University Of California, Santa Cruz
1992 Bicycle Plan

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POLICY OVERVIEW AND EXECUTIVE SUMMARY

Many communities and institutions have developed bike plans addressing concerns similar to those of the UCSC campus. Rather than simply adopting CalTrans standards, this Plan recommends adoption of a series of policies and design guidelines which evolved under the varied circumstances of those communities. The policies and guidelines identified in this Plan reflect a compilation of the best and most applicable found during our research of those other plans.

This Plan identifies policies and design guidelines for the development and implementation of convenient, efficient, and safe bike routes and related infrastructure. This document is intended to serve as a tool for planners to develop new bike amenities and for bicyclists to understand the intentions and purpose of the university. Furthermore, this Plan may serve to help other institutions create similar plans specific to the conditions and concerns of their particular situations.

The 1992 Bicycle Plan identifies a set of goals and objectives designed to improve and maintain a safe, effective and convenient bicycle circulation system and related infrastructure on the UC Santa Cruz campus.

- Part I of the Plan presents a series of policies intended to guide the development and implementation of this circulation system;
- Part II offers a model bike circulation plan for the campus;
- Part III presents a compilation of bicycle design guidelines and standards recommended for adoption by the campus;
- Appendix A includes a list of planned and recommended bicycle improvement projects, and is intended for review and modification on an annual basis.

Because of their similar speeds, bicycles mix more safely with motor vehicles than with pedestrians. Therefore, the campus should promote bike policies and programs that direct bicycle traffic to routes adjoining roadways (Class II bike lanes), dedicated bike paths (Class I bike paths), and service roads (Class III bike routes). Bike use of roadways should become a common "pattern language" used consistent throughout the campus.

- In general, bicycles should be treated as vehicles and directed to routes adjoining roadways, service roads or dedicated bike paths. Class II bike lanes are the preferred form of bikeway; where Class II bike lanes are infeasible, impractical or especially costly, Class I bike paths should be provided.
- Where both Class II bike lanes and Class I bike paths are infeasible or impractical and traffic volumes are low, service roads may be designated as Class III bike routes (mixing bicycle and low-volume vehicle traffic) to colleges and certain core facilities.

Pedestrians and bicycles don't mix well. Therefore, the campus should attempt to separate pedestrian and bicycle traffic wherever possible. Where separation is not practical or feasible, the campus should implement management policies which minimize safety risks to both bicyclists and pedestrians.

- In order to reduce conflicts, pedestrians should be prohibited from walking on Class I bike paths, Class II bike lanes, and recreational bike trails.
- Class III bike routes which mix pedestrian and bicycle traffic are not recommended for development. The current use of pedestrian paths by bicycle traffic should be managed, as described below, until adequate alternate routes provide access to all campus facilities.

- As long as pedestrian paths continue to carry bike traffic, the campus will designate all pedestrian paths as "slow zones" in which bikes shall not travel at speeds greater than is safe for both pedestrians and bicyclists. In certain critical areas, pathways may also be designated as "walk zones," in which bicyclists must dismount and walk their bikes. In all such situations, pedestrians shall have the right of way. This will require educating both bicyclists and pedestrians about such policies, and will necessitate enforcement.

Bike parking should be provided near bicyclists' final destinations, but should not promote riding through predominantly-pedestrian areas (such as courtyards, plazas, patios, and other hardscaped areas). Similarly, bike parking should be easily accessible, easily identified, secure, and of ample capacity.

- College courtyards and plazas or patios surrounding various campus facilities should also be designated "walk zones." Medium-sized bike parking areas will be provided at the predominant entrances to walk zones, while only minimal bike parking should be provided within the walk zone itself.
- Large bicycle parking areas should be developed at the south entrance, and in some other areas of campus.

Recreational off-road or "mountain" biking must be managed to reduce environmental impacts and minimize safety risks. While the easiest response might be a total prohibition of mountain bikes from all off-road, unpaved areas, this approach would prove infeasible and ultimately ineffective. Instead, the campus should promote responsible mountain bike practices through "indirect management" techniques such as environmental education, posting of sensitive or restricted areas, enforcement, development of recreational bike trails, and promotion of campus and local off-road bicycling groups.

- The use of off-road bikes shall be restricted to the existing network of maintained fire roads and, when developed, designated bicycle trails. All use of off-road bikes in other non-paved areas of the campus shall be prohibited, but this prohibition shall be enforced through an intensive education/awareness program and "indirect management."
- Under certain conditions, fire roads and bicycle trails may be closed temporarily or permanently.

UCSC will have the greatest success in promoting bicycling if it works cooperatively with local agencies to design and implement programs and projects that benefit bicyclists throughout the Santa Cruz community.

