

Growth and Stewardship

University of
California,
Santa Cruz

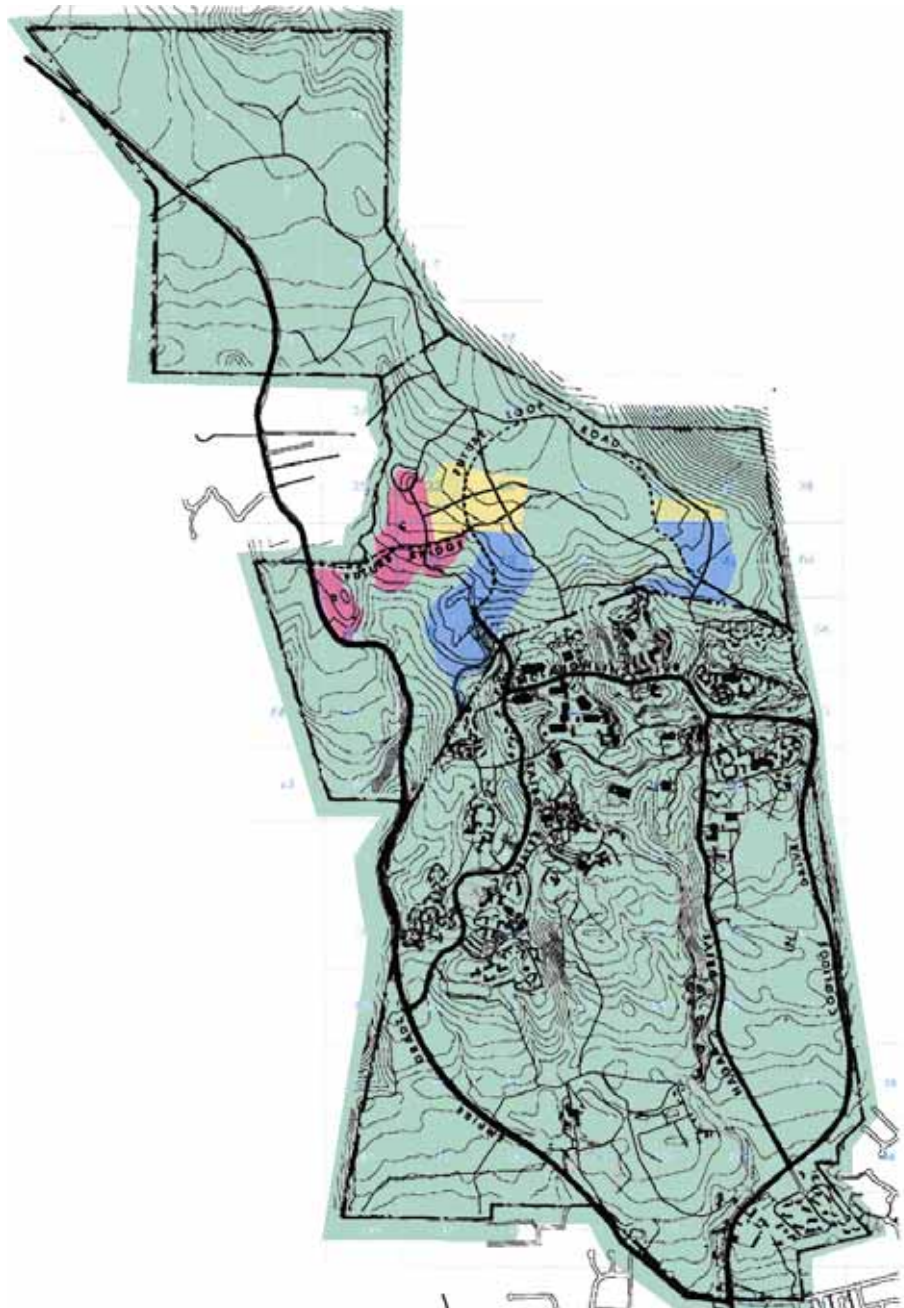


Table of Contents

UC Santa Cruz Campus Core Capacity Study

	EXECUTIVE SUMMARY	Capacity Circulation Open Space
1	INTRODUCTION	Background Planning Determinants Program Development Locations and Intensity Study Scenarios
2	SITE CAPACITY FINDINGS	Site Analysis <ul style="list-style-type: none">• Slope Analysis• Environmental Analysis• Composite Constraints Capacity Scenarios <ul style="list-style-type: none">• Program Assumptions• Density Assumptions• Scenario A: 1988 LRDP Designations• Scenario B: Infill and Program Allocation• Scenario C1: Redefine 1988 LRDP Designations #1• Scenario C2: Redefine 1988 LRDP Designations #2• Scenario C3: No 1988 LRDP Designations Circulation Comparison of Costs
3	CONTRIBUTORS	<ul style="list-style-type: none">• Growth and Stewardship Committee• Consultants

Table of Contents

UC Santa Cruz Campus Core Capacity Study

APPENDIX

Bound separately

- A** Planning Principles
- B** Program
- C** CEQA Overview
- D** Natural Reserve Academic Plan
- E** UC Sustainability Initiative
- F** Planning Schedule
- G** Physical Capacity Studies
- H** Environmental Analysis
- I** Density Studies
- J** Transportation
- K** Cost Studies

Executive Summary



UC Santa Cruz Growth and Stewardship Planning

- Planning for Growth
- Physical Program (Draft 2)
- Study Limits
- Process
- Findings
- Next Steps

This physical capacity study is the first step of a master planning effort to accommodate projected growth at UC Santa Cruz. This report includes findings of preliminary environmental studies and a capacity assessment of housing, recreation and parking. The study addresses both the developed and undeveloped areas of the campus.

The Growth and Stewardship Task Force (G&STF) appointed by Executive Vice Chancellor/Campus Provost John Simpson provided review and direction of the work. The Task Force is charged with guiding the campus' physical planning effort consistent with the 1988 Long Range Development Plan (LRDP).

PLANNING FOR GROWTH

The 1988 LRDP for UCSC projects an increase of the student population from 9,000 in 1987 to 15,000 by 2005, and targets 70% of undergraduates and 50% of graduates to be housed on campus. The student housing goal is the primary driver of this stage of the planning effort.

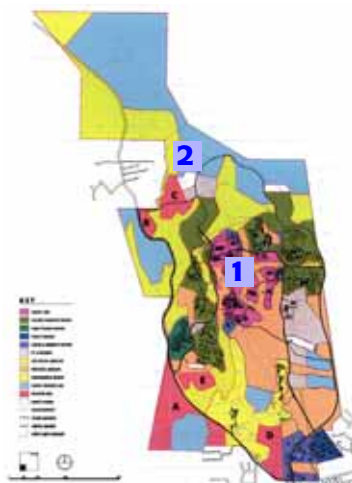
The first step in the capacity study examines the 1988 LRDP assumptions, and tests those against current realities. This study uses four broad and significant areas of consideration in the testing process:

- Physical
- Environmental
- Economic (forthcoming)
- Social

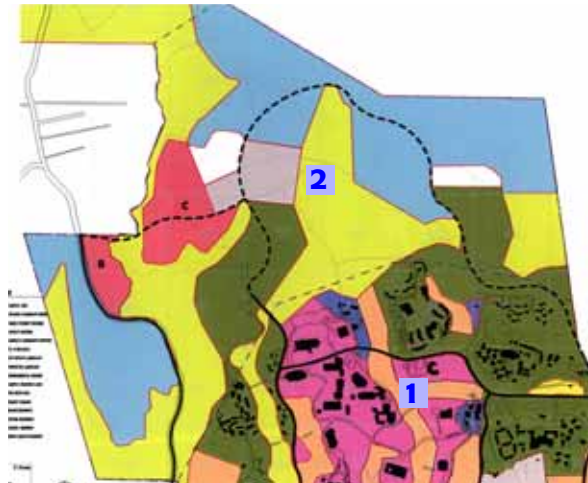
PHYSICAL PROGRAM (Draft 2)

The draft physical program uses the housing goals established in the 1988 LRDP to quantify the remaining housing units to be built. It identifies a population mix of 85% undergraduates and 15% graduate students, resulting in the following elements to be added to the campus:

- Nearly 800 student apartments
- 100 faculty/staff units
- Surface parking for 800-1000 cars
- 10 acres of play fields



E-1



E-2

E-1 1988 Long Range Development Plan

The 1988 LRDP concentrates campus improvements in the developed area of the campus (1)

E-2 The North Campus

The undeveloped lands to the north (2) contain several land use zones to address residential, parking, recreation, and environmental reserve program needs.

STUDY LIMITS

As suggested by the 1988 LRDP, this study includes a review of potential residential infill sites in the developed areas of the campus. Potential infill development was limited to areas defined in the 1988 LRDP.

The 1988 LRDP also projected future development in undeveloped campus lands north of the existing developed campus ("North Campus"). The assessment of the North Campus includes an evaluation of environmental factors, composite of opportunities and constraints maps, and the creation of potential development envelopes. The Campus Environmental Reserve is a central feature in the North Campus study area and comprises approximately 38% (~150 acres) of the 400 total acres.

PROCESS

A physical and environmental analysis of the North Campus lands served to identify potential development sites while minimizing the complexity of construction and avoiding or minimizing the degree of environmental impact.

As a density benchmark, this study examines existing residential development at UCSC. These density ranges were averaged, used as a prototype, and applied to potential infill sites and to the development envelopes identified in the North Campus. This determined the carrying capacity of each site. As the master plan develops further, these densities will be refined based on specific development alternatives.

FINDINGS

Campus lands can accommodate the projected growth by utilizing a combination of infill in the existing developed campus and new development in the North Campus, or by using the North Campus entirely.

Residential Program

- Approximately 30% of the residential program can be accommodated through infill projects within the existing developed campus. Therefore, to meet the housing goals set forth in the 1988 LRDP, approximately 70% of the residential program will need to be accommodated in North Campus undeveloped lands.
- The balance of the residential program (70%) can be sited in the North Campus within the 1988 LRDP land use designations.

The planning process analyzed existing development patterns in the developed areas of the campus (1) to identify likely density benchmarks for proposed development.



- ## Environmental Reserve

- Any development in the North Campus (within or outside of designated 1988 LRDP land uses) may adversely affect the function of the Environmental Reserve.

- A majority of the parking program can be accommodated in the North Campus using the 1988 LRDP land use designations. However, the area will be fragmented.

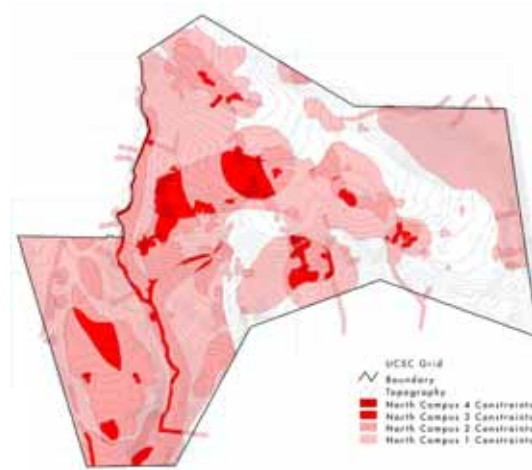
- Nearly the entire OPERS program can be accomplished in the North Campus using the 1988 LRDP land use designations. However, the available land will be fragmented into several small parcels.
- A large sports field (greater than 5 acres) can be accommodated in the North Campus, provided a modification of LRDP land use designating boundaries occurs.

- Springs and seeps in the North Campus study area could be adversely affected by development in the 1988 LRDP land use designations, however development patterns could be altered to reduce the impacts.

- Extensive development within 1988 LRDP designated land uses will increase the need for, and cost of, environmental mitigation.
- Vegetation and wildlife communities present in the North Campus will be impacted by development, however development patterns could be altered to reduce the impacts.
- Development in the North Campus, in areas other than those identified for development in the 1988 LRDP (or in combination with areas identified), could avoid or greatly reduce impacts on hydrologic and biological resources.
- The extent of cultural resources in the North Campus, and their potential constraint on development, is unknown at this time.



E-4



E-5

E-4 Physical Studies

Detailed slope analysis identified areas most suitable for development.

E-5 Environmental Studies

Environmental data, compiled and edited in a geographic information system (GIS), identified areas with the fewest development constraints..

- The dominant vegetation in the North Campus is fire prone and fire dependent. Development in or near this vegetation will require vegetation and hazard management.

Circulation

- Creation of a loop road connecting the developed ends of Chinquapin Road to Heller Drive is desirable. The most direct layout extends the road through the campus environmental reserve.
- Fire safety will require a secondary means of egress for any development in the North Campus.
- The bridge to Empire Grade, as identified in the 1988 LRDP, is not required for either fire safety or to mitigate traffic flows at the West Entry.
- A continuation of Coolidge Drive (to the east of the Merrill Provost House), as identified in the 1988 LRDP, is not feasible.

- Further Campus development may require traffic control devices, pedestrian crossovers, or road closures (to private vehicles) in the core campus.
- The longer the circulation loop, the less desirable for transit and other alternative transportation.
- Pedestrian/bicycle connection from residential areas to the academic core is complicated by topography.
- Pedestrian/bicycle connections may effect the campus environmental reserve.

Cost

(In December 2001 valued dollars)

- North Campus development of common infrastructure ranges from \$15 - \$30 million
- Development in the North Campus is roughly 1%-10% greater than development of infill projects.
- The "ballpark" cost to develop the current program is roughly \$400 million.

NEXT STEPS

Significant challenges exist in developing either infill sites or expanding into the North Campus. As the campus has refocused its energies on planning for expansion, it is evident that some of the external forces and internal programs that guided the creation of the 1988 LRDP have changed. Included in some of the change are the current political climate, financial capabilities, regulatory requirements, and site constraints and opportunities.

UCSC's goal is to formulate guidelines and a framework to integrate existing adjacent infrastructure, facilities, and natural features into the developing UCSC campus. The planning process will formulate viable alternatives based on stewardship of the land, sustainable development, recognition of UCSC's unique physical environment, and fiscal capacity.

This Master plan will provide the starting point for the next round of revisions to the UCSC Long Range Development Plan.



- Background
- Planning Determinants
- Physical Program
- Development Locations and Intensity
- Study Scenarios

BACKGROUND

The resource and planning methodology is the first step of a master planning effort to accommodate projected growth at University of California Santa Cruz (UCSC). It provides a framework for the physical capacity study. The physical capacity study identifies appropriate locations for development based on the November 2001 draft physical program, site suitability/environmental factors, and the desired character of the University.

The University anticipates accommodating the projected growth under the 1988 Long Range Development Plan (1988 LRDP). The physical capacity study assists the university in identifying new ways to accommodate growth, building on the fabric of the existing campus (the Developed Campus) while incorporating comprehensive environmental factors into site planning considerations for undeveloped campus land (the North Campus).

