CREATING CONNECTIONS

by

AMY S. SHAFFER

A REPORT

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MASTER OF LANDSCAPE ARCHITECTURE

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Approved by:

Major Professor
William P. Winslow III, FASLA, RLA

Abstract

The proposed site development is situated in the ahupua'a of Honouliuli, in the district of Ewa on the island of Oahu, Hawaii and has been given the name Kaiaulu. Currently the University of Hawaii is planning to expand their campus in the Ewa district. The project site is 500 acres with the university occupying 204 acres. The remaining 296 acres of the site will be a mixed-use residential community. The design of the site addresses two main dilemmas: 1) creating a town-gown relationship between the university and surrounding mixed-use community and 2) promote the use of the two transit stations that will be located on the site for the new light rail system that will be implemented on the island in the next few years.

To better understand the relationships between the institution and the surrounding neighborhood communities and how to successfully incorporate light rail stations into the communities, research was conducted to address the issues stated above. Literature was reviewed with a focus on the guidelines, principles, terms, and relative issues on each topic. Two precedent studies were then conducted relating to town-gown relationships and the implementation of light rail systems and stations.

The program and the placement of the transit stations, the institution, and the mixed-use communities were based on the site inventory and analysis of the existing site. With the strategic placement of the transit stations and the university campus, students and residents of the surrounding community are encouraged to interact. Additionally, by making the transit stations welcoming, convenient, and safe, the light rail encourages the students and residents of the communities to lessen the use of their automobiles and use the public transit as a means of reaching their destinations around the island.

The design of Kaiaulu brings the students of the institution and the residents and visitors of the surrounding communities together and creates a strong town-gown relationship.

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Creating Connections

Amy Shaffer

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A Master's Project and Report

May 8, 2009

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Figure 1.Ocean Scene. Dedication photo. (Flickr.com).

I would like to dedicate this project to my mother because without her my education would not have been possible.

A special thanks to Belt Collins for supplying the project and to Dawn Easterday for all the help along the way.

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1. Introduction

Goal

There are two goals set for the completion of this masters project. The first goal is to better understand the relationships between an institution and its surrounding neighborhoods and communities. It is important to recognize and understand the guidelines and principles that go along with creating a ‘town-gown’ relationship and the issues associated.

The second goal for the project focuses on the use of transit systems in communities. There are several debates about transit systems and their benefits. It will be important to study and research what makes a station successful and what does not.

The study for this project will consist of detailed research on each topic and the examination of specific case studies that will contribute to the understanding of the issues at hand and how to implement them appropriately.

Dilemma

In the county of Ewa on the island of Oahu, Hawaii, a 500 acre site is soon to be developed. 204 acres of the site is planned for an expansion of the University of Hawaii while the remaining 296 acres will be used for residential and mixed-use villages. It is important to bring these two entities together rather than having them segregated from each other.

There is currently a proposed plan for the university, but unfortunately the site arrangement is not appropriate for creating strong relationships with its surrounding community and will not contribute to making the goal of a town-gown community possible.

The implementation of the new light rail in the next few years presents many opportunities to unite the site. Currently two transit stations have been proposed to be located on the site and the placement of these stations will be crucial in getting the residents to use them. While the placement of the stations is important for the overall success of the light rail, the design done to make them attractive to the students and residents of the communities will play an important role as well. If the use of the light rail is successful it will in return help preserve the natural beauty of the island, which has been a concern for the current residents living on Oahu.

Thesis

By designing a walkable community where the institution and neighborhood work together as one will preserve the natural beauty of the island, create unity, and enhance the overall social and physical quality of the site.

Key Issues Relevant to Landscape Architecture

The key issues that are of relevance to the project include creating a 'town-gown' community and making the proposed light rail system appealing to the students and residents of the area.

Town-Gown Relationships

Cities and towns may experience a kind of 'love/hate' relationship with their institutions (Kenney and Dumont and Kenney 2005, 62). They are aware of the benefits the institution brings them, but they are also frustrated by the day-to-day problems that they sometimes attribute to those same institutions. Sometimes the relationship is uncomfortably adversial. Immediate, day-to-day goals may be opposed. But with a longer-term perspective, institutions find that promoting the welfare of the neighborhood and town is not only consistent with their missions, it is also in their best interest, and it is the right thing to do (Kenney and Dumont and Kenney 2005, 62).

As a first step, institutions and their neighbors need to understand each other's point of view. Every situation is different, but the outcomes that most institutions and communities desire are similar, though they sometimes seem distressingly hard to achieve (Kenney and Dumont and Kenney 2005, 62).

Transit Systems

It can be considered good news that we are moving beyond the auto-oriented paradigm and thinking of new ways to get around that are more environmentally friendly. But the issue then arises, how do we get people to give up their cars and use public transit? What has made some transit stations successful and others not?

Too often transit lines are located in areas that are not transit-supportive because they have too little density, no pedestrian quality, and little opportunity for redevelopment. Lines through existing suburbs often make this mistake and become dominated by a "park-and-ride" auto access strategy (Calthorpe 1993, 104). The alternative is to balance these conditions with alignments that run through new growth areas designed for higher densities, mixed-use, and walkability (Calthorpe 1993, 104).

Island Growth

While growth is inevitable on the island, many current residents are not pleased with more development taking place to the west. Development is destroying prime agricultural land and is taking

away from the natural beauty that makes the island such a popular place to visit. While development is inevitable, there are many factors that can take place in preserving as much of the beauty as possible.

By acknowledging the existing site conditions and working with them in the overall design will help keep the natural beauty of the island within the community.

Figure 3. Book. Chapter two photo. (Flickr.com).

2. Literature Review

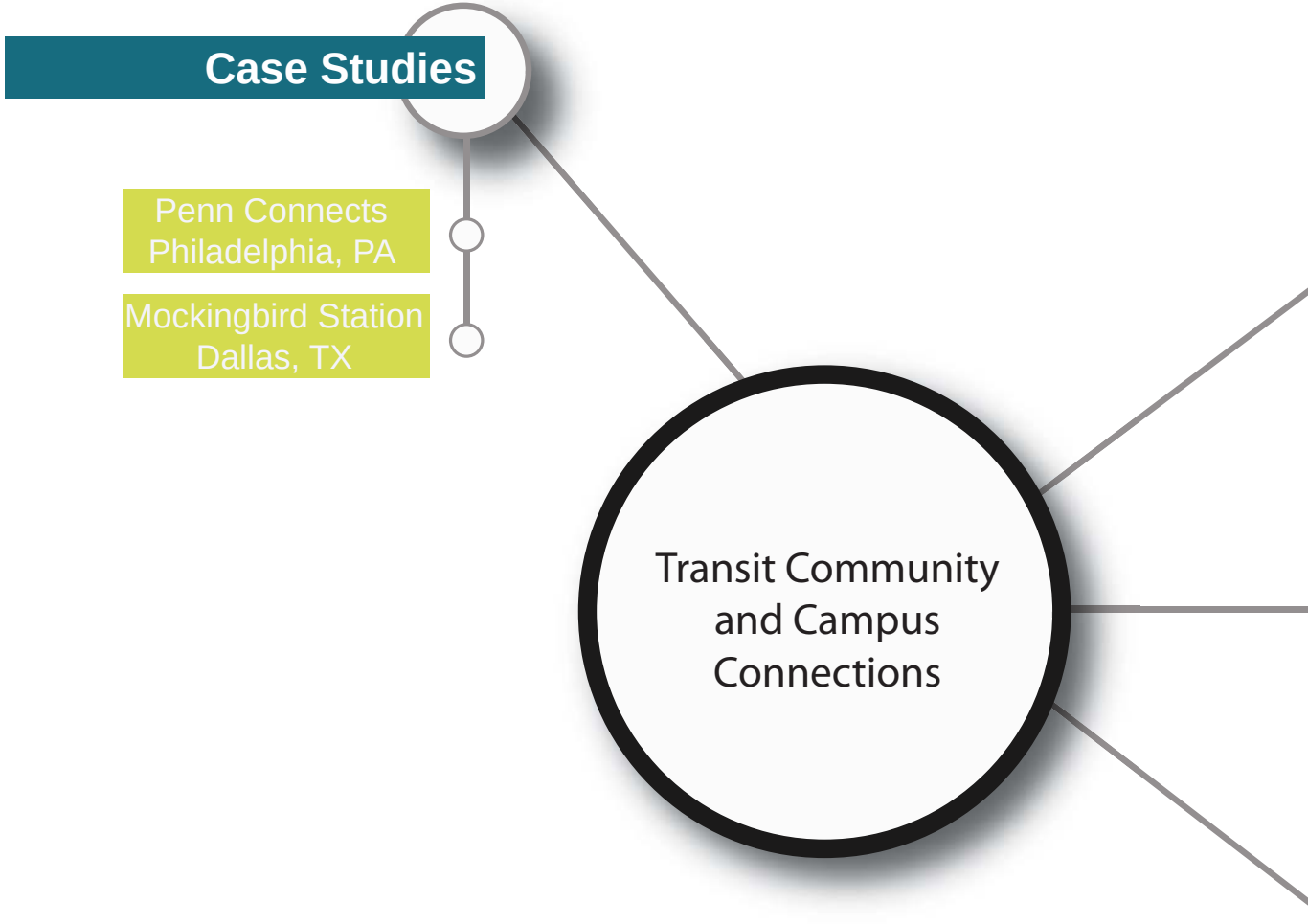
This literature review has been done to acquire the knowledge and understanding necessary to successfully solve the project dilemma of the this project. Figure 4 is a diagram illustrating the literature and articles used in the research of the project. The research in the literature map was done in order to answer the following questions:

- What are the major issues and debates about on the topics of town-gown relationships and transit systems?

- What are the origins and definitions of the topics?

- How is the knowledge on the topics structured and organized?

- What are the key theories, concepts, and ideas?


Case Studies
Penn Connects
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Mockingbird Station
Dallas, TX
Transit Community
and Campus
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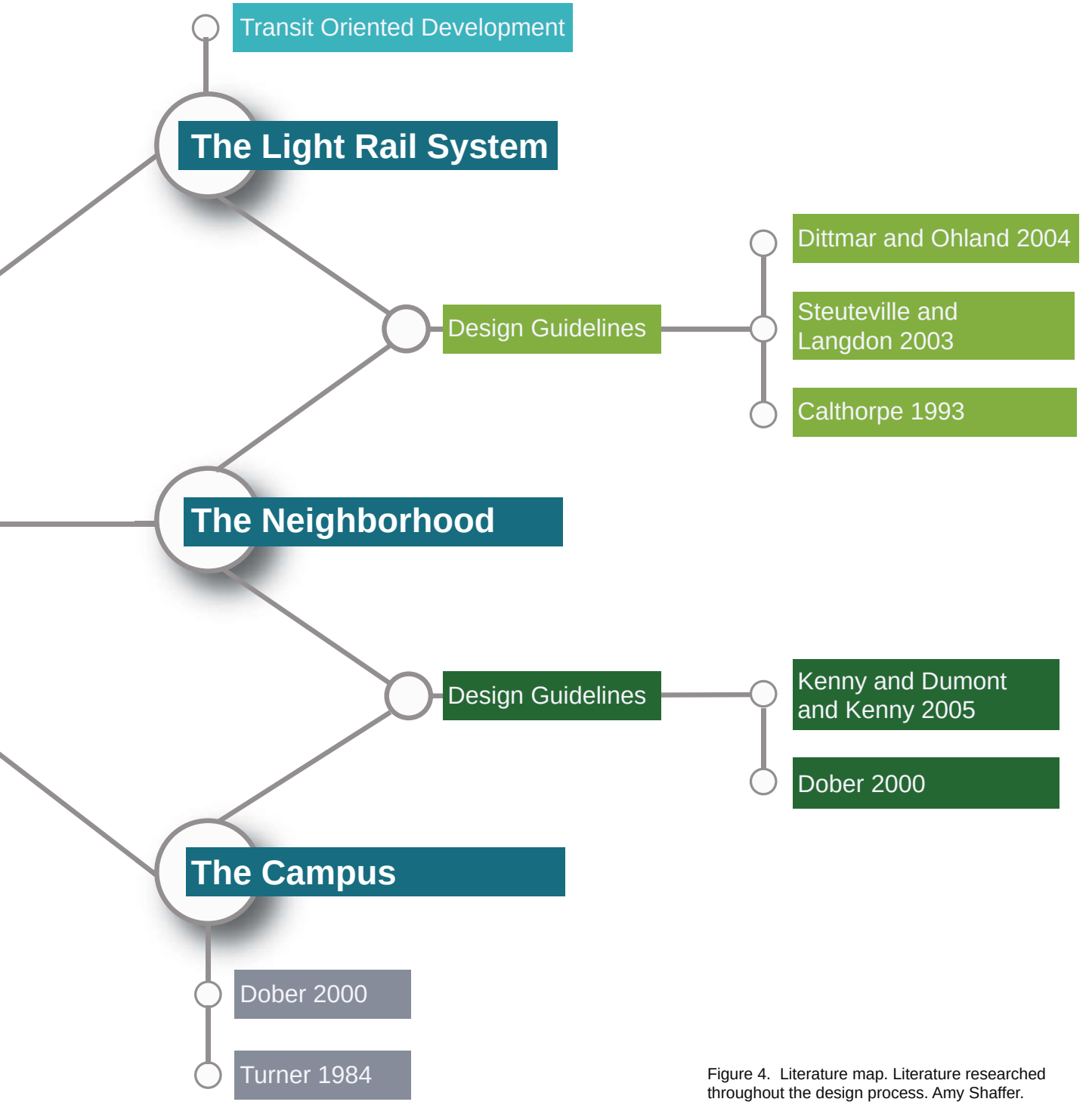


Figure 4. Literature map. Literature researched throughout the design process. Amy Shaffer.

Literature Review on Campus Design and Neighborhood Connectivity

Mission and Place: *Strengthening Learning and Community through Campus Design* by Daniel R. Kenney, Ricardo Dumont, and Ginger Kenney

The literature focused its research on the campus itself and how to enhance student learning and engagement, create meaningful places, link the institution to its place, and preserve the natural environment of the campus. The main chapter of focus was chapter six entitled *Neighborhood and Community*. The chapter addressed many of the issues with institutions and its surrounding neighborhoods, the points of view of the neighborhood and university, how leaders have emerged in creating a healthy community where both can interact together as one, and some general principles to follow when designing for both.

The major issues between university campuses and their surrounding neighborhoods today are that their relationships are weak and they are not working together to achieve a successful end product. It is important that an institution located in a city, suburb, or small town have a strong relationship with its surrounding community and neighborhoods for the success of both communities. Most academic institutions, especially those in confined cities and towns, are on a constant quest for space and land, which is a threatening reality to most neighborhoods and communities (Kenney and Dumont and Kenney 2005, 225).

Both the institution and the college have their negative points of view. The community stresses that the student housing saturates the abutting neighborhood districts, parking and traffic congest the city streets, and the public must pay to police the nighttime student activities. The college views the community as an unattractive or hostile neighborhood environment that can have an impact on recruiting top students and faculty. Also when a college experiences a lack of safety in a neighborhood students will worry about going out into the city or surrounding areas. The community and institution will endlessly describe the negatives while the positives receive little recognition (Kenney and Dumont and Kenney 2005, 225).

In order to address this problem many leaders have emerged and taken a stand in creating healthy communities. Many institutional leaders have found that they need to take the lead in building a healthy community. Those institutions that have achieved enduring symbiotic relationships with their neighboring communities or city districts are conscious of, and cultivate the benefits that both the institution and the city or neighborhood can realize from this relationship (Kenney and Dumont and Kenney 2005, 225).

As with the institutional community, physical places play a pivotal role in creating a sense of community with the neighborhood and city. Planning and implementing change to the physical environment can be a powerful vehicle for turning a negative community relationship into a positive one, and for addressing the concerns of both the institution and the town. The institutions that are the most successful in creating a positive relationship with their communities work with their neighbors in many ways such as instituting policies of buying products and services locally to acting as developers in their areas (Kenney and Dumont and Kenney 2005, 225-226).

The authors have given six general principles that have been implemented in the most successful institutions and their surrounding communities; 1) living in the neighborhood, 2) setting boundaries on growth, 3) creating a vital edge, 4) handling traffic and parking, 5) respecting the physical character of the neighborhood, 6) leveraging community partnerships through reciprocal planning (Kenney and Dumont and Kenney 2005, 226).

Living in the neighborhood

When it comes to living in the neighborhood, most colleges and universities prefer that their faculty and staff live in nearby neighborhoods. Faculty who live nearby are more likely than those with longer commutes to spend time on campus when not teaching. Also faculty are more likely to use a means other that the automobile to commute to the campus, reducing traffic congestion. Staff and faculty living nearby strengthen positive ties with the community (Kenney and Dumont and Kenney 2005, 226-228).

Setting boundaries

Most neighborhoods can live with a certain degree of institutional expansion, but they want an explicit understanding about how much the university is going to grow, what kind of growth it will be, and where it will take place. To contribute to the quality of the neighborhood rather than to its decline, institutions must, in partnership with community groups or town governments, set limits to their community encroachment, and then plan to live within those limits (Kenney and Dumont and Kenney 2005, 229).

Creating a vital edge

Until recently a clearly defined edge, such as a fence or a wall, was seen as a desirable way of distinguishing a college or university from its neighborhood. Today institutions are seeking ways of being a part of the community rather than being separated. Treatment of the edge between the institution and the town is one of the most decisive actions an institution can take in building vitality in its neighborhood (Kenney and Dumont and Kenney 2005, 229-230).

Handling traffic and parking

The worst relationships between an institution and neighborhood center on automobile issues. In many places, the institution is the single largest generator of traffic in nearby neighborhoods. Lessening the impact of traffic and parking on the town requires a cooperative strategy. The best solutions can strengthen the relationship between the university and town or it can destroy the neighborhood (Kenney and Dumont and Kenney 2005, 233-234).

Some universities have bought land in surrounding neighborhoods and have torn down housing to create surface parking for the campus. These barren parking lots can destroy neighborhood character, isolate the institutions from their host communities, and perhaps even cause neighborhood decline (Kenney and Dumont and Kenney 2005, 234). Updating a parking system is usually a large project for universities, but it should be their responsibility to create a cost-effective, safe, and aesthetically appealing solution (Dober 2000, 144).

The best method for reducing automotive impact on the neighborhood is to reduce the demand for driving. Many colleges and universities are motivated to reduce demand because of problems on campus, particularly in the core area. In this case the neighborhood will also benefit (Kenney and Dumont and Kenney 2005, 234).

Respecting the physical character of the neighborhood

In an institution's development in or near its neighborhoods, an institution should respect those neighborhoods' physical character. Lack of respect for a neighborhood's character can cause lasting problems and neighbors sometimes have long memories (Kenney and Dumont and Kenney 2005, 235).

Leveraging community partnerships through reciprocal planning

Universities and their neighborhoods often share the same needs. Actions that benefit one can also benefit the other. It is important for students and the neighborhoods to have parks and play spaces as well as local convenience stores (Kenney and Dumont and Kenney 2005, 236).

Majority of campuses are surrounded on four sides by land uses that may or may not be compatible with the institution's presence, and vice versa. These land uses include mixes of city, town, and rural development. Ideally it would be desirable to have the landscapes in those surrounds give some visual clues or share some common interests to show a connection between the campus and its surroundings (Dober 2000, 82).

In many cities and towns, overall improvements in the neighborhoods near institutions should be good for the institutions, the cities, and the neighborhoods themselves. But these improvements are not possible without leadership and direct action by the institutions (Kenney and Dumont and Kenney 2005, 239). It is important to realize that designs for both can be done to celebrate a place, communicate its purpose, presence, and domain graced with its history (Dober 1992, 3). Colleges and universities are emerging as significant players in urban revitalization and it is important that the neighborhoods and institutions work together to create a bold clear vision for the future of the community.

The literature has provided a detailed insight to the problems experienced between universities and the surrounding communities which relates heavily to the dilemma at hand. The guidelines given provide a good framework with the overall organization and design of the site.

Campus and Landscape: *Functions, Forms, and Features*

by Richard P. Dober

The literature focused on campus design and the programs, visual character, style, and certain configurations. The main chapters of focus were *Site Size and Configuration, The Surroundings of Campus and the Perimeter.*

Site Size and Configuration

The site size and configuration gave many suggestions on working with the site's natural environment such as the terrain, views, and drainage. It was found that many early American designers preferred elevated sites over flat land because the views to and from campus were better, the ambient air was presumably healthier, and waste drainage was easier to engineer. Dober mentioned the importance of placing a building or two in an area that had emblematic value. These buildings would then convey purpose, presence, and possession (Dober 2000, 17).

In categorizing topographic influences as campus landscape determinants, it is useful to discuss first macro-scale concepts and then smaller-scale terrain modifications. The first are those masterworks whose magnitude and amplitude help inform and create panoramic scenery comparable to the Acropolis or a medieval castle crowning the heights with the townscape draped down the slopes. The second are more localized in their visibility and contribution to a sene of place. Dober makes a comment that even though flatland designs lack visual interest, there is always a horizontal plane that has a wrinkle or two that can add aesthetic interest to the landscape (Dober 2000, 17-18).

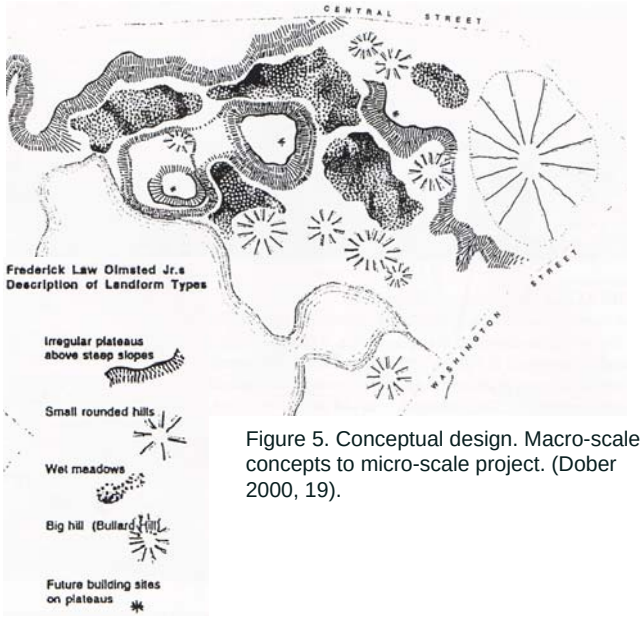


Figure 5. Conceptual design. Macro-scale concepts to micro-scale project. (Dober 2000, 19).

Figure 5 is Elizabeth Meyer's recapitulation of Frederick Law Olmsted Jr.'s terrain analysis. Figure 6 is the Academic Quad, a model interpretation of Olmsted's concept (Dober 2000, 19).

