COLLABORATIVE DEVELOPMENT

EXPLORING RESIDENTIAL DESIGN ALTERNATIVES IN NOVATO, CALIFORNIA

by

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B. S., Brigham Young University, 2009

A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture, Regional and Community Planning
College of Architecture, Planning and Design

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2014

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Howard Hahn

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Abstract

In Novato, California, zoning regulations and the city's urban growth boundary (UGB) have restricted development on open agricultural and hillside land outside the city. These restrictions have added to a shortage of affordable homes in Novato in spite of a demand for housing. Population growth estimates suggest that this demand will continue and strategic development of land outside the current city boundaries will need to occur in order over the next 15-20 years (Bay Area Census Data 2010 and Heid 2004).

This report outlines a process of land development which evaluates the success of a development alternative relative to what the land owners, developers and the community want, need, and value. This process involved producing four community design alternatives of varying housing densities for an 867 acre parcel of land just beyond Novato's UGB. The alternatives were: high density (556 homes), medium density (224 homes), low density (14 homes), and low density + land swap (72 homes). Using a systematic scoring process, each alternative was evaluated based on what the land owner, developer, and the community valued in the development and then awarded each a feasibility score. This score represents likelihood of implementation. The higher the feasibility score, the more likely the alternative could be pursued as a development option.

The high density alternative (556 homes) received the lowest feasibility score. It met many of the land owner and developer values, but few of the community values. The low density + land swap alternative (58 homes) received the highest feasibility score. This alternative met nearly all of the developer and owner values as well as the community values. The land swap option of this alternative was unique and made this design more feasible. The swap identified land areas on the site property that could be traded for developable land inside the city boundary allowing Novato to maintain the rural character of the city fringe, while giving the developer land that could be used for future development. This alternative is a compromise that adequately addresses the values of all involved and is therefore recommended as the most feasible design possibility.

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Major Professor | Howard Hahn
Committee member | Gary Stith
Committee member | Larry Lawhon

Note

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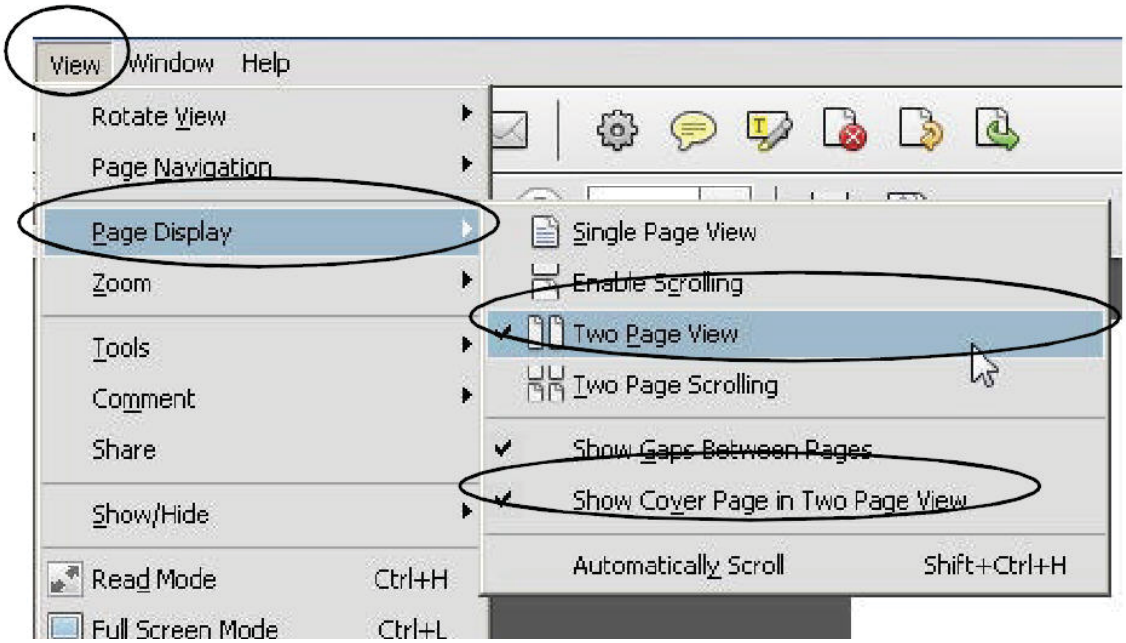

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(Hahn, 2014)

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(Author, 2012)

Acknowledgements

Many people have contributed to the completion of this master's project. I would first like to acknowledged and thank my major professor Howard Hahn. His commitment to his students is unmatched, and I am grateful for his guidance through every aspect of my project. I also acknowledge the other members of my master's committee, Gary Stith and Larry Lawhon, for their land development and community planning expertise and insights.

Components of this project would not have been possible without the help of community leaders and planning professionals in Marin County, California. Specifically, I am grateful for the help of Denise Athas, Novato City Council member and real estate professional; Jim Heid, a community development consultant and founder of UrbanGreen in San Francisco, California; and Scott Hochstrasser, an environmental planning consultant and president of International Planning Associates Inc. in Fairfax, California. Each gave valuable insights into the professional aspects of land development in Marin County.

I am especially grateful for the time, hard work, and suggestions from my sister and editor Lauren Bangerter Wilde. I know she has spent many hours reviewing the details for this report. Knowing she would help to edit my work has made the entire process easier and more enjoyable.

I am grateful to the time and effort of my Grandfather, G. Jay Garlick, in meeting and consulting with me on this project. He has given many years of professional life to ensure that the ground in Novato is developed in a wise way. I have learned from his faith and vision in what can happen in Novato.

Lastly I would like to acknowledge the sacrifice and support of my wife Lindsey and three daughters, Alina, Anna, and Page. Lindsey's faith and confidence in my abilities throughout this project, as well as my three years at Kansas State University, has given me untold energy and commitment to the challenges of graduate school. I am blessed beyond compare to have the eternal love and support of my best friend and angle wife.

1 PREFACE

Figure 1.1: Aerial photo of Alpine, Utah taken in 1993 (Google, 2014)

Figure 1.2: Aerial photo of Alpine, Utah taken in 2013 (Google, 2014)

I grew up in American Fork, Utah, a city of 30,000 people located about 30 minutes south of Salt Lake City. As a boy, I loved to spend time at my grandparents' 27-acre farm in Alpine, Utah, only a few minutes from our home. The farm is nestled at the base of the Wasatch Mountain range along the Alpine Highway, the main street into town. My Grandpa Bangerter had horses, and I, along with him, my Dad, and cousins, loved to ride in the nearby foothills. We seldom needed to use a horse trailer because there were so many open fields between the farm and the mountains.

That was years ago and things are different now. While the beauty of the mountains and the farm has remained, the rural feel of Alpine has slowly changed. We can still ride to the mountains from the farm, but we have to stay on designated trails that wind through housing developments. Homes now cover the fields that 15 years ago were completely open. Although I was not aware of it at the time, I was watching sprawl roll over the fields and hillsides. Creeks, thickets of oak brush, ponds, old fence lines, and worn horse trails were replaced with roads, gutters, detention ponds, cul-de-sacs and sidewalks. Overall, the growth has been for the better and has allowed more people to live in the beautiful mountain valley. Looking back I realize that these fields could not remain open forever and that development of this area was inevitable. However, I feel the land could have been developed in a more sensitive way; a way that responded to what the land had to offer.

Introduction

Goal

My goal in selecting this project was to explore the role of landscape architects in sensitive and integrated land development. This objective can be separated into four objectives:

Project objectives

1. Apply the methods of conservation community design to develop skills as a designer of residential communities.
2. Learn how the land development process works and how city and county officials manage population growth.
3. Understand opposition to development in northern California.
4. Propose development solutions for the site property that address development opposition and can benefit all parties.

Relevance to Landscape Architecture

This project focuses on two areas important to landscape architects:
(1) conservation design
(2) the role of a landscape architect on development teams.

First, conservation design is applicable to landscape architects because of the priority it gives to planning successful designs respecting natural systems. This project utilizes the latest technologies in mapping and digital rendering to prepare and present development plans.

Second, landscape architects are qualified to lead teams of professionals in land development projects because of their education and professional training. Education includes understanding methods of community design, community planning, site inventory and analysis, sensitive building placement, and design representation. Using hand and digital graphics, landscape architects can create plans, maps, and images that help others visualize what a development will look like. A landscape architect should use all of these skills as a mediator between government officials and land developers to help propose successful development solutions.

Figure 1.3: Panorama view of the hills in Novato,California (Author, 2012)

Personal Interest

Graduate Education

As a student at Kansas State University, I learned early in my first year about two methods of design that provides a better approach to community development. These methods are conservation community design and McHarg's mapping overlay analysis. The conservation community design method identifies the natural features of a site and conserves them by arranging homes and roads around them. McHarg's mapping overlays, pioneered by landscape architect Ian McHarg, identifies areas suitable for development through a series of maps. The maps highlight areas that are either suitable or un-suitable for development. These two methods give the designer a framework for design that works with nature, not against it.

Project

Studying these methods from the start of my education prompted my thoughts toward a family development dilemma. My grandfather, G. Jay Garlick, has owned ground in northern California for nearly 40 years. It is located on the border of the City of Novato in Marin County. For many reasons development of this property has been difficult. The natural beauty of the area combined with the land preservation mentality of many in California made the property a prime study site for conservation community design. The project started early in the fall semester of 2012 when I approached Professor Howard Hahn about using the property as the site for his design implementation studio. The studio is focused on advancing student's knowledge of community design utilizing the methods of conservation community design. Professor Hahn agreed to use the site for the 2013 fall studio when I would take the class. Before the studio began, I visited the site in California and worked with my grandfather, my dad (an attorney looking into the legal aspects of developing the land), and Professor Hahn to prepare a project that would benefit all involved.

Project Methods

The study methods for this project (Figure 1.5) are organized into three main phases: 1) Research, 2) Design, and 3) Compare.

Phase 1 – Research: understand local development and determine housing needs

Phase one included researching development in California and determining projected housing needs. The first step of research was a literature review of topics related to community development and specifically community development in northern California.

Literature Review

The literature review included a study and analysis of both Marin County and Novato City's positions on anticipated population growth and residential development. These positions have guided the preparation of their respective development plans. As part of the analysis, these development plans were reviewed to study how both the county and teh city outline their goals and action plans for dealing with population growth. These plans offer insights into what the residents value about their communities and how the city or county intends to protect these values. Having only visited northern California a few times, gleaning perceptions of population growth and housing development from these plans was an important step in understanding the development climate of the area. I reviewed audio and video recordings of past Novato City Council and Planning Commission meetings to deepen my knowledge about local development issues and perceptions. Interviews with government officials and development professionals in Novato also helped in understanding the housing development climate.

The research phase also involved identifying current and projected housing needs of the county and Novato. These needs were identified using primarily the Marin County Housing Element (Marin County Planning Commission 2013) and the Novato City Housing Element (Novato City 2013). Census data of the Bay Area publications from The Marin Community Foundation (Hickey 2011a; Hickey 2011b) were also extremely helpful.

Mapping

The next step in the research phase was mapping housing needs and trends. This series of maps culminated in a map of all available, developable land in Novato. The map separated developable land into tiers of development potential. Development potential was determined by future development plans, current land use, surrounding land uses, and zoning. The purpose of the map was to graphically show where development is planned to occur in both the near and long-term future. The final step of the research phase was to identify development values and development options applicable to Novato. From my analysis, I identified infill development and conservation development as two methods of development appropriate for Novato's needs. Because the study site is outside the urban growth boundary, the conser-

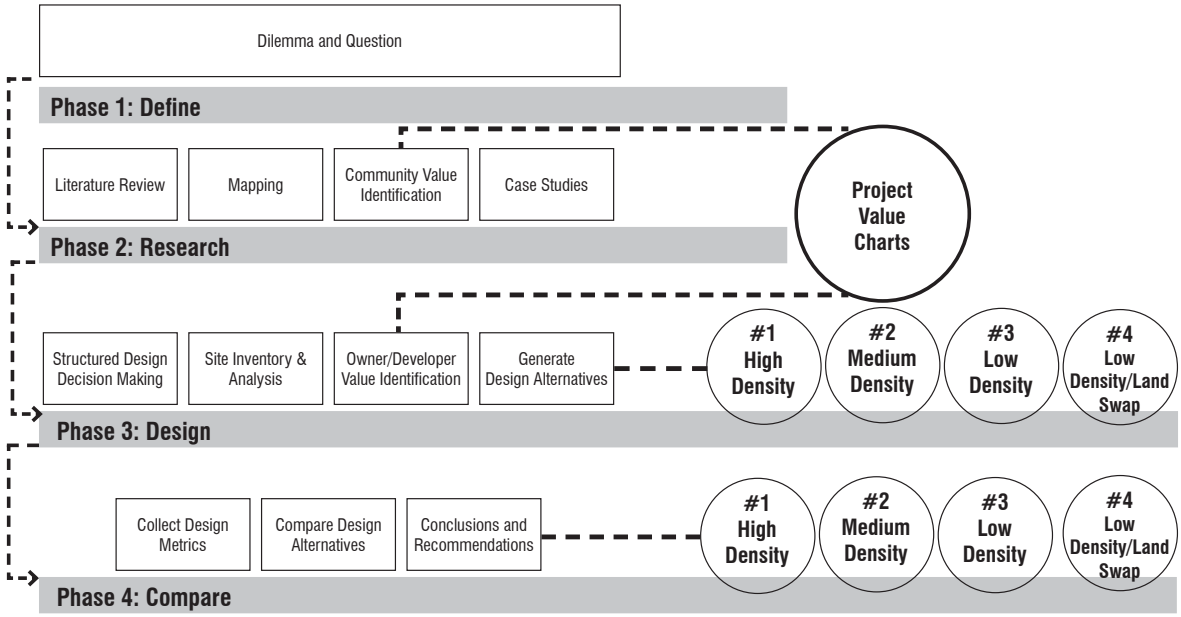


Figure 1.4: Project method diagram

vation development method was the most applicable. I then conducted case studies of four northern California communities that used principles of conservation design. The studies of both successful and unsuccessful conservation communities strengthened the design alternatives for the project site. The approach for phases two and three, the design and compare phases, were adapted from a lecture given by Dr. Brent Chamberlin at Kansas State University on structured decision making (Chamberlin 2013).

Phase 2 – Design: designing a development plan sensitive to housing and environmental needs

Structured Decision Making

Structured decision making, illustrated in Figure 1.6, is an iterative process of clarifying the context of a design question, defining objectives and evaluation criteria, developing alternatives to address the question, estimating the consequences of the alternatives, evaluating tradeoffs, selecting the most appropriate alternative, and monitoring the alternative after implementation. This process is used for larger projects at a city, county, or regional level. Adaptations of the process for this report focused it down to the site scale. The modifications simplified the process into four phases: define, research, design and compare (Figure 1.7). I found the process to be iterative between phases, shown by the small circles. I also found that by the end of the project I had defined new dilemmas that could be answered by repeating the process. The stakeholders for this project are the land owners, potential land developers, the local city governing boards (city council and planning commission), and the residents of Novato.

Site Inventory and Analysis

An inventory and analysis of the project site were important parts of my design process. A large part for the analysis was completed as part of Professor Hahn's Conservation Community Design Studio. The studio was made up of six landscape architecture graduate students in their last or second to last year of study. As a studio we conducted a thorough GIS-environmental analysis where we mapped topography, vegetation, soils, watersheds drainage ways, land uses, and visual sensitivity. The result of the analysis was a suitability map identifying areas most appropriate for development. The inventory and analysis then included a site visit to California in September 2013. The visit included verifying findings from the GIS maps, documenting the existing features of the site, taking site photos, and visiting Santa Lucia Preserve, one of the four case study communities. Two additional site visits in November 2013 and March 2014 were also important steps in learning more about the site, the community, and other case study communities.

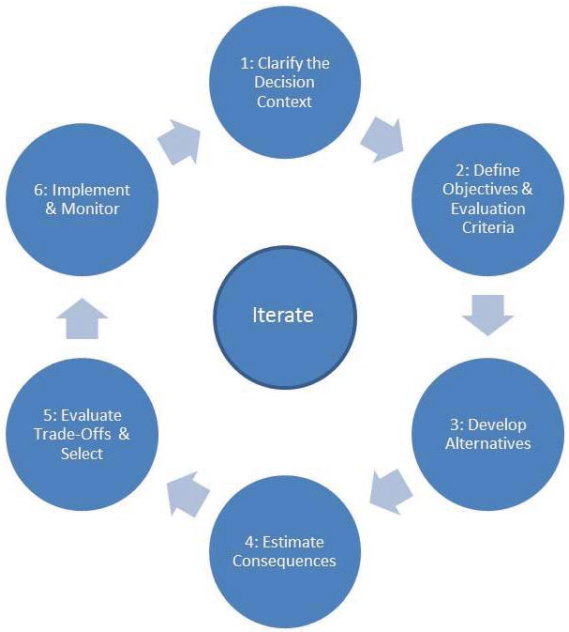


Figure 1.5: Structured design decision making process

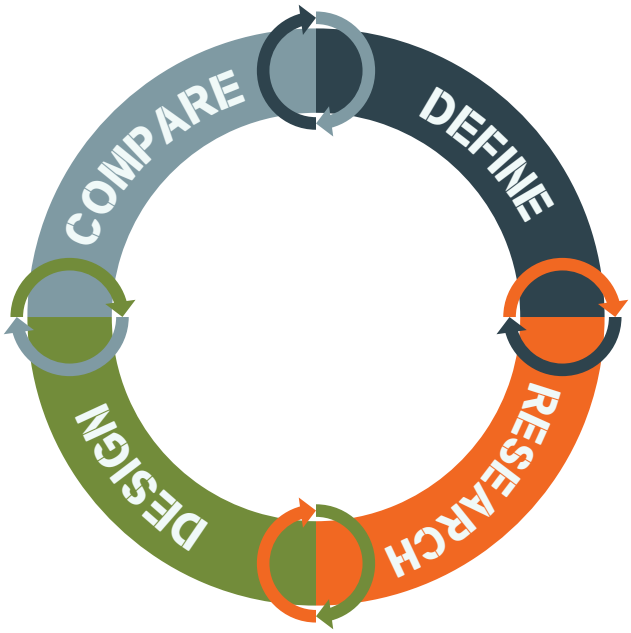


Figure 1.6: Modified structured design decision making process

Generate Design Alternatives

The next step of the design phase was to develop design alternatives for the project site. These alternatives offer a wide range of design options, densities, program elements, and consequences. Each alternative includes a site master plan, site development metrics, conceptual renderings, and a plan for implementation.

The design alternatives and target densities are:
1) High-Density Development: 500–600 dwelling units
2) Medium-Density Development: 100–300 dwelling units
3) Low-Density Development: 10–50 dwelling units
4) Low-Density + Land Swap: 50–100 dwelling units

The high-density alternative focuses on including as many homes as possible on all suitable land. The medium-density alternative focuses on the preserving the agricultural character on the south end of the site with homes and roads strategically placed on the north hillsides. This alternative also includes a corporate retreat facility in the center of the site. The low-density alternative is designed to maximize the limited density currently allowed by the county. Finally, The low-density and land swap alternative includes the residential design from the low-density alternative and a proposed land swap with the city.

Phase 3–Compare: reviewing the design metrics and recommending action

Collect Metrics

The final phase was to collect and compare the metrics of each design alternative. The purpose of comparing each alternative was to illustrate that each design has different results and consequences and therefore, each presents unique challenges for development. The metrics numerically summarize alternatives and begin to quantify the pros and cons of each. The metrics include: amount of developed and conserved land, length of roads and trails, lot size, number of dwelling units, development costs, and compliance with the California Environmental Quality Act or CEQA. More about these metrics and how they were determined is explained in Chapters four and five.

Value Charts

Once the metrics were collected each design alternative was given a feasibility score. Feasibility scores were determined with the use of value ratings and charts. Value ratings describe each value, how it was calculated, and the associated score. Value charts were created for each design alternative as a way to combine the value ratings and the metrics in to a cumulative feasibility score. The feasibility score represents the likely implementation for each design alternative with higher scores more likely than lower scores. Analyzing each of the alternatives based on these metrics helped me recommend the alternative I found most appropriate to be implemented.

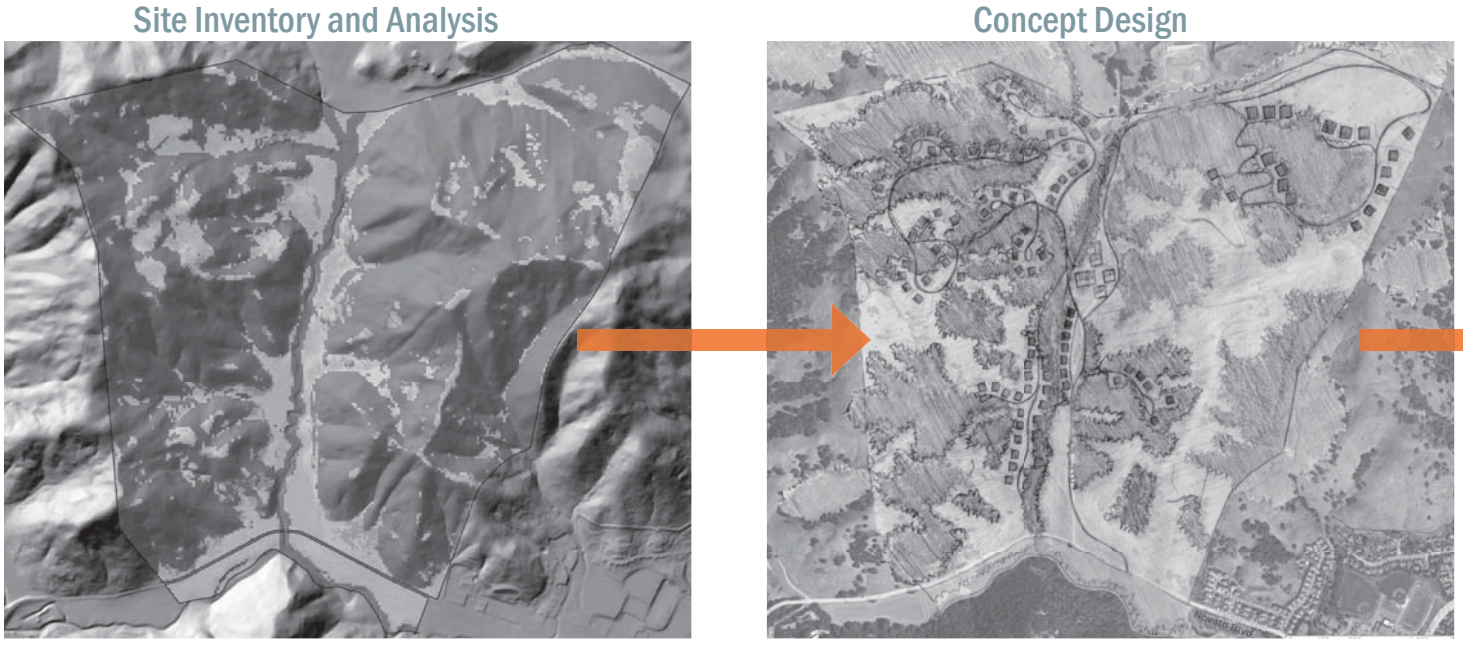
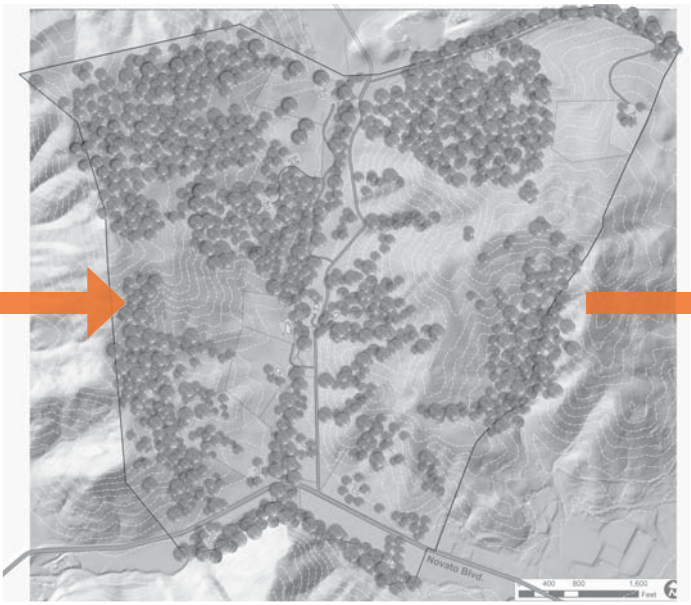


Figure 1.7: Process of site design development

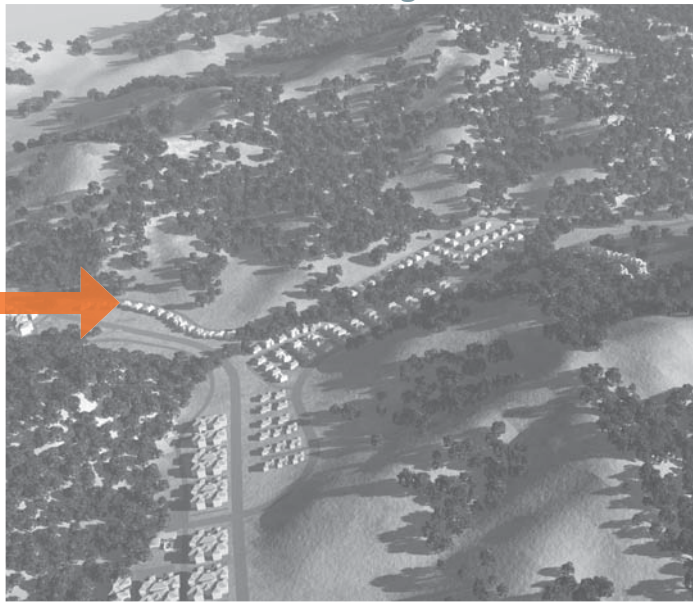
Recommendations

Through this process of discovery and research, my site visits to California, and my conversations with key stakeholders in this project I found that any successfully implemented design will have to meet strict environmental and development guidelines. The strict development guidelines in many ways serve as a barrier to development and growth. The final recommendation for implementation takes into account the value charts and suitability scores. It also factors in the development process and associated time line. Some of the design alternatives may have a higher return on investment potential, although the time line for implementation is unknown.

Site Plan



Final Design



II DEFINE

Introduction

This chapter provides the physical boundaries and theoretical issues of the project. The project site is located in northern California near the city of Novato. Novato is in Marin County, north of San Francisco. The chapter provides an overview of the site, identifies the dilemma of fulfilling housing development needs in Marin and Novato, and addresses how those needs relate to the project site. The research question and thesis focus on how to solve development dilemmas using the attributes of the project site.

Project Location

Marin County

The location for my master's project is in Marin County, California, one of nine counties surrounding the San Francisco Bay, and one of 27 original California counties. The county is 45 miles long and 10 to 20 miles wide. It extends from the Golden Gate Bridge at the south to Bodega Bay on the north (see Figure 2.2). Marin County's western border is defined by the natural beauty of seventy-two miles of Pacific coastline. Just inland from the coast is Muir Woods National Monument. Created in 1908, Muir Woods is a 550 acre park preserving the world's largest tree species, the Coastal Redwood, that can live for 1,500 years and grow to over 300 feet (Olson and Roy 2014). Muir Woods is appreciated worldwide for the preservation of the redwoods and is visited by more than one million people annually. Farther inland, Marin County is mostly rolling hills covered with trees and grasses. The scenic San Pablo and San Francisco Bays and wetlands define Marin's eastern boundary.

The man-made vistas of Marin County are equally impressive. Views of the San Francisco city skyline, Alcatraz Island, the Oakland Bay Bridge, and the Golden Gate Bridge are just a few landmarks that make Marin County unique. The Golden Gate Bridge, a modern marvel of engineering, is often considered one of the manmade wonders of the world. Built from 1933 to 1937, it spans the strait between San Francisco and the Marin Highlands, a distance of 1.7 miles (see Figure 2.1). The bridge is constructed of 80,000 miles of cable wire and 1.2 million steel rivets.

Figure 2.1: Golden Gate Bridge from Marin County Highlands at night (Hahn, 2013)

Figure 2.2: San Francisco Bay Area county location map

Novato City

Marin County's second largest and northern-most city is Novato, home to 52,000 residents (ABAG and MTC 2010). Novato was originally settled as an agricultural and farming community and was incorporated as a city in 1960. As a bedroom community to San Francisco, Novato has grown as transportation routes to San Francisco have expanded to make the commute easier, first with the railroad in 1879 and again with U.S. Highway 101 after World War II. These expansions made commuting into San Francisco from Novato more convenient.

Preserving Novato's rural character and history remains a priority for residents. The western boundary of Novato sets the boundary between urban development and rural areas which extend 16 miles to the Pacific Ocean. In 1997, voters approved an urban growth boundary to "encourage efficient growth patterns that foster and protect the rural character of Novato" (City of Novato 2007). Over the last seventeen years, the urban growth boundary has successfully limited development on open space immediately adjacent to the city. Novato is proud of the fact that within their sphere of influence (a boundary which extends beyond the urban growth boundary) 2,600 acres of land are permanently preserved as open space. This space is used by many for hiking, biking, and horseback riding.

Figure 2.3: View of Novato and Marin County from the northwest (Hahn, 2013)

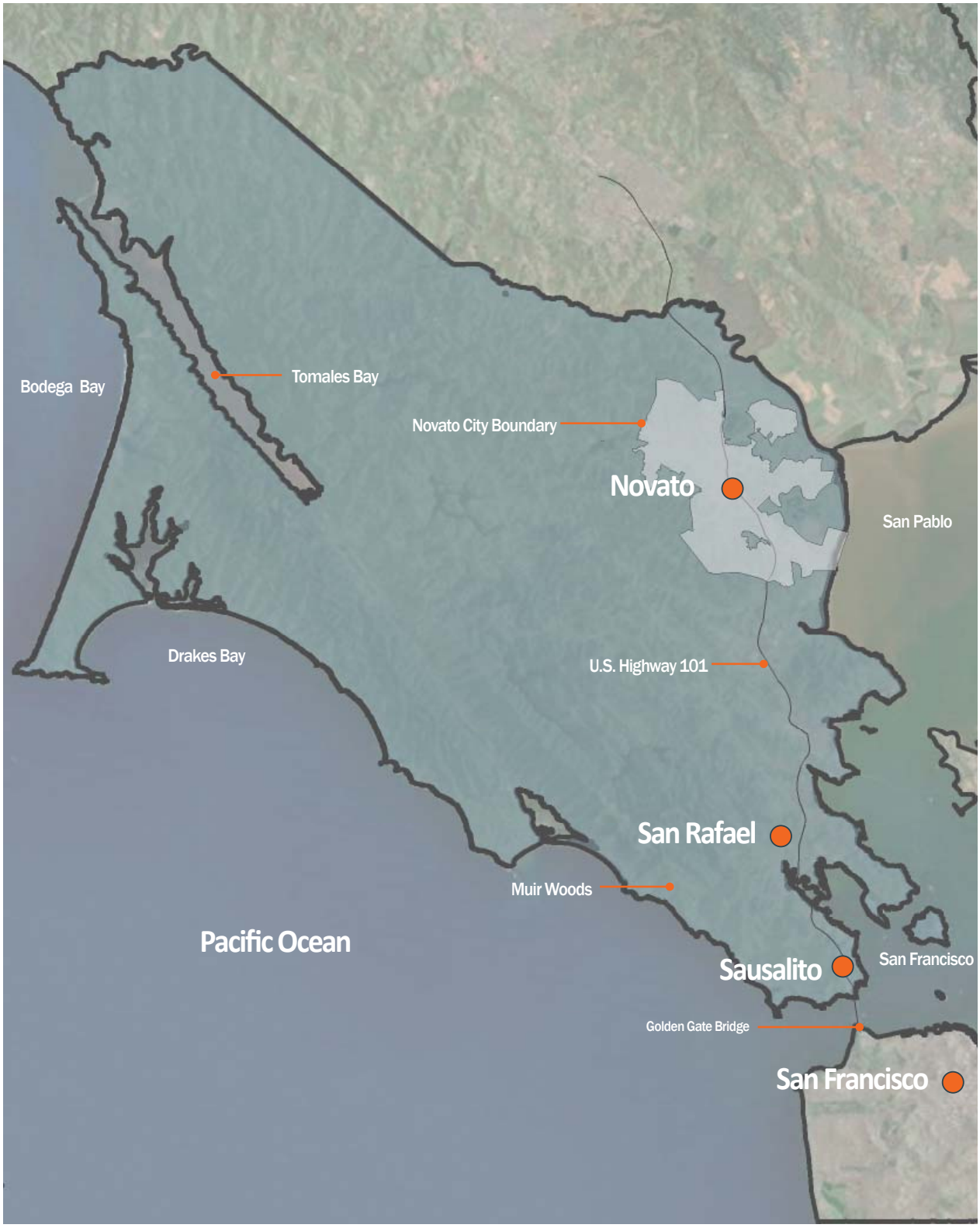


Figure 2.4: Novato City location map

Project Site

The site for this project is an 867 acre parcel of land in Marin County, adjacent to Novato's western boundary (see Figure 2.5). The majority of the site lies on rolling hills with slopes in excess of 25%. The slopes are covered with groves of oak and bay trees with grasses covering the remainder of the property. North of the site is a working dairy, and to the south is Novato Creek flowing through a dense grove of bay trees. To the east is Novato City and the Mount Burdell Preserve. To the west is some privately owned land, another dairy, and Stafford Lake.

The property is owned by G. Jay Garlick, the majority share stakeholder for the past 40 years. Mr. Garlick values the land for its proximity to Novato, its residential development potential, its beautiful rolling hills, and its stunning ridgeline views of San Pablo Bay. The property is currently used for cattle grazing and lumber harvesting. The property resides within an AG-1 county zoning designation, which allows a density of 1 unit per 60 acres resulting in fourteen potential residential lots. Because the property has never been included within the urban growth boundary of Novato, amending the zoning to allow higher densities has been strongly resisted for decades. Mr. Garlick would like to develop the property for residential housing to help fill Novato's need for workforce housing.