1988 LRDP. Figures 1-1 and 1-2 illustrate the 1988 LRDP for the entire campus and North Campus, respectively.

PLANNING DETERMINANTS

Outlined in Table 1-3, a number of determinants or factors were identified during the planning process to aid in the analysis and, ultimately, the physical plan for the University. Established by University staff at planning sessions held early in the process, the seven determinants, and associated considerations, provide a comprehensive list of factors for campus planning. It was acknowledged that future efforts (including environmental review) would look at many of the determinants in greater detail.

Further discussion identified the following as the key determinants that would most significantly influence the capacity analysis:

- Slope
- Vegetation
- Wildlife
- Hydrology

- Major infrastructure
- Costs

As discussed in the following section, the planning process applied these key determinants to the North Campus in an effort to identify the amount of land available for development.

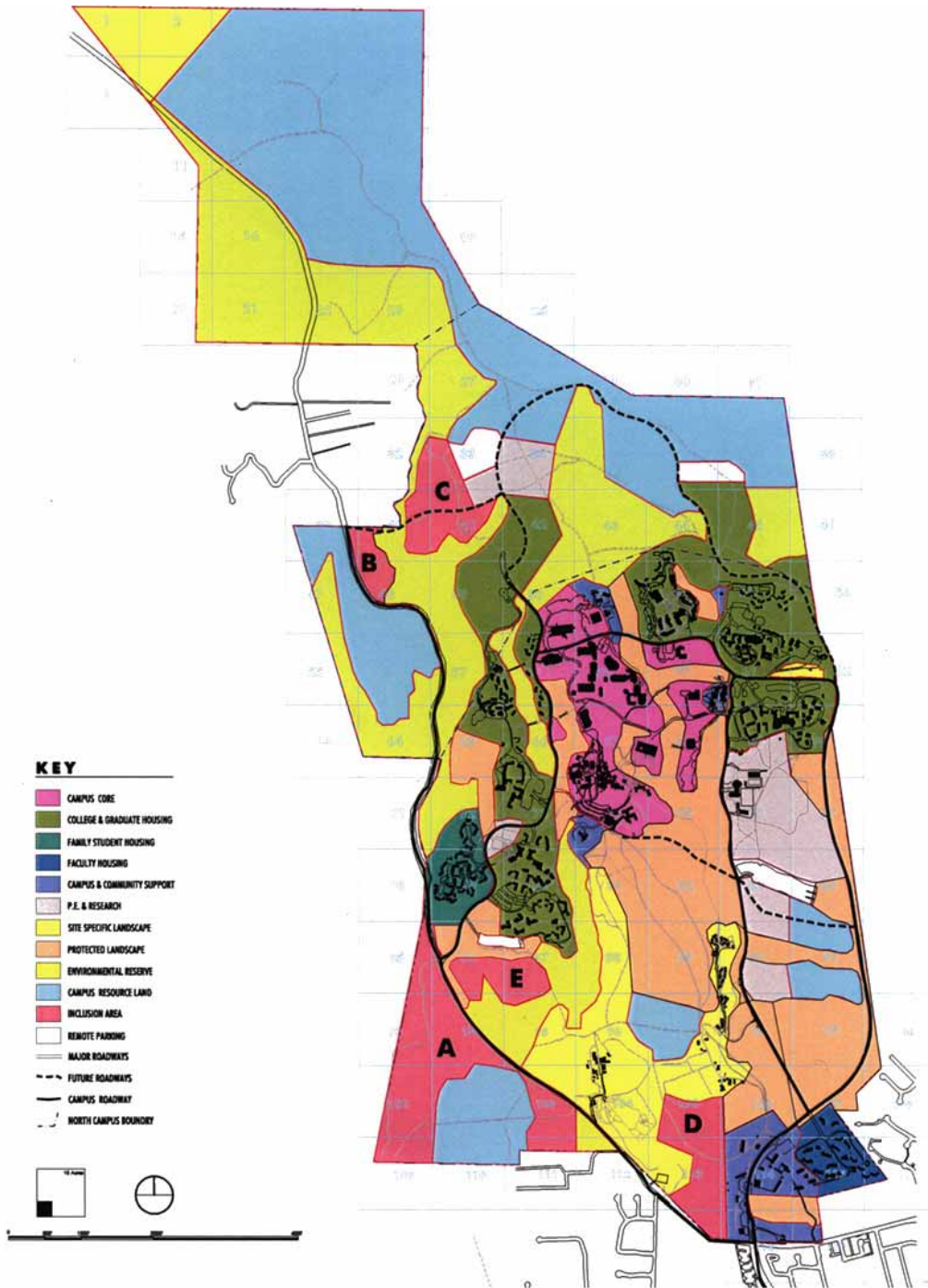
PHYSICAL PROGRAM

The 1988 LRDP for UCSC projects an increase of the student population from 9,000 in 1987 to 15,000 by 2005, and targets 70% of undergraduates and 50% of graduates to be housed on campus. The 1988 LRDP also projects housing for faculty and staff.

The physical program establishes a mix of 85% undergraduate students and 15% graduate students, and other facility expansion, resulting in the following elements to be added to the campus:

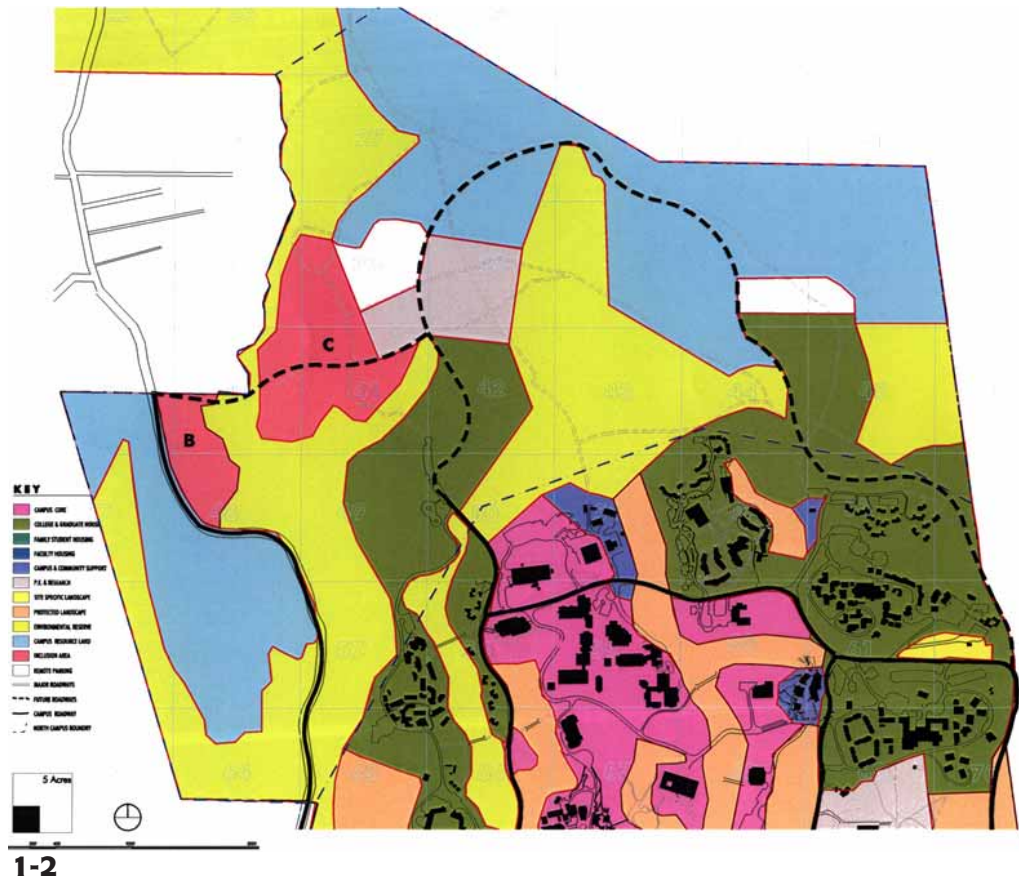
- Nearly 800 student apartments
- 100 faculty/staff units
- Surface parking for 800-1000 cars
- 10 acres of recreation fields

1-1 Land Use
 1988 Long Range
 Development Plan Land
 Use Designations



1-1

1-2 Land Use
 1988 Long Range
 Development Plan Land
 Use Designations - North
 Campus



**DEVELOPMENT
 LOCATIONS AND
 INTENSITY**

To achieve a complete understanding of development potential, the study assesses infill sites in the Developed Campus and considers several ways to incorporate improvements in the North Campus.

The study analyzes potential residential infill sites in the Developed Campus as identified in the 1988 LRDP. The study also analyzes capacity in the North

Campus, the area projected for future development in the 1988 LRDP. The assessment of the North Campus includes an evaluation of environmental factors, composite opportunities and constraints maps, and the creation of potential development envelopes. It identifies potential development sites in the North Campus that minimize environmental impact from development while considering both constructability and planning considerations.

As a density benchmark, this study examines existing residential development at UCSC. These density ranges were averaged, used as a prototype, and applied to potential infill sites and to the development envelopes identified in the North Campus. This determined the carrying capacity of each site. As the master plan develops further, residential densities will be refined based on specific development alternatives.

DETERMINANTS	CONSIDERATIONS
1 Programmatic Goals UC System and Campus Considerations	Academic Academic Facilities Environmental Reserve Academic Support Facilities Residential Student Residences Faculty and Staff Residences Community Support Community Center Residential Life Facilities Childcare Facilities Recreation, Wellness Facilities Events Center Service and Operations Security Personnel Security Fire Access and Safety
2 Campus Planning Community Context and On-Campus Considerations	1988 LRDP Land Use Designations and Policies Connections Community Scale Campus-wide Large area Small area Sustainability Future Expansion Needs
3 Environmental Regional Context and On-Campus Considerations	Cultural/Historic Resources * Vegetation * Wildlife * Hydrology * Slope * Soils * Bevelation
4 Practicalities	Operations Costs * Financial Capacity * Safety * (Security, fire, emergency access, etc.)
5 Transportation Regional Context and On-Campus Considerations	Capacity and convenience of service Circulation - Pedestrian, vehicular, bike, transit, service
6 Infrastructure Capacity and Off and On-Campus Requirements	Major Utilities (Power, water, gas, sewer) Storm Drainage Circulation Vehicles Bicycles Pedestrian Transit Service Fire/Safety Roads Bridges Parking Remote Storage Residential
7 Implementation Schedule to achieve target dates	Phasing Strategy LRDP Amendment Future Expansion* Regulatory Requirements* (CEQA, Habitat Management Plan, etc.)

* Potential constraining issue

1-3 Growth and Stewardship Planning Determinants

The determinants identified in the planning process are a comprehensive list of factors for campus planning.

		Use 1988 LRDP Land Use Designations	Reallocate 1988 LRDP Land Use Designations	Targeted Percentage of Program to Accommodate	
STEP 3: Physical Capacity Analysis				Developed Campus	North Campus
A	Develop North Campus within 1988 LRDP Land Use Designations	●		0	100
B	Intensely Developed Campus within 1988 LRDP Land Use Designations	●		100	0
C	Redefine 1988 LRDP Land Use Boundaries in the North Campus		●	0	100
STEP 3: Alternatives					
X	Mix of the above	●	●	100	100
Y	Mix of the above	●	●	100	100
Z	Mix of the above	●	●	100	100

1-4

1-4 Physical Capacity Analysis

The three scenarios represent the three ways used for analyzing campus capacity. The capacity analysis will serve as the foundation for preparation of alternatives for growth at the university.

STUDY SCENARIOS

To determine the capacities of the infill sites on the Developed Campus and North Campus, the study tests three broad scenarios, as outlined in Table 1-4 and illustrated in Figures 1-5, 1-6, and 1-7. Discussed in Section 2, the three scenarios are:

- **Scenario A**

- Develop the North Campus only within 1988 LRDP Land Use Designations.**

- This scenario considers how much of the entire program might be accommodated in the North Campus within 1988 LRDP land use designations. This scenario tests the carrying capacity of the North Campus consistent with 1988 LRDP land use designations.

- **Scenario B**

- Intensify the Developed Campus within 1988 LRDP Land Use Designations.**

- This scenario considers how much of the entire program might be accommodated in the Developed Campus, consistent with the 1988 LRDP and its land use designations.

- **Scenario C**

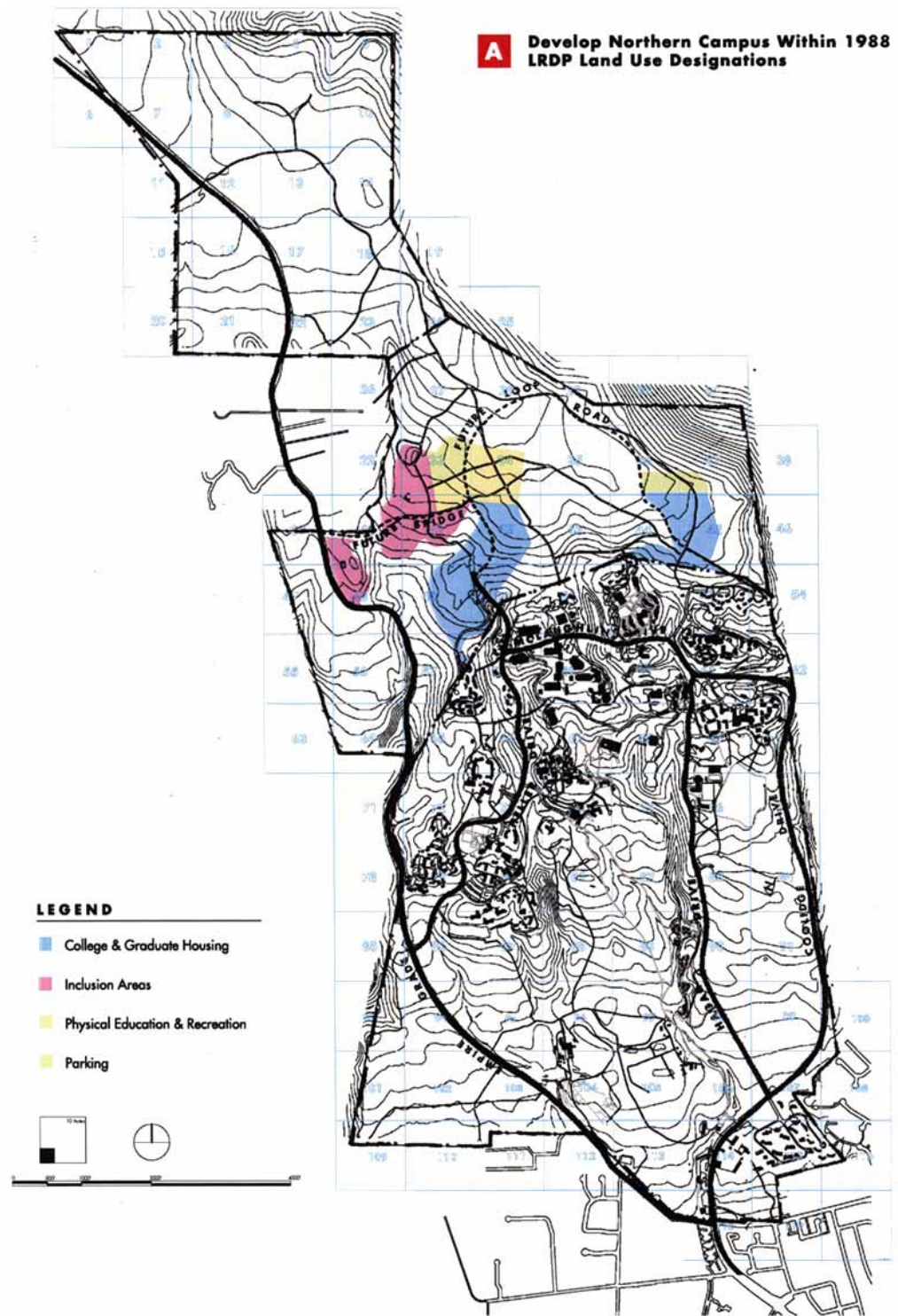
- Redefine the 1988 LRDP Land Use Boundaries in the North Campus.**

- This scenario considers how the remaining program not located in the Developed Campus (Alternative B), as well as the entire program, might be accommodated in the North Campus if the 1988 LRDP land use designations are changed. The redefined 1988 LRDP land use designations are based on land use suitability per environmental factors.