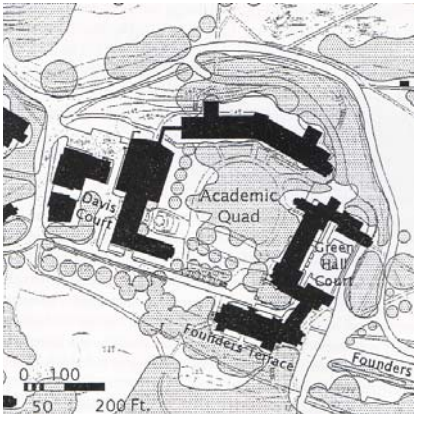


Figure 6. Conceptual design. Macro-scale concepts to micro-scale project. (Dober 2000, 19).

The Surroundings of Campus and the Perimeter

The section focused on the surroundings of campuses and your first encounters when approaching them. The many problematic issues we see on campuses today is that when we approach a campus it is always the same. We arrive at a perimeter, enter a gateway, and the campus traverses to roads and parking, bike racks, and sidewalks that lead to buildings. It is mentioned that one could arrive by a transit, taxi, or car pool to give a different experience when stepping foot on campus. More often than not the issue with campuses and their communities are disjointed and arbitrary (Dober 2000, 82).

Dober generalizes that in North America four thousand campuses are surrounded on four sides by land uses that may or may not be compatible with the institution's presence, and vice versa. The sixteen thousand combinations would include mixes of city, town, and rural development. Ideally it would be desirable to have the landscapes in those surrounds give some visual clues and cues of the campus' presence without having them separated by walls, fences, or a strong perimeter. It would be a great alternative if the institution and surrounding neighborhood community could share or promote some common interests. These common interests could include a cultural center, recreation fields, or a commercial area. Each project could generate a landscape setting beneficial at the campus-community interface. It is important to solve the town-gown conflicts in order to make the community successful (Dober 2000, 82-83).

The perimeter of the campus is a large design issue when linking the campus with the community. Campuses are often surrounded by strong perimeters, periphery, and edges. These imply this is where the campus is presumed to begin physically, and thus it may require segregation. Typically the perimeter is defined by the boundaries of the land holdings. Dober mentions three property patterns that can be discerned: self-contained and unified, fragmented, and scattered. Fragmented and scattered patterns reflect land divided by streets and intervening properly, or land and buildings on the fringe of central campus obtained and held through gifts or purchases, and staked out for protection, possible growth, income, and land use compatibility (Dober 2000, 83).

The question then arises, how should the edges of campuses be landscaped? Dober gave many examples of campuses that have dealt with this issue and it has been realized that you don't need a wall or fence to give identity to an institution. There are several other edge treatments that can give a sense of place to the campus while still having a strong connection with the surrounding community. Some edge treatments mentioned were using a pleasant composition of earth mounds, lawn, trees, and entry signs to give the perimeter a welcoming sense of place (Dober 2000, 88).

This literature covered many key components in the programming and analysis of my project site and will be a strong resource in the design process.

Campus Design

by Richard P. Dober

The literature covered almost every aspect on campus design including landmarks, materials, past styles from Gothic to late 20th century, and current designs on new campuses today.

What was most interesting in Dober's literature was his objective in creating a distinctive campus. He mentioned that the method of creating a distinctive campus involves the location of the physical components which constitute a campus; the buildings, landscapes, and infrastructure. This helps achieve a physical pattern which is functional and attractive with forms that are appropriate for the institution's purpose, size, resources, and organization; positioned to reflect the best aspects of the particular site, locale, and environs with an overall design that is as complete as possible, but adjustable to new conditions (Dober 1992, 231).

He also stressed that site arrangements and design inflections are located to encourage contact and communication among those using and visiting the campus, and to generate an image and sense of place that promotes the institution's presence, domain, and values (Dober 1992, 231).

Figure 7 is the master plan diagram for Koc University in Istanbul, Turkey. The proposed new campus is organized in response to programmatic requirements and fitted to the site to take optimum advantage of views, vistas, micro-climate, and terrain influences (Dober 1992, 236).

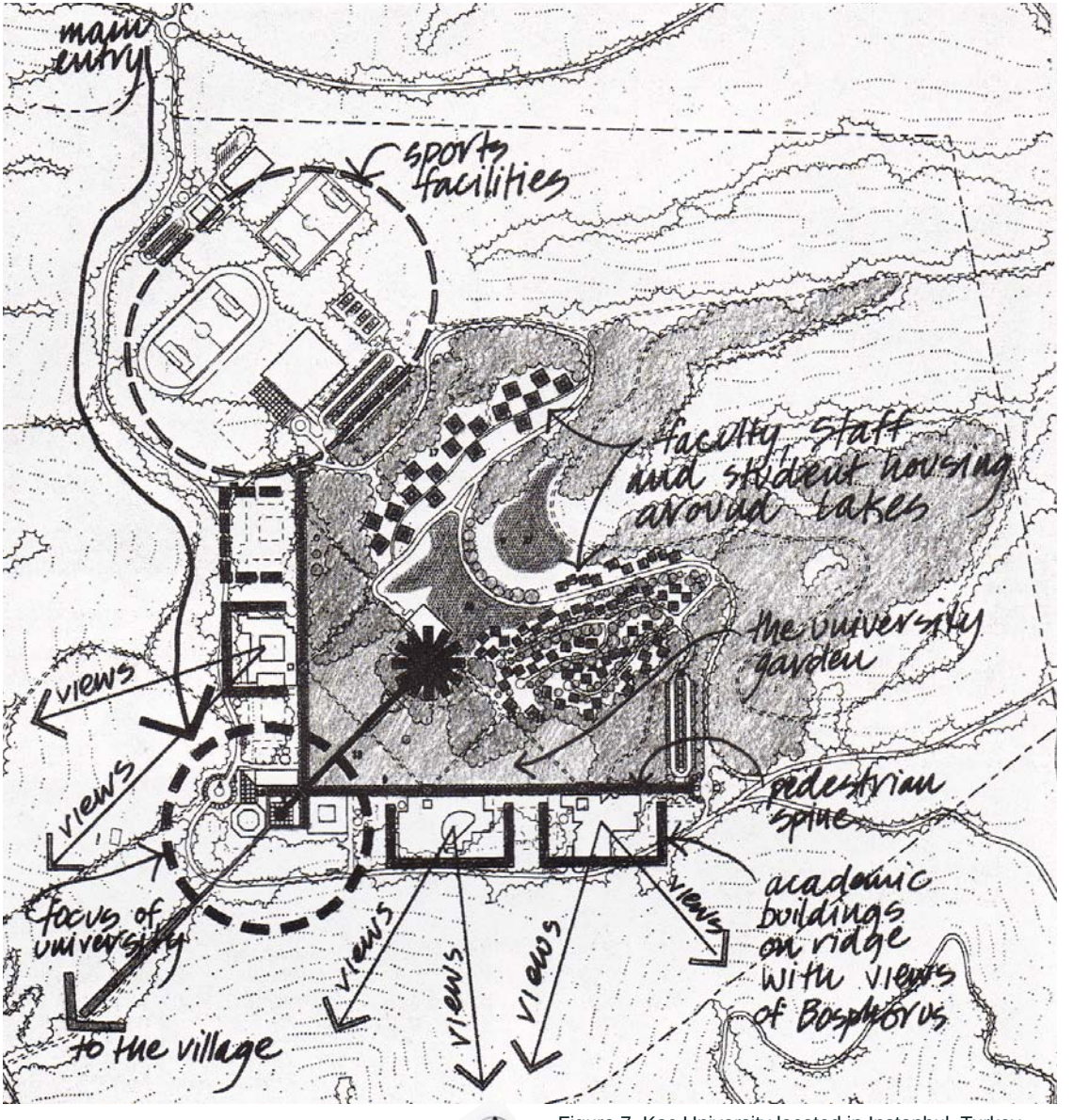


Figure 7. Koc University located in Instanbul, Turkey. Conceptual design diagram of the master plan. (Dober 1992, 236).

Campus: *An American Planning Tradition*
by Paul Venable Turner

Paul Turner focused on the early designs of college campuses and how they came about to what they are today. Such campuses discussed were Harvard, the University of South Carolina, and the University of Pennsylvania. While the initial designs of the campuses have changed quite significantly since the 1800s, their underlying principles can still be seen.

The literature demonstrates how different universities got their start and how they have progressed to what they are today. Some of the underlying principles demonstrated are the building orientations and hierarchy, views to surrounding site features, connectivity to surrounding communities, and strong axial connections.

Figure 8 is of the University of North Carolina, Chapel Hill. In the middle of the 'ornamental ground,' the first three university buildings are placed forming an open quadrangle. The number squares to the north and west of the campus are housing lots in the proposed adjacent town (Turner 1984, 56).

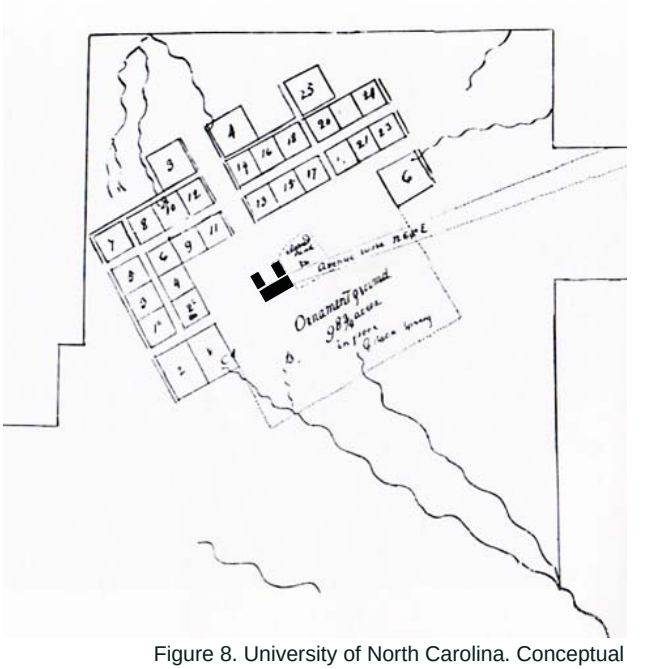


Figure 8. University of North Carolina. Conceptual diagram. (Turner 1984, 56).

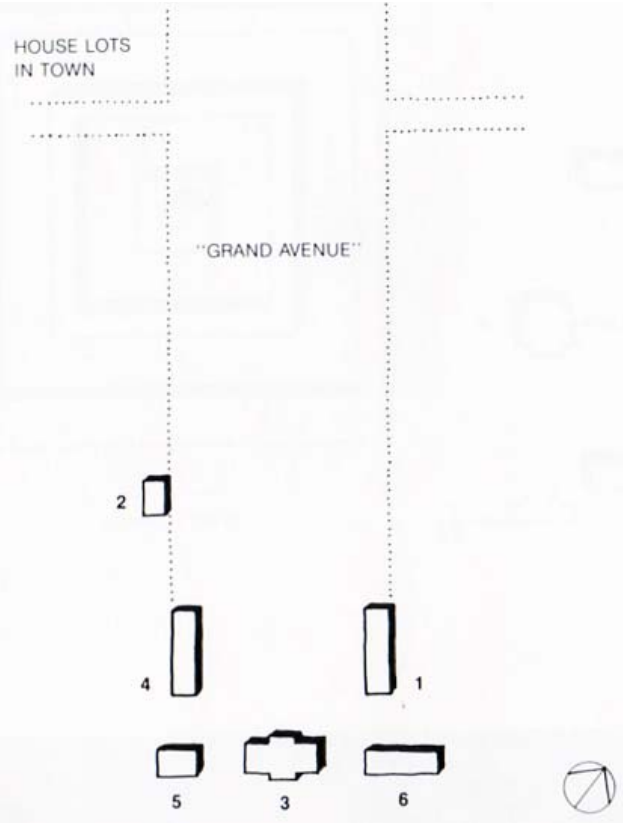


Figure 9. University of North Carolina. Diagram of building layout. (Turner 1984, 57).

Figure 9 is of the University of North Carolina that shows the early growth of the campus. The grand avenue creates a sense of entry to the campus and creates a sense of building hierarchy (Turner 1984, 57).

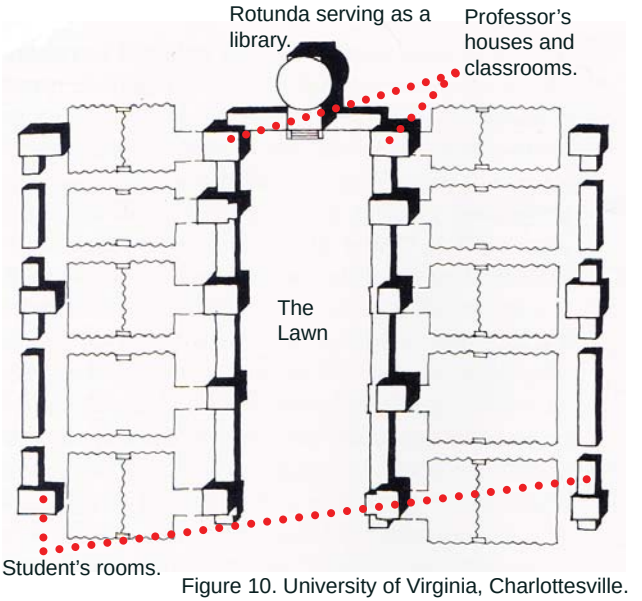


Figure 10. University of Virginia, Charlottesville. Diagram of building layout. (Turner 1984, 77).

Figure 10 is a schematic plan of the University of Virginia. There is a central space called the "lawn," that is flanked by ten pavilions each serving as a professor's house and classroom. These are then linked by colonnades onto with students' rooms are open. At the north end of the "lawn," is a domed Rotunda, serving principally as the library. Behind the pavilions are gardens, enclosed by serpentine brick walls and beyond those are extra students' rooms and dining halls (Turner 1984, 77).

This literature provided many alternatives for campus layouts and gave insight to how some of the most beautiful campuses today got their start.

Literature Review on Transit in the Community

It is important to encourage the students, residents, and visitors on the site to use the future light rail system. Many cities have transit implemented, but the stations are not being used. It is important to determine what makes the use of transit stops appealing and what can hinder the success of a transit-oriented development (TOD).

The New Transit Town

edited by Hank Dittmar and Gloria Ohland and forwarded by Peter Calthorpe

The literature focused on the many issues and debates of transit-oriented developments. It mentioned that transit proponents have been guilty of overpromising all sorts of environmental and social benefits from transit investment. Today many highway and automobile enthusiasts tend to condemn transit by using national statistics and regional averages, without reference to the fact that transit is largely a tool for urban areas and works best as part of an integrated set of strategies involving transit, development, and other supportive policies (Dittmar and Ohland 2004, 2).

Another debate pits the libertarians and smart growth advocates against one another over land use. The libertarians argue that today's growth patterns reflect market demands, ignoring decades of government intervention in planning and government subsidization of highways and automobiles. Smart growth advocates tend to overstate the effectiveness of planning remedies and ignore the very real and persistent appeal of the detached single-family home in a suburb with good schools, not to mention the difficulty of changing entrenched lifestyles and habits. TOD has been touted as a solution, with some arguing that all metropolitan growth can be accommodated through higher density infill development along transit lines (Dittmar and Ohland 2004, 2).

The literature tries to take a middle path. The authors believe that transit and transit-oriented development are essential parts of the toolkit for healthy metropolitan economies and improved quality of life (Dittmar and Ohland 2004, 2).

Some of the key topics of focus when reading the literature dealt with the factors impeding the effectiveness of TOD, traffic, and parking. Some of the factors impeding the effectiveness included the issues with free and excessive parking, poor pedestrian environments, poor quality transit service, incorrect mix of land uses, lack of transit between housing and jobs, and finally current zoning practices. The authors go into detail on each of the issues which gives a better understanding of what to avoid when designing a TOD (Dittmar and Ohland 2004, 114).

When dealing with traffic and parking there are two primary components that define the traffic and parking demand of transit-oriented development; 1) the demand generated by the transit facility independent of the adjacent land uses, and 2) the demand generated by the land uses themselves. Additional secondary factors were also mentioned to help define TOD characteristics such as the location of the TOD in relation to the region, the type and scale, and the interconnectivity and coverage of the transit station (Dittmar and Ohland 2004, 115).

The traffic and parking attributes of a TOD include location efficiency, which results when higher density mixed use is located in proximity to transit, resulting in decreased auto use. The synergy that occurs with an appropriate mix of land use has the potential to further reduce travel by internalizing trips (Dittmar and Ohland 2004, 115).

Parking must be treated carefully so as not to become an impediment to pedestrians, and because the provision of ample free parking can help generate traffic. Other than charging for parking, one of the most effective ways for changing travel behavior, there are many other strategies that can be employed. One strategy would be to configure parking so that it does not dominate a space. Parking should be oriented away from the pedestrian realm, behind buildings, or preferably in structures or underground. Increasing the amount of developable land and density in transit-oriented developments may offset the cost of structural parking (Dittmar and Ohland 2004, 121).

A second strategy would be to reduce off-street parking requirements. Zoning code parking requirements do not reflect the characteristics of transit-oriented development and can result in excessive parking that encourages driving because they are based on demand studies of isolated suburban uses with free parking. Parking requirements in transit-oriented developments can be reduced for a number of legitimate reasons, including shared parking between complementary uses, internal trips, use of on-street parking, and the trip reduction benefits of transit-orientation. After factoring for these efficiencies, off-street parking supply can often be reduced by as much as 30 percent (Dittmar and Ohland 2004, 122).

Those opposed to reduced parking requirements and parking pricing often use spillover impacts in adjacent neighborhoods to validate the need for free and ample parking. While a legitimate concern, neighborhood parking impacts can be mitigated with time restrictions, enforcement, and residential parking permit programs. Some places have priced on-street parking using meters in neighborhoods exempting residents from charges or time restrictions. Larger transit-oriented development projects, especially those with concentrations of retail and entertainment uses, should have overflow contingency plans to accommodate occasional special events and peak seasons (Dittmar and Ohland 2004, 122).

Utilizing on-street parking is another strategy. With a denser grid of pedestrian-oriented streets in development projects, on-street parking can be used to reduce off-street parking requirements and provide parking supply for adjacent retail and service uses. On-street parking should always be time restricted, and can be metered, to minimize employee parking (Dittmar and Ohland 2004, 123).

The use of remote parking facilities with shuttle and express connections to major intermodal transit stations can be important to parking design. One of the challenges of developing the property

around transit stations is the replacement of existing commuter parking. A solution is to build or lease remote park-and-ride facilities and provide frequent express bus services to the transit station (Dittmar and Ohland 2004, 122).

Another type of parking situation is unbundle parking. Private parking is usually included in the sale or lease of residential units and commercial buildings. By separating the cost of the parking from the sale or lease of the home or building, tenants pay only for what they need and any excess parking can be sold or leased to others, reducing the overall parking requirements of the development (Dittmar and Ohland 2004, 122-123).

A final strategy would be to create parking districts. Larger areas adjacent to transit-oriented developments can benefit from the creation of parking districts with municipal parking facilities funded by in-lieu fees and annual maintenance fees. When considering shared parking efficiencies, transit-orientation, and internal trips, the cost of funding municipal parking facilities can be less than providing on-site parking for individual buildings (Dittmar and Ohland 2004, 123).

The literature gave several methods and strategies for parking arrangements, methods for handling traffic, and designing appropriate circulation within a TOD. The authors also mentioned several case studies to reference which will be very important as the project moves forward.

The Next American Metropolis:

Ecology, Community, and the American Dream

by Peter Calthorpe

Peter Calthrope's literature focuses on the ecology of communities. How the ecological principles of diversity, interdependence, scale, and decentralization can play a role in our concepts to design suburbs, cities, and regions. It highlights principles for communities more diverse and integrated in use and population; more walkable and human-scaled; communities which openly acknowledge and formalize the decentralization at work in our times (Calthorpe 1993, 9).

The guiding principles Calthorpe mentions in his literature are the basic principles for all TODs, regardless of type or location, and they are simple: the site must be mixed use, transit-oriented, walkable, and diverse. Reordering private space to make the public domain more usable, memorable, and the focus of each neighborhood is an overarching goal (Calthorpe 1993, 53).

The guiding principles focused on include *Core Commercial Areas, Residential Areas, Secondary Areas, Streets and Circulation Systems, Pedestrian and Bicycle Routes, Transit Systems, and Parking Configurations.*

Core Commercial Areas

It is important to create an accessible commercial center from both local and arterial streets, placing an emphasis on the needs of pedestrians and integrating retail with civic and transit uses. This would represent a considerable change from the current norm (Calthorpe 1993, 53).

The core commercial area may be a mix of ground floor retail, office, and commercial space as shown in Figure 11. It must occupy at least ten percent of the total TOD site area and have a minimum of 10,000 square feet of retail space adjacent to the transit stop (Calthorpe 1993, 77).

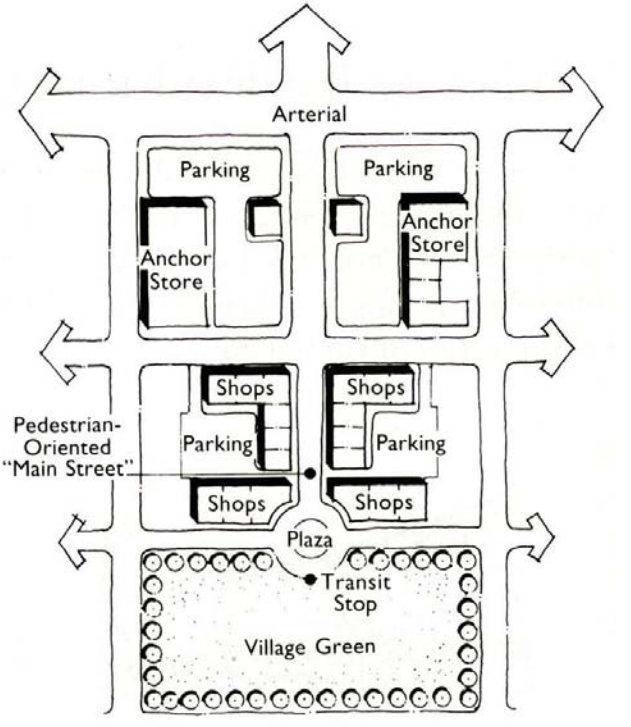


Figure 11. Core commercial area. Building configurations for commercial areas in a TOD. (Calthorpe 1993, 79).

Residential Areas

The key to the housing program for TODs is diversity and flexibility. By defining an average minimum density, the guidelines allow considerable flexibility for developers to invent new combinations of housing types. The guidelines outline several new types of housing to fill the gap between conventional single-family and multi-family needs, including courtyard cottages, small-lot single-family, and ancillary units. These higher-density forms could provide an affordable alterative while maintaining the ownership patterns and private yard features of the single-family home (Calthorpe 1993, 53).