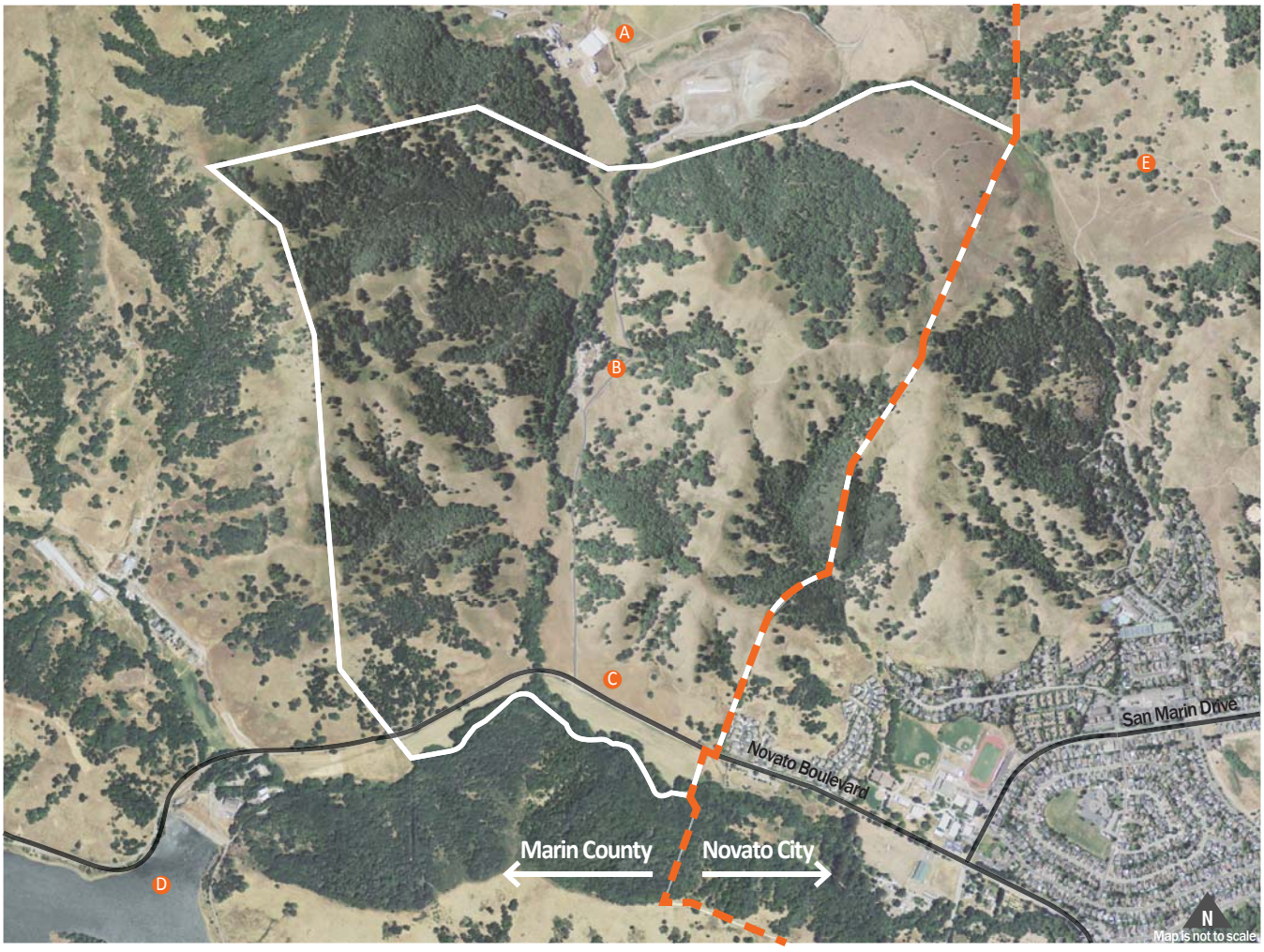


Figure 2.5: Project site context map

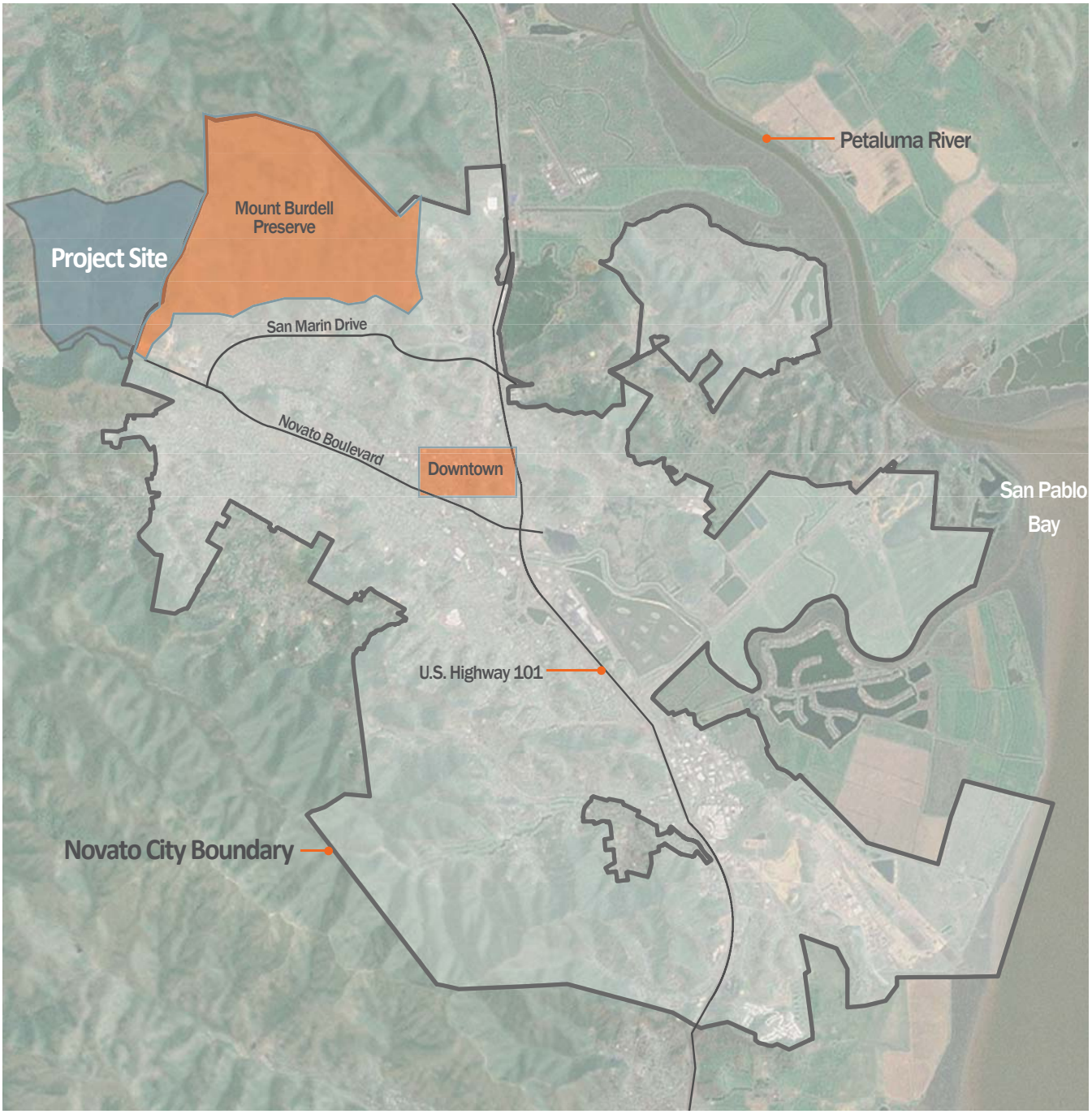


Figure 2.6: Project site location map in relation to Novato

Project Dilemma

Dilemmas

Over the years as Mr. Garlick has tried different development options for the project site, he has routinely encountered obstacles and opposition. These obstacles include resistance to growth, Novato's urban growth boundary (UGB), environmental preservation, and county zoning restrictions.

A major limitation to housing development in Marin County is community resistance to growth. The Marin County Housing Element (2013), notes that "another constraint to housing production in Marin County is community resistance to new developments. At times there is a tension between fair housing laws and a desire to provide . . . housing for some community segments. In many cases it is not possible to target housing to select groups." This resistance is also evident by Novato's slow rate of growth over the last 30 years. The UGB has dictated how the city has grown over the past 17 years. The UGB was established in 1997 with the purpose of preserving the rural quality of life in Novato (City of Novato 2007). Various environmental groups in and around Novato oppose land development due to the impact it has on the environment. The Marin County Conservation League, an organization representing Marin's major environmental organization, states that one of its goals is to reduce the amount of disruptive and inappropriate development. Finally, Marin county zoning restrictions for the site area allows for 14 units. These zoning restrictions do not allow the owner of the property to achieve his development goals for the property.

Opposition to development has restricted home building. Another dilemma for Novato is a shortage of market rate housing despite a great need. Because there has been little growth on the edges of the city, Novato has developed nearly all of its available land within the city limits. Population growth estimates suggest that in 10–20 years Novato will develop all of its available land. The city will need to acquire land for residential development in order to satisfy housing demands over the next 25–30 years (ABAG and MTC 2010; ABAG and MTC 2013). In spite of Novato's needs, and even requirements for housing of all income levels, plans proposing residential development of the study site have been rejected.

Project Question and Thesis

Question

The question of this project revolves around reaching mutually beneficial development solutions between the parties involved. Novato City and Marin County have established development goals that protect the environment in response to public objection. Developers and land owners likewise have development goals that are often limited by the development goals of the community.

In areas where development is highly regulated, as is the case with Novato, California, how can landowners and developers more effectively advance development proposals that encourage a balance between the goals of the city, the goals of the developer, environmental and aesthetic protection, and the needs of the community?

Thesis

Proposing designs that are in harmony with community goals is vital for the success of a development project. Understanding Novato's land development values by using a structured design decision-making process will help land developers to design, measure, discover, and present feasible design alternatives to the city for approval. I will use this decision making process for the development of the project site in Novato. The microcosm of the project site can be used to understand how the process could work in other areas of the country with similar development conditions.

Figure 2.7: San Francisco from Marin County (Author, 2014)

III RESEARCH

Figure 3.1: Suburban neighborhood in Irvine, California (Google Earth, 2014)

Research and Literature Review

The research phase of the project helped me understand the need for, as well as the approach to residential development in northern California. Through this phase, I gained valuable insight to what the people of Marin County and Novato value in their communities. The research phase included a literature review of topics related to community development, informational mapping of Marin County and Novato City, and case studies of community development projects in California.

Suburban Sprawl

Since the late 1940s, America has experienced rapid suburban growth driven by demands for single family housing, increased popularity of automobiles, affordable fuel, and the creation of a national highway system (Teaford 2008). These factors, combined with many Americans' dreams of home and land ownership, promoted suburban expansion which shaped the growth of most American cities (Tachieva 2010; Teaford 2008; Duany, Plater-Zyberk, and Speck 2010). This suburban expansion became known as suburban sprawl. Sprawl is often characterized as auto-dependent, single family residential neighborhoods separated from commercial areas, business parks, civic centers, and open space (Figure 3.1). This pattern of growth has dominated nearly every region of America. Unfortunately, in some regions of the country, sprawl has led to housing developments that have been insensitive to the natural landscape (Duany, Plater-Zyberk, and Speck 2010).

Smart Growth

Smart growth principles were conceived as alternatives to sprawl with the goal of reducing its negative effects (Downs 2005). Unlike sprawl, smart growth focuses on limiting outward expansion of new development making human settlements more compact. Some of the key elements of smart growth are: restricting outward growth, revitalizing existing neighborhoods, raising residential densities in existing and new neighborhoods, expanding mobility and livability, limiting the use of cars, and providing a greater mix of land uses (Downs 2005; Porter, Dunphy, and Salvesen 2002). The principles of smart growth are often used to identify areas for future development and urban expansion (Gause, Franko, and Urban Land Institute 2007). These principles are used in a variety of community design options including traditional neighborhood development, new urbanism development, and transit oriented design.

Recently, the smart growth strategy of infill development has become a popular and acceptable alternative to outward sprawl. Infill focuses on the redevelopment of vacant or underutilized land within a city's existing urban growth boundaries (Anderson, Richards, and Baxley 2005). While infill development is a feasible and wise alternative, population growth patterns suggest that it will only be able to satisfy a fraction of America's housing needs in the next 10 to 15 years (Heid 2004).

Exurban Development

The exurban region is the area just beyond the boundaries of the suburbs and is becoming the next area targeted for land development as illustrated in Figure 3.2. Also known as greenfield development, development in the exurban region offers space to expand communities that will satisfy increasing population demands. It also offers many of the benefits once claimed by suburbia: large lots, low land prices, and low density. However, exurban development must be done differently than suburban development. It must be approached in a sensitive way in order to avoid the same negative results and impressions of suburban sprawl. Design and development strategies that have been used to create better communities within the urban and suburban environment must be applied to greenfield developments in order to avoid past mistakes made by sprawl. Three exurban design strategies to achieve this goal are: 1) to include green infrastructure systems (i.e., watershed, woodland, and other natural resource corridors) connected to natural open spaces; 2) to integrate multiple modes of transportation to reduce the need for cars; and 3) to construct a diverse mix of housing types to accommodate a wide variety of residents (Heid 2004).

Conservation Community Design

Conservation community design (or conservation development) is a method of exurban development that reduces and even eliminates the negative aspects of sprawl. Conservation

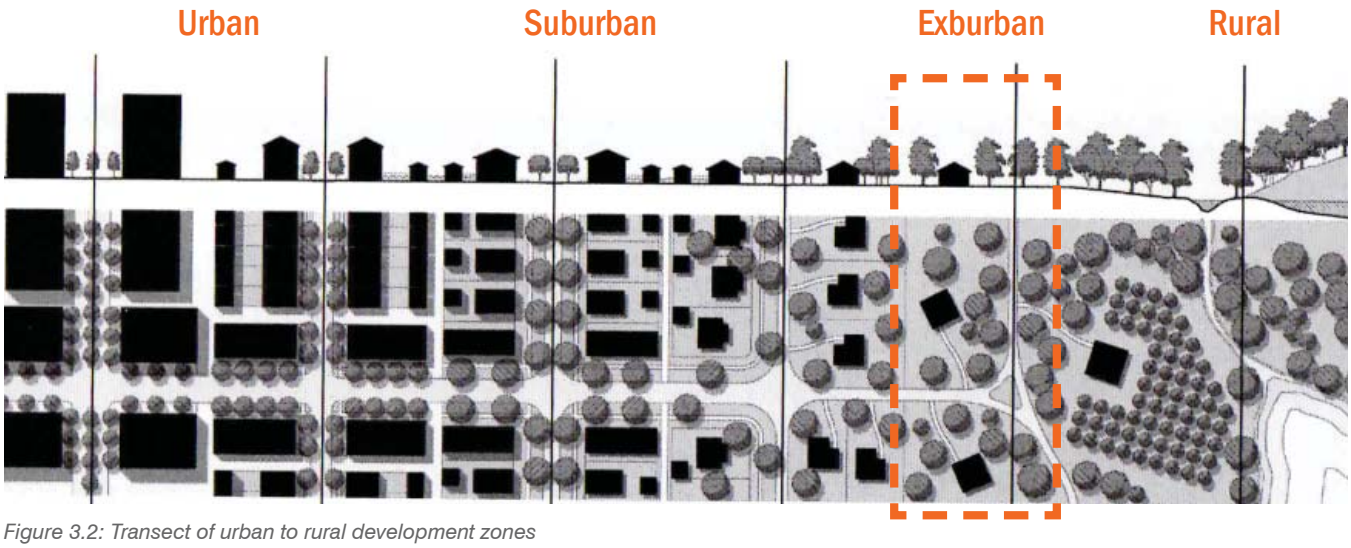


Figure 3.2: Transect of urban to rural development zones

community design combines residential development with land conservation in order to preserve high quality natural resource areas early in the development process (Hannum et al. 2012). Unlike conservation development, sprawling development is guided by rules of geometry, principles of physics, engineering protocols, and the goals of maximizing the use of open space (McMahon 2010). Conservation community design first considers the natural elements on a site and reserves sensitive areas for conservation (McMahon 2010). Site elements are divided into primary and secondary conservation areas. Primary conservation areas include sensitive soils, wetlands, floodplains, and steep slopes. Secondary conservation areas include wildlife habitats, woodlands, farm-land, historic landmarks, key views and aquifers, and groundwater recharge areas (Arendt et al. 1996). Various mapping techniques are used to identify the size and location of each conservation area. Landscape architect Ian McHarg pioneered the transparent overlay mapping technique as documented in his book *Design with Nature* (McHarg 1969). By overlaying maps of primary and secondary conservation areas, the designer can identify those areas most suitable for development. McHarg's mapping process was the precursor to modern day Graphic Information Systems (GIS). ESRI credits McHarg as one of the visionaries and founders of this technique (ESRI 2011).

Open space in conservation communities is protected as natural open space for a variety of uses including passive and active recreation, farming, ranching, or livestock grazing. While conventional developments may also preserve areas for these activities, the focus of a conservation community design is preserving the appropriate areas first and developing around them to provide the highest possible quality of open space (McMahon 2010). Widely spread throughout the country, conservation developments account for roughly 9.8 million acres (4 million ha) of land, or 25% of all privately conserved land in the United States (Milder and Clark 2011).

Benefits of Conservation Communities

The quality of life in conservation communities is considered high and can be partially attributed to the large amount of natural open space surrounding the homes in the community. Research has shown that natural open space in communities has been linked to social and psychological benefits, decreased violence, improved neighborhood relationships, and an increase in overall neighborhood satisfaction (Kaplan and Austin 2004; Kuo and Sullivan 2001; Marcus 1986). Homes in conservation communities often appreciate in value faster than homes in conventional communities and are sold at higher premiums (Arendt et al. 1996; Hannum et al. 2012; McMahon 2010). For developers and homeowners the potential benefits of conservation community design include reduced capital and infrastructure costs, higher home values, faster market absorption rates, and protected open spaces (McMahon 2010; Hannum et al. 2012).

Figure 3.3: Santa Lucia Preserve, a conservation community in Monterey County, California (Hahn, 2014)

California Development Patterns

Historical development patterns in the San Francisco Bay Area have reflected those of American suburban sprawl. From 1940 to 1980 the migration of households from the centers of big cities out to the suburbs was dramatic. During those 40 years the populations of nine counties surrounding San Francisco and Oakland grew while the populations within the cities declined. By the end of the 1970s, only one quarter of the population lived within the two major city cores (Pincetl 2003; ABAG and MTC 2010). The 1990 census showed an increase in the urban population of Oakland and San Francisco. This has continued up to the most recent census in 2010, demonstrating the increased popularity of infill development.

California Environmental Quality Act

The California Environmental Quality Act, refered to as CEQA, was signed as legislation by then California Governor Ronald Reagan in 1970. CEQA was conceived and passed in order to support the National Environmental Protection Act (NEPA) which was created one year earlier in 1969. The purpose of CEQA is to maintain a quality environment for residents of California now and in the future. CEQA is a statute that requires cities and counties to identify any significant environmental impacts for all projects within their jurisdictional boundaries. A project is defined as any activity undertaken by a public or private entity which may cause direct or reasonably indirect changes to the environment. The environment is defined as physical conditions that may be affected by a project including land, air, water, minerals, flora, fauna, noise, or objects of significant aesthetic or historical importance (State of California 2007).

Working within the limitations of CEQA can be complicated depending on the location, size, and nature of the project. CEQA provides an environmental checklist which can help determine whether a project will trigger CEQA regulations and fees. The checklist covers 17 sections such as air quality, hydrology and water quality, geology and soils, biological resources, and land use and planning. A series of questions in each of the sections help agencies determine whether their project will have significant environmental impacts. If significant impacts are expected, the project must complete an environmental impact report (EIR) where all relevant data and information is collected and reviewed. The purpose of the EIR is to provide public agencies, and the public in general, a document to review in order to understand the environmental impacts and the potential mitigation measures of the project (California Resources Agency 2012).

The CEQA checklist is a guide that to encourage a thoughtful assessment of any development project. The checklist rates 17 environmental factors as having between potentially significant to no environmental impacts. I selected eight factors which were applicable to my project and used them to determine the likelihood of each alternative passing the CEQA review process. These factors are: aesthetics, agriculture and forestry resources, geology and soils, greenhouse gas emissions, hydrology and water quality, population and housing, recreation, and utilities and service systems. Comparing the alternatives against the CEQA standards is an important step in recommending feasible solutions.

Figure 3.4: Marin County and San Pablo Bay (Author, 2014)

Marin County Analysis

Marin Countywide Plan

Marin's countywide plan, titled *Sustainable Marin*, is written with the purpose of guiding conservation and development in Marin County (Marin County Community Development Agency 2007). The plan is organized into three elements: 1) the natural systems and agriculture element, 2) the built environment element, and 3) the socioeconomic element. The elements focus on building sustainable communities where the natural systems, the built environment, and socioeconomic activities all work together for a high quality of life. *Sustainable Marin* outlines 11 goals (Table 3.1) that reflect the communities core values and desired outcomes. These goals identify what is important to the people of Marin and will help guide future design proposals. Many of these goals will be addressed either directly or indirectly throughout the development of this project.

Natural Systems and Agriculture Element

Since its establishment, Marin County has maintained a strong history of environmental planning and preservation. Marin County is surrounded on three sides by water and is known for its diverse natural settings. *Sustainable Marin* outlines intentions to preserve and protect water and biological resources, atmosphere and climate, open spaces, trails, and agricultural land.

Marin Countywide Goals

- Preserve and restore natural environments
- A sustainable agricultural community
- A high-quality built environment
- More affordable housing
- Less traffic congestion
- A vibrant economy
- Reduced ecological footprint
- Collaboration and partnerships
- A healthy and safe lifestyle
- A creative, diverse, and just community
- A community safe from climate change

Table 3.1 : Marin Countywide goals

The Built Environment Element

The built environment element of *Sustainable Marin* dictates land use policies and identifies the constraints and opportunities for development within the county. It attempts to balance population growth with available public services. Sections of the built environment element include: community development, energy and green building, mineral resources, housing needs, transportation, and public facilities and services. One of the purposes of identifying environmental corridors was to control where buildings could be built. One goal of *Sustainable Marin* is to confine urban and suburban development to the city-centered corridor to link housing with public transportation and jobs.

The Socioeconomic Element

The socioeconomic element section of *Sustainable Marin* focuses on the people of Marin and encompasses sections that enhances quality of life. These sections include: economy, child care, public safety, population diversity, parks and recreation, education, arts and culture, public health, and historical resources. Within the plan, these sections are addressed in detail outlining the objectives, actions, and outcomes for each area.

Environmental Corridors

An important part in developing or preserving the land in Marin has been the formation of environmental corridors. The 606 square miles of land and water in Marin County are divided into four corridors each with specific characteristics that form natural boundaries between them. Preserving the natural character of these corridors is a priority in the county-wide plan (see Figure 3.5).

The Coastal Recreation Corridor

The land adjacent to the Pacific Ocean, primarily used for recreation, agriculture, and preserving small coastal communities.

The Inland Rural Corridor

The central and northern areas of the county, primarily used for agriculture and other compatible uses as well as preservation of small communities

The City Centered Corridor

The area spreading along U. S. Highway 101, land area is primarily designated for urban uses and the preservation and protection of open land between cities.

The Baylands Corridor

Land along the shorelines of San Francisco, San Pueblo, and Richardson Bay, land use is dominated by marshes, tidelands, and dike lands that were once wet and part of the bays.

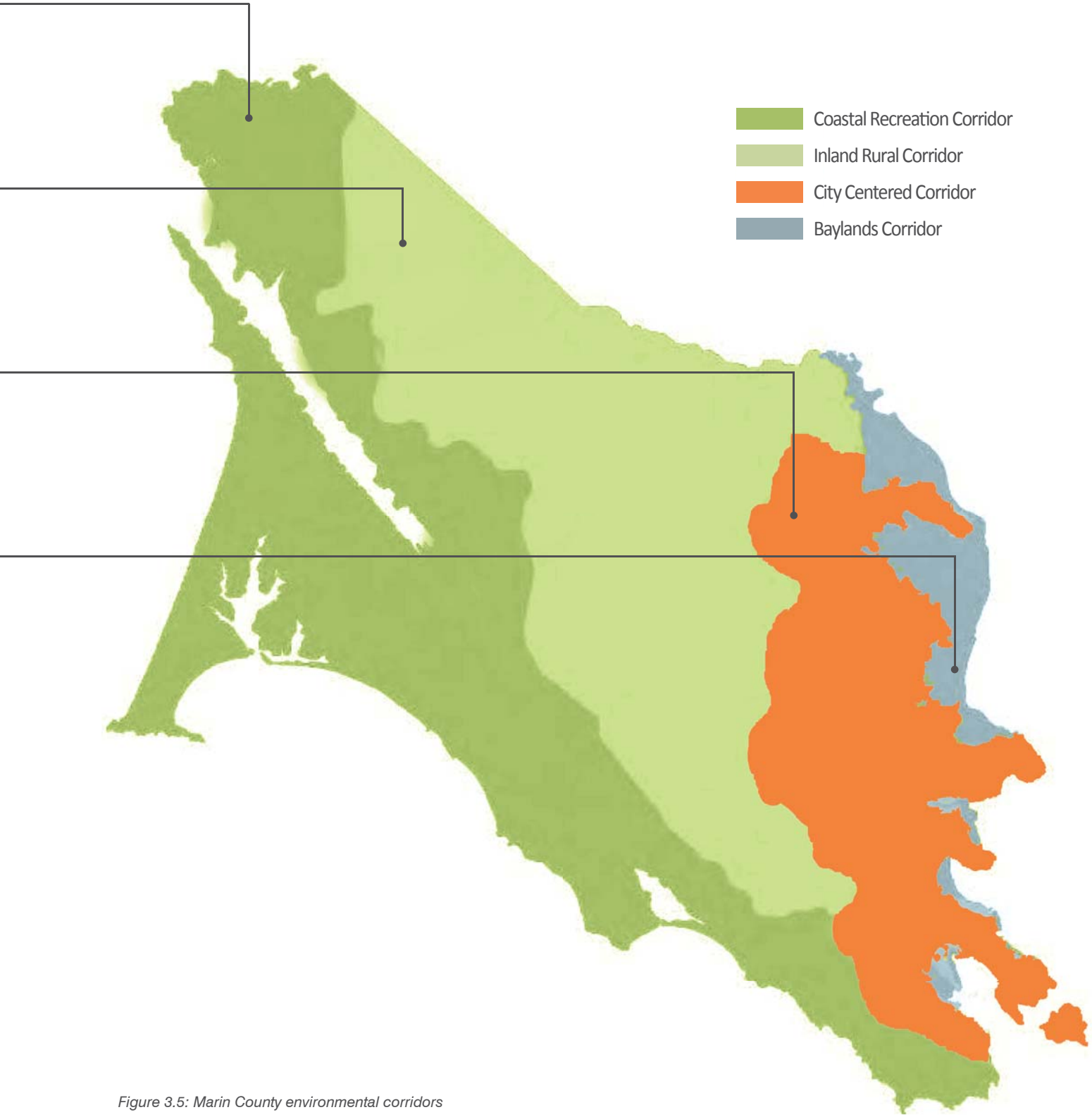


Figure 3.5: Marin County environmental corridors

Housing Demands and Needs

Population

Marin County is home to 256,069 residents spread over 33 cities and towns. Approximately 26% of the population, around 67,000 residents, live in unincorporated areas of the county. The population of Marin increased (see Figure 3.6) by 40% between 1960 and 1970. Since then the county has grown at a slower pace, between 3 to 8% each decade. This slow pace is expected to continue until 2025 when it is expected to level off at 3% a decade (ABAG and MTC 2010). The median age in Marin County is 44.5, higher than the California median age of 35.2, with 16.7% of households 65 and older (Marin County Planning Commission 2013). The majority of the population in Marin lives along the Highway 101 corridor with very few cities or towns in the inland rural corridor, between the highway and the ocean. The two largest cities in Marin, San Rafael and Novato, both have over 50,000 residents each, 58,502 and 53,301 respectively. The third largest city, Mill Valley, has only 14,159 residents (ABAG and MTC 2010). However, Figure 3.7 illustrates how population and city growth has made it is difficult to determine city boundaries.

Marin County Cost of Living

Because of its location, Marin County has become one of the most desirable and richest counties in America. In 2012, *Forbes* magazine ranked Marin County as one of the top twenty richest counties in the United States with an average household income of $103,000 (Francesca 2010). High tech companies like Google, Facebook, Apple, and Adobe, all located in the San Francisco Bay area, attract employees who often reside in Marin County. Marin County is also home to its own high tech companies, such as Autodesk. In general, Marin's population is considered affluent and well educated. With the wealth has come a high cost of living. Beautiful scenery, temperate coastal weather, and career opportunities all contribute to the desirability and high cost of living in Marin County. Unfortunately, the recent economic recession, a sector of low paying jobs, and an uncertain job market has made it difficult for many families in Marin to afford basic food, housing, and childcare needs. In 2011, the cost of those basic needs for a family of five was $82,913. (Marin County Planning Commission 2013). U. S. Census Bureau data shows that 20% of the county's households earn less than $50,000. Increasing home values in Marin also contribute to the high cost of living. The average home value in Marin was $686,400 compared to the national average of $272,900 (ABAG and MTC 2010; US Census Bureau 2010) Because of the high cost of living, it is increasingly difficult for much of Marin's labor force to live in the county. Estimates suggest that nearly 61,000 workers commute into Marin County each day and leave every evening, taking their money with them. Organizations like the Marin Community Foundation are working to find ways to provide affordable housing in the county to help boost the county's social and economic health (Hickey 2011a).

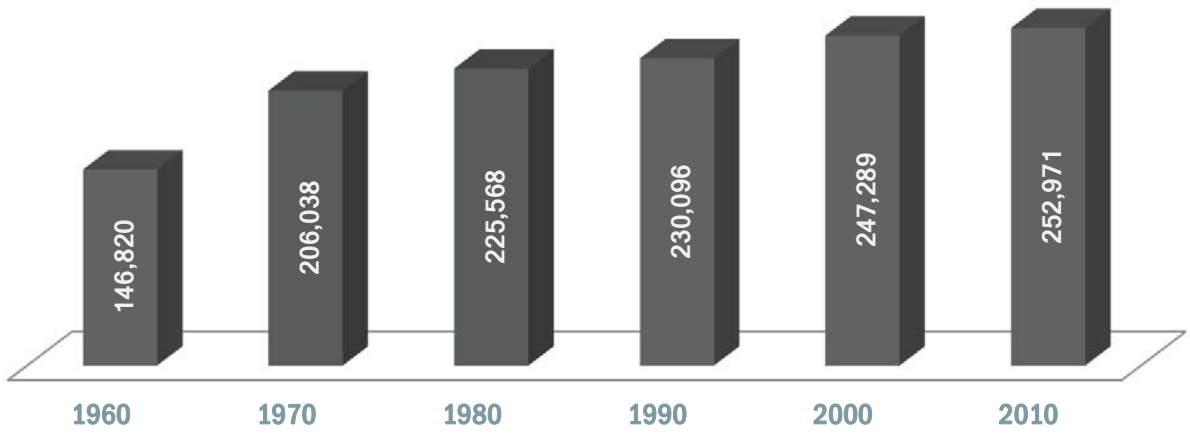


Figure 3.6: Population growth of Marin County by decade

Population Density in Marin County

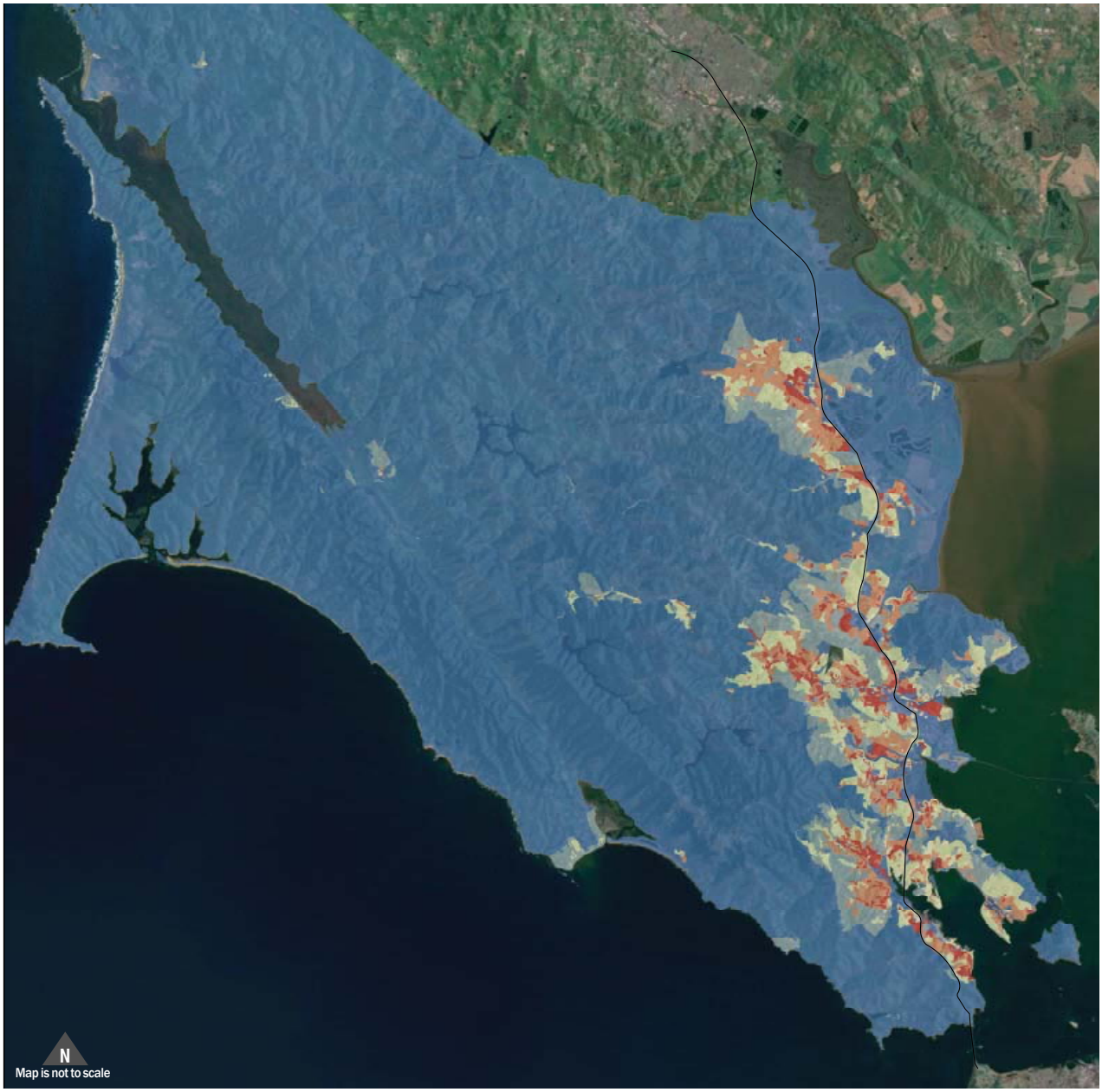


Figure 3.7: Current population density of Marin County

High Density

Low Density

U.S. 101

Marin County Housing Element

An important component to *Sustainable Marin* is a plan to fill the housing demand, entitled the Marin County Housing Element. The purpose of this document is to establish "objectives, policies, and programs in response to community housing conditions and needs" (Marin County Planning Commission 2013). Like the countywide plan, the housing element's objective is to plan for sustainable communities. This is done through supplying a wide range of housing options in order to match the diverse community and workforce. The three goals of the housing element are: 1) to use land efficiently; 2) to meet the housing needs of Marin through a variety of housing choices; 3) to ensure leadership and institutional capacity. Ultimately, Marin's housing element presents goals, objectives, policies, and action plans to the cities within the county to assist them in providing housing (Marin County Planning Commission 2013).

RHNA Income Levels

Very Low	less than $55,000
Low	$55,501–$88,800
Moderate	$88,801–$123,600
Above Moderate	more than $123,600

Table 3.2 : RHNA income categories

Regional Housing Need Allocation Program

Critical to the Marin County Housing Element is the Regional Housing Need Allocation program (RHNA). Since 1980, the state mandated RHNA program requires counties and cities to fulfill a share of future housing needs. The housing needs are divided into four income categories encompassing all levels of housing affordability (see Table 3.2). Housing needs for the RHNA are reassessed and assigned in eight year cycles by the Association of Bay Area Governments (ABAG). In the previous cycle, 2007–2014, the total housing need for the Bay Area was 214,500 homes with Marin County responsible to provide 4,882 of them. For the current cycle, 2014–2022, the total housing need has been reduced to 187,990 homes. Marin's responsibility was likewise reduced to 2,298 homes. These dropping RHNA requirements, shown in Figure 3.8, indicate slow population growth for the entire Bay Area. The RHNA is discussed in greater detail in the Novato Housing section of this report.