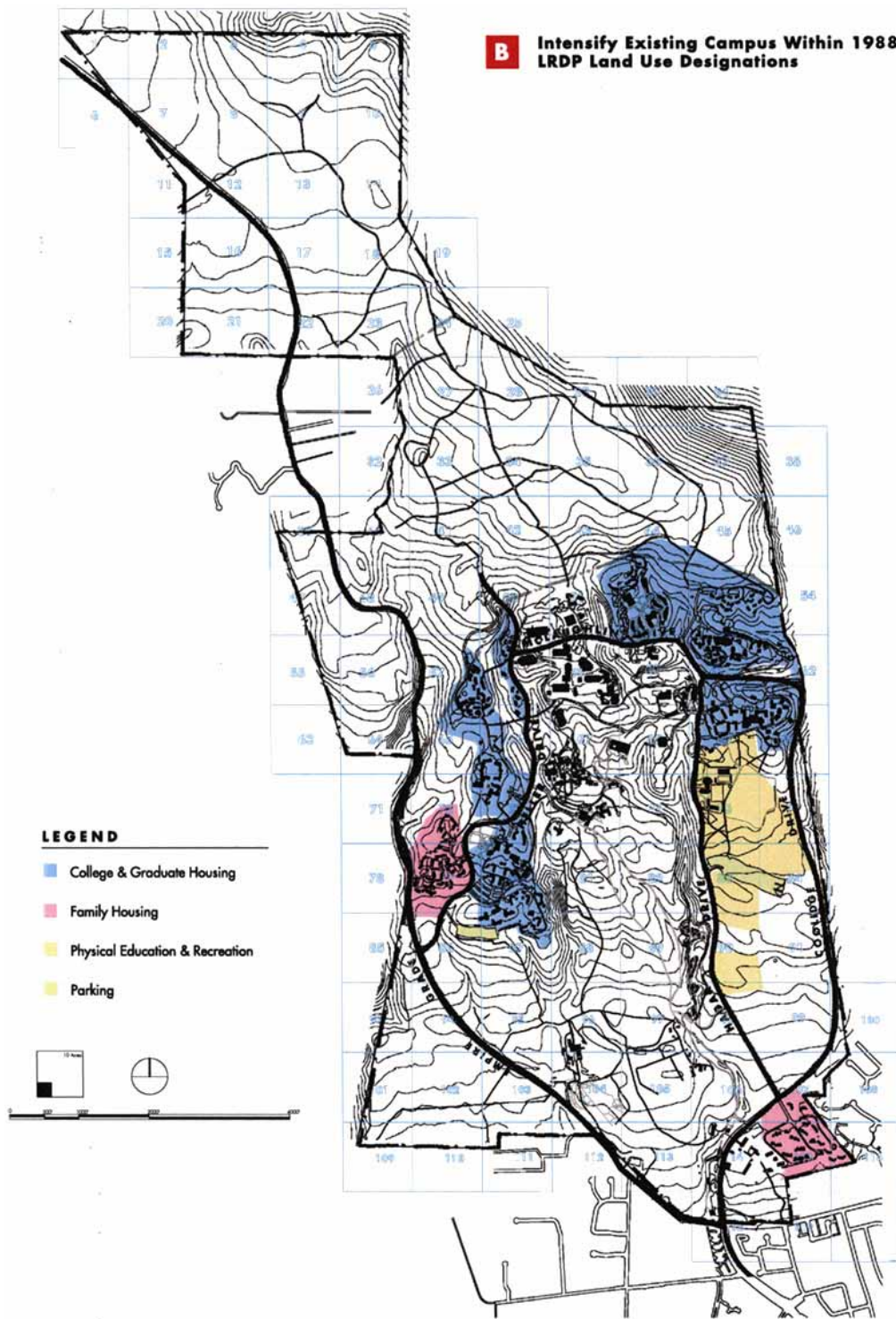
The scenarios are not a set of alternatives that explore physical planning and design relationships, rather, the scenarios are developed to test capacity. Based on findings from the capacity study, the next phase of the planning effort will include the exploration of planning alternatives. The alternatives will include accommodating a combination of program elements on the Developed and North portions of the campus.

1-5 Scenario A

Scenario A considers how much of the entire program might be accommodated in the North Campus within 1988 LRDP designations.



1-5

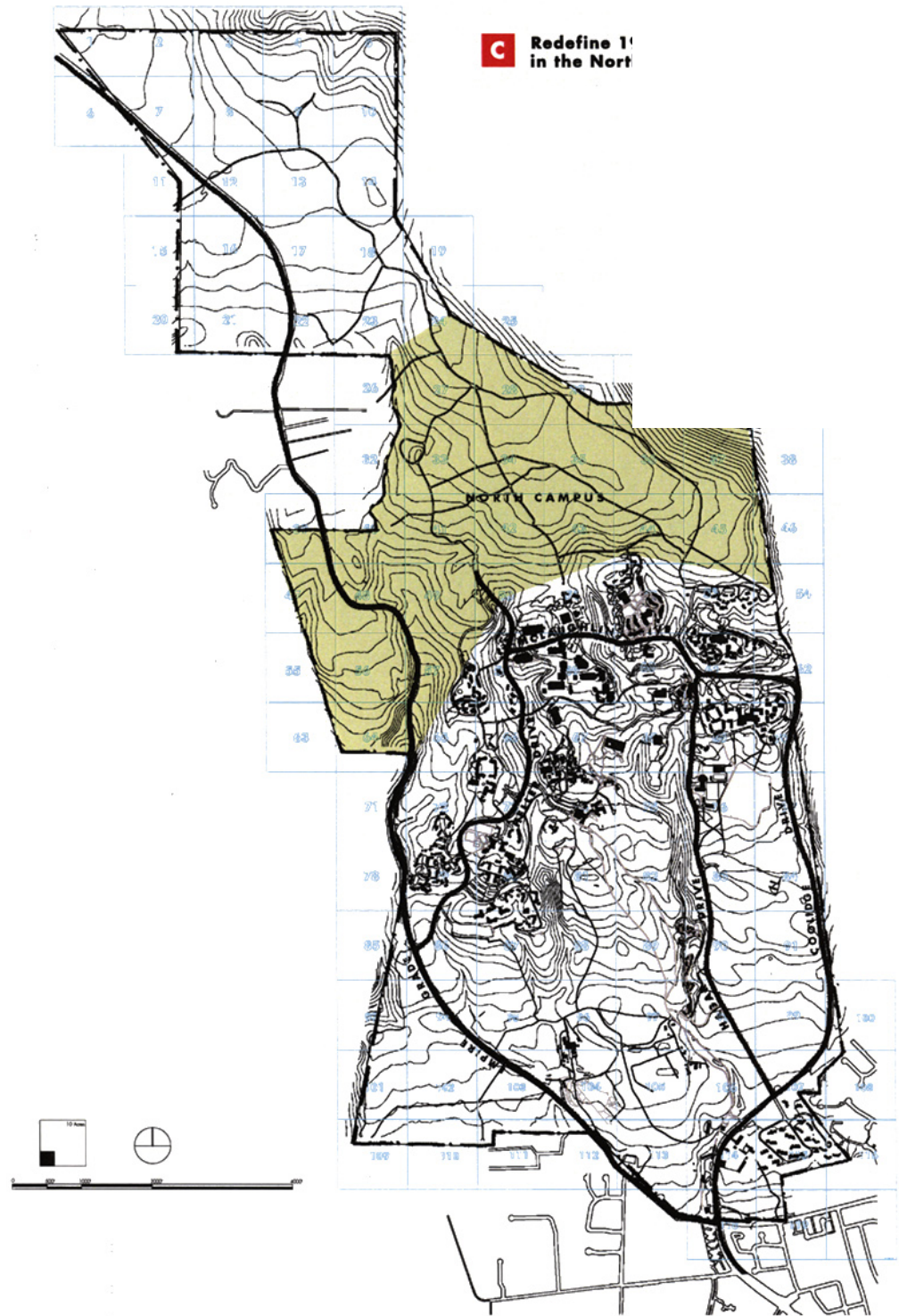


1-6 Scenario B

Scenario B considers how much of the residential program might be accommodated in the Developed Campus within 1988 LRDP designations.

1-7 Scenario C

Scenario C considers how much of the remaining program not accommodated in the Developed Campus, as well as the entire program, might be accommodated in the North Campus if 1988 LRDP designations are changed.



1-7

2

Capacity Analysis

UC Santa Cruz Growth and Stewardship Planning



- Study Approach
- Site Analysis
- Capacity Scenarios
- Circulation
- Comparison of Costs
- Capacity Scenarios

The physical capacity analysis identifies development constraints within the North Campus, and it considers how the identified program might be accommodated throughout the Developed and North Campus areas.

STUDY APPROACH

The site analysis looks at both the Developed Campus and North Campus for accommodation of the identified program. In general, the study identifies how much program can be accommodated in either/both locations given 1988 LRDP designations, site constraints, and, in some instances, redefinition of 1988 LRDP designations.

Described in more detail below, the analysis considers the following:

Site Analysis

This part of the analysis establishes what land is appropriate for development in the North Campus based on slope and environmental factors. The analysis focused on key environmental issues, including hydrology, biological resources, and cultural resources (SEE APPENDIX I). Other environmental issues -

specifically recreation, noise, air quality, geology and soils, and transportation - were determined to be less important for the capacity analysis.

These issues will not significantly affect project location or scope in the North Campus and can be addressed during the detailed campus planning in future phases.

Capacity Scenarios

Assumptions about program and ways the program might be accommodated on campus considers the following factors:

Program Assumptions

Provided by the University, the program includes a mix of housing, associated recreational facilities (OPERS), and remote storage parking (SEE APPENDICES B and C).

Density Assumptions

The assumptions about the density of new housing on campus are based on the analysis of existing housing and Colleges on the campus.

Scenario A: 1988 LRDP Designations

Using the program and density assumptions described above, Scenario A identifies

how much of the program can be located in the North Campus based on the 1988 LRDP designations and site constraints identified earlier in the process.

Scenario B: Infill and Program Allocation

The analysis assumes that housing will be provided at infill sites on the Developed Campus, per the 1988 LRDP, and that the housing that cannot be accommodated in the developed areas will be located in the North Campus.

Using the program and density assumptions described above, Scenario B identifies how much housing can be located at infill sites (as identified by the University) in the Developed Campus. In turn, the scenario identifies how much remaining program will need to be located in the North Campus.

To further explore development opportunities, the analysis considers three other approaches for improvements in the North Campus (Scenarios C1, C2, and C3). All assume a fundamental redefinition of

the 1988 LRDP land use designations. Scenarios C1 and C2 assume a portion of the program is accounted for in the Developed Campus. Scenario C3 assumes 100% of the program is located in the North Campus.

Scenario C1: Redefine 1988 LRDP Designations #1

Scenario C1 identifies a way to allocate the remaining housing program in the North Campus assuming that the 1988 LRDP Environmental Reserve designation remains but all other areas are open for development within defined site constraints. This scenario assumes a non-continuous "loop" road to service the area.

Scenario C2: Redefine 1988 LRDP Designations #2

Like Scenario C1, Scenario C2 identifies how to allocate the remaining housing program in the North Campus assuming that the 1988 LRDP Environmental Reserve designation remains but all other areas are open for development within defined site constraints. This scenario assumes a "linear" road connecting to Empire Grade to service the area.

Scenario C3: No 1988 LRDP Designations

Scenario C3 establishes a development approach for the ENTIRE program in the North Campus without consideration of 1988 LRDP land use designations but within defined site constraints.

Comparison of Scenarios

The analysis provides a comparison of the capacity analysis for all five scenarios.

Circulation

The analysis summarizes findings from the circulation analysis.

Comparison of Costs

The analysis provides a comparison of costs for all five scenarios.

SITE ANALYSIS

The capacity analysis examines the physical characteristics of the campus to establish what land is appropriate for development and what is not. The analysis looks at slope and environmental factors to make this determination, resulting in a composite constraints map. All development scenarios discussed in the next section are considered within the site constraints outlined here.

