LANDFILL INFILL

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Senior Capstone

University of Wisconsin - Madison

LANDFILL INFILL

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A SENIOR CAPSTONE PROPOSAL

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I am here today because of all of you. On Wisconsin!

ABSTRACT

Quality housing and accessible public space shouldn't be a privilege. The de facto standard of single family houses with a yard isn't available to all, and the barrier for entry leaves something to be desired for those of lower economic means or those desiring community beyond the typical picket fence neighborhood. This site provides an opportunity to establish that not only can mixed-income housing be integrated into a community, but that it can also serve as a major asset to the community and the city at large.

Working with the City of Altoona, the goal of this capstone is to propose a new mixed-income housing development for the Windsor Forest neighborhood. In addition to the housing, the nearby capped landfill on which the site stands will be transformed into accessible, quality public space providing the adjacent community and Altoona as a whole with public open space for recreation, community engagement, and ecological sustainability.

This mixed-income development will set a precedent within Altoona and neighboring communities for quality, medium to high density housing which adds to the community, rather than detract from it. Along with this, it will highlight that former landills and similar brownfields needn't be barren, but that they can provide quality open space if designed with care in mind.

Figure 1.00 Treeline within project site

(Figure 1.01 - The Author)

THE AUTHOR

Hailing from Wausau, Wisconsin, I came to the University of Wisconsin - Madison following the footsteps of my brother and father before me. I transferred into landscape architecture after my freshman year, following an eagerness to find a subject which I was truly passionate about. That passion was fostered from a young age, with countless memories of the childhood gardens which I helped my father create. Love for nature, design, and art are all values which I hold dear.

I am grateful to have found landscape architecture and to have the opportunity to make a positive impact on the world through my work.

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Department of **Land**scape **Arch**itecture

Fall 2020

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Figure 1.02 Altoona Water Tower

INTRODUCTION

To fulfill the requirements of the Senior Capstone Program in the Department of Planning and Landscape Architecture at the University of Wisconsin-Madison I will investigate how ideas of community psychology may inform the design of neighborhood master plans. This investigation will be given context and focus by the concerns and goals of Altoona's City Planner Joshua Clements, which include placemaking, public space, and planting design. The area including and surrounding the capped landfill in the Windsor Heights neighborhood of Altoona, Wisconsin will be the site for this study.

RESEARCH TOPIC: COMMUNITY PSYCHOLOGY

The role of community psychology in placemaking and community building are at the core of this project. Community psychology is concerned with the relationship between the built/natural environment and it's users, specifically how one influences the other. This is important to note when working on a project such as this given the project is developing small scale neighborhoods with attached open/green space. Creation of community is key in order to best integrate the project with the surrounding neighborhood.

New Urbanist developments are focused on the human scale, highlighting the connection between built environment and the social outcomes of a space. Placemaking is another key aspect of a successful design as it combines both that which is (built enrivonment) with that which isn't (experience). In general, placemaking is the process by which a space (our site) becomes a place, specifically a place which has emotional appeal, provides desire to return, and elevates itself beyond a passover space. With pragmatic placemaking at the forefront of the design process behind these developments, the focus shifts from raw housing output to a more holistic view of neighborhood building from the ground up. In a comparison study done by Kim and Kaplan two neighborhoods, one New Urbanist and the other a traditional suburb, were measured by their members on ratings of community and attachment to elements therein. Overwhelmingly the New Urbanist community won in measures of community satisfaction, place attachment, and social interaction. Of these measures, place attachment seems the most nebulous at its surface, owing in part to its relation to placemaking. Place attachment can be interpreted as the emotional bond which one forms to a space which they visit or live, built upon their day to day experiences and the memories formed theirin.

Prioritizing New Urbanist principles within the planning development for this capstone is integral, as it will cement the new development within the greater neighborhood and foster a lively community. Given the site has constraints on building over the existing landfill, two main zones of development appear: residential and open space. The transition from one to the next should seek to emulate what Quayle and Lieck describe as a 'hybrid landscape'. These are spaces which embody the in-between of the pure built and pure natural environment. The tandem processes of community building through New Urbanist ethos and the creation of public open space programming will help to integrate this new development into the area and serve as precedent for future developments within Altoona.

TYPE OF PROJECT: MIXED INCOME HOUSING DEVELOPMENT

The City of Altoona is located within Eau Claire County, in the Northwest part of Wisconsin. The site is roughly 22 acres, 16 of which is a former capped landfill, with the remaining space partially forested. The city itself owns the capped landfill and much of the surrounding plots of land within the Windsor Forest neighborhood. Joshua Clements and the city of Altoona's planning department is looking for ideas for how to revitalize the landfill in addition to creating affordable, mixed income housing on the site. In addition to the houses themselves, this project includes infrastructure such as roads, parking, and multi-purpose buildings for use by the community. Given the lack of public green space for the southern half of Altoona, revitalization and formalization of the landfill site is a priority. By implementing New Urbanist ethos within the developments in addition to formal green space such as trails, open lawns, and pollinator gardens, Altoona hopes to foster community building in and around the site.

PROFESSIONAL FOCUS

Altoona has undergone significant growth as a city within the past decade, placing it as the second fastest growing city in Wisconsin as of 2010. With a large proportion of young, emerging professional population there is a growing need for affordable housing for those just entering the housing market. In addition to new professionals needing housing, there is a significant portion of the older population looking to downsize. The professional focus of this project, which will focus on placemaking and housing design, will aid both populations. In addition to this, other goals include the greater recreational opportunities, community building, and health-promoting environments. By embodying these goals, this new development will help Altoona to accommodate its new growth while implementing forward-facing design.

CAPSTONE PRODUCTS

The products of this capstone will include a set of design documents and recommendations for the Windsor Heights landfill site, which will be submitted to Joshua Clements, and a capstone document, which will be submitted to the Department of Landscape Architecture in partial fulfillment of the degree of Bachelor of Science in Landscape Architecture.

Figure_1.03 Windmill On Site

PROJECT WORKFLOW

The following workflow diagram depicts the time frame and process which guided my work over the course of this capstone. While the timeline itself is chronological, there is interplay from one step to the next as design is inherently iterative.

The diagram can be split into two parts, with the first semester being dedicated to defining the projects goals and performing initial analysis of the site and its surrounding community and region.

The second semester takes the base materials and analysis from the previous to develop and polish a final design for the project, ultimately producing a series of plans, renderings, and construction documents.

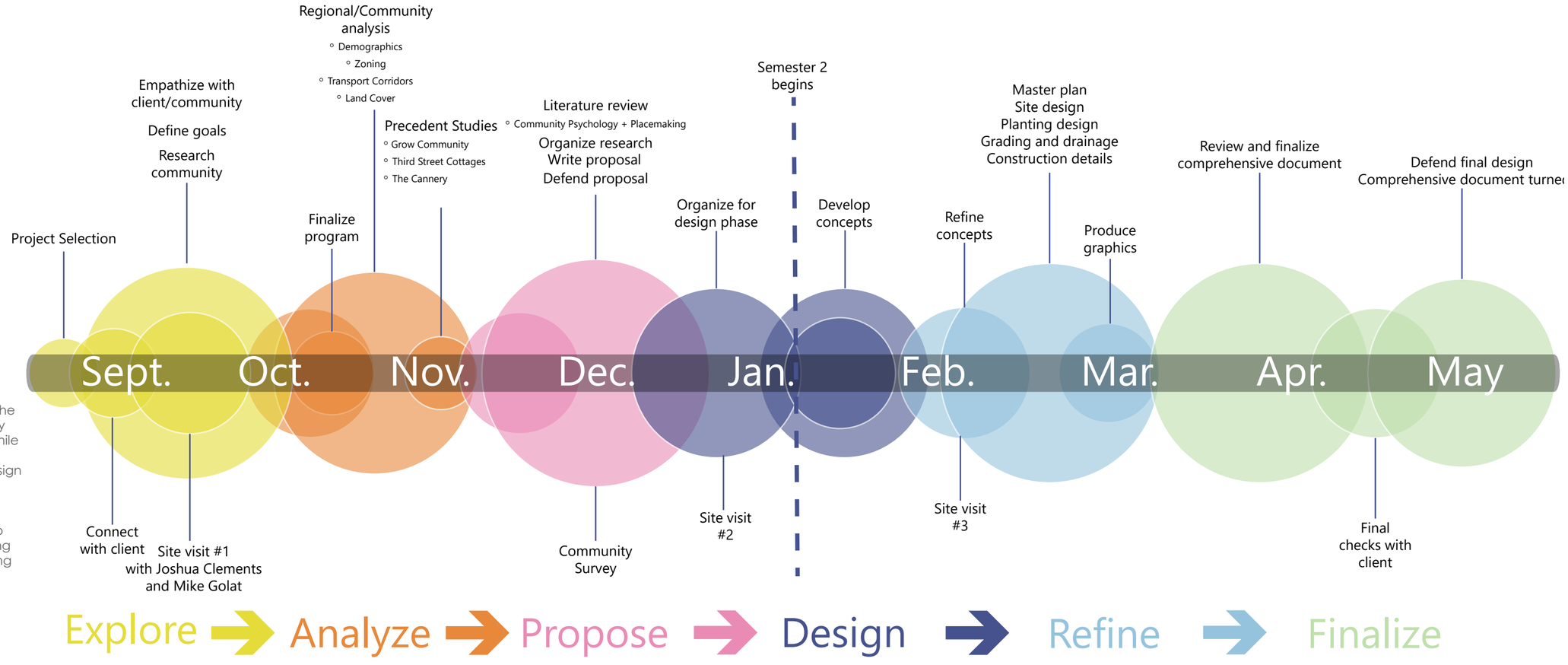


Figure 1.04 Workflow Diagram

PROJECT CONTEXT

Altoona is located within Eau Claire County, Wisconsin. The city has a land area of **4.98 square miles** compared to Eau Claire County's 645 square miles. Eau Claire county is located in the Northwest area of Wisconsin. The city itself lies adjacent to the **Chippewa River** as well as **Lake Altoona**. Altoona lies due east of the city of Eau Claire. Both Eau Claire and Altoona sit at the confluence of multiple major highways for the region including US-53, US-12, and I-94. Of these, **US-12** is of importance to this project given that it separates the site from the remainder of Altoona posing issues for connectivity with the broader Altoona community.

In recent years Altoona has experienced continual population growth, lending credence to this capstone's focus as affordable, **mixed-income housing** becomes ever more necessary with a growing population.

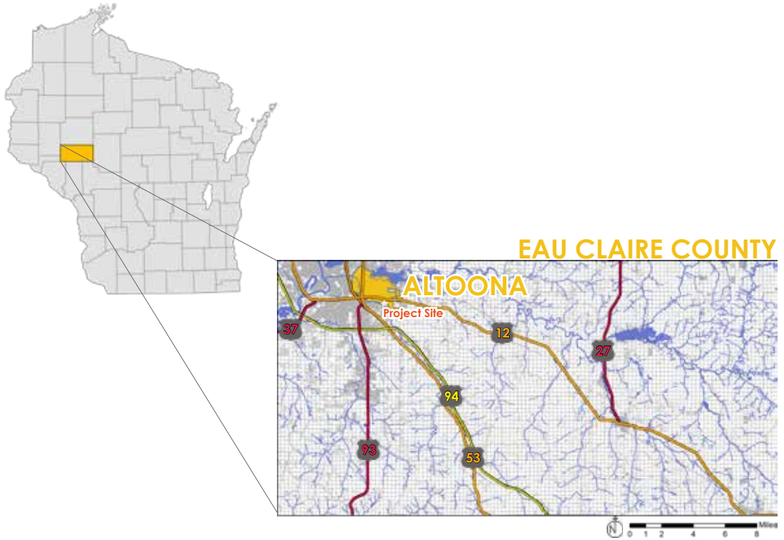


Figure 1.05 Context Maps of Altoona

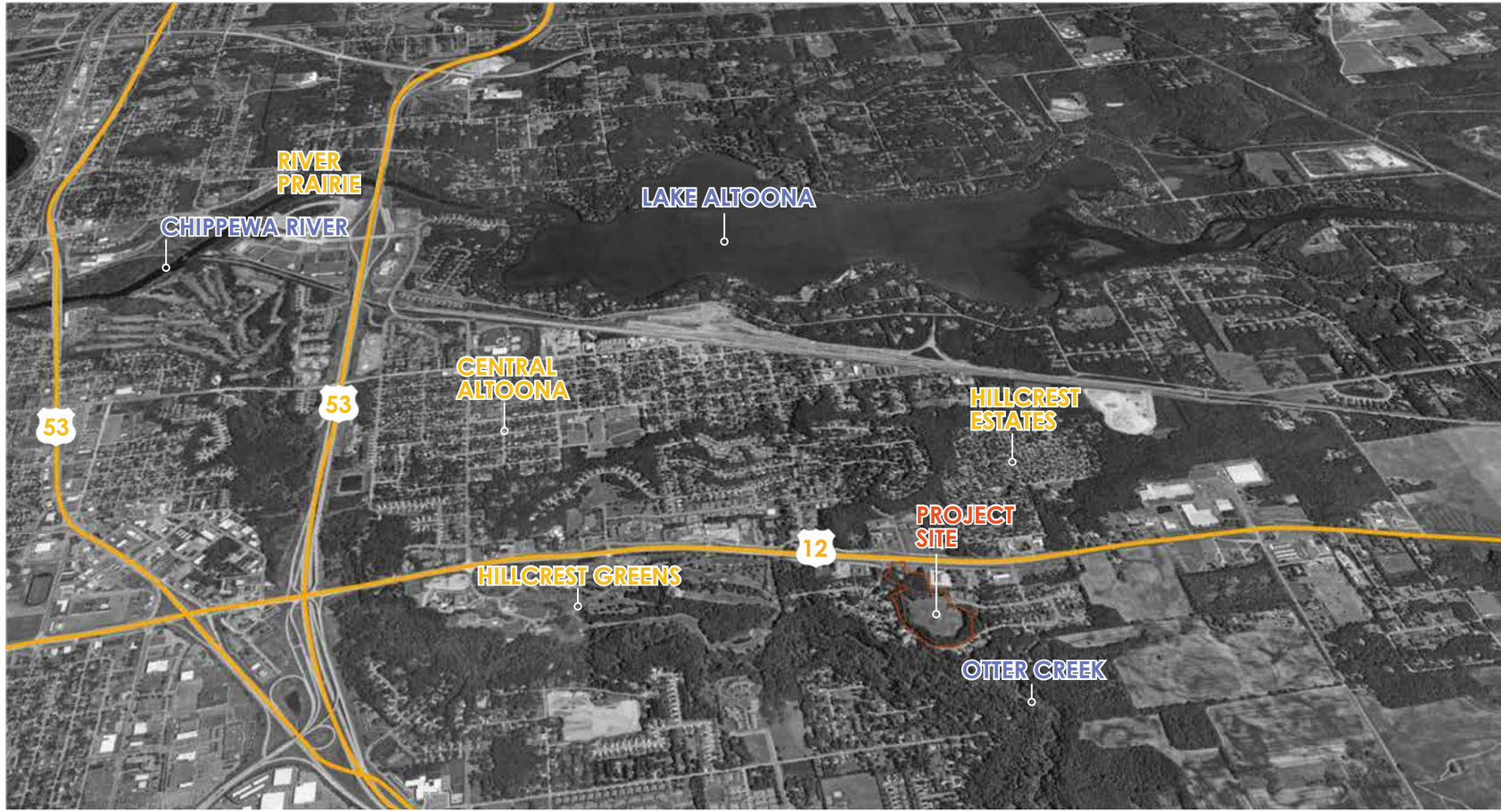


Figure 1.06 Altoona Overview

HISTORY

FIRST NATIONS

The land which is now Eau Claire County originally was inhabited by two separate Native American tribes, the Ojibwe and Dakota. The two tribes were often in conflict within this area. The land was ceded by both tribes in 1837.

BEFORE

Before Altoona, there was Eau Claire. Sat the confluence of the Chippewa and Eau Claire River, the city began around 1855. Its population skyrocketed surrounding a boom of white pine harvesting within the region. With easy access to the rivers, the logging industry took off. Increases in tech coincided with further increases in population, with the steamboat bringing new residents to the city . In 1870, with the advent of the railroad, logging continued to be a lucrative business with saw mills being founded near the confluence of the two rivers. The railroad allowed logging to continue all year round, as opposed to the mainly wintertime practice which it was due to practice of rolling the logs onto the ice, then waiting for the thaw to transport them downriver (Walz)

EAST EAU CLAIRE

The City of Altoona recieved its charter in 1887, however the events which led to its founding began in 1824. By this time, the railroad had reached Eau Claire and established itself. Smaller villages surrounded Eau Claire including Eau Claire City and North Eau Claire were recently incorporated into what we now know as the City of Eau Claire. One village was left out of this however, East Eau Claire where Altoona now lies (History of Altoona). At the time the area was barren, four miles East of Eau Claire. In 1874 a telegraph station was established, paving the way for what was yet to come. In 1880 officials from the railroad sought to find a division point between Elroy, WI and St. Paul, MN. The land which they chose would become Altoona, though at the time it was known as East Eau Claire. In 1881 the land had were beginning to be built. 1883 a post office was established in East Eau Claire. As the city continued to grow the locals began to use the name Altoona as it reminded them of the Altoona, PA railroad yards (History of Altoona).

In 1887, the city of Altoona was granted its charter by the state legislature. Now that the division point had been established, the railroad attracted other business. "Saloons, taverns, general stores, livery stables, a blacksmith shop, shoe repair shops and a number of barber shops soon followed," (History of Altoona). The city would continue to grow its base, with the plentiful lumber and abundant labor houses began to spring up. In 1892 a three room school was erected, this would continue to grow to support K-High School.

As time would go on Altoona would begin to slow. The establishment of quality roads to Eau Claire in the early 1900's led to more shopping being done there than Altoona leading to a dwindling local economy (History of Altoona). The railroad began to decline, with fewer and fewer employees still on payroll. "After World War II the town fell on quiet ways. Taxes were low because few improvements were made and the citizens seemed content ot leave things as they were," (History of Altoona). This stagnation would continue up until 1959, where a building contractor and a realtor Hans Solem and Chick Feather respectively, formed the Hometown Development Corporation. Their purchase of 112 lots within Altoona kickstarted a residential boom which would continue until the 70's.

Figure 1.07 Altoona Train

Figure 1.08 East Eau Claire Terminal

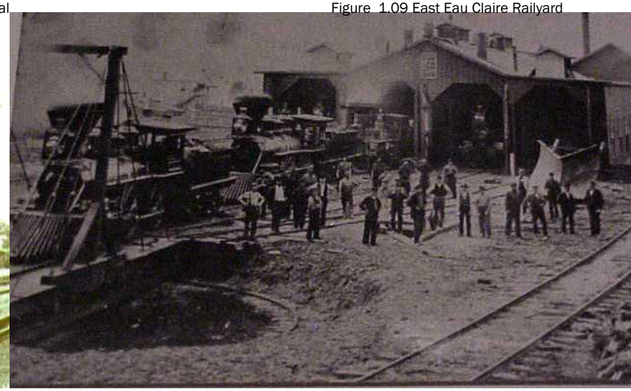


Figure 1.09 East Eau Claire Railyard

PROJECT GOALS

Goal 1. Create a mixed income, mixed size housing development

- The main goal for this project is the creation of a housing development which caters to a variety of incomes and consequently to a variety of housing types. These housing types will consist of the so called 'missing-middle', structures which are neither the typical detached single family house which pervades Altoona nor highrise apartments which wouldn't fit within the locale.

- This development will be built around site programming which will create community both within the development while also inviting the adjacent housing developments within the neighborhood to participate and engage through the associated green spaces located in the landfill section of the development.

Goal 2. Utilize existing and new trail systems to further community

- By integrating pedestrian footpaths within the new development to existing path connections throughout Altoona the development will serve as a node along the greater Altoona path system. This will encourage and facilitate walking as an activity by providing attractive open space as a destination while also giving direct access by the community to an area suited for community-oriented programming such as farmer's markets, movies in the park, etc.

- The paths within the site will be multi-seasonal to activate the open space throughout the Winter. Accessibility via ADA standards will be upheld to encourage use by all members of the community.

Goal 3. Create open space for Southern Altoona

- Given the divide between Northern and Southern Altoona via US-12, accessible open space for the Windsor Forest neighborhood where our site is located is limited, save the existing site which remains undeveloped and lacking in any formalized programming.

- In addition to creating a space which is desirable to the community, the ecological importance of the site will be upheld and celebrated both through preservation of the existing forest where possible. In addition to preservation, native plants will account for 75% of the the new plantings within the open space. Of these, special care will be taken to care for pollinators and native species.

Goal 4. Integrate existing landfill infrastructure into design aesthetic

- Left on its own, the existing infrastructure surrounding the capped landfill's gas maintenance is unsightly and sticks out. Throughout the design for the open space of the site as well as the housing development, care will be taken to integrate the aesthetics of the above ground infrastructure in a manner which is aesthetically pleasing.

- In addition, site details and material palette will reflect the sites original use as a landfill in a positive light, emphasizing recycled materials as a source of inspiration and art rather than an eyesore.

PROJECT CONCERNS

Concern 1. Providing affordable, higher density housing which integrates into adjacent neighborhood

This project breaks the norm for housing infill within Altoona, with a push for higher density comes pushback from:

- Breaking precedent/Norms
- NIMBY-ism

As such there needs to be a consolidated effort to provide a design which prioritizes affordability without sacrificing aesthetics and perceived quality. From the first meeting with my client, the phrase ,"develop up not out" was floated as a general design ethos. Given the rise in population, notably young professionals and 'empty nesters' within the area, a shift in perception surrounding medium to high density housing must occur within the minds of local Altoonans.

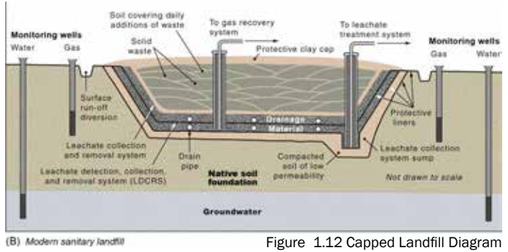
Figure 1.10 Altoona Low Density Housing

Figure 1.11 Proposed Higher Density Housing

Concern 2. Constraints imposed by developing adjacent to and on a capped landfill

Development on and around capped landfills requires diligence so as to not disturb both the infrastructure surrounding the landfill and its gas venting, but more importantly not to pierce the cap itself, which consists of layers of compacted dense soil over the waste itself.

The landfill's extent within the site limits the available space for development of housing to mainly the Northern forested area. In addition to issues surrounding the cap, all existing infrastructure must be maintained and accessible by foot for yearly measurements and maintenance. This includes a series of vents, wells, as well as the central pump station located within the center of the landfill.



(B) Modern sanitary landfill

Figure 1.12 Capped Landfill Diagram

Figure 1.13 Existing Landfill Infrastructure

MIXED INCOME HOUSING DEVELOPMENT

When dealing with a neighborhood which caters to a variety of incomes, you must consider the clientel to which you are catering. Altoona has experienced and continues to experience growth in its younger demographics. These young professionals place developments which cater to multiple income levels at high demand. They aren't the only ones however, according to the census bureau, 47.5% of Altoonans are "rent-burdened" meaning that they pay greater than 30% of their income towards rent.

The stigma surrounding affordable housing is difficult to shake; the knee jerk reaction is often NIMBY-ism for fear that proximity to such a development will lower property values. In general, there is a lack of thought in design surrounding neighborhoods. With the lion share of houses in Altoona being single family detached homes, it is to the developers glee that simple grid patterns emerge. While they do provide every house with a lawn, they lack a feeling of community.

New Urbanism is one answer to this problem. New Urbanism is a design ethos based around a few central tenets, notably (Congress for the New Urbanism,2) :

- "Neighborhoods should be compact, pedestrian friendly, and mixed-use"
- "Within neighborhoods, a broad range of housing types and price levels can bring people of diverse ages, races, and incomes into daily interaction, strengthening the personal and civic bonds essential to an authentic community"
- "A range of parks, from tot-lots and village greens to ballfields and community gardens, should be distributed within neighborhoods. Conservation areas and open lands should be used to define and connect different neighborhoods and districts"

Within this project, in order to create a development which caters to both the young professionals, those of low socioeconomic status, and all others within Altoona, effort must be made to create a community which provides adequate housing for all of these needs. The creation of such a development coincides with that of a network of green spaces to connect and encourage users to interact with one another. The green spaces will cater to a multitude of interests, including walking, relaxing, and recreation.

Figure 1.14New Urbanist Plaza

Figure 1.15 Alexandria, VA

PLACEMAKING/HOUSING DESIGN

Placemaking is a topic which most understand intuitively however enacting it within a design requires forethought and understanding of both the site and the user. Placemaking is the process by which a space becomes a place. While this may seem semantic, it is a process through which design can either make or break a project. To go from a space to a place, there must be emotional attachment to some aspect of the space. Whether it be simply living there for a time and accruing memories or by the creation of a daily habit which involves the space, the user has the final say whether they are currently in a space or a place. This process takes time, and new developments must work to establish themselves to ease into the community and make the creation of memories and habits seem natural. Within this project, placemaking will occur for both those who live in the development as well as those who pass through its open space. Creating intrigue surrounding the space, whether through bright colors, interesting program elements, or community activities will help to cement the new development within the communities psyche and usher forth placemaking.