- The University shall continue to work closely with the City, the County, SCMTD and CalTrans to promote the development of ample bicycle parking facilities along transit corridors and at park and ride lots.

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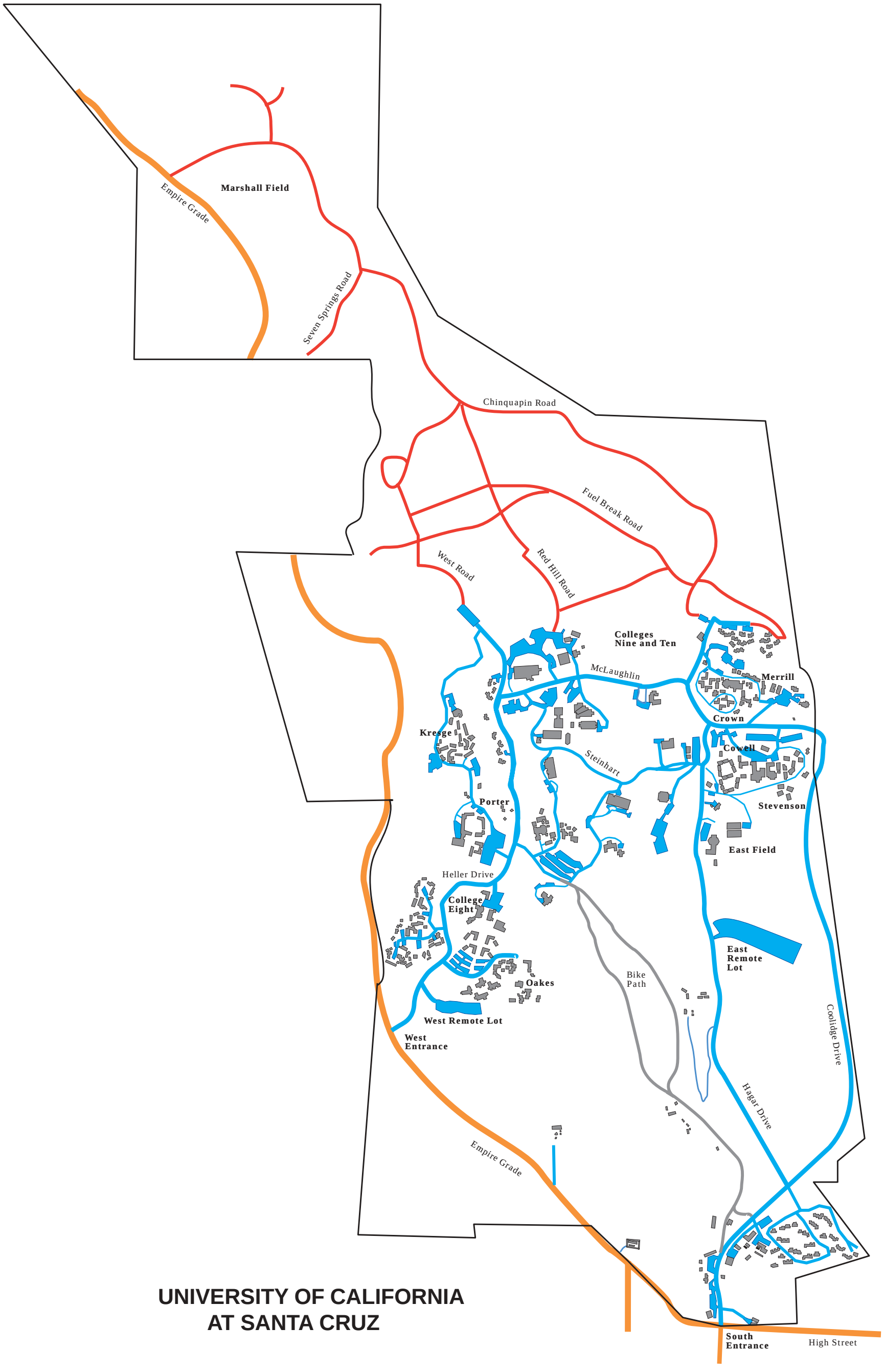


PART I: POLICIES AND GUIDELINES

1.0 INTRODUCTION

Bicycling is the fastest growing means of travel at UC Santa Cruz. During the last two years, the number of persons commuting to campus by bicycle has risen dramatically. Studies conducted in May 1989 suggested an average of 400 bicyclists commuted to campus daily. By May 1991, this had increased to approximately 700 bicyclists (representing more than 6 percent of all campus commute trips), and informal counts conducted in October 1991 suggest this number may exceed 1,000. Furthermore, it is estimated that another 1,000 campus residents use bicycles for traveling across campus and for recreation.