In addition, all development in the North Campus must have at least two means of egress. The North Campus also requires all new infrastructure including:

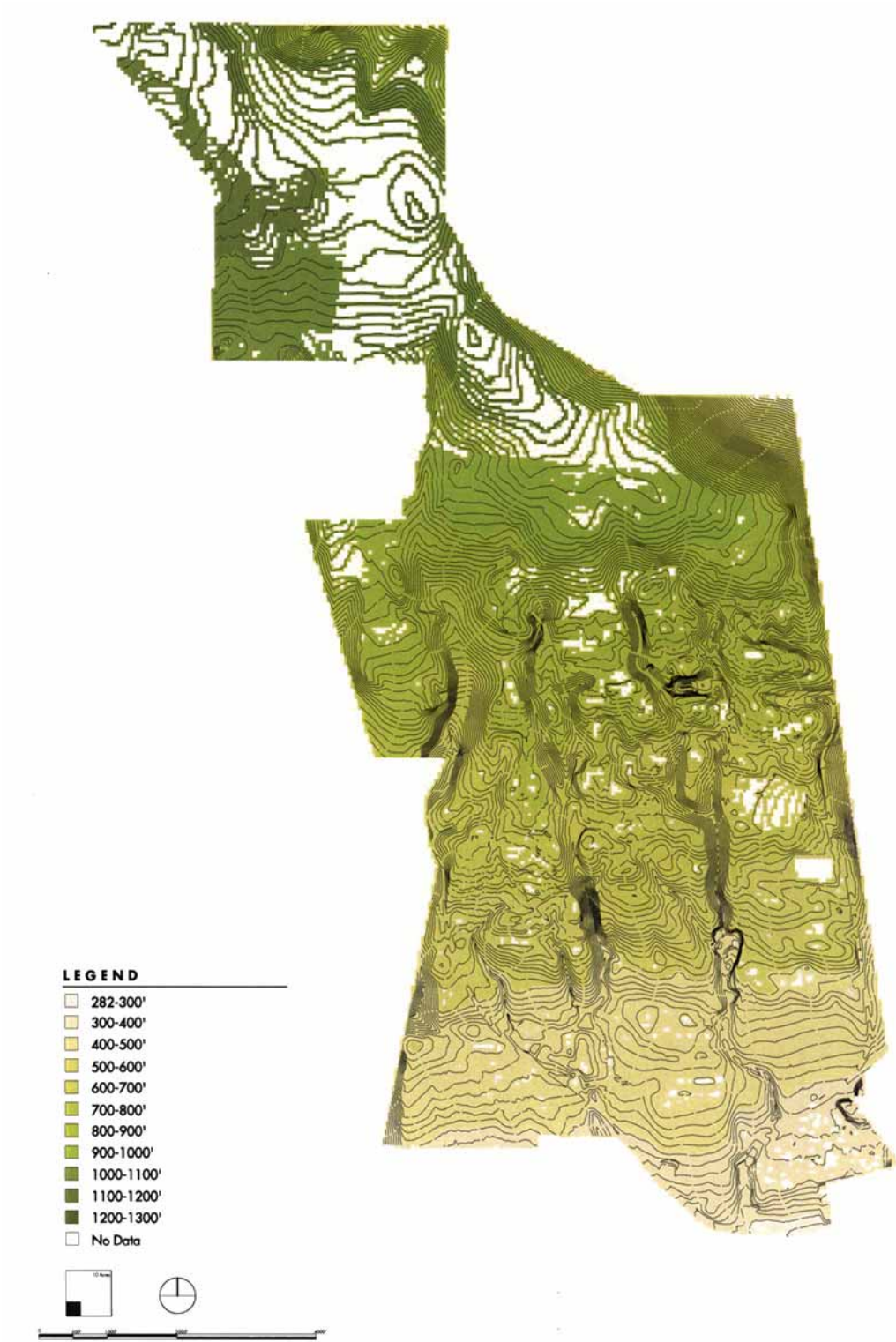
- Water
- Sewer
- Gas
- Electricity
- Data
- Telecom
- Storm (part of existing system)

Slope Analysis

The Developed and North Campuses are located on hilly terrain with slope conditions varying from slight (0% - 10%) to moderate (10% to 20%), to steep (20% or more). While both locales are hilly, the North Campus has gentler slope conditions of 0% - 10% and 10% - 20%.

2-1 Elevation Analysis

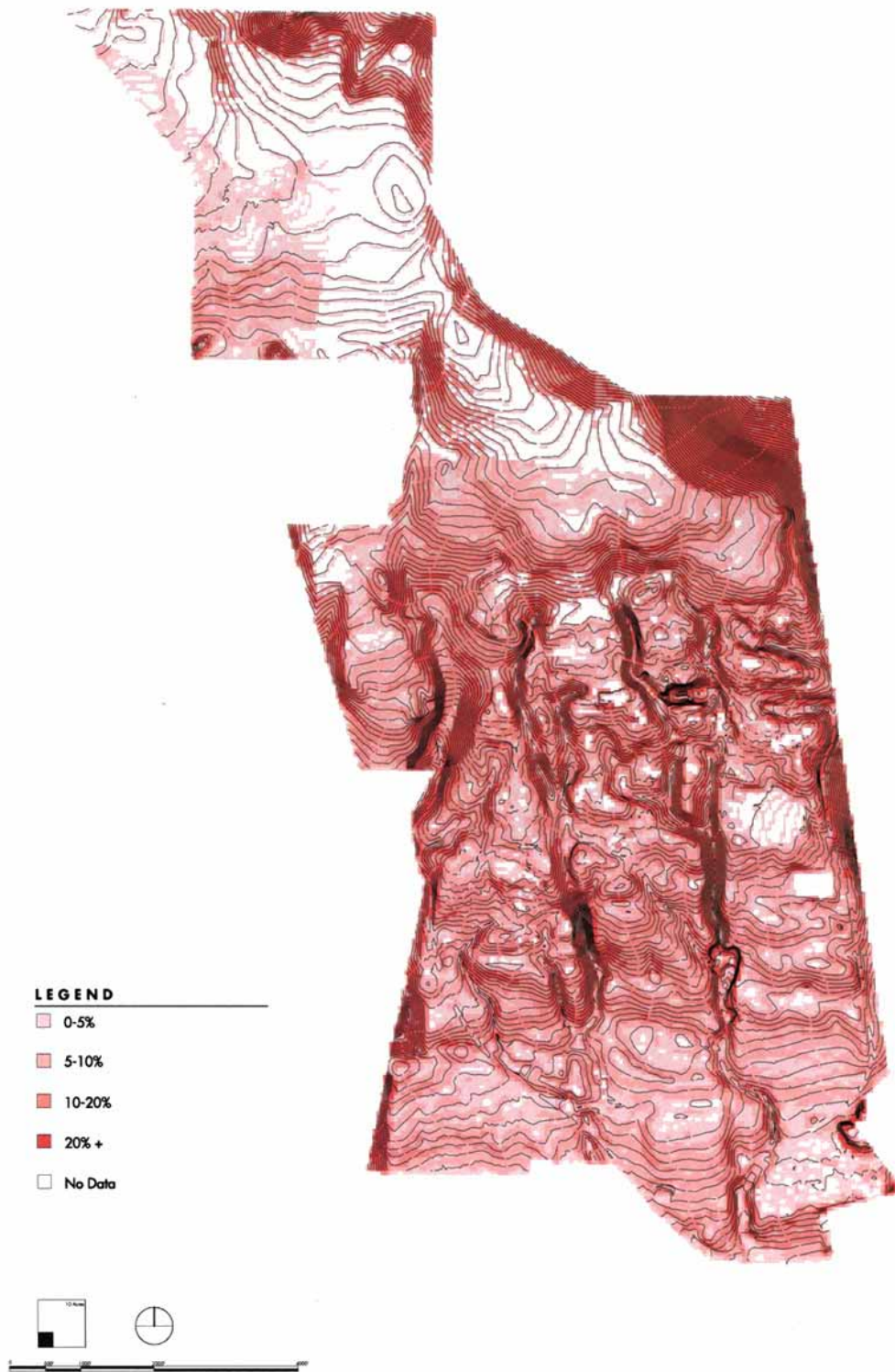
Elevations rise from 400 - 500 feet at the southern edge of the campus to 1,100 feet and higher in the North Campus.



2-1

2-2 Slope Analysis

Slopes are steepest at the ravines that run through campus. Gentler slopes exist in large portions of the North Campus.



2-2

2-3 Slope Analysis of the North Campus

Geographic information system analysis provided the basis of the slope analysis used in the capacity studies.

- **0% to 10% slope**

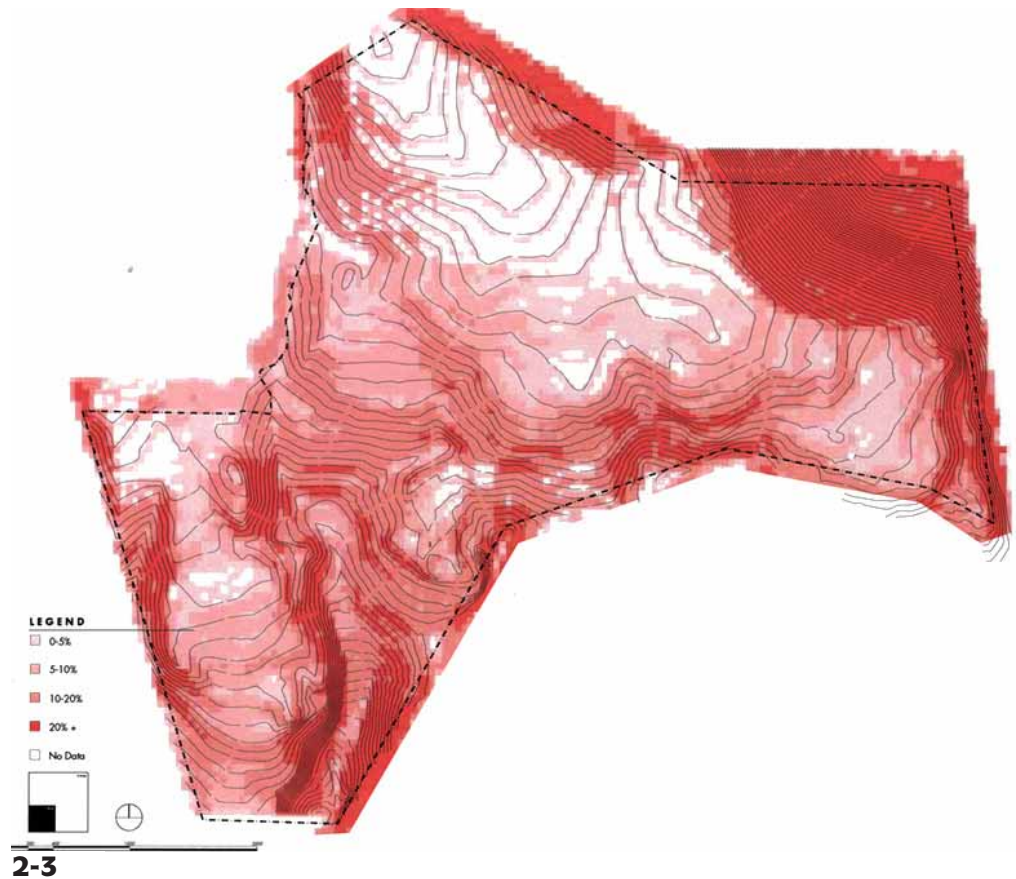
Land that is the easiest land to develop.

- **10% to 20% slope**

Land that can be developed but costs will be slightly higher and density assumed to be slightly lower.

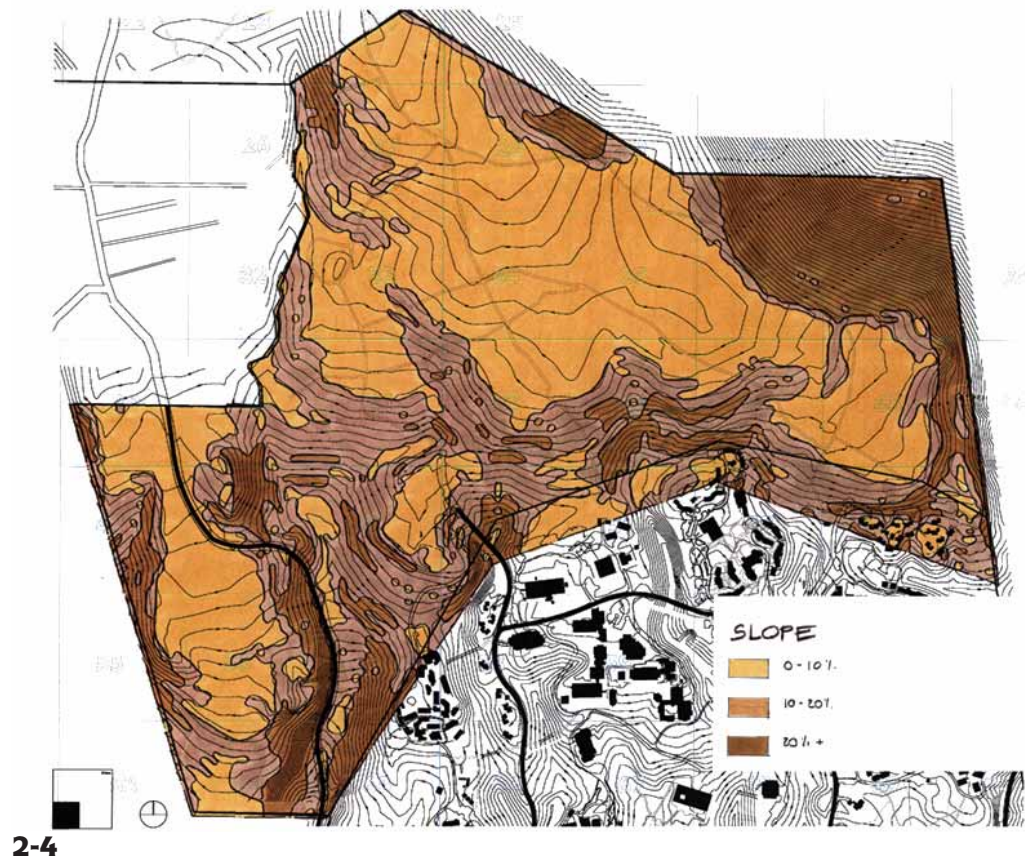
- **20% and higher slope**

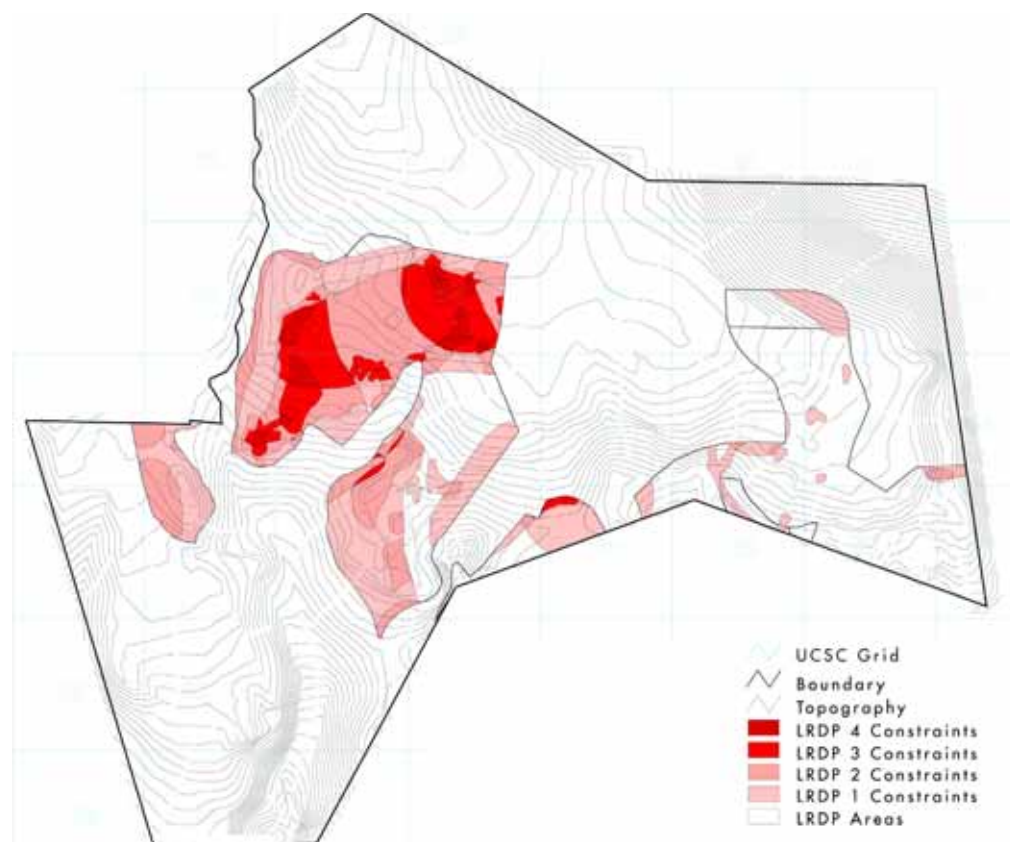
Land that cannot be built on, consistent with University policy.