Drawing from the New Urbanist's desire for walkable neighborhoods, the choice in housing plays a large role in whether such activities occur or not. One method by which this is achieved is the so called 'missing-middle' housing. This class of house is somewhere between low density and high density, providing more neighbors without feeling cramped. These include: multiplexes, townhouses, cottage courts, bungalows, and more. All of these share a common thread of fitting into an existing residential neighborhood seamlessly while providing a more affordable and, for some, attractive option to the typical detached single family home. This will play a large role within this capstone as my site's size constrains the options to consider when looking to provide affordable housing. Missing middle class homess fit that gap perfectly, providing the means to a walkable neighborhood which builds community without sticking out within an existing low-density residential neighborhood.

Figure 1.16 Missing Middle Housing

Mixed-Income Housing

The housing development on site provides affordable and diverse options to suit varying demographics, most notably young professionals and those looking to downsize, so called 'empty nesters'. The organization of the homes will depend on the size and type however as a general rule a push for 'pocket neighborhoods' has pervaded discussions of the project from the beginning. Pricing will vary, as a percentage of the total dwelling units will be low income in addition to those which are market rate.

Figure 1.17 Townhouse Row

Figure 1.18 Bioswale

Traffic Infrastructure

In order to facilitate the creation of the new neighborhood, roads will need to be constructed on site to provide EMS access as well as allowing day to day traffic. A thoroughfare will be installed connecting the court on Saxonwood Road on the east to Nottingham Way to the west of the site.

In addition to the streets themselves, parking will be installed throughout the site in a variety of formations, suited to the number of dwelling units in any particular pocket neighborhood.

Trail Systems

By formalizing a set of trails within the site as well as connecting to nearby ecological features such as Otter Creek the site itself will gain a greater level of use by passersby as well as the community at large. Effort will be made to make these paths ADA accessible as well as multi-seasonal so as to activate the space even during the Winter months.

Within the housing development itself the path system will work in tandem with open lawns and public areas to facilitate casual meetings between neighbors.

Figure 1.19 Trail System

Figure 1.20 Community Garden

Public Art

Rather than shy away from the sites former use as a landfill, integrating public art which prioritizes and reframes recycled materials as art helps to establish a unique site identity. Several possible uses include: the use of piping to create vertical planters and birdhouses, gabions with recycled materials for color as seating and site dividers, and integration of recycled materials into the palette of the facades of the building development.

These features would help to orient the site as a positive addition to the neighborhood, rather than a low-cost development on tainted land.

Figure 1.22 Green Infrastructure

Community Gardens

Serving to not only provide a source of healthy food within the community but also as a source of community engagement both within the development itself but also with surrounding housing community, gardens help to establish the site.

Introduction of compost bins to reduce waste within the development will provide compost for use within the garden. During an initial site visit there were multiple piles of discarded organic waste from gardens located within the woods going to waste. This addition seeks to solve that issue, keeping woodland paths pristine while furthering the garden's productivity.

Figure 1.21Recycled Art

Green Infrastructure

Integrating both ecologically sustainable elements such as pollinator gardens and bioswales as well as more environmentally savvy elements like solar roofs provide benefits to users and fauna alike. The capture of rainwater for use as grey-water and to more generally reduce runoff helps to reduce the sites ecological footprint.

Integrating pollinator gardens will help to not only increase the aesthetic appeal of the open space but also to foster bird habitat and bee populations.

LITERATURE REVIEW

Research Topic

The focus of my research this semester will be community psychology with a focus on placemaking and community building. Community psychology is akin to Environmental psychology in that it focuses on the relationship between environments, built or natural, and their effects on the user's enjoyment and ease of use within a space. This will include the social, built, and ecological characteristics which facilitate ties within a community. I will be exploring placemaking as well as how neighborhood layouts can facilitate social ties and associations with place.

Moura Quayle, Tilo C. Driessen van der Lieck. (1997, November). Growing community: A case for hybrid landscapes. Landscape and Urban Planning, 99-107.

This article highlighted what are coined "hybrid landscapes" which combine the design and maintenance of public parks with the intimacy which comes from small scale appropriation and embellishment of individual yards. The article goes on to describe some of the common predictors for community satisfaction, notably: objective housing quality and subjective neighborhood quality, ease of access to nature, and home ownership. Neighborhood quality isn't measured by the same metrics by which one would consider housing quality as it is more focused on the experiential aspects of living, such as the memories and social connections built by living in a space for a long period of time. The authors note one discrepancy in their findings, that there is a split decision on social interaction as a measure of community satisfaction. Some report that the absence of local social interaction as a positive whereas others place a far greater emphasis on the social element over the built environment. One interesting comparison was of the dichotomy between front and backyard in a typical suburban environment. The front yard is the "nurtured pedigree" with "high value in the public mind as an expression of care, aesthetic value, and civic spirit" where the homeowner affirms their membership in the community through their adherence to these standards. The backyard presents itself as a more free form expression of individuality, where programming isn't as strict nor as publicly available. It is through this dichotomy that the articles main example is presented.

A greenway, as described, is composed of a central core which functions as the groomed space similar to the front yard. Within it, programming allows for a variety of social opportunities, from large scale spaces catering to farmers markets to very intimate spaces for one on one spaces for one on one communication. Important and different from the typically manicured work of landscape architects in urban settings, surrounding this core are areas devoted to "messier" landscapes. These areas entice the users to explore and more importantly to change the landscape. Such spaces aren't exclusive, though they may cater to nearby uses within the community such as a daycare or a senior center. One caution which the author makes in the creation of such a space is the fine line between 'messy' and 'unkempt', these spaces require a certain level of care lest they exceed their bounds and encroach on the 'front lawn'.

This article provides an interesting viewpoint on which to base community outreach and the design process. It is useful with its focus on the separation of more formal and informal areas of programming and how each feed into the greater experience of the space. Ultimately, the site will have elements which will make it fit the description of a hybrid landscape. To this end, this article will be helpful in informing some of the design decisions on where the formal vs. informal zones will lie and what forms they take.

Xiangqiao Chen, Jianguo Wu. (2009, April 09). Sustainable landscape architecture: implications of the Chinese philosophy of "unity of man with nature" and beyond. Landscape Ecology, 1015-1026.

This article examined the cultural traditions of landscape ecology and sustainability through the lens of classical Chinese landscape tradition. The authors bring up three main tenets, the first and overarching is that of the harmony between man and nature. A distinction is made that such landscapes ought not to return outright to their 'natural' state but rather to take from nature to go beyond into a more symbiotic relationship. The second tenet is that of the peach blossom spring ideal, wherein the users connect with nature by minimizing interactions with the outside world, facilitating a closer bond to the environment in that moment. The third and final tenet which they espouse is that of the world in a pot model. Historically, landscapes used as examples for this model were on much larger often regional scales where the surrounding mountainsides flanked the main valley, highlighting its various ecosystems and niches. The authors apply this to a much smaller scale, attempting to showcase the imagination and expression of nature's various forms in a limited and otherwise enclosed space.

In addition to these principles, the authors highlight three functions which must be considered in designing a landscape which creates harmony between its users and the site itself. First, the production of goods and services which can generate economic benefits lends itself to a mutual relationship between the two parties. Next, the creation of life enriching activities within the landscape whether they be more formal buildings designated for community use or informal spaces for recreation. Finally, ecological conservation through sustainable practices. As with any landscape architecture problem, how one defines sustainability is vastly important. Within this context, sustainability deals with material culture, stormwater, and the creation of forward-facing spaces for generations to come.

This article is the most disconnected from its more urban-planning counterparts however it provides an interesting overarching set of themes, such as creating self-contained moments in nature to disengage from the daily hustle and bustle, on which to base analysis and later designs. Where other articles focus solely on the social aspects of community building within the built environment, this article focuses largely on the natural environment itself. It is a good resource in that it breaks the designer away from the Western 'man v. nature' stereotype, one which pervades landscape architecture within more urban settings, and instead focuses on a more symbiotic relationship akin to biophilia. This integration of landscape and built environment will emerge through community programming as well as site layout, through green corridors and sight lines.

Joongsub Kim, Rachel Kaplan. (2004, May 01). Physical and Psychological Factors in Sense of Community: New Urbanist Kentlands and Nearby Orchard Village. Environment and Behavior, 313-340.

This article compared a New Urbanist neighborhood to a traditional suburb, focusing on the communities formed within. The research looked at four domains on community building: attachment, identity, social interaction, and pedestrianism. The first two domains have a decent amount of overlap, with many responding that their attachment to a community is largely in part due to the inherent identity of that place. Social interaction and pedestrianism have some overlap as well. The blend of formal and informal social interaction lends itself to community building, both through the general sense of friendliness of an area but also due to specific friendships which form between neighbors. Pedestrianism looks at the environment through the lens of a walker: whether amenities are close by and how the design of the paths influences or dissuades walking.

In comparing the two communities the results favored the New urbanist development, with some caveats. Overall, the shift in architecture to more dense housing with a greater emphasis on public open space lent itself to greater community engagement and subsequent feelings of attachment. The built details such as the prevalence of porches, short setbacks, and narrow roads also aided this community. Some interesting findings within this study were that of the four domains studied, social interaction ranked last in both cases, though a subcategory of this study was relationship to neighbors in which the opposite was true with a large proportion reporting this as an important factor to their community involvement. In discussing the findings the authors didn't simply tout the findings of the New Urbanist neighborhood as an absolute win over the traditional style, given that their findings revealed those who lived in the traditional neighborhood favored greater privacy and larger lot sizes.

This article will be key in presenting the project and reaching out to the community for this project. Given the client has voiced a desire for pocket neighborhoods and more generally for New Urbanist neighborhoods this analysis will be influential in picking and choosing which elements of New Urbanism to focus on during the outreach portion of capstone as well as the design phase. Building on and reframing the sites identity as a former landfill will be key to create a space which is viewed in a positive light, rather than a gilded waste site. The domains of community building will serve as starting points during the design phase through spatial diagrams to map identity/attachment as well as wayfinding and pedestrianism.

PRECEDENT REVIEW

Precedent review is an important part of the design process. By examining past works which have successfully dealt with problems similar to this project, the designer can borrow elements and practices to better their work.

The following precedents deal with the formation of housing developments which place community and sustainability at the heart of their ethos. Ranging in scale from 8 homes to 550, the core tenets in each of these projects remains at the heart of community building.

Both Grow Community and Third Street Cottages follow the idea of a 'pocket neighborhood', based around communal spaces to encourage community interaction both in planned events as well as day-to-day passings by.

Sustainability is a common thread throughout these precedents, often within the realms of material culture and integration of green practices such as stormwater capture and solar energy. Grow Community has aimed for the lofty goal of zero carbon emissions as a driving force through their design choices. The Cannery has placed the energy needs of the community as one of their main focuses, with 100% of the energy needed for the site being produced via an array of solar photovoltaic panels as well as rooftop panels. Both Grow Community and Third Street Cottages have emphasized local materials and sustainable building practices within their developments.

The holistic approach which these three communities base their designs upon creates a cohesive network of homes which are oriented towards the user, both in terms of community building as well as peace of mind that their impact on the environment is minimized.

Grow Community

Location: Bainbridge Island, Washington
Project Type: Intergenerational residential community
Size: 2.75 acres
Client:
Designer: Davis Studio Architecture + Design
Completed: 2014

Figure: 1.23 Grow Community Cover

Third Street Cottages

Location: Langley, Washington
Project Type: Pocket Neighborhood
Size: 1 acre
Client: City of Langley
Designer: Ross Chapin Architects
Completed: 1998


Figure: 1.24 Third Street Cottages Cover

The Cannery

Location: Davis, California
Project Type: Pedestrian Friendly Neighborhood
Size: 98.6 acres
Client: The New Home Company
Designer: SWA Group
Completed: 2014


Figure 1.25 Cannery Cover

Grow Community

Location: Bainbridge Island, Washington
Project Type: Intergenerational residential community
Size: 2.75 acres
Client:
Designer: Davis Studio Architecture + Design
Completed: 2014

This development serves as a shining example for sustainable development with multiple features and standards in place to achieve this goal. 85% of the energy needed to run its 53 homes is generated by solar photovoltaic arrays which adorn the rooftops. The materials used to build and cover the buildings are preferentially sourced locally with an emphasis on sustainable materials. Food is grown throughout the development, with 65% of the population actively participating in its upkeep and harvest.

The houses consist of 50 single family homes and 80 multi family units. The homes are pre-fabricated and built on site to reduce development time and lower construction costs and emissions. The development contains both net-zero and net-positive homes, with an overarching goal to have zero carbon emissions by 2020. The framework of the development is based around 2 central corridors where the communal gardens and lawn space lie, providing a cozy, tight-knit community feel.


Figure 1.26 Grow Community Night


Figure 1.27 Grow Community Front Garden


Figure 1.28 Grow Community Corridor


Figure 1.29 Grow Community Aerial


Figure 1.30 Grow Community Plan

Third Street Cottages

Location: Langley, Washington
Project Type: Pocket Neighborhood
Size: 1 acre
Client: City of Langley
Designer: Ross Chapin Architects
Completed: 1998

This project coined the term 'pocket neighborhood' in 1998. Utilizing a new zoning provision, 8 cottages were placed within 4 standard single family lots. The cottages themselves are approximately 650 square feet each, with an attached loft of an additional 200 square feet. The houses are situated such that the windows on one side of the house peer to a side yard, while the opposite side instead has skylights and high windows. This allows for privacy as neighbors aren't staring directly into one anothers homes. While the homes themselves may be similar in form, their outward appearance varies to suit the home owners taste. This individuality extends to the front and side gardens of each home.

The development is centered around a public lawn, around which the cottages and their front gardens stand adjacent. Front porches facing the lawn and uninhibited site lines promote both secrutiy within the neighborhood as well as casual, every-day encounters. This focus on shared spaces as an interaction primer extends to the communal mail-box cluster as well as off street parking.

Figure 1.33 Third Street Facade

Figure 1.35 Third Street Lawn

Figure 1.32 Third Street Sign

Figure 1.34 Third Street Garden

Figure 1.36 Third Street Parking

Figure 1.31 Third Street Aerial

Figure 1.37 Third Street Plan

The Cannery

Location: Davis, California
Project Type: Pedestrian Friendly Neighborhood
Size: 98.6 acres
Client: The New Home Company
Designer: SWA Group
Completed: 2014

Established in 2014, the Cannery is a pedestrian friendly neighborhood boasting 550 homes. The homes cater to a wide variety of demographics including young families, professionals, and seniors. The design itself is built such that each home is within 300 feet of the extensive pedestrian trail network which facilitates both walking and biking. The central core of the site includes a series of parks, open space, and wildlife habitat all in all totalling 28 acres.

One of the major anchors within the site is the 7.6 acre farm which is ran and maintained by a local non-profit, the Center for Land-based Learning, that trains local farmers. This farm provides healthy food options at a stones throw as well as creating and building a local economy.

In addition to the sustainable farming practices on site, there are a series of sustainable practices at hand including stormwater cleansing and conservation, pollinator catered landscaping, and widespread use of solar collection. The solar panels located throughout the site provides for 100% of the sites electrical needs.

As CityLab, a multidisciplinary design firm, put it:

"It's a vision of the good life that is primed to reshape many American suburbs."

Figure 1.38 The Cannery Sign

Figure 1.40 The Cannery Corridor

Figure 1.39 The Cannery Greenbelt

Figure 1.41 The Cannery Park

Figure 1.42 The Cannery Plan

Regional Analysis

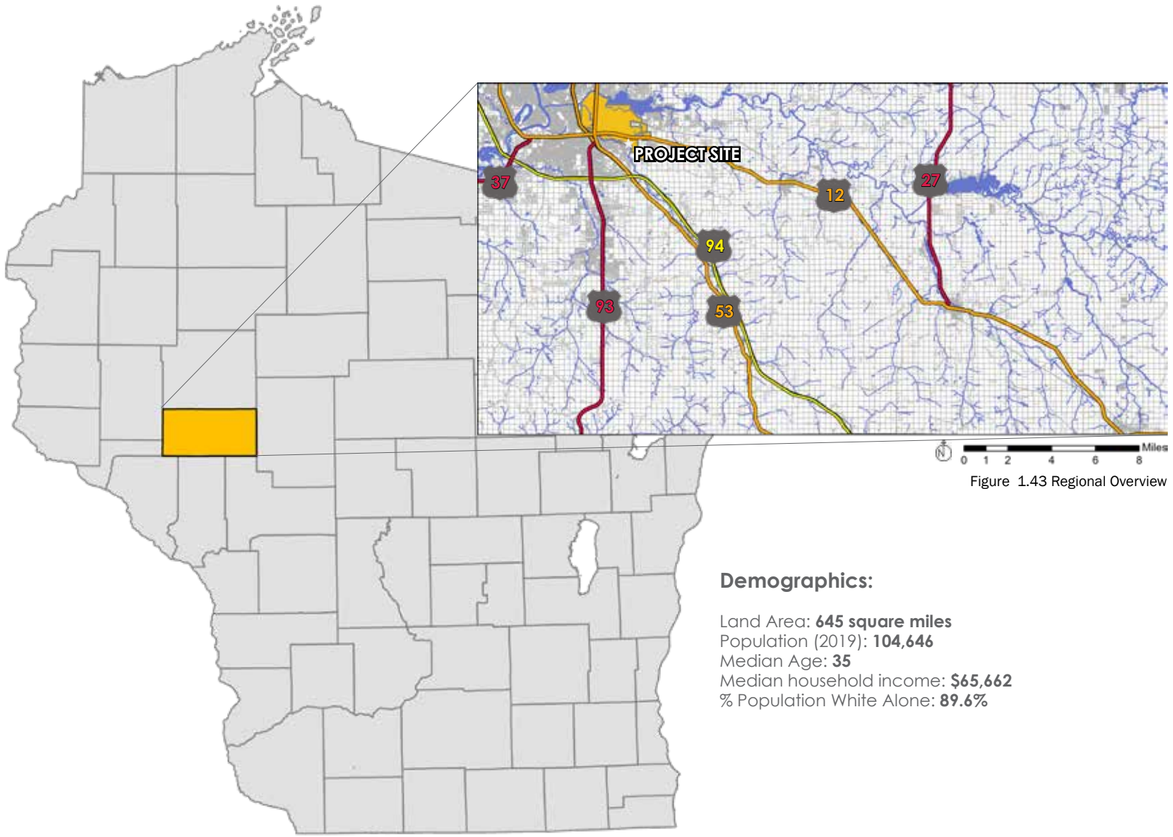


Figure 1.43 Regional Overview

Demographics:

Land Area: **645 square miles**
Population (2019): **104,646**
Median Age: **35**
Median household income: **$65,662**
% Population White Alone: **89.6%**

Population Analysis

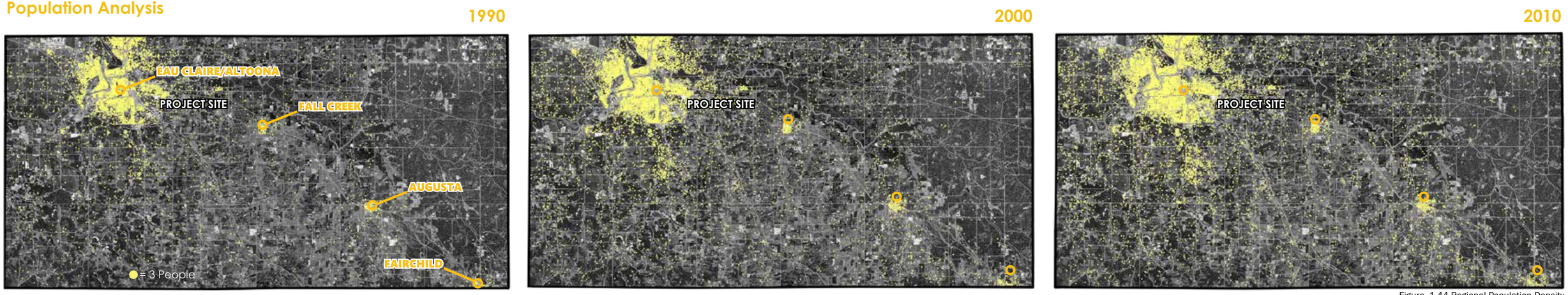


Figure 1.44 Regional Population Density

The population density for Eau Claire County is **164** people/sq. mile with a 2020 population of **104,646** people. Looking at the graphs above you can see that the majority of the population is located within the urban centers of **Eau Claire, Altoona, Fall Creek, Augusta, and Fairchild.** Of these, Eau Claire and Altoona have retained the largest % of the total population growth. Eau Claire has undergone a 3.9% population increase as from 2010. Altoona has undergone a **17.2%** increase during that same timeframe.

The median age of Eau Claire county is **35**. The population within Eau Claire county is split between two main demographics agewise: those **20-30** and those **50-70**. As is relates to this project these are two of the main demographics which our housing is catered to as the former is eager for affordable housing within an urban center and the latter may be looking to downsize.

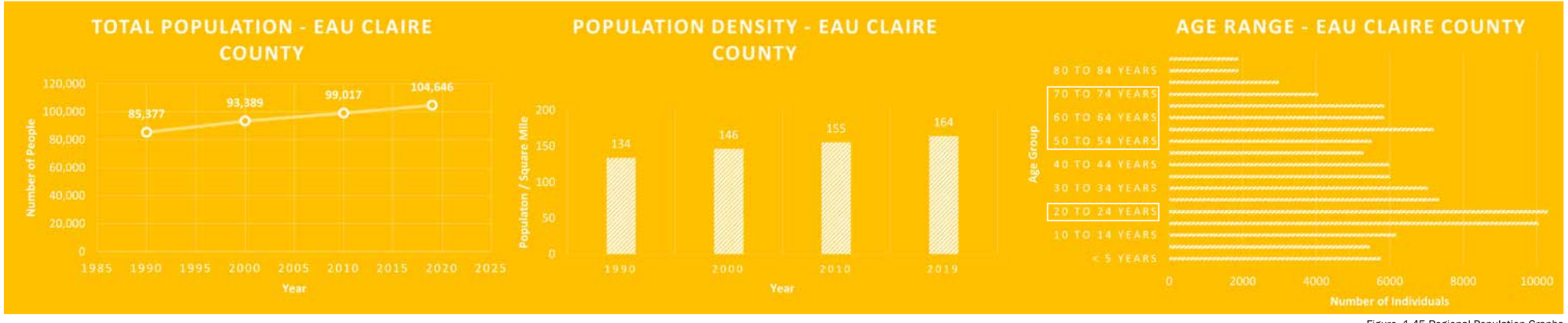


Figure 1.45 Regional Population Graphs

Transportation Corridors

Figure 1.46 Regional Highways

Located in Northwest Wisconsin, Eau Claire county acts as a thoroughfare for traffic to and from the Twin Cities. Eau Claire serves as a main node for several important traffic corridors within Wisconsin, as outlined by the Wisconsin D.O.T. These include:

- **Badger State Corridor**: 180 mile corridor to Madison
- **Chippewa Valley Corridor**: 80 mile corridor to the Twin Cities
- **Peace Memorial Corridor**: 150 mile corridor to Duluth-Superior
- **Trempealeau River Corridor**: 80 mile corridor to Eau Claire
- **Wisconsin Heartland Corridor**: 200 mile corridor to Green Bay

These corridors serve as major passenger and freight routes, extending beyond Wisconsin into Minnesota at the Twin Cities as well as south to Chicago.

Figure 1.47 Statewide Highways

Key Industries

AGRICULTURE

Dairy
Grain
Vegetables
Apples

MANUFACTURING

Veritas Steel
American Phoenix
Silver Springs
Nestle USA

RETAIL

Menards
Mills Fleet Farm
Oakwood Mall
Target

HEALTHCARE

Mayo Clinic
Oakleaf Medical
Marshfield Clinic

EDUCATION

University of Wisconsin - Eau Claire
Chippewa Valley Technical College
Altoona School District

TECHNOLOGY

Jamf
IBM
Foxconn

Figure 1.48 Regional Employers

The following are 6 key industries located throughout Eau Claire County. Although many key employers aren't located in Altoona directly, save Jamf and the Altoona School District for example, the city is located directly next to Eau Claire which provides easy access to employment for Altoona residents.

Community Analysis

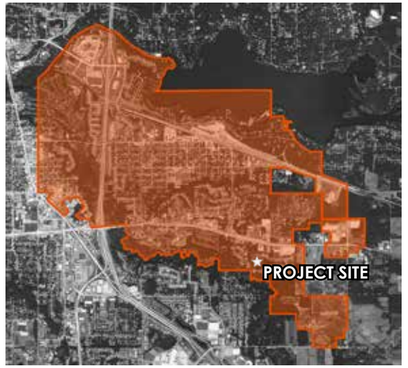


Figure 1.49 Community Overview

Demographics:

Land Area: **645 square miles**
Population (2019): **104,646**
Median Age: **35**
Median household income: **$65,662**
% Population White Alone: **89.6%**

Comparing Altoona's demographics to that of Eau Claire we find a few key differences. While the median age of Altoona is the same of the county, the age distributions differ. Notably, there is a greater proportion of young population, given the peaks from 0-14 and 24-34. The growth rate of Altoona is far higher than Eau Claire county, at 17.2%, compared to 3.9%. This has placed Altoona as one of the top 5 fastest growing cities in Wisconsin. As a thriving city adjacent to the largest urban center within the county, the population is poised to continue growing, especially with an influx of young professionals seeking employment both in Altoona and the city of Eau Claire. This makes this capstone of special importance in that it will continue to aid in providing affordable housing to a rapidly expanding population.

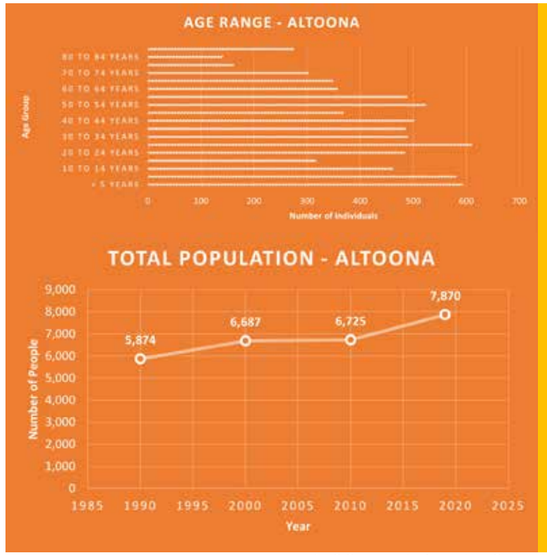


Figure 1.50 Community Population Graphs

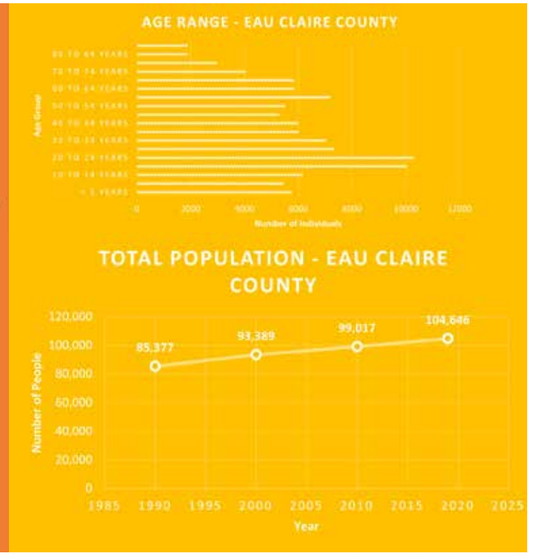
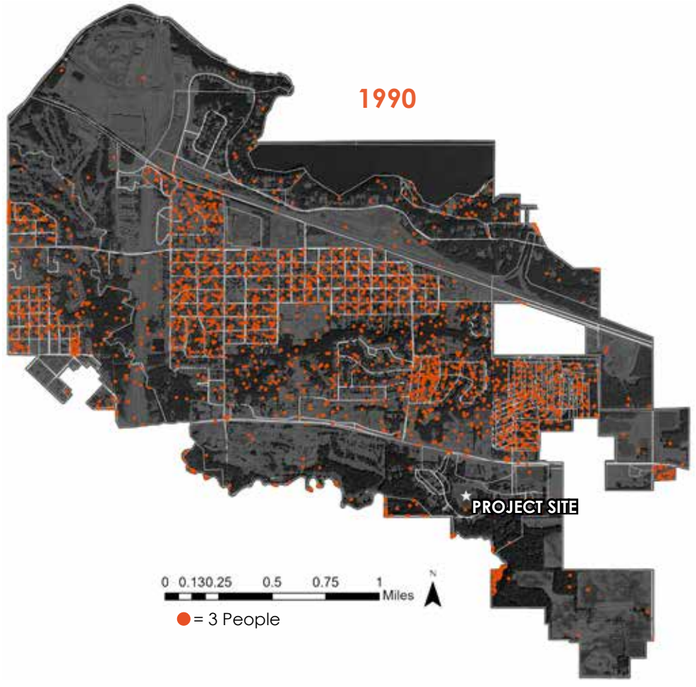
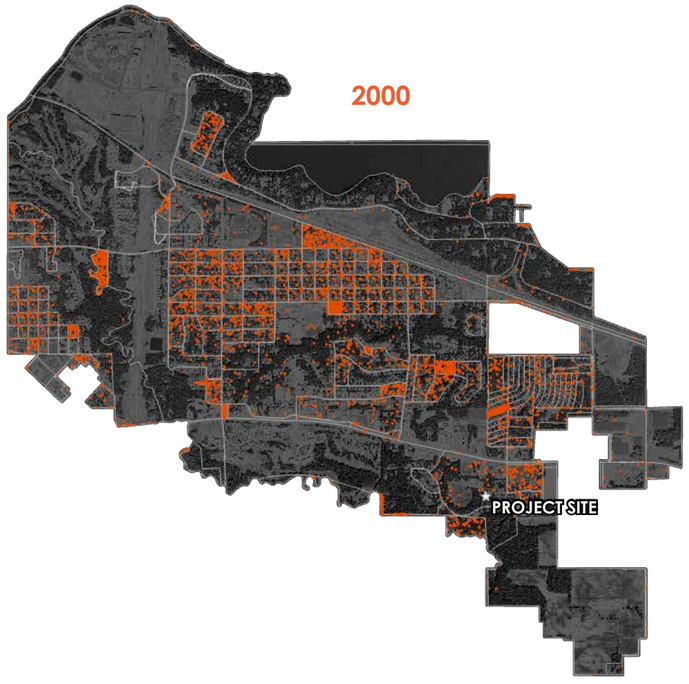
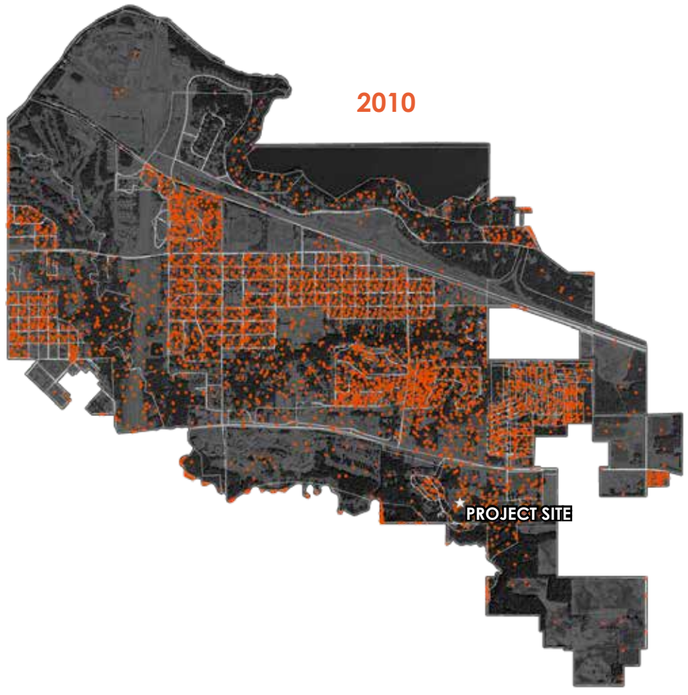


Figure 1.45 Regional Population Graphs

Population Analysis







Looking at the distribution of population over the years the main trend is continual growth within the central core of Altoona. Starting around 2000, growth South of US-12 began, notably around the site of this capstone. With new developments continuing South of US-12 in addition to proposed expansion to the Southernmost tip of Altoona's boundaries, this development is poised at the heart of what will become a hub for the lower half of Altoona.

Figure 1.51 Community Population Density

High Density Residential

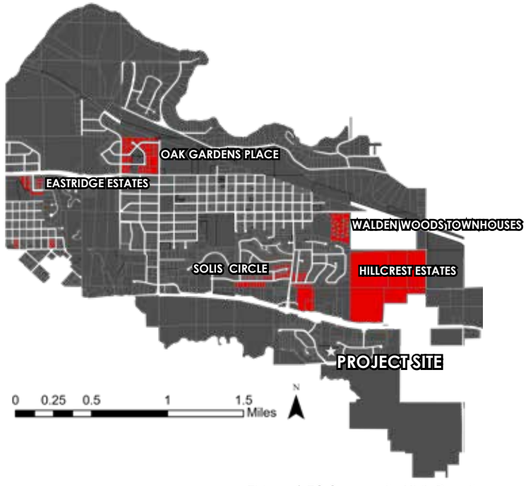


Figure 1.52 Community High Density

Located throughout Altoona are a series of high density residential developments. These include a series of apartment complexes and townhouses such as Eastridge Estates, Solis Circle, and Walden Woods. Hillcrest Estates is a mobile home park located North of US-12. Oak Gardens place is an assisted living complex to the North of Altoona. These developments are zoned R-3 Multi-family Residential and R-4 Mobile Home Park Residential. The maximum housing density allowed is 20 units per acre for R-3 and 7 units per acre in R-4.

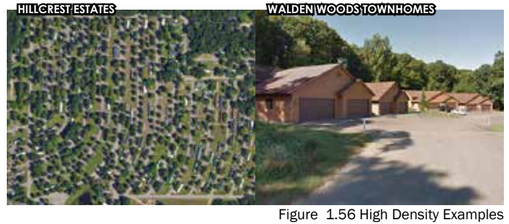


Figure 1.56 High Density Examples

Low Density Residential

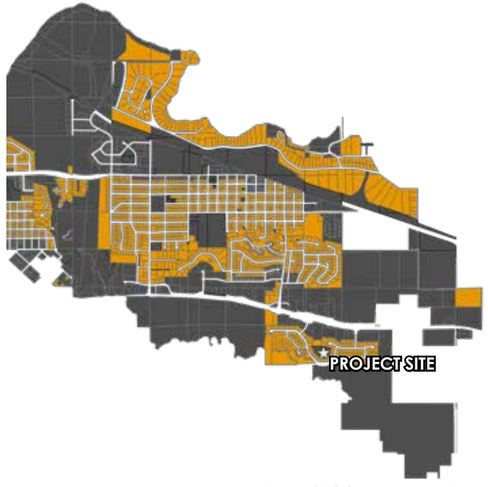


Figure 1.53 Community Low Density

The majority of Altoona's housing is zoned as low density residential, including both R-1 and R-2 zoning. Within the central development of Altoona the typical housing structure is a single family detached house with a yard. This type of housing is found within the capstones immediate area, though there are instances here of R-2 housing which is two family. Both R1 and R2's zoning requirements include a minimum lot area of 8,750 sq. ft. however R-2 has a restriction of a maximum of 5 units per acre.

Figure 1.57 Low Density Examples

Mixed Use Residential + Commercial

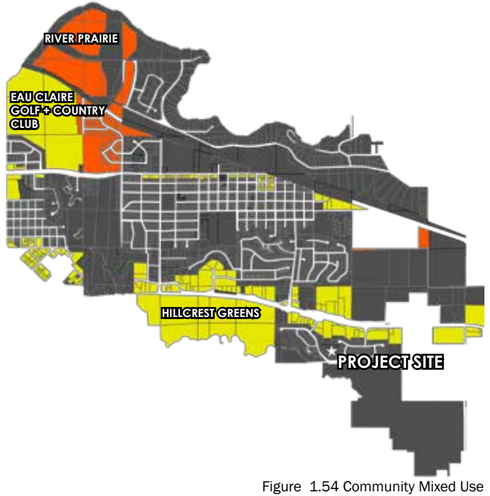


Figure 1.54 Community Mixed Use

Altoona's most noteworthy development, River Prairie is a thriving mixed use residential development. It sits at the Northern tip of Altoona adjacent to the Eau Claire Golf + Country Club. A former golf course, Hillcrest Greens now is a commercial housing development. It sits adjacent to the main commercial corridor which bounds US-12 to the South. Mixed use within Altoona is zoned as C-1, transitional commercial, with the main commercial areas zoned as C-2, general commercial.

Figure 1.58 Mixed Use Examples

Overall Zoning

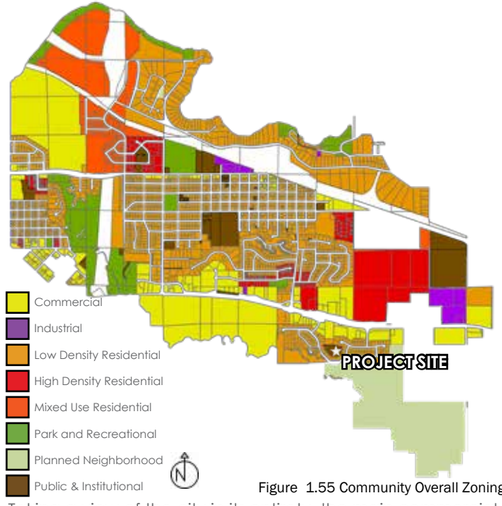


Figure 1.55 Community Overall Zoning

Taking a view of the city in its entirety, the main commercial corridor surrounding US-12 in the South is of special interest to this capstone. Given the sites proximity to this corridor, there is opportunity for drawing new users into the site as well as providing business to the growing corridor itself. One issue raised by the current zoning of the site is that the majority of the site is zoned as low-density residential, R-1. The Northern half of the site is zoned as C-2. Given that development is largely limited to this Northern half, possible zoning changes will need to be proposed and ratified in order to develop. This is due to the restrictions surrounding residential development within a commercially zoned parcel. One possibility to consider would be to establish a mixed use/transitional commercial zoning to allow for the new development while still maintaining the possibility for commercial infill along the corridor itself.

Transportation Corridors: Altoona

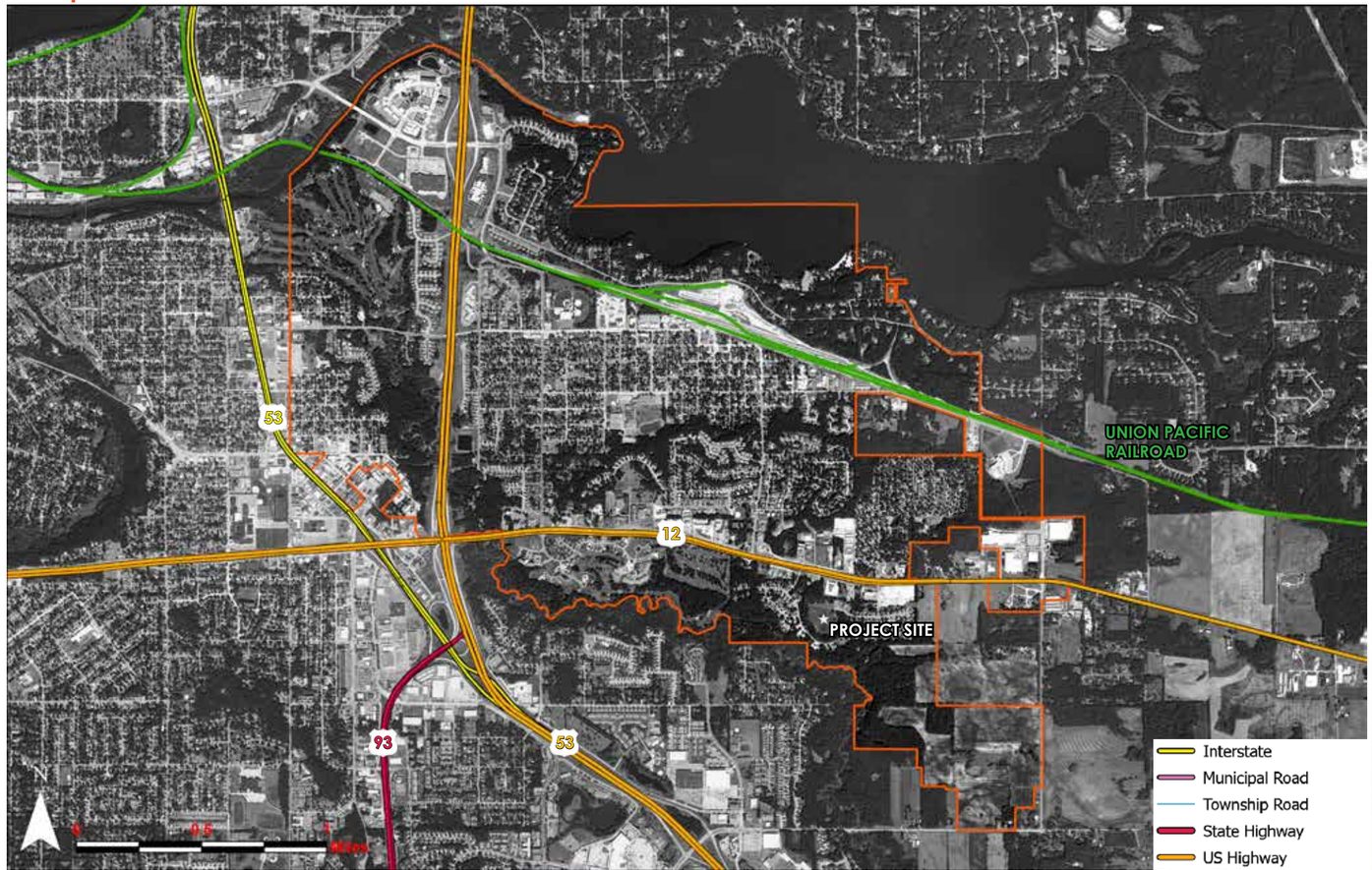


Figure 1.59 Community Highways

Altoona has two major highways bisecting it: US-12 and US-53. Of these, US-53 has the higher daily traffic count or A.A.D.T at between 35-42,000 cars traveling this stretch daily. US-12 averages roughly 30,000 from the crossing of US-53 heading West towards Eau Claire. On the stretch adjacent to the capstone site, heading East from the crossing of US-53, the average annual daily traffic is between 14,000 and 20,000 cars. Both US-12 and US-53 are 4 lane highways, with posted speed limits of 55 mph.

US-12 poses both challenge and opportunity for this capstone as it currently bisects Altoona into its Northern and Southern sections. The capstone site sits within the Windsor Forest neighborhood, found due South of the commercial corridor which lines US-12. The businesses which lie along this stretch include the Finley Engineering Company and the Altoona Family Child Care Center, both of which will have interplay with this capstone's site programming. Along with these, a series of auto shops, taverns, and convenience stores hold residence. The pedestrian experience is currently perilous when crossing US-12 given the high speed and long span of the road.

Figure 1.60 Community US-12 Focus

Figure 1.61 US-12 Google Earth

Path Systems + Open Space

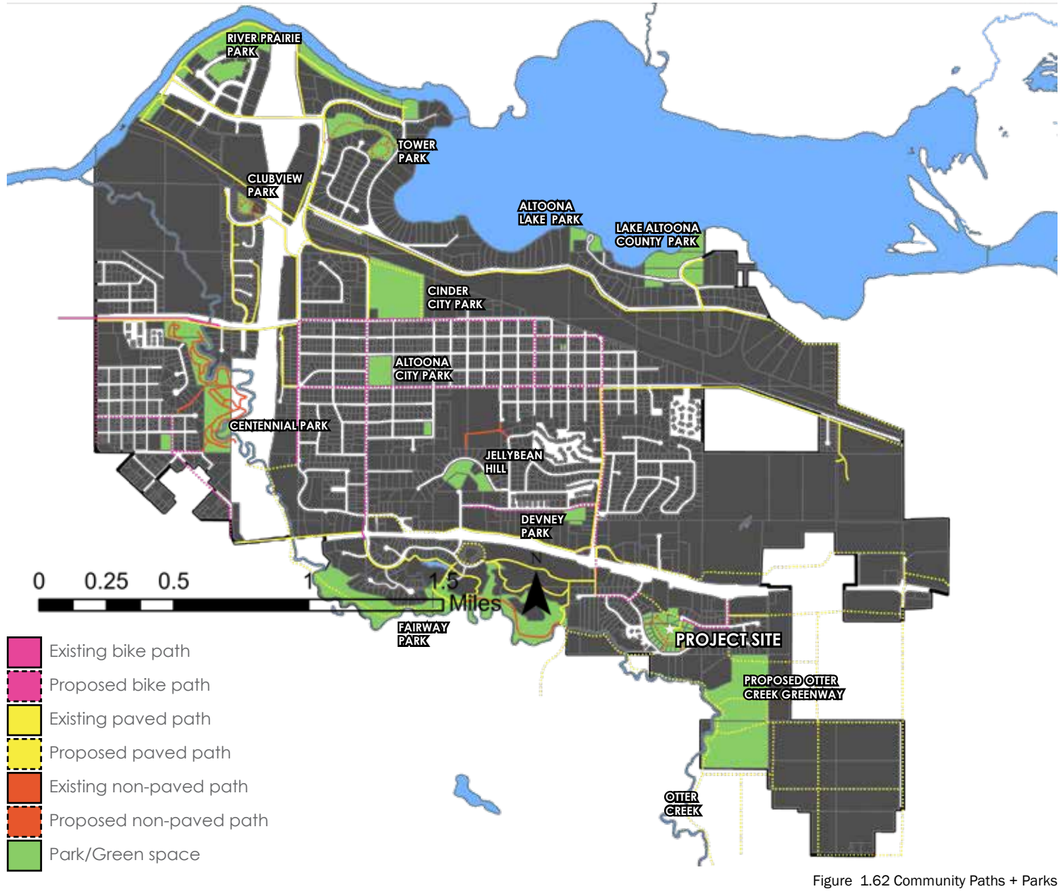


Figure 1.62 Community Paths + Parks

The existing path system for pedestrians is fragmented, with a majority of paved paths surrounding River Prairie to the North as well as Fairway Park and Hillcrest Greens to the South. Central Altoona has a proposed network of bike paths to encourage pedestrian use throughout the central development. To the South, the proposed Otter Creek Greenway is a great opportunity to connect with this capstone by funneling pedestrian traffic out of the site, into and along the creek up to Fairway Park.

Looking at the green spaces throughout Altoona, there is a disparity between the areas North of US-12 and those South of it. Apart from Fairway Park, the capstone site is the main green space for the Windsor Forest neighborhood. Otter Creek presents an opportunity to expand the existing pedestrian options for nature spaces within their grasp, however this requires a consolidated effort including signage and possibly the development of a more thorough path hierarchy.

Figure 1.63 Otter Creek

Otter Creek is an ecological corridor which spans the Southern border of Altoona, ultimately making its way to meet the Chippewa River in the Northwest portion of Altoona. The creek has existing footpaths, though they are not easily accessible nor are they maintained. The Creek is one of the major opportunities for connections within this capstone; both as an outlet for nature exploration as well as a connector path which would span Altoona's Southern border from the proposed developments on the Southernmost tip of the municipal border up to US-12 and beyond

Figure 1.64 Fairway Park

Fairway park lies due South of Hillcrest Greens, the housing development on the former golf course. The park has a series of footpaths as well as open lawns with play areas suited to small children. Connection to this park would be helpful in establishing a series of publicly accessible green spaces for the neighborhoods South of US-12.

Figure 1.65 Cinder City Park

Cinder City park is a recreation focused park, containing four lighted ball fields of which two are adult softball, one baseball, and one youth field. In addition there are nearby playgrounds for smaller children as well as restroom and concession buildings to aid during local ball games. Located northwest of the central development of Altoona, it is in a prime location for walkable recreation and community during the Summer months.

Figure 1.66 River Prairie Park

River Prairie has been a shining example of a successful mixed-use development within Altoona. Its park space is comprised of a series of open lawns, ampitheaters, walking and biking paths, and water features. Though it is quite a walk from the capstone site, it serves as a great example of a cohesive development which encourages public use through spaces which are flexible enough to support community programming and daily use.

Site Analysis

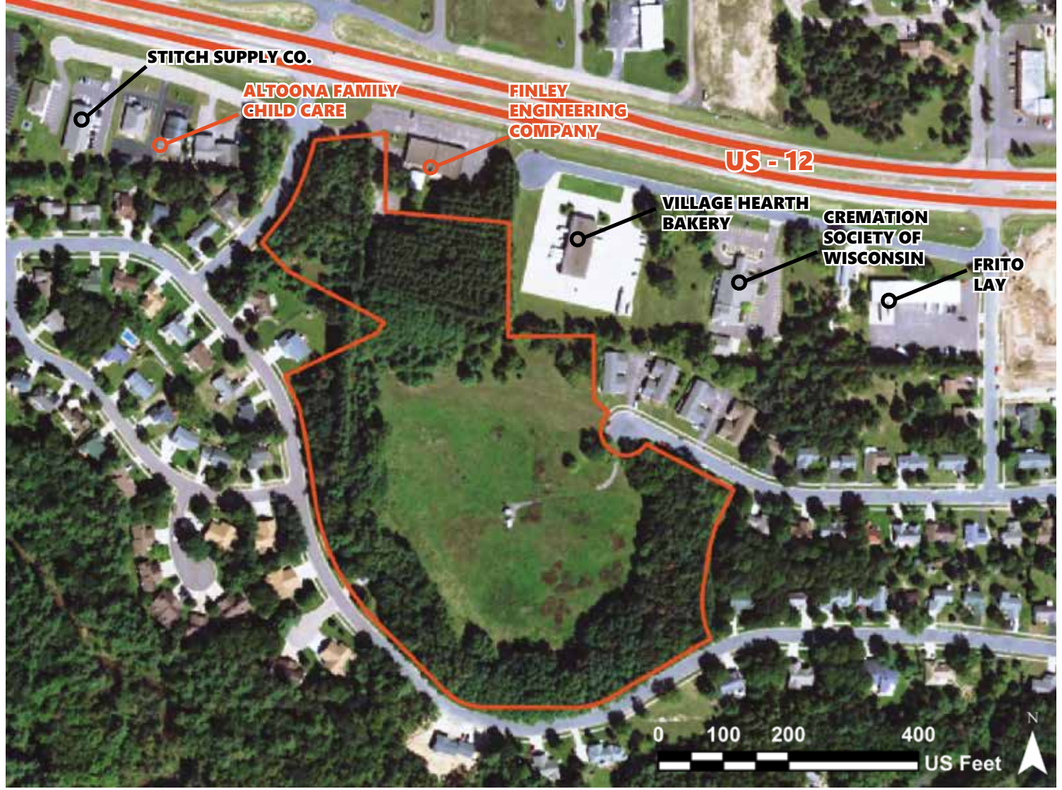


Figure 1.67 Site Overview

This capstone site is located just South of US-12 in Southern Altoona. The site is 22 acres, of which 16 are a capped landfill with the remaining 6 forested by a mix of deciduous and coniferous trees. The site is found within the Windsor Forest neighborhood which is predominantly low-density residential housing. Of the businesses which flank US-12, two are of importance to this capstone: Finley Engineering Company and the Altoona Family Child Care. The former is likely to be bought by the city, adding both the building and its land to the capstone site. The child care is planning to assimilate the existing Finley building to expand its available space.

The landfill was active from the 1930's - 1980's, it was capped in 1983. Per the DNR guidelines, a passive vent system and shallow vent trench was installed to manage gas exfil from the landfill. In 1994, due to migration of landfill gas, an active gas extraction system was installed. This infrastructure was in place until 2018, where the annual report performed by the multidisciplinary firm SEH filed for a return back to passive venting due to positive outlook based on the data. This motion was approved by the DNR in 2019. As of November, 2019 the existing infrastructure has been altered to once again perform passive gas venting. Yearly maintenance and gas monitoring is ongoing.

Surrounding Roads + Housing

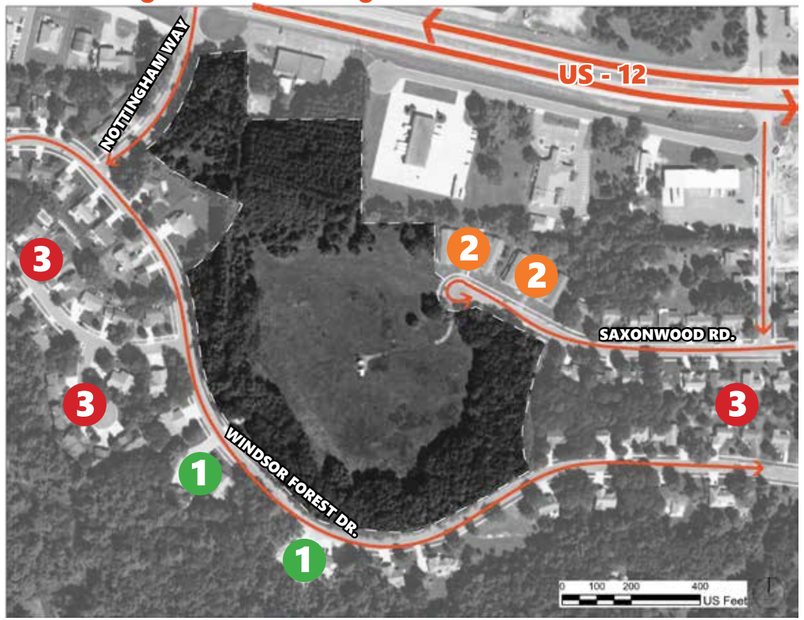


Figure 1.68 Site Roads + Homes

The site's neighborhood has relatively slow traffic once you exit US-12. During my initial visit with my client we discussed the idea of connecting Saxonwood Road to Nottingham Way. This proposal not only creates greater connectivity within the neighborhood, it also directly provides access to the proposed site development.

The neighborhood is largely single family homes given its zoning. A few exceptions are the series of multi-family houses (2) which sit at the end of Saxonwood Road as well as a number of condos which lie at the base of Windsor Drive at the Southern border of the site. The makeup of the neighborhood's housing is fairly typical of Altoona. Given the presence of multi-family housing already within the community, the new development will nestle nicely.

Figure 1.69 Windsor Forest Drive

Figure 1.70 Saxonwood Road

Figure 1.71 US -12 Crossing

Figure 1.72 Site Condo

Condos

Located in the Southern half of the neighborhood, this series of condominiums is a step in the right direction for the neighborhood. Similar to the single family housing, well manicured yards are the norm. Given their proximity to the site, access should be created along the Southern slope of the site to encourage activity and movement throughout the neighborhood.

Figure 1.73 Site Multi Family

Multi-Family Housing

Found just at the end of Saxonwood Road, this series of multi-family houses is the perfect segue into the site. Their location grants them sight lines into the site as well as direct access by foot. Given this, program elements should be located adjacent to the Eastern entry to the site to encourage participation and provide ease of access for these community members.

Figure 1.74 Site Single Family

Single Family Homes

The majority of the houses within the Windsor Forest neighborhood are single family detached homes. Yards are commonplace within this neighborhood and the overall aesthetic of the homes is that of a clean suburban neighborhood. While this style of housing is popular and prevalent within Altoona, there is a significant barrier for entry for those just entering the housing market such as young professionals. As the development has little space to work with given the site constraints, single family houses at this scale will not be a priority.

Existing Plant Cover

Figure 1.75 Site Zones

The site can be broken down into three main zones. The main lawn (1), the Southern forest (2), and the Northern forest (3). Below are the main plants found within each zone.

1.
Switchgrass
Panicum vergatum

Prairie Dropseed
Sporobolus heterolepis

Reed canary grass
Phalaris arundinacea

Common milkweed
Asclepias syriaca

2.
Black locust
Robinia pseudoacacia

Littleleaf Linden
Tilia cordata

3.
Scots pine
Pinus sylvestris

Red pine
Pinus resinosa

Figure 1.76 Site Zone 1

Figure 1.77 Site Zone 2

Figure 1.78 Site Zone 3

Site Profile + Soils

Figure 1.79 Site Contours

The majority of the site is largely flat with a few notable exceptions. The first is a dip following the edge of where the landfill's mass ends and has since subsided (note the red circle).

The main source of elevation change is found along the Southern half of the site. Here there is a steep drop off which creates difficulty for access and development. This will pose issues for creating pedestrian access from the road into the site itself. The ground levels out for the road then continues to dip as you go further South leading towards Otter Creek.

The site's soil consists of two main types:

- Plainfield sand, river valley(15-60% slopes) (RED)
- Simescreek sand (0-3% slopes) (GREEN)

Below are two suitability analyses for development on the site. Green is deemed suitable, red is unfit:

Figure 1.80 Site Dwelling Suitability

Figure 1.81 Site Road Suitability

Landfill Infrastructure

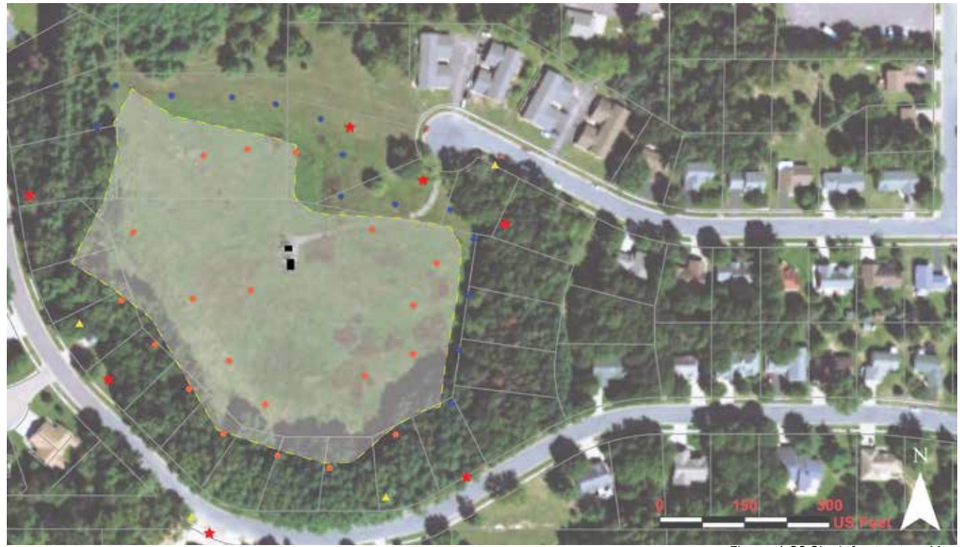


Figure 1.83 Site Infrastructure Map

Upon entering the site, one of the first things you notice are the existing infrastructure for the gas monitoring system. All of the pipes, wells, and the gas pump building must be maintained and accessible by foot to accomodate yearly maintenance and gas monitoring sessions.

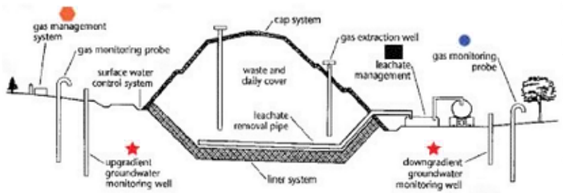


Figure 1.82 Site Infrastructure Diagram

As stated within the yearly report by SEH, alterations to the existing infrastructure must be in line with proper use and maintenance of the site. As such, it is out of the option to make aggressive grade changes on the site. The nature of the capped landfill itself begets caution, as the existing cap which is composed of a ~2 foot layer of heavily compacted soil mustn't be punctured lest landfill integrity fail. This limits the available flora to be used on the site and root depths must be thoroughly checked when placed on a planting plan. It is possible, however, to bring in soil in order to build up the land though this must be done in accordance with the existing infrastructure.

Figure 1.84 Site Infrastructure Photos

Opportunities

The main lawn of the site is practically a blank canvas save the existing infrastructure. As such it will provide excellent public green space for the community and help to create a node of activity along the greater Altoona path system.

Acquiring the Finley Engineering building will expand the site's boundaries as well as provide access to the commercial corridor along US-12. This purchase will allow for greater visibility of the development and a more cohesive design given the limiited space on which to develop.

The existing forest provides ecological habitat as well as a natural 'glade' upon which to develop our site. This sense of enclosure will help to create a space which at once feels inviting yet secure.

Connecting Saxonwood Road to Nottingham Way will greatly increase the ease of automotive movement throughout the neighborhood while also providing an avenue for foot traffic.

Constraints

The existing neighborhood makeup of largely single family housing yields tidings of NIMBY-ism for a larger development of affordable housing. In addition, there is stigma surrounding both affordable housing as well as development upon a former landfill. Efforts must be made to embrace the site's former use in order to create a new development which meshes well within the neighborhood without ruffling too many feathers.

The existing landfill infrastructure surrounding the gas abatement of the landfill pose quite a design problem. Given that none of it may be removed efforts must be made to either camoflauge the existing pipes and wells or to embrace their aesthetic and work similar materials and forms into the palette for the design.

The Southern slope is steep which poses issues for development as well as equitable access as the aging population within the neighborhood may have trouble or feel uneasy climbing a steep slope.

Figure 1.85 Site Probe

SPATIAL RELATIONSHIP STUDIES

Figure 1.86 Spatial Diagram 1 Cover

Concept One

Upscale Upcycle

Concept one emphasizes the past history of the site, integrating recycled and upcycled materials into the palette of both the open space and the built environment.

Figure 1.87 Spatial Diagram 2 Cover

Concept Two

Give and Take

Concept two prioritizes the existing environment, beckoning you to learn more about what is right in front of you and enjoy the view while you're at it.

Upscale Upcycle

Housing is grouped around public lawns, with a central spine of bioswale bisecting the development. The main path leading from the community center to the main open space brings the user through a community garden at the heart of the space. Utilizing solar cells on the roofs for electricity, bioswales and integrated stormwater management and sequestration for use as grey water and sustainably sourced materials for the houses, this development pushes for green both in the garden and in the home. This development provides a total of **105** dwelling units.

Rather than try to cover up the sites former use, various art pieces and sculptural elements celebrate the sites history. Interspersed between native prairie and pollinator gardens, these art pieces and sculptural elements catch the eye.


Figure 1.91 Cottage


Figure 1.92 Townhouse


Figure 1.93 Multiplex

Cottage

6 dwelling units/acre
Total dwelling units: **10**

Townhouse

14 dwelling units/acre
Total dwelling units: **45**

Multiplex (3 Story)

50 dwelling units/acre
Total dwelling units: **50**


Figure 1.88 Pipe Sculpture

Pipe 'Trees'

Utilizing jointed pvc, sculptural 'trees' will erupt from the landscape. Providing both color, space for plantings, as well as integrated bird houses, these elements are the center pieces of the open space.


Figure 1.89 Upcycle Art

Upcycle Art

Ranging in size and shape, these sculptural pieces can serve either as seating as gabions or as walls, blocking views while encouraging others. Their material will be utilizing recycled plastic for diffused light and site significance.


Figure 1.90Flexible Space

Flexible Space

Whether it be taking a book and sitting down or farmer's markets on Sunday, these flexible spaces will shift to suit the needs of the community. Centrally located, these spaces let the user enjoy the park how they wish.