The trend toward increased bicycle use can be linked to advances in bicycling technology, the increasing popularity of bicycling for exercise and recreation, and a growing concern for the natural environment. Moreover, the cost of owning, operating, and parking an automobile continues to rise, while local public transit continues to undergo significant service reductions. The natural beauty of the campus, with its remarkable views and peaceful setting, also serves to attract both commuting and recreational bicyclists. With this trend comes an opportunity to promote bicycling as an important transportation alternative, thereby mitigating automobile impacts on both the campus and the local community.

1.1 Context of this Plan with Other Campus Planning Documents

The 1992 Bike Plan is one in a series of campus plans based upon the goals and guidelines identified in the 1988 Long Range Development Plan (LRDP) and its accompanying Environmental Impact Report (EIR).

Soon after his arrival at UCSC in late 1991, Chancellor Karl Pister directed campus planning staff to develop an "LRDP Implementation Program" to better articulate the objectives of the 1988 LRDP and to provide an improved planning process for campus development. Furthermore, Chancellor Pister called for development of a Comprehensive Transportation Plan for the campus.

The 1992 UCSC Bicycle Plan is one element of the Comprehensive Transportation Plan. Other elements include:

- a Campus Transit Plan (drafted during 1990-91);
- a Parking Demand Management Plan;
- a Pedestrian Circulation and Access Plan;
- a Vehicular Circulation and Service Access Plan; and
- a Travel Demand Management Plan.

Each of these transportation planning elements identifies a set of goals and objectives, outlines a series of policies and guidelines necessary to achieve those goals and objectives, and indicates a means of implementing and monitoring those policies and guidelines. Completion of the Comprehensive Transportation Plan is expected by mid-1993.

1.2 History of the UCSC Bike Plan

When first conceived by University planners in the early 1960's, UC Santa Cruz was intended to consist of a "primarily pedestrian" campus core surrounded by "an outer and inner perimeter loop system" of roadways. The 1963 Long Range Development Plan's (LRDP) discussion of bicycles was limited to one paragraph:

> "It is difficult at this time to estimate the number of bicycles that might be used on campus. The experiences of other universities on hilly sites are inconclusive. The University of California is now studying this problem on other campuses, and when more data are available, a study of bicycle path and parking problems should be made for the Santa Cruz campus."[1]

Given the prevalent perspective and attitudes of the early 1960's, this statement is reasonable. The new campus was situated 600 to 800 feet above and several miles away from central Santa Cruz. Moreover, UC Santa Cruz was slated to enroll 27,500 students residing in twenty colleges and ten professional schools located throughout the 2,000 acres of campus lands. The distances between campus facilities, the elevation difference between the campus and the city, and the state of bicycle technology combined to make realistic estimates of bicycle use at the new campus uncertain.

By 1971, when the LRDP underwent its first revision, the desire remained to "establish a pedestrian precinct in the central campus." One primary objective of the 1971 LRDP was "To facilitate intracampus pedestrian movement and discourage the internal use of the private automobile.

> "The attainment of this goal requires both specific programs that respond to immediate circulation needs and an open-ended effort that permits the campus to avail itself of changes in transportation technology, a shift in transportation resource allocation, or a change in public attitudes toward transportation. Thus we have set forth a balanced plan for the campus of traffic service, vehicular control, parking, transit, and pedestrian ways, while encouraging the development of regional transit systems."[2]

Still, there was no specific mention of bicycles anywhere in the 1971 LRDP.

In 1973, the Bike Path across the Great Meadow was completed. A campus transportation study, prepared by De Leuw, Cather & Co. in 1974, endorsed increased transit service, but offered only one paragraph concerning bicycle improvements:

> "In conjunction with the pedestrian system are the bikeway paths. Presently there is only one dedicated bike/pedestrian route, this running from the Coolidge entrance to College 5 [Porter]. This route serves the west side of the campus but provides only limited access to the eastern colleges. Additions to the bikeway system should be limited to providing access routes. Provision of additional routes on campus are not warranted with present volumes. It appears that existing roads and the paved pedestrian paths will offer sufficient circulation for bicycle needs… [New bikeway] facilities should be a

[1] UC Regents, *Long Range Development Plan: University of California, Santa Cruz,* September 1963, Page 36.