2-4 Slope Analysis of the North Campus

Hand drawn version of the computer generated slope analysis.

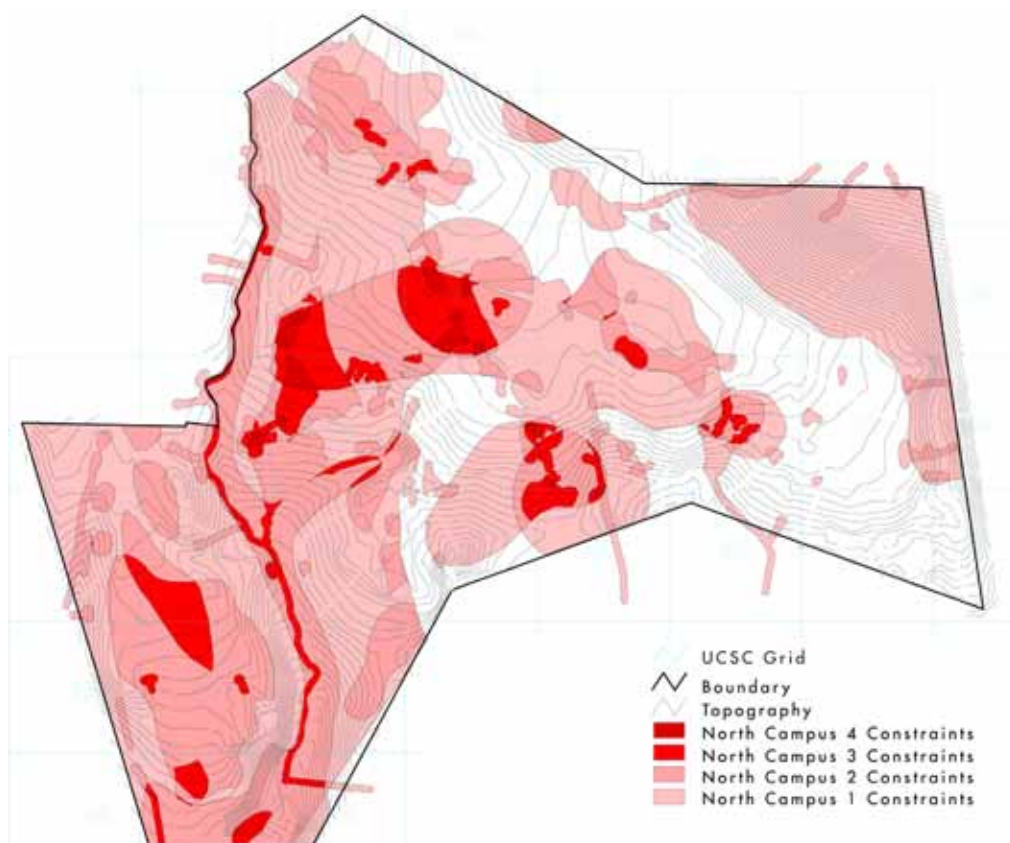




2-5 Environmental Constraints within 1988 LRDP Land Use Designations

The analysis identifies known environmental constraints existing within the 1988 LRDP boundaries for the North Campus for areas designated for development.

2-5



2-6 Environmental Constraints for the Entire North Campus

This analysis addresses the whole of the North Campus irrespective of the 1988 LRDP land use designations.

2-6

Environmental Analysis

The accompanying figures illustrate areas where environmental constraints are present in the North Campus. For purposes of this analysis, it is assumed that any environmental constraint in the Developed Campus can be mitigated. Appendix H includes a detailed report concerning environmental factors in the North Campus.

The analysis considers the following environmental factors:

Hydrology

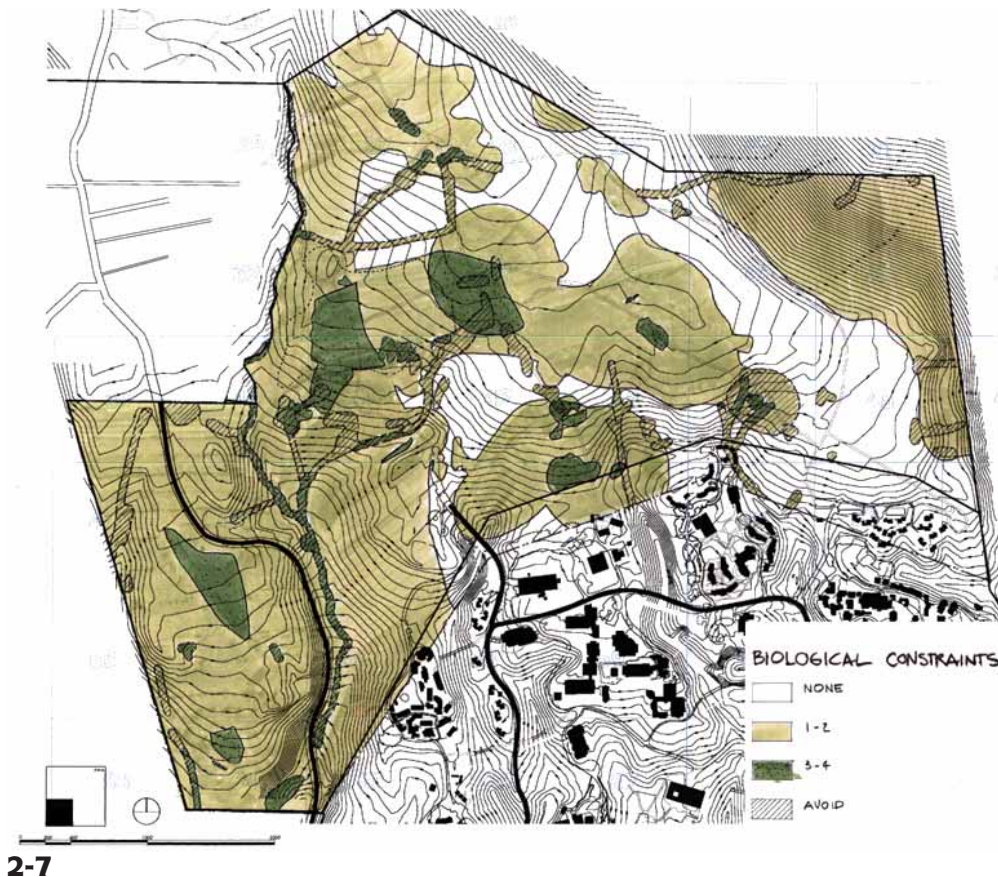
- Springs
- Seeps
- Watersheds
- Soils

Biology

- Santa Cruz Manzanita, threatened plant per the California Native Plant Society
- Northern Maritime Chaparral, rare plant community
- Coastal Terrace Prairie, rare plant community
- Habitat Diversity
- Locally Important Habitats
- Bats, seven special-status bat species

- California Red-legged Frog, threatened species per the federal Endangered Species Act (ESA)
- Sharp-shinned Hawk, special status raptor species
- Cooper's Hawk, special status raptor species
- White-tailed Kite, special status raptor species
- Ohlone Tiger Beetle, endangered species per the ESA

Geology and soil conditions are not considered environmental issues in regards to site capacity. The North Campus is underlain primarily by schist with some granite, and it is capped by a relatively thin layer of sandstone. This is in contrast to the Developed Campus, which is underlain by limestone marble. In general, both campuses exhibit low land sliding, liquefaction, and fault hazards.



2-7 Biological Constraints

The analysis organizes the number of environmental constraints as:

- **No Constraints**

This is the best area to develop based on environmental factors.

- **Low Constraints**

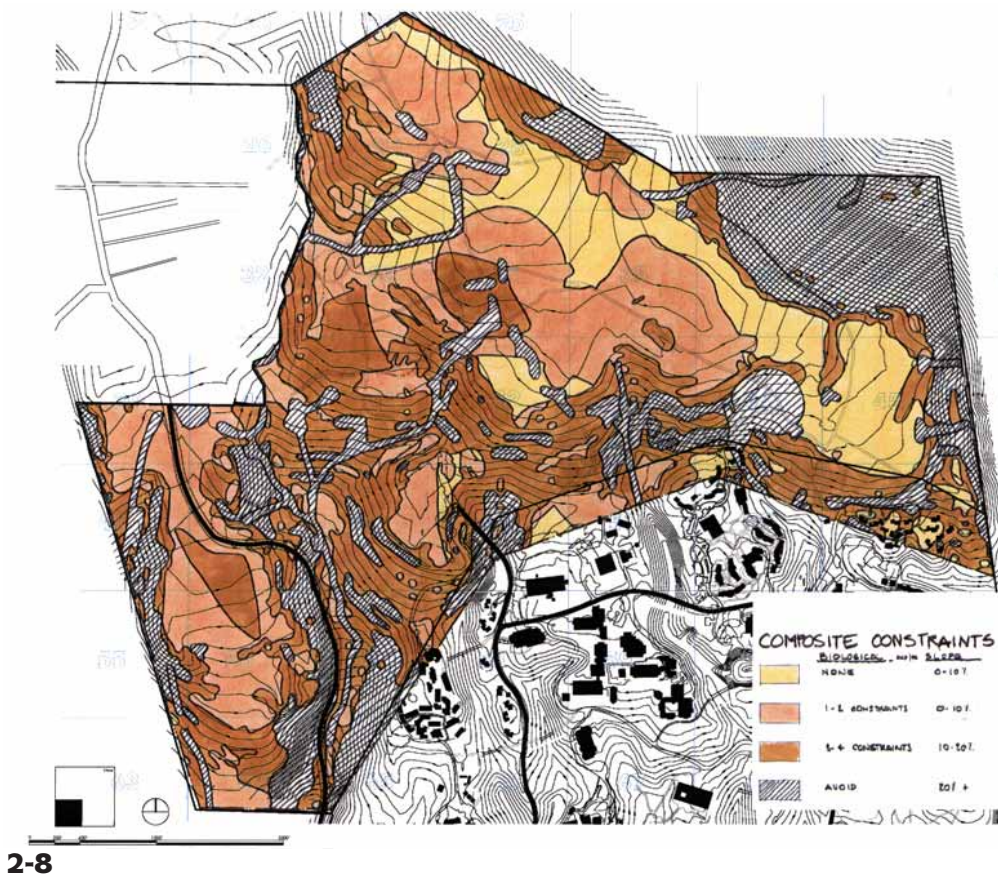
With one or two environmental constraints that can be mitigated, these areas are acceptable for development

- **Moderate Constraints**

With three or four environmental constraints that can be mitigated, these areas could be developed but should be avoided.

- **Avoid**

These areas have five or more environmental constraints, or include constraints that cannot be mitigated, and are to be avoided.



2-8 Composite Constraints

- **No Constraints**

No environmental constraints and 0% to 10% slopes and are the best locations for development.

- **Low Constraints**

One to two environmental constraints and 0% to 10% slopes and are acceptable for development. In these locations, existing environmental constraints can be mitigated.

- **High Constraints**

Three to four environmental constraints and/or 10% to 20% slopes, and development in these locations would be most difficult.

- **Avoid**

These locations environmental constraints that are not (easily) mitigable and/or have 20% or higher slopes. Development in these locations is not allowed.

Composite Constraints

The analysis of site characteristics combines the results of the slope analysis and environmental analysis to create a composite constraints map. Figure 2-8 illustrates overall constraints for the North Campus. The analysis establishes the least problematic locations for development.

In the next phase of work, environmental mitigation requirements will be refined and quantified.

CAPACITY SCENARIOS

Program Assumptions

The program includes a mix of housing, associated recreational facilities (physical education, recreation, and sports programs or OPERS), and remote storage parking. The November 2001 draft physical program uses the housing goals established in the 1988 LRDP to quantify the remaining housing units to be built. The 1988 LRDP identifies a population mix of 85% undergraduates and 15% graduate students, resulting in the program below. (For details, see the Appendix for the most current draft of the program).

Student and Faculty Housing 872 units

Summarized below and in the Appendix, the proposed housing accommodates undergraduates, graduates, undergraduate and graduate students and their families, and faculty and staff (for sale and rental units) in 872 units.

- Undergraduate
477 units
- Graduate
194 units
- Family Student:

Undergraduate
67 units

- Family Student: Graduate
34 units
- Faculty/Staff: For Sale
50 units
- Faculty/Staff: For Rent
50 units

Recreation Field (OPERS) 10 acres

Associated with housing, recreation is a minimum of 10 acres of play fields on relatively flat land. It may be in one location or on several sites to better serve the residential developments.

Parking 800 -1,000 parking stalls

Parking is long-term "storage" parking for students and others living on campus. It accommodates 800 to 1,000 parking spaces on surface lots, requiring approximately 10 acres of level land.

Density Assumptions

In order to establish the amount of acres needed to accommodate the program, the analysis looks at existing residential developments and Colleges in the Developed Campus. Housing at the University provides the best model for establishing residential density, given the University's unique physical setting.

The analysis uses four approaches to establish density as measured by units/acre, resulting in a range of density for any given housing type. The following figures summarize and illustrate the findings. (See Appendix for more detail.)

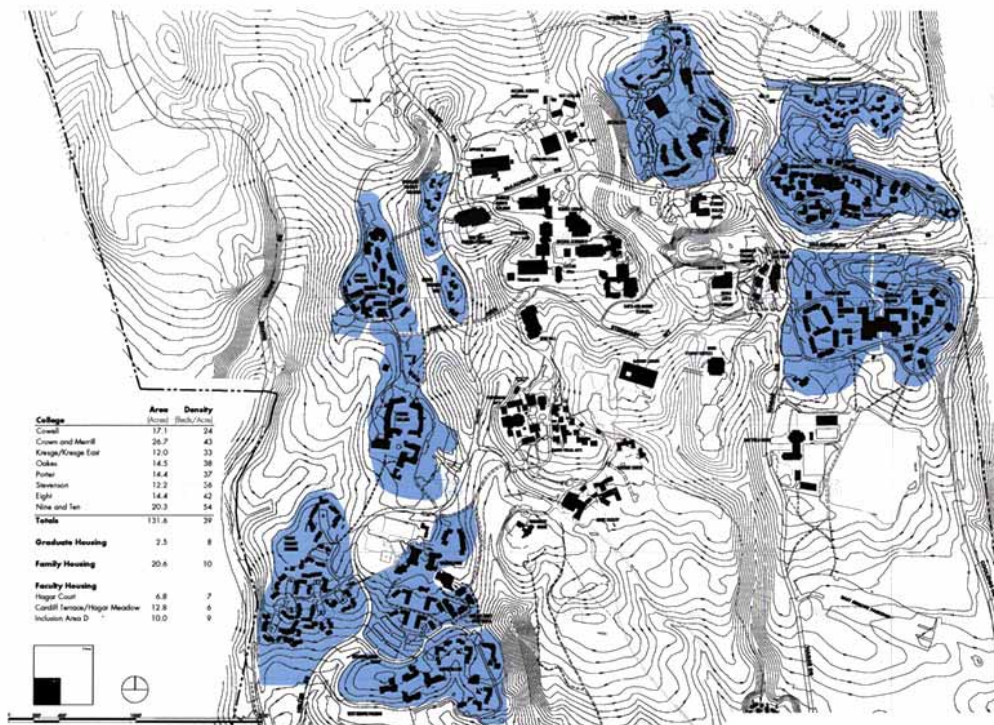
The four approaches for establishing density are:

- **Area 1**
Includes all College buildings and grounds, including all open spaces and parking areas generally associated with the College.
- **Area 2**
Like Area 1 but excludes any parking areas.