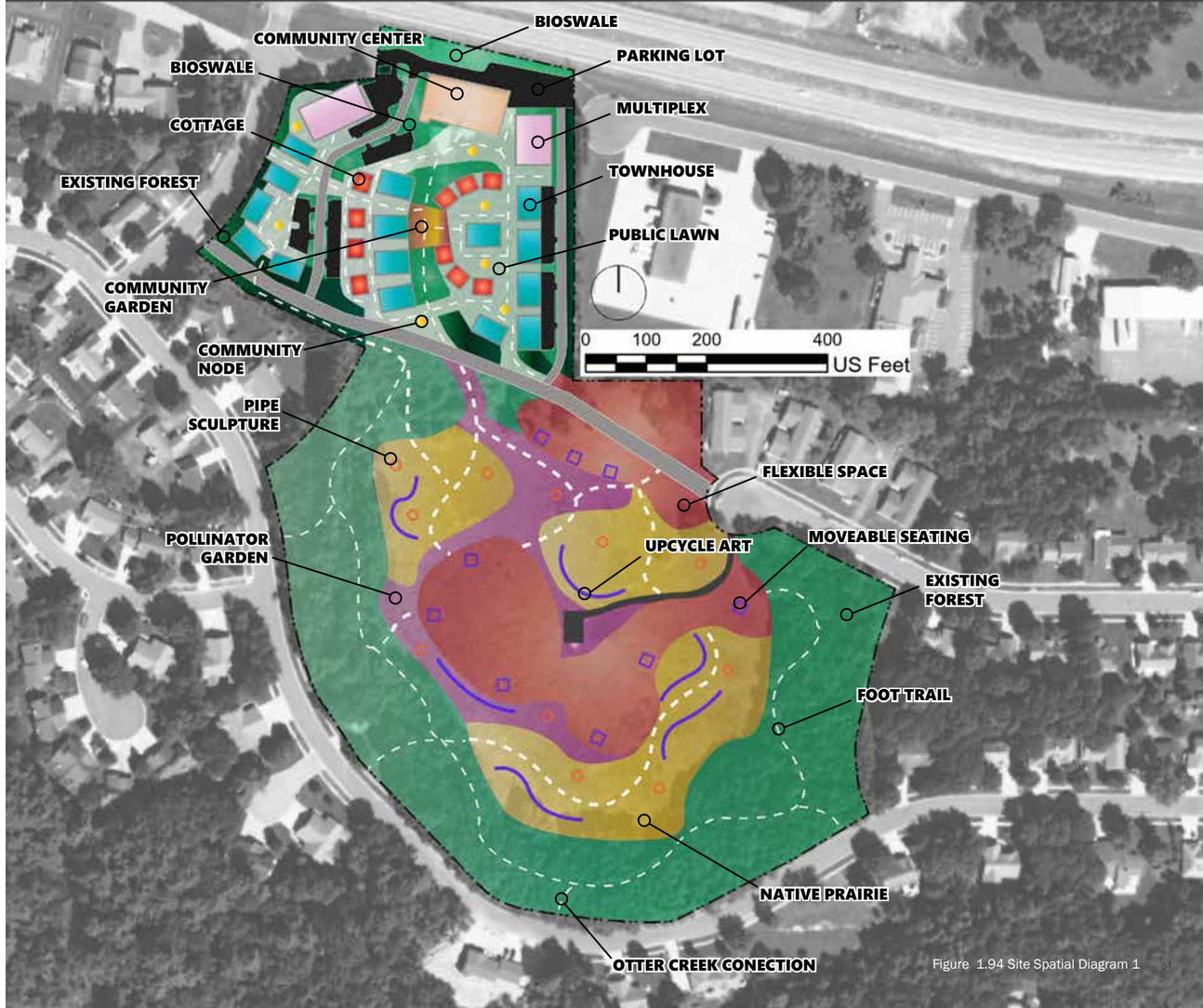


Figure 1.94 Site Spatial Diagram 1

GIVE AND TAKE

With an orderly housing development offset by a naturalized open space, this concept pushes for more dense housing through its use of Stacked Flats over cottages. Like concept 1 however, the clusters of houses are built around shared public spaces to encourage interaction and community programming. This development provides a total of **123** dwelling units.

Given the site is a landfill, this concept works to celebrate the natural qualities of the site rather than disparage it for what lies underneath. WIth an extensive trail system built around an eco-tour, this space is the perfect companion for the proposed childcare extension. Giving the kids an opportunity to run around and learn about the natural environment is a great way to not only get them outside, but get them interested in nature and sustainability, too.


Figure 1.98 Stacked Flat


Figure 1.99 Townhouse


Figure 2.00 Multiplex

Stacked Flat

12 dwelling units/acre
Total dwelling units: **40**

Townhouse

14 dwelling units/acre
Total dwelling units: **33**

Multiplex (3 Story)

50 dwelling units/acre
Total dwelling units: **50**


Figure 1.95 Glade Nook

Glade Nook

Providing a bit of privacy along your forest walk, these nooks allow for bird watching, outdoor learning, and general relaxation.

Figure 1.96 Eco Tour

Eco Tour

Engaging the community surrounding their surroundings is key to this concept. As you walk along the many paths on the site you can take a look at these colorful placards to learn more about whats right in front of you.


Figure 1.97 Pollinator Garden

Pollinator Garden

In addition to adding color and variety to the plantings on site, these gardens are specifically tailored to pollinators within the area. The resulting swarms of butterflies and bumbling bees will create a idyllic atmosphere.

Figure 2.01 Site Spatial Diagram 2

APPENDIX

Time Log

Colin Thomasgard
Capstone Project Name: LANDFILL INFILL
Capstone Project Location: Altoona, WI
Fall 2020, Spring 2021

Project Time Tracking

Code: D (design), P (presentation/prep), M (meeting), T (travel), R (research), O (organizing), E (emailing), W (writing), A (analysis/summary)

Day	Date	Task/Work Code	Hours Worked	Travel Time	Cumulative Time
Week 1					
Monday	08/31/20			0.00	
Tuesday	09/01/20			0.00	
Wednesday	09/02/20				
Thursday	09/03/20				
Friday	09/04/20				
Saturday	09/05/20				
Sunday	09/06/20				
		Total	**0.00**	**0.00**	**0.00**
Week 2					
Monday	09/07/20			0.00	
Tuesday	09/08/20			0.00	
Wednesday	09/09/20	R, O	2.00	0.00	
Thursday	09/10/20	E, R	3.00	0.00	
Friday	09/11/20	R, O	3.00	0.00	
Saturday	09/12/20	P, R, O	6.00	0.00	
Sunday	09/13/20	P, R, O	4.00	0.00	
		Total	**18.00**	**0.00**	**18.00**
Week 3					
Monday	09/14/20	O, R, P	4.00	0.00	
Tuesday	09/15/20	O, R	6.00	0.00	
Wednesday	09/16/20	O, R, P	2.00	0.00	
Thursday	09/17/20	Em, D, R, O	9.50	0.00	
Friday	09/18/20	D, R, O	9.00	0.00	
Saturday	09/19/20	E, O	2.00	0.00	
Sunday	09/20/20	O, R, W	5.00	0.00	
		Total	**37.50**	**0.00**	**55.50**
Week 4					
Monday	09/21/20	E, T, P	5.50	3.00	
Tuesday	09/22/20	T, A, P	8.50	3.00	
Wednesday	09/23/20	R, O	3.00		
Thursday	09/24/20	E, T,	1.50		
Friday	09/25/20	R, O	3.00		
Saturday	09/26/20	R, D	6.00		
Sunday	09/27/20	R, O	5.00		
		Total	**32.50**	**6.00**	**94.00**
Week 5					
Monday	09/28/20	R, O	3.00		
Tuesday	09/29/20	E, P, R	6.00		
Wednesday	09/30/20	V, O, R	4.00		
Thursday	10/01/20	O, R	5.00		
Friday	10/02/20	E, V,	2.00		
Saturday	10/03/20	R, O	5.00		
Sunday	10/04/20	V, O	5.00		
		Total	**31.00**	**0.00**	**125.00**
Week 6					
Monday	10/05/20	V, O	2.00		
Tuesday	10/06/20	A, R	6.00		
Wednesday	10/07/20	O, R	3.00		
Thursday	10/08/20	O, V	4.00		
Friday	10/09/20	O, D	4.00		
Saturday	10/10/20	O	1.00		
Sunday	10/11/20	R, O, V	2.00		
		Total	**23.00**	**0.00**	**148.00**
Week 7					
Monday	10/12/20	V, R	3.00		
Tuesday	10/13/20	-	0.00		
Wednesday	10/14/20	-	0.00		
Thursday	10/15/20	R, D	2.00		
Friday	10/16/20	E, R, O	2.00		
Saturday	10/17/20	P, O, D	11.00		
Sunday	10/18/20	P, O, D	12.00		
		Total	**30.00**	**0.00**	**178.00**
Week 8					
Monday	10/19/20	A, D	7.00		
Tuesday	10/20/20	A, D	13.00		
Wednesday	10/21/20	P, O	10.00		
Thursday	10/22/20	D, P	10.00		
Friday	10/23/20	D, P	8.00		
Saturday	10/24/20	D, P	8.00		
Sunday	10/25/20	D, P	12.00		
		Total	**69.00**	**0.00**	**246.00**

Expense Tracking

Code: P (Printing), L (Lodging), T (Transportation/Fuel/Rental), M (Meals)

Expense Code	Expense Note (Keep Receipts)	Expense Cost $	Cumulative Expenses
T	Fedex/Kinkos	$0.00	
L	Super 8	$0.00	
		$0.00	**$0.00**
P	Fedex/Kinkos	$0.00	
L	Super 8	$0.00	
		$0.00	**$0.00**
P, M	Fedex/Kinkos	$0.00	
L	Super 8	$0.00	
		$0.00	**$0.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$105.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$210.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$315.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$420.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$525.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$630.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$735.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$840.00**

Day	Date	Task/Work Code	Hours Worked	Travel Time	Cumulative Time
Week 9					
Monday	10/26/20	D, P	6.00		
Tuesday	10/27/20	D, P	12.00		
Wednesday	10/28/20	O	4.00		
Thursday	10/29/20	O	4.00		
Friday	10/30/20	D, P	3.00		
Saturday	10/31/20	O	6.00		
Sunday	11/01/20	D, P	3.00		
		Total	**38.00**	**0.00**	**294.00**
Week 10					
Monday	11/02/20	D, P	1.50		
Tuesday	11/03/20	D, P	3.00		
Wednesday	11/04/20	D, P	5.00		
Thursday	11/05/20	D, P	3.00		
Friday	11/06/20	D, P	4.00		
Saturday	11/07/20	D, P	6.00		
Sunday	11/08/20	D, P, O	8.00		
		Total	**30.50**	**0.00**	**314.50**
Week 11					
Monday	11/09/20	D, O	6.00		
Tuesday	11/10/20	D, O, P	10.00		
Wednesday	11/11/20	D, P	4.00		
Thursday	11/12/20	D, P	1.00		
Friday	11/13/20	D, P	4.00		
Saturday	11/14/20	D, P	8.00		
Sunday	11/15/20	D, P	5.00		
		Total	**38.00**	**0.00**	**352.50**
Week 12					
Monday	11/16/20	D, P	7.00		
Tuesday	11/17/20	D, P, O	10.00		
Wednesday	11/18/20	O, P	4.00		
Thursday	11/19/20	E, O, P	2.00		
Friday	11/20/20	O, P	4.00		
Saturday	11/21/20	O, P	7.00		
Sunday	11/22/20	O, P	8.00		
		Total	**42.00**	**0.00**	**394.50**
Week 13					
Monday	11/23/20	O, P	1.50		
Tuesday	11/24/20	O, P	3.00		
Wednesday	11/25/20	O, P	6.00		
Thursday	11/26/20	O, P	7.00		
Friday	11/27/20	O, P	7.00		
Saturday	11/28/20	O, P	5.00		
Sunday	11/29/20	O, P	10.00		
		Total	**39.50**	**0.00**	**434.00**
Week 14					
Monday	11/30/20	O, P	6.00		
Tuesday	12/01/20	O, P	16.00		
Wednesday	12/02/20	O, P	6.00		
Thursday	12/03/20	O, P	4.00		
Friday	12/04/20	O, P	8.00		
Saturday	12/05/20	O, O, P	14.00		
Sunday	12/06/20	O, O, P	18.00		
		Total	**72.00**	**0.00**	**506.00**
Week 15					
Monday	12/07/20	O, P	16.00		
Tuesday	12/08/20	P, E	6.00		
Wednesday	12/09/20	O	1.00		
Thursday	12/10/20	O	1.00		
Friday	12/11/20	O	3.00		
Saturday	12/12/20	O	12.00		
Sunday	12/13/20	O	14.00		
		Total	**52.00**	**0.00**	**558.00**
Week 16					
Monday	12/14/20	O	12.00		
Tuesday	12/15/20	O	16.00		
Wednesday	12/16/20	O	5.00		
Thursday	12/17/20				
Friday	12/18/20				
Saturday	12/19/20				
Sunday	12/20/20				
		Total	**33.00**	**0.00**	**591.00**

Expense Code	Expense Note (Keep Receipts)	Expense Cost $	Cumulative Expenses
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$105.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$210.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$315.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$420.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$525.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$630.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$735.00**
P	Fedex/Kinkos	$29.99	
L	Super 8	$105.00	
		$105.00	**$840.00**

Graphic Figures

Literature References

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