[2] UC Regents, *Long Range Development Plan: University of California Santa Cruz, 1971,* Page 13.

minimum of ten feet wide, have good drainage, and should be swept regularly to provided the needed surface for ten-speed operation."[3]

An accompanying diagram (shown in Figure B) indicated three proposed bikeways: 1) along Empire Grade and Heller Drive to Porter College; 2) along Allen Road in Jordan Gulch from the lower quarry to the vicinity of Steinhart Drive, where it turned west and followed an existing pedestrian path north of Hahn Student Services to McHenry Library; and 3) from Hagar Drive in the vicinity of the East Remote parking lot north, around the East Field, to Cowell College.

When the 1978 LRDP was prepared, "increased auto/bicycle use of campus roadways" was finally identified as a distinct issue. The 1978 LRDP Draft EIR noted that

> "Bicycle use has increased remarkably since the completion of a bikeway across the Great Meadow. To encourage this trend, the campus, the City and County are planning or evaluating bicycle facilities projects:
>
> • A second bikeway is planned along the alignment of an existing ranch road up to the East Field House;
>
> • A bike lane from Coolidge Drive to the end of Spring Street to connect with a City-planned bike route;

[3] De Leuw, Cather & Company, UCSC *Transportation Study*, 1974, Page 91.

Figure B: Past Bike Path Proposals

Three bikeway alignments were proposed by De Leuw, Cather & Company in their 1974 UCSC Transportation Study, Figure 35. The Empire Grade/ Heller route (1), the Allen Road route (2), and the East Field route (3) are indicated by dashed lines. The existing Bike Path (4) is represented by the solid line.

- At present a popular bike shuttle van operates between the Barn Theater and the Bookstore. As demand increases the campus should add a second bike shuttle van during peak hours to operate between the Barn Theater and the Whole Earth Restaurant;

- A bikeway is being considered on Cardiff Way, to bypass the Bay/High intersection;

- As needed, the campus will provide additional bike-locking stands at campus buildings;

- The City is considering a bikeway on Spring Street to Coolidge Drive, and eventually shoulders and a bike lane on Empire Grade;

- A future recreational bike trail from Coolidge Drive to Henry Cowell Redwoods State Park at Highway 9 via the old Rincon Road;

- Shoulder surfacing along Coolidge Drive."[4]

The 1978 LRDP noted that "Bicycle, pedestrian and other forms of commuting to the campus, while increasing rapidly over recent years, still represents less than 16% of the trips to and from campus." The 1978 LRDP also stated that "Bicycle use for intracampus circulation is growing rapidly, to the point that safety considerations at the places of auto/bicycle interchange are now becoming a problem. There is also increased demand for bike lockstands and more paved bikeways to accommodate this circulation alternative."

The 1978 LRDP went on to blame "topography, [the] relative remoteness of the campus from the major areas of student and staff residences, and [the] physical/economic limitations of other forms of commuting" as factors stifling alternatives to the single-occupant auto.

The advent of the "all terrain" or "mountain" bike during the mid-1980's resulted in another dramatic increase in bike use that continues today. While initially designed for off-road recreational use, multi-geared mountain bikes were a perfect match for the UCSC campus and community. Recreational bicyclists found the grasslands, forests and canyons of campus an ideal place to ride, while commuters found a comfortable and fun means of traveling to, from and around the campus and greater Santa Cruz.

The 1988 LRDP explored the benefits and impacts of bicycle use more thoroughly than any previous campus planning document. Its four paragraphs of recommendations, as well as all pertinent mitigation measures identified in the Final EIR, are presented in Figures C and D, on the following page.

During 1987 and 1988, while the LRDP was being drafted, members of the Bicycle Subcommittee of the campus Transportation, Parking and Circulation Committee prepared *A Bicycle Plan for the University of California Santa Cruz*.[5] Although the 1988 Bike Plan was never

[4] UC Regents, *Environmental Impact Report for the 1978 Long Range Development Plan, University of California, Santa Cruz,* November 1978, Page II.9.

[5] Members of the Bicycle Subcommittee of the Campus Transportation Committee who contributed to the 1988 document included Scott Brookie, Kevin Karplus, Ken Kawazoe, Barry McLaughlin, Malcolm McNelly, Dayoan Rivera and Peter Scott. In preparation of that plan, the Subcommittee benefited substantially from suggestions provided by members of the Campus Planning Staff, the Campus Police and Fire Departments, and the Campus Safety Committee. The June 16, 1988 plan was a revision of a draft dated November 1987.

BICYCLE CIRCULATION

The campus will encourage the use of bicycles as an alternative to automobiles for intra-campus travel. Where topography permits, it is also proposed that bicycle lanes be developed on new roads built on campus and on existing roads when they are repaved. It is proposed that the existing campus bicycle path be realigned near the south campus entrance to improve safety conditions in that area (the specific alignment of which will be determined in a future study). Additional Class I bicycle paths (8-foot minimum width, separate from roadways) are recommended throughