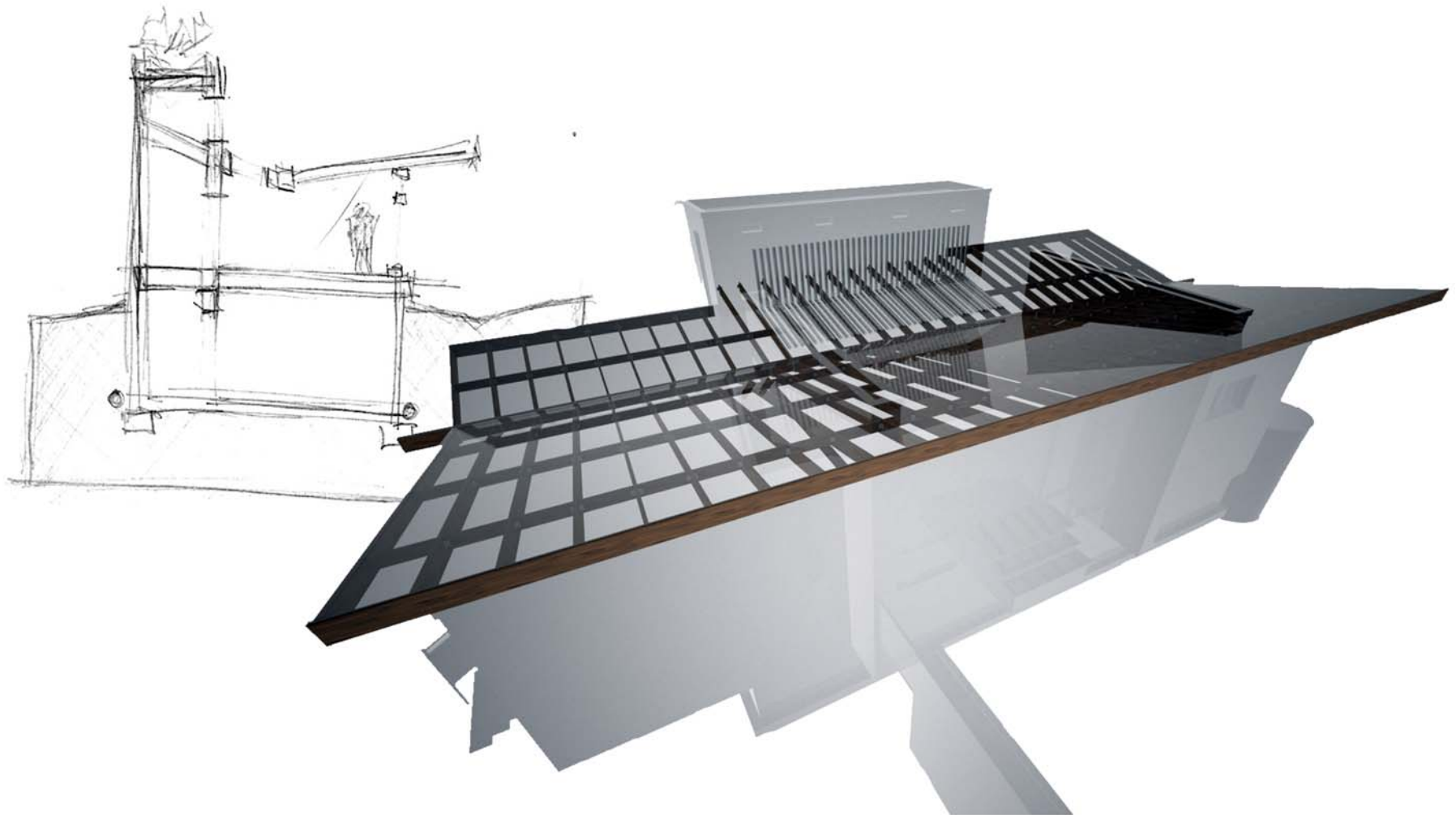
THE IDEA OF USING AN INVERTED ROOF AS A SORT OF SPINE OF THE BUILDING FOR A PASSIVE RAINWATER COLLECTION SYSTEM SEEMED TO BE THE APPROPRIATE METHOD TO BUILD THE COLLECTION INTO THE BUILDING CONSTRUCTION RATHER THAN IT BEING SOMETHING THAT IS OPTIONAL OR ATTACHED TO A SORT OF GUTTER SYSTEM THAT RUNS AROUND THE SIDES.