Regional Housing Need Allocations for Marin County

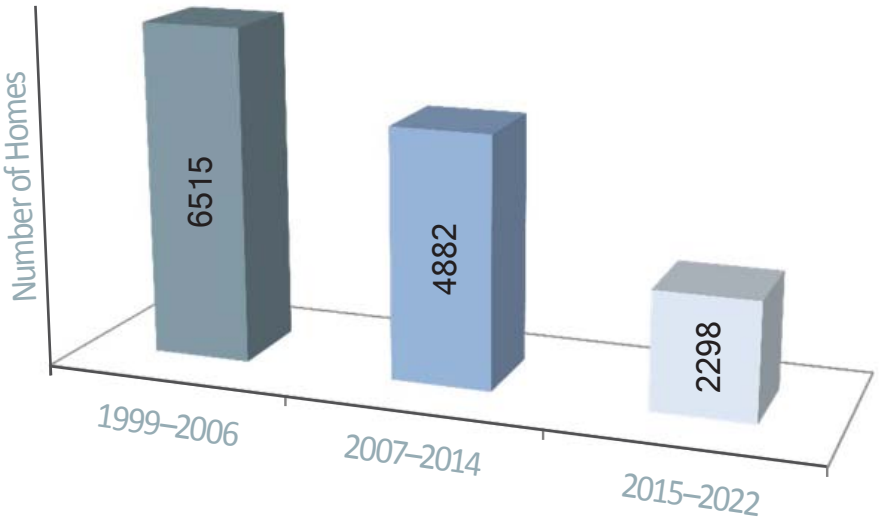


Figure 3.8: Marin County RHNA from 1999-2022

Figure 3.9: Novato City Hall (Author, 2014)

Novato City Analysis

Novato City General Plan

The City of Novato General Plan was adopted by the city council in 1996 and has been updated regularly, most recently in 2007. Novato is currently undergoing a complete revision of the General Plan that will be completed sometime in 2016. Novato's General Plan outlines the vision for the future of the city and is a statement of community values. The plan identifies numerous goals related to the city's land use, transportation, environmental protection, economic, and social needs. The plan is intended to help the city council and planning commission as they make decisions related to long-range conservation and development policies. The plan also informs citizens, developers, and other decision makers of the rules the city will use to guide development and conservation. The General Plan states that "the citizens of Novato view the city as a 'small town' in character now and in the future. They are proud of its beautiful setting and environment and want to preserve those attributes and incorporate them into its designs for the future" (City of Novato 2007). Clearly, environmental protection of Novato's natural resources is a high priority to its citizens and governing officials. Novato contains numerous unique and valuable environmental features that the community feels should be "preserved, protected, or restored where needed" (City of Novato 2007). These features include wetlands, baylands, woodlands, hillsides, and open space corridors. In the opening summary of the plan, Novato claims that its General Plan is "one of the strongest, if not the strongest, environmental plans in the State of California . . . . The plan balances its responsibilities of meeting the needs of Novato's residents with meeting the needs of Novato's environs" (City of Novato 2007). The plan is organized around 13 goals (see Table 3.3), which serve as the foundation of Novato's vision of future growth and development. Updates to the General Plan identified two more themes important to future visions of the city's growth: first, maintain the character of existing residential neighborhoods and second, emphasize infill rather than annexation.

Novato City Goals

- Preserve and improve the quality of life in Novato
- Retain and promote Novato's small town character
- Keep Novato compact in physical size
- Maintain and revitalize downtown as the heart of the community
- Preserve, protect, and enhance natural settings throughout the community
- Preserve the bay front lands and diked wetlands for agriculture
- Increase job opportunities and income
- Provide a variety of housing opportunities
- Coordinate transportation and land use planning
- Coordinate development with infrastructure
- Encourage local job opportunities
- Provide recreational, educational, and cultural opportunities
- Protect the integrity of residential neighborhoods from incompatible land uses.

Table 3.3 : Novato City goals

2035 General Plan

In April of 2013, the city council approved the work plan and budget for updating the city's General Plan. The new plan, entitled "City of Novato General Plan 2035," will include updates made to the 1996 General Plan and will reflect city conditions as of 2012. The 2035 plan is organized into three sections: 1) the natural environment, 2) the built environment, and 3) the socio-economic environment. The plan will organize issues related to the urban growth boundary, land use designations, the downtown business district, hillside and ridge line protection, climate action plan, complete streets, bike and pedestrian plans, traffic service levels, and healthy living policies into the three sections. The update will take three years to complete and is scheduled to be ready for adoption by the winter of 2016 (O'Rourke 2013). A schedule of the update process outlines each of the areas that will be addressed and provides a timeline for completion.

Environmental Importance

High on Novato's list of goals is a desire to protect the natural environments and landscapes of their city. Over half of the city's general plan goals address preserving or protecting environmental features. The Novato area encompasses a variety of environmental conditions including bay plains, marshlands, hills, ridges, and creeks. These areas provide numerous habitats for a wide range of animals and plants. They also provide agricultural and farm land that is used for livestock grazing, harvested crops, and vineyards.

Streams and Water Bodies

Nearly all of Novato is contained within the Novato Creek watershed. Novato Creek flows from west to east, bisecting the center of the city. Two major bodies of water that have an impact on Novato are Stafford Lake to the west and San Pablo Bay to the east. Stafford Lake (Figure 3.11), the headwaters of Novato Creek, is a manmade reservoir that provides Novato with 20% of its potable water and helps reduce flooding along Novato Creek. San Pablo Bay extends for approximately seven miles along Novato's eastern border and is a navigable waterway providing access to San Francisco Bay and the Pacific Ocean. The Petaluma River forms the northeast border of Novato and has long been a transport way for petroleum and gravel products between Petaluma and San Pablo Bay.

Baylands and Wetlands

Baylands and wetlands are found along the east end of Novato Creek and along the shorelines of San Pablo Bay (Figure 3.12). Seasonal wetlands provide necessary nesting, feeding, and roosting habitats for nearly 40 different species of waterfowl and shorebirds. Diked baylands were historically diked for agricultural uses and are used to filter and catch runoff into the bay. Freshwater wetlands are found along Novato Creek in areas where water either permanently or seasonally floods low areas. Freshwater wetlands provide productive habitats for birds, small mammals, reptiles, and amphibians. Sections of riparian habitat are scattered along Novato Creek and other minor creeks throughout Novato. Similar to freshwater wetlands, riparian habitats are productive for numerous species of birds, mammals, and amphibians.

Figure 3.10: Hillsides at Sant Lucia Preserve (Hahn, 2013)

Figure 3.11: Stafford Lake (Hahn, 2013)

Figure 3.12: San Pablo Bay (Author, 2014)

Woodlands, Grasslands, and Agricultural Land

Oak and bay woodlands cover many of the slopes of the Novato hills, especially those facing north. There are two main groups of oak species in Novato one of which, the red oak group, is susceptible to Sudden Oak Death disease. Sudden Oak Death is caused by a fungal-like pathogen, Phytophthora ramorum, which damages and oftentimes kills infected trees. The name Sudden Oak Death comes from the rapid decline of oaks once they have contracted the pathogen, sometimes as soon as two to four weeks (Davidson et al. 2003). Rich agricultural land is found in the valley and bay areas of Novato. As mentioned, diked wetlands were and are used for agricultural purposes. Agricultural lands are also found along within the flood plains of Novato's rivers and streams. Agricultural land in Novato is used for oat and grass hay, nut crops, vineyards and fruit orchards (see Figure 3.13). There is one chicken farm within Novato's city limits and two dairy farms just outside Novato's western urban growth boundary.

Figure 3.13: Agricultural fields in Novato (Hahn, 2013)

Ridgelines

The ridgelines surrounding Novato create a visual boundary for the city and enhance the city's visual resources (Figure 3.14). Mount Burdell is a prominent landmark delineating the city's northern ridgeline. The Big Rock Ridge forms the western and southern ridgelines with a series of ridges and canyons extending to the west. Small ridgelines within the city play a role in screening views from one residential area to another. Views from the highest ridgelines extend across San Pablo Bay into the Oakland area providing scenic views of the bay, the shoreline, surrounding hillsides, and the city.

Figure 3.14: Wooded hillsides and ridgelines in Novato (Hahn, 2013)

Preserved Open Space and Parks

Ten preserved open space areas are within Novato's sphere of influence and total over 9,000 acres of publicly owned land. Two major open space areas are Mount Burdell, a publicly owned 1,600 acre preserve and the tidal marsh and flood ponding areas of Novato Creek along San Pablo Bay. The City of Novato owns approximately 200 acres of developed and underdeveloped parks throughout the city. As one of its opens space objectives, Novato would like to preserve and protect open space of local importance through public purchase or negotiated transfers (City of Novato 2007). Additionally, Novato has an objective to provide a system of parks and trails that meet the recreational needs of the community.

Figure 3.15: Public open space trails in Marin County, California (Author, 2014)

Novato City Growth

A source of pride and identity for Novato's residents is the small town character of their city. The city's General Plan states that "the citizens of Novato view the City as a 'small town' in character, now and in the future" (City of Novato 2007). Two of Novato's top three goals relate to maintaining a small town character. One of those goals was to establish firm urban limit lines.

Urban Growth Boundary

An urban growth boundary (UGB) is a limit line beyond which urban development is restricted. Novato's purposes for the UGB are: 1) to help keep the city compact in physical size; 2) to avoid any price increases in municipal services (water, sewer, waste) resulting from unregulated growth; and 3) to foster and protect the small town character and rural quality of life. Novato's UGB was established in 1997 by a public vote and expires in November 2017, after a 20-year duration. Any development outside the UGB must be limited to nonurban uses such as agricultural, conservation, parkland, and open space uses. The urban growth boundary may be amended by a vote of the people or a majority vote of the city council. In order to amend the UGB the city council must have reasonable cause in one of the following exceptions: to comply with state housing requirements; to avoid taking private property; to promote public health, safety, and welfare; or to approve exempt projects with vested rights under the law. The current UGB is under review as part of Novato's 2035 General Plan update. The three options for action with the UGB are to renew the current boundary, to extend the UGB to include more land, or to let it expire. Due to public support it is not likely that the city will allow the UGB to expire, and the city will decide by 2017 whether to renew or extend the boundary.

Annexation Guidelines

Any proposal of land annexation must meet all five of the city's established guidelines. First, areas of annexation must be serviceable by existing city facilities and those services provided by other agencies. These services include transportation, water, fire protection, waste water treatment, schools, and other public services. Second, the annexation must be contiguous to developed areas and not "leap-frog" over open undeveloped land. Third, the annexation must have no negative impact on the city's short term or long term financial condition. Forth, the annexation must include a specific development plan demonstrating how the proposed development contributes to the city's goals and policies. Fifth, proposed annexation must be compliant with

1973

Figure 3.16: Novato 1973 (Maring County GIS, 2013)

1984

Figure 3.17: Novato 1984 (Maring County GIS, 2013)

proper land use designations and other city requirements. No more than ten acres each year may be brought inside the UGB for the purpose of residential development. There is no mention of acreage limits for any other land uses other than residential.

City Development Patterns

The population in Novato grew slowly until the 1960s . From the 1960 to 1970 the population exploded by 73%. The pattern of development in Novato illustrates this growth (see Figures 3.18 and 3.16). The photographs show a small downtown in 1952. The pattern drastically changes in 1973 with development expanding in all directions, with the majority to the west. Also prominent in the 1973 photograph is U. S. Highway 101. Growth over this time corresponds with its construction as well as the urban flight movement into the suburbs experienced across the United States.

Most of the development in the 1984 photograph appears to be infill to the existing urban boundary. The photographs from 2004 and 2012 show some expanded growth to the north. However, Novato continues to favor infill growth to outward expansion.

1952

Current City Boundary

Figure 3.18: Novato 1952 (Marin County GIS, 2013)

2004

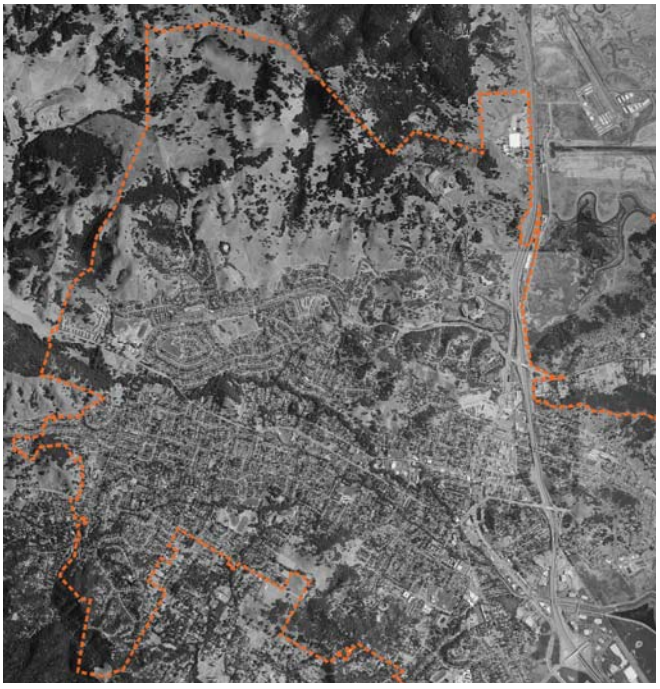


Figure 3.19: Novato 2004 (Google Earth, 2014)

2012

Figure 3.20: Novato 2012 (Google Earth, 2014)

Development in Novato

** Information in this section is taken from the Novato City Housing Element with page numbers noted in parenthesis*

Population Trends

From 1960 to 1980 Novato experienced rapid population growth from 17,881 to 43,916. Since then growth has leveled at a much slower rate (Figure 21). From 1980 to 1990 the city grew a total of 8.4% to 47,585, and from 1990 to 2000, Novato grew by only 45 people to 47,630. The 2010 census showed a 9% growth rate to 51,904. Much of the growth from 2000 to 2010 is attributed to the redevelopment of Hamilton Air Force Base in the southeastern portion of the city which added over 1,170 new homes. The latest population (see Figure 22) estimate of 53,301 makes Novato the second largest city in Marin County (p. 13–14).

Future population estimates in Novato continue to show a slow-growth pace. The Association of Bay Area Governments projects that Novato will add 1,170 households by 2040 a population increase between 2,300 and 4,600, or only 88 to 180 people per year (p. 15–16).

The majority of Novato's population is between the ages of 25 and 64 with an average age in 2010 of 42.6. A significant trend in the age of Novato residents is the increase of seniors over 65 years of age and the decrease of people under 25 years of age. From 1980 to 2010 the senior population has grown from 6% of the population to 16%. During the same 30 year period, the percentage of people under 25 has decreased from 40% to 29%. With the aging baby boomer generation, the percentage of seniors is expected to increase to approximately 23% by 2020.

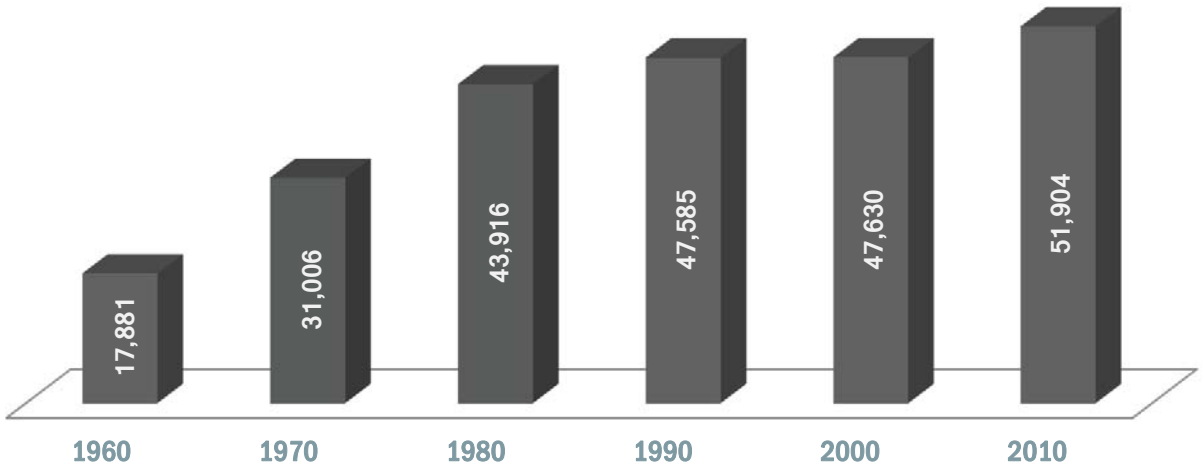


Figure 3.21: Population change in Novato by decade

Population Density in Novato

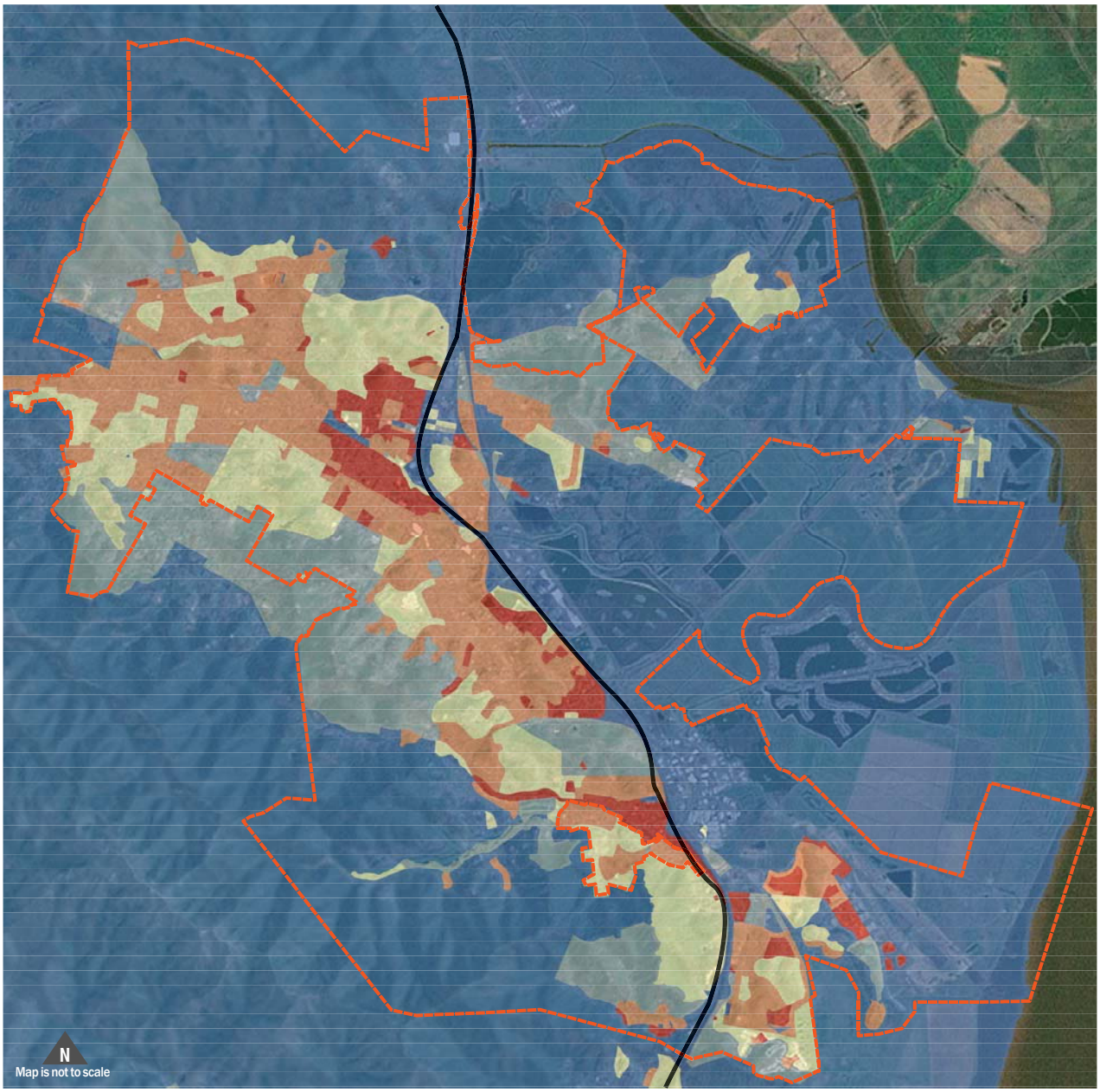


Figure 3.22: Current population density of Novato

High Density

Low Density

U.S. 101

City Boundary

Housing Demands and Needs

Regional Housing Need Allocation

As mentioned earlier, the RHNA is a system of allocating portions of California's housing needs to counties and cities throughout the state. Novato's RHNA requirements are determined by the Association of Bay Area Governments and Marin County. The categories are defined according to the area median income (AMI). All of Marin County, including Novato, uses the same AMI categories which are listed in Table 3.4.

From 2007-2014, the RHNA allocations of 1,241 required homes were distributed across income levels as follows: 275 (22%) in the very low income category, 171 (14%) the low income category, 221 (18%) the moderate income category, and 574 (46%) the above moderate income category. For the current cycle, 2015–2022, of the 415 required homes, 111 (26%) have to fit in the very low income category, 65 (16%) the low income category, 72 (17%) the moderate income category, and 167 (40%) the above moderate income category.

RHNA Income Levels

Very Low	less than $55,000
Low	$55,501–$88,800
Moderate	$88,801–$123,600
Above Moderate	more than $123, 600

Table 3.4 : RHNA income levels

Inclusionary Housing Requirements

The Novato Inclusionary Housing Requirements (IHR) were adopted by Novato in 1999 and were most recently updated in 2007 (p. 109). IHR are home building mandates developers must meet when planning a community with more than three homes. The requirement calls for a percentage of homes in a new community to be designated as inclusionary units. An inclusionary unit is defined as one that is affordable to very low, low, or moderate income households. The maximum sales price for a very low income inclusionary unit cannot exceed $278,000; for a low income unit $445,000; and for a moderate income inclusionary unit, $620,000 (p. 45). For residential projects of three to six homes, 10% are required to be inclusionary units or developers can pay a fee of $8,000 to $28,000 per unit. For projects of 7 to 19 homes 10% must also be inclusionary units with no option for a fee. Interestingly, for projects of more than 20 homes, only 20% can be inclusionary units (p. 116)

Inclusionary units are required to be dispersed throughout the project and be comparable in design and construction to other market rate units. Developers have an option to develop the units in an off-site location or to dedicate land in place of building the units. Inclusionary units must be intended for permanent housing and be deeded or rent restricted to single family or multi-family housing, condominiums, townhomes, or apartments in perpetuity (p. 151).

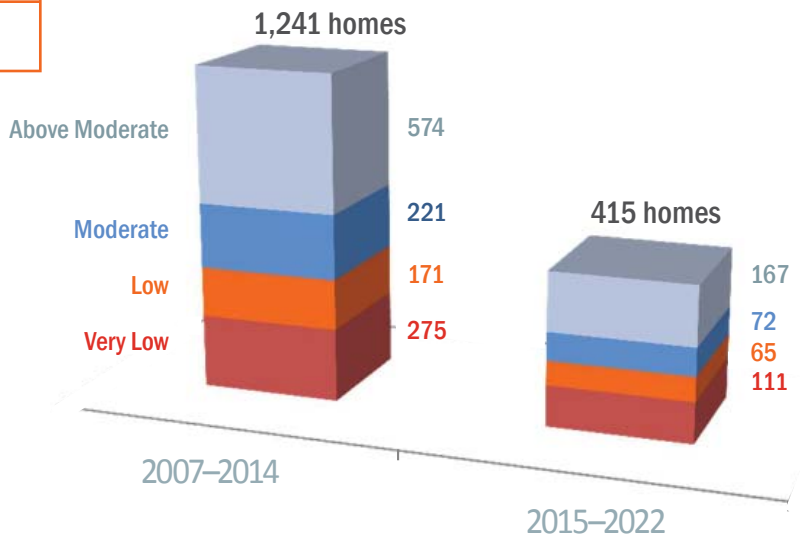


Figure 3.23: Required home allocations for Novato 2007–2022

Housing Market*

Home Sales

For the purpose of this report, I analyzed housing data relative to three types of owned homes: detached single family, condominiums, and townhomes. I was interested in homeownership, not home or apartment rentals. A detailed analysis of the rental market in Novato can be found in the City of Novato Housing Element 2007–20014 (p. 36). The housing market in Novato has generally followed the up and down trends of the economy from 2001 to 2013. Coinciding with the housing bubble, over 800 homes were sold each year in 2004 and 2005. Inversely, sales dropped to just under 350 in 2007 and 2008, nearly 100 homes less than six years earlier in 2001. The market has recovered over the past five years to around the same level as in 2001 with 472 homes sold in 2013.

Sales Price

The average home sales price for the same 12 year period has followed a similar, although gentler, pattern as the number of homes sold. The average high sales price was over $900,000 in 2005 and 2006 and dropped to a low of $547,000 in 2011. Currently, average home sales prices are back on the rise matching averages from 2004 .

Home Sales in Novato, CA (2000–2014)

Figure 3.24: Novato home sales from 2000–2014

Median Home Sales Price in Novato, CA (2000–2014)

Figure 3.25: Novato median home sales price from 2000–2014

Development Costs

For this report, the seperation of costs are divided between land development and home construction. While both are important to consider, the focus of this project are the land development costs. These include: the cost to acquire the land, infrastructure costs, environmental impact statement cost for CEQA compliance, and local development fees. Land value was calculated with the help of Denise Athas, of Athas & Associates Real Estate, Inc in Novato. The infrastructure costs and development fees were based on calculations given by the City of Novato and in consultation with Scott Hochstrasser of IPA Inc., a development consultant in Marin County. Estimates of environmental impact costs were provided by Jim Heid of Urban Green, a development consultant in Marin County. Home construction cost estimates were given by the City of Novato in the housing element.

Land Value and Infrastructure Costs

It is expected that vacant land in Novato makes up less than 1% of the city's land area and is therefore extremely limited and valuable. Calculations by the city of Novato estimate that land zoned for multi-family residential development is valued at approximately $1.12 million dollars per acre (p. 91). An average of assessed land values of residential homes near the high school resulted in a per acre value of $980,000.

Infrastructure cost estimates, provided by Scott Hochstrasser of International Planning Associates Inc., were calculated per linear foot for roads and underground sewer and water pipes. These values were $10 per linear foot for roads and $40 per linear foot for underground pipes. According to these estimates, 100 foot of infrastructure would cost $5,000, $1,000 for the road and $4,000 for the sewer and water pipes.

Development Fees

Local fees greatly add to the cost of development in Novato. Fees for development fall into five categories: 1) planning and development fees, 2) building permit fees, 3) impact fees, 4) district and utility fees and 5) environmental study fees. Planning and development fees apply as needed per project and not all of them apply to every project (p. 122). Building permit fees vary according to a sliding scale of home value and range, costing anywhere from $74 to $5,600. Impact fees are applied to all development projects regardless of size or value. Novato's Impact fees are divided into public facility and traffic impact fees. In addition, new developments are required to dedicate land for parks or have the option of paying an in-lieu fee. Park dedication fees can be as high as $5,200 per single family home but vary depending on the size and number of homes in a development. Novato notes that their impact fees are generally higher than those of surrounding cities and often pose limitations to development (p. 125). District and utility fees apply to water, sewer, fire, and school services. Connection fees for water and sewer services cost between $20,000 and $42,000 per unit for a single family residence (p. 124).

Environmental Impact Costs

Environmental impact costs are associated with all development projects in California per CEQA compliance. The costs for environment impact reports vary depending on the project size, location, and community where the project is located. Jim Heid, a development consultant in Marin County, estimates the costs to range anywhere form $200,000 to over $1 million (Heid, 2014). Litigation following the completion of an EIR from those opposing development plans can be costly. While this report does calculate an estimated environmental impact cost, it does not factor in any potential litigation costs. There is no way to accurately determine what those costs may be.

Home Construction Costs

Estimated home construction costs (p. 98) in Novato vary between $200 and $250 per square foot for the average home. They can, however, extend up to $500 per square foot for a high-end single family home (p. 91). Hard costs, such as materials and labor, are usually less variable than soft costs, which can include architectural and landscape design services, engineering fees, property taxes, and city and utility fees. Site work to treat steep slopes, unstable soils, waterways, or other environmental concerns can greatly increase soft costs and therefore the overall cost of the home. Therefore, according to these estimates, a 1,500 square foot single family home could be built for a cost between $300,000 and $375,000. Including land costs, the price of this home would exceed $600,000 putting it out of reach of very low and low income households.

Figure 3.26: Oak tree on the project site (Hahn, 2013)

Developable Land Map

Map Process

To identify developable land within the city of Novato, I synthesized information from the Novato City General Plan, the Novato City Housing Element, the 2035 Novato City General Plan update, and the Novato General Plan Land Use Map. First, as part of the city housing element, Novato identified areas suitable for residential development (see Novato's Available Land Inventory Map in appendix B). This was done to meet the RHNA requirements for the 2007–2014 cycle. The city's map identified 60 parcels of land, the majority of which are privately owned, that are currently zoned for residential development. According to current zoning standards, 362 new units could be built on the 60 parcels. In order to meet the need for very low and low income housing, the city created the Affordable Housing Opportunity (AHO) zoning district. The AHO district was applied to five sites deemed physically suitable for affordable housing. Second, as part of the 2035 General Plan update, the city identified six focus areas for future development, all along the U. S. Highway 101 corridor. According to the General Plan, these areas were selected with public input and will be the focus of development opportunities over the next few years. Third, using the city's land use map I identified all of the open space within the city boundaries including agricultural, conservation, and park lands.

Map Purpose

The purpose of the developable land map is to identify how much land is available for development and where that land is located. Using the previously described information, I divided the map into two tiers: tier one being open land within Novato's UGB most suitable and most likely for development and tier two, open land within Novato's UGB suitable but not likely for development and open county land adjacent to but outside Novato's UGB. Tier one includes the 60 developable land parcels, the ANO zoning district, and the six focus areas. Tier two includes all open space land within the City with the idea that if needed the city could rezone these parcels for residential development.

Map Conclusion

The developable land map shows that the city is running out of infill options on tier-one parcels of land. In order to satisfy both future RHNA requirement and future housing demands, Novato will need to develop some of the tier-two or tier-three parcels. Development of tier-two parcels would require re-zoning for residential units.

Development Values and Strategies

Throughout this research, I have identified several development values of Novato residents. These values include: economic health and growth, connection to downtown, adequate housing (regular as well as affordable), hillside and ridgeline protection, and open space protection and conservation.

Tiers of Available Land for Development in Novato

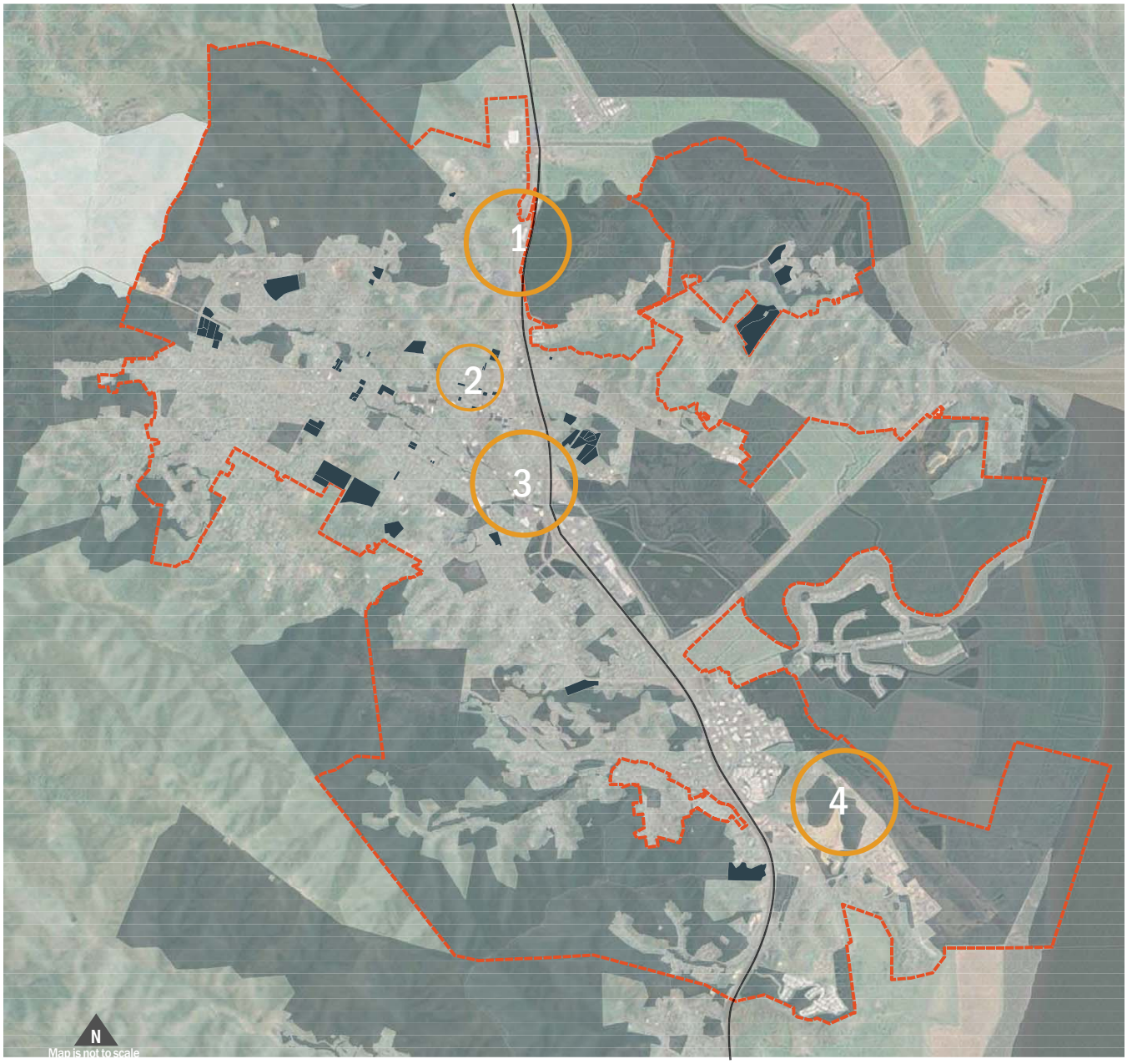


Figure 3.27: Developable land map for Novato City

Tier 1 Development
Tier 2 Development
U.S. 101
City Boundary
Focus Area

Community Case Studies

Community Case Studies

To help strengthen design alternatives for the project, I conducted case studies of both successful and un-successful communities that used principles of conservation design. The projects selected as case studies are all located in northern California, have medium to high densities, and faced opposition to their development. Each of the projects faced environmental and political concerns similar to the study site in Novato. I selected two successful projects, Santa Lucia and Village Homes, and two unsuccessful projects, Angwin Eco-Village and Grady Ranch. These case studies helped me identify successful and un-successful development visions, objectives, and strategies.