Secondary Areas

The lower-density areas within a mile of transit represent a desirable place for the housing and low-intensity employment uses typical of the modern suburb (Figure 12). The quantity of land allocated for this use will establish the fundamental single-family/ multi-family housing ratio for a region. Secondary areas are close enough for walking and biking, and is directly linked by local streets to the mixed-use TOD. Its streets are tree-lined and comfortable to walk along. It is an area which integrates schools, neighborhood parks, and some employment into an accessible framework (Calthorpe 1993, 54).

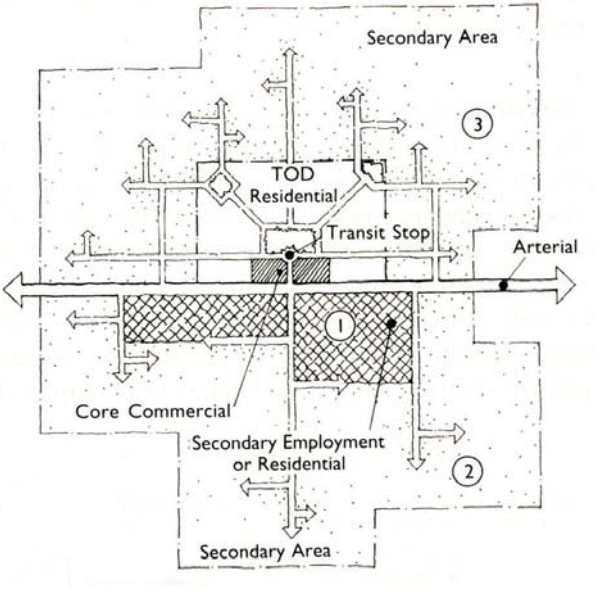


Figure 12. Secondary area. Configuration of layout. (Calthorpe 1993, 87).

Streets and Circulation System

Traffic is one of the most important and controversial aspects of TODs. Reducing street widths to slow traffic and make pedestrian crossings comfortable is difficult. Although empirical studies have shown that narrow streets are safer, changing the current standards raises issues of legal liability (Calthorpe 1993, 54). Figures 13 and 14 illustrate appropriate the street widths for a TOD.

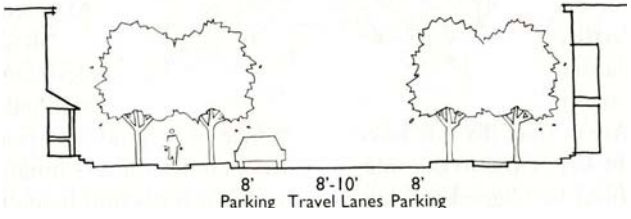


Figure 13. Street Width. Width of a typical street. (Calthorpe 1993, 95).

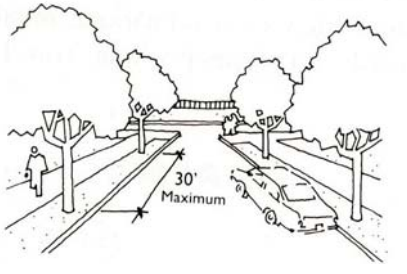


Figure 14. Street Width. Width of a typical street. (Calthorpe 1993, 96).

Pedestrian and Bicycle System

The purpose of these guidelines is to encourage streets that are comfortable, interesting, and safe to walk along rather than segregated pathways which isolate the pedestrian and result in expensive, duplicative systems. The emphasis for bikes should not be to integrate them on the street rather than create a separate network (Calthorpe 1993, 54).

Transit System

Land use and transit systems must be planned together. Transit systems should help guide regional growth and land use, and transit stations should be treated as neighborhood and community focal points. Placing stations at the center of mixed-use commercial and residential neighborhoods will increase ridership as it allows people to combine errands on foot (Calthorpe 1993, 54). Figures 15 and 16 illustrate these guidelines.

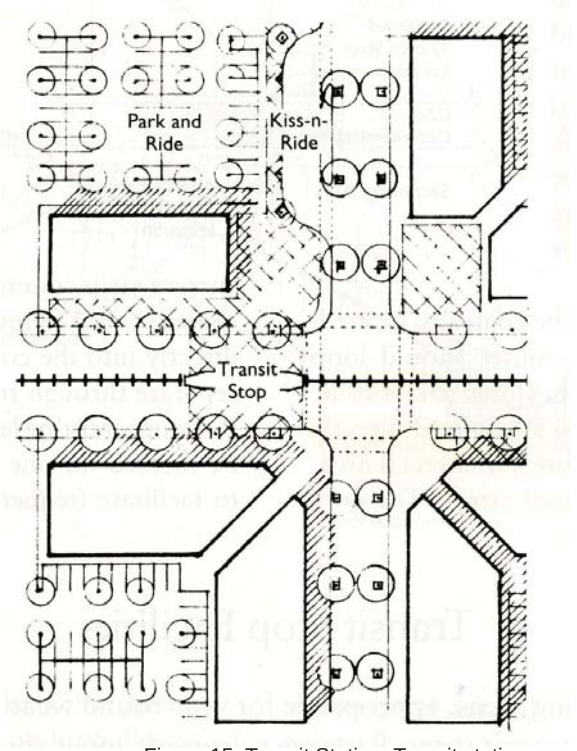


Figure 15. Transit Station. Transit station layout. (Calthorpe 1993, 105).

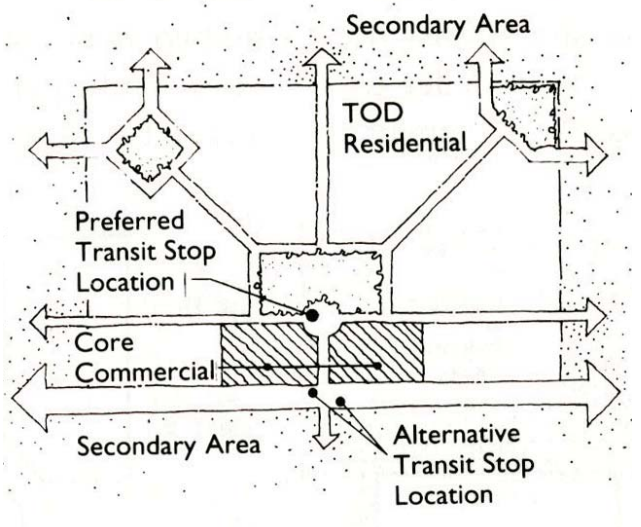


Figure 16. Transit Station. Transit station layout. (Calthorpe 1993, 106).

Parking Requirements and Configuration

In mixed-use areas several strategies should be employed to reduce the functional and aesthetic dominance of parking lots. On-street parking should be credited, the number of stalls should be reduced to reflect the joint-use time of day or time of week needs of different uses, and lower standards should be set to reflect non-auto arrival modes- transit, bike, or pedestrian. Where possible, parking lots should be placed to the rear of buildings with entries and windows fronting on streets and sidewalks as shown in Figures 17, 18, and 19. Reducing and relocating parking lots will be a difficult change, as developers do not want to be at a disadvantage in competing with conventional projects (Calthorpe 1993, 55).

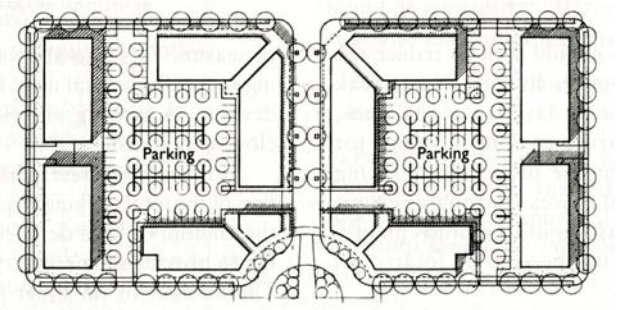


Figure 17. Parking. Parking is to be located behind buildings. (Calthorpe 1993, 110).

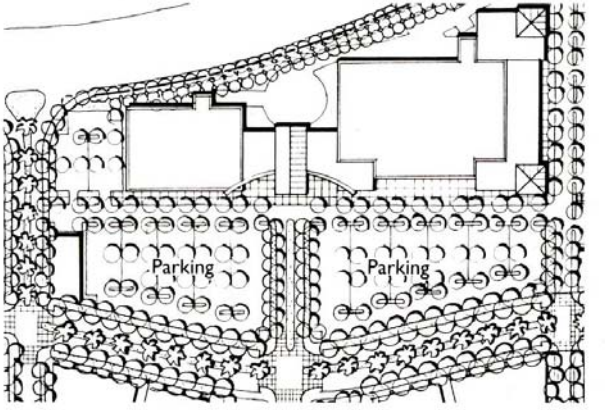


Figure 18. Parking. Parking is to be located behind buildings. (Calthorpe 1993, 112).

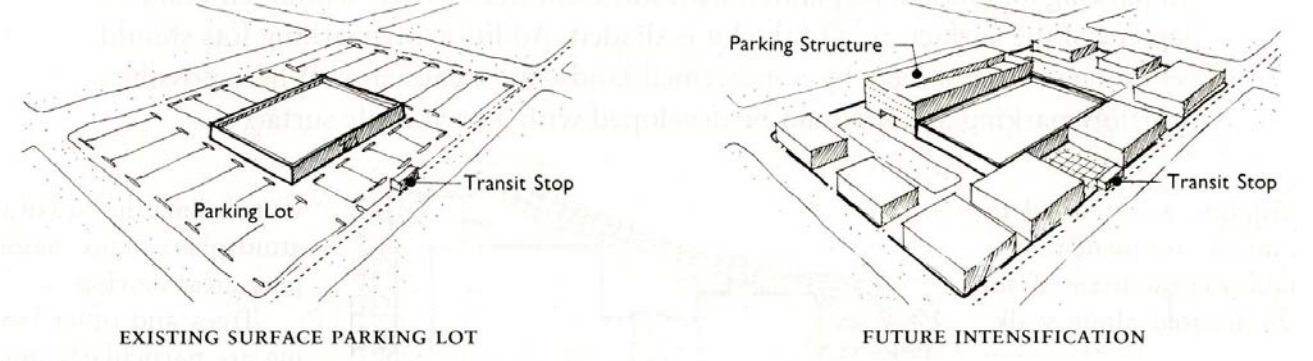


Figure 19. Parking. Existing and future parking and transit location layout. (Calthorpe 1993, 112).

Figure 20. Mockingbird Station. Chapter three photo. (Flickr.com).

3. Precedent Studies

In the research completed two precedent studies were selected to analyze specific issues relevant to the project site. The Penn Connects plan was chosen due to the connection of the institution with its surrounding community and for the creation of several inviting places on the campus for everyone to enjoy, not just its students.

The second precedent study chosen was Mockingbird Station in Dallas, Texas. This was selected to better understand how to make transit systems more appealing to the surrounding residents and visitors. There are several issues that need to be considered when making a transit system attractive and Mockingbird Station was one of the first to successfully integrate transit within a community.

Both precedent studies contain important information that demonstrate several of the principles and guidelines learned in the previous literature reviews.

Penn Connects

Project Name: Penn Connects
Location: University of Pennsylvania
Size: 47 acres
Designer: Sasaki Associates
Client: University of Pennsylvania
Date of completion: Last phase to be completed 2025.

Project Background

Penn Connects, the Campus Development Planning Study for the University of Pennsylvania was submitted by Sasaki Associates in June 2006 (Figure 21). The plan acknowledges the unprecedented opportunity to transform the Penn campus in response to the acquisition of the postal properties along the Schuylkill River shown in Figure 22 and 23. The campus expansion of contiguous land will enable the University, for the first time in history, to establish a major physical presence along the Schuylkill River corridor, create new gateways to the campus from the city, and establish new connections with the surrounding communities. It will also enable the University to address short term programmatic needs, as well as strategic priorities that may arise as they develop and improve over the next 30 years or more (Sasaki 2006, 1).

Figure 21. Master plan. Master plan of the university's expansion. (Sasaki 2006, xv).

Campus Vision

To connect the University to the City and the City to the University. The vision emerges from a broader goal of establishing stronger connections, not only within the campus, but in the surrounding community context as well (VisionPlan, ix).

The Vision Plan that emerged from the master planning process focused on the following premises:

- Establish new connections and gateways between the campus, Center City and the neighboring communities,

- Concentrate mixed-use, dense development with strategic locations taking advantage of existing transportation hubs,

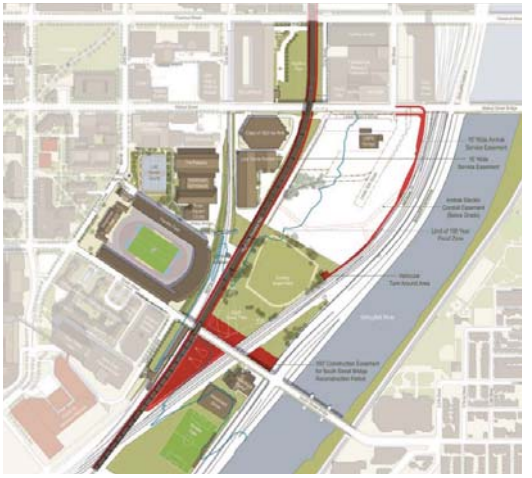


Figure 22. Flood plain. Campus flood plain. (Sasaki 2006, xv).

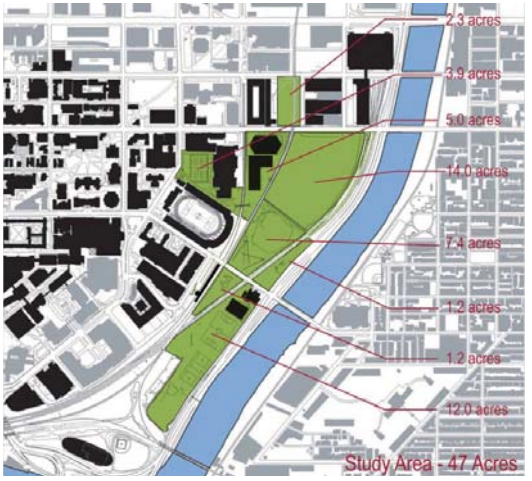


Figure 23. Acquired lands. The university's expansion. (Sasaki 2006, xvi).

- Create a signature new park to include sports and recreation fields east of Franklin Field on the site of the existing Bower Field and the surface parking areas of the postal lands,

- Provide for a series of new public gathering and circulation spaces in the Palestra and Franklin Field area that serve to link the postal lands and the campus,

- Accommodate significant development potential for future academic, research and supporting program elements, and,

- Establish a university presence along the Schuylkill River.

The circulation, landscape framework, and development opportunities of the campus vision are conceptually organized by "Bridges of Connectivity," a series of existing, proposed, and virtual theme bridges that link the campus and eastern expansion to Center City.

Program

When examined concurrently with University-owned properties the east campus area encompasses over 42 acres of land for future development. The consultation process revealed a wide range of potential programming priorities that were considered during the planning process. These priorities include:

- Housing- undergraduate, graduate, family, alumni, visiting, faculty, and retiree

- Athletics and recreation facilities- open spaces, public spaces, a modern field house, intramural and club sports

- Undergraduate and graduate student centers- study and recreation spaces

- Cultural- universal performing art space

- Conference center- hotel, international conferences, continuing education
- Retail shopping and dining
- Daycare
- Research- flexible interdisciplinary space, corporate co-location
- Non-academic offices relocated from core campus
- Parking

The areas of focus consisted of the proposed bridge connections to the surrounding communities, the edge treatment of the east campus, the mixed use development, and parking issues.

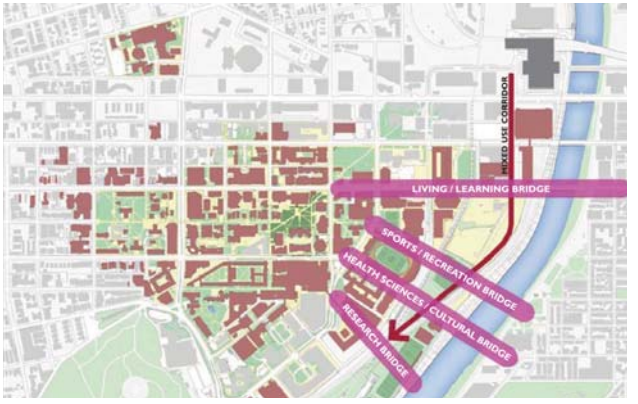


Figure 24. Proposed bridges. Bridges of connectivity. (Sasaki 2006, 30).

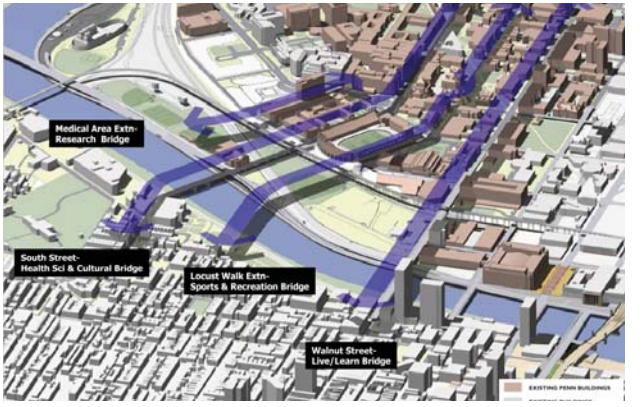


Figure 25. Proposed bridges. Bridges of connectivity. (Sasaki 2006, 31).

Bridges of Connectivity

There are four bridges, as shown in Figures 24 and 25, that Penn is proposing build in order to link the campus to the neighboring communities and they are:

Living/Learning Bridge

Walnut Street is envisioned as the gateway connecting Center City with the core of the Penn Campus. The proposed mix of uses is intended to contribute to the academic and research environment, and includes retail, food services, and hotel and residential uses. Parking for the area is located underground. The Living/Learning Bridge, Figure 26, along Walnut street will connect Rittenhouse Square to College Green, Hill Square and points west (Sasaki 2006, xi).

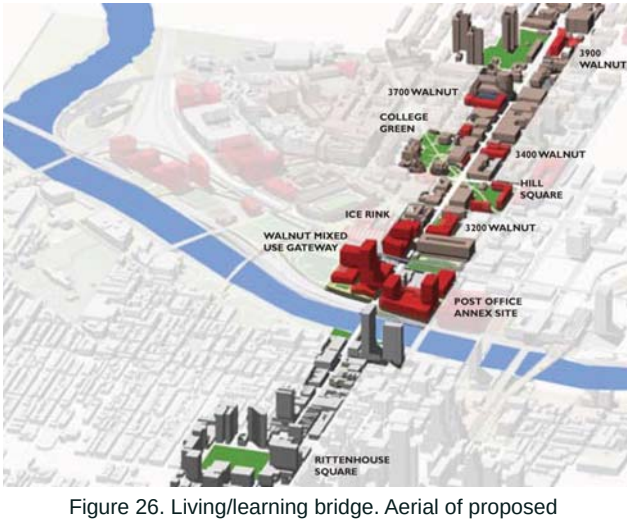


Figure 26. Living/learning bridge. Aerial of proposed bridge. (Sasaki 2006, 33).

The Sports/Recreation Bridge

The Sports and Recreation Bridge serves as the extension of Locust Walk, connecting College Green with new open spaces at the Palestra and Franklin Field (Figure 27). It extends eastward, providing access to the sports and recreation fields and across the Schuylkill River to connect with the Schuylkill Banks Park system (Sasaki 2006, xi).

The Cultural/ Health Sciences Bridge

The South Street Bridge is envisioned as the cultural gateway to the campus in recognition of the Museum of Archaeology and Anthropology. Future uses along the bridge could include social and cultural activities (Sasaki 2006, xi).

The Research Bridge

A pedestrian bridge is planned to connect the medical district with the River Fields, opening this area up for medical expansion and research space in the long term (Sasaki 2006, xi).

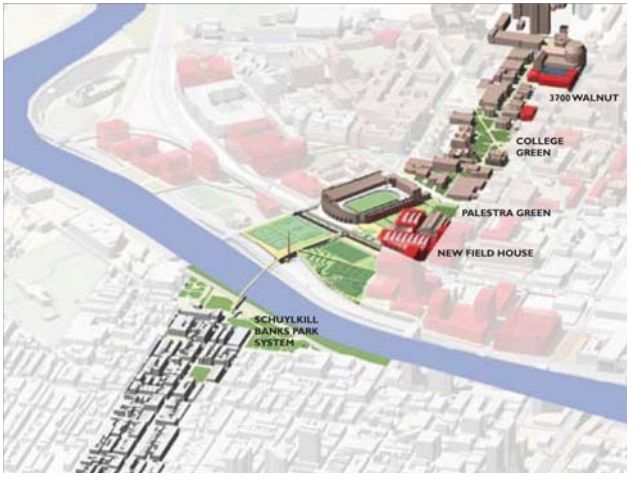


Figure 27. Sports/recreation bridge. Aerial of proposed bridge. (Sasaki 2006, 33).

Urban Parks and Fields

Penn Connects envisions a dramatic transformation of the postal lands property in conjunction with the redevelopment of existing, under-utilized open space surrounding the Palestra and Franklin Field. Figures 28 through 31 illustrate the locations of the program elements.

The program elements for the postal lands includes:

- A proposed women's NCAA quality softball stadium with synthetic infill turf with seating for 1,000 spectators, an electronic scoreboard, and storage below the bleachers (Sasaki 2006, 8).

- A synthetic infill turf field to accommodate NCAA men's and women's lacrosse and soccer with a full size field measuring 360' x 210'. This primary field could be enclosed for part of the year with a seasonal air structure, permitting indoor practices for intercollegiate and recreational sports (Sasaki 2006, 8).

- A synthetic infill turf field on top of the future parking garage adjacent to South Street Bridge to accommodate NCAA women's field hockey (Sasaki 2006, 8).

- A minimum of six new outdoor tennis courts with bleachers to accommodate the relocation of the existing tennis courts. Additional courts are recommended (Sasaki 2006, 8).

- All field venues are to incorporate the use of synthetic infill turf where possible and sports lighting to permit evening use of the fields (Sasaki 2006, 8).

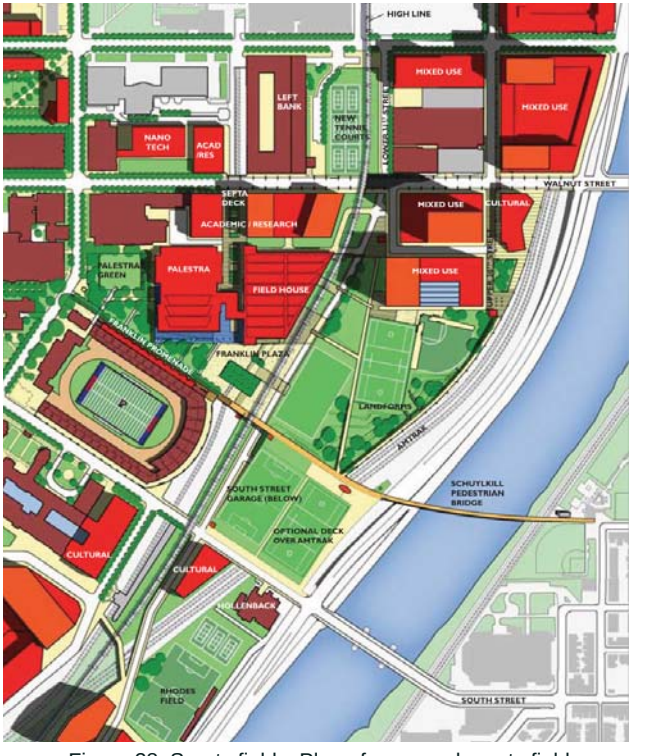


Figure 28. Sports fields. Plan of proposed sports fields. (Sasaki 2006, xvii).

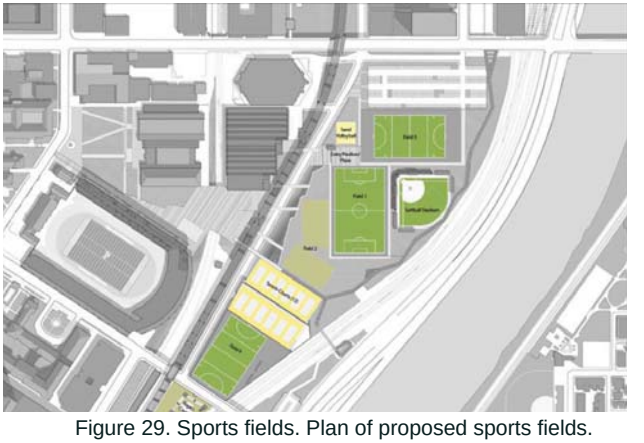


Figure 29. Sports fields. Plan of proposed sports fields. (Sasaki 2006, 9).

The placements of the fields create strong visual and physical connections from the core campus toward the urban parks and fields and to the pedestrian bridge across the river to the city (Sasaki 2006, 5).

Franklin Field Plaza, a new urban public space will anchor the Promenade at the east and provide a venue for outdoor pre-game celebrations. The plaza will bridge the channel of the SEPTA line and, with broad stairs stepping down to the fields, will link the upper and lower fields (Sasaki 2006, 5).

The Fields

The Urban Park east of the Highline and stretching from Walnut Street features a fabric of tightly interwoven recreation and athletic components (Sasaki 2006, 23).

Formal and informal play fields are framed and subdivided by patches of canopy trees extending the familiar landscape of the campus. The shady environment of the grove allows for relaxation between classes or after a match (Sasaki 2006, 23).

A welcoming entry plaza is situated at the gateway to the fenced athletic sports facilities. It collects the pedestrian flow to the play fields and provides sunny areas to gather around the field entrance. A small entry pavilion, placed in the middle of the plaza, meets the need for ticketing, restrooms and small scale storage (Sasaki 2006, 23).

The grove contains a continuous vegetated swale, collecting conveying and finally, infiltrating the stormwater runoff of the sports fields and paved park surfaces. Besides its environmental purpose, the swale will be designed to be an aesthetic enrichment of the park (Sasaki 2006, 23).

The Amtrak Northeast Corridor and the Schulkill Expressway disconnect the park from the river and challenge the site with all of the effects of busy traffic. In order to mitigate these effects, a screening device along the rail lines is proposed. A semitransparent metal mesh, attached to the raised walk structure, provides visual relief and interest (Sasaki 2006, 23).

Figure 30. Sports fields. Plan of proposed sports fields. (Sasaki 2006, 10).

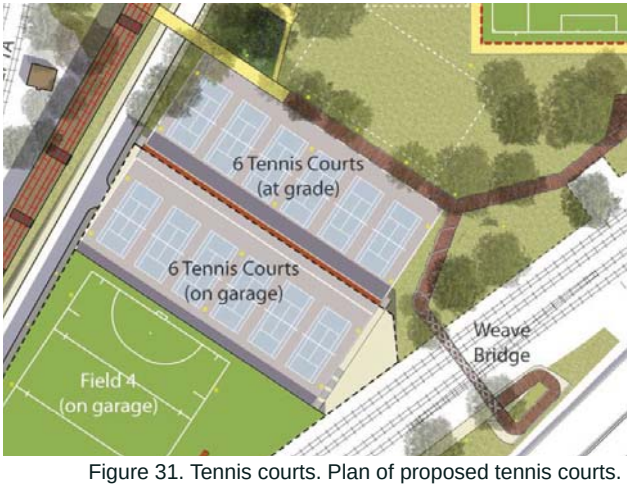


Figure 31. Tennis courts. Plan of proposed tennis courts. (Sasaki 2006, 10).

Walnut Street Mixed-Use

East of the Highline, a major new mixed-use node is proposed on the postal lands. This area is envisioned as a new gateway to the campus and could include research, office, hotel, residential and retail/commercial uses. Figures 32 and 33 are two different renderings illustrating the character of the mixed-use entrance. An estimated 1.7 million (gsf) of space can be accommodated in the proposed development, which would be constructed at the level of the Walnut Street Bridge, with parking provided below in a deck. Development must be located at the bridge level and above due to the floodplain conditions in the area. Up to three levels of parking are possible below the bridge level. The development will eventually include a 30-story mixed-use development, and a 15-story mixed use building constructed over the parking deck (Vision Plan 2006, 48).

The 30-story tower is located closest to Walnut Street and would include bridge level uses that activate the street and enhance the gateway to the campus (Vision Plan 2006, 48).

Figure 32. Living/learning bridge. Living/learning bridge mixed-use entrance. (Sasaki 2006, xvi).

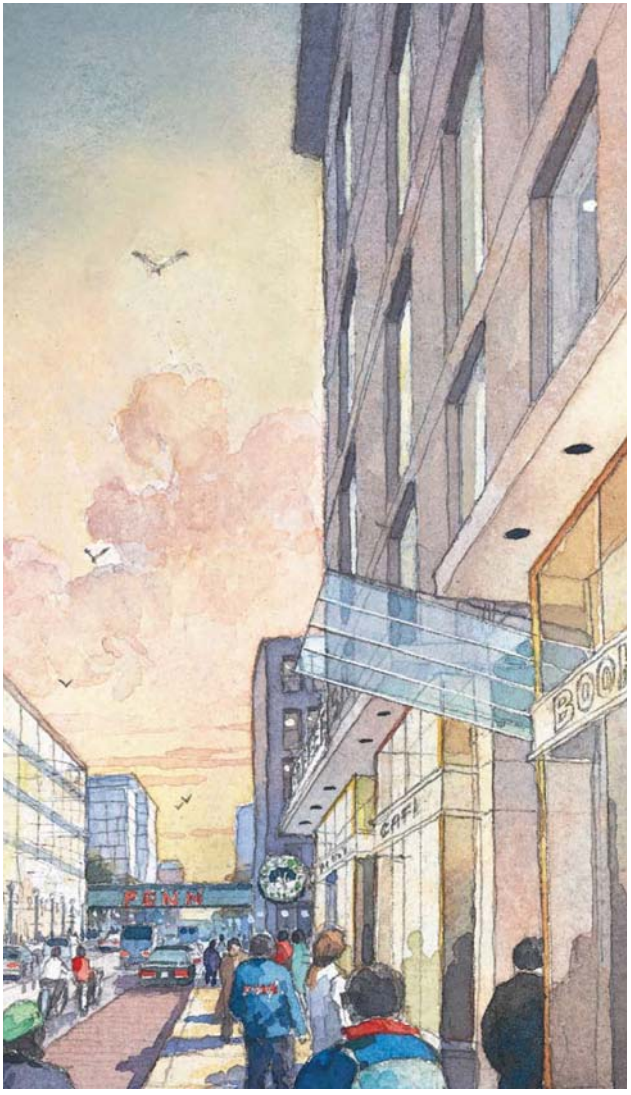


Figure 33. Living/learning bridge. Living/learning bridge mixed-use entrance. (Sasaki 2006, 51).

Lessons Learned

There was much to be learned from studying the Penn Connects plan. The information taken into great consideration was the program, the design elements used to create a connection to the surrounding communities, the size of certain amenities, and the circulation issues for both vehicular and pedestrian. The proposal follows many of the guidelines discussed in the literature review texts, which will help with the completion of the project.

Mockingbird Station Dallas, Texas

Project Name: Mockingbird Station
Location: Dallas, Texas
Size: 10 acres
Designers: RTKL and Ken Hughes
Client: City of Dallas/Dallas Area Rapid Transit (DART)
Date of completion: July 2001

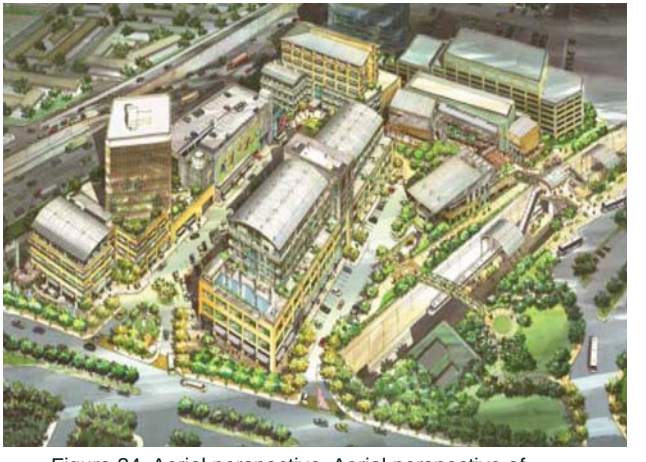


Figure 34. Aerial perspective. Aerial perspective of Mockingbird Station. (Mockingbird Station).

Physical Context and Site Analysis

Located four miles north of Downtown Dallas, Mockingbird Station is an urban-chic, mixed-use village linked directly to a Dallas Area Rapid Transit (DART) light-rail station via a welcoming pedestrian bridge (Figure 34). This is the first mixed-use project in Texas specifically designed and built for a light-rail station (Mockingbird Station).

The Station is literally built upon and around the historic elements from the original warehouse and carries many of these significant components throughout its current architecture. One of the key components of the Station's success is its appeal and ease of access to both transit users of the DART light rail and motorists driving the vastly traveled Central Expressway and Mockingbird Lane. However, it is still not enough traffic to overwhelm the pedestrian friendly site as developers pushed many of the just over 1,600 parking spaces on-site into the below grade parking garage (Mockingbird Station).

Project Background

The Dallas-Fort Worth metro-plex was seeking to reinvent itself around rail and transit-oriented development (TOD). DART had in place only twenty miles of light rail in 2002, and the system had been operating only since 1996, with an additional twenty-four miles opening to the suburbs by 2003 and other corridors in the planning stages. But in part because the starter lines served a transit-dependent population on the city's south end and employment centers to the north, ridership was well above projections, and DART had become so popular that 77 percent of voter passed a bond proposal in 2000 to dramatically accelerate the expansion of the light-rail (Dittmar and Ohland 2004, 156).

Trained as an urban planner, DART executive director Roger Snoble understood the transportation/land use connection. At DART he did market research and analysis to identify development opportunities at each station. DART designated a staff person to act as a liaison to developers who shared the agency's vision of high density, mixed-use, transit-oriented development, and who could make available to them the agency's engineering and real estate expertise (Dittmar and Ohland 2004, 156).

Economic development was within the scope of the agency's mission, and by 2001 DART boasted that more than one billion dollars in new development was either built or under construction near stations. The agency advertised this success and a 1999 study by the University of Texas showed that property valuations within a quarter mile of a DART station were 25 percent higher. In 2003 a follow-up study showed that the value of office properties were increased by 53 percent near DART stations and the residential properties increased by 39 percent. The suburbs of Dallas seemed poised to do whatever was required to encourage TOD even if it meant making significant public investments in streets, landscaping, and other infrastructure (Dittmar and Ohland 2004, 157-158).

In 2002, Mockingbird Station stood out because of its ambitious, well-designed, and functional mixed use development. Mockingbird station is interesting because its works as an auto-oriented and transit-oriented environment. Mockingbird Station is immediately adjacent to the light-rail line with service every ten to twenty minutes. Parking is provided at the station, but is mostly underground (Dittmar and Ohland 2004, 160).

Program Elements

- 211 loft style apartments (Figure 35 and 37)
- 150,000 square feet of office space
- 183,000 square feet of retail (Figure 38 and 39)
- 6 restaurants (Figure 40)
- An eight-screen independent film theater
- A bank
- A dry cleaner
- 1,440 parking spaces (which nearly all are underground)

There is also a full-service grocery store and ninety other shops within a five-minute walk of the station (Urban Land Institute 2006). Figures 36 and 41 illustrate the locations of these program elements.

Project Vision

The vision of the project was to create a TOD that encouraged the use of walking and transit rather than the automobile. It was important to create a community that had close connections with residents and make access to the rail easy and convenient for everyone (Urban Land Institute 2006).

Figure 35. Apartment lofts. Apartment lofts at the station. (Mockingbird Station).

Goals of the Project

Some of the most important goals of the project were to:

- Create organization, but with surprise
- If buildings exist, reuse them if they are in good quality
- Provide broad pedestrian access from the rail
- Hide most of the parking
- Create city blocks that are 360 degree fronts
- Make good connections to neighbors (Hughes and Dunning 2002, 19).

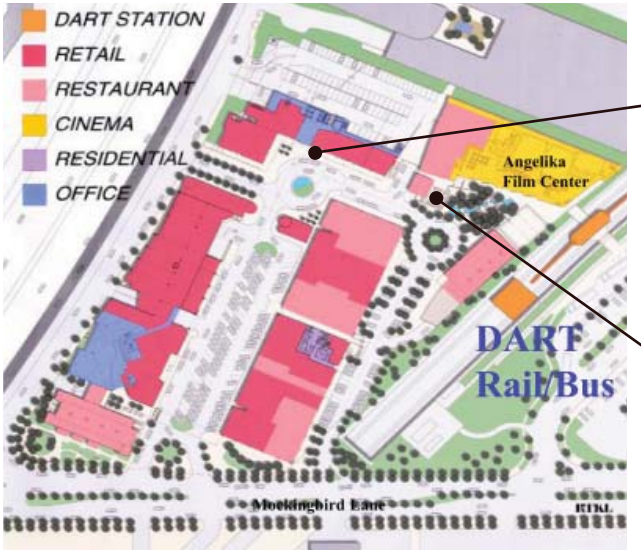


Figure 36. Station plan. Station plan. (Mockingbird Station).

Figure 37. Lofts. Residential lofts at the station. (Mockingbird Station).

Figure 38. Retail. Perspective of retail building. (Mockingbird Station).

Figure 39. Retail. Perspective of retail building. (Mockingbird Station).

Figure 40. Outdoor Dining. Perspective of outdoor dining. (Mockingbird Station).

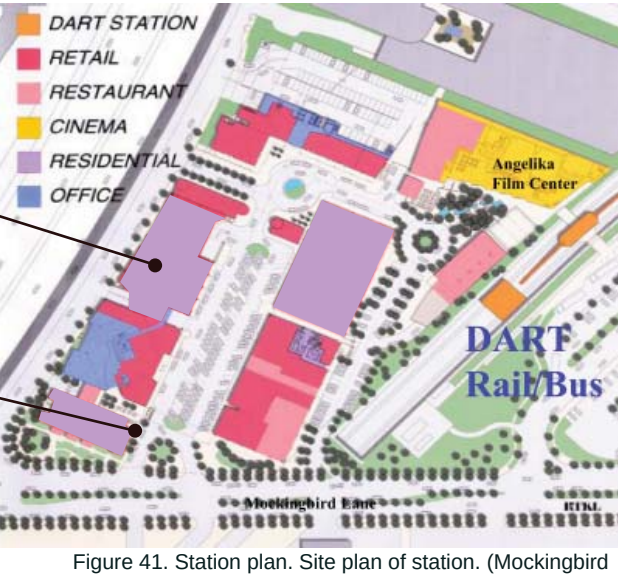


Figure 41. Station plan. Site plan of station. (Mockingbird Station).

Lessons Learned

Carefully studying the success of Mockingbird Station has helped with the understanding of programming needs and overall organization around transit stations in order to make them appealing to those living in an area. The station has successfully incorporated mixed-uses, residential, parking, and many necessities within a five minute walk which is important to any community trying to reduce automobile usage.

Overall the two precedents studies of focus are supportive of the guidelines proposed in the literature review texts and will be great resources to reference throughout the site programming and design process.

Figure 42. Lava. Chapter four photo. (Flickr.com).

4. Site Inventory

The island of Oahu was built by the extrusion of basaltic lavas from the Waianae and Ko'olau shield volcanoes. As volcanic activity in the Waianae volcano ceased, lava flows from the Ko'olau volcano banked against its eroded eastern slope forming a broad plateau, known as the Schofield Plateau (Geolabs Inc. 2007, 3).

The project site is located to the southeast of the Waianae Mountains. The Ewa Plain is a gently sloping alluvial plain formed by the deposition of alluvial clays and silts derived from the weathering of the basalt rock formation further up-slope. The alluvial deposits were laid down and are inter-bedded with marine sediments and coral/algal reef formations to form a sedimentary wedge. This wedge forms the Ewa Plain and serves as the confining formation, or "caprock," over the artesian basal aquifers of southern Oahu (Geolabs Inc. 2007, 3-4). Basalt rock formation resides below the marine deposits at substantial depth (Geolabs Inc. 2007, 3-4).

The project site is situated over the alluvial clay soils. The coral line and marine deposits are believed to underlie the site, but at some depth beneath the alluvium. Agricultural developments within the last 100 years have brought the area to its present form (Geolabs Inc. 2007, 4).

The inventory began with looking at the site as a whole. The process began by closely looking at the demographics, hydrology, soils, existing site conditions, surrounding uses, and the circulation that takes place on and around the project site. Studying these aspects will ultimately help with the programming needs of the site and the appropriate locations for the campus, surrounding residential, and the proposed transit stations.

After examining the overall site and its surroundings and its existing conditions, it was important to analyze the proposed campus plan to make sure it was accessible and inviting to the surrounding community. The first elements studied were the pedestrian and vehicular circulation paths, outdoor spaces, building orientation, the student body characteristics, and the existing program. Unfortunately, the proposed plan does not support my goals and objectives and the plan will have to be revised. The program will remain the same with a few extra elements added to help achieve some of the guiding principles of the project.

Transportation/Circulation

Existing

The site is located southeast of Farrington Highway that runs in an east-west direction adjacent to the property. Approximately 4.4 acres will be set aside for edge improvements to Farrington Highway. To the southwest of the site runs Kapolei Golf Course Road, the Kapolei Golf Course entry drive (Figure 43).

There is a bus route along Farrington Highway, but the nearest stop is about a 10-15 minute walk to the site.

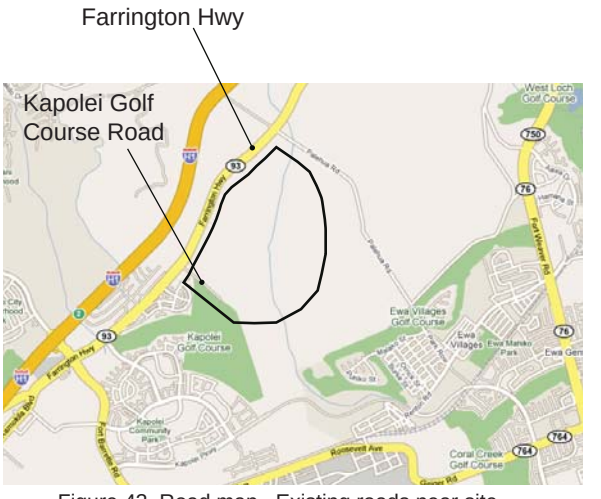


Figure 43. Road map. Existing roads near site. Amy Shaffer.

Proposed

Along the east side of the site there is a proposed road that is currently referred to as 'North-South' road (Figure 44).

In 2015, Hawaii will have their light rail system integrated within the island and there are two proposed stations to be located along the east side of the project site with the rail continuing to extend westward past the site (Figure 45 and 46).

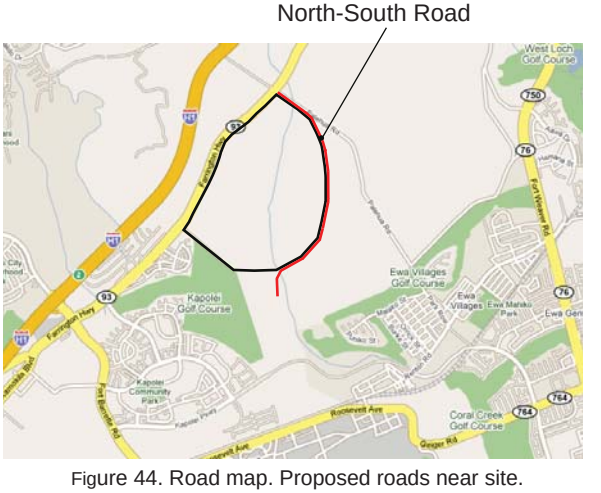
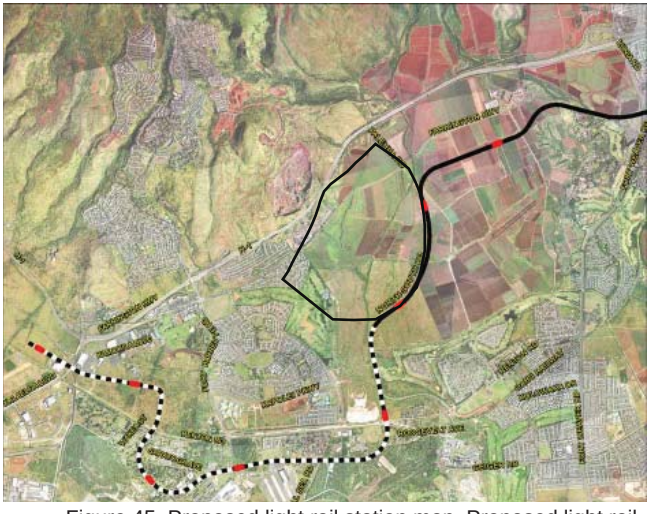


Figure 44. Road map. Proposed roads near site. Amy Shaffer.

Proposed Light Rail Line and Station Location



Legend

Potential Station Location

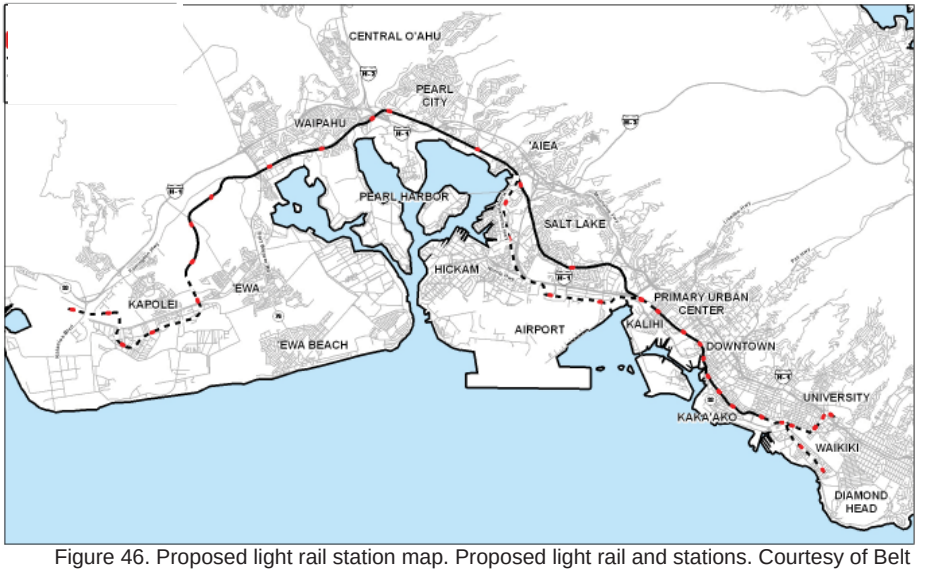
First Project

Planned Future Extension

N

Not to Scale

Figure 45. Proposed light rail station map. Proposed light rail and stations. Courtesy of Belt Collins.



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Not to Scale

Figure 46. Proposed light rail station map. Proposed light rail and stations. Courtesy of Belt Collins.

Surrounding Land Use

It is important to identify the surrounding uses around the site in order to determine an appropriate program. Knowing the surrounding uses and their distances from certain areas on the site could give a strong indication as to where the best transit stations should be located. Too often transit lines are located in areas that are not transit supportive because they have too little density, no pedestrian quality, and little opportunity for redevelopment.

To conduct this study a circle diagram was created, Figures 47 and 48, that included specific radii to show the distance of a five minute walk, a ten minute walk, and one mile from the center of the site and on its surrounding land uses.

The studies have suggested that it would be appropriate to have any of the following uses be accessible within the project site. The closest uses were elementary schools and dining, but only the elementary schools were within the ten to one mile walking radius. The amenities seem to be scattered around the site and by being able to centrally locate them and make them accessible through walking or biking would be ideal. The locations of the current amenities as shown in figures 49 through 56.

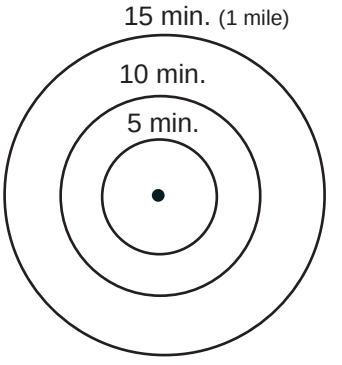


Figure 47. Walking radius diagram. Walking diagram based on minutes. Amy Shaffer.

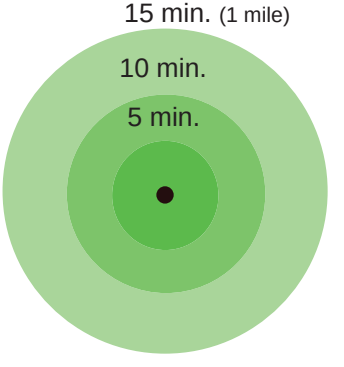
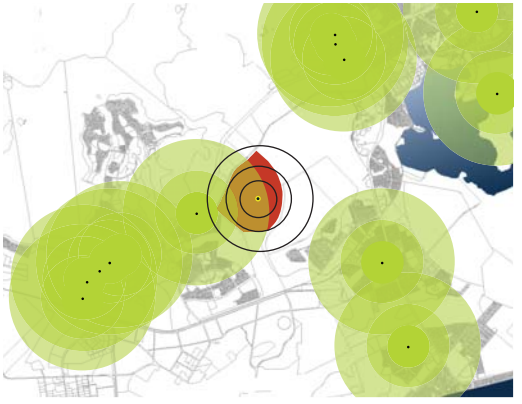
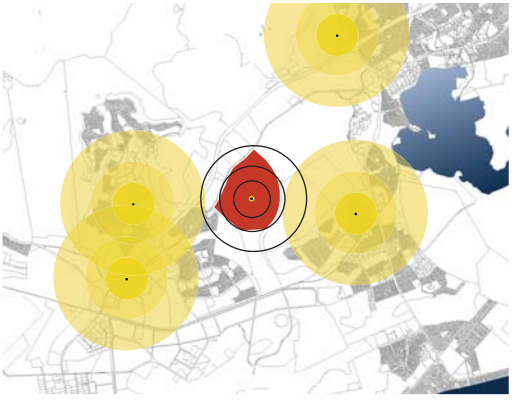


Figure 48. Walking radius diagram. Walking diagram based on minutes in color. Amy Shaffer.



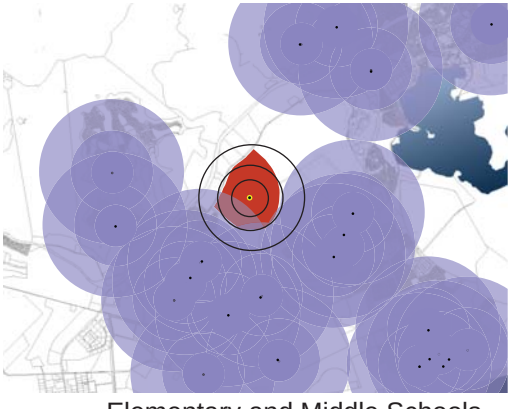
Dining

Figure 49. Dining. Current dining locations around the site. Amy Shaffer.



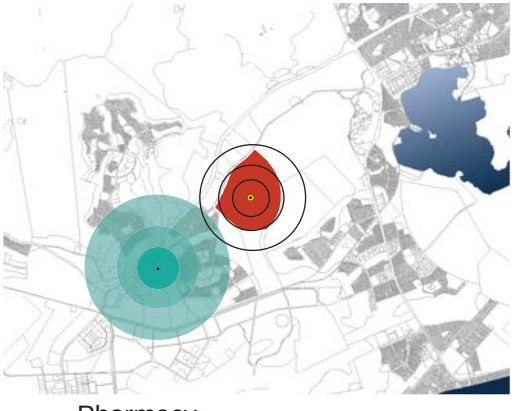
Grocery Stores

Figure 50. Grocery stores. Current grocery store locations around the site. Amy Shaffer.



Elementary and Middle Schools

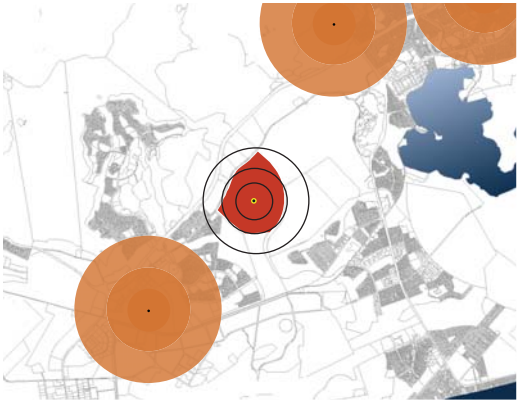
Figure 51. Elementary and middle schools. Current school locations around the site. Amy Shaffer.



Pharmacy

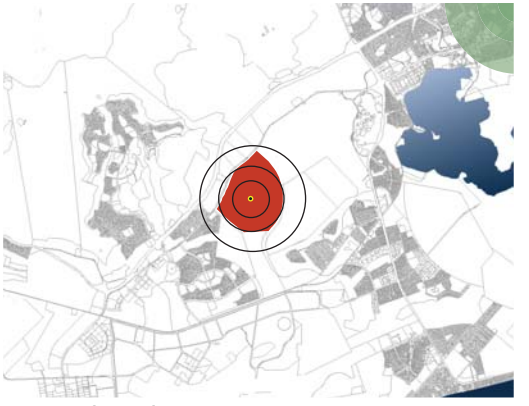
Figure 52. Pharmacy. Current pharmacy locations around the site. Amy Shaffer.

Not to Scale



Major Retail

Figure 53. Major retail. Major retail locations around the site. Amy Shaffer.



Shopping Center

Figure 54. Shopping center. Current shopping center locations around the site. Amy Shaffer.

Banks

Figure 55. Banks. Current bank locations around the site. Amy Shaffer.

Coffee Shops

Figure 56. Coffee shops. Current coffee shop locations around the site. Amy Shaffer.

Not to Scale

Demographics

In order to successfully develop the site, it is important to know the demographics of the area. Since the surrounding areas are fairly new developments it is necessary to know who is living there to predict who might be moving to the area.

The first set of information studied was the population growth over the past several years. For the purpose of determining the amount of housing and types of housing needed it is necessary to know if people are actually moving to the west side of the island even though it is quite underdeveloped compared to the rest of the island. The main demographics looked at were age, renter and owner, the number of families, and families with or without children (figures 57-63). This information will be helpful in determining an appropriate program for the site and the land use planning.

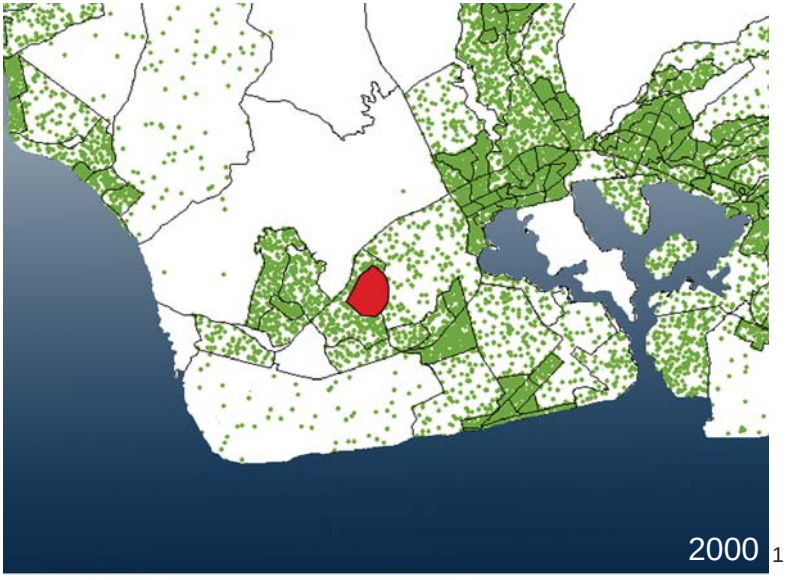


Figure 57. 2000 population. 2000 population density map. Amy Shaffer.

The most recent populations given were from the year 2000 and 2007. Figures 57 and 58 show that the population on the west side of the island is growing and development of the project site has a high potential to be successful if designed correctly.

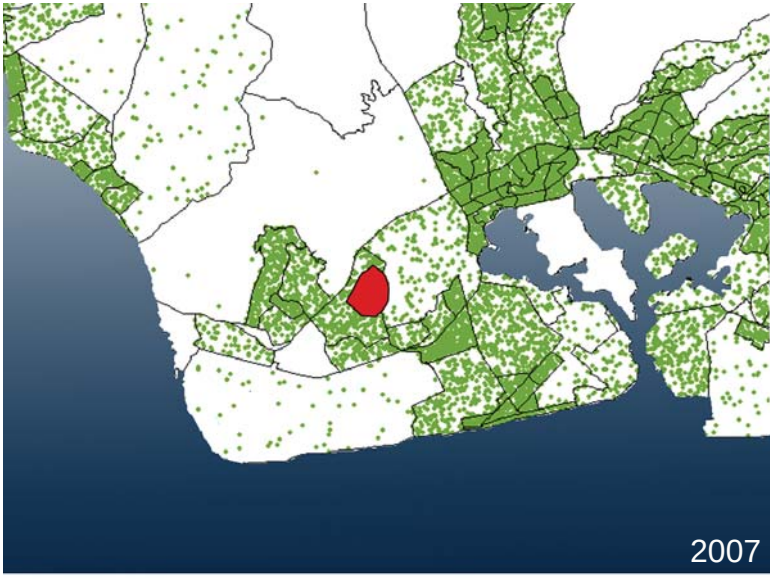
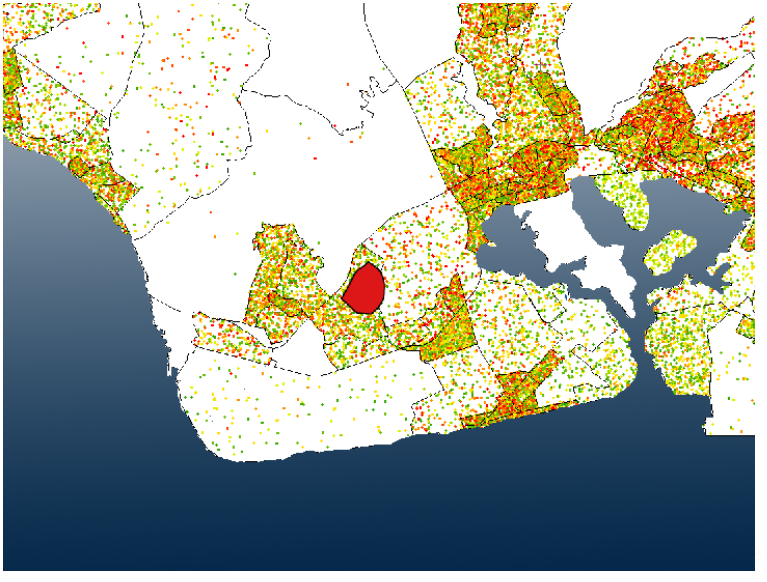


Figure 58. 2007 population. 2007 population density map. Amy Shaffer.

Not to Scale

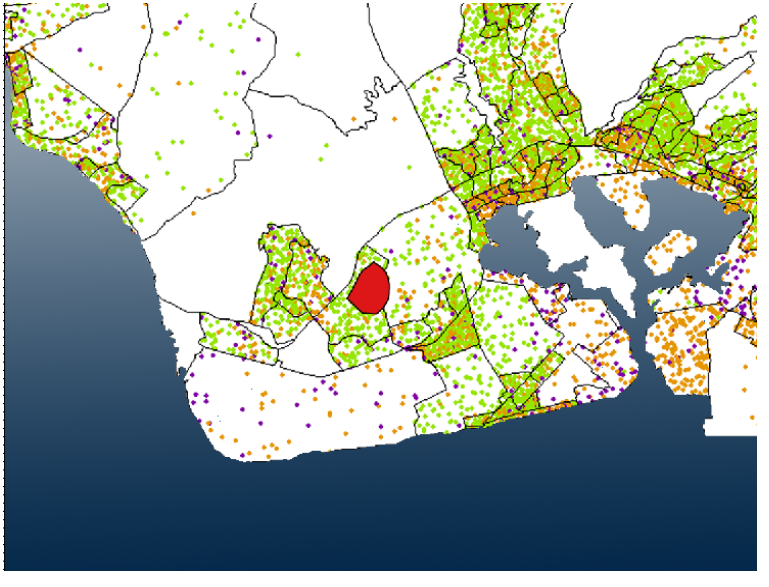


The age of those living around the site is important to know so planning and programming can be done correctly. Currently the average age is approximately 21-45 years of age, but that will more than likely change when the new campus expansion is complete. The University is expecting 7,600 new students ranging in age from 18-24.

Under 5
5-17
18-21
22-29
30-39
40-49
50-64
65 plus

1 Dot equals 10 people

Figure 59. Age. Age density map. Amy Shaffer.



Knowing where the homeowners are around the site is important because those who own their homes are more likely to stay longer and contribute to the success of their community and its surrounding areas. The locations of homes that are rented, owned, or vacant are illustrated in figure 60.

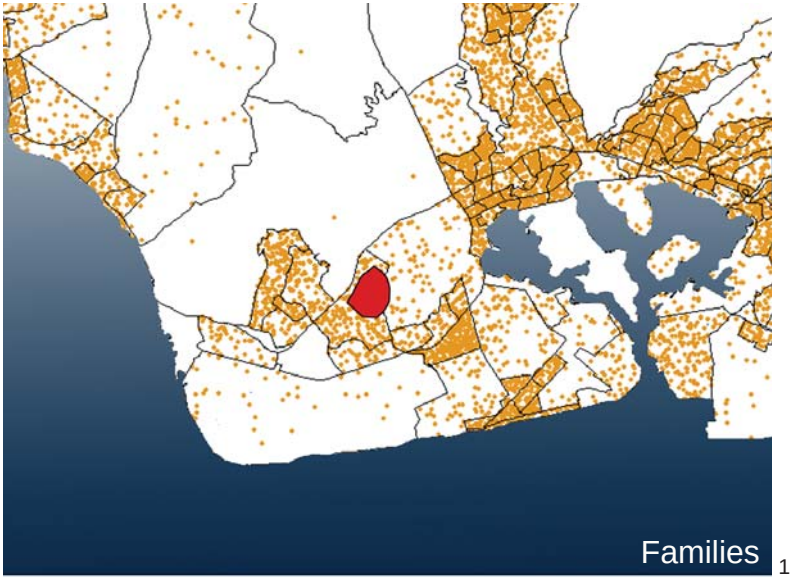
Renter
Owner
Vacant

1 Dot equals 10 people

N

Not to Scale

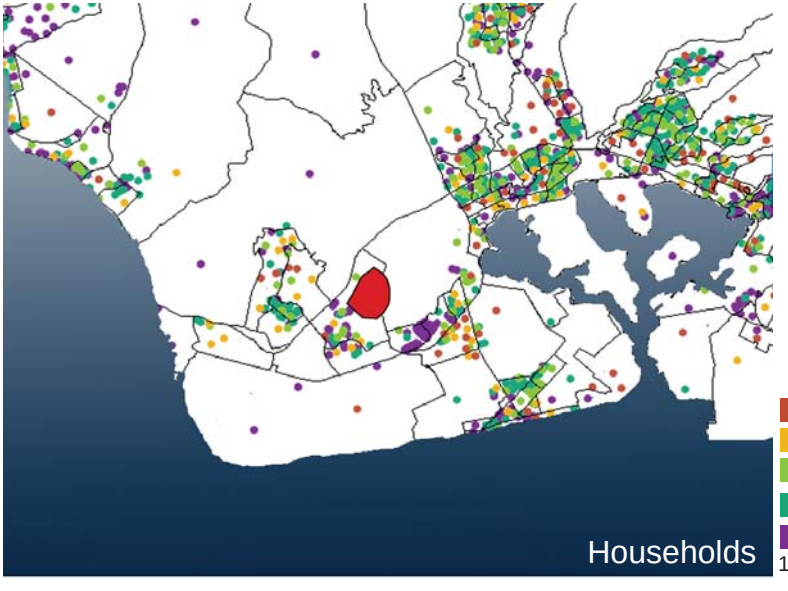
Figure 60. Renter/Owner. Renter/Owner density map. Amy Shaffer.



1 Dot equals 10 families

Families require different needs than college students, young professionals, and retirees. The majority of the residents surrounding the site are families which will be extremely important in the development of the site's programming and planning.

Figure 61. Families. Family density map. Amy Shaffer.



1 Dot equals 10 families

Figure 62. Households. Household density map. Amy Shaffer.

N

Not to Scale

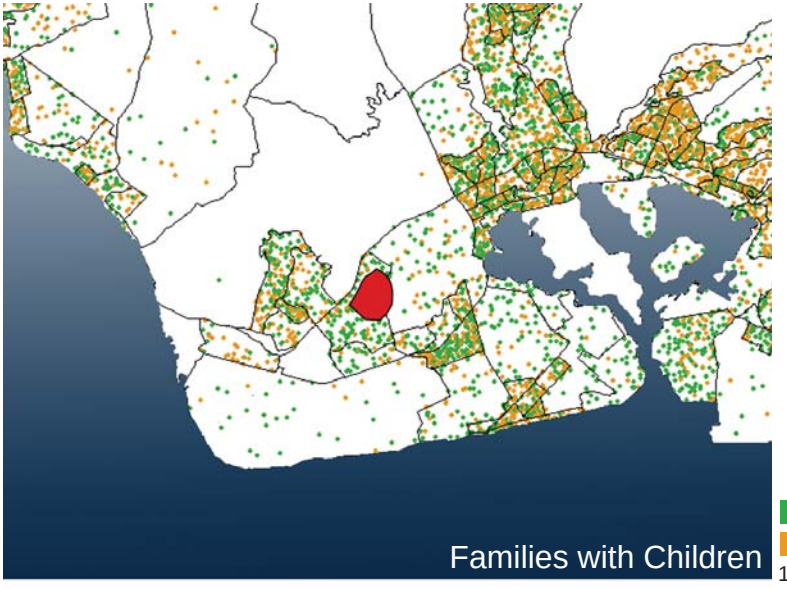


Figure 63. Families with children. Families with children density map. Amy Shaffer.

Children too will require different needs such as schools and parks. It is important to remember the needs of the younger ages living within the community and not just the university students.

N

Not to Scale

Hydrology

The project site has to gulches that run north to south as shown in figure 64. The Kaloi gulch and its tributary, the Hunehune gulch are characterized as dry gulches. Although listed as dry gulches, they do have the Waianae Mountain stormwater run through them for short amounts of time when it rains. When water does flow through the gulches is moves at rapid speed. The highest peak flow was in 1980 with 725 cubic feet per second (USGS). The site is located in the Kaloi watershed.

There have been no records of flooding on the site, but there are some areas around the site that have flooded and when those sites flood it is usually sheet flow on sloping terrain ranging from one to three feet deep. The flooding hazards of the site are undetermined (Hawaii.gov).

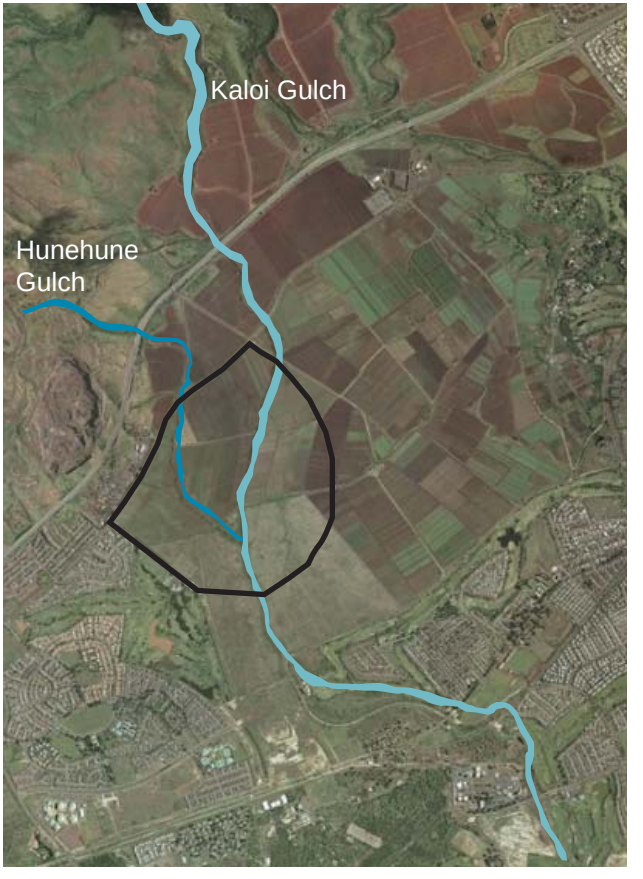


Figure 64. Kaloi and Hunehune gulches. Map of the gulches running across the site. Amy Shaffer.