ON-SITE CONSTRUCTION

FINAL DESIGN

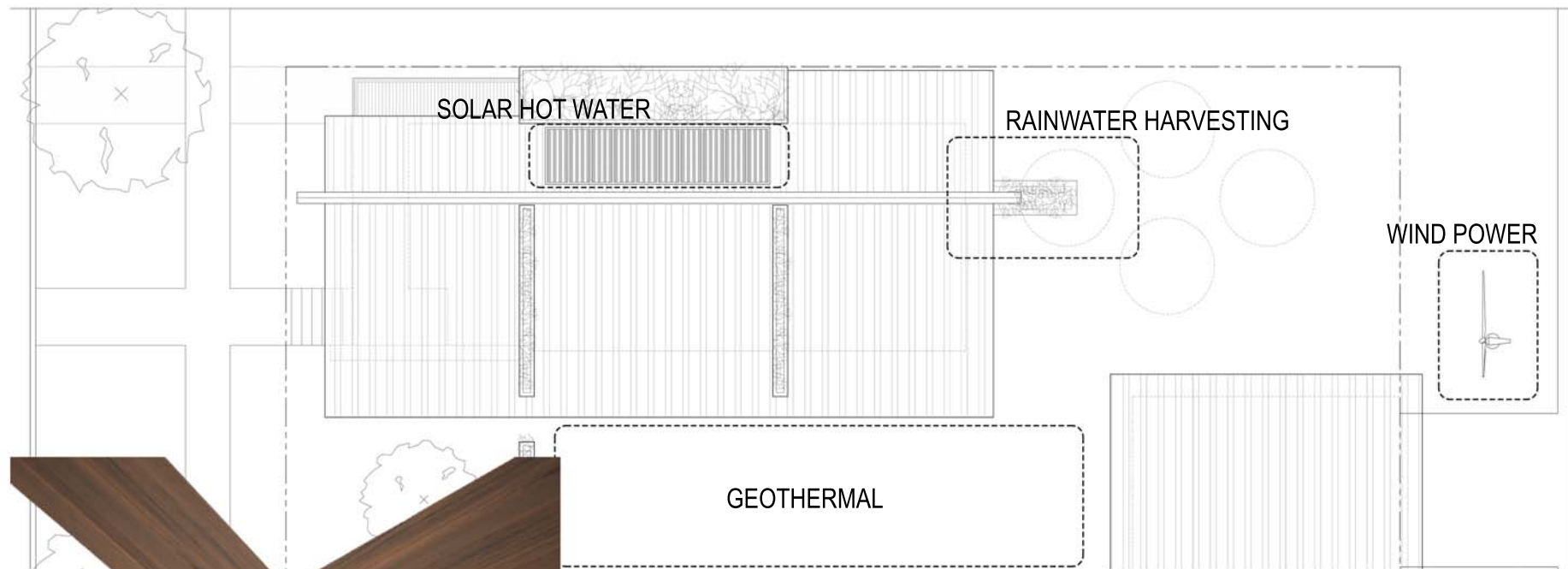
THE SPINE OF THE PROJECT BECAME AN ADVANCED TRUSS SYSTEM THAT WOULD THEN BE EXPOSED ON THE INTERIOR. IT WOULD BE RAISED SLIGHTLY IN THE FRONT TO ALLOW FOR PROPER DRAINAGE TO THE BACK OF THE BUILDING. THIS IS WHERE THE FUTURE PLANTER [ACTING AS A FILTER] WOULD BE THAT DRAINS INTO THE UNDERGROUND STORAGE SYSTEM FOR ALL OF THE RAINWATER.



## ON-SITE CONSTRUCTION

## FINAL DESIGN

THIS THEN LED TO THE IMPLEMENTATION OF AN ACTIVE SOLAR HOT WATER SYSTEM BEING INTEGRATED INTO THE SPINE AS WELL. THIS WOULD SERVE TWO FUNCTIONS; FIRST TO HAVE THE CAPACITY FOR THE BUILDING TO CREATE ITS OWN HOT WATER, AND SECOND, TO CREATE AN OVERHEAD LIGHT SOURCE FOR THE INTERIOR LIVING SPACE AND STAIRS.



### GEO-THERMAL HEAT PUMP

3 WELL - VERTICAL, CLOSED LOOP, GROUND SOURCE HEAT PUMP  
THIS CAN EQUAL A 40% SAVINGS TO AIR SOURCE HEAT PUMPS + A 70% SAVINGS OVER ELECTRIC RESISTANCE AIR CONDITIONERS. IN ADDITION THEY ARE 48% MORE EFFICIENT THAN 'EFFICIENT' GAS FURNACES. THE LIFE EXPECTANCY OF THE GROUND LOOP IS AROUND 50 YEARS AND REQUIRES NO MAINTENANCE.



THE NEXT STEP WAS TO CALCULATE THE POTENTIAL FOR ALL OF THE SYSTEMS, BOTH ACTIVE AND PASSIVE, TO SEE WHAT EACH WOULD OFFER INTO THIS SOLUTION OF THE SPINE HOUSE.

## WIND POWER

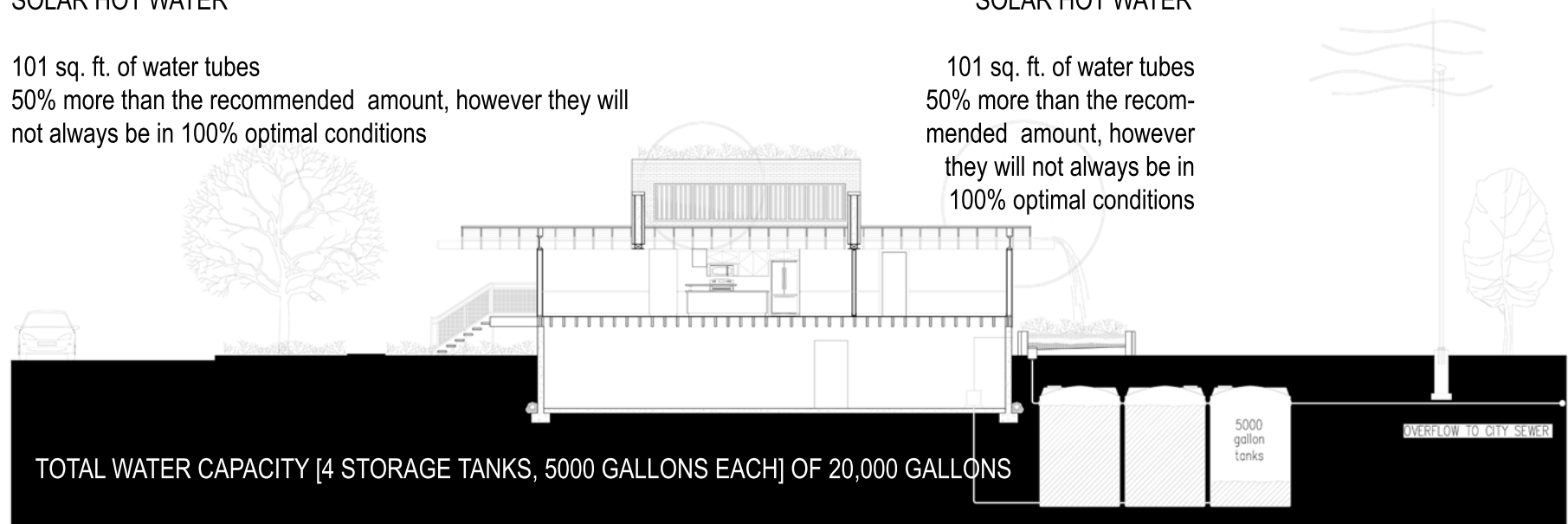
WIND TURBINE - SKYSTREAM 3.7  
 RED OAK, IA - 12.5 MPH ANNUAL WINDSPEED  
 400 kW/h PER MONTH WITH A MAXIMUM UOTPUT OF 825 kW/h PER  
 MONTH BASED ON HIGH AVERAGE WINDSPEEDS

## SOLAR HOT WATER

101 sq. ft. of water tubes  
 50% more than the recommended amount, however they will  
 not always be in 100% optimal conditions

## SOLAR HOT WATER

101 sq. ft. of water tubes  
 50% more than the recommended amount, however  
 they will not always be in  
 100% optimal conditions



## ON-SITE CONSTRUCTION

### FINAL DESIGN

THE PROJECT THEN WENT BACK INTO THE OVERALL MASTERPLAN TO SEE THE OVERALL EFFECT OF THE SITE LAYOUT COMPOSED WITH THE NEW INFILL HOUSING AND THE POTENTIAL PARK FEATURE TO THE WEST. THE SITE USES SPLIT GARAGES PLACED IN THE REAR ALLEY TO CREATE MORE EMPHASIS ON THE FRONT PORCH RATHER THAN THE GARAGE. THE PROPERTY SETBACKS WERE CHANGED TO 0' ON THE NORTH AND 20' ON THE SOUTH OF EACH PROPERTY TO ALLOW EACH PROPERTY OWNER THEIR OWN PRIVACY. WINDOWS ON THE NORTH FACADE OF EACH HOUSE ARE BOTH MINIMAL AND ABOVE EYE LEVEL SO AS TO NOT VISUAL INVADE THE NEIGHBORS YARD.



BASED ON THE SQUARE FOOTAGE OF THIS HOUSE IT WOULD HAVE A PRICE \$113,000 ON THE LOW END AND \$150,000 ON THE HIGHER END WITH ALL ADDITIONAL EQUIPMENT FOR ENERGY REDUCTION IN PLACE.

THIS PLAN WAS CREATED AFTER MANY REVISIONS OF ATTEMPTING TO CREATE A PLAN THAT HAD LITTLE OR NO HALLWAY SPACE. THE CIRCULATION SPACE IN MOST CASES IS TYPICALLY THROUGH ANOTHER SPACE SO THAT THERE IS NOT A TYPICALLY DEFINED HALLWAY OR CORRIDOR AND IN TURN IT OFFERS A LARGER SPATIAL FEELING BY NOT SEPERATING EACH PORTION OF THE HOUSE.

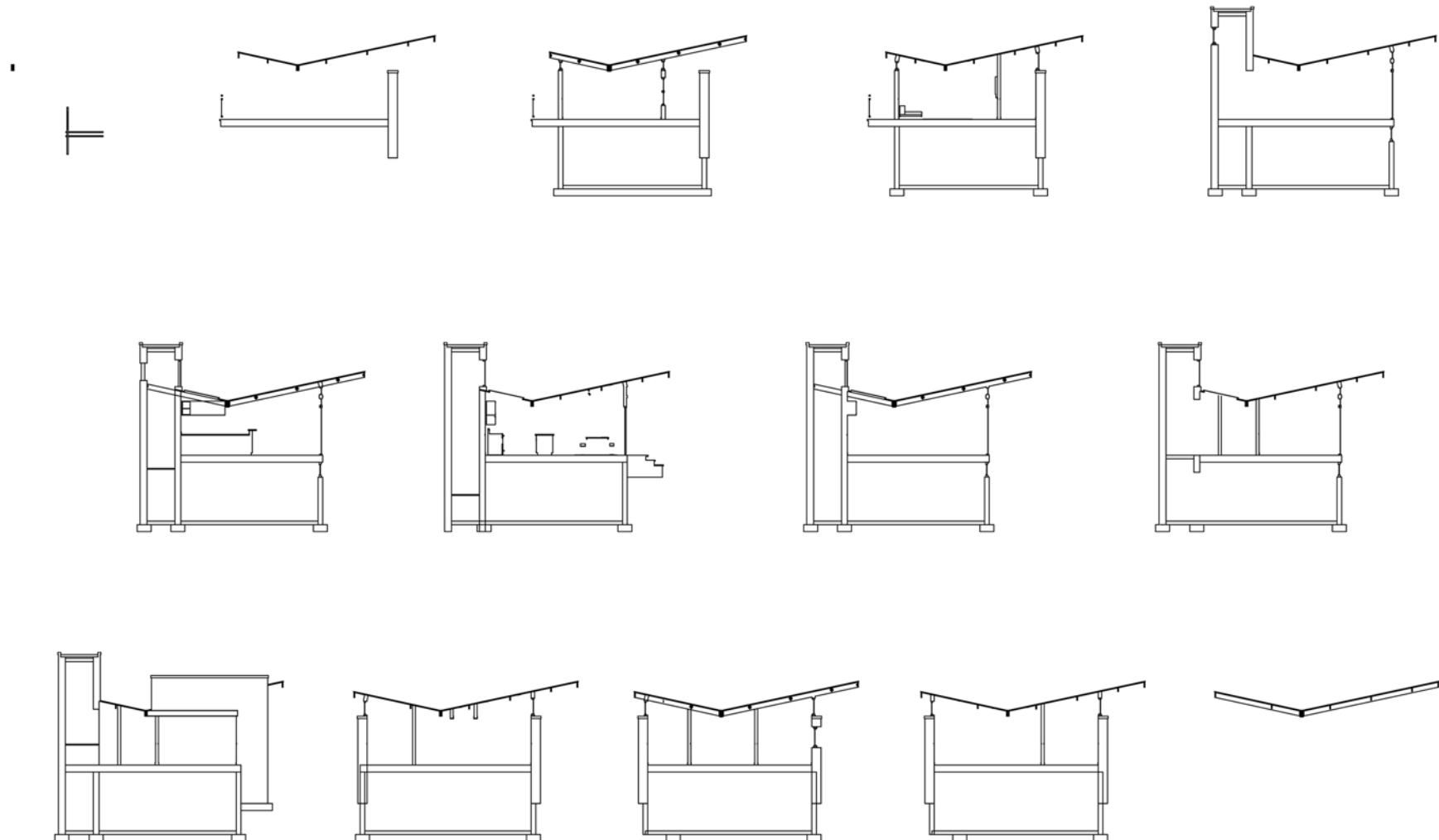
THE PUBLIC SPACE IS ALL SEEN AS ONE ENTERS INTO THE SPACE WHILE THE PRIVATE SPACE IS FURTHER BACK AND HAS A CLEARLY DEFINED ENTRY TO SIGNIFY THE CHANGE. WHILE FOR THE PUBLIC SPACE IT IS ALL TECHNICALLY ONE SPACE, THE CEILING STRUCTURE IS MANIPULATED TO SIGNIFY A TRANSITION FROM ONE SPACE TO THE NEXT.



ON-SITE CONSTRUCTION

FINAL DESIGN

SECTIONS TAKEN THROUGH THE SPINE HOUSE AS ONE PROGRESSES FROM THE FRONT PORCH AND THE PUBLIC SPACE BACK INTO THE MORE PRIVATE SPACES. [WEST TO EAST]

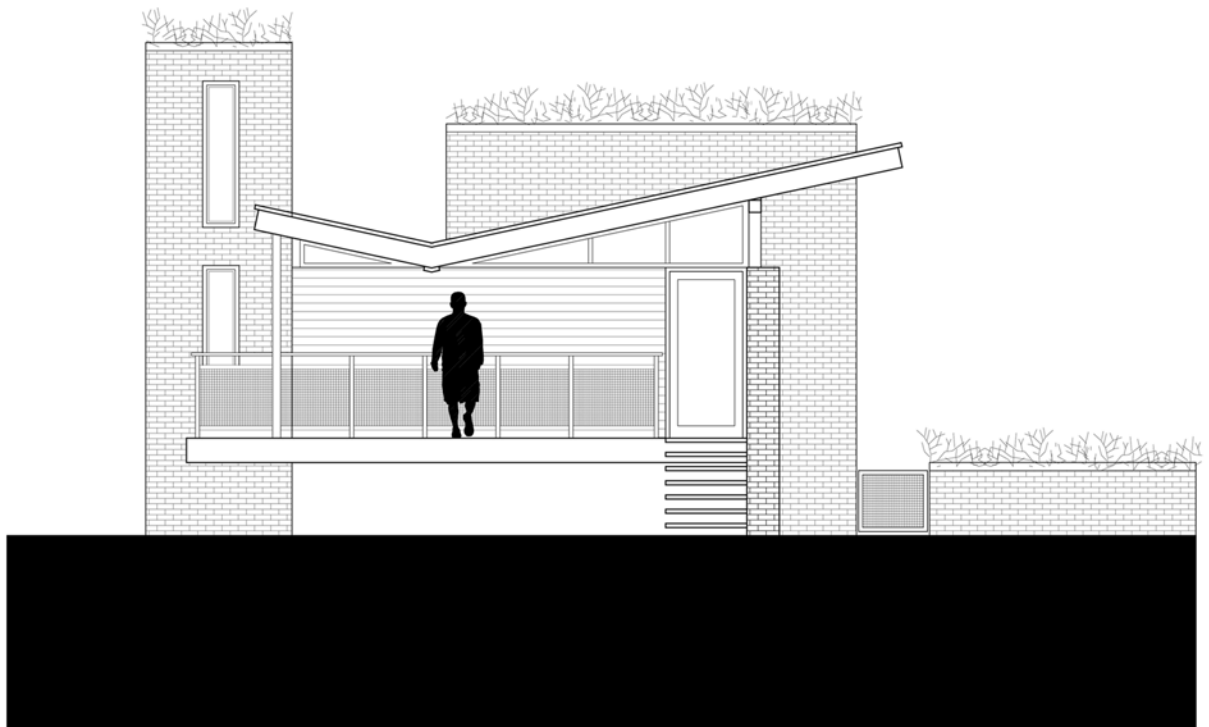




ON-SITE CONSTRUCTION

FINAL DESIGN

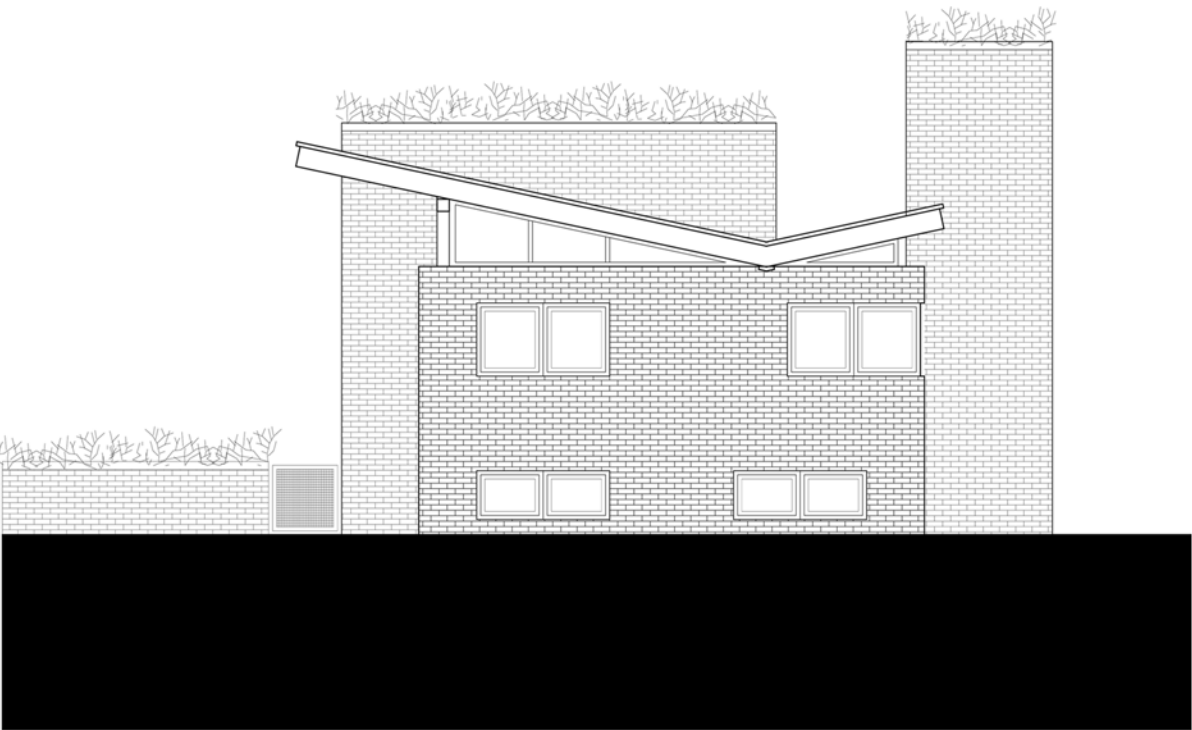
WEST ELEVATION



ON-SITE CONSTRUCTION

FINAL DESIGN

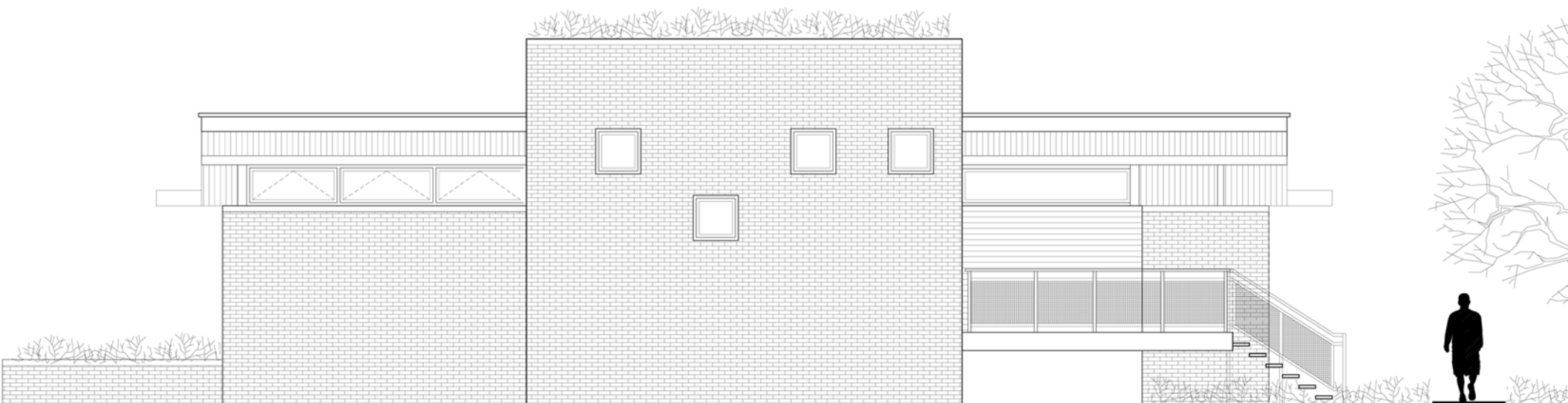
EAST ELEVATION



ON-SITE CONSTRUCTION

FINAL DESIGN

NORTH ELEVATION



ON-SITE CONSTRUCTION

FINAL DESIGN

SOUTH ELEVATION

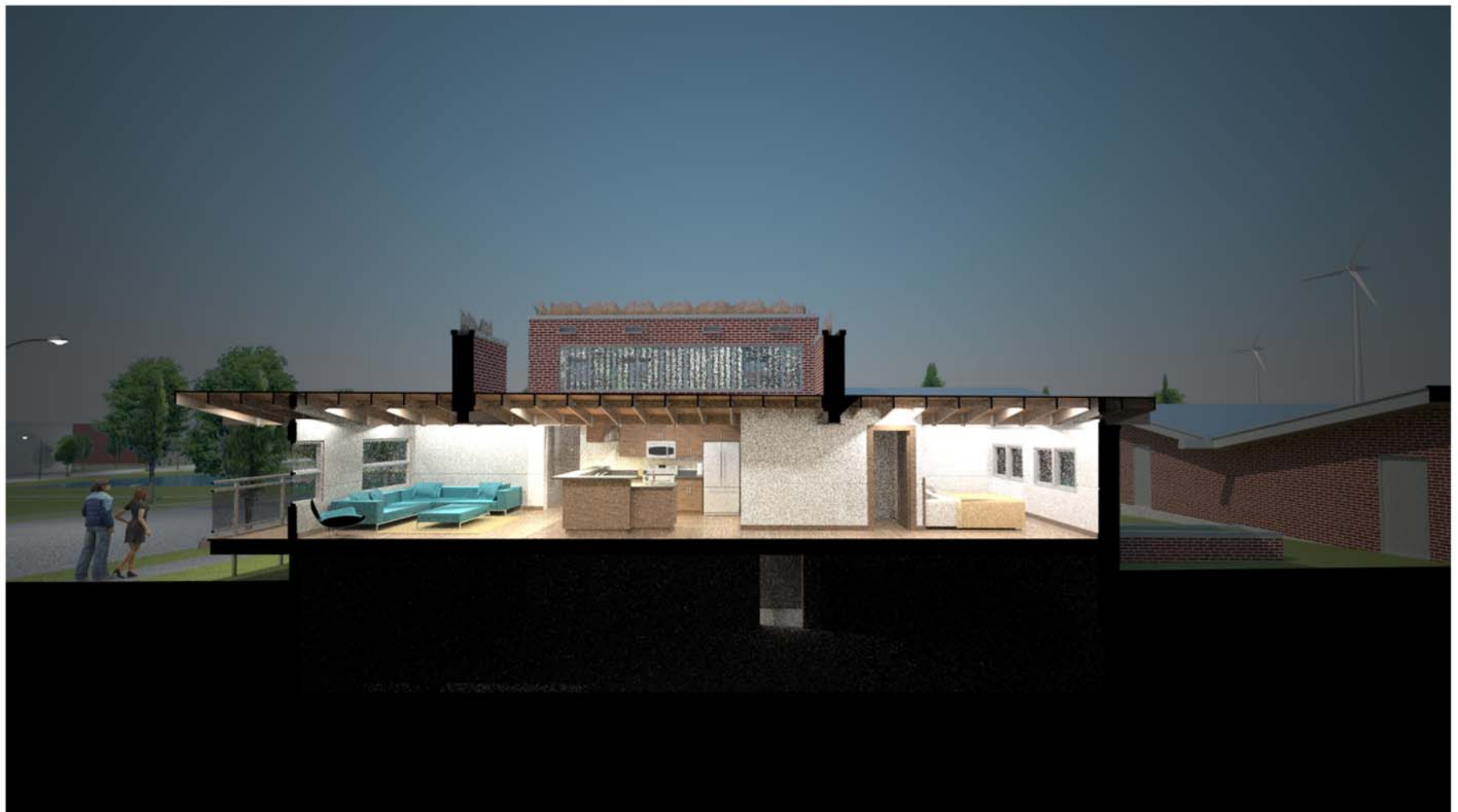




ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE SECTION LOOKING NORTH



ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE LOOKING EAST



ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE LOOKING SOUTH





ON-SITE CONSTRUCTION

FINAL DESIGN

FRONT PORCH PERSPECTIVE





ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE NORTHWEST FROM BACKYARD





ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE FROM ENTRY





ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE FROM DINING SPACE



ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE FROM LIVING ROOM





ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE LOOKING INTO KITCHEN

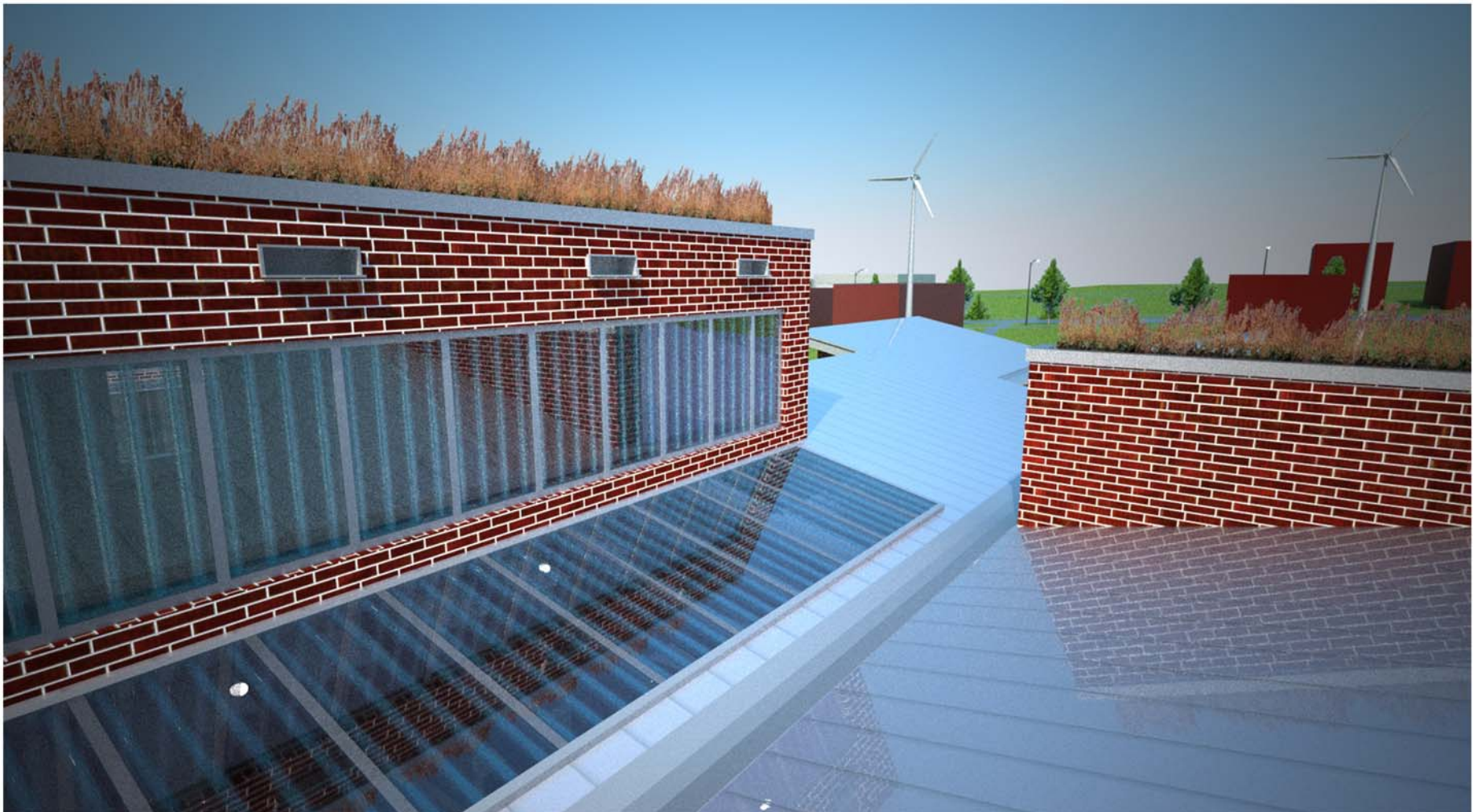




ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE OF SOLAR HOT WATER HEATER BUILT INTO SPINE



ON-SITE CONSTRUCTION

FINAL DESIGN





ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE SITE PLAN



ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE FROM FRONT PORCH





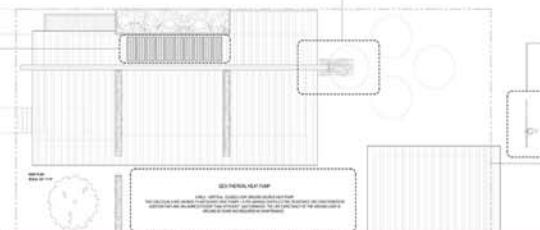
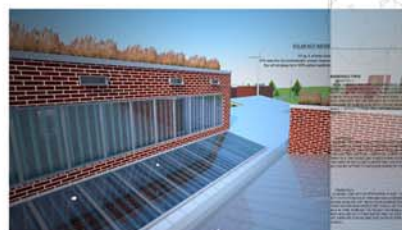
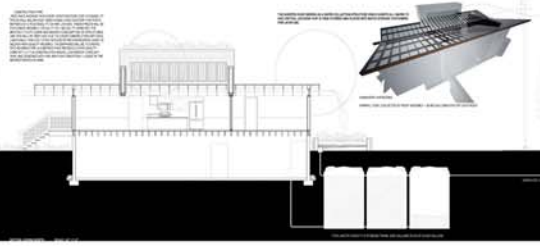
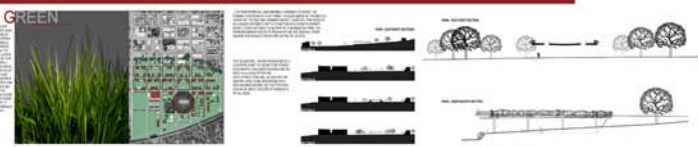
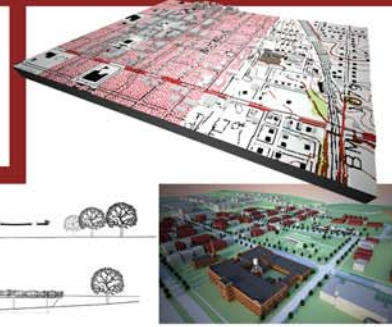
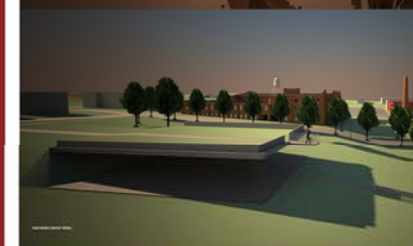
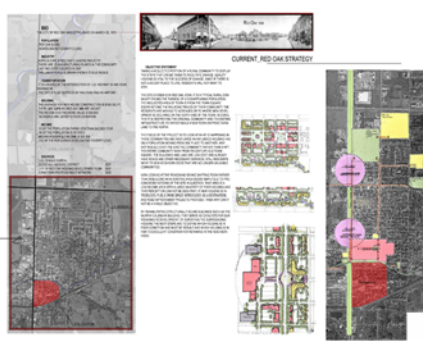
ON-SITE CONSTRUCTION

FINAL DESIGN

PERSPECTIVE OF OVERALL THESIS PROJECT







Upon the terminal project completion, and the final months leading up to that point, many things came to light. The terminal project did not necessarily become what was first envisioned upon the thesis proposal. The idea of working through every aspect of the initial desires of the project did not manifest itself in the final design solution. However, many other topics arose that were addressed, such as structural issues that conflicted with design issues. Everything can change and nothing is set in stone, but one change can produce a waterfall of change over everything else.

This terminal project essentially became three separate yet somehow cohesive projects. The first aspect of this project was the master planning and site analysis which led to changes in roads, landscape, and lot sizes. The analysis seemed to show that one neglected property can also set a chain of events that creates less desire to live near such a property and before one knows it, there are several neglected/vacant properties. It led to the recommendation that certain properties should eventually be replaced with new housing or live/work structures to rehabilitate the community. One of the most influential properties is currently under renovation in the middle of this deteriorating neighborhood and will help serve as a catalyst for the community. It will be renovated into a much needed assisted living structure which will change the needs of this specific neighborhood.

Run down light industrial buildings [both occupied and vacant] immediately border the east and west sides of this future assisted living home, and by relocating and removing these structures it opens up the potential for public park space for the neighboring households. A well maintained green space can have a much more positive effect on a residential neighborhood in contrast of a rusted steel warehouse.

So through this analysis a design and recommended location for green space was needed. This piece became the Link from the future residential proposal to the of the Murphy Calendar Building to the west. The residential proposal focus group is younger couples and singles, while the Murphy Calendar Building would be for the retired elderly community. So this green space would be common ground for both age groups to share and enjoy.

Feedback on the design solution for this idea was mixed, although it seemed to be a good idea overall, critics were unsure of the proposed solution to the green space. I saw it as something independent, and not as a space that should spend time reflecting on the past but geared more towards the communities future. However, this also seemed to be seen as a potential eyesore and to much of an individual piece if the residents would not buy into the solution. The argument that can counter this however is that how can one dislike something without ever experiencing such a space and its potential.

The housing also had similar issues with the surrounding context. With a large 3 story brick building across the park from the housing site, not to mention several existing homes intermingling throughout, how would the context be addressed. It was a long process of give and take to find a solution that was not architecture for the sake of architecture, but rather a sensitive response to the existing context. The residential piece has a very low profile, and although it does not match the identical roof slopes and front porch of existing homes, it does not overwhelm the existing homes nor does it scream that it is out of place. It does obviously have a different appeal than the existing houses, which is intentional, since obviously there is no desire for the current 300 vacant existing homes of the same style. The intention was to catch youths attention and give them an affordable community that has a newer context that what is already built in these rural cities.

With the terminal project ending it is intriguing to think about where the project began, the many paths taken that became dead ends, and where the project evolved to in the final months of production and design.

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