- **Area 3**
Includes all College buildings and immediate open spaces, excluding undeveloped areas and parking areas.
- **Area 4**
Like Area 3 but separates the areas dedicated to Residence Halls (and Dining Halls) from the areas dedicated to apartments and excludes academic uses.

The resulting range of density used in the analysis is **6 - 25 units per acre**, assuming 2 to 4 story construction. Selected densities based on the housing type and the physical characteristics of the land were used to allocate housing to potential infill sites in the Developed Campus and to the development envelopes identified in the North Campus.

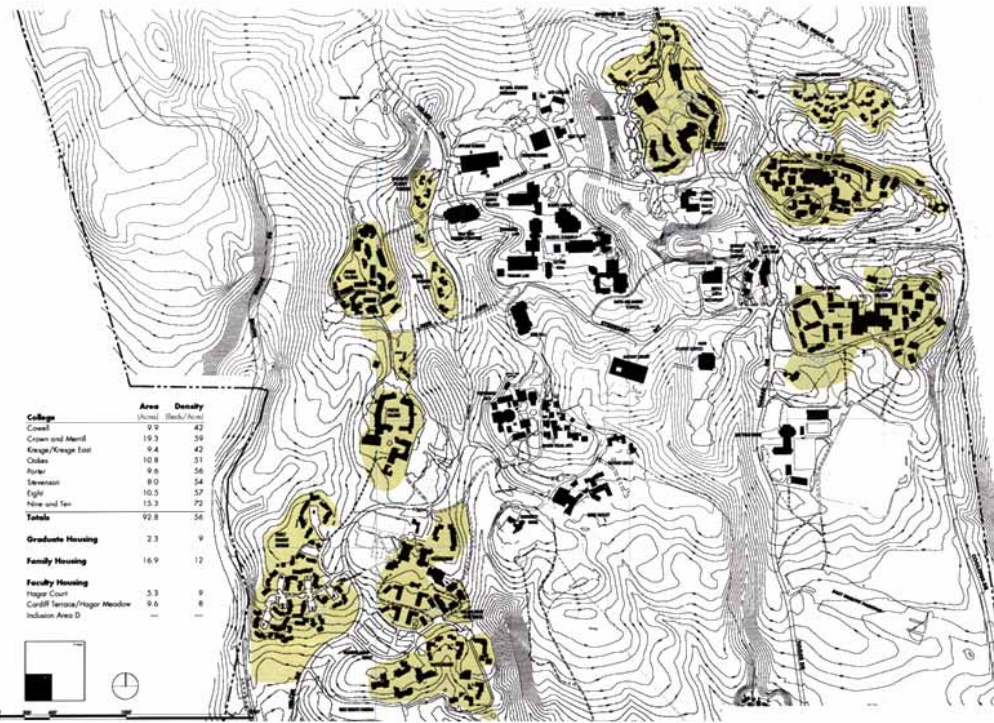
Determining the carrying capacity of each site, the locations and densities used in the scenarios vary depending on the physical characteristics of available sites. As the master plan develops further, these densities will be refined based on specific development alternatives.



2-9 Density Study: Area 1

Density Study: Area 1 looked at all College buildings and grounds, including associated open space and parking.

2-9



2-10 Density Study: Area 2

Density Study: Area 2 looked at all College buildings and grounds, including open space and excluding parking.

2-10

**2-11 Density Study:
Area 3**

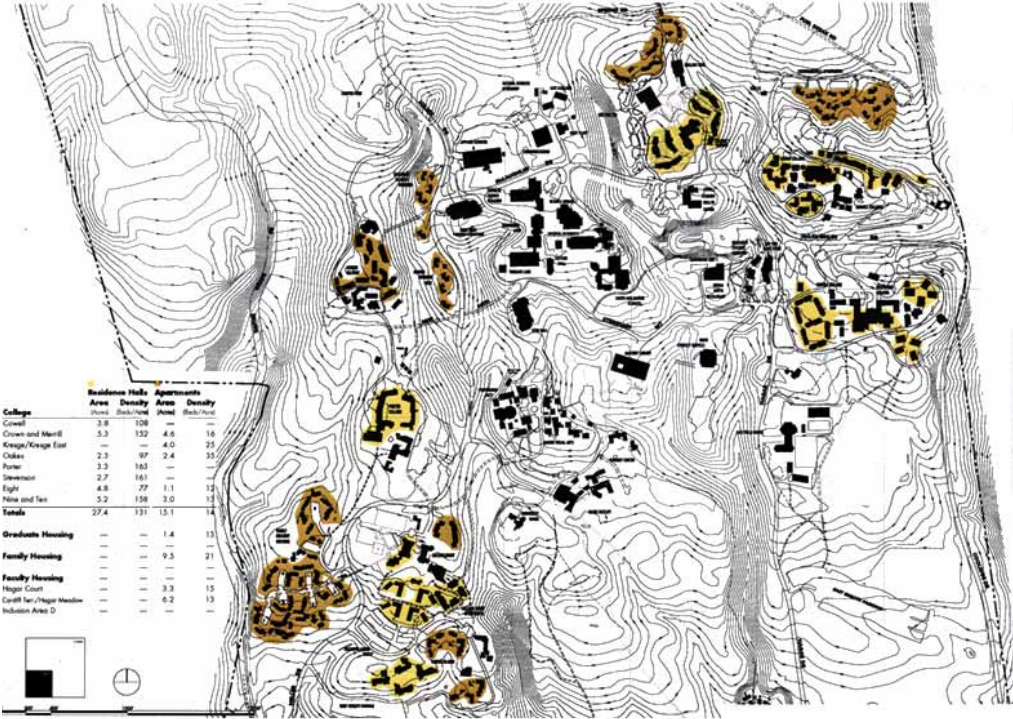
Density Study: Area 3
looked at all College build-
ings and immediate open
spaces, and excluded unde-
veloped areas and parking.



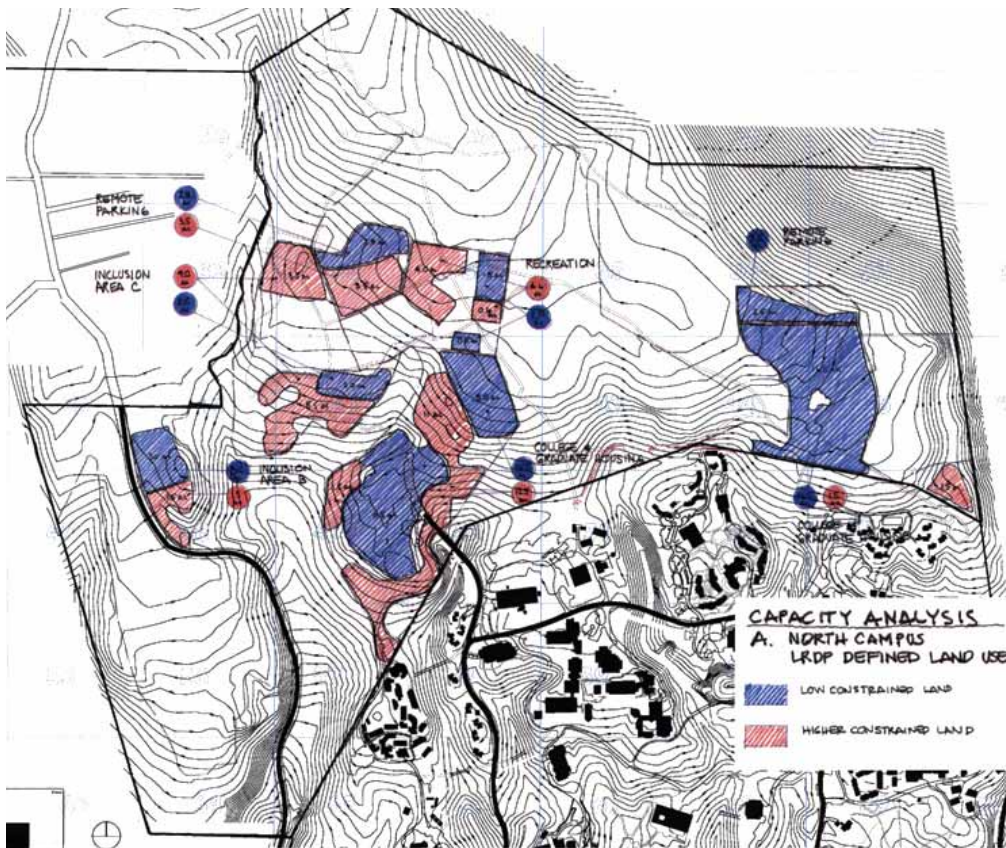
2-11

**2-12 Density Study:
Area 4**

Density Study: Area 4
looked at all College
buildings and immediate
open space but separates
the areas dedicated to
residence halls and din-
ing facilities from areas
dedicated to apartments.
It also excludes academic
uses.



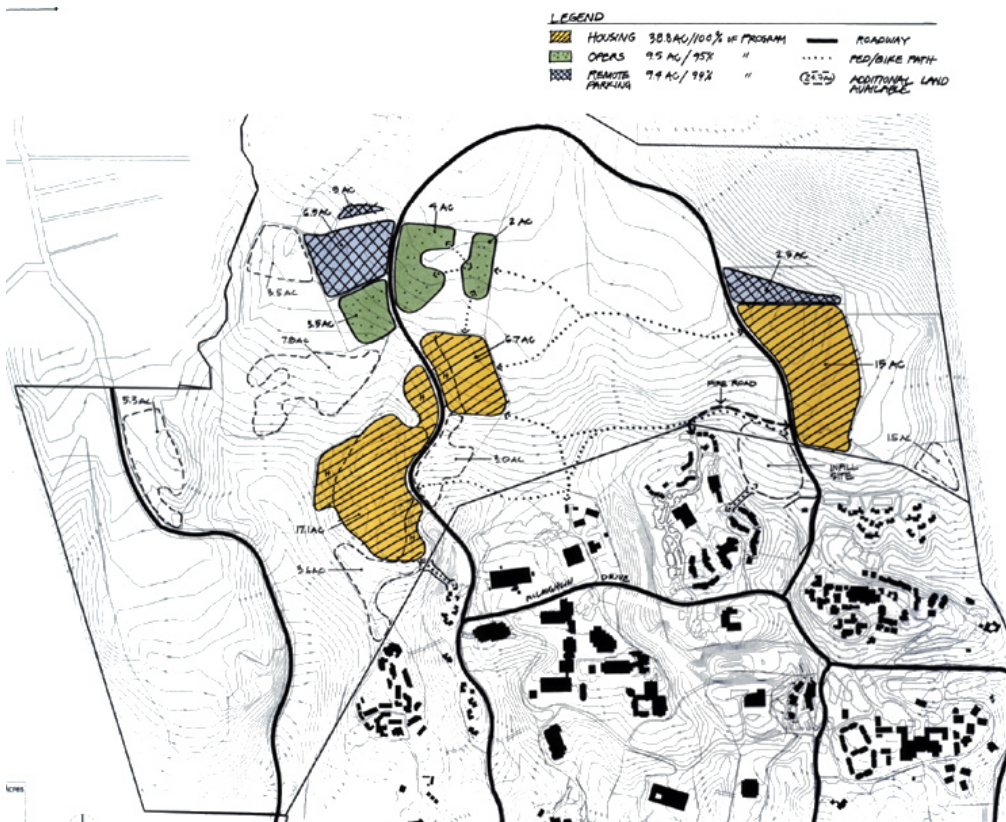
2-12



2-13

2-13 North Campus Capacity using 1988 LRDP

The red and blue areas illustrates the capacity of the North Campus, identifying areas with low constraints and higher constraints for lands currently designated for residential, OPERS, and parking.



2-14

2-14 Scenario A Program Accommodation

The colored and outlined areas illustrate how 100% of the program might be located in the North Campus on low- and high-constrained lands. The colored areas alone illustrate how the remaining 70% of the program (the amount of program that can not be accommodated in the Developed Campus) might be located in the North Campus.

2-15 Scenario A Accommodation Summary

Scenario A accommodates 100% of the housing program and nearly all of the recreation and parking programs.

Scenario A		Program	
Housing			
Total Housing Needed	872	units	100%
Total Housing Achieved: North Campus	872		100%
Total Remaining	0		0%
OPERS			
Total Recreation Needed	10.0	acres	100%
Total Recreation Achieved	9.5		95%
Total Remaining	0.5		5%
Parking			
Total Parking Needed (800 - 1,000 spaces)	10.0	acres	100%
Total Parking Achieved	9.4		94%
Total Remaining	0.6		6%

2-15

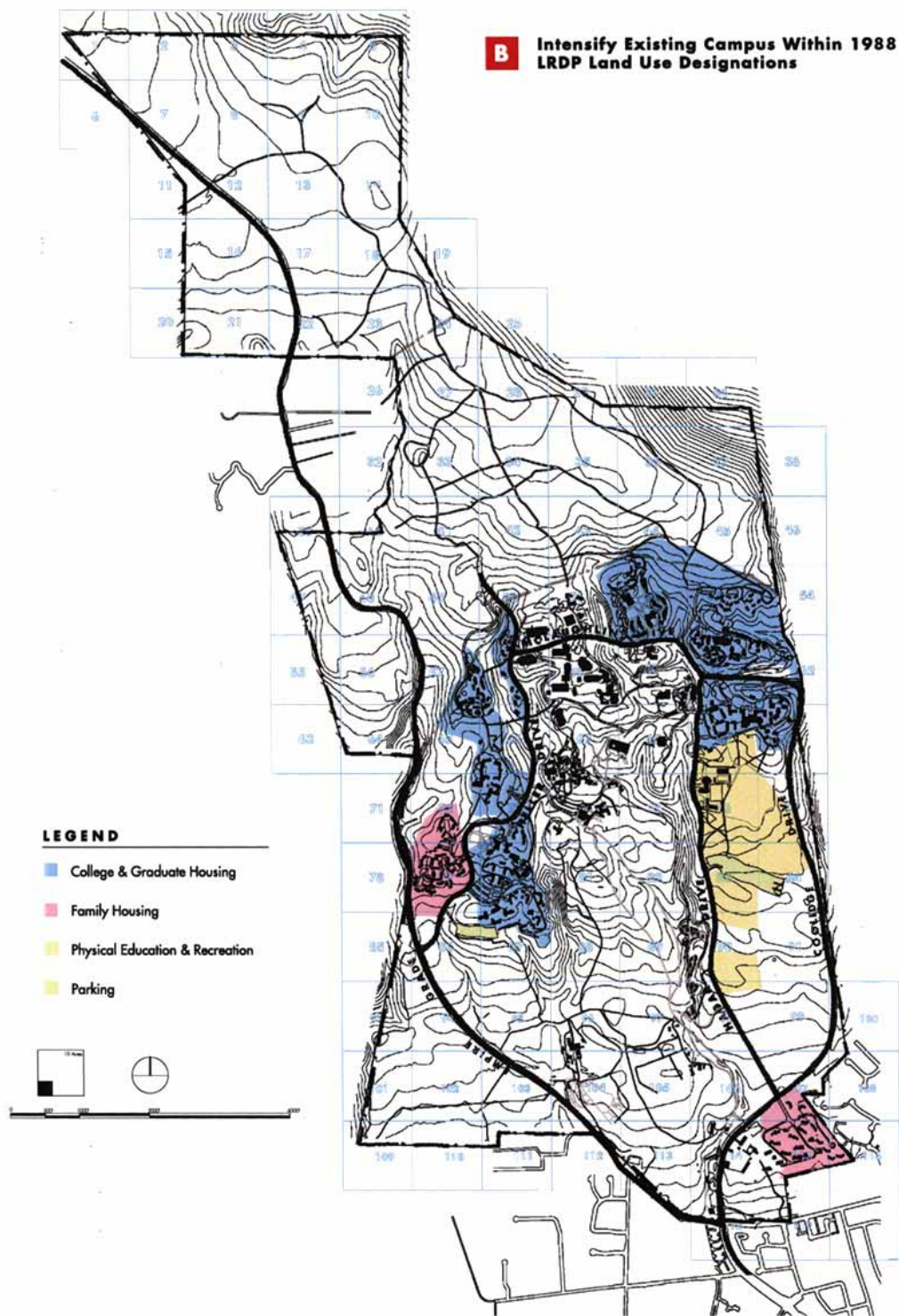
SCENARIO A 1988 LRDP DESIGNATIONS

Scenario A considers how much of the entire program might be accommodated in the North Campus within the 1988 LRDP land use designations and defined site constraints. This scenario excludes land designated Environmental Reserve in the 1988 LRDP

Findings

Using the assumptions of Scenario A, the North Campus can accommodate 100% of the housing program, 95% of the recreation (OPERS) program, and 94% of the parking program

- The entire program can only be accommodated by using low- and high-constrained lands, and it results in a fragmented land use pattern.
- The remaining residential program can be accommodated in the North Campus within the existing 1988 LRDP designations.
- The entire recreation and parking program cannot be fully accommodated in the North Campus within the existing 1988 LRDP designations.



2-16 Potential Infill Sites in the Developed Campus

This figure identifies possible sites for infill housing based on the 1988 LRDP land use designations and the sites appropriate for development. In general, preferred sites are those adjacent to existing housing and Colleges with no existing development and low slopes or flat. The sites include some existing parking lots. The analysis assumes that any environmental impacts would be mitigated.

2-16

**2-17 Scenario B
Accommodation Summary**
Scenario B accommodates approximately 30% of the housing program.

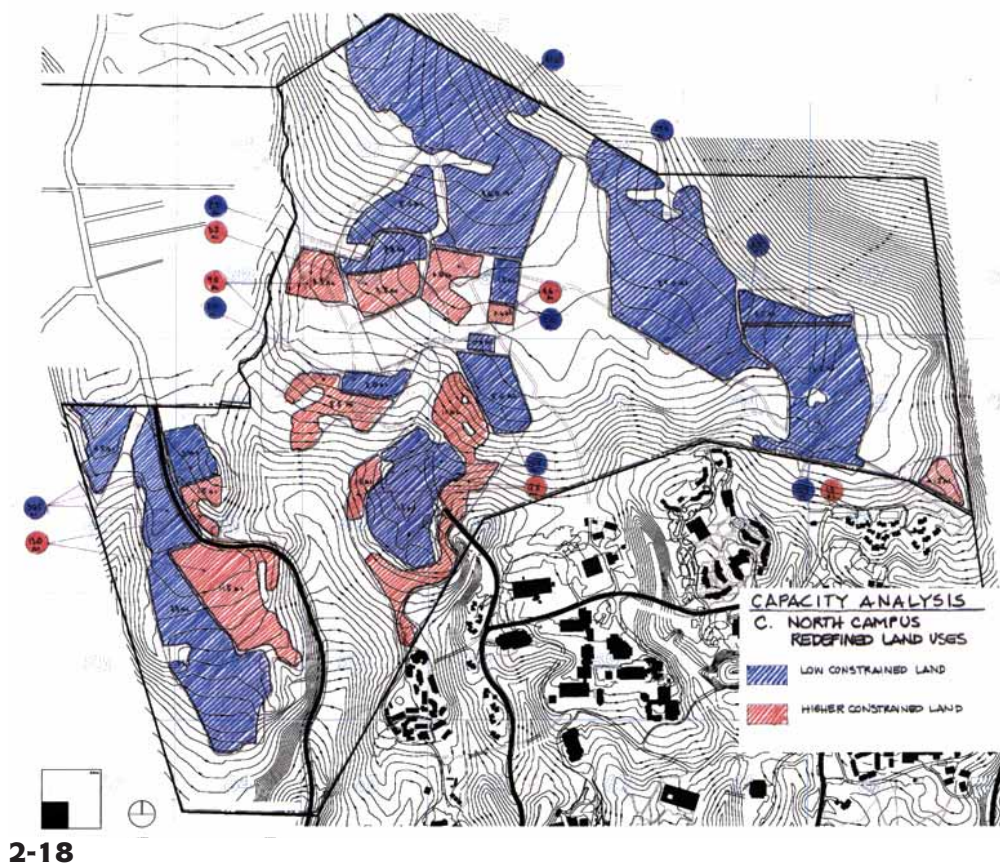
Scenario B	Program	
Housing		
Total Housing Needed	872 units	100%
Total Housing Achieved: Developed Campus (on average)	<u>290</u>	30%
Total Remaining	582	70%

2-17

**SCENARIO B
INFILL AND PROGRAM
ALLOCATION**

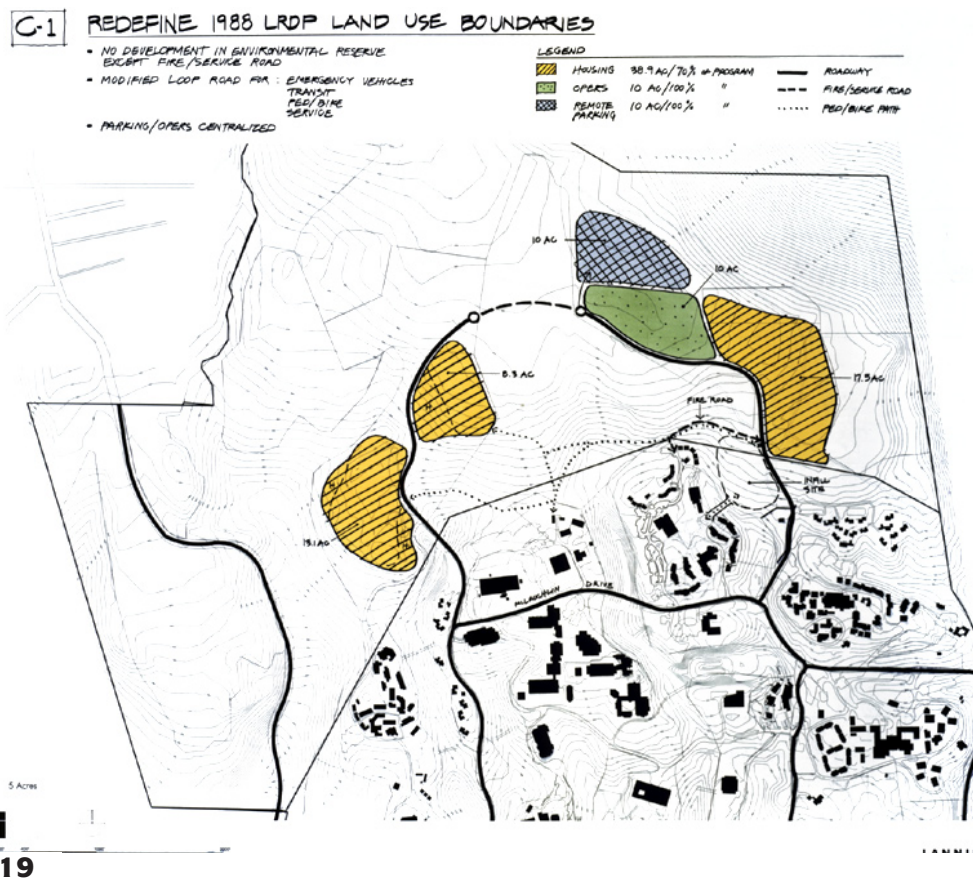
Scenario B considers how much of the housing program might be accommodated in the Developed Campus within the 1988 LRDP land use designations. This scenario reflects the 1988 LRDP, which advocates development in the Developed Campus prior to undertaking improvements in the undeveloped areas. This scenario does not consider accommodation of recreation and parking programs.

Findings
 The Developed Campus can accommodate approximately 30% of the housing program



2-18 Capacity Based on New Land Use Designations While Retaining the Environmental Reserve

The red and blue areas illustrate the capacity of the North Campus, identifying lands with low constraints and high constraints for all areas not designated Environmental Reserve. Low constraint areas are the areas primarily considered for development.



2-19 Scenario C1

Program Accommodation

This figure illustrates how the remaining program might be located in the low constrained lands of the North Campus, identifying the amount of program both in acreage and percentage.

2-20 Scenario C1 Accommodation Summary
Scenario C1 accommodates the entire housing, recreation (OPERS), and parking programs. The low constrained lands can achieve an estimated 750 - 2,500 housing units depending on housing densities,

Scenario C 1		Program	
Housing			
Total Housing Needed	872	units	100%
Total Housing Achieved: Developed Campus	290		30%
Total Housing Achieved: North Campus	582		70%
Total Remaining	<hr/> 0		0%
OPERS			
Total Recreation Needed	10.0	acres	100%
Total Recreation Achieved	<hr/> 10.0		100%
Total Remaining	<hr/> 0.0		0%
Parking			
Total Parking Needed (800 - 1,000 spaces)	10.0	acres	100%
Total Parking Achieved	<hr/> 10.0		100%
Total Remaining	<hr/> 0.0		0%






2-20

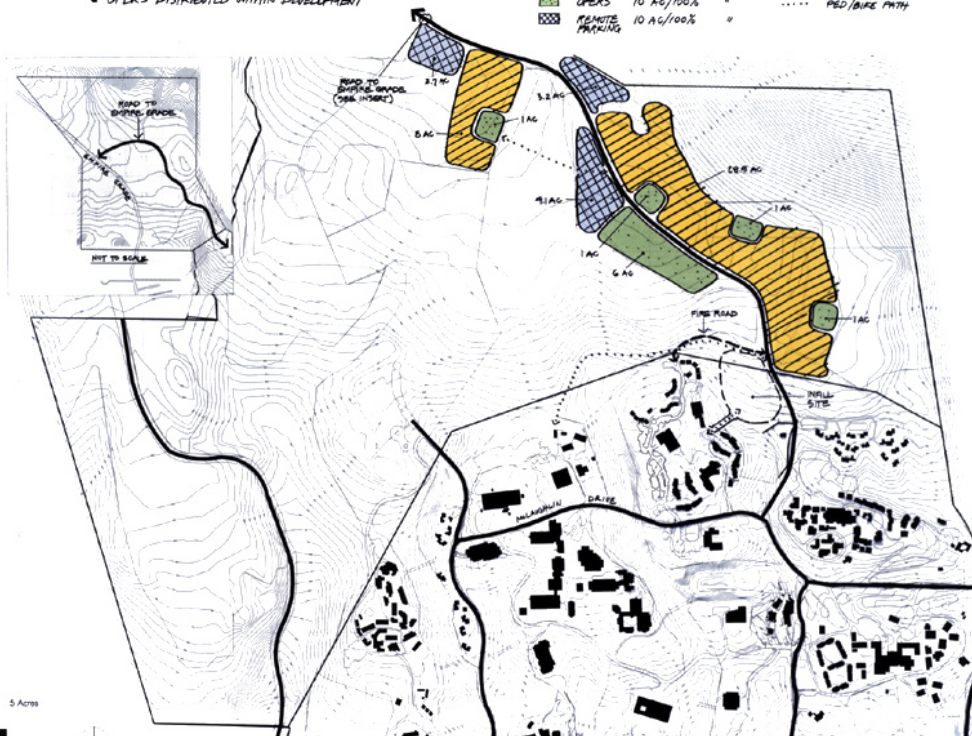
**SCENARIO C1
REDEFINE 1988 LRDP
DESIGNATIONS #1**

Scenario C1 considers how much program might be accommodated in the North Campus assuming the 1988 LRDP Environmental Reserve designation remains but all other areas are open for development within defined site constraints. In addition, Scenario C1 considers how much of the remaining housing program units not located in the Developed Campus (defined by Scenario B) might be accommodated in the North Campus. This scenario includes centralized recreation and parking facilities and a modified loop road (with limited access) that passes through Environmental Reserve lands to accommodate emergency vehicles, transit, service, bicycles, and pedestrians.

Findings
The North Campus can accommodate housing far in excess of the 582 units needed to satisfy the remaining housing program within site constraints and excluding Environmental Reserve lands.

C-2

- LEGEND**
- | | | | | |
|---|----------------|--------------------------|---|----------------------|
|  | HOUSING | 36.5 AC / 70% OF PROGRAM |  | ROADWAY |
|  | OPERS | 10 AC / 100% " |  | PEDESTAL / BIKE PATH |
|  | REMOTE PARKING | 10 AC / 100% " | | |



This figure illustrates how the program might be located in the primarily low constrained lands of the North Campus, identifying the amount of program in acreage and percentage.

**2-22 Scenario C2
Accommodation Summary**
Scenario C2 accommodates the entire housing, recreation (OPERS), and parking programs.