Site Boundary

N

Not to Scale

Site Summary

Presently, the site consists of vacant areas and agricultural land. The area is vegetated with wild grasses and very few trees. There are six general types of soils and neither are highly erodible. There are several dirt roads that traverse the site and one major highway running adjacent to the northwest half of the site (Geolabs Inc. 2007, 4). The property is identified as “prime” agricultural land under the Agricultural Lands of Importance to the State of Hawaii, (Land Use Commission 2007, 15).

There are two gulches, the Kaloi gulch and the Hunehune gulch, that cross through the site in a north-south direction. The Hunehune gulch is a tributary to the Kaloi gulch. The two gulches are characterized as dry, but have had some rapid moving stormwater flow at times of heavy rain. There has not been any history of flooding on the site (Land Use Commission 2007, 15).

Figure 65. Aerial of Waikiki shore line. Chapter five photo. (Flickr.com).

5. Program

The first step in determining the program for the site was to review the initial goals and objectives. While it is necessary to think of the program for the campus and the community as two separate entities, it is important to think about the placement of certain program elements and how they might be shared.

An information index, Figure 66, was created to determine an appropriate program for the campus, community, and potential connections between the two in order to create interaction.

Goals

- Bring together the institution and the surrounding community
- Create a community that encourages interaction among its residents
- Create a sense of place for the institution without separating it from the surrounding neighborhood/communities
- Enhance community identity
- Provide a variety of housing opportunities and choices
- Foster walkable communities

Objectives

- Make public transit easily accessible and safe
- Create an inviting edge around the campus
- Get students out into the neighborhoods and neighbors onto the campus
- Determine the most appropriate locations for the campus, neighborhoods, transit stations, and amenities
- Determine what age groups will be living around/ on the site to accommodate the needs for all ages
- Determine the housing needs for the site

	Goals	Facts
Function Universtiy Neighborhood Mixed-use Light Rail	develop a ‘town-gown’ relationship Strong connections Community relationships/interaction	Universtiy expansion to talke place Light rail system to be implemented in 2010
Form Site Environment Quality	Lessen use of automobile Make a walkable community Preservation of views/natural resources Minimal impact on the site	Total site is 500 acres 214 acres owned by Universtiy of Hawaii Site is charactereized as ‘prime’ agricultural land
Economy Initial Budget Sustainable Methods	Save money through transit use Walkable communities save money/and lessen environmental impacts	Incoperate several housing types- medium-high denstiy, medium density, medium-low density, and low density. Making housing affordable Student housing
Time Past Present Future	Change in architectural style, but keep within the Hawaiian character Make campus a historic place after 50 years	Link surrounding communties with the project site Allow other communities to use amenities and public transportation on the site

Concepts	Needs	Problem
Parks Ball fields Community centers Greenways Mixed-use around transit stations Bike ways	Common spaces to be shared by community and campus- indoor and outdoor Safety on campus/community/transit stations Campus and community organization Sense of place	The variety of ages on the site, will be challenging incoperate different uses Getting residents to you transit system
Strong connections Vernacular architecture Recyclable materials Strong sense of community character	Easy accessiblity from all area on-site and off-site	Incorperating new architecture while maintaining the Hawaiian characteristi and those of the surrounding neighborhood Designing to preserve as much of the existing site as possible
Residents help keep communtiy up Neighbors and students help keep a safe environment	Energy savings Community savings Affordable housing	Getting the residents to be more enviromentally friendly and lessen their uses of automobiles
Surrounding communities and project site eventually seen as one community	Light rial implemented in 2010 Campus comstruction completion Student housing with campus completion	Designing the site so it is open to future expansion and can work with new and existing development

Figure 66. Information index. Site design elements. Amy Shaffer.

Proposed Campus Master Plan

There is currently a proposed campus plan designed by the University of Hawaii for the new expansion in West Oahu (Figure 67). Having analyzed the plan thoroughly, it has been determined that the proposed campus plan does not agree with the project goals and objectives and will need to be revised. The plan will be adjusted to create a stronger connection with its surrounding community and become a more inviting place.

In the proposed plan the edges of the campus are surrounded by parking, buildings, and a gulch. These elements do not create an inviting feeling for the campus and act as a barrier, separating it from the surrounding community. The main entrance to the site does not have a sense of entry and is surrounded by parking on both sides.

One of the main goals of the project is to create connectivity between the institution and the surrounding neighborhood. The student housing is not only disconnected from the potential surrounding community, but from the campus as well. The students will need to cross through a parking lot to reach campus.

The buildings on campus seem to be centrally oriented. The backs of the buildings face away from the future surrounding communities and all of the campus' outdoor spaces are located in the center of the buildings, not easily accessible to its neighbors. There is currently one large open space to the south of campus, which is land that could be used for expansion if needed. The expansion would close the open space off once again from the community.

Overall, the proposed campus plan will need to be reassessed when designing to meet the goals and objectives for the site.

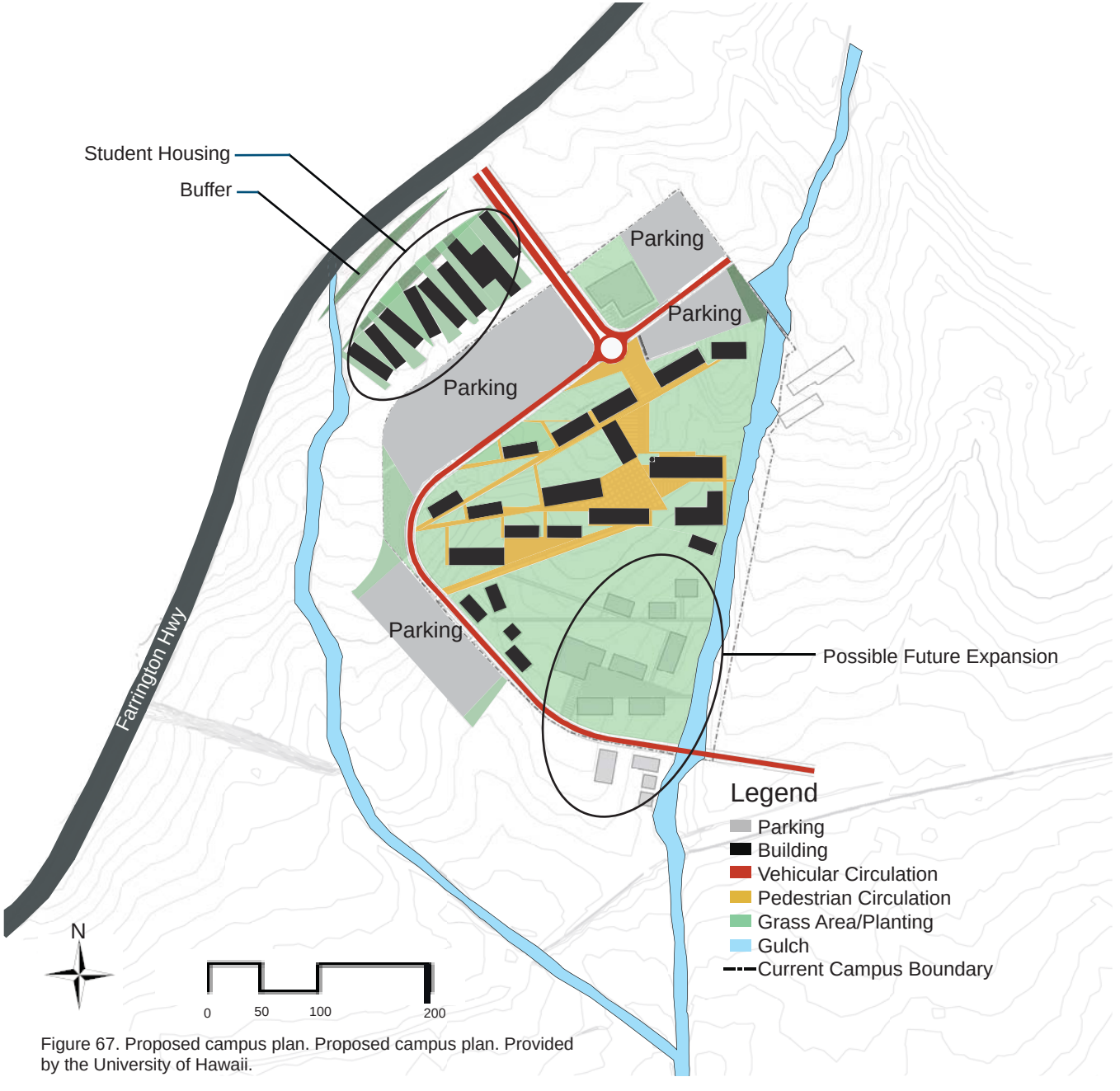


Figure 67. Proposed campus plan. Proposed campus plan. Provided by the University of Hawaii.

A majority of the following program elements below were provided by the University of Hawaii and Ewa County. These program elements are just initial elements used as a starting point, but can be adjusted for the final design in order to meet the goals and objectives set for the site. The following information provides the building usages on campus, types of housing and mixed-use elements for the surrounding community, and amenities to be shared by both students and residents.

Campus Program:

Community Service Building	11,500 sf
Administration Building	17,500 sf
2 Campus Center Buildings	1- 17,500 sf
	1- 13,000 sf
7 Classroom buildings	2- 22,000 sf
	2- 9,500 sf
	2- 9,000 sf
	1- 22,000 sf
2 Libraries	1- 25,000 sf
	1- 34,000 sf
3 Maintenance Buildings	3- 7,500 -8,000 sf
Student Service Building	14,500 sf
Student Housing	Approx. 38 acres, 646 units

Surrounding Community Program:

Residential	Approximately 40 acres
Medium-High Density	6 plex buildings, 3 stories in ht. ~ 925 units
Medium Density	4-6 plex, 12 units/acre ~ 489 units
Medium-Low Density	Duplex with detached carports ~561 units
Low Density	6 units/acre (bungalow style) ~ 365 units
Park	at least 11 acres (required)
Detention area	Approximately 15 acres
Mixed-use	35 acres
office retail commercial residential supermarkets drugstores restaurants	217 multi-family units (to be located above uses)
Improvements along Farrington Highway	4.5 acres

- Parking for both programs: 1,500-1,700 spaces
  - Office: 2-4 spaces/1,000 square feet
  - Retail: 3-5 spaces/1,000 square feet

- At least two transit stations on site

Figure 68. Landscape. Chapter six photo. (Flickr.com).

6. Site Analysis

The beginnings of the analysis started after the collection of inventory and the creation of the program. The analysis primarily focused on the best location for the university, its surrounding neighborhoods, and light rail stations. The surrounding land uses and the demographic studies contributed the most to the site analysis process.

Decision Tree

The first step in analyzing the project site was to take the inventory and use it to determine the best locations for the campus, residential communities, and transit stations.

The next step was to assign the university, surrounding community, and the transit stations a color. The university was given purple, the community yellow, and the transit station was assigned the color red.

A colored circle was placed next to the inventory elements in which the campus or community would best be located near. For example, the campus would be better placed near Farrington Highway (existing transportation) in the north to prevent excess traffic flow and parking in the neighborhoods. Some elements received both colored circles because they were prime locations for the campus and community.

After each element was given a colored circle, they were placed on the map according to the locations of those elements (Figure 69). Once each circle was in place it was easy to see where the campus and community should be placed according to where most of their colored circles were placed. This also helped with determining the location of the transit stations. The largest clusters of circles suggested where the ideal locations for transit stations because that is where the most people and land uses would be located.

University of Hawaii at West Oahu (UHWO)
Surrounding Community/Neighborhood
Possible Light Rail Station

Transportation	Existing (north)
	Proposed (east)
Surrounding Uses	Dining (southwest)
	Banks (southwest)
	Retail (northeast)
	Grocery (west)
	Schools- elementary/middle (south)
	Pharmacy (southwest)
Demographics	Age
	under 5 (northwest)
	5-17 (west)
	18-21 (west)
	22-29 (southwest)
	30-39 (southeast)
	40-49 (northwest)
	50-64 (south)
	65 plus (southwest)
	Families (south)
	Children (west, north, south)
	Renter (northwest)
	Owner (west and south)
Hydrology	Kaloi Gulch (north to south)
	Hunehune Gulch (north to south)
Soils	Steeper Areas (north)
	Flatter Areas (south)

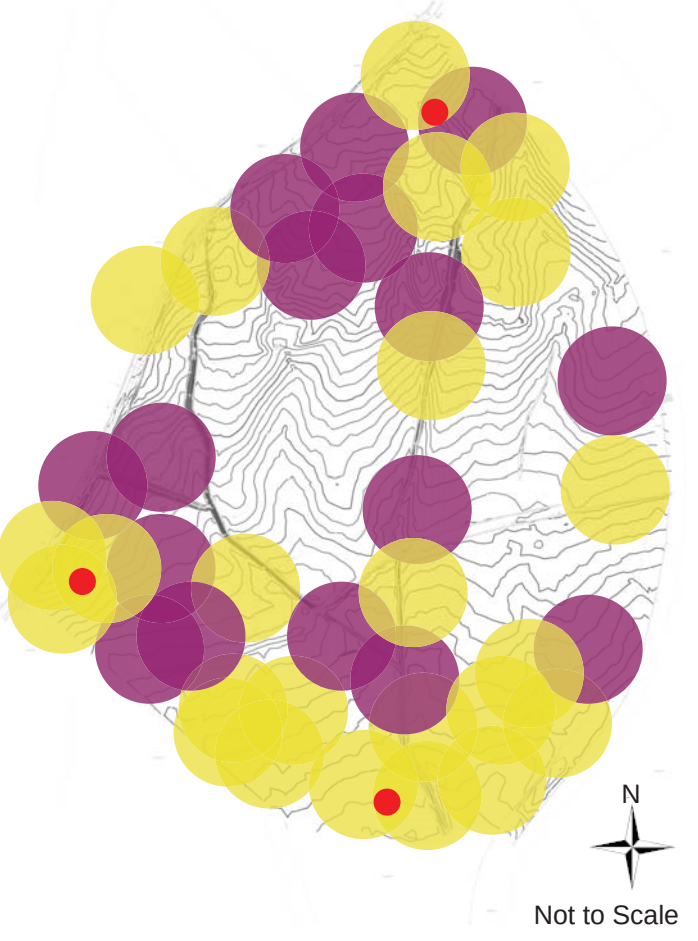


Figure 69. Decision tree. Mapping of design elements. Amy Shaffer.

Decision Tree Conclusion

Having studied the decision tree it was obvious that the community is best located in the south and southwest part of the site. The campus circles were about half and half so the inventory elements were looked at again and it was determined that the north part of the site would be the best placement for the campus expansion. The transit stations would be most popular in the north, south, and southwest, but it was decided that the stations would be best suited in the north and south so the light rail would not interfere with the surrounding and proposed communities.

Another conclusion was drawn showing that not much activity takes place in the center of the site. This would be an ideal area to make strong connections when creating the ‘town-gown’ relationship. The gulches could be used as an amenity and other uses such as parks and ball fields could be placed centrally to be shared spaces by the campus and community.

Site Analysis

After deciding the best locations for the campus, surrounding community, and transit stations, the next step was to focus on the connections, types of amenities, mixed-use, and housing placements (Figure 70). The process began with referring back to the literature reviews and precedent studies and re-examining the guiding principles and strategies mentioned when placing certain elements on a site. This information contributed to the determination of the proper orientation of buildings and establishing the main circulation.

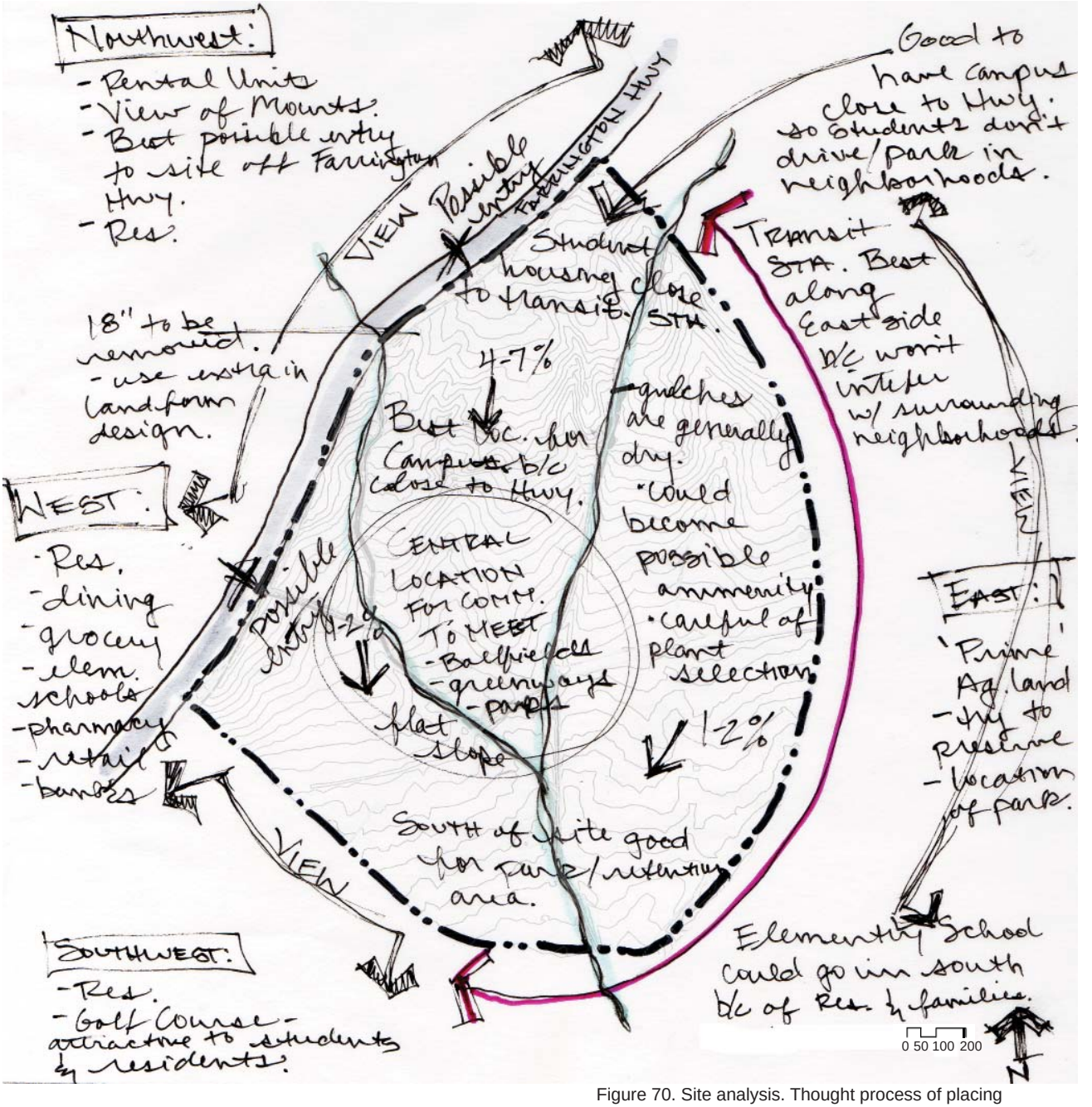


Figure 70. Site analysis. Thought process of placing elements. Amy Shaffer.

Campus Analysis

The next step conducted in the analysis process was the context area for the University of Hawaii's campus expansion as seen on Figure 71.

It was apparent that the best placement for the main campus entry would be off of Farrington Highway. It would then be best to place parking adjacent to Farrington Highway to act as a partial buffer and not disturb the visual character of the campus.

The highest elevation is at the north end of the site. When determining the building hierarchy and the creation of views, placing a building or design element at the highest elevation could create a strong sense of place.

With the convenience of a light rail system being integrated on the site, it would be best to place student housing as close as possible to the station. It was difficult to decide if the student housing should be placed near transit or the neighborhoods to help create a stronger community connection, but it was eventually decided that the best placement would be near a transit station. Having it near the neighborhoods could create more on-street parking and traffic. If placed near a transit station the student housing could potentially influence the students to use the light rail and it would be convenient for those without cars.

The next piece analyzed were the program elements and the best locations of these elements in order to create a town-gown relationship. With the two gulches running in a north-south direction it makes this process even more challenging because they are so large and create a definite edge between the campus and community. It was thought to have the connections such as parks, ball-fields, or an amphitheater be placed on the campus side of the two gulches to entice community residents to cross over and spend time on the campus.

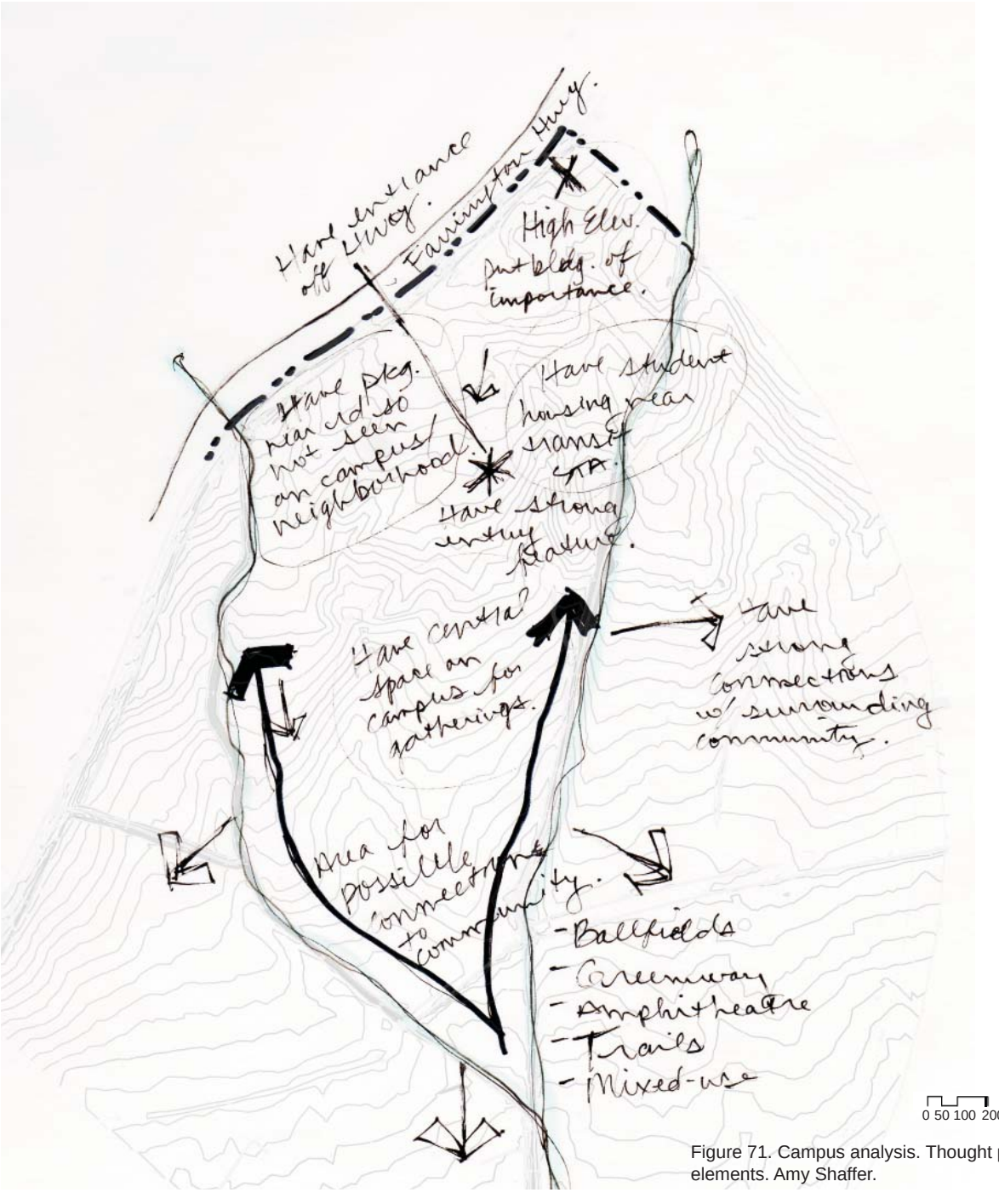


Figure 71. Campus analysis. Thought process of placing elements. Amy Shaffer.

Conceptual Analysis

This conceptual analysis is a more complete analysis derived from the previous analyses, literature reviews, and precedent studies (Figure 72).

The university expansion will be placed to the north end of the site primarily due to the accessibility off of Farrington Highway. If residential were to be placed in the north there would be issues with heavier traffic through the neighborhoods and an increase in on-street parking. Being that the slope is steeper in the north grading would be less disturbed if the campus were built there because the buildings will be more spread out than a residential neighborhood.

It is proposed that there be two light rail stations on site. One being located towards the north end and the other in the south. The one in the north would be easily accessible to the college community as well as those living in the upper north part of the site and across Farrington Highway in the northwest. The station located in the south would primarily be used by neighborhood residents and those in the surrounding areas.

The placement of the residential housing was based on the literature research and case studies. It was learned that in order to make a transit station successful it needs to be placed in a high density area with the residential and mixed-uses surrounding the station.

The connections between the entities has not yet been fully determined. It would be best to have them centrally located within the site so they are accessible to the whole community at an equal distance. It is required that the project site have at least eleven acres of park space. It would be desirable for all residents to have easy access to the parks. Another solution could be to break up the eleven acres and allow each neighborhood to have their own small park space.

The university's proposed campus and community plan pipes the Hunehune tributary through the entire site, but both gulches could be used as amenities and bring value and unity to the site.

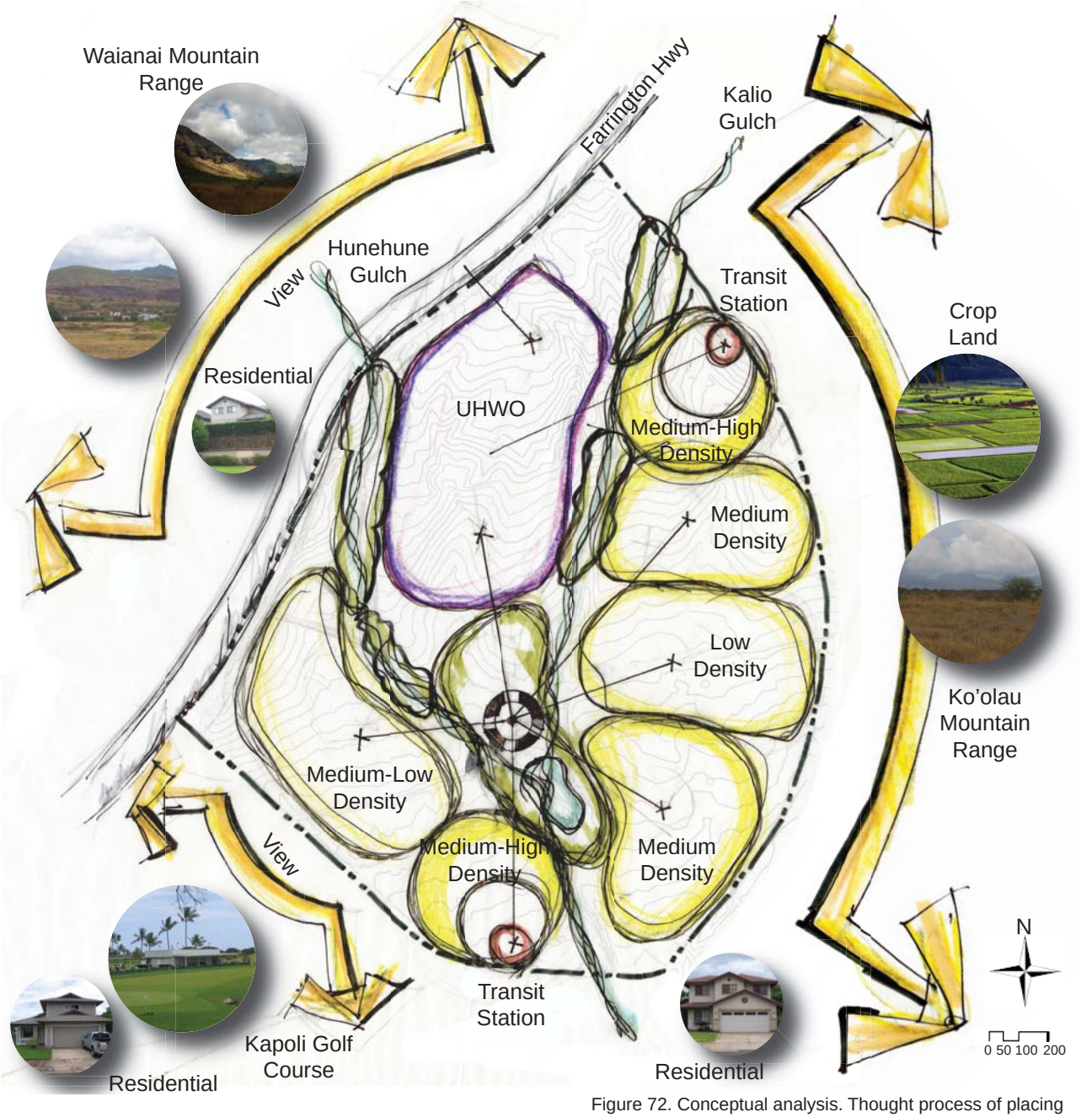


Figure 72. Conceptual analysis. Thought process of placing elements. Amy Shaffer.

Figure 73. Sunset. Chapter seven photo. (Flickr.com)

7. Final Design

The beginning processes that have lead to the completion of this final design proposal have been clearly documented in the previous chapters. Along with the research and the findings it was important to keep in mind the wants and needs of the client and the preservation of the island's natural beauty.

While a program was given by the University of Hawaii and Ewa County, mentioned in chapter five, it was important to make some adjustments in certain areas to meet the goals and objectives set for the site and these changes will be presented throughout this chapter (Figure 74).

Concept Statement

The concept behind the design was to create a place that inspired interaction between a university and its surrounding communities. This was accomplished by taking into the consideration the needs of all ages living on and around the site and creating several different places where everyone could share and enjoy together. Each place is meant to be unique and provide for the needs of the residents. This uniqueness comes from the framing of certain views on site, using native vegetation and materials, integrating a variety of different uses, and working with the elements the site has to offer.

With the implementation of the future light rail and trying to preserve as much of the site as possible it was desirable to make the community walkable which in return would create more interactions among the residents and preserve the beauty.

Figure 74. Bubble diagram. Sketch of major site features. Amy Shaffer.

Master Plan

The master plan is a representation of the variety of elements used to create community interactions on the site (Figure 75). These interactions were created by borrowing from the site's surrounding views, beauty, and nature of the island.

There are five major connections within the site designed to create a town-gown relationship and to meet the goals and objectives for the project. They include transit stations located on the 1) east and 2)south edges of the site, 3) a lush greenway with pedestrian and bicycle trails, 4) ball fields for the older and younger residents living on the site, and 5) the campus sculptural landform and open space that creates great spaces to relax and connect with the nature and the beauty of the island.

Each connection is unique with incorporating different elements found on the island, but all have one goal in common, which is to promote unity between the campus and the surrounding communities. Each connection will be described in further detail throughout the remainder of the chapter.

Figure 75. Master Plan. Proposed site design.
Amy Shaffer.

Land Use Plan

There area several different uses that have been incorporated within the master plan to better provide for the needs of the students, residents, and those living in the surrounding communities (Figure 76). The main uses include office, retail, residential, and education from the University of Hawaii. The site's variety of housing types and densities will provide new housing opportunities affordable to a broad spectrum of families, singles, elderly, and couples. It would be desirable for those living on the site to work on site, but commuters would be more than welcome.

Site Program

Land Use	Size
Campus	73 acres
Residential	189 acres
Mixed-use Community (retail, office, transit)	18 acres
Park/Open Space (greenway, ball fields)	122 acres
Trails	13,990 square feet
Retention Ponds	6 acres

Table 1. Program. LIst of program elements and their sizes. Amy Shaffer.

Figure 76. Land Use Plan. Different land uses throughout the site. Amy Shaffer.

Site Circulation

The first step in the design process was determining the main circulation throughout the project site. By having a conceptual layout of the different programmatic elements it was clear where the main circulation should be established. It was decided that there would be two primary boulevards that would serve as the main circulation on site. From there came the layout of the secondary residential and mixed-use streets and the tertiary alley and service roads.

When designing the street layout it was important to keep in mind the health of the community residents and the environment. Making the community walkable and bicycle accessible will benefit the overall quality of the site, the health and safety of its residents, and pose more opportunities for social interactions. The streets and paths will provide physical and visual connections between parks, homes, shops, and transit. The circulation routes on the site are shown in Figure 77.

Figure 77. Site circulation diagram. Layout of main circulation throughout the site. Amy Shaffer.

The Boulevards

The two boulevards run north to south and east to west. They are the main circulation routes and will be the most heavily used on the site. While these boulevards will receive the most traffic they will remain friendly and safe to pedestrians and bicyclists. There will be four lanes with bicycle lanes on the outer side and a median to separate travel in opposite directions as seen in Figure 78. The use of monkey pod trees will provide a nice large canopy for those walking, driving, and bicycling. The sidewalks are ten feet wide which allows for comfortable walking room and a ten foot buffer with more monkey pod trees to keep a continuous street canopy. The buffer lies between the sidewalk and streets to provide more pedestrian safety and shade.

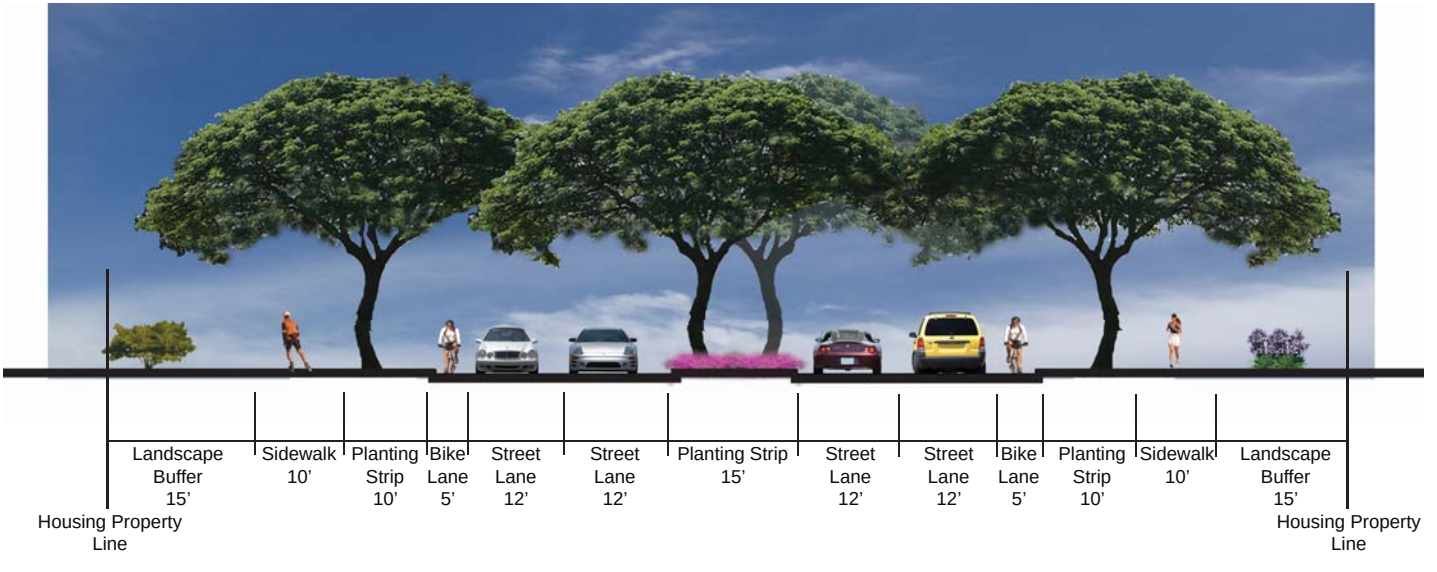


Figure 78. Boulevard Section. Section through boulevard. Amy Shaffer.

Residential Streets

Each residential street will have two lanes and allow for street parking on both sides (Figure 79). The residents will walk on five foot sidewalks on each side of the street with a five foot buffer in between. The buffer will have trees to provide shade and protection for the residents walking in the neighborhoods.

The campus street will be similar to the residential streets only they will not allow for on street parking in order to keep campus open and inviting to everyone.

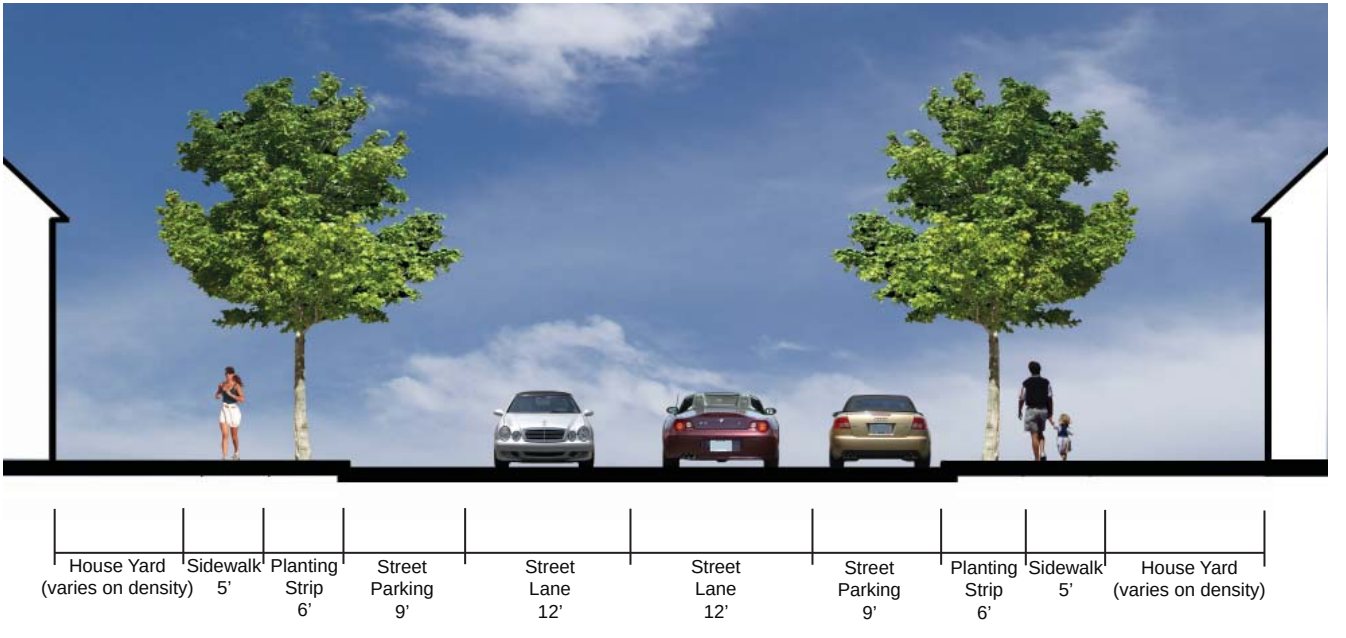


Figure 79. Street section. Section through residential and campus street. Amy Shaffer.

Connections

Having established the best placement for all the programmatic elements within the site, the next step was to determine what would occur in each space to make them desirable to the residents.

The first areas of focus were the two transit stations. It is important to create spaces that would encourage the residents to use the light rail and reduce their automobile usage. Each transit station has its own set of distinguishing characteristics that set them apart from one another and will appeal to those living within the community as well as outside the community.

Each station provides a parking garage and drop off area for those who choose not to use the light rail. There will be a charge for parking in the garage in order to further encourage transit use.

1. The East Transit Station

The east transit station is designed to be a mixed-use village and will provide for the basic needs of the students and residents. It will include such amenities as a grocery store, pharmacy, offices, some retail, dining, coffee shops, and residential units (Figure 82).

There is a strong axis from the station to campus with a great lawn, Figure 80 and 81, serving as a linking element. The lawn is designed to serve as a small park with trees for shade and a place to relax during lunches, breaks, or while waiting for the light rail. The station is designed at a pedestrian scale with no buildings taller than 40 feet in height. There will be ample lighting in the evenings for pedestrian safety.

Figure 80. Perspective of east transit station. Lawn perspective from a pedestrian level. Amy Shaffer.

Figure 81. Detail plan. Plan of east transit station. Amy Shaffer.

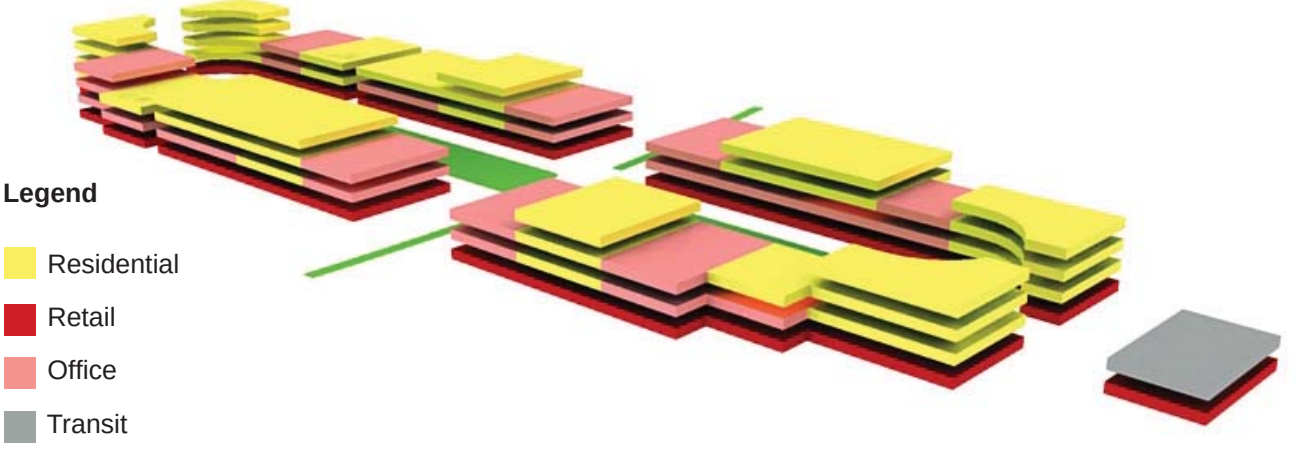


Figure 82. Land use diagram. Diagram of land uses taking place around the east transit station. Amy Shaffer.

2. The South Transit Station

The south transit station is designed to be the entertainment district on site (Figure 85). It will provide shopping, dining, bars, and a movie theater for its residents and visitors. Each building in the entertainment district will be two stories. Retail will be located on the ground level and the restaurants and bars will be on the second level (Figure 83). Having the restaurants and bars on the second level will provide a nice view of the station plaza, reduce noise, and provide more privacy while dining.

The south station is located on the south end of the longest pedestrian connection on site. The connection begins on campus and has a variety of visual elements that will draw people from one end to the other. These elements include landform, open space, and a retention pond that will be discussed next.

The station has a large fountain in the center of the plaza that will be similar to the campus fountain creating a visual connection between the two places and serving as a gathering place. The visitors will be able to interact with the fountain such as sitting on the edge and cooling their feet or just feeling the light mist from the cascading waters (Figure 84).

Figure 83. Perspective of the south transit station. Pedestrian perspective walking east in the plaza. Amy Shaffer.

Figure 84. Perspective in south transit station. Perspective of the south transit station walking down the main circulation path at night facing south toward the fountain. Amy Shaffer.

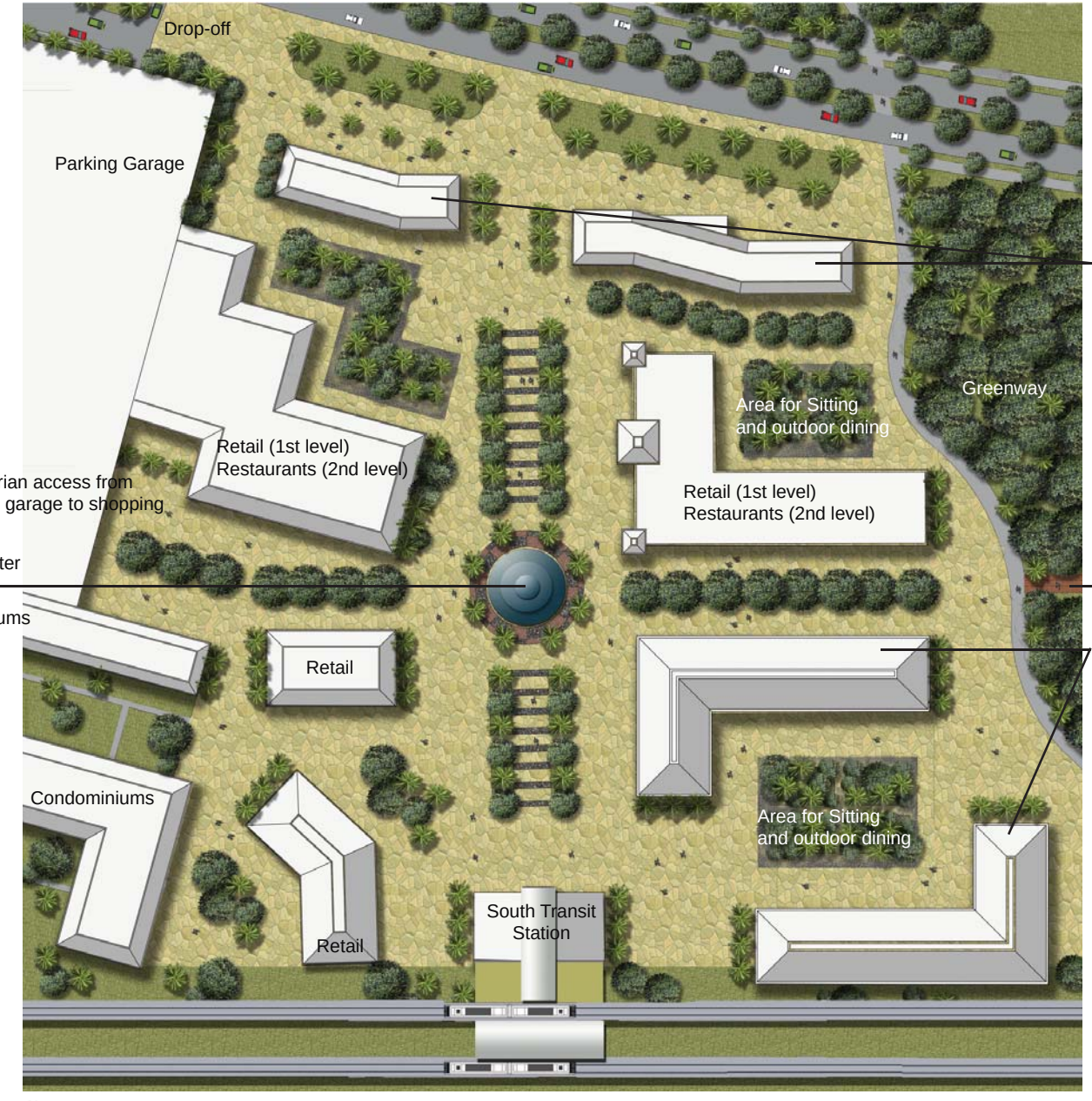


Figure 85. Detail plan of the south transit station. Plan showing the circulation, materials, and planting design of the station. Amy Shaffer.