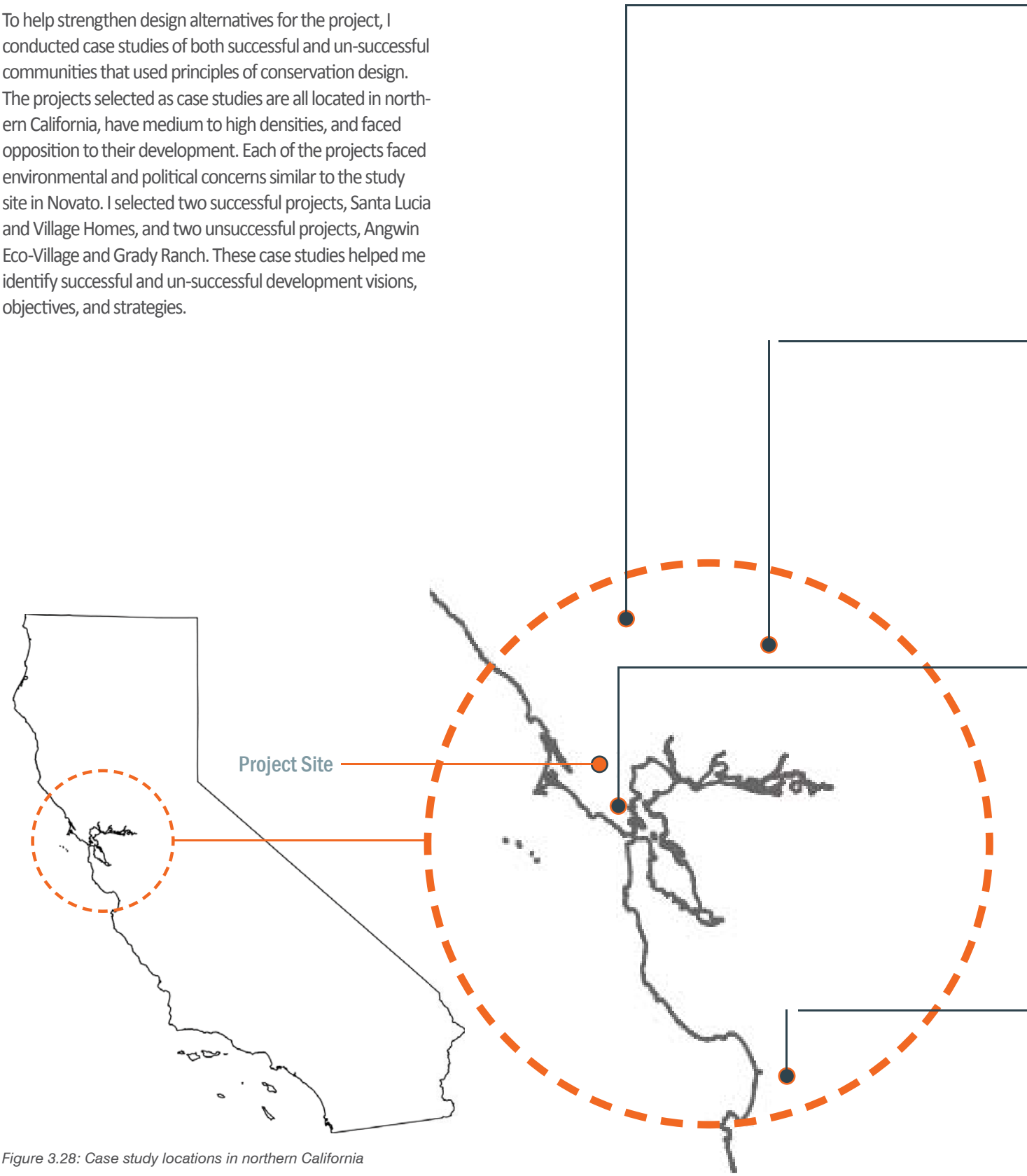


Figure 3.28: Case study locations in northern California

Angwin Ecovillage
Angwin, CA

Figure 3.29: PUC Campus in Angwin, California (Gill, 2012)

Village Homes
Davis, CA

Figure 3.30: Village Homes community in Davis, California (Village Homes HOA, 2009)

Grady Ranch
San Rafael, CA

Figure 3.31: Grady Ranch property near San Rafael, California (Author, 2014)

Santa Lucia Preserve
Carmel, CA

Figure 3.32: Santa Lucia Preserve Monterey County, California (Hahn, 2013)

Santa Lucia Preserve: Monterey County, California

Figure 3.33: Santa Lucia Preserve, Monterey County, California (Hahn, 2013)

Project Summary

The primary vision of the Santa Lucia Preserve (Figure 3.32), even from the very beginning phases of design, was to develop a community "dedicated to appreciating and respecting the natural beauty of the Preserve and its geographical, historical, and cultural setting" (Santa Lucia Preserve 2008). These goals of preserving the geographical, historical, and cultural settings provided the framework for nearly every decision during the development process. The Preserve is located in Monterey County, California, three miles inland from Carmel and Pebble Beach. Santa Lucia is situated along a coastal valley, stretching 15 miles long and five miles wide.

After understanding the history of the area surrounding Santa Lucia, the design team mapped the ecological resources of the land with a team of biologists, geologists, ecologist, and the like. These maps identified suitable areas for development. Home sites, roads, trails, fence lines, and community amenities were all sited in areas deemed suitable for their use. This mapping process also helped identify 18,000 acres of land to be permanently conserved as part of the Santa Lucia Conservancy.

Santa Lucia consists of 298 residential lots ranging in size from 6 to 80 acres. A 2.5 acre building envelope is specified on each lot. Homes at Santa Lucia (Figure 3.34) are carefully sited within these building envelopes to minimize environmental and visual impacts. Nearly every home site was personally selected in the field by the land owners and the design team.

Community amenities at Santa Lucia (Figure 3.33) include: a world class golf course; a ranch club with tennis courts, a fitness center, and swimming pools; an equestrian center; and The Hacienda (Figure 3.35), a Spanish colonial home built in the 1920s. The Hacienda is used as a hotel and office management buildings for the preserve. Also included as part of the 20,000 acre preserve are 100 miles of hiking and riding trails, numerous campsites, and an 18 acre lake.

Location

Monterey County, California

Land Use Information

Site Area:	20,000 acres
Open Space:	18,000 acres
Buildable Area:	2,000 acres
Lots:	298
Homes Built:	100
Buildable Lot Size:	2.5 acres
Average Net Density:	6.7 acres per unit

Land Use Plan

Residential:	750 acres
Roads:	120 acres
Developed Open Space:	420 acres
Conserved Open Space:	18,000 acres
Mixed Use Center:	420 acres

Development Costs

Site Acquisition:	$70 million
Site Improvements:	$145 million
Amenity Construction:	$80 million
Soft Costs:	$41 million
Total Development:	$336 million
Lot Sales Price:	$1 to 4 million

Development Timeline

1989	Idea development and planning
1990	Land purchased for $70 million
1990–1997	Design development and approval
1997	Construction begins
1999	First lots sold
2008	Majority of lots sold
2013	All lots sold with 100 homes built

Figure 3.34: Main entrance of Santa Lucia (Hahn, 2013)

Figure 3.35: Home at Santa Lucia (Hahn, 2013)

Figure 3.36: The Hacienda at Sant Lucia (Hahn, 2013)

Village Homes: Yolo County, California

Figure 3.37: Home at Village Homes in Davis, California (Village Homes HOA, 2009)

Project Summary

Village Homes is a residential housing development designed by Michael and Judy Corbett in the mid-1970s (Figures 3.36 and 3.38). Throughout the development process of Village Homes, the Corbetts had two goals: "designing a neighborhood which would reduce the amount of energy required to carry out the family's daily activities" and building a place with a sense of community. To achieve energy reduction all of the homes in the community were oriented and designed to use the sun for the majority of the homes' energy needs (see Figure 3.40). To establish a sense of community the homes were oriented around common open spaces and play areas. A considerable portion of the development was left open and devoted to sport fields, playgrounds, orchards, vineyards, and community gardens to further the sense of community. The majority of the landscape is designed with edible plants that are maintained and managed by the residents.

Village Homes has widely been regarded as one of the most successful examples of sustainable community design in the United States (see Figure 3.37). The framework of open space trails (see Figure 3.39), parks, drainage systems, gardens, and agricultural land set it apart from proposals of new urbanism that begin with the street as the framework. Village Homes emphasizes and highlights open space in order to build a sense of community.

Figure 3.38: Master Plan of Village Homes Development (Corbett, 2014)

Location

Davis, California

Land Use Information

Site Area:	70 acres
Open Space:	12 acres
Single Famly Lots:	225
Average Net Density:	.31 acres per unit

Land Use Plan

Agriculture:	12 acres
Greenbelt:	12 acres
Residential Housing	
Commercial Office Space	
Community Spaces:	Village Green
	Swimming Pool
	Community Center
	Restaurant
	Dance Studio

Residential Information

Type:	225 single family homes
	20 apartments
Total Dwelling Units:	245
Total Residents:	650 (2002)

Development Costs (1974)

Site Acquisition:	$434,000
Site Improvements:	$313,000
Land Development:	$2.3 million

Development Timeline

1972	Development proposal and planning; the land is purchased
1972–1973	Developers submit their plans to the city and are met with resistance
1975	First homes are constructed
1975-1982	All homes are constructed and sold

Figure 3.39: Home and path at Village Homes, (Village Homes HOA, 2009)

Figure 3.40: Walking path at Village Homes (Village Homes HOA, 2009)

Figure 3.41: Village Homes public green space (Village Homes HOA, 2009)

Grady Ranch: Marin County, California

Figure 3.42: Grady Ranch property in San Rafael, California (Author, 2014)

Project Summary

George Lucas, billionaire film maker of the Star Wars empire, first received permission in 1996 to construct a movie production studio on his property in Marin County immediately west of San Rafael (Figure 3.43 and 3.44). The studio was approved as part of the master plan for Skywalker Ranch and development plans were submitted in 2009. When opposition to the project escalated to threats of litigation from nearby residents, Lucas removed his plan request and started considering alternative uses for the property. In May of 2012, after deciding to use the Grady Ranch property (Figure 3.41 and Figure 3.42) for affordable housing, Lucas partnered with the Marin Community Foundation to secure financing and find a developer(s) for the project. Opponents to development accused Lucas of spitefully suggesting a dense housing development in retaliation to those who opposed the original production studio plans.

Opposition to development again stalled with this new direction of the project. One blogger, David Edmondson, voiced his opinion writing "This is the worst possible place for affordable housing. Grady Ranch, if it's not going to be a film studio, needs to remain as open space." Mr. Edmondson, along with many others, felt that the property was too far from any downtown, commercial center or transit line and that the existing infrastructure of roads, police and fire services, sewage, water, and electricity was insufficient. Opponents to development also noted that the development would add car-trips to the road increasing traffic and generating a higher demand for parking.

In June of 2013, after identifying 20 developers qualified for the project, the Marin Community Foundation dropped the Grady Ranch project. In a press release the foundation cited challenging economics in organizing a development team saying " the Marin Community Foundation had to suspend their plans . . . due to the increasing uncertainties of obtaining the necessary federal and state financing."

George Lucas continued to engage in development discussions with some of the 20 identified developers. In a statement about the foundation's decision to drop the project, Lucas Real Estate Holdings said that George Lucas was disappointed with the decision and was still in favor of affordable housing for his property.

Location

San Rafael, California

Development Team

Owner:	Lucas Real Estate
Partner:	Community Marin Foundation

Land Use Information

Site Area:	230 acres
Lots:	200–240

Land Use Plan

Senior Housing
Workforce Housing
Single Family Housing

Development Costs

$120–150 million

Development Time line

2006	Lucas submits movie studio plans for Grady Ranch property
Apr 2012	Opposition to movie studio forces Lucas to postpone the project
May 2012	Residential development discussed for Grady Ranch. Lucas partners with the Marin Community Foundation (MCF)
Dec 2012	RFQ issued by the MCF to all interested developers
Jan 2013–May 2013	20 developers identified as possible partners for the project
June 2013	MCF drops Grady Ranch project due to uncertainties with funding
June 2013	Lucas continues work with developers identified from the RFQ

Figure 3.43: HIllside of Grady Ranch (Author, 2013)

Figure 3.44: San Rafael, California looking west (JDoorjam, 2006)

Figure 3.45: Saint Raphael Church (DL Snyder, 2006)

Angwin Eco-Village: Napa County, California

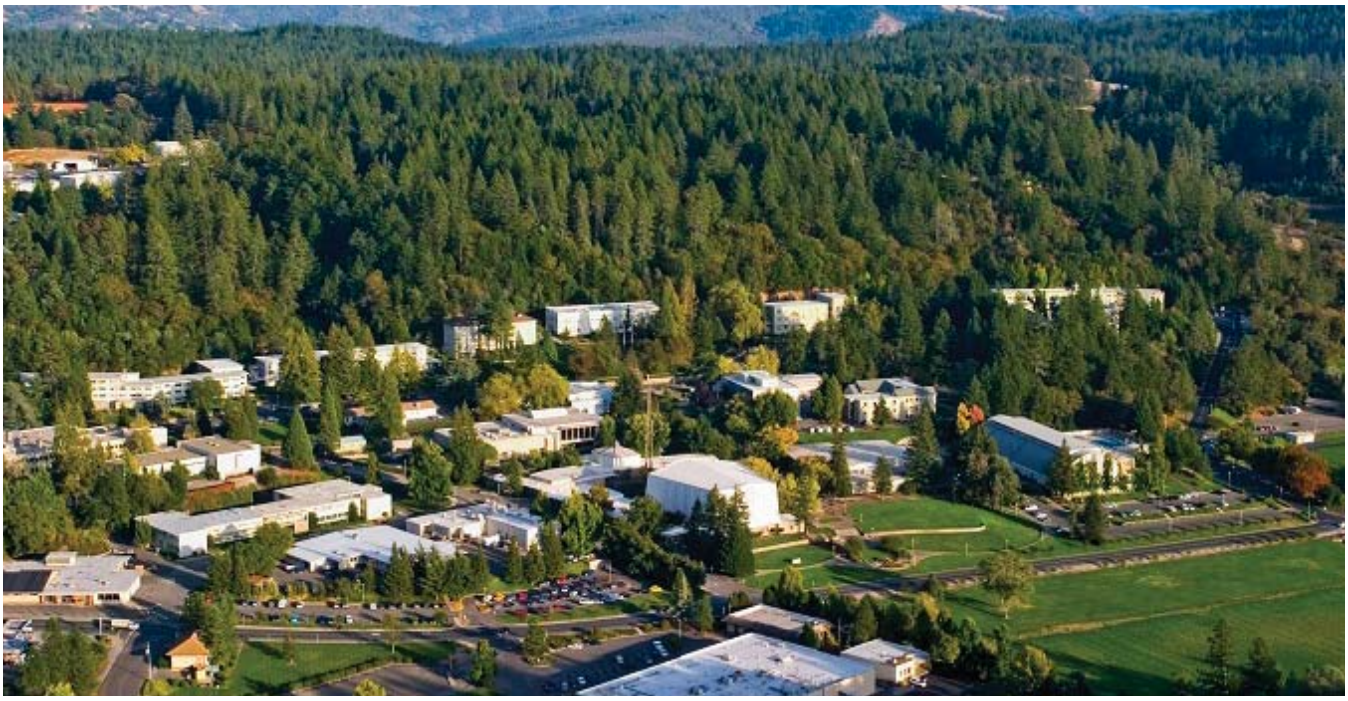


Figure 3.46: PUC Campus in Angwin, California (Gill, 2012)

Project Summary

Pacific Union College (PUC) designed the Eco-Village as a compact planned community as part of its campus in Angwin California (Figure 3.45). All of the proposed Eco-Village fits within the developable "urban-bubble" of the city. If built, the project would include 380 residential units that would be designed to house 1,000 residents. All of the new homes and businesses in the community would receive their energy from solar and geothermal power. In accordance with California State law, 35% of the housing units would be designated as affordable. The layout and design of the community accounted for 100% wastewater, generated 70 acres of farm land, and ensured preservation of 90% of PUC's property.

Angwin Eco-Village is comprised of four main areas: PUC Campus, Village Square Neighborhood, Highland Oaks Neighborhood, and Mill Valley. The PUC campus development would add 59 new student residential units and replace 110. The Village Square Neighborhood would include a village-style green open space (Figure 3.47), retail and dining (Figure 3.48), community amenities and services, and a variety of housing types including a retirement center, single family homes, cottages, townhomes, and apartments in the retail area. The Highland Oaks Neighborhood includes 100 single family homes on small lots. A trail system would connect the neighborhood to the campus and the village square. The Mill Valley section is divided into 12, 40-unit agriculture parcels. As the project started there was strong opposition to the number of units in the proposed development. The original design had 1,600 units which was reduced to 275 units by the final design proposal (Figure 3.46). In spite of the environmentally conscious design and layout of the community there was opposition to the commute times it created. Some felt that adding housing 45 minutes from where many of the residents would work defeated the purpose of a sustainable community. Local residents formed the group Save Rural Angwin to organize their opposition. Their efforts stalled the project which was eventually suspended indefinitely.

Location

Angwin, California

Land Use Information

Site Area (new development):	30 acres
Site Area (re-development):	36 acres
Total Area:	66 acres
Total Dwelling Units:	275
Average Net Density:	.24 acres per unit

Land Use Plan

PUC Campus Student Resident Halls
Mixed Use Neighborhoods
Residential Neighborhoods
Agricultural Land
Permanently Preserved Forest and Agricultural Land

Residential Type:	Apartments
	Single Family Homes
	Townhomes
	Cottages/Condos
Proposed Density:	
	Original: 1,600 units
	Draft 1: 600 units
	Draft 2: 380 units
	Final: 275 units

Development Time line

2006	PUC hires Triad Communities as development partner
2007	Design and public input process begins
2008	Triad begins environmental impact review (EIR)
Apr 2009	Triad suspends work on EIR for due to public opposition to the project
Jul 2009	PUC attempts to secure entitlements for 380 dwelling units
Nov 2010	PUC ends contract with Triad
Nov 2012	PUC suspends project indefinitely

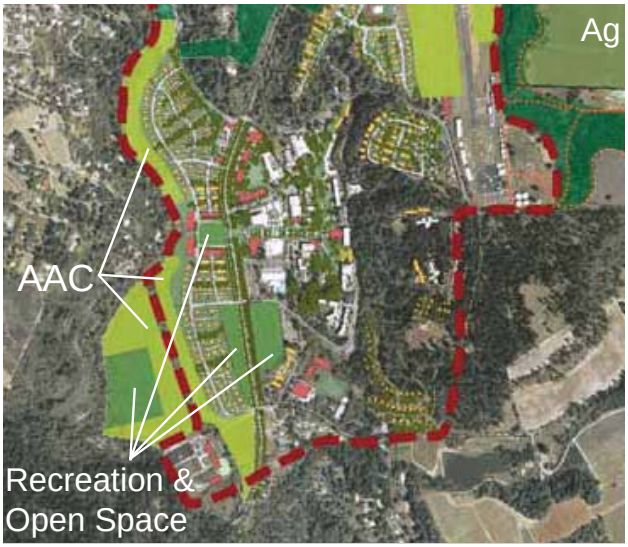


Figure 3.47: Eco-Village final design proposal (PUC, 2014)

Figure 3.48: Village green open space design (PUC, 2014)

Figure 3.49: Residential neighborhood (PUC, 2014)

Summary: Lessons Learned From the Case Studies

- Over prepare environmental assessment information
- Expose and highlight natural systems, especially storm water management
- Focus on the sustainable aspects of the project such as solar energy harvesting and water conservation
- Know what the market is demanding and what the city or county needs
- Know what is valuable in a residential development to future residents
- Anticipate objections to development and develop plans to mitigate them
- Keep the development process as open and as transparent as possible
- Encourage community participation in all phases of the development

Figure 3.50: Santa Lucia Preserve conservation community (Hahn, 2013)

IV DESIGN

Site Inventory and Analysis

Taking the information gained and lessons learned from the research and case studies detailed in the previous chapter, I applied what I learned to the project site. Phase two, the design phase, follows the structured design decision making process discussed in chapter two. The process is a series of steps where the designer identifies values of the stakeholders, creates multiple design alternatives to address those values, and then evaluates the outcomes and consequences of each alternative. The design process for this project began with a series of Graphic Information Systems (GIS) maps documenting site conditions. The next step was a site inventory. Following the site visit, I identified and designed three alternatives for the layout of the community. This chapter will present the outcomes from each of these steps.

The design phase of the project began with an extensive site inventory and analysis. The analysis included GIS mapping, a site visit, and research of Novato and Marin's zoning codes and building ordinances.

GIS Mapping

The mapping phase was done prior to the site visit to help me understand conditions that would affect the eventual design of the property. The maps were used during the site visit to verify their findings. The GIS analysis included mapping the slopes, general visibility areas, the watershed and drainage ways, the soils, and the vegetation. Three of the maps, watershed and drainage ways, slope, and general visibility, were selected as the most important factors when considering suitable land for development. They were selected due to the community's values of preserving the visual integrity of the ground (visibility map), hillside development regulations (slope map), and stream buffer requirements (watershed and drainage map).

Site Inventory and Analysis

Slope Map

The map uses the elevation data to separate the slopes into five classifications: 0–5%, 5–10%, 10–15%, 15–20%, and 20+%. In Novato the maximum allowable slope for development is 10%. Roads and driveways are allowed on slopes up to 18%.

Purpose:

The purpose of the map was to determine areas that were suitable for development according to allowable building codes in Novato. The map was used as part of the composite suitability map.

Conclusions:

The majority of the hills on the site have slopes over 20% where no buildings or roads are allowed. The valley down the center of the property is made up of flat slopes between 0 and 10%. Throughout the property, flatter sloped areas are primarily associated with ridgelines and hill tops. There are a few large flat areas in the upper northwest and northeast corners. There is a large flat area along the southern border of the property bisected by Novato Boulevard. This area has historically been used for agriculture and livestock grazing because the maximum allowable slope for development in Novato is 10%. Roads and driveways are allowed on slopes between 15 and 18%. Future home sites must, therefore, be placed in areas of 0–10% slope with roads and driveways designed to ascend the hills at slopes less than 18%.

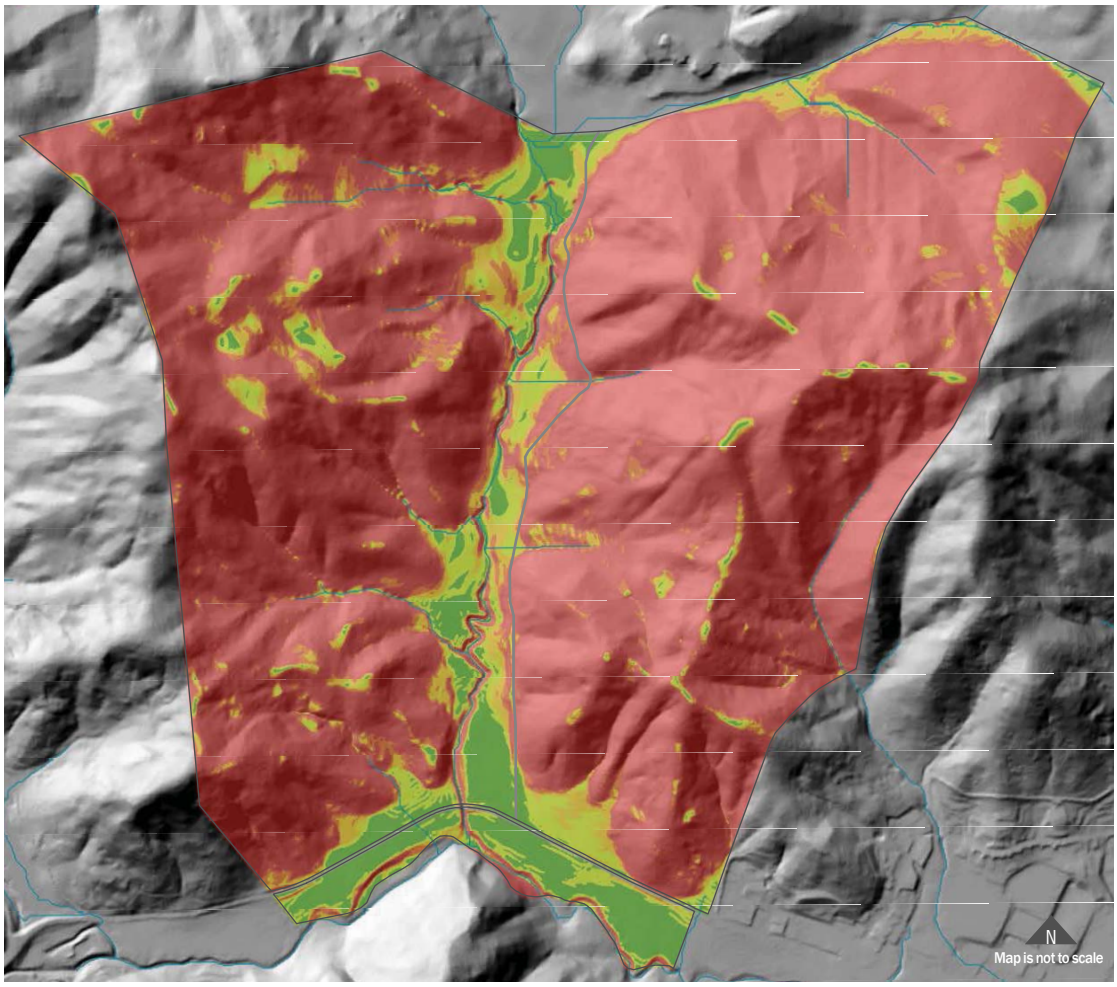


Figure 4.1: Slope map

Streams and Drainage Map

This map shows all of the drainage ways from the hills of the site into the central Bowman Canyon Creek. The drainage ways were calculated using the ArcHydro extension of ESRI's ArcGIS. Darker blue lines on the map show high concentrations of flow with the light blue lines representing low flow. The red dashed lines represents a 100-foot riparian buffer from the bank of the stream on both sides. The riparian buffer is required for all 'blue line streams' as designated by the United States Geological Survey (USGS) on quad maps (Marin County Planning Commission, 2013). The required buffers are shaded on the map.

Purpose:

This mapping identified how water drains from the hills of the site and delineates the 100 foot riparian buffer from each stream. It was also important to identify which of the streams required the 100 foot buffer. This analysis was used as part of the composite suitability map.

Conclusions:

This map shows drainage ways running throughout the property some of which are not identified on other maps. Novato Creek at the bottom of the map and Bowman Canyon Creek through the center of the site carry the most water. While it is permissible to cross the buffer, development within the 100 foot riparian buffer is prohibited. Therefore, while there is available land outside the riparian buffers, they pose a limitation to development. Any feasible design must take the limitations of the buffers into consideration.

Figure 4.2: Streams and drainage map

General Visibility Map (Novato Boulevard)

The general visibility map uses elevation data, vegetation massing, and highly visible viewpoints along the road to calculate visibility of the project site from particular vantage points. The map calculates which areas are screened from view by landform or vegetation. The vegetation was given an elevation of 25 feet to represent the height of a tree. The colors of the map represent how many times that area can be seen from different viewpoints. If an area is seen from all five viewpoints it is green, meaning highly visible. If an area is red it is not visible from my tested viewpoints.

Purpose:

The purpose of this map was to identify which areas of the site are most visible from Novato Boulevard. This analysis was used as part of the composite suitability map.

Conclusions:

The map shows that the south end of the property is highly visible from Novato Boulevard. The ridgelines and hillsides fronting Novato Boulevard are especially visible, adding to the beauty and value of the land. The map also shows that the north-south valley in the center of the property is visible from only one viewpoint with some areas not visible at all. The hillsides and ridgelines are also visible in the center. The back third of the property is not visible from Novato Boulevard except for a few ridgelines. Future development can be located out of sight of Novato Boulevard if placed behind the front ridgelines in strategic areas.

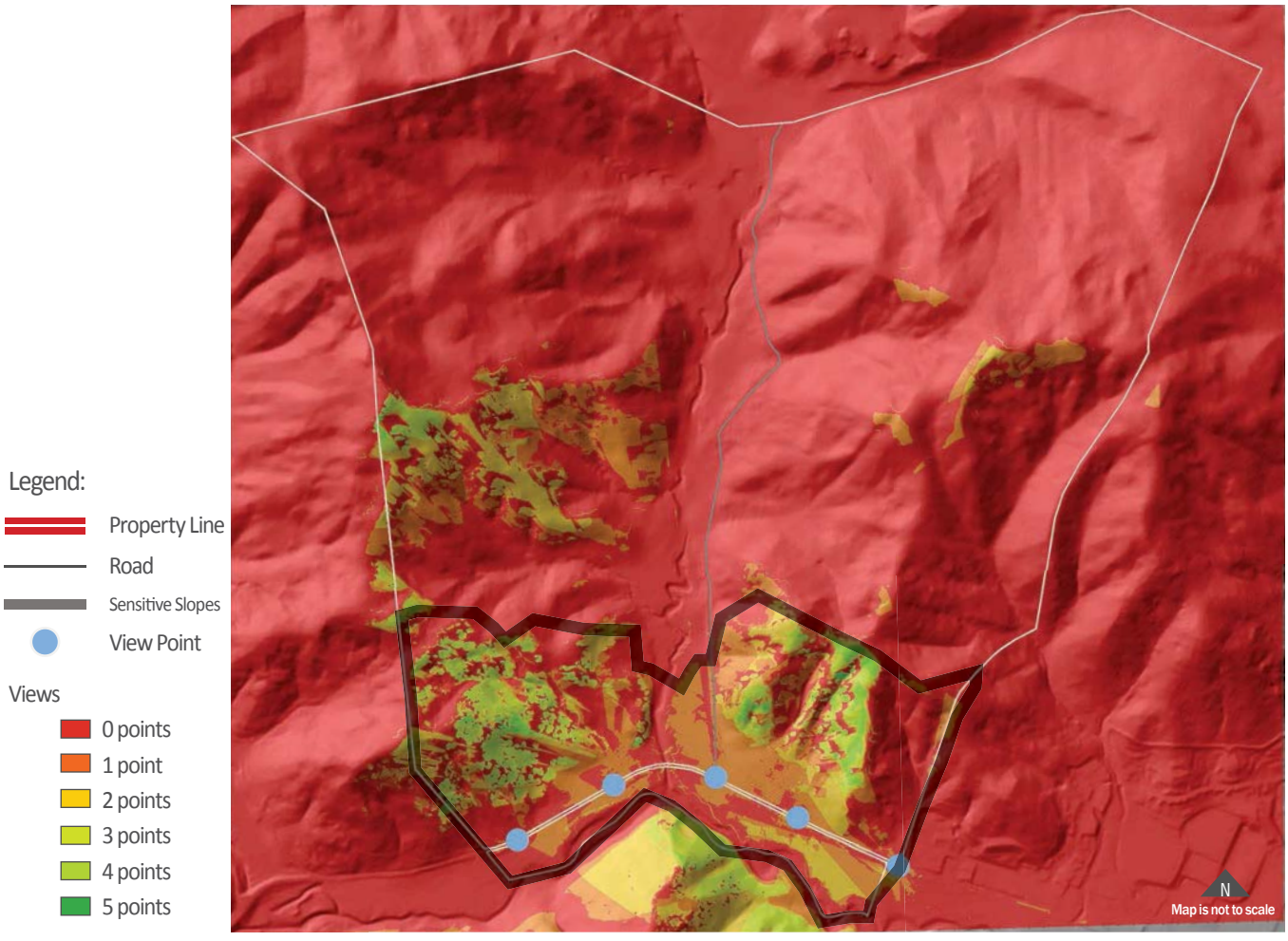


Figure 4.3: Novato Boulevard general visibility map

General Visibility Map (Novato City)

The Novato City visibility map determines the visibility of the site from select points within Novato's city boundary. The points are in locations that have views of the property. The purpose of the map was to identify areas of the site that are visible from Novato City and where the most visible points were located. This information will be used as part of the medium density + land swap alternative to determine areas that should be considered for conservation.

Conclusions:

The ridgelines along the north end of the site are highly visible from the selected view points. There are a few areas along Novato Boulevard that are also visible from one of the five points.

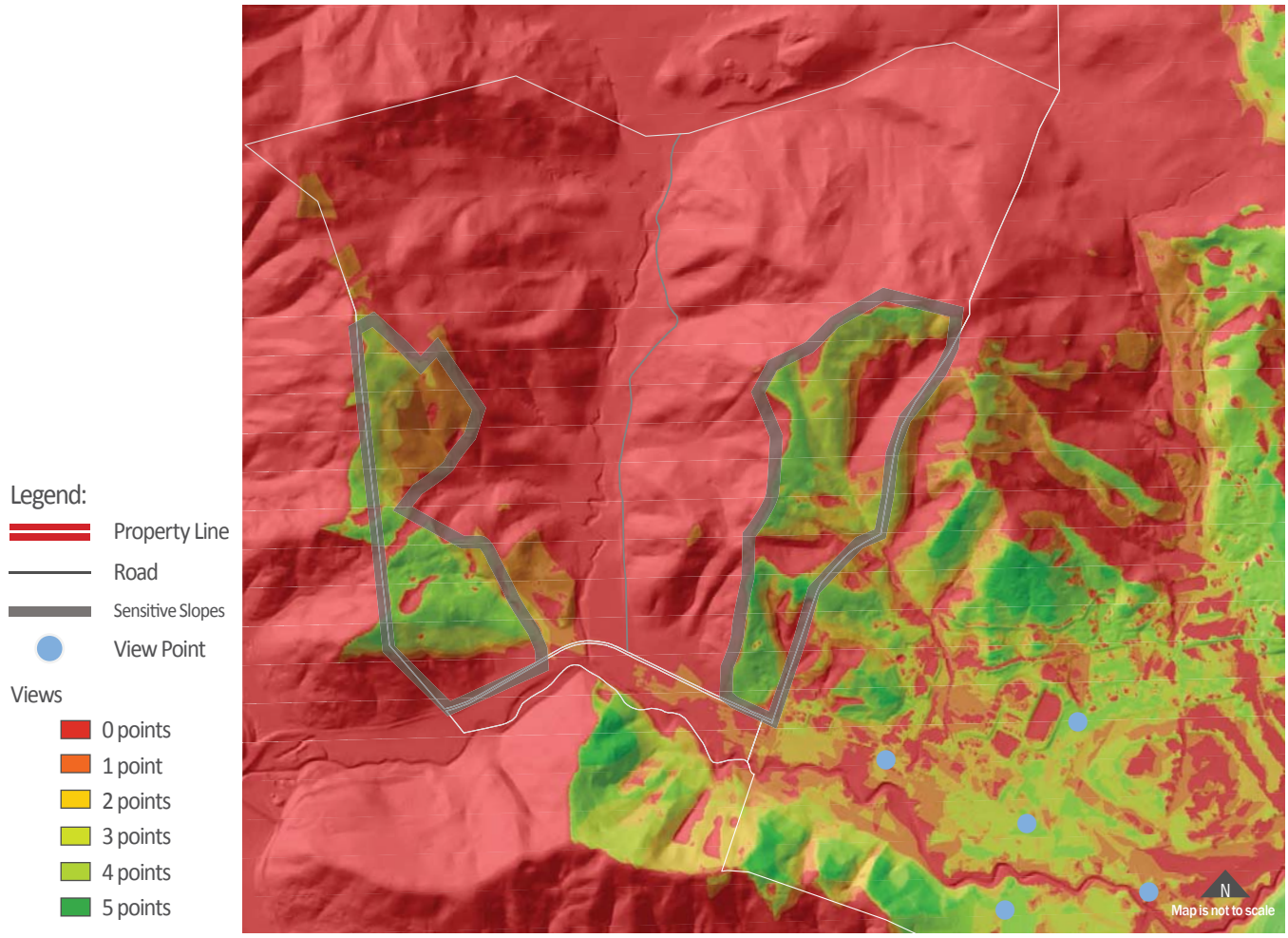


Figure 4.4: Novato City general visibility map

Vegetation Map

The vegetation map was produced from an aerial image of the site and modified into three land type categories: vegetation (trees and shrubs), grassland, and development. The development areas include all buildings and roads on or near the site. The majority of the vegetation masses are made up of large trees, mostly oak and bay.

Purpose:

The purpose of this map was to illustrate where vegetation occurs on the property. The information from this map was used in the visual impact map as the suitability map.

Conclusions:

Most of the site is covered with trees and shrubs. Trees are especially dense on the north facing hillsides and in in canyons along the streams. The two largest wooded areas are in the north end of the property on the east and west sides of the valley. Grasslands cover most of the ridgelines and hill tops. The two largest grassland areas are located in the back northeast corner and along Novato Boulevard.

Figure 4.5: Vegetation map

Composite Suitability Map

The suitability map combined the slope, general visibility, and streams and drainage maps to identify those areas most suitable for development. The criteria below was used to determine suitability. If the areas did not meet all three of the criteria for suitability, it was deemed unsuitable.

Suitable development areas:

Slopes of 10% or less
Visible from one or none of the viewpoints
Not within the 100 foot riparian buffer

Unsuitable development areas:

Slopes of 11% or greater
Visible from two or more view points
Within the 100 foot riparian buffer

Conclusion:

There are only a few limited locations on the property that fit all three suitability criteria.

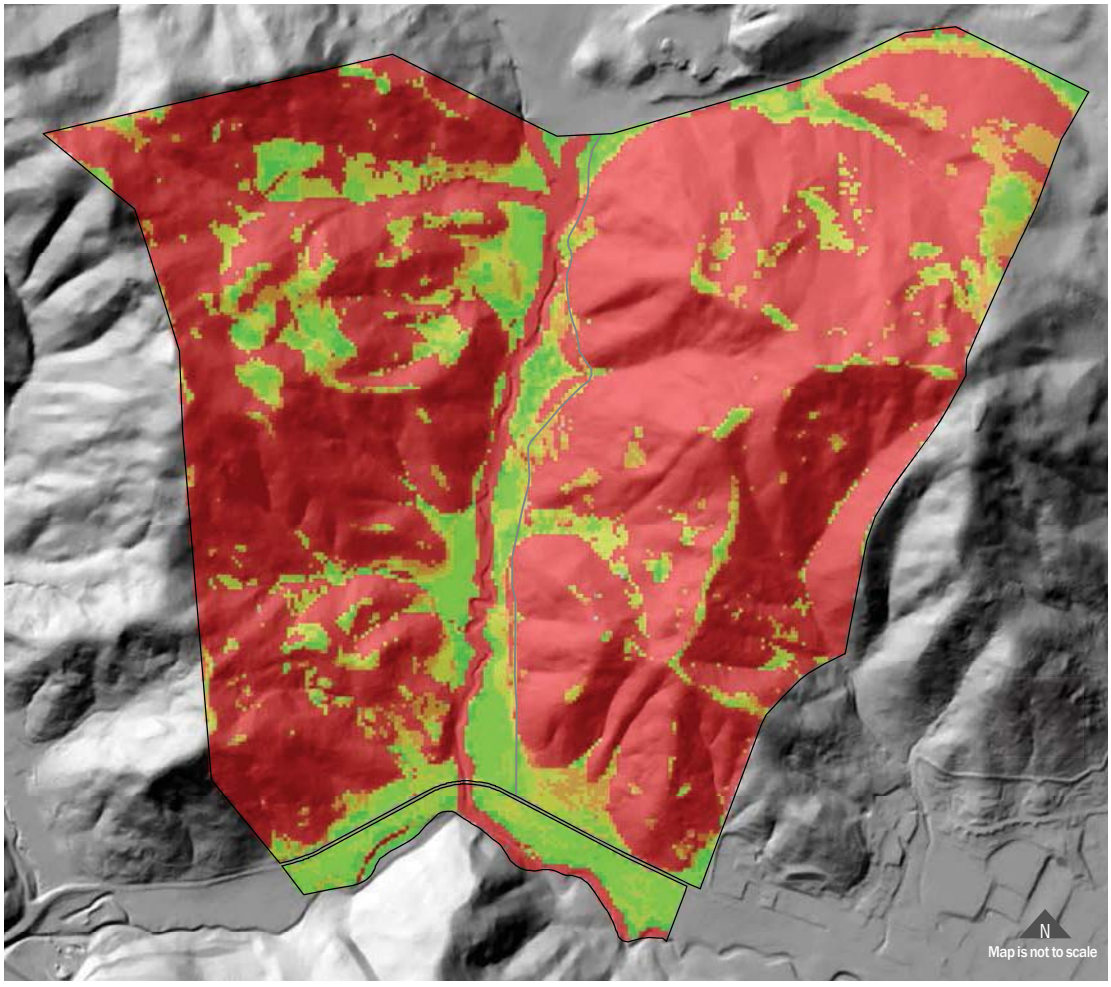


Figure 4.6: Composite suitability map

Site Visits

Over the course of four site visits in March 2012, September 2013, November 2013, and March 2014, I identified and mapped existing noteworthy features of the property. These features include scenic views, fence lines, buildings, roads and trails, ponds and springs, and creeks.

Site Views

Outward views from high vantage points on the project property are spectacular and mostly unknown to Novato residents. From the top of the two highest points on the property, views of San Pablo Bay and Richmond to the east and Stafford Lake to the west are seen. Public views into the site are most prominent from Novato Boulevard on the south end of the property and the Mount Burdell Preserve to the east of the property. These views are of open hillsides and agricultural fields with no visibility of the barn or existing homes. Within the site are a variety of views of the hillsides, woodlands, and valleys. Many of the areas of the site are secluded due to limited access by roads or trails and dense groves of oak and bay trees.

Figure 4.7: View from site looking east to Novato (Hahn, 2013)

Fencing and Structures

The site is characterized by two major north-south land forms with a valley in the center. The property is fenced on all sides with barbed wire fencing and along the northeast boundary by a three foot dry stack stone wall. It is unknown when this wall was constructed. The central feature of the property, and one of three existing structures, is an old dairy barn built over 60 years ago. The barn is now used to store vehicles and earthwork equipment for those who lease the property. Surrounding the barn are California Live Oak trees (Quercus agrifolia) and two homes occupied by the caretakers of the property.

Figure 4.8: Old dairy barn (McElroy, 213)

Figure 4.9: Wire fence line (Hahn, 2013)

Figure 4.10: Oak at the old dairy barn (Hahn, 2013)

Figure 4.11: Fence along Novato Boulevard (Author, 2012)

Figure 4.12: Stone wall (Author, 2012)

Roads and Trails

Dirt roads around the property make hilltops accessible and provide access for logging equipment. Numerous dead oak trees, caused by Sudden Oak Death disease, have been removed using the roads and are sold for firewood. In addition, trails crisscross the property and were primarily created by cows and wildlife that graze the hillsides. Existing roads and trails are often used for mountain biking and hiking when permitted by the owner.

Figure 4.13: Grass covered road in the spring (Author, 2012)

Figure 4.14: Dirt road in the fall (Leise, 2013)

Figure 4.15: Novato Boulevard looking east (Author, 2013)

Figure 4.16: Gravel road near the barn (Hahn, 2013)

Figure 4.17: Novato Boulevard looking west (Hahn, 2013)

Ponds and Streams

Ephemeral ponds in the upper hills hold water during the winter and spring rains. The ponds are filled by rain runoff and are not fed with springs or wells. Depending on the amount of rain in a given year the ponds can retain water year-round. Numerous ephemeral creeks and drainage ways flow during the wet times of the year. An unnamed creek, fed by a natural spring in the northeast corner of the property, marks the northern boundary of the property. Novato Creek, the major drainage way for the Novato Creek watershed, marks the southern boundary. Bowman Canyon Creek runs through the center of the property and has water year around.

Figure 4.18: Upper pond on the west side (Author, 2012)

Figure 4.19: Upper pond on the east side (Author, 2012)

Figure 4.20: Bowman Canyon Creek in the center valley (Author, 2012)

Figure 4.21: Bowman Canyon Creek (Author, 2014)

Figure 4.22: Dry stream bed (Author, 2014)

Figure 4.23: Western hillsides (Author, 2012)

Hillsides and Vegetation

The hillsides of the site are dotted with groves of oak and bay trees. There are multiple species of oak, one of which is infected by the disease Sudden Oak Death. As a result of the disease, many of the oaks are completely dead and are being removed. Bay trees are intermingled with the oaks. The hillsides of the property are steep, most with a slope over 25%, and covered with vibrant green grass during the wet season, December to May. Starting in June, Novato receives little to no water and the hillsides slowly turn brown. By late summer, the green of the trees lies in stark contrast to the brown slopes. North facing slopes are covered with denser groves compared to south facing slopes.

Figure 4.24: Oak tree (Author, 2012)

Figure 4.25: Front hill side (Hahn, 2013)

Figure 4.26: Property high point (Hahn, 2013)

Figure 4.27: Novato Boulevard looking east (Hahn, 2013)

Figure 4.28: Oak tree at the old barn (Hahn, 2013)

Design Alternatives

Alternative Explanation

Four design alternatives for the property provide a range of development options. The alternatives were determined after discussing development goals with the owner of the property. The first three alternatives are classified according to the final number of dwelling units, which was an important consideration for the owner. These alternatives are : the high density alternative (500–600 units), the medium density alternative (200–300 units), and the low density alternative (14 units). The final alternative is also a low density alternative that includes a land swap with Novato city in addition to the 14 units.

Having a wide range of design alternatives gave me the opportunity to test different design strategies. Strategies I used to design included the physical design of the community, based primarily on conservation community design principles, as well as the plan for development. The results of each alternative are quantified using common metrics. The metrics used in this report are: development area, conservation area, lot size, road length, trail length, number of dwelling units, community amenities, and development costs (see chapter three). The next chapter of the report will use these metrics to analyze and compare the feasibility of each alternative.

High Density Alternative

The high-density alternative focuses on including as many homes as possible on suitable land. It maximizes the number of single family and multi-family units on the south portion of the site and strategically places lots and roads on the northern hillsides. It includes a network of trails connecting the neighborhoods to community parks and one another.

Medium Density Alternative

The medium-density alternative focuses on preserving the rural feel of the south end of the site while strategically placing homes and roads on the hillsides at the north end. Included with this design alternative are areas for businesses that could provide income for both the owners and the city. Some of the possible business options include an equestrian riding center, an arts school campus, a mountain bike retreat center, or a corporate retreat center.

Low Density Alternative

The low-density alternative maximizes the allowable density. The current AG-1 zoning, allows 1 unit per 60 acres, which equals 14 homes over the 867 acre property. The county requested that the homes are clustered to limit environmental disturbance during development. The homes sites are located in flat areas suitable for development: five in the front along Novato Boulevard, four in the center valley, three in the north valley, and two in the northeast corner.

Low Density + Land Swap Alternative

This alternative includes 14 units on the site laid out in a similar pattern to the low density alternative. However, all of the lots are placed out of sight from Novato Boulevard to maintain the visual integrity and rural feel of the property. This alternative proposes trading the front agricultural land (site property) with the city of Novato for developable land within the city's boundary (city property). The swap preserves the rural visual character of Novato Boulevard corridor as the entrance to the city and gives the owner a range of development options within the city.

Figure 4.29: High density alternative

Figure 4.30: Medium density alternative

Figure 4.31: Low density alternative

Figure 4.32: Low density + land swap alternative

High Density Alternative

Figure 4.33: High density aerial image looking southeast

Novato Hills Ranch is a community designed to highlight the agricultural and ranch history of Novato. This high density development alternative presents a variety of housing options including apartments, condominiums, townhomes, and single family homes. The homes are arranged in six neighborhoods with pricing options that appeal to potential residents of all income levels. The community includes two clubhouses each with a pool, exercise facilities, game rooms, a movie theater, and banquet rooms.

The south valley neighborhood includes apartments and townhomes for sale or rent. The clubhouse and pool are available for use by the entire community. The east valley neighborhood, central valley neighborhood, and south hills neighborhood include market rate single family homes on quarter to half acre lots. In the center of the community is the barn, a club house and pool complex for community use. The west and east hills neighborhoods contain larger homes on lots typically a one-half to one acre.

A unique component of Novato Hills Ranch is the integration of ranching into everyday living. Cows and horses graze the hillsides and fields of the community. They are contained by strategically placed fences keeping livestock at a safe distance from private residences. Grazing patterns are highly managed to maintain the natural balance that has always existed on the property and to avoid overgrazing.

The layout of the community follows conservation community design principles. This conservation approach preserves the hillsides, vegetation, and waterways with homes and community amenities strategically placed in the most suitable locations. Of the 867 acres included in the community 82% of the property is conserved for recreation and livestock grazing. Miles of hiking and equestrian trails lead to beautiful vistas of the surrounding hills and connect to the Mount Burdell Preserve and Stafford Lake trail systems.

Figure 4.34: High density master plan

- A Clubhouse 1
- B Bowman Canyon Drive
- C Spring
- D Novato Boulevard
- E Property High Point
- F Main Entrance
- G Clubhouse 2
- H South Valley Neighborhood
- I Central Valley Neighborhood
- J East Valley Neighborhood
- K Upper West Pond
- L Upper West Hills Neighborhood
- M East Hills Neighborhood
- N Bowman Canyon Creek
- O Walking Trail
- P Lower West Hills Neighborhood

Development Metrics

Land Use Information

Site Area:	867 acres
Developed Area:	153 acres (18%)
Private Conserved Area:	714 acres (82%)
Public Conserved Area:	0 acres (0%)
Lot Size:	.25–1.5 acres
Lot Width:	Varies
Lot Depth:	Varies
Road Length:	8.5 miles
Trail Length:	3.0 miles

Dwelling Units

Large Single Family:	225 (40%)
Small Single Family:	129 (23%)
Multi Family:	212 (37%)
Total Units:	566
Density:	1du/1.53 ac

Community Amenities

2 Clubhouses:	Pools
	Movie Rooms
	Game Rooms
	Banquet Rooms

Development Costs

Home Development Costs

Home Construction:	$252.5 million
Home Impact Fees:	$6 million
Water Fees:	$13.1 million
Sewer Fees:	$4.1 million
Fire and School fees:	$3.5 million
Sub Total:	*$279.5 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$4.3 million
Environmental Fees:	$1 million
Roads:	$449,000
Water Pipe:	$1.8 million
Sewer Pipe:	$1.8 million
Sub Total :	*$9.4 million*
Total Costs:	**$289 million**

Figure 4.35: West hills neighborhood looking west

Figure 4.36: Central valley looking south to Novato Boulevard

Figure 4.37: Southwest aerial of the south and central valley

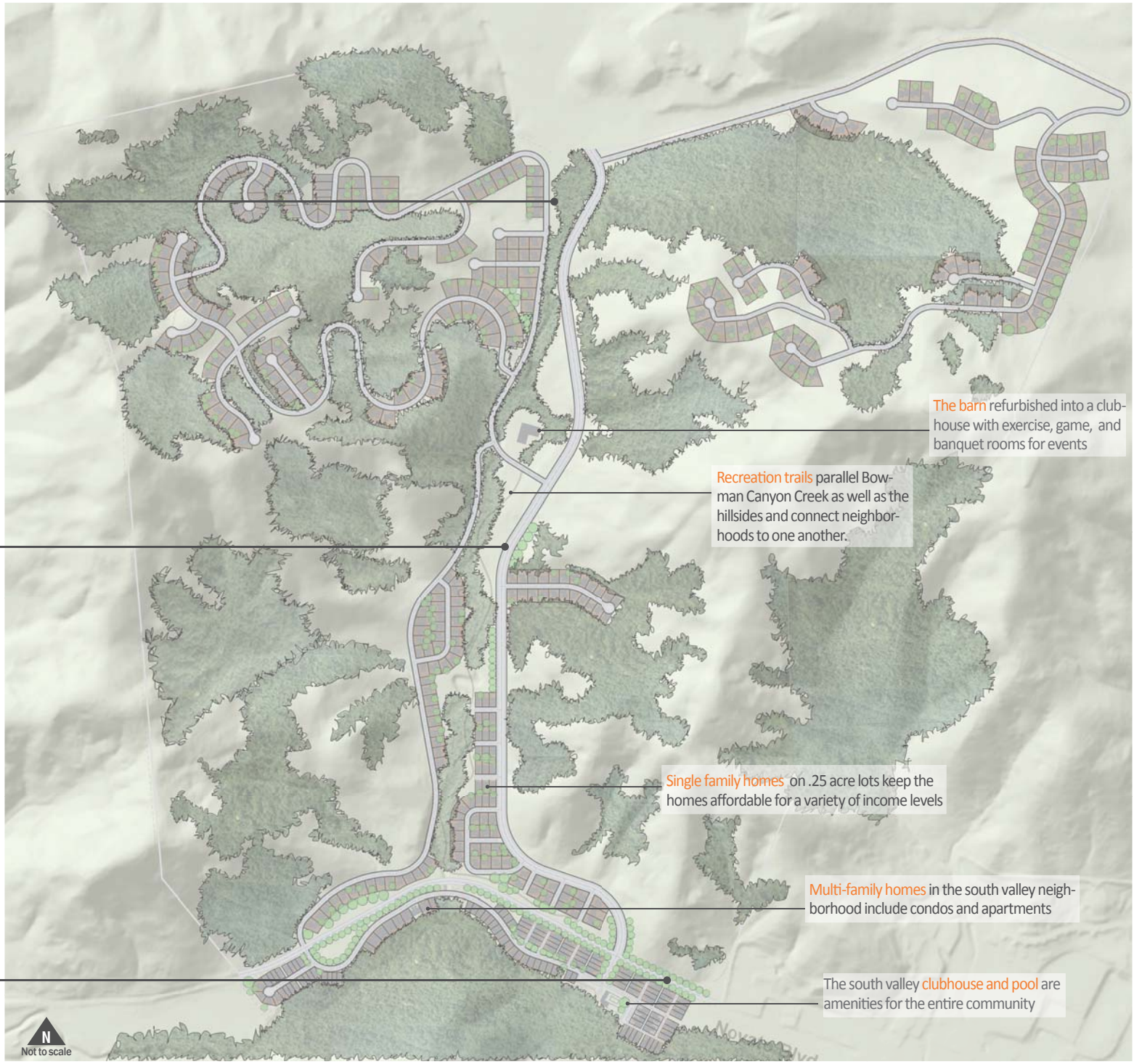


Figure 4.38: High density master plan

Medium Density Alternative

Figure 4.39: Medium density aerial rendering

The medium density development alternative offers a mix of high-end residential living and market rate mixed-use housing along with a 25-acre retreat, selected from several possible options. The retreat includes a 54,000 square foot conference center and 21 tree house rental cabins. Because the residents of Novato deeply value the beauty of the hillsides, this development uses conservation principles to maintain and protect that rural character while offering housing options and recreational activities. The development option preserves nearly 90% of the 860 acres to retain the natural environmental characteristics. Any development remains virtually hidden from Novato Boulevard.

The 20-acre retreat is a getaway for both locals as well as tourists to the Bay area. The conference center is the center of the retreat, with rooms and space for banquets and seminars. The outdoor plaza allows visitors to enjoy the ideal northern California weather. The retreat acts as the region's hub for mountain biking, horseback riding, or hiking to vistas overlooking the San Pablo Bay.

Residential neighborhoods on the east and west sides of Bowman Canyon Creek occupy the northern two-thirds of the property. The residential units include 176 single-family homes and 48 multi-family homes.

Figure 4.40: Retreat center plan

1. Horse Riding Barn
2. Retreat Center Plaza
3. Retreat Center
4. Bowman Canyon Creek
5. Tree house Cabins
6. Tennis Courts

Figure 4.41: Medium density master plan

- A Existing Barn
- B Bowman Canyon Drive
- C Bowman Canyon Creek
- D Novato Boulevard
- E Property High Point
- F Front Agricultural Land
- G Novato Creek
- H Tree House Cabins
- I Retreat Center
- J Front Agricultural Land
- K West Hills Neighborhood
- L Multi-family Housing
- M East Hills Neighborhood
- N Tennis Courts
- O Equestrian Trail

Development Metrics

Land Use Information

Site Area:	867 acres
Developed Area:	100 acres (12%)
Private Conserved Area:	767 acres (88%)
Public Conserved Area:	0 acres (0%)
Lot Size:	.25–.33 acres
Lot Width:	90 feet
Lot Depth:	150 feet
Road Length:	5.0 miles
Trail Length:	4.5 miles

Dwelling Units

Single Family:	176 (79%)
Multi Family:	48 (21%)
Total Units:	224
Density:	1 du/ 3.78 ac

Community Amenities

Conference Center:	27,500 sf
Retreat Plaza:	24,500 sf
Tree Cabins:	21
Cabin Size:	500 - 1,000 sf

Development Costs

Home Development Costs

Home Construction:	$236.5 million
Home Impact Fees:	$2.4 million
Water Fees:	$5.2 million
Sewer Fees:	$1.6 million
Fire and School fees:	$1.4 million
Sub Total:	*$247.1 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$1.7 million
Environmental Fees:	$1 million
Roads:	$264,000
Water Pipe:	$1 million
Sewer Pipe:	$1 million
Sub Total :	*$5.1 million*
Total Costs:	**$252.3 million**

Figure 4.42: West hills home layout

Figure 4.43: View from the retreat center into the plaza

Figure 4.44: View of the retreat center looking south

Figure 4.45: Medium density master plan

Low Density Alternative

Figure 4.46: Novato Boulevard looking west

The low density alternative consists of 14 building sites, the density allowed under current zoning standards. The sites are situated in groups of two or three with the majority in the central and front valley where the land is flat and most suitable for development. A few sites are located in the hills on flat areas and two are located in the far northeast corner of the property. At the center of the community is the old dairy barn that has been restored and updated for community events. Surrounding the barn is a park and network of trails that connect to the Mount Burdell Preserve and Stafford Lake. The community is organized as a home owners association (HOA) with dues and fees for the maintenance of roads, trails, and community buildings.

Each of the 14 building sites include two land classifications, the home land and the open land. The homeland is the building and development envelope. The lots range from 1.25 to 2.65 acres in size depending on location. Permanent structures and roads could only be built within this area. The rest of the lot is classified as open land. The open land is privately owned but not suitable for development. Trails and temporary structures would be allowed on the open land with agreements from the HOA and neighbors. Open land lots range from 6 to 30 acres and take advantage of hillsides and hilltop views. The remainder of the site is reserved for private use with over 7 miles of trails for hiking, biking, or horseback riding.

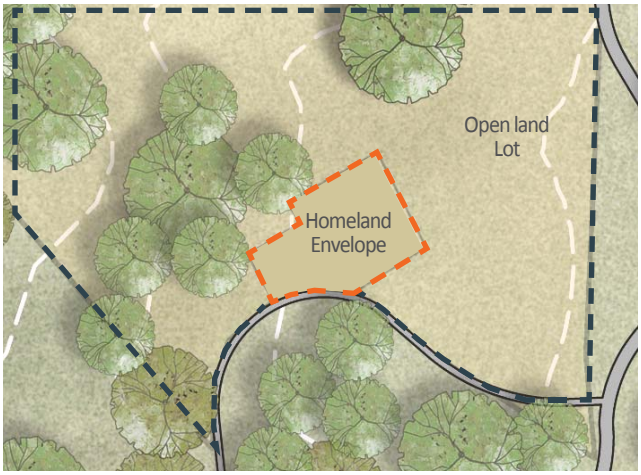


Figure 4.47: Homeland and open land areas

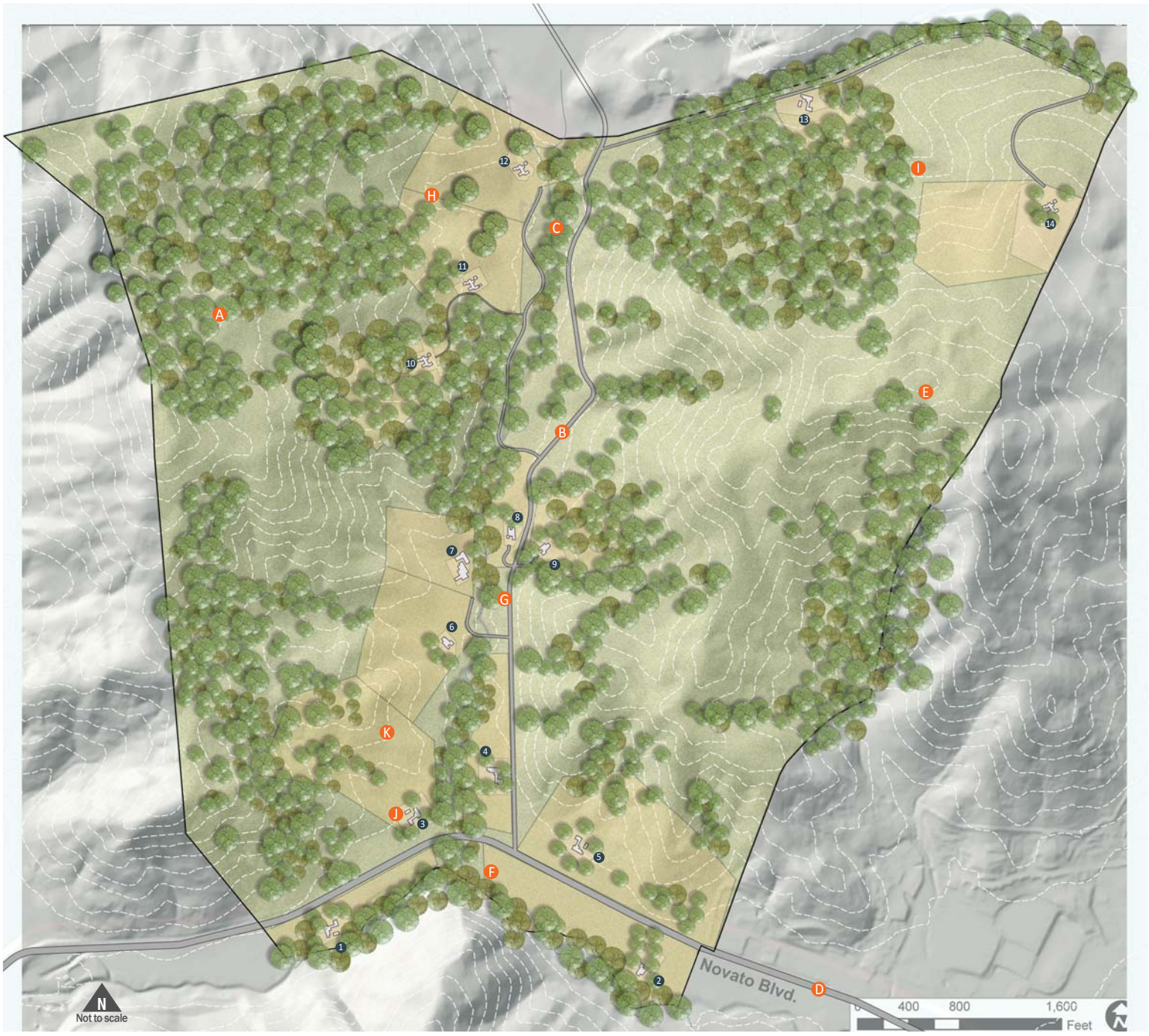


Figure 4.48: Low density master plan

- A Upper Pond
- B Bowman Canyon Drive
- C Bowman Canyon Creek
- D Novato Boulevard
- E Property High Point
- F Novato Boulevard Homes
- G Central Valley Homes
- H North Valley Homes
- I East Hills Homes
- J Homeland
- K Open land
- 1 Home Sites

Development Metrics

Land Use Information

Site Area:	867 acres
Homeland Area:	20 acres (2%)
Openland Area:	172 acres (18%)
Private Conserved Area:	675 acres (80%)
Public Conserved Area:	0 acres (0%)
Road Length:	2.8 miles
Trail Length:	7.0 miles

Dwelling Units

Single Family Detached:	14 (100%)
Density:	1du/60 ac

Development Costs

Home Development Costs

Home Construction:	$42 million
Home Impact Fees:	$150,000
Water Fees:	$326,000
Sewer Fees:	$103,000
Fire and School fees:	$87,000
Sub Total:	*$42.6 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$108,000
Environmental Fees:	$500,000
Roads:	$211,000
Water Pipe:	$845,000
Sewer Pipe:	$845,000
Sub Total :	*$2.5 million*
Total Costs:	**$45.2 million**

Figure 4.49: Valley aerial view of the site

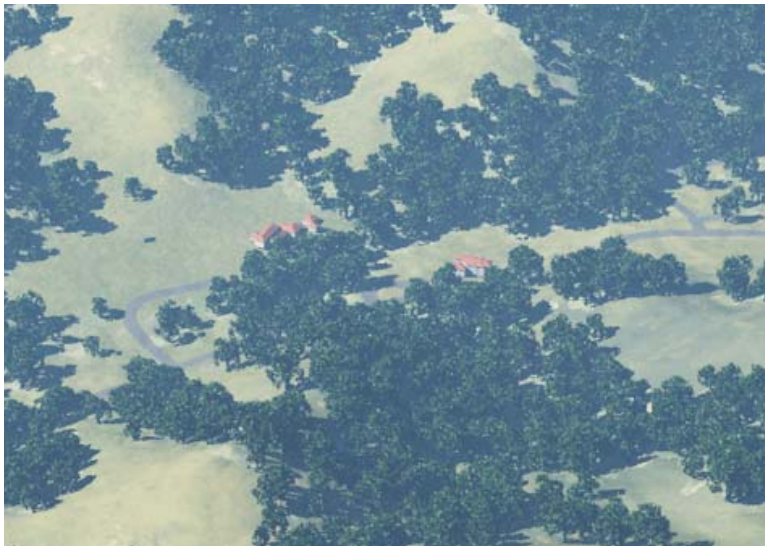


Figure 4.50: Central valley homes

Figure 4.51: Low density western view of Novato Boulevard

Figure 4.52: Low density master plan

Low Density + Land Swap Alternative

Figure 4.53: Novato Boulevard looking west

The low density and land swap alternative consists of four parts; the housing development, privately conserved land, publicly conserved land, and a land swap with Novato. Development of the property (92 acres) is similar to the low density alternative with 14 units strategically placed in suitable areas. However, for this alternative, all of the units are placed in the center and north portions of the property which are out of view from the protected Novato Boulevard visual corridor

The privately conserved land includes 354 acres primarily in the northwestern portion of the property. This land is jointly owned by residents of the development and set aside as conserved land for their use. The land includes hilltop views of the surrounding hills, Novato, and San Pablo Bay. It also includes the upper flatlands and pond. The upper flatlands could be sensitively developed with parks and structures for the residents' private use.

The publicly conserved land includes 243 acres along the east border of the property. This land would be permanently conserved for public use and connected to the trail systems of the Mount Burdell Preserve. It includes the high point of the property with views of Novato and San Pablo Bay currently unavailable to the public.

The land swap would trade the flat agricultural land, hillsides, and ridgelines along Novato Boulevard (hereafter referred to as site property) for land within Novato's UGB (hereafter referred to as city property). These areas of the property create the visual corridor for the entrance into the city. With the trade, Novato would own this valuable land preserving the current visual character. The land for the swap was identified using the Novato City general visibility map (see Figure 4.4). Any areas of the property visible from the viewpoints in the city were considered for the land swap areas.

Based on land value estimates, the proposed swap ratio would be approximately 19 acres of site property to 1 acre of city property. Using the developable land map (see Figure 3.26), a 10 acre site of parkland at the intersection of Novato Boulevard and Sutro Avenue was identified as a candidate for the swap. The proposed swap would be 172 acres of site property for the 10 acres of city property. The land is owned by the city and currently used for an equestrian facility, Morning Star Farms, and a passive recreation park, O'Hair Park. Six acres of the land is vacant and undeveloped, but is adjacent to a housing development.