Scenario C2		Program	
Housing			
Total Housing Needed	872 units	100%	
Total Housing Achieved: Developed Campus	290	30%	
Total Housing Achieved: North Campus	582	70%	
Total Remaining	0	0%	
OPERS			
Total Recreation Needed	10.0 acres	100%	
Total Recreation Achieved	10.0	100%	
Total Remaining	0.0	0%	
Parking			
Total Parking Needed (800 - 1,000 spaces)	10.0 acres	100%	
Total Parking Achieved	10.0	100%	
Total Remaining	0.0	0%	

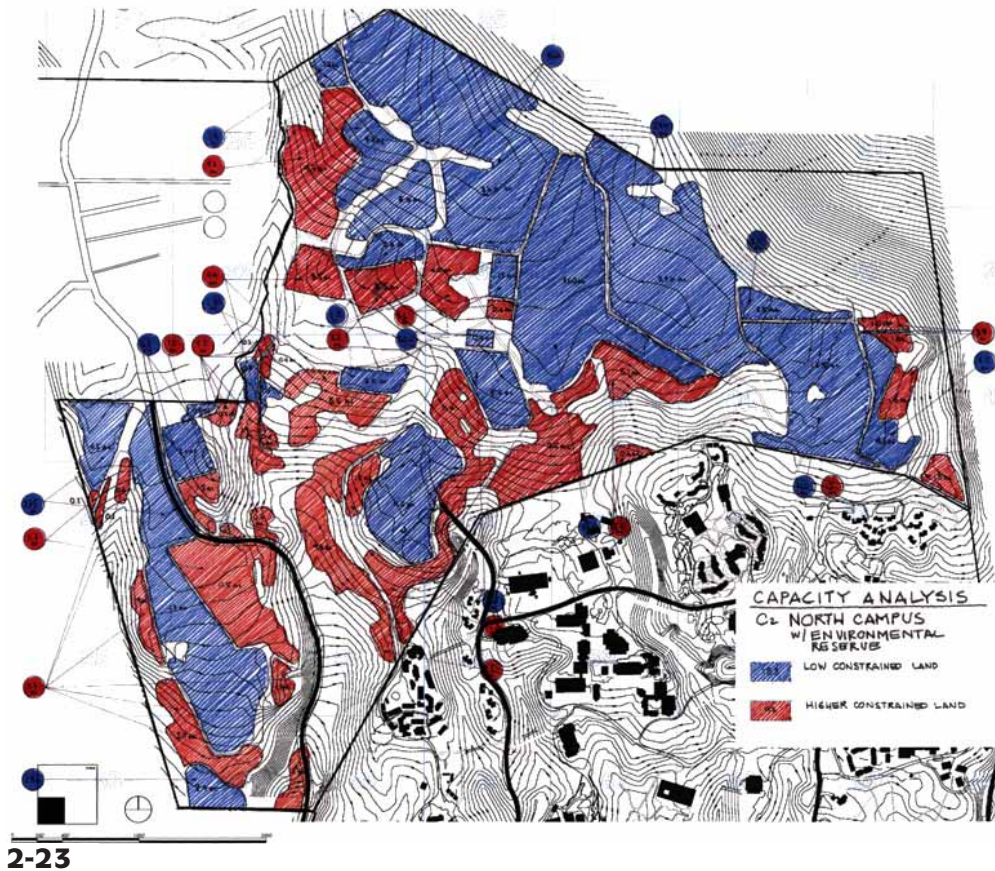
2-22

**SCENARIO C2
REDEFINE 1988 LRDP
DESIGNATIONS #2**

Like Scenario C1, Scenario C2 considers how much of the remaining housing program not located in the Developed Campus (defined by Scenario B) might be accommodated in the North Campus, assuming the 1988 LRDP Environmental Reserve designation remains but all other areas are open for development within defined site constraints. This scenario includes recreation (OPERS) distributed within the development, multiple parking facilities, and a road connecting with Marshall Field/Empire Grade (and not looping back to campus). Unlike C1, this scenario introduces no improvements, such as a roadway, in the Environmental Reserve area. In this scenario, development is most easily introduced on contiguous, low constrained land.

Findings

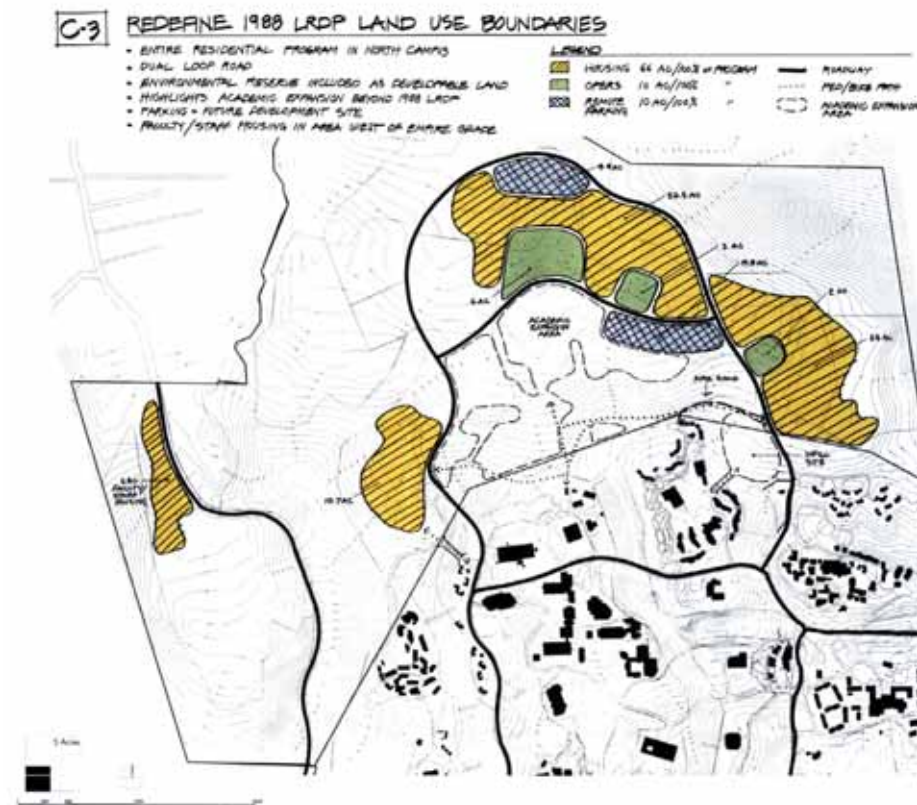
Like Scenario C1, Scenario C2 accommodates the remaining program.



2-23 Capacity Based on New Designations for all Land Uses

This figure illustrates the capacity of the North Campus, identifying areas with low constraints and higher constraints. Low constraint areas are the areas primarily considered for development. The capacity assumes re-designation of all 1988 LRDP land use designations, including the Environmental Reserve

2-23



2-24 Scenario C3 Program Accommodation

This figure illustrates how the program might be located in the low constrained lands of the North Campus, identifying the amount of program in acreage and percentage.

2-24

**2-25 Scenario C3
Accommodation Summary**
Scenario C3 accommodates the entire housing, recreation (OPERS), and parking programs.

Scenario C3		Program	
Housing			
Total Housing Needed	872	units	100%
Total Housing Achieved: North Campus	872		100%
Total Remaining	<hr/> 0		0%
OPERS			
Total Recreation Needed	10.0	acres	100%
Total Recreation Achieved	10.0		100%
Total Remaining	<hr/> 0.0		0%
Parking			
Total Parking Needed (800 - 1,000 spaces)	10.0	acres	100%
Total Parking Achieved	10.0		100%
Total Remaining	<hr/> 0.0		0%

2-25

**SCENARIO C3
NO 1988 LRDP
DESIGNATIONS**

Scenario C3 considers how the entire program might be accommodated in the North Campus, assuming all areas, including Environmental Reserve, are open for development within defined site constraints. This scenario includes faculty/staff housing west of Empire Grade, multiple recreation and parking facilities, parking facilities that can later become development sites, a dual loop road, and academic expansion areas for programs beyond the 1988 LRDP. With the academic expansion areas, this scenario continues the pattern at the University of academic buildings ringed by residential colleges.

Findings

The North Campus can accommodate 100% of the housing, recreation (OPERS), and parking program.

Composite

Program

Housing

Total Housing Needed	872	units
Scenario A - North Campus	872	100%
Scenario B - Developed Campus	290	30%
Scenario C1 - North Campus	582	70%
Scenario C2 - North Campus	582	70%
Scenario C3 - North Campus	872	100%

OPERS

Total Recreation Needed	10.0	acres
Scenario A - North Campus	9.5	95%
Scenario B - Developed Campus	n/a	n/a
Scenario C1 - North Campus	10.0	100%
Scenario C2 - North Campus	10.0	100%
Scenario C3 - North Campus	10.0	100%

Parking

Total Parking Needed (800 - 1,000 spaces)	10.0	acres
Scenario A - North Campus	9.4	94%
Scenario B - Developed Campus	n/a	n/a
Scenario C1 - North Campus	10.0	100%
Scenario C2 - North Campus	10.0	100%
Scenario C3 - North Campus	10.0	100%

2-26 Comparison of Scenarios

The table summarizes the abilities of all five scenarios to accommodate the desired housing, recreation (OPERS), and parking programs on the Developed and North Campuses.

CIRCULATION

Described in more detail in the Appendix, findings from the circulation analysis follow:

- Creation of a loop road connecting the developed ends of Chinquapin Road to Heller Drive is desirable. The most direct layout extends the road through the campus Environmental Reserve.
- Fire safety will require a secondary means of egress for any development in the North Campus.
- The bridge to Empire Grade, as identified in the 1988 LRDP, is not required for either fire safety or to mitigate traffic flows at the West Entry.
- A continuation of Coolidge Drive (to the east of the Merrill Provost House), as identified in the 1988 LRDP, is not feasible.
- Further Campus development may require traffic control devices, pedestrian crossovers, or road closures (to private vehicles) in the core campus.
- The longer the circulation loop, the less desirable for transit and other alternative transportation.
- Pedestrian/bicycle connection from residential areas to the academic core is complicated by topography.
- Pedestrian/bicycle connections may affect the campus Environmental Reserve.

COMPARISON OF COSTS

A comparison of costs of the various scenarios was developed to identify an overall magnitude of costs and to determine whether there are significant differences in costs between the scenarios that may influence decisions regarding location of the development.

Discussed in detail in the Appendix, the comparison of costs (in December 2001 valued dollars) suggests the following:

- The "ballpark" cost to develop the current program is roughly \$400 million regardless of the combination of scenarios used to achieve the program.
- The differential in cost between combination of scenarios is roughly 4% or smaller, with the development of the Developed Campus less expensive than the North Campus. In general, the differential is small because the savings from using existing infrastructure in the Developed Campus is roughly offset by the economies achieved in developing large, contiguous parcels in the North Campus.
- The cost of intensifying the existing campus through infill development (Scenario B) is approximately \$180 million. This is a constant cost for all combination of scenarios except Scenario C1, which assumes the entire program is located in the North Campus.
- In general, development in the North Campus is roughly 1% to 10% greater than development of infill projects.
- The cost for development of common infrastructure in the North Campus ranges from \$15 - \$30 million.

2-27 Major Programmatic Cost Inclusions and Exclusions

	Included	Excluded
Academic		<ul style="list-style-type: none"> > Capacity Space > Non-Capacity Space
Admin and Support Space		<ul style="list-style-type: none"> > Chancellor > Other Administrative Units > EH+S
Residential	<u>Single Students</u> <ul style="list-style-type: none"> > Undergraduates > Graduates <u>Family Students</u> <ul style="list-style-type: none"> > Undergraduates > Graduates <u>Faculty/Staff</u> <ul style="list-style-type: none"> > For Sale > Rental 	<ul style="list-style-type: none"> > Community Housing > Residential Adjacent Parking > Childcare > Maintenance Facilities > Housing Administration > Residential Life
TAPS	<ul style="list-style-type: none"> > North Remote Lot 	<ul style="list-style-type: none"> > TAPS Offices > Core Parking > Fleet Parking > Transit Parking
Student Affairs	<ul style="list-style-type: none"> > North Campus Playing Fields 	<u>Other OPERS Facilities</u> <ul style="list-style-type: none"> > Events Center > Student Union > Commercial Center
Infrastructure	<u>North Campus Infrastructure</u> <ul style="list-style-type: none"> > Water > Sanitary Sewer > Storm Drainage > Gas > Electric > Communication > Fire > Roads > Road Lighting > Transit Stops > Signalization > Pathways > Landscaping 	<u>Physical Plant</u> <ul style="list-style-type: none"> > Staff Offices > Fleet Parking <u>Equipment Parking</u> <ul style="list-style-type: none"> > Shop Stores > Recycling <u>Grounds Storage</u> <u>Central Campus Infrastructure</u> <ul style="list-style-type: none"> > Utility Upgrades > Circulation Upgrades > Off-Campus Assistance Measures

*See the DLA Capacity Analysis Cost Studies for a basis of estimate and other inclusions and exclusions related to construction costs

2-27

SCENARIOS		Total Recommended Budget Rounded to the nearest hundred thousand		100% Program Cost Comparison Rounded to the nearest hundred thousand	
		Residential	OPERS	Parking	Total Budget for 100% Program
B	Intensify Developed Campus within 1988 LRDP Designations	\$128,700,000	n.a.	n.a.	Cannot achieve 100% Program
A-1	Develop North Campus within 1988 LRDP Designations	\$259,000,000	\$1,600,000	\$4,200,000	A1 + B = \$393,500,000
C-1	Redefine 1988 LRDP Boundaries - excluding Environmental Reserve	\$252,400,000	\$1,700,000	\$4,400,000	C1 + B = \$387,200,000
C-2	Redefine 1988 LRDP Boundaries - excluding Environmental Reserve	\$260,600,000	\$1,700,000	\$4,400,000	C2 + B = \$395,400,000
C-3	Redefine 1988 LRDP Boundaries - including Environmental Reserve	\$388,300,000	\$1,700,000	\$4,400,000	C3 = \$394,400,000

2-28 Recommended Total Budget by Scenario
The general costs for improvements are approximately the same for all combination of scenarios.

2-29

PROGRAM	RESIDENTIAL				OPERS	PARKING
	Undergraduate	Graduate	Family Units (Undergrad and Grad)	Faculty / Staff (For Salaj)	Faculty / Staff (For Rent)	
Total Beds	1,908	777	n.a.	n.a.	n.a.	10 acres
Total Units	477	194	100	50	50	
SCENARIOS						
	Cost (Including Probated Infrastructure, in thousands - 000's)			Cost (in thousands - 000's)		
	Per Bed	Per Bed	Per Unit	Per Unit	Per Acre	Per Acre
B	\$112	\$114	n.a.	n.a.	n.a.	n.a.
	Intensify Developed Campus within 1988 LRDP Designations					
A-1	\$115	\$121	\$344	\$586	\$170	\$442
	Develop North Campus within 1988 LRDP Designations					
C-1	\$112	\$118	\$335	\$571	\$170	\$442
	Redefine 1988 LRDP Boundaries - excluding Environmental Reserve					
C-2	\$115	\$121	\$346	\$590	\$170	\$442
	Redefine 1988 LRDP Boundaries - excluding Environmental Reserve					
C-3	\$113	\$119	\$340	\$580	\$170	\$442
	Redefine 1988 LRDP Boundaries - including Environmental Reserve					

2-29 Probable Costs by Scenario

All combinations of scenarios assume similar product types and use of low constraint, unencumbered land.

3

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