3. Greenway

The greenways were formed along the two existing gulches that run through the site. The longest greenway runs north to south and the other runs northwest to southeast, but both merge together in the south. The greenways will contain pedestrian and bicycle trails and will serve as the main pedestrian circulation path throughout the site. This trail system is easily accessible from any location on site.

The greenway will be heavily vegetated with native Hawaiian plants and will contain wooden bridges, as seen in Figure 86, that allow for crossing over the gulches in order for the trail to take place on both sides. While walking or riding on the trails, framed views of certain site elements such as the landform, baseball and soccer fields, and views of the transit stations will be made visible to create a more exciting experience.

4.Ball fields

In the southwest corner of the site there are baseball and soccer fields of different sizes, one for the college students and adults on the northern half of the greenway and youth sized fields for the children in the neighborhoods on the southern half. The campus also contains six tennis courts for the students and community residents use.

There is a wide opening in the greenway for visitors to easily walk from the youth fields over to the adult fields and vice versa. The fields were purposely laid out to have the greenway take place in the center to provide more safety when games are taking place on both sides.

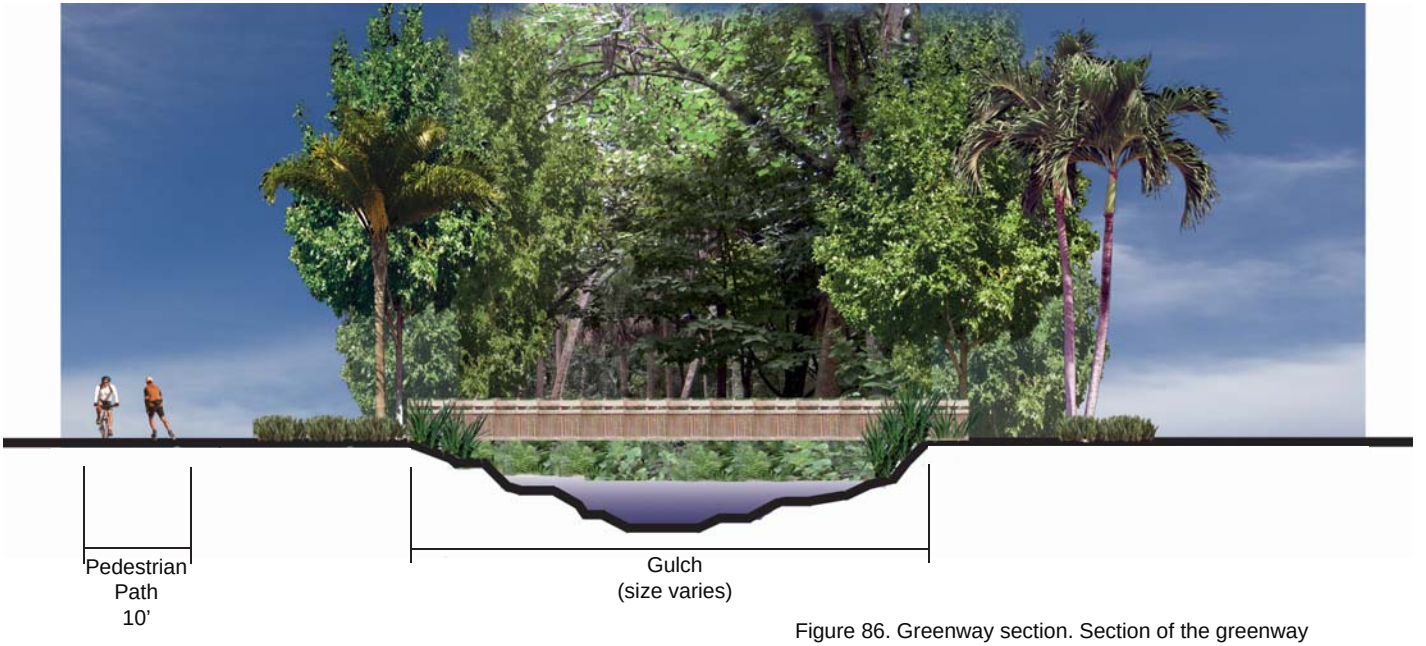


Figure 86. Greenway section. Section of the greenway looking north. Amy Shaffer.

Campus Plan

As mentioned in chapter four the original campus design did not meet the goals and objectives for the site. The campus was updated in order to create a more unified feel between the students, professors, faculty, staff, and visitors. During the design process for the campus it was important to create a memorable place with unique characteristics and inviting spaces that would deepen the ways in which people would experience the campus.

The new placement of the buildings on campus were given serious thought in order to better unite the campus with its community. It was important to place certain facilities such as libraries, student housing, and recreation centers and ball fields close to residents living off campus to encourage them to use the campus amenities.

The circulation throughout campus lies on two strong axes that align with both transit stations on site. This was done to promote the use of the light rail and reduce the use of the automobile by students. The campus was designed to be pedestrian oriented and eliminate unsightly views of parking lots and traffic. In order to achieve this goal only one main drive takes place throughout the campus and the parking is hidden through the use of parking garages and landscaping. The main entry to campus extends off of Farrington Highway which will reduce neighborhood traffic and on-street parking.

The view of the Waianae mountains to the north was an important view to capture. This view enhances the overall quality of campus and makes it a comforting place to be. The campus building heights do not extend over 40 feet which makes the view able to be seen from anywhere on the site.

The curvilinear planting design is a smaller repetition of the sculptural landform on campus that will be explained in more detail later in this chapter. A central fountain with lawn and shade surrounding it was provided at the core of campus in order to provide a place for users of the campus to gather and relax in between classes.

Figure 87 is the most recent campus proposal for the University of Hawaii at West Oahu and has a legend identifying the use of each building.

Legend

Campus Buildings

A - Administration building

B - Library (2)

C - Student housing (2)

D - Classroom (13)

E - Recreation center

F - Campus center building

G - Student Union

H - Community service building

I - Parking garage (2)

J - Maintenance building (3)

Campus Features

K- Campus Retention Pond

L- Central Water Fountain

M- Northeast Open Space

N- Student Housing Great Lawn

O- Entrance to Student Housing

P- Main Campus Entrance

Figure 87. Campus Plan. Organization of campus elements. Amy Shaffer.

5. Campus Landform

The campus contains landform elements along the main connection path that leads to the south transit station. The top 18 inches of soil will need to be stripped on campus site because it is not suitable for construction. Rather than having the soil removed it was thought that different landform shapes could be made using the excess soil in order to add a unique characteristic to the campus that would encourage not only the students, but residents and visitors to see and interact with as well.

The concept of the landform shapes came from two of the most natural elements on the island that Hawaii is well known for, its clear large sparkling waves and the beautiful mountain scenery. The curvilinear pedestrian paths toward the south end of campus are inspired by the waves as well as the landform that lines some of the path edges (Figure 88). The concept of the curvilinear forms were mimicked in the campus planting design, as above, to keep the concept present throughout the whole campus (see Figure 87).

Conical landform was used to depict the mountain scenery. This landform is located in the distance off the paths placed in natural grasses, but can still be accessed by small trails (figure 89). The conical landform is also placed at the main entrance to campus off of Farrington highway and at the two smaller campus entrances to help create a sense of entry and campus identity.

The landform is meant to be sculptural, but will also allow students and residents to interact with it by climbing or sitting on it. The south end of campus is large and open with natural vegetation and acts as a nice retreat to reconnect with nature and clear the mind.

Figure 88. Landform perspective. Perspective at pedestrian eye level of landform walking along the main axial connection. Amy Shaffer.

Figure 89. Landform perspective. Perspective of conical landform in the native grasses on the site. Amy Shaffer.

Residential Communities

There are four different affordable housing densities that take place on the site: *medium-high, medium, medium-low, and low*. Following the principles learned from the research completed, the highest densities take place around the transit stations and the lowest are located farthest away.

Medium-high Density

Medium-high density consists of condominiums that range from seven to nine stories. The building heights do not extend above ninety feet due to the maximum building height limit set for Ewa county. There are approximately 3000 units on the site varying in different sizes. Parking for the condominiums will be in parking garages that are surrounded by smaller attached condominiums in order to hide the view of cars and create a strong neighborhood environment (Figure 90).

Medium Density

The medium density units consist of duplexes that have one car garages either attached or detached from the unit as shown in Figure 91. The lot size is 40 feet by 80 feet which allows for a small lawn in the front and back of the duplex. There are 287 medium density units on the site.

Medium-low Density

The medium-low density units are single family homes that contain two car garages either attached or detached from the unit. The average lot size is approximately 50 feet by 90 feet. There are 185 medium-low density units on the site and each has a small yard in the front of the house and a larger one in the back (Figure 92).

Low Density

The low density units are single family homes with a two to three car garages either attached or detached from the unit. The lot size is approximately 60 feet by 110 feet with 274 units on the site (Figure 93).

The residential programming is the one site element that has changed significantly from the initial program mentioned in chapter five. The changes made were to the amount of residential units on the site and the sizing of the housing lots. To promote interaction among residents certain amenities were added such as each residential neighborhood having at least one park and an accessible connection to the greenway. These parks will provide playground equipment for children, tables for sitting or eating, and plenty of open space for larger activities. These changes will encourage interaction among neighbors and create a more desirable area to live. The park spaces for each neighborhood can easily be seen on the master and landuse plans (Figures 75 and 76).

Figure 90. Condominium perspective. Perspective of medium-high density. Amy Shaffer.

Figure 91. Section of medium density housing. Section showing lot frontage and spacing between the housing lots. Amy Shaffer.

Figure 92. Section of medium-low density housing. Section showing lot frontage and the spacing between the housing lots. Amy Shaffer.

Figure 93. Section of low density housing. Section showing lot frontage and the spacing between the housing lots. Amy Shaffer.

Housing Density Table

Land Use	Number of Lots/Units	Lot Size (square footage)	Acres
Medium-high density	3000 units	n/a	25 acres
Medium density	287 units (approximately12 units per acre)	3,600 square feet	41 acres
Medium-low density	185 units (approximately 9 units per acre)	4,500 square feet	62 acres
Low density	274 units (approximately 6 units per acre)	6,600 square feet	61 acres
Totals	3,746 units	n/a	189 acres

Table 2. Housing density table. The table shows the number of lots, lot sizes, and acreage of each housing density. Amy Shaffer.

Figure 94. Feet in sand. Chapter eight photo. (Flickr.com).

8. Conclusion

Today, many collegiate institutions are reevaluating their identities and how to best express their mission. The challenges institutions are realizing is that they are more focused on learning and teaching and not about place. Institutions that have this focus often have troubles with recruitment because of their surroundings or have student complaints about feeling isolated and having to drive off campus quite often because many stores or services are not located near campus.

This masters project focused on eliminating the sense of isolation between and institution and its surrounding communities. The goal was to transform many challenges institutions experience into new exciting opportunities and to address the lack of community and interaction between the two. By establishing specific goals and objectives for the site, completing detailed research and looking at several precedent studies on town-gown communities and transit systems, and by conducting a site inventory and analysis, the proposed design successfully unites the site and its residents.

While much of the program and design has expanded from what was given by the University of Hawaii and Ewa County, it has made the site a desirable place where everyone can afford and would want to live.

The proposed design is more open and provides large areas of green space than what is typically seen throughout the island. The community was designed to be walkable and to promote the use of the new light rail. These changes will not only preserve the beauty of the island, but also promote interaction among the residents which was the ultimate goal of the project. While some may see these changes as unnecessary, in the long run these site changes will help with preservation of the island and provide a cleaner and healthier environment for everyone to live.

Figure 95. Flower. Appendix photo. (Flickr.com).

Appendicies

Appendix A: Glossary

Arterial. An arterial is a moderate or high-capacity road which is immediately below a highway level of service (Calthorpe 1993 ,107).

Light Rail Transit. Light rail transit is a form of urban rail public transportation that generally has a lower capacity and lower speed than heavy rail and metro systems (Transit Oriented Development).

Neighborhood TOD. This type of TOD is located on a local or feeder bus line within ten minutes transit travel time (no more than 3 miles) from trunk line transit stop. They place an emphasis on moderate density residential, service, retail, entertainment, civic, and recreational uses (Calthorpe 1993, 57).

Node. A node is the connection point or stop on a transit line in a regional transportation network (Dittmar and Ohland 2004, 32).

Park-and-Ride Lots. These lots are located at transit stops where you can park your car to use a public transit, catch a bus, or carpool (Calthorpe 1993 ,107).

Place. A place is a connection point or stop on a transit line in a neighborhood (Dittmar and Ohland 2004, 32).

Town-Gown. Town-gowns are two distinct communities of a university town; “town” being the non-academic population and “gown” metonymically being the university community (Kenney and Dumont and Kenney 2005, 62).

Transit-oriented development (TOD). A TOD is the exciting new fast growing trend in creating vibrant, livable communities. It is the creation of compact, walkable communities centered around high quality train systems. This makes it possible to live a higher quality life without complete dependence on a car for mobility and survival (Transit Oriented Development).

Unbundle parking. Unbundle parking is separating the cost of parking from the sale or lease of the home or building, tenants will then only pay for what they need and any excess parking can be sold

or leased to others, reducing the overall parking requirements for the development (Dittmar and Ohland 2004, 122-123).

Urban TOD. This type of TOD is located directly on the trunk line transit network: at light rail, heavy rail, or express bus stops. They are developed with high commercial intensities, job clusters, and moderate to high residential densities (Calthorpe 1993, 57).

Appendix B: Office Providing the Project and Project Information

This project was made available through Belt Collins in Honolulu, Hawaii. Belt Collins has supplied me with all my base information. The office is willing to keep in contact through the development of this project to answer questions, give suggestions, or give the appropriate contacts. Belt Collins would definitely like to see the final product, but would also like to see the progress made along the way to offer suggestions and give feedback.

Base Maps

The base maps that I have for the completion of this project include:

- An autocad file showing the topography of the land in two foot contours and showing existing utilities (Courtesy of Belt Collins).
- An autocad map of the proposed campus for the University of Hawaii West Oahu (Courtesy of Belt Collins).
- Google Earth aerial site photos
- A plan of the future light rail system and the proposed station locations (Courtesy of Belt Collins).

Other Project Information

Other information that will be useful through the design process include:

- A soils report conducted by Geolabs, Inc. (Courtesy of Belt Collins).
- Site Photos
- The university and community design guidelines of the client (Courtesy of Belt Collins).
- Dawn Easterday at Belt Collins Hawaii (Courtesy of Belt Collins).
- Hawaii development codes and regulations (Courtesy of Belt Collins).
- ArcGIS layers illustrating demographics, hydrology, soils, and other helpful information

Appendix C: Site Photos

Kapolei Golf Course

The Kapolei Golf Course is located to the southeast of the project site and accessible by Kapolei Golf Course Road, the golf course entry drive, that runs adjacent along the southeast edge of the site, which is accessible from Farrington Highway.

Kapolei Golf Course Road is tree-lined and fenced with plantings in front of the fence. The trees create a nice screen so the project site is not visible to the visitors. The golf course would be a nice view after the project development is completed.

The southwest side of the project site that runs along the entry drive is temporarily being used as a parking lot for the golf course guests.

Figure C-1. Entry sign. Entry sign upon entering the Kapolei Golf Course. Amy Shaffer.

Figure C-2. Entry waterfeature. Demonstrates the use of lava rock. Amy Shaffer.

Figure C-3. Entry drive. Golf course entry drive. Amy Shaffer.

Figure C-4. Golf course. View of golf course driving range. Amy Shaffer.

Figure C-5. Golf course. View of golf course. Amy Shaffer.

Figure C-6. Temporary parking lot. Temporary parking lot looking west at the golf course. Amy Shaffer.

Surrounding Neighborhoods

There are two neighborhoods that border the project site. Manalai, to the west, and Kapolei Knolls to the northwest.

The homes were primarily single family and have roughly 5,650 square feet of land. Each neighborhood had a central park with playground equipment, tables, and benches. The appearance was clean and seemed to be well kept. Unfortunately no one was using either park at the time of my visit so how the residents interacted within the park is unknown.

Kapolei Knolls is one of the more preferred neighborhoods to live in on the west side of the island. While the housing styles appear to be similar, Kapolei Knolls has more spacious sidewalks and better streetscapes compared to the Manalai neighborhood.

Both neighborhoods had similar privacy walls that run along Farrington Highway. The materials used were primarily stone and lava rock. There were also plantings placed in front of the wall to help create a softer edge.

Figure C-7. Hawaiian house. House in the Kapolei Knolls neighborhood. Amy Shaffer.

Figure C-8. Hawaiian house. House in the Manalai neighborhood. Amy Shaffer.

Figure C-9. Neighborhood park. Kapolei neighborhood park. Amy Shaffer.

Figure C-10. Lava rock wall. Edge treatment of west neighborhood. Amy Shaffer.

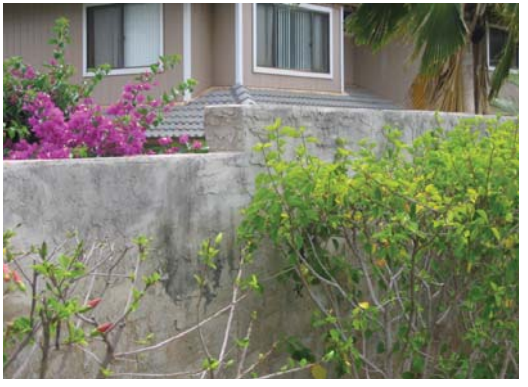


Figure C-11. Stone wall. Edge treatment of west neighborhood. Amy Shaffer.

Figure C-12. Lava rock wall with planting. Edge treatment of north neighborhood. Amy Shaffer.

Between the residential privacy walls and Farrington Highway there was roughly five feet for planting, a three foot sidewalk, and then another three feet for grass and the street trees.

Figure C-13. Stone wall with planting. Edge treatment of west neighborhood. Amy Shaffer.

Appendix D: Typical Hawaiian Architecture

Much of the Hawaiian architecture has been inspired by the plantation homes built by the early farmers on the island. Since then the architecture has changed to meet different needs such as weather and accessibility of materials.

Hawaii has a perfect temperature all year round so there is no need for air conditioners or heaters. Although It is important to have lots of windows so they can easily be opened to circulate air. Lanais are also an important part of the architecture because majority of the people on the island spend most of their time outdoors.

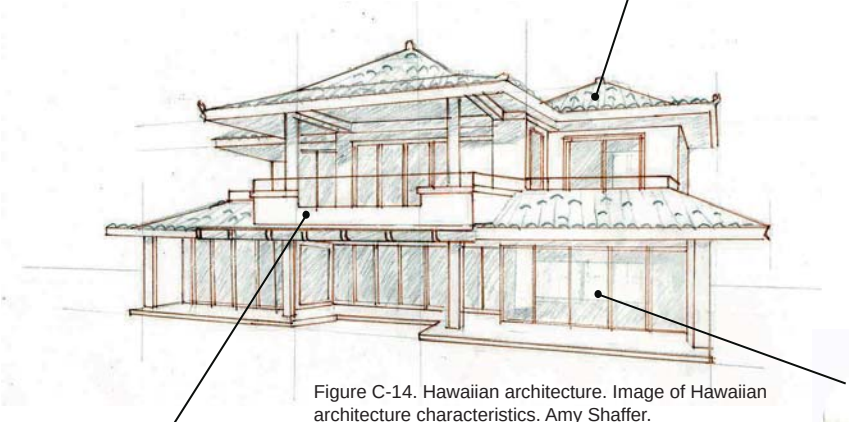
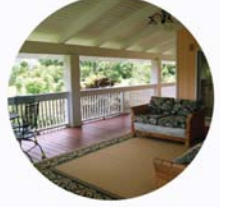
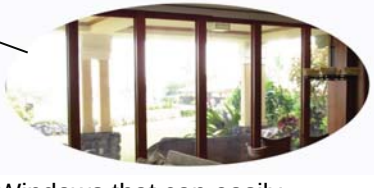


Figure C-14. Hawaiian architecture. Image of Hawaiian architecture characteristics. Amy Shaffer.



With perfect weather all year round, it is important to have spaces where residents can spend time outside.



Windows that can easily be opened and closed are important to allow for air circulation through the houses.

Vernacular Architecture

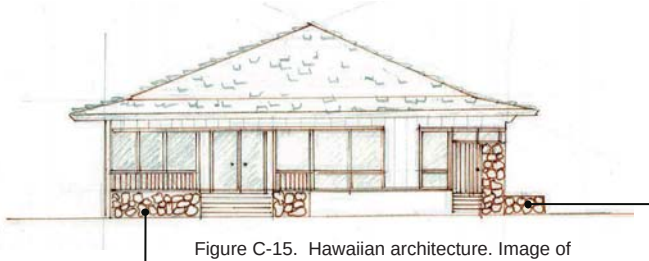


Figure C-15. Hawaiian architecture. Image of Hawaiian architecture characteristics. Amy Shaffer.

Lava rock can be used for just about everything on the island such as planters, sidewalks, facades, retaining walls, and ornamental decoration. It is often seen on houses and buildings as trimming or accent features.

Figure 96. Bamboo. Chapter ten photo. (Flickr.com).

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