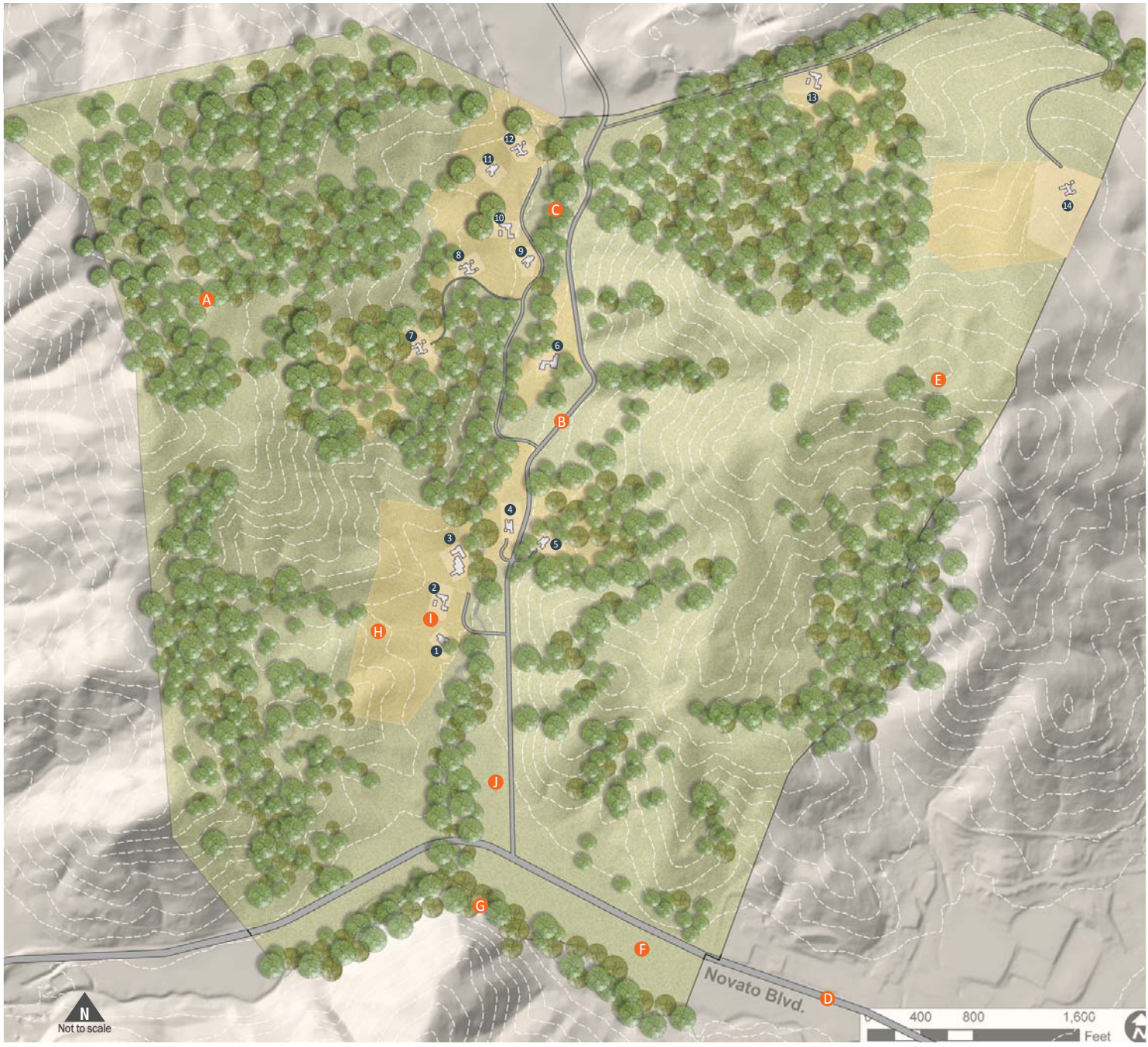


Figure 4.54: Low density+land swap master plan

- A Upper Pond
- B Bowman Canyon Drive
- C Bowman Canyon Creek
- D Novato Boulevard
- E Property High Point
- F Front Agricultural Land
- G Novato Creek
- H Private Open Land
- I Private Home Land
- J Front Agricultural Land
- 1 Home Sites

Development Metrics

Land Use Information

Site Area:	867 acres
Homeland Area:	16 acres (2%)
Openland Area:	89 acres (10%)
Private Conserved Area:	354 acres (40%)
Public Conserved Area:	238 acres (28%)
Land Swap Area:	172 acres (20%)
Road Length:	2.8 miles
Trail Length:	7.0 miles

Dwelling Units

Site-Large Family:	14 (19%)
Land Swap:	58 (81%)
Site Density:	1 du/60 ac
Land Swap Density:	1 du/.17 ac

Development Costs

Home Development Costs

Home Construction:	$81.1 million
Home Impact Fees:	$770,000
Water Fees:	$1.6 million
Sewer Fees:	$532,000
Fire and School fees:	$446,000
Sub Total:	*$84.6 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$555,000
Environmental Fees:	$500,000
Roads:	$211,000
Water Pipe:	$845,000
Sewer Pipe:	$845,000
Sub Total :	*$3 million*
Total Costs:	**$87.5 million**

Figure 4.55: Central valley view of the property

Figure 4.56: Central valley home cluster

Figure 4.57: Land swap western view of Novato Boulevard

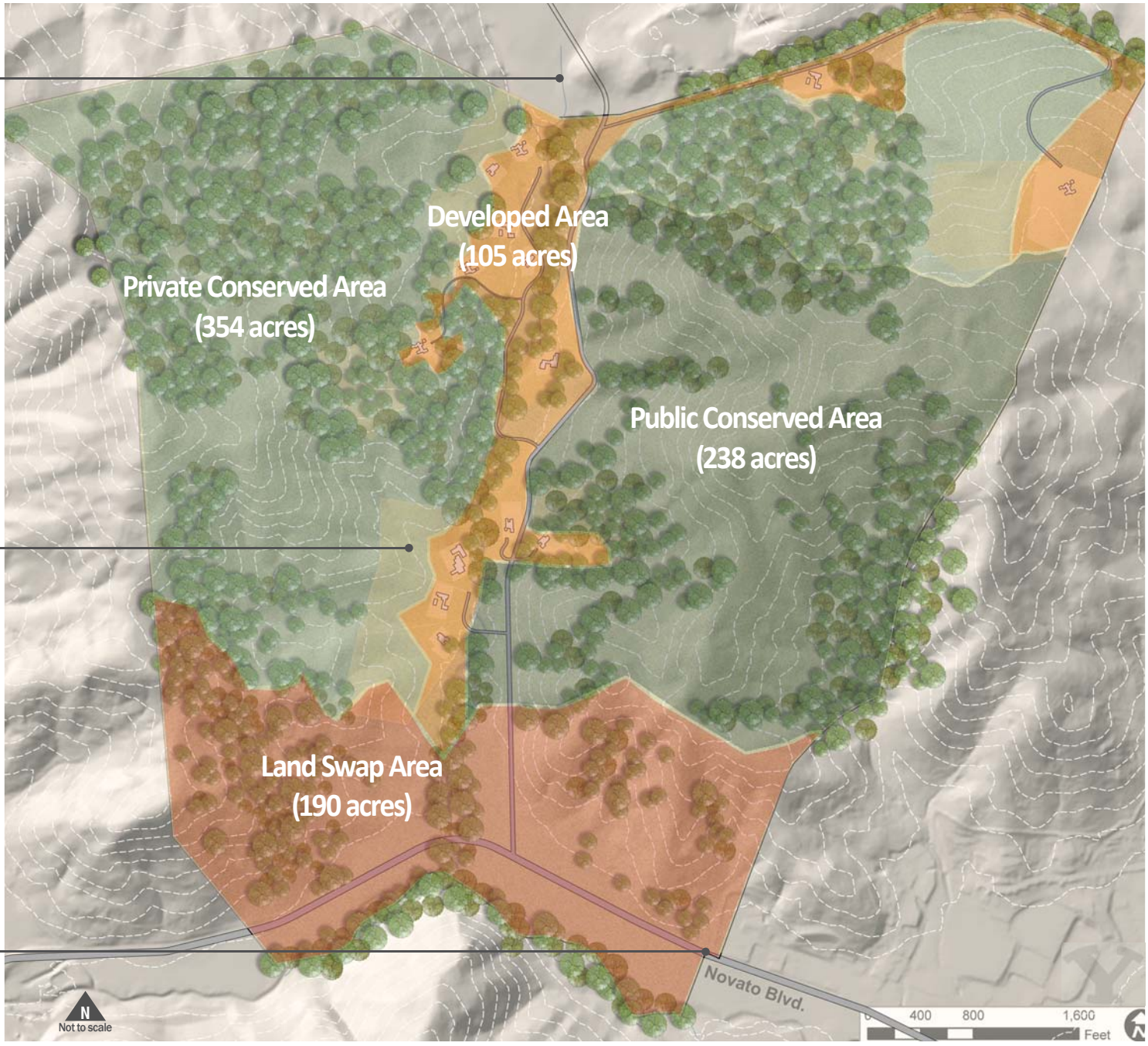


Figure 4.58: Low density + land swap master plan

Land Swap Areas	190 acres
Developed Area	105 acres
Publicly Conserved Area	238 acres
Privately Conserved Area	354 acres

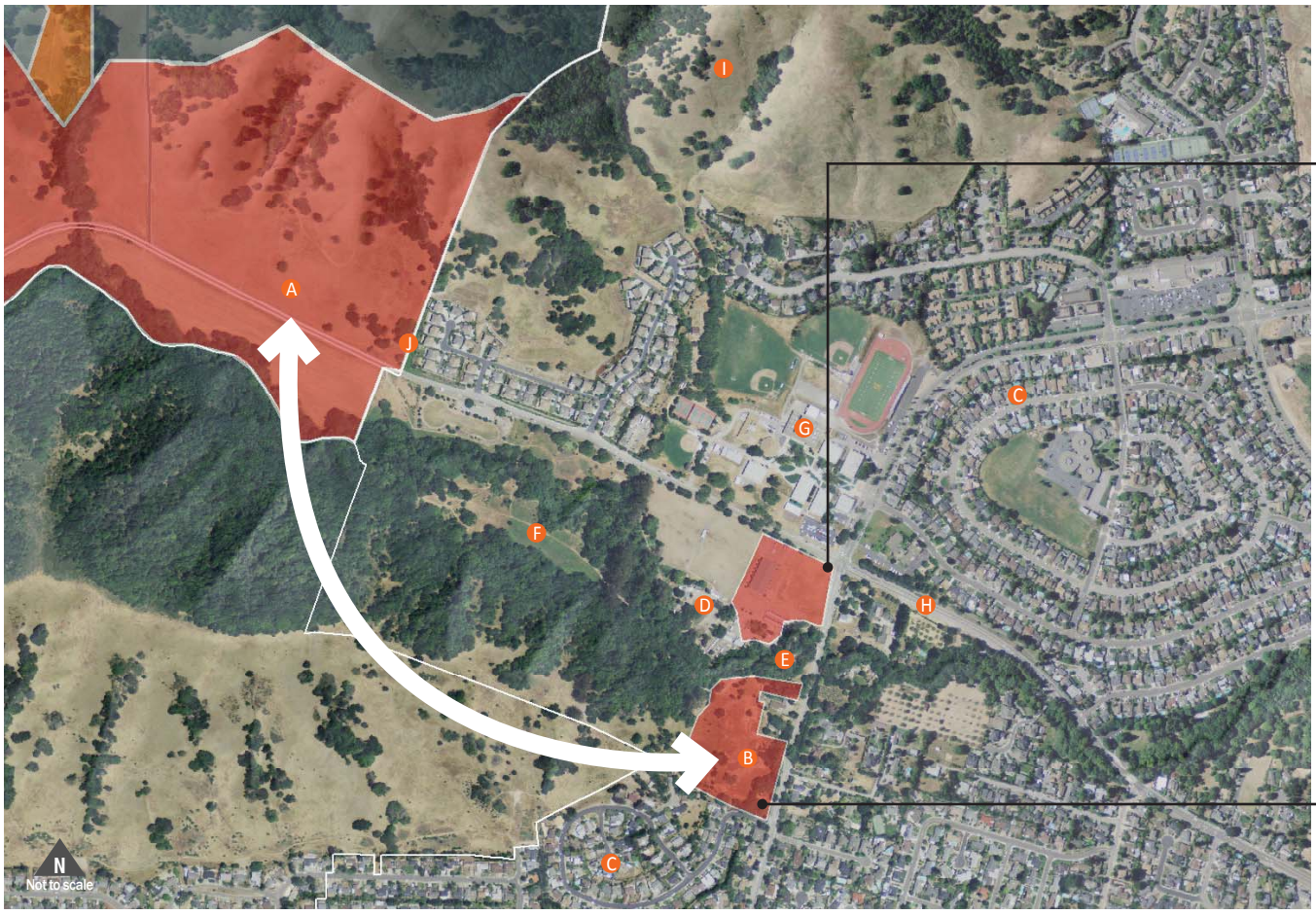
Land Swap Details

Land Swap Areas

Site Area:	190 acres
City Area:	10 acres
Swap Ratio:	19:1

Site Information:

Current Zoning:	Parkland
Current Use:	Park and Equestrian Center
Current Owner:	City of Novato
Proposed Zoning:	R1-7.5
Proposed Density:	5.8 units/acre
Potential Homes:	58-60 single family



A Site Land Swap Area
B City Land Swap Area
C Residential Neighborhoods
D Equestrian Riding Center
E Novato Creek
F City Park
G San Marin High School
H Novato Boulevard
I Mount Burdell Preserve
J Novato City Boundary

Figure 4.59: Land swap area map

Figure 4.60: City land swap area, equestrian riding center (Author, 2014)

Figure 4.61: City land swap area, looking north to the project site (Author, 2014)

V COMPARE

Process

The concluding phase of this project was to analyze the metrics for each design alternative and determine a feasibility score for each. The feasibility score represents the likelihood for each design alternative to be implemented with higher scores being more desirable than lower scores. The process to determine the feasibility score was: 1) identify the key development values for the community and the owner, 2) collect metrics from each design alternatives that addressed each value, 3) synthesize the values and associated metrics into value charts, and 4) add up the value ratings for a composite feasibility score. This section will outline how the value ratings were determined, how the value charts were compiled, and how the feasibility scores were calculated.

The specific values and value rating categories are based on research for the area of the project and the specific project site and were not intended to be used for other projects. The process, however, can be duplicated and applied to any development problem. The important step is to identify those values of highest value to the stakeholders of the project.

Value Ratings

The value ratings are tables that describe how each value will be calculated and scored. The table shows in detail a breakdown of each value rating and the range of metrics that determine the final score for each value. The scores range from one to three: one being the least desirable and three the most desirable. The values are based on findings and thresholds specific to this project and are limited to my research. The purpose of the value ratings is to show exactly how each rating was determined.

Value Charts

Each value chart lists the community and developer values and the associated ratings. The value charts compile the values and value ratings into a feasibility score. A high feasibility score indicates that the alternative adequately satisfies values of the community and developer and is therefore more likely to be implemented. A low feasibility score indicates that the alternative does not adequately satisfy these values and would be less likely to be implemented.

Value Charts & Ratings

Owner and Developer Values

I used six values to measure the feasibility score for the developer values. Those values were: infrastructure costs (roads and utilities), development costs (fees and permits), number of dwelling units, return on investment (ROI) potential, privately accessible open space, and community amenities. The values and each associated ratings are listed in Table 5.1.

Infrastructure costs are based on linear foot prices for roads and underground pipes (Hochstrasser 2014). Development costs are based on values per dwelling unit given by the city of Novato (Novato City 2013). The lower these costs the more desirable an alternative would be to a developer. The number of dwelling units was of particular importance to the current owner of the property in order to satisfy the housing needs of Novato. The ROI is calculated by subtracting the market value per acre by the land development costs (infrastructure and development) divided by the land development costs. The market value per acre of land was determined with the help of Denise Athas, a real estate agent in Novato. The result of the ROI formula is a percentage of potential return from the project. Projects with a high ROI are more desirable than those with a low ROI. Privately accessible open space and the presence of community amenities can make developments more attractive to potential buyers and are therefore valuable to developers.

Community Values

I used six values to measure the feasibility score for the community. Those values were: visual impact of development along Novato Boulevard, visual impact of development to the hillsides, amount of conserved open space, publicly accessible open space, protection of hillside slopes, and compliance with the California Environmental Quality Act (CEQA). The values and each associated rating are listed in Table 5.1.

The visual impact of any development (a new structure or road) to the site is extremely important to the community. The areas of visual importance were determined during the mapping phase of the project with the GIS visual impact maps. When new development is located within these areas it is considered inpactful. Conserved open space is a measure of land area not disturbed by development and maintained to preserve the land's natural setting. Hillside protection is measured as a percentage of development on slopes either above or below 10 %. According to Novato City development codes, 10 % is the maximum slope suitable for construction. CEQA compliance was based on the number of significant environmental impacts the design would have according to the CEQA environmental checklist (California Resources Agency 2012). For a detailed summary of each alternative's CEQA compliance, see Appendix A.

Owner/Developer Values		Value Rating		
		1 Low	2 Medium	3 High
1	*Infrastructure Costs (Roads and Utilities)*	*Over $4 million*	*$1 to $4 million*	*Less than $1 million*
2	*Land Development Costs (Fees and Permits)*	*Over $10 million*	*$3 to $10 million*	*Less than $3 million*
3	*Number of Dwelling Units*	*Less than 100 units*	*100-300 units*	*More than 300 units*
4	*ROI Potential*	*0–25% ROI*	*25–50% ROI*	*more than 50% ROI*
5	*Community Amenities*	*Few trails and parks*	*Some trails and parks and community center*	*Many trails and parks and multiple community centers*
6	*Privately Accessible Open Space*	*1–20 acres*	*21–40 acres*	*more than 40 acres*

Table 5.1 : Development values of the developer and owner

Community Values		Value Rating		
		1 Low	2 Medium	3 High
1	*Visual Protection (Novato Blvd Corridor)*	*31+% of development in visible areas*	*11%–30% of development in visible areas*	*0%–10% of development in visible areas*
2	*Visual Protection (Hillsides)*	*31+% of development in visible areas*	*11%–30% of development in visible areas*	*0%–10% of development in visible areas*
3	*Conserved Open Space*	*70–79% of the land conserved*	*80–89% of the land conserved*	*more than 90% of land conserved*
4	*Publicly Accessible Open Space*	*1–20 acres*	*21–40 acres*	*more than 40 acres*
5	*Hillside Protection*	*Some development on slopes over 10%*		*No development on slopes over 10%*
6	*CEQA Compliant*	*5–8 (of 8) significant environmental impacts*	*2–4 (of 8) significant environmental impacts*	*0–1 (of 8) significant environmental impacts*

Table 5.2 : Development values of the community

High Density Alternative Value Charts

The High Density Alternative received low ratings for five of the eight values. Of the developer values, it received low ratings for infrastructure due to the high number of dwelling units and the length of roads. However, because of all the homes the ROI potential of this design was the highest of all the alternatives. The developer feasibility score was 15.

For the community values, the high density alternative rated low for three values: visual protection of Novato Boulevard, hillside protection, and CEQA compliance. This alternative has a major impact to the visual character of Novato Boulevard due to the residential neighborhoods along the road. In order to reach a high number of units, much of the development to the north would be on slopes over 10 % which accounted for the low hillside protection rating. The high density alternative had significant impacts to seven of the eight CEQA environmental factors including aesthetics, agriculture, greenhouse gas emissions, hydrology, population, and service systems. Because there is no publicly accessible open space in this design, it received no rating for this value. The community feasibility score was 7 and the overall feasibility score was 19, the lowest of the four alternatives.

Figure 5.1: West hills neighborhood

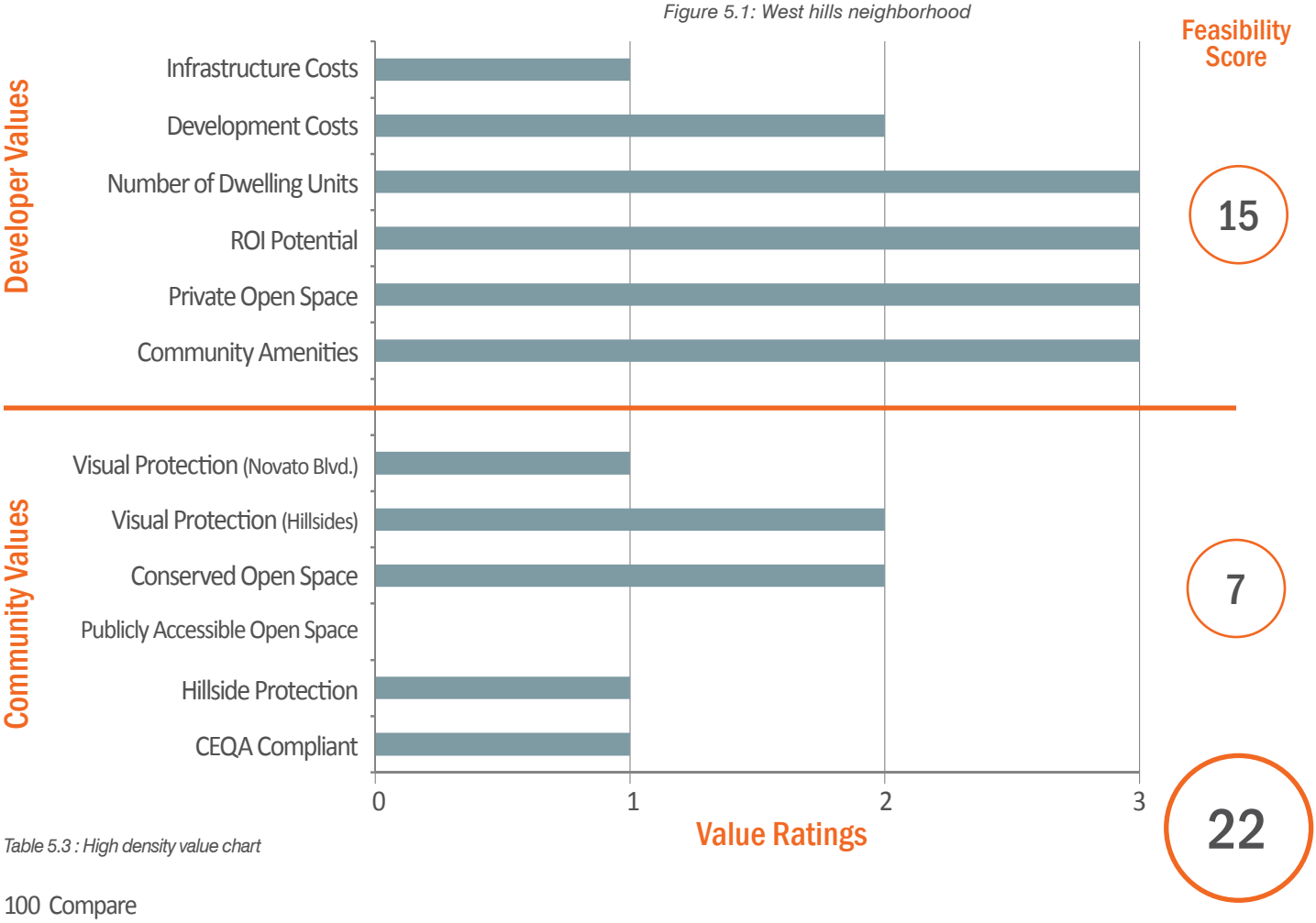


Table 5.3 : High density value chart

Development Metrics

Land Use Information

Site Area:	867 acres
Developed Area:	153 acres (18%)
Private Conserved Area:	714 acres (82%)
Public Conserved Area:	0 acres (0%)
Lot Size:	.25–1.5 acres
Lot Width:	Varies
Lot Depth:	Varies
Road Length:	8.5 miles
Trail Length:	3.0 miles

Dwelling Units

Large Single Family:	225 (40%)
Small Single Family:	129 (23%)
Multi Family:	212 (37%)
Total Units:	566
Density:	1du/1.53 ac

Community Amenities

2 Clubhouses:	Pools
	Movie Rooms
	Game Rooms
	Banquet Rooms

Development Costs

Home Development Costs

Home Construction:	$252.5 million
Home Impact Fees:	$6 million
Water Fees:	$13.1 million
Sewer Fees:	$4.1 million
Fire and School fees:	$3.5 million
Sub Total:	*$279.5 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$4.3 million
Environmental Fees:	$1 million
Roads:	$449,000
Water Pipe:	$1.8 million
Sewer Pipe:	$1.8 million
Sub Total :	*$9.4 million*
Total Costs:	**$289 million**

Figure 5.2: West hills neighborhood looking west

Figure 5.3: Central valley looking south to Novato Boulevard

Figure 5.4: Southwest aerial of the south and central valley

Medium Density Alternative Value Charts

For the developer values, the Medium Density Alternative received high ratings for private open space conservation, community amenities, and ROI potential. The other three values; infrastructure costs, development costs, and number of dwelling units, all received medium ratings. The developer feasibility score was 15.

For the community values, the medium density alternative received high ratings for the visual protection of Novato Boulevard as well as the amount of conserved open space. This alternative focused development in the north end of the property preserving the rural character along Novato Boulevard. It received medium ratings for hillside visual protection and CEQA compliance, and a low rating for hillside protection. Similar to the high density design, there is no publicly accessible open space in this alternative and, consequently, received no rating for that value. The community feasibility score was 10 and the overall feasibility score was 25, the second to lowest of the four options.

Figure 5.5: Aerial view of medium density alternative

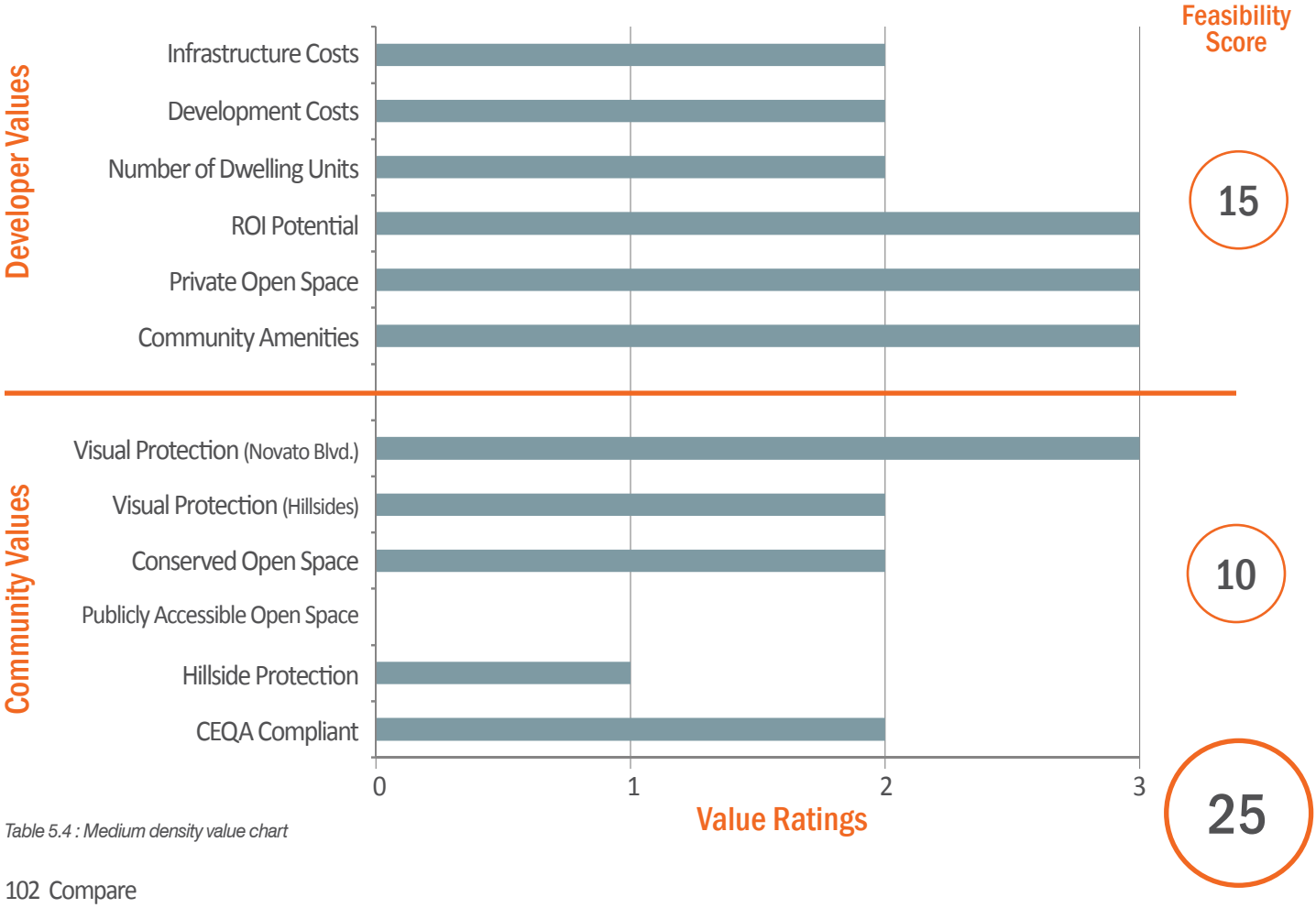


Table 5.4 : Medium density value chart

Development Metrics

Land Use Information

Site Area:	867 acres
Developed Area:	100 acres (12%)
Private Conserved Area:	767 acres (88%)
Public Conserved Area:	0 acres (0%)
Lot Size:	.25–.33 acres
Lot Width:	90 feet
Lot Depth:	150 feet
Road Length:	5.0 miles
Trail Length:	4.5 miles

Dwelling Units

Single Family:	176 (79%)
Multi Family:	48 (21%)
Total Units:	224
Density:	1 du/ 3.78 ac

Community Amenities

Conference Center:	27,500 sf
Retreat Plaza:	24,500 sf
Tree Cabins:	21
Cabin Size:	500 - 1,000 sf

Development Costs

Home Development Costs

Home Construction:	$236.5 million
Home Impact Fees:	$2.4 million
Water Fees:	$5.2 million
Sewer Fees:	$1.6 million
Fire and School fees:	$1.4 million
Sub Total:	*$247.1 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$1.7 million
Environmental Fees:	$1 million
Roads:	$264,000
Water Pipe:	$1 million
Sewer Pipe:	$1 million
Sub Total :	*$5.1 million*
Total Costs:	**$252.3 million**

Figure 5.6: West hills home layout

Figure 5.7: View from the retreat center into the plaza

Figure 5.8: View of the retreat center looking south

Low Density Alternative Value Charts

For the developer values, the Low Density Alternative received high ratings for development cost, private open space conservation and amount of community amenities. The number of dwelling units for this alternative was far lower than the previous two alternatives, and received a low rating. The ROI for this alternative was less than zero, and received no rating. In spite of only having a few units, the infrastructure costs of this project received a medium rating. The overall developer feasibility score was 12.

This alternative rated very high in four of the six community values. This alternative protects the visual character of both the hillsides and Novato Boulevard, conserves open space, limits development on hillsides greater than 10 % and was compliant with nearly all of the CEQA environmental factors. This plan, similar to the other alternatives, does not provide any publicly accessible open space and therefore received no rating for this category. The feasibility score for this alternative was 26, the second highest of the four options.

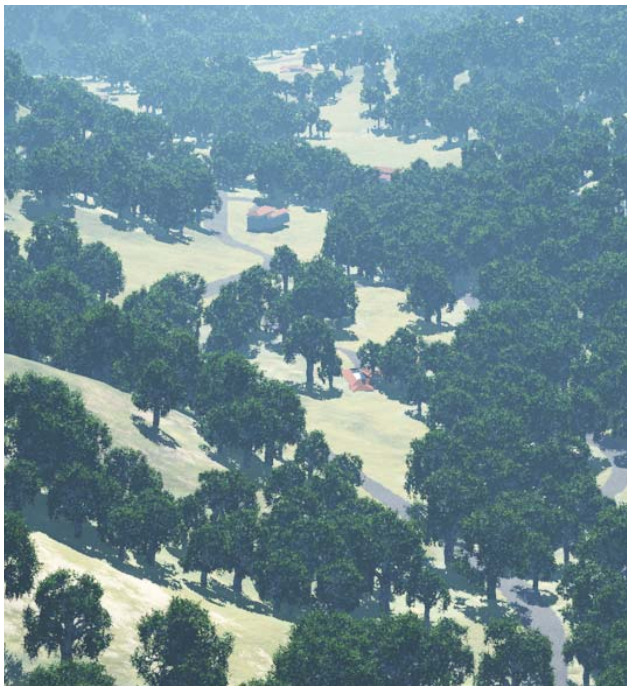


Figure 5.9: Low density rendering 1

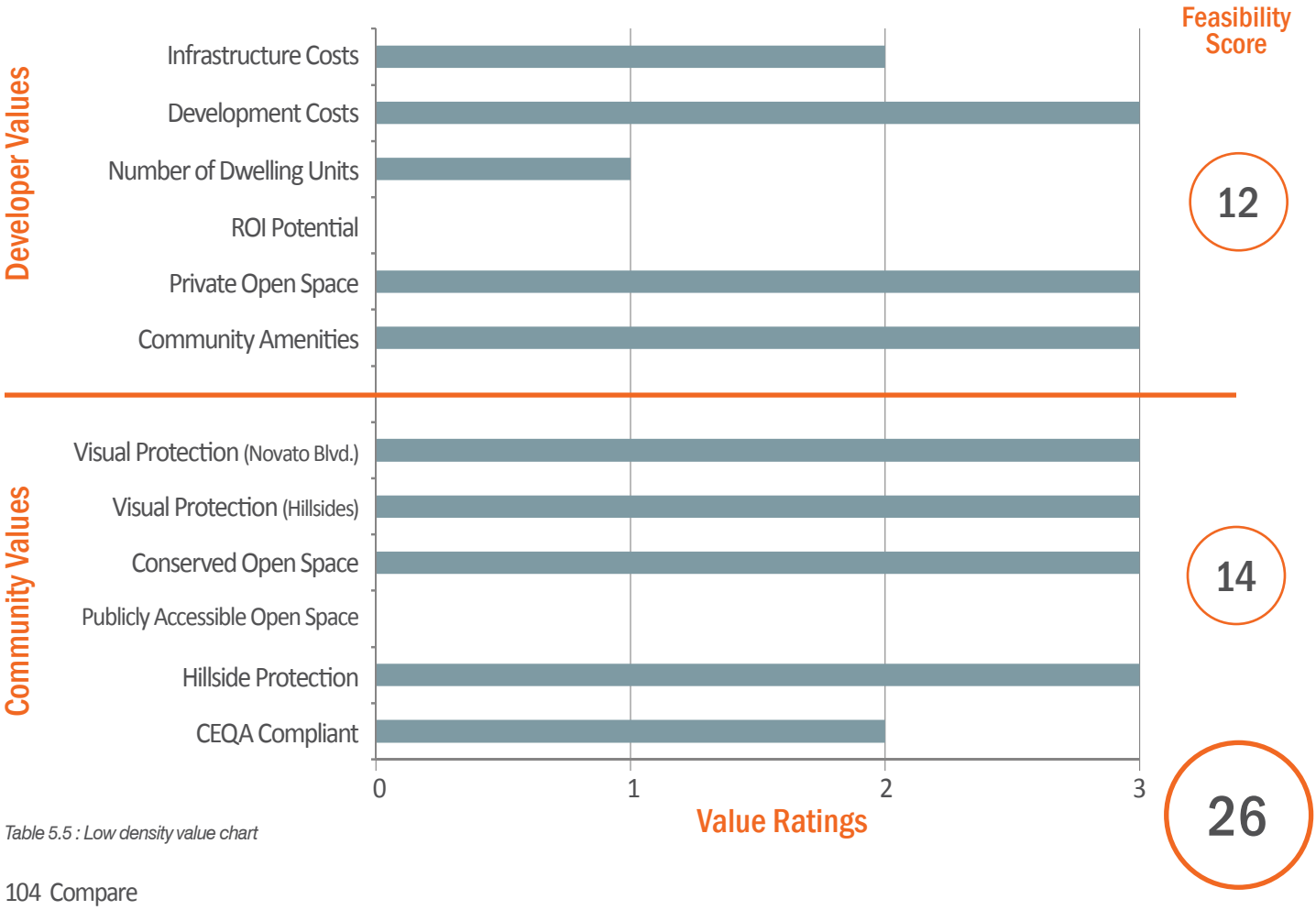


Table 5.5 : Low density value chart

Development Metrics

Site Area:	867 acres
Homeland Area:	20 acres (2%)
Openland Area:	172 acres (18%)
Private Conserved Area:	675 acres (80%)
Public Conserved Area:	0 acres (0%)
Road Length:	2.8 miles
Trail Length:	7.0 miles
Single Family Detached:	14 (100%)
Density:	1du/60 ac

Development Costs

Home Development Costs

Home Construction:	$42 million
Home Impact Fees:	$150,000
Water Fees:	$326,000
Sewer Fees:	$103,000
Fire and School fees:	$87,000
Sub Total:	

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$108,000
Environmental Fees:	$500,000
Roads:	$211,000
Water Pipe:	$845,000
Sewer Pipe:	$845,000
Sub Total :	*$2.5 million*
Total Costs:	**$45.2 million**

Figure 5.10: Valley aerial view of the property

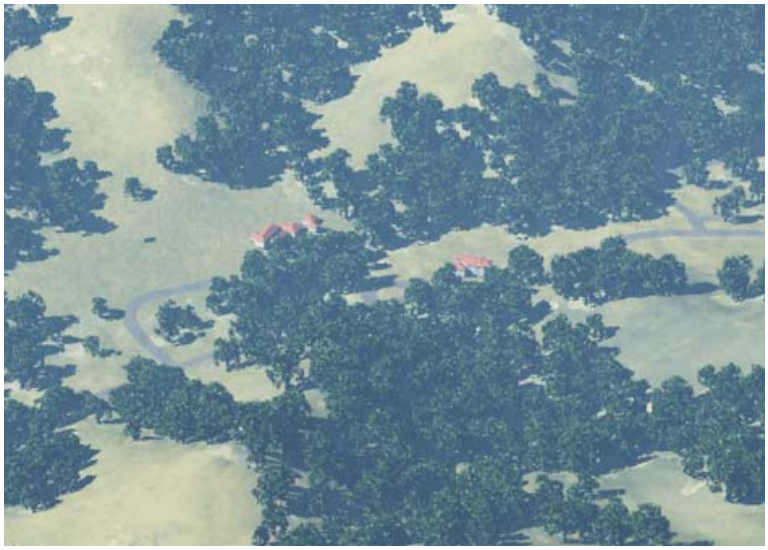


Figure 5.11: Central valley homes

Figure 5.12: Low density western view of Novato Boulevard

Low Density + Land Swap Alternative Value Charts

For the developer values, the Low Density and Land Swap Alternative received high ratings for the amount of open space conserved and the community amenities. The potential of building units on the land swap parcels gave the dwelling unit value a medium rather than a low rating. Due to the development potential of the land swap parcels, the ROI potential received a medium rating.

All of the community values for this alternative received the highest rating. It was the only alternative of the four that included publicly accessible open space. This area is designated as part of the land swap and connects with the trail system of Mount Burdell Preserve providing stunning views of Novato and Stafford. The land swap parcel at the south end of the property protects that visual character of Novato Boulevard and placing homes in the flat valley protects the visual character of the hillsides. The feasibility score for this alternative was 31, the highest of the four design alternatives.

Figure 5.13: Low density + land swap plan

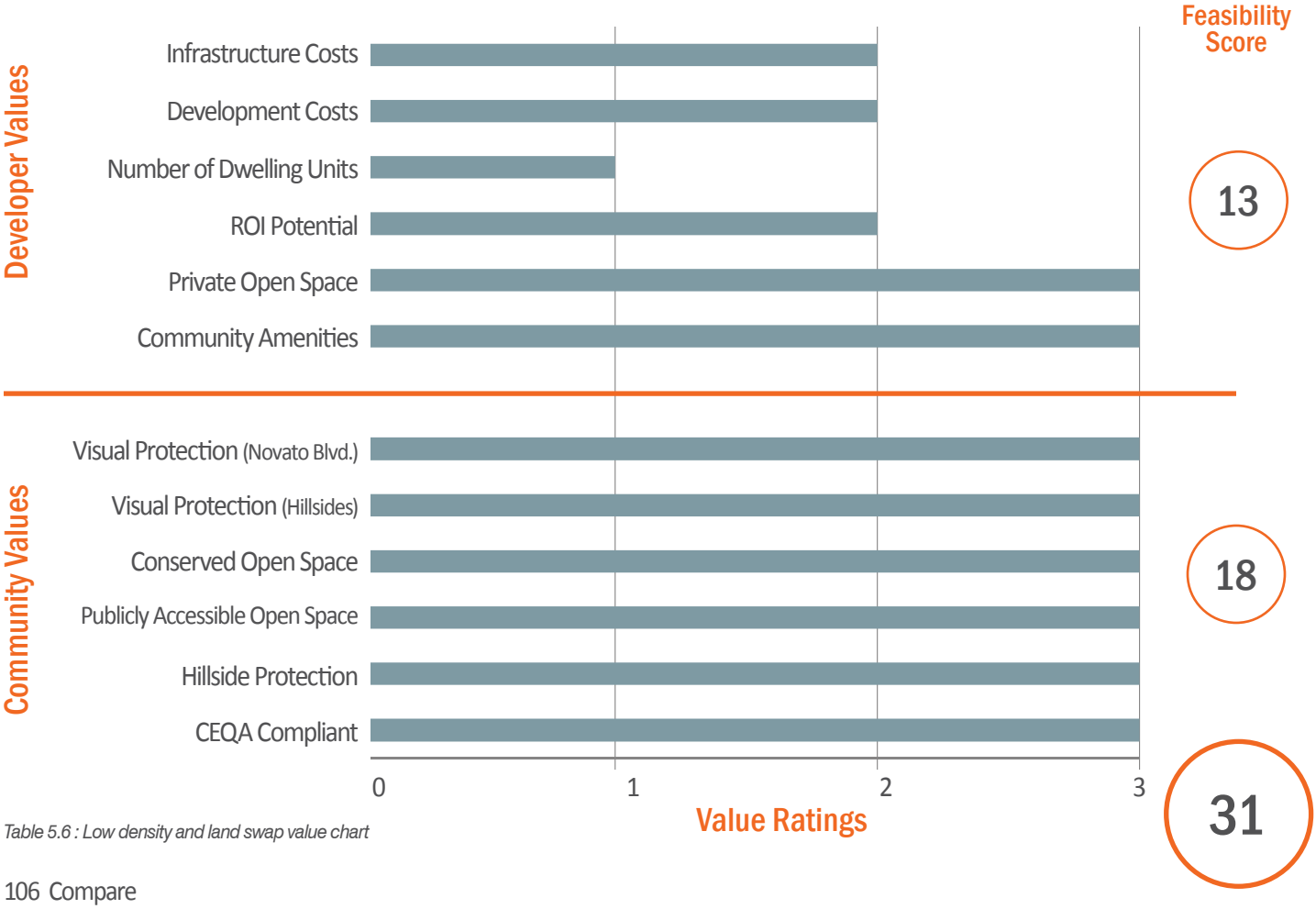


Table 5.6 : Low density and land swap value chart

Development Metrics

Land Use Information

Site Area:	867 acres
Homeland Area:	16 acres (2%)
Openland Area:	89 acres (10%)
Private Conserved Area:	354 acres (40%)
Public Conserved Area:	238 acres (28%)
Land Swap Area:	172 acres (20%)
Road Length:	2.8 miles
Trail Length:	7.0 miles

Dwelling Units

Site-Large Family:	14 (19%)
Land Swap:	58 (81%)
Site Density:	1 du/60 ac
Land Swap Density:	1 du/.17 ac

Development Costs

Home Development Costs

Home Construction:	$81.1 million
Home Impact Fees:	$770,000
Water Fees:	$1.6 million
Sewer Fees:	$532,000
Fire and School fees:	$446,000
Sub Total:	*$84.6 million*

Land Development Costs

Development Fees:	$33,300
Impact Fees:	$555,000
Environmental Fees:	$500,000
Roads:	$211,000
Water Pipe:	$845,000
Sewer Pipe:	$845,000
Sub Total :	*$3 million*
Total Costs:	**$87.5 million**

Figure 5.14: Central valley view of the property

Figure 5.15: Central valley home cluster

Figure 5.16: Land swap western view of Novato Boulevard

Value Chart Summary

High Density Alternative

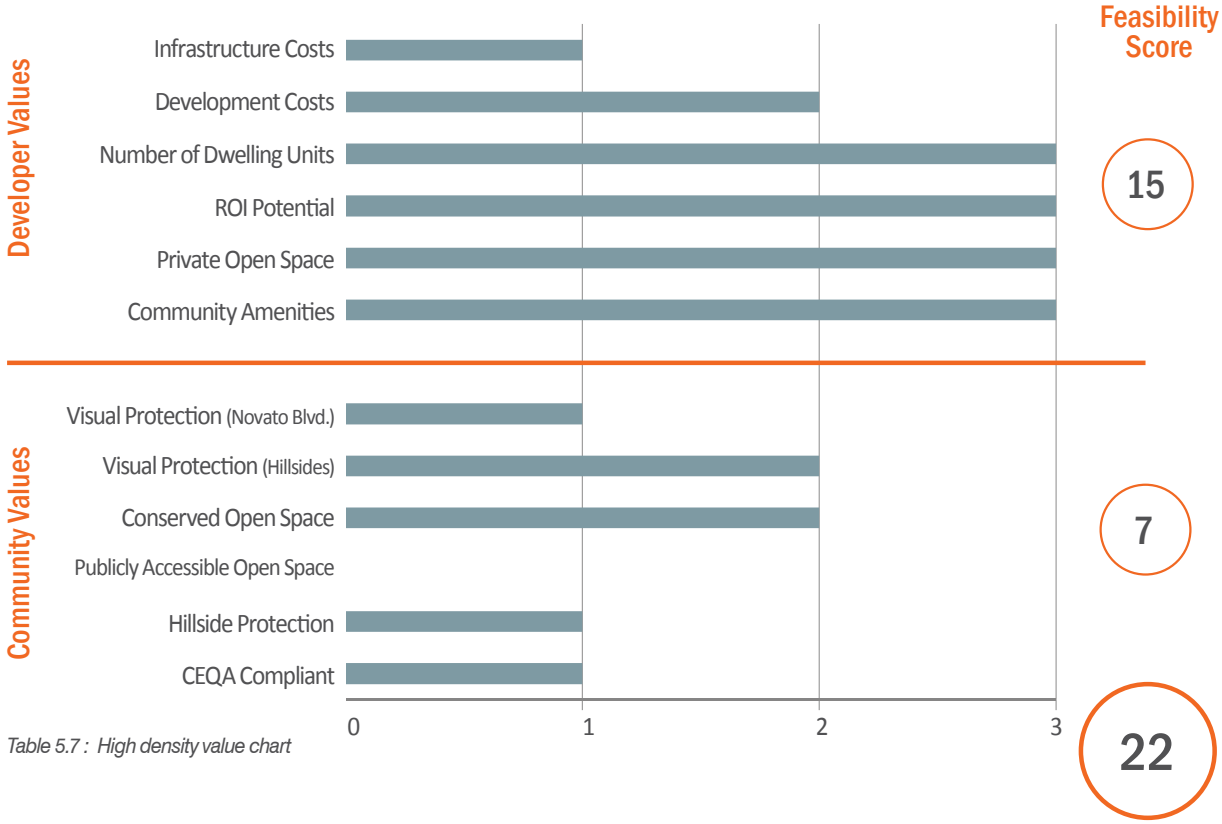


Table 5.7 : High density value chart

Low Density Alternative

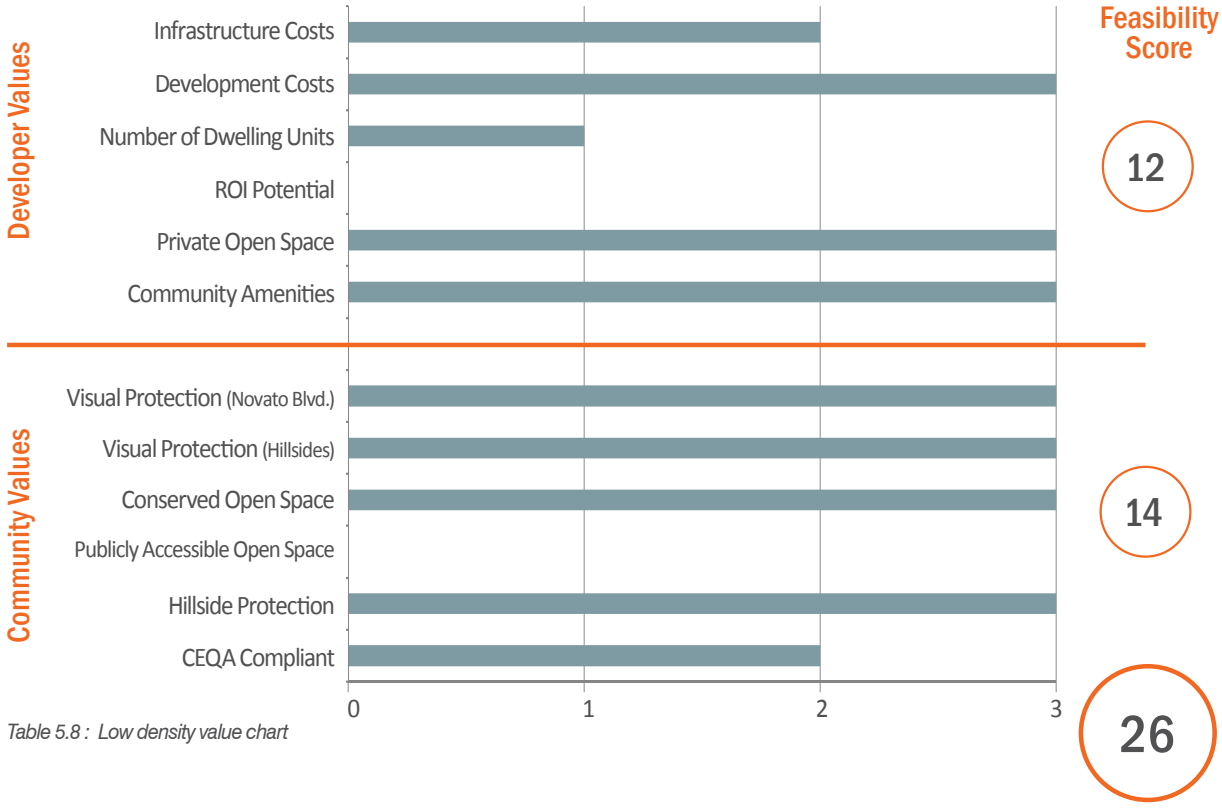


Table 5.8 : Low density value chart

Medium Density Alternative

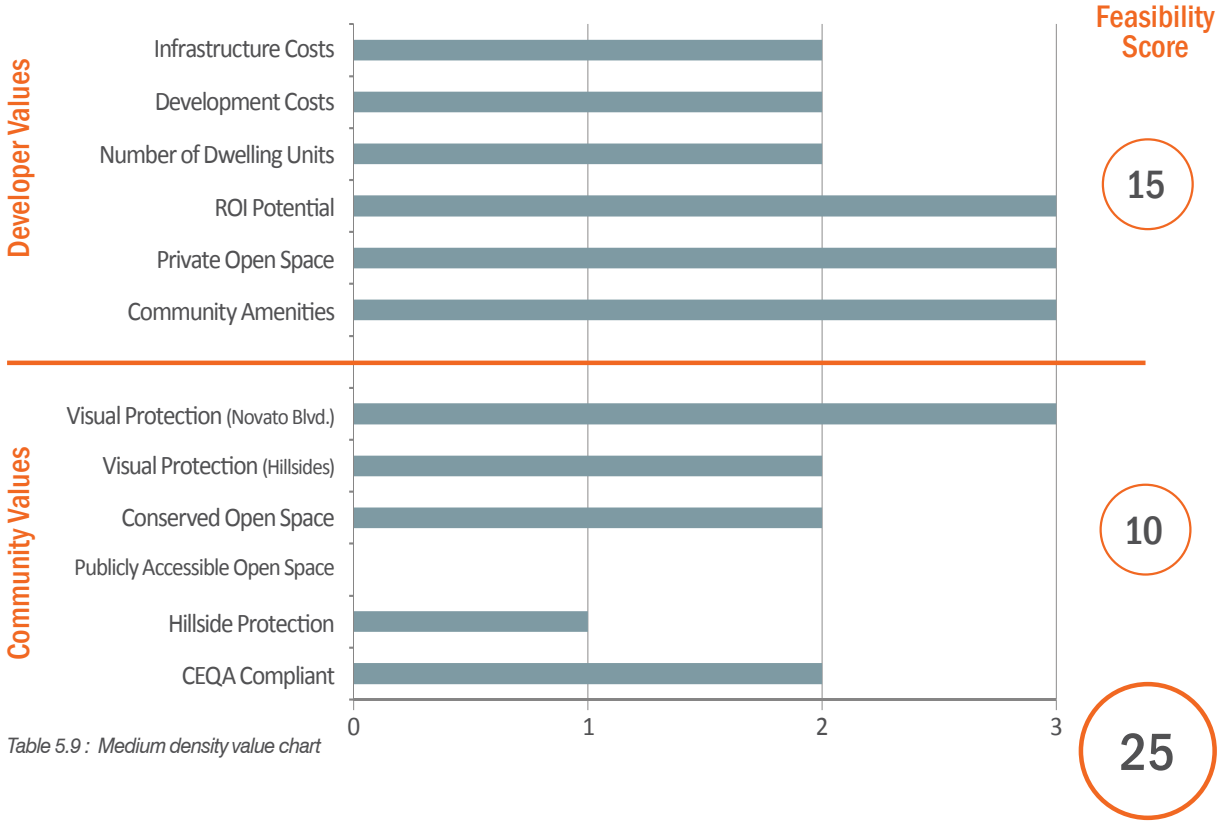


Table 5.9 : Medium density value chart

Low Density + Land Swap Alternative

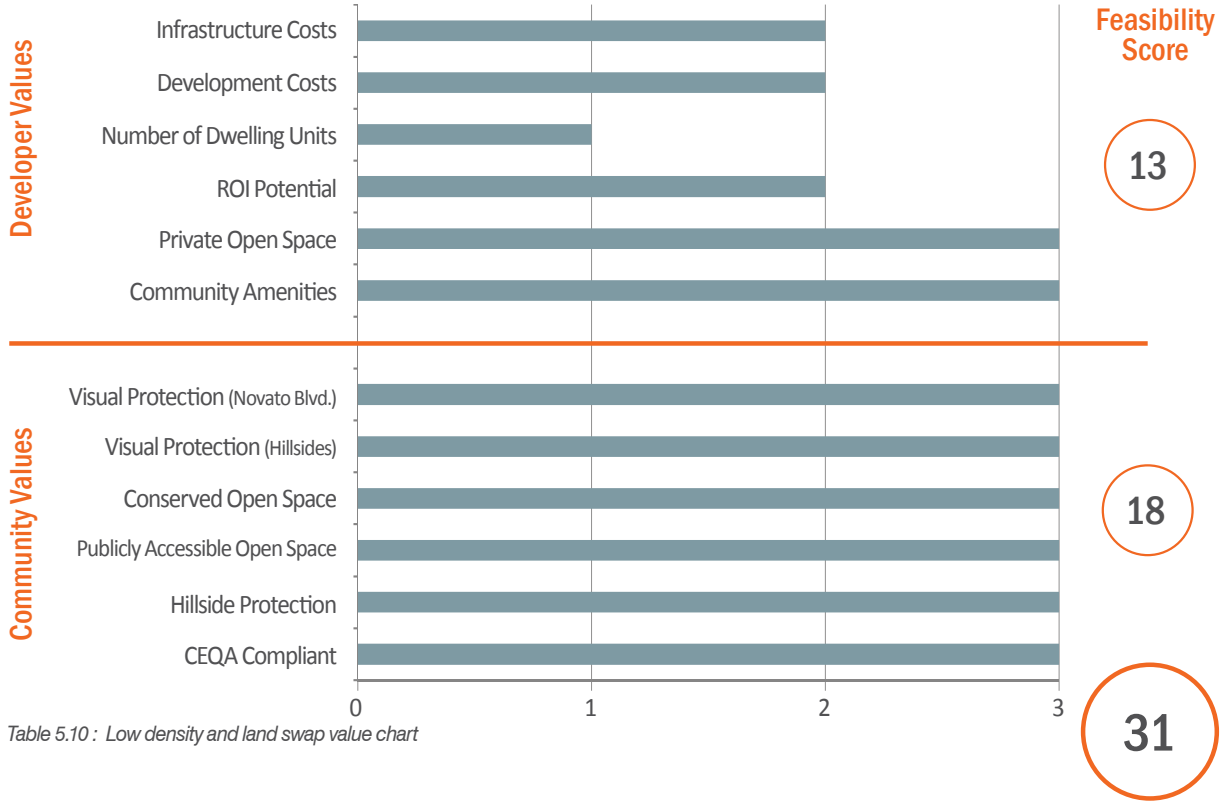


Table 5.10 : Low density and land swap value chart

VI CONCLUDE

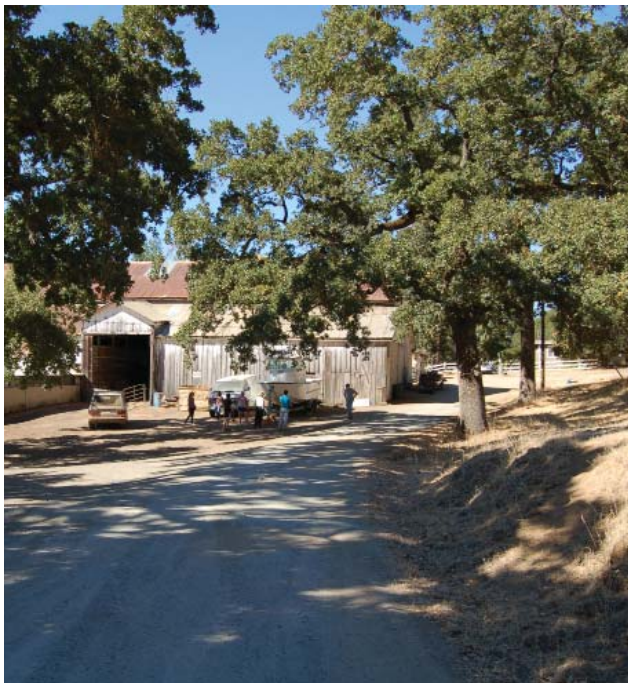


Figure 6.1: Entrance to the old dairy barn (Hahn, 2013)

Project Summary

Using the structured design decision making process, research into the community of Novato, and four design alternatives for the project site, I was able to collect data and metrics for each design that addressed the values of the stakeholders. With value charts and feasibility scores, I compared the design alternatives to one another. Analyzing the charts, it is clear that each design proposal has unique consequences and challenges. The feasibility scores show the range of options, from the high density alternative favoring the owner and developer to the low density alternative favoring the community.

The conclusions of this project focus first on my final design recommendation for implementation. They touch on the lessons I gained over the process of my project and areas of opportunity for future design and research. Finally, the chapter concludes with my final thoughts of the project and the process.

Final Design Recommendation

Of the four alternatives, the Low Density and Land Swap Alternative had the highest feasibility score and is the alternative I would recommend for implementation. As shown in the value charts, this alternative best addresses the development values of the community and the owner. The value of this alternative is the land swap for vacant land within Novato's UGB.

By swapping land, Novato is able to protect and maintain the visual quality currently existing along Novato Boulevard. The alternative likewise preserves the hillsides and ridgelines along the front of the property that are critical to the skyline and visual backdrop for the western portion of the city. The owner is able to exchange the value of the site property for valuable land within Novato's UGB that will be developed in the future. The development of this land would be less expensive because of its location within the city. The cost of the homes could therefore be within the affordable range. The swap gives the owner a greater possible return on his investment while providing Novato with needed market rate housing.

Figure 6.2: Low density + land swap plan

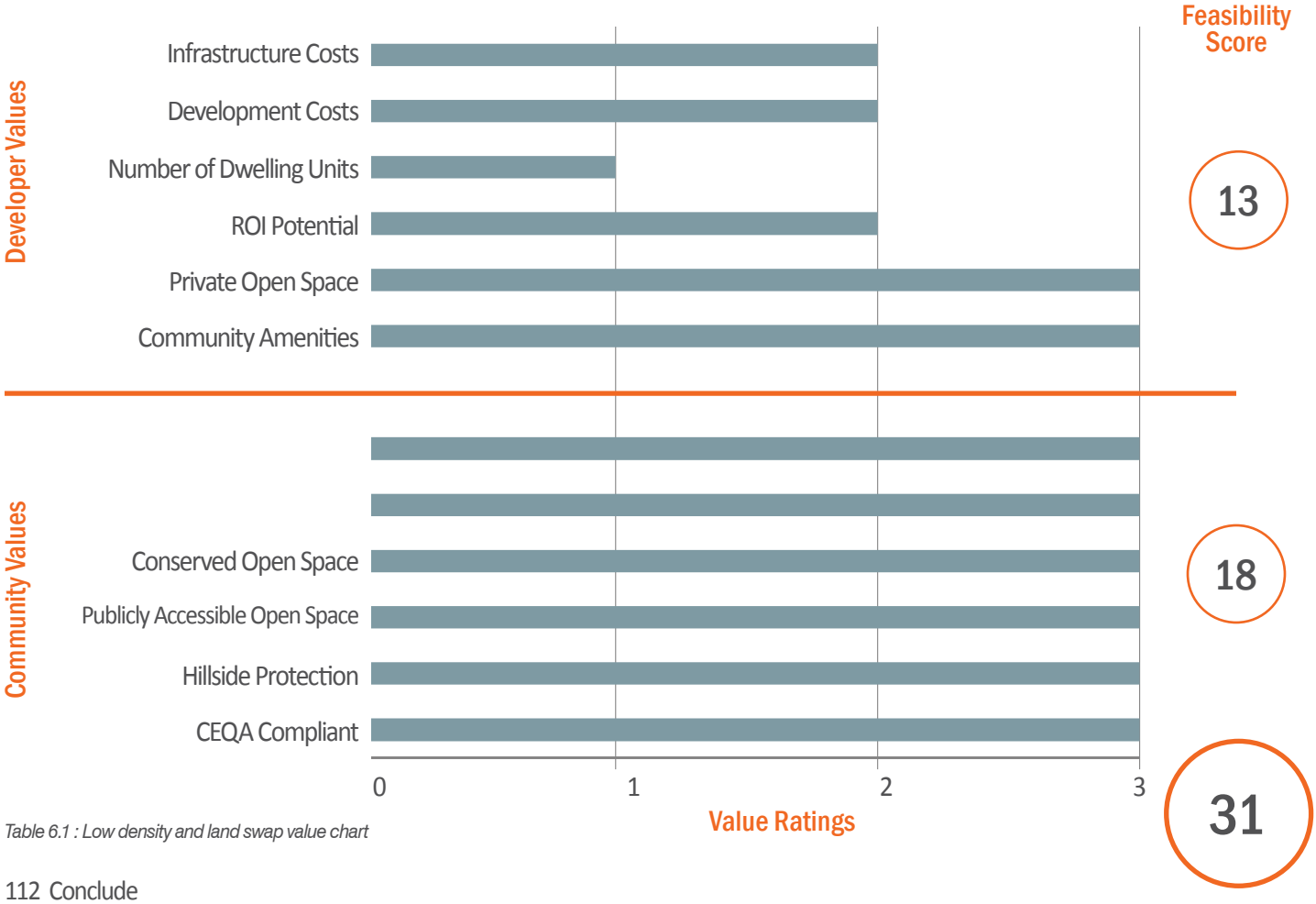


Table 6.1 : Low density and land swap value chart

Lessons Learned

Embarking on this project, I knew very little about land development. I felt that the design would be a critical factor in development, but recognized that the project involved much more than designing a perfect street system and housing grid. Reflecting back, I certainly did not understand the complex layers of zoning, permitting, land use, politics, finance, and law that contribute to development projects. On top of those factors, with the site in California I was subjected to possibly the strictest development requirements and standards in the country.

I did realize that a landscape architect is an important member of any development team. This is due to their training in the process of design, design representation, and environmental science. A landscape architect has the ability to organize and lead a development team because of their diverse education and ability to think at a wide range of scales. They can act as a mediator between the parties of development.

Design Process

Somewhere in the middle of the project, after I had started the designs and before I had thoroughly researched the other components of a development project, I realized that a physical design would not be the final product. Instead it became a tool for exploring and quantifying the development potential of the property. The design alternatives were each ideas that had very different consequences. To quantify these consequences, I collected important metrics that scored the performance of each design. By scoring the designs with common, although subjective, standards I could compare how they related to one another.

Design Renderings

The design alternatives also graphically illustrate some of the results and consequences of each alternative. The high density master plan and renderings shows that the homes would be compact on small lots resulting in a sense of suburbia. The low density master plan and renderings demonstrate the rural virtues and scenic beauty the site inherently possesses. Preliminary construction documents for the high and medium design alternatives further illustrate the complexities and consequences of the design alternatives. The construction documents resolve the technical issues of design implementation including site grading, proper road alignment, and placement of homes in suitable areas. The documents quantify the amount of materials needed to build the necessary infrastructure which can be used to calculate the cost.

Figure 6.3: Rendering of the project site

Future Opportunities

The next project phase after completion of this report will include the design of a residential community for the land swap parcel within the city boundaries. The parcels are adjacent to the Morning Star Farm, an equestrian riding and boarding center. The new community could include the program elements of the riding center to improve the marketability of the development.

Areas of future study and research identified from this project include the impact of the RHNA program and how it has affected California communities. Specifically, how the RHNA program has influenced how cities grow either positively or negatively.

Conclusion

The results of this report were more than four individual design proposals, but rather an exploration of the process to successfully develop in Novato. However, the designs and renderings were an important outcome. Design renderings show what is possible through illustrative plans, 3D models, and renderings. The 3D models and renderings show how the alternatives would realistically look after construction, vital for both the owner as well as the community. I anticipate that the renderings and plans will demonstrate to the owner the visual impact of high density development. Likewise, the low density renderings will demonstrate its low visual impact.

One solution is not going to resolve all of the community's development concerns while satisfying the owner's goals and objectives. There needs to be a blending of ideas agreeable to both the city and the owner. The structured design decision making was the systematic framework I used to identify important development values, define design alternatives addressing these values, create the designs, and evaluate their outcomes with the use of value charts and feasibility scores. According to the feasibility scores, the low density and land swap alternative best represents the compromise for a successful design.

I am grateful to my committee, especially my major professor Howard Hahn, for helping me explore these issues of land development. I have gained valuable insight from their direction on how broad this process is. Through this process Professor Hahn has helped me understand the role landscape architects play in designing exceptional places for people to live. His attention to detail in every aspect of my project has demonstrated to me how to work as a professional. I plan to take these lessons and apply them to not only the completion of this specific project, but to my career as a landscape architect and community designer.

Figure 6.4: Stafford Lake from the hillsides of the property (Hahn, 2013).

VII APPENDICES

GLOSSARY

Project Glossary

Bay Area: Same as San Francisco Bay Area.

California Environmental Quality Act (CEQA): A statute, passed in 1969, requiring state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts.

Conservation communities: housing developments that use the principles of conservation community design.

Conservation community design: Process of planning, designing, building, and managing communities that preserve landscapes or other community resources that are considered valuable for their aesthetic, environmental, cultural, agricultural, and/or historic values (McMahon 2010).

Development values: Important considerations when considering development in a given area. Development values may include: economic growth, return on investment, open space conservation, slope protection, and ridgeline protection.

Environmental corridors: Areas of land with similar natural characteristics.

Environmental Impact Review (EIR): Review, required by CEQA on development and construction projects , which analyzes environmental impacts as a result of the development.

Exurban development: Development outside the suburban boundary, between the suburban and rural zones. This area of development can be referred to as exurbia. Also referred to as greenfield development.

Exurban region: The area between the suburban and rural development zones. Area to describe the land suited for exurban or greenfield development.

Geographical Information Systems (GIS): A collection of hardware, software and data capturing systems used to capture, store, manipulate, and represent many types of data.

GIS environmental analysis: Using the programs of GIS to analyze and evaluate environmental characteristics of an area.

GIS mapping: Using the programs of GIS to map and document the characteristics of an area.

Greenfield development: Development on any undeveloped parcel of land that: is in a rural or low density area; contains significant natural or agricultural resources; and is located outside of the suburban boundary. Also called exurban development.

Housing development: A residential area where the homes, utility pipes, and roads have been planned and built during the same time period.

Housing Element: Portion of a city or county plan that addresses housing demands of the given area. It may include: population growth and history, population projections, land use plans, zoning requirement and restrictions, and development codes and guidelines.

Infill development: New construction or building on vacant or underutilized lots within previously developed areas. Infill is done within UGB and is an alternative to sprawling development. It is also one of the principles of smart growth.

Land conservation: Placing development restrictions on parcels of land with the purpose of conserving it natural state.

Land swap: Trading parcels of land at a predetermined ratio depending on land value.

Land use plan: Plan used by counties and cities to guide how land is used and developed within their jurisdiction. Includes areas for residential, commercial, industrial, professional, open space, and parkland uses.

Master planned communities: Large residential and mixed use communities that can include diverse elements including parks, recreation facilities, preserved recreation land, schools, commercial centers and golf courses. Planned communities can be located in both urban, exurban, and rural locations. Components of conservation communities are often incorporated into master planned communities but are not always the focus of the community.

National Environmental Protection Act (NEPA): Act passed in 1970 that established policy and goals for protecting, enhancing, and maintaining the quality of natural environments in the United States. Precursor to CEQA.

Open space: Open parcels of land that are undeveloped (no buildings and/or structures) that is accessible to the public.

Regional Housing Need Allocation (RHNA): Program for allocating housing needs in California. It identifies each jurisdiction's responsibilities for housing for an eight year period. Allocations are made for the Bay Area by the California Department of Housing and Community Development and the Association of Bay Area Governments.

Rural: Geographic area located outside the boundaries of cities and towns that are undeveloped

Residential development: Building of homes, roads, and the necessary infrastructure. Highly regulated by the jurisdiction (city or county) of the development.

Suburb or Suburban: Residential or mixed use area that is part the city area and typically within the city's growth boundaries.

Suburban sprawl: Expansion of suburban growth that is often characterized by homes of similar size and style, a separation of land uses, dependent on cars for transportation.

Slope map: Map identifying slope percentages of a given area.

San Francisco Bay Area: The area comprising nine counties surrounding the San Francisco and San Pablo Bays in northern California. Counties included in the San Francisco Bay Area are: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

Smart growth: Limiting the outward expansion of new development in an effort to make human settlements more compact, more livable with more transportation options, and to preserve open space. Smart growth is the opposite of sprawl.

Structured decision making: Iterative and structured process of identifying problems and then implementing and analyzing solutions.

Sudden Oak Death: Disease common to northern California that affects various types of oaks often resulting in sudden death. The disease is caused by the Phytopthora ramorum pathogen.

Suitability map: Identifies suitable areas for development through a process of overlaying maps of significant features.
Traditional neighborhood development: neighborhood design principles that places shops, business and various housing types in an urban core with concentrated densities. An emphasis is made on making the streets pedestrian friendly making them an integral part of the public realm. Pedestrians and walkability take precedence over vehicles and drivability.

Urban: Cities, areas of development characterized by higher population and building densities.

Urban Growth Boundary (UGB): Boundary of development that limits growth and expansion. Used to control how a city grows and to preserve natural areas.

Urban infill: Development of vacant, undeveloped, or underdeveloped land within the suburban zone.
Visibility map: GIS map identifying land areas that are visible form selected view points using elevation data.

Value Chart: A chart which organizes all of development values for a project and gives each one a score based on their value ratings. Value charts are used to calculate feasibility scores of the design alternatives.

Value Rating: A numerical score between zero and three given to each of the values to be used in the value charts.

Watershed: An area of land where all water drains to a common stream, river, pond, lake, or other body of water. They are nested with many smaller watersheds within larger watersheds and are defined by ridgelines.

APPENDIX A

Appendix A includes all metrics associated with the four development alternatives. Also included is the preliminary CEQA analysis for each alternative. These analyses are not comprehensive. They are estimates of potential CEQA compliance based on the CEQA checklist.

Development Metrics

High Density Alternative

Property Layout				
	Total Acerage (ac)		867	
	Developed Land (ac)		153	18%
	Privately Conserved Land (ac)		714	82%
	Publicly Conserved Land (ac)		0	0%
	Roads (miles)		8.5	44880 (lf)
	Trails (miles)		3	15840 (lf)
	Lot size	.25-1.5 ac		
	Lot Width	varies		
	Lot Depth	varies		

Dwelling Units			
	Medium Single Family	225	40%
	Small Single Family	129	23%
	Multi Family	212	37%
	Total	566	
	Density (1du / ac)	1.53	

Costs		
Home Development Costs		
(per unit)	Medium Home Construction	$151,875,000
(per unit)	Small Home Construction	$43,537,500
(per unit)	Multi Family Contruction	$57,240,000
(per unit)	Home Impact Fees	$6,054,502
(per unit)	Water Connection	$13,173,650
(per unit)	Sewer Connection	$4,182,740
(per unit)	Fire and School	$3,506,370
	Sub Total	$279,569,762
Land Development Costs		
(one time)	CEQA Anaysis	$1,000,000
(one time)	Development Fees	$33,377
(per unit)	Development Impact Fees	$4,363,294
(linear ft)	Roads	$448,800
(linear ft)	Water Pipe	$1,795,200
(linear ft)	Sewer Pipe	$1,795,200
	Sub Total	$9,435,871
	Total Costs	**$289,005,633**

Home Size	sf	Average	High End	Multi Family
Large	6000	$1,350,000	$3,000,000	
Medium	3000	$675,000	$1,500,000	$540,000
Small	1500	$337,500	$750,000	$270,000

Construction Costs (square foot)	*per Novato City Housing Element
Average Construction	$225
Highend Construction	$500
Multi Family Construction	$180

Fees (per home)	*per Novato City Housing Element
Development Fees	$33,377
Development Impact Fees	$7,709
Home Impct Fees	$10,697
Water Connection	$23,275
Sewer Connection	$7,390
Fire and School	$6,195

Infrasturcutre (per linear foot)	*per development consultant Marin County, CA
Roads	$10
Water pipes	$40
Sewer pipes	$40

ROI (per developed acre)		
Land Market Value/ac	$141,000	*per Denise Athas, March 2014
Development cost/ac	$61,672	
Total Land Development Costs	$9,435,871	
Developed Land (ac)	153	
Difference	$79,328	
ROI	1.3	

* ROI was calculated by dividing the difference between the two costs (land market value and development) by the development cost /ac

Medium Density Alternative

Property Layout			
	Total Acerage (ac)	867	
	Developed Land (ac)	100	12%
	Privately Conserved Land (ac)	767	88%
	Publicly Conserved Land (ac)	0	0%
	Roads (miles)	5	26400 (lf)
	Trails (miles)	4.5	23760 (lf)
	Lot size	.25-.33	
	Lot Width	90 ft	
	Lot Depth	150 ft	

Dwelling Units			
	Single Family	176	79%
	Multi Family	48	21%
	Total	224	
	Density (1du / ac)	3.87	

Costs		
Home Development Costs		
(per unit)	Medium Home Construction	$151,200,000
(per unit)	Small Home Construction	$59,400,000
(per unit)	Multi Family Contruction	$25,920,000
(per unit)	Home Impact Fees	$2,396,128
(per unit)	Water Connection	$5,213,600
(per unit)	Sewer Connection	$1,655,360
(per unit)	Fire and School	$1,387,680
	Sub Total	$247,172,768
Land Development Costs		
(one time)	CEQA Anaysis	$1,000,000
(one time)	Development Fees	$33,377
(per unit)	Development Impact Fees	$1,726,816
(linear ft)	Roads	$264,000
(linear ft)	Water Pipe	$1,056,000
(linear ft)	Sewer Pipe	$1,056,000
	Sub Total	$5,136,193
	Total Costs	**$252,308,961**

Home Size	sf	Average	High End	Multi Family
Large	6000	$1,350,000	$3,000,000	
Medium	3000	$675,000	$1,500,000	$540,000
Small	1500	$337,500	$750,000	$270,000

Construction Costs (square foot)		*per Novato City Housing Element
Average Construction	$225	
Highend Construction	$500	
Multi Family Construction	$180	

Fees (per home)		*per Novato City Housing Element
Development Fees	$33,377	
Development Impact Fees	$7,709	
Home Impct Fees	$10,697	
Water Connection	$23,275	
Sewer Connection	$7,390	
Fire and School	$6,195	

Infrasturcutre (per linear foot)		*per development consultant Marin County, CA
Roads	$10	
Water pipes	$40	
Sewer pipes	$40	

ROI (per developed acre)		
Land Market Value/ac	$141,000	*per Denise Athas, March 2014
Development cost/ac	$51,362	
Total Land Development Costs	$5,136,193	
Developed Land (ac)	100	
Difference	$89,638	
ROI	1.7	

* ROI was calculated by dividing the difference between the two costs (land market value and development) by the development cost /ac

Low Density Alternative

Property Layout			
	Total Acerage (ac)	867	
	Homeland	18	2%
	Openland	89	10%
	Privately Conserved	849	98%
	Publicly Conserved	0	0%
	Roads (miles)	4	21120 (lf)
	Trails (miles)	7	36960 (lf)
	Lot size	.25-.33	
	Lot Width	90 ft	
	Lot Depth	150 ft	

Dwelling Units			
	Large Single Family	14	100%
	Total	14	
	Density (1du / ac)	61.93	

Costs		
Home Development Costs		
(per unit)	Large Home Construction	$42,000,000
(per unit)	Home Impact Fees	$149,758
(per unit)	Water Connection	$325,850
(per unit)	Sewer Connection	$103,460
(per unit)	Fire and School	$86,730
	Sub Total	$42,665,798
Land Development Costs		
(one time)	CEQA Anaysis	$500,000
(one time)	Development Fees	$33,377
(per unit)	Development Impact Fees	$107,926
(linear ft)	Roads	$211,200
(linear ft)	Water Pipe	$844,800
(linear ft)	Sewer Pipe	$844,800
	Sub Total	$2,542,103
	Total Costs	**$45,207,901**

Home Size	sf	Average	High End
Large	6000	$1,350,000	$3,000,000
Medium	3000	$675,000	$1,500,000
Small	1500	$337,500	$750,000

Construction Costs (square foot)	*per Novato City Housing Element
Average Construction	$225
Highend Construction	$500
Multi Family Construction	$180

Fees (per home)	*per Novato City Housing Element
Development Fees	$33,377
Development Impact Fees	$7,709
Home Impct Fees	$10,697
Water Connection	$23,275
Sewer Connection	$7,390
Fire and School	$6,195

Infrasturcutre (per linear foot)	*per development consultant Marin County, C
Roads	$10
Water pipes	$40
Sewer pipes	$40

ROI (per developed acre)		
Land Market Value/ac	$73,810	*per Denise Athas, March 2014
Development cost/ac	$141,228	
Total Land Development Costs	$2,542,103	
Developed Land (ac)	18	
Difference	($67,418)	
ROI	-0.5	

* ROI was calculated by dividing the difference between the two costs (land market value and development) by the development cost /ac

Low Density + Land Swap Alternative

Property Layout				
	Total Acerage (ac)		867	
	Homeland		16	2%
	Openland		89	10%
	Privately Conserved		354	41%
	Publicly Conserved		238	27%
	Site Land Swap area		172	20%
	City Land Swap area		10	
	Roads (miles)		4	21120 (lf)
	Trails (miles)		7	36960 (lf)
	Lot size	.25-.33		
	Lot Width	90 ft		
	Lot Depth	150 ft		

Dwelling Units			
Site	Large Single Family	14	19%
Land Swap	Medium Single Family	58	81%
	Total	72	
	Site Density (ac/1 du)	61.9	
	Land Swap Density (ac/1du)	0.17	

* The density of .17 ac/du is based on surrounding residential densities, zoned R1-7.5 by the city of Novato

Costs		
Home Development Costs		
(per unit)	Large Home Construction	$42,000,000
(per unit)	Medium Home Construction	$39,150,000
(per unit)	Home Impact Fees	$770,184
(per unit)	Water Connection	$1,675,800
(per unit)	Sewer Connection	$532,080
(per unit)	Fire and School	$446,040
	Sub Total	$84,574,104
Land Development Costs		
(one time)	CEQA Anaysis	$500,000
(one time)	Development Fees	$33,377
(per unit)	Development Impact Fees	$555,048
(linear ft)	Roads	$211,200
(linear ft)	Water Pipe	$844,800
(linear ft)	Sewer Pipe	$844,800
	Sub Total	$2,989,225
	Total Costs	**$87,563,329**

Home Size	sf	Average	High End	Multi Family
Large	6000	$1,350,000	$3,000,000	
Medium	3000	$675,000	$1,500,000	$540,000
Small	1500	$337,500	$750,000	$270,000

Construction Costs (square foot)	*per Novato City Housing Element
Average Construction	$225
Highend Construction	$500
Multi Family Construction	$180

Fees (per home)	*per Novato City Housing Element
Development Fees	$33,377
Development Impact Fees	$7,709
Home Impct Fees	$10,697
Water Connection	$23,275
Sewer Connection	$7,390
Fire and School	$6,195

Infrasturcutre (per linear foot)	*per development consultant Marin County, CA
Roads	$10
Water pipes	$40
Sewer pipes	$40

ROI (per developed acre)		
Land Market Value/ac	$141,000	*per Denise Athas, March 2014
Development cost/ac	$114,970	
Total Land Development Costs	$2,989,225	
Developed Land (ac)	26	
Difference	$26,030	
ROI	0.2	

* ROI was calculated by dividing the difference between the two costs (land market value and development) by the development cost /ac

CEQA Compliance

High Density Alternative

		Significant Impact	Less than Significatn Impact	No Impact
1	**Aesthetics**	**1**		
	Substantial effect on a scenic vista	x		
	Damage scenic resources			x
	Degrade existing visual character	x		
2	**Agriculture and Forestry Resources**	**1**		
	Convert prime farmland to non-ag use	x		
	Conflict with existing zoning	x		
3	**Geology and Soils**		**1**	
	Expose people to risk involving landslides			x
	Result in soil erosion of the loss of topsoil		x	
4	**Greenhouse Gas Emissions**	**1**		
	Generate greenhouse gass emissons	x		
5	**Hydrology and Water Quality**	**1**		
	Place housing within the 100 ytear flood plane	x		
6	**Population and Housing**	**1**		
	Induce substantial population growth	x		
7	**Recreation**	**1**		
	Increase the use of existing neighborhood and regional parks or recreational facilities	x		
8	**Utilities and Service Systems**	**1**		
	Require or result in the construction of new storm water drainage facilities	x		
		7	1	0

Medium Density Alternative

	Significant Impact	Less than Significatn Impact	No Impact
1 Aesthetics		**1**	
Substantial effect on a scenic vista			x
Damage scenic resources		x	
Degrade existing visual character		x	
2 Agriculture and Forestry Resources		**1**	
Convert prime farmland to non-ag use			x
Conflict with existing zoning		x	
3 Geology and Soils		**1**	
Expose people to risk involving landslides			x
Result in soil erosion of the loss of topsoil		x	
4 Greenhouse Gas Emissions		**1**	
Generate greenhouse gass emissons		x	
5 Hydrology and Water Quality			**1**
Place housing within the 100 ytear flood plane			x
6 Population and Housing	**1**		
Induce substantial population growth	x		
7 Recreation	**1**		
Increase the use of existing neighborhood and regional parks or recreational facilities	x		
8 Utilities and Service Systems	**1**		
Require or result in the construction of new storm water drainage facilities	x		
	3	4	1

Low Density Alternative

	Significant Impact	Less than Significatn Impact	No Impact
1 Aesthetics	**1**		
Substantial effect on a scenic vista	x		
Damage scenic resources			x
Degrade existing visual character	x		
2 Agriculture and Forestry Resources	**1**		
Convert prime farmland to non-ag use	x		
Conflict with existing zoning			x
3 Geology and Soils			**1**
Expose people to risk involving landslides			x
Result in soil erosion of the loss of topsoil			x
4 Greenhouse Gas Emissions			**1**
Generate greenhouse gass emissons			x
5 Hydrology and Water Quality			**1**
Place housing within the 100 ytear flood plane			x
6 Population and Housing			**1**
Induce substantial population growth			x
7 Recreation			**1**
Increase the use of existing neighborhood and regional parks or recreational facilities			x
8 Utilities and Service Systems			**1**
Require or result in the construction of new storm water drainage facilities			x
	2	0	6

Low Density + Land Swap Alternative

	Significant Impact	Less than Significatn Impact	No Impact
1 Aesthetics		**1**	
Substantial effect on a scenic vista			x
Damage scenic resources			x
Degrade existing visual character		x	
2 Agriculture and Forestry Resources			**1**
Convert prime farmland to non-ag use			x
Conflict with existing zoning			x
3 Geology and Soils			**1**
Expose people to risk involving landslides			x
Result in soil erosion of the loss of topsoil			x
4 Greenhouse Gas Emissions			**1**
Generate greenhouse gass emissons			x
5 Hydrology and Water Quality			**1**
Place housing within the 100 ytear flood plane			x
6 Population and Housing			**1**
Induce substantial population growth			x
7 Recreation			**1**
Increase the use of existing neighborhood and regional parks or recreational facilities			x
8 Utilities and Service Systems			**1**
Require or result in the construction of new storm water drainage facilities			x
	0	1	7

APPENDIX B

Appendix B includes any city or county documents relevant to the compleation of this project. These documents include development costs, the Marin County Land use Map, the Novato General Land Use Plan, the Novato City Available land inventory. It also includes a site visit map from Septermber 2013.

Development Fees

Novato Impact Fees

Impact Fee	Single Family Fee	Multi-family and Second Unit Fee
Public Facilities Fees		
Recreation/ Cultural Facilities	$5,633	$5,633
Civic Facilities	$1,010	$1,010
General Government Systems	$438	$438
Open Space	$1,218	$1,218
Drainage	$2,398	$692
Traffic Impact Fees		
Streets & Intersections	$7,709	$3,552
Transit Facilities	$265	$123
Corporation Yard	$166	$77
TOTAL	$18,837	$12,743
Source: City of Novato Community Development Department		

Novato Planning and Application Fees

Planning and Application Fees	Fee
Design Review	$5,526
Variance	$2,154
Use Permit	$2,661
General Plan Amendment	$8,775
Rezoning	$6,518
Lot Line Adjustment	$2,219
Master Plan or Master Plan Amendment	$15,230
Precise Development Plan	$6,576
Tentative Map Land Division	$4,280
Tentative Map Subdivision	$4,791
Annexation	$8,134
Initial Study and Negative Declaration or Environmental Study	$9,543
Source: City of Novato Community Development Department	

Home Development Costs

Land Development Costs

Marin County Average Water Connection Fees

Service Area	Water District	Single-family Home	10-Unit Condo
Belvedere	Marin Municipal Water District	$14,141	$102,890 ($10,289 per unit)
Corte Madera			
Fairfax			
Larkspur			
Mill Valley			
Ross/Kentfield			
Tiburon			
San Anselmo			
San Rafael			
Novato	North Marin Water District	$23,275	$76,175 ($7,618 per unit)

Source: 2009 Marin Countywide Housing Element Workbook

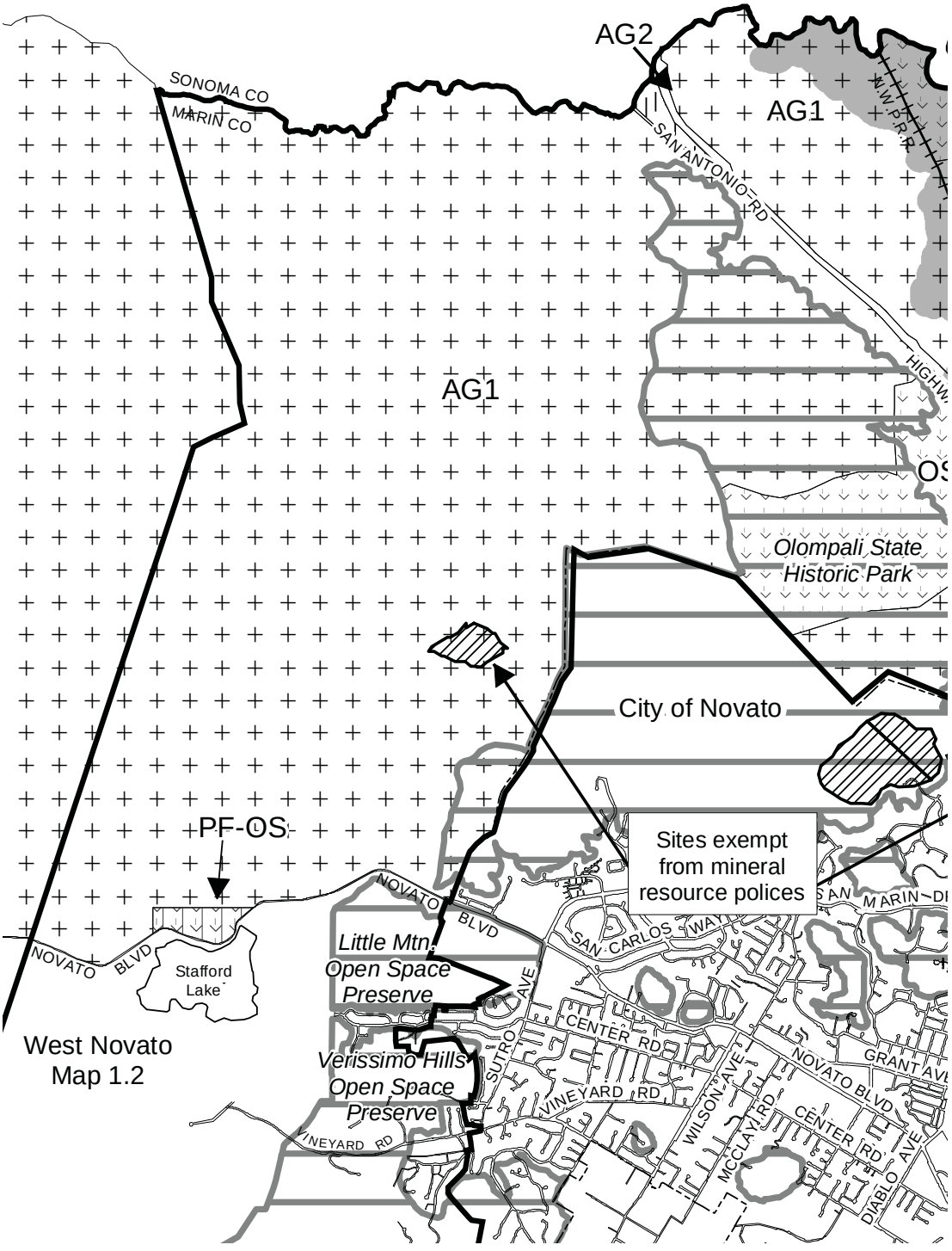
Marin County Average Sanitary Connection Fees

Service Area	Sanitary District	Single Family Home	1-Condo Unit	10-Unit Condo
Belvedere	Sanitary District No. 5	$7,351	$6,083	$60,290 ($6,029 per unit)
Tiburon		$7,282	$6,026	$59,720 ($5,972 per unit)
Corte Madera	Sanitary District No. 2 (Jurisdiction)	$6,747	$6,747	$67,470 ($6,747 per unit)
Fairfax	Ross Valley Sanitary District No 1.	$6,794	$6,594	$56,940 ($5,694 per unit)
Larkspur †				
Ross				
San Anselmo				
Mill Valley	Jurisdiction's Department of Public Works	$4,000	$4,000	$40,000 ($4,000 per unit)
Novato	Novato Sanitary District	$7,390	$7,390	$73,900 ($7390 per unit)
San Rafael	Las Gallinas Sanitary District	$6,200	$6,200	$62,000 ($6,200 per unit)

† Jurisdiction calculated slightly lower fees than sanitary district. (2008).

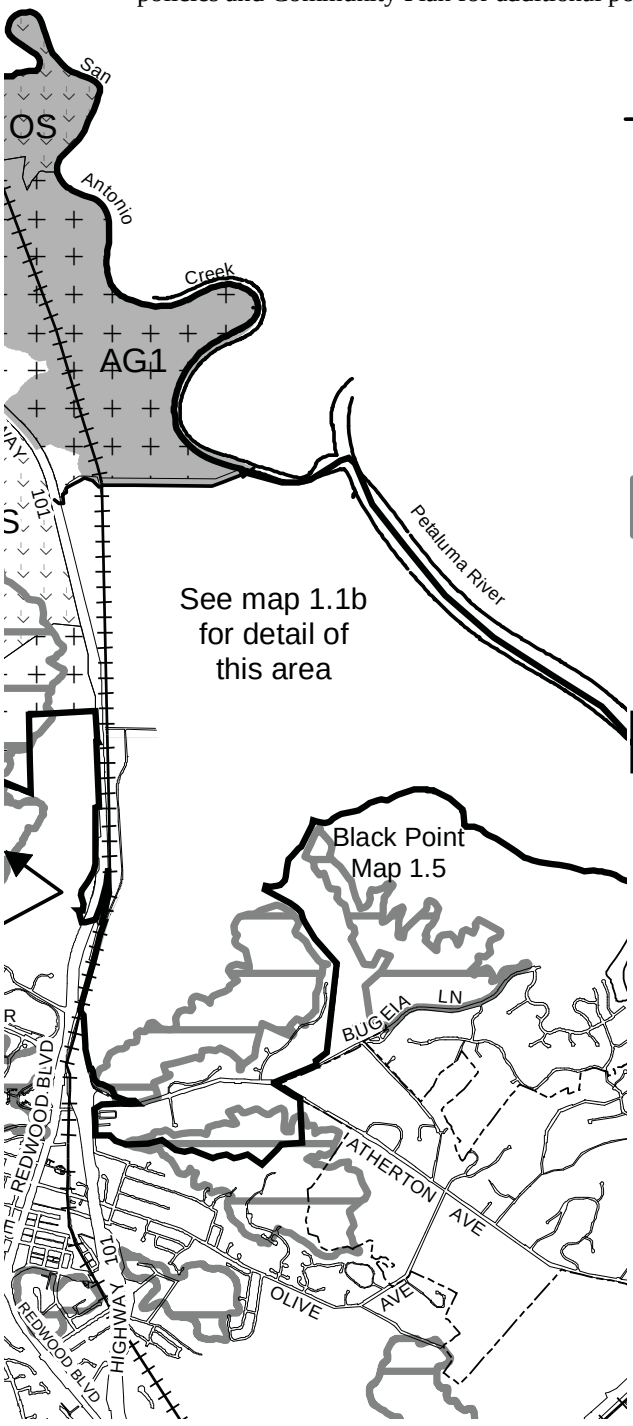
Marin County Land Use

MA
North Novato L



AP 1.1a
and Use Policy Map

Note: Please also reference the respective Planning Area policies and Community Plan for additional policy guidance.



Legend

- OS Open Space
- PF-OS Public Facility / Open Space

Agricultural

- AG2 1 unit/10-30 acres
- AG1 1 unit/31-60 acres
- Ridge and Upland Greenbelt Area (See Community Design Policy DES-4.1)
- Mineral Resource Area
- Baylands Corridor
- Community Boundary
- City/Town Limit

N

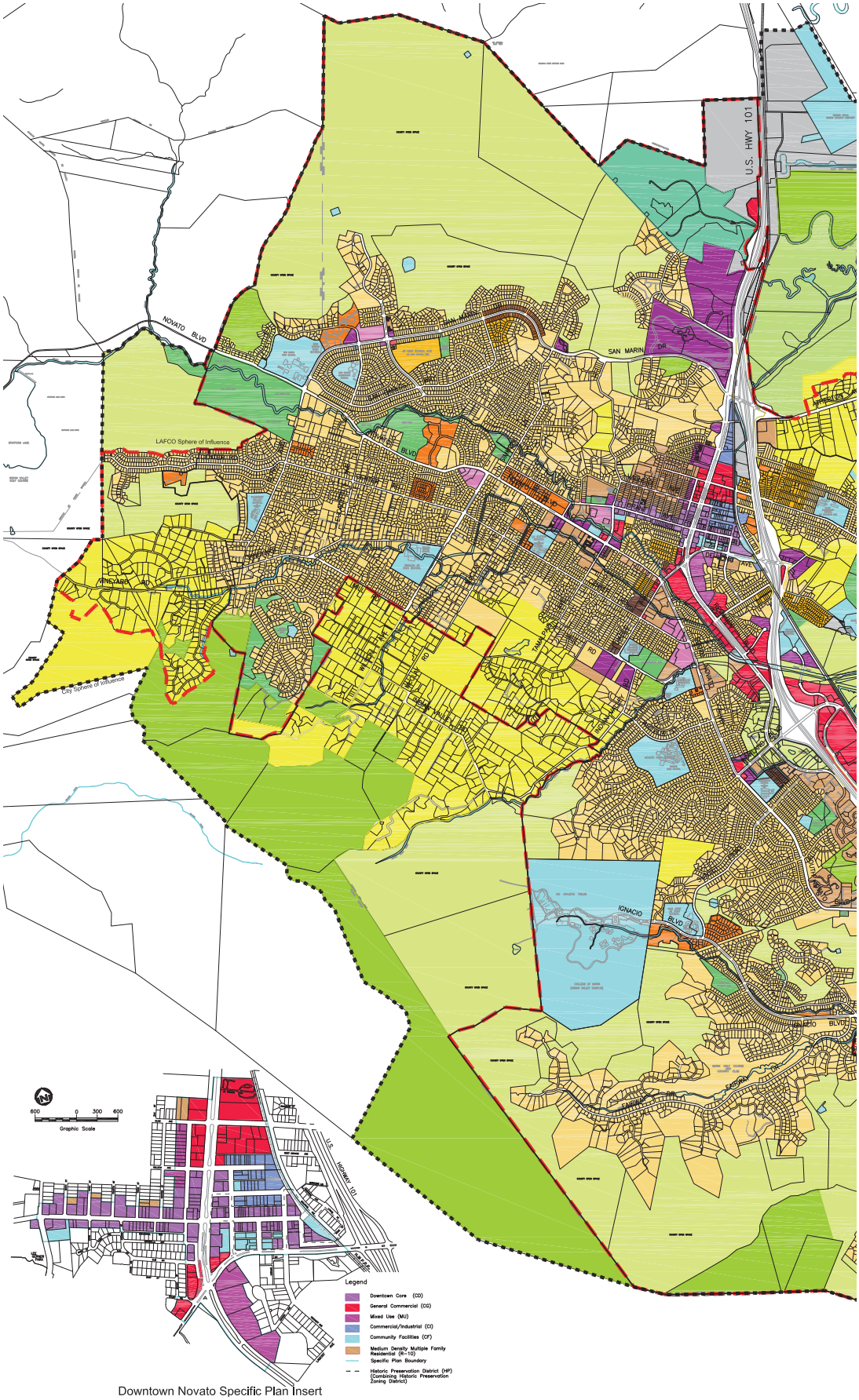
NOT TO SCALE

FILE: MAP1_1A.MXD

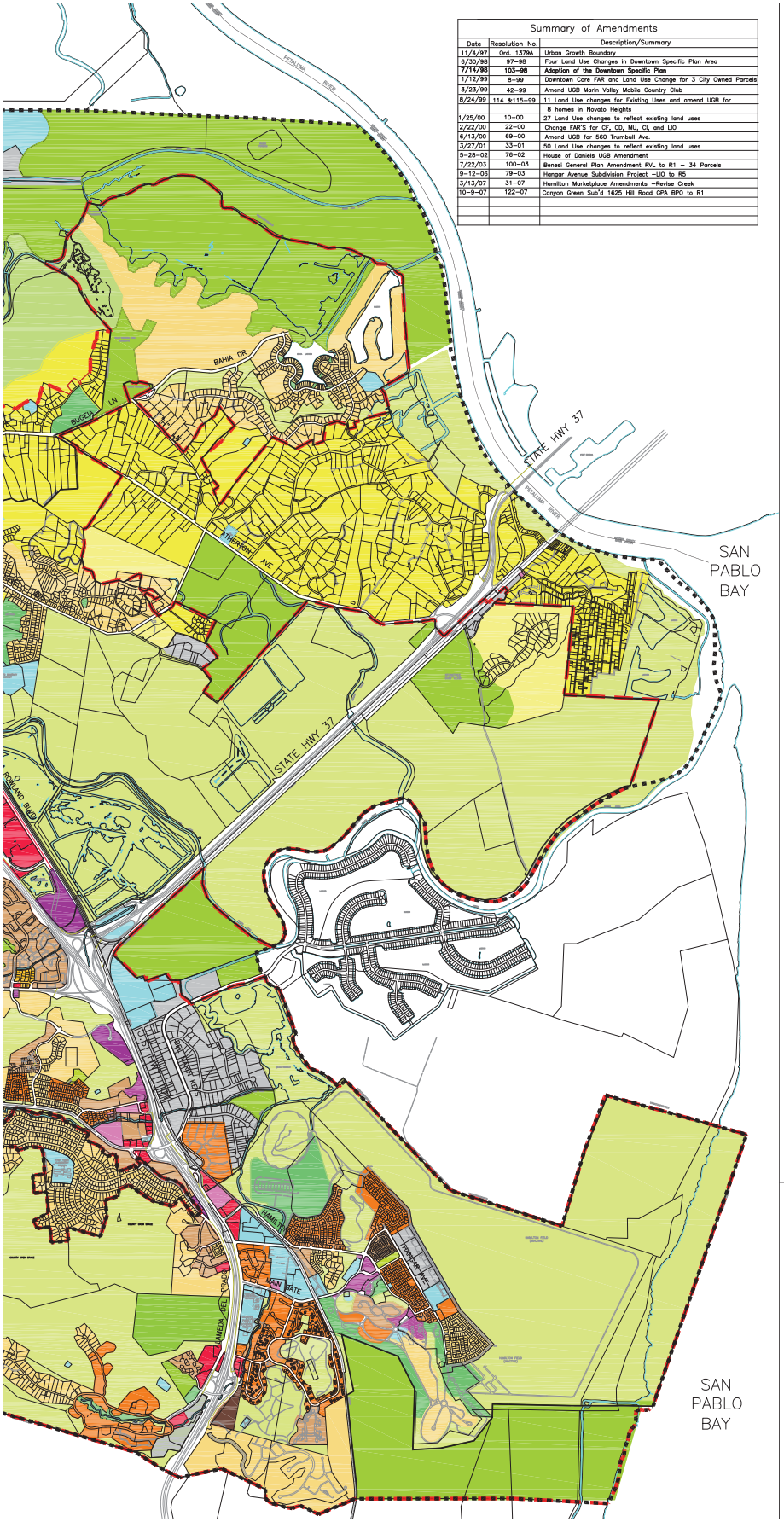
This map is representational only.
Data are not survey accurate.

Source: Marin County Communit
Development Agency

Novato Land Use Map



Downtown Novato Specific Plan Insert



Summary of Amendments		
Date	Resolution No.	Description/Summary
11/4/97	Ord. 1379A	Urban Growth Boundary
6/30/98	97-98	Four Land Use Changes in Downtown Specific Plan Area
7/14/98	103-98	Adoption of the Downtown Specific Plan
1/12/99	8-99	Downtown Core FAR and Land Use Change for 3 City Owned Parcels
3/23/99	42-99	Amend UGB Marin Valley Mobile Country Club
8/24/99	114 &115-99	11 Land Use changes for Existing Uses and amend UGB for 8 homes in Novato Heights
1/25/00	10-00	27 Land Use changes to reflect existing land uses
2/22/00	22-00	Change FAR'S for CF, CD, MU, CI, and LIO
6/13/00	69-00	Amend UGB for 560 Trumbull Ave.
3/27/01	33-01	50 Land Use changes to reflect existing land uses
5-28-02	76-02	House of Daniels UGB Amendment
7/22/03	100-03	Benesi General Plan Amendment RVL to R1 - 34 Parcels
9-12-06	79-03	Hangar Avenue Subdivision Project -LIO to R5
3/13/07	31-07	Hamilton Marketplace Amendments -Revise Creek
10-9-07	122-07	Canyon Green Sub'd 1625 Hill Road GPA BPO to R1

Legend

- RURAL RESIDENTIAL (RR) — UP TO .49 DWELLING UNITS PER ACRE
- VERY LOW DENSITY RESIDENTIAL (RVL) — .5 TO 1.0 DWELLING UNITS PER ACRE
- LOW DENSITY RESIDENTIAL (R1) — 1.1 TO 5.0 DWELLING UNITS PER ACRE
- MEDIUM DENSITY DETACHED RESIDENTIAL (R4) — 4.1 TO 7.0 DWELLING UNITS PER ACRE
- MEDIUM DENSITY RESIDENTIAL (R5) — 5.1 TO 10.0 DWELLING UNITS PER ACRE
- MEDIUM DENSITY MULTIPLE FAMILY RESIDENTIAL (R10) — 10.1 TO 20.0 DWELLING UNITS PER ACRE
- HIGH DENSITY MULTIPLE FAMILY RESIDENTIAL (R20) — 20.1 TO 30.0 DWELLING UNITS PER ACRE
- MIXED USE (MU) — MAXIMUM FAR IS 0.4 FOR COMMERCIAL USES AND UP TO 0.8 MAY BE ALLOWED IF HOUSING IS INCORPORATED
- NEIGHBORHOOD COMMERCIAL (CN) — MAXIMUM FAR IS 0.4 WITH AN INCREASE TO 0.8 IF HOUSING IS INCLUDED, PROVIDED THE DIFFERENCE BETWEEN FAR 0.4 AND 0.8 IS USED FOR HOUSING
- GENERAL COMMERCIAL (CG) — MAXIMUM FAR IS 0.4
- DOWNTOWN CORE (CD) — MAXIMUM FAR IS 1.2 FOR COMMERCIAL USES UP TO 2.0 FAR MAY BE ALLOWED FOR HOUSING HISTORIC PRESERVATION OR EXCEPTIONAL DESIGN IN CONFORMANCE WITH DOWNTOWN SPECIFIC PLAN GUIDELINES
- COMMERCIAL/INDUSTRIAL (CI) — MAXIMUM FAR IS 1.0
- BUSINESS AND PROFESSIONAL OFFICE (BPO) — MAXIMUM FAR IS 0.4
- RESEARCH/EDUCATION-INSTITUTIONAL (REI) — MAXIMUM FAR IS 0.2 FOR NON-RESIDENTIAL USES. MAXIMUM RESIDENTIAL DENSITY IS 1.0 DWELLING UNIT PER ACRE
- LIGHT INDUSTRIAL/OFFICE (LIO) — MAXIMUM FAR IS 0.4 EXCEPT FOR NOVATO INDUSTRIAL PARK AND HAMILTON HANGER AREA WHERE THE MAXIMUM FAR IS 0.6
- OPEN SPACE (OS)
- AGRICULTURE (AG) — MAXIMUM DENSITY IS 1 DWELLING UNIT PER 60 ACRES.
- CONSERVATION (CON) — MAXIMUM DENSITY IS 1 DWELLING UNIT PER 10-60 ACRES
- PARKLAND (P)
- COMMUNITY FACILITIES (CF) — MAXIMUM FAR IS 0.8

NOVATO GENERAL PLAN

LAND USE MAP LU 1

Adopted by City Council
March 8th, 1996 Resolution #21-96

This LAND USE MAP is only one of several maps that affect development in Novato. In addition to the General Plan Text, other maps which should be consulted are listed in the Table of Contents of the General Plan.

Key

- CITY LIMITS
- URBAN GROWTH BOUNDARY (UGB)*
- SPHERE OF INFLUENCE (LAFCO)
- SPHERE OF INFLUENCE (CITY)
- DOWNTOWN SPECIFIC PLAN

Note: * Urban Growth Boundary (UGB) is coterminous with the City Limit Boundary.

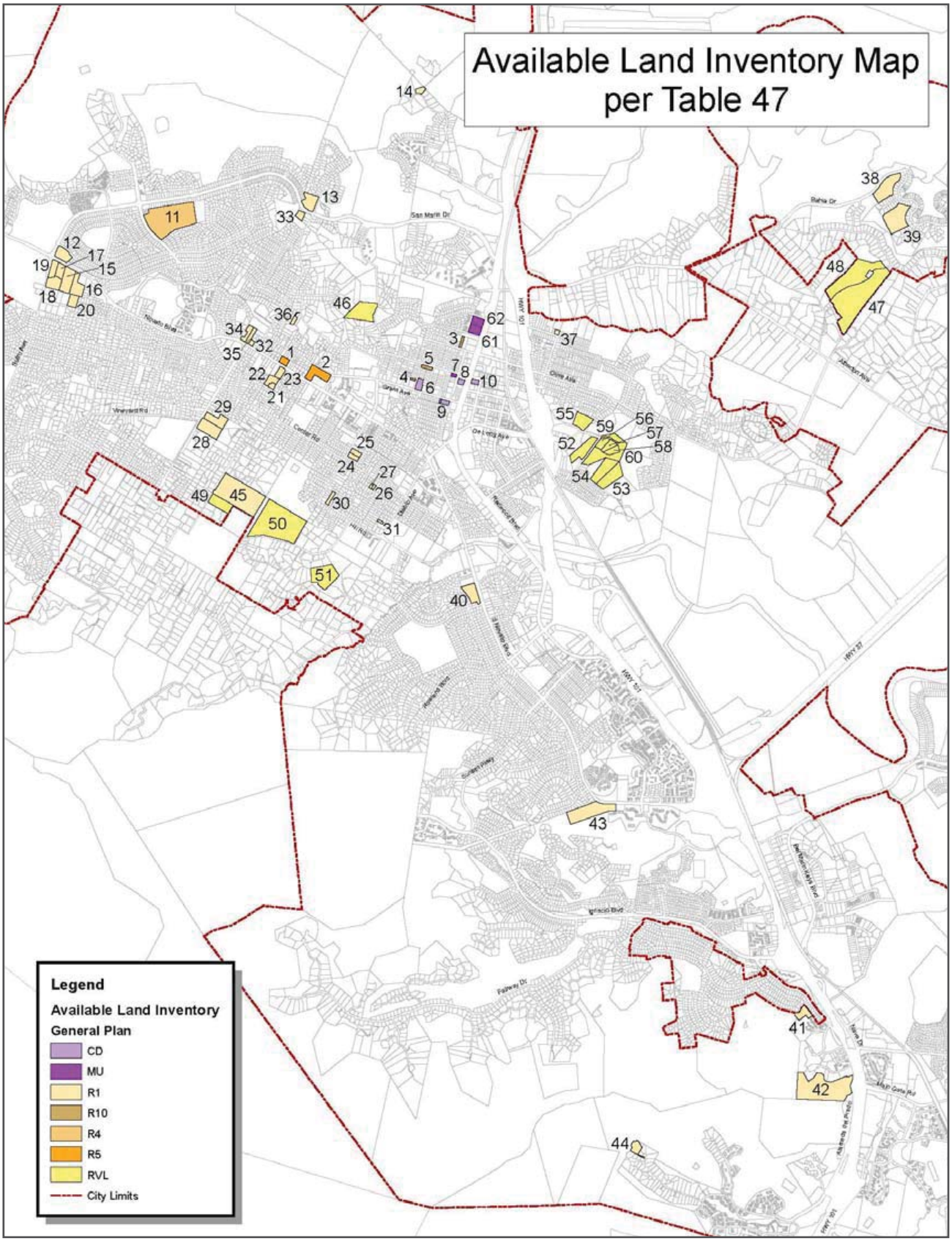
N

0 FEET 5000

SCALE 1"=1200'

Printed Date: Nov. 11. 2008

Available Land Inventory Map



Site Inventory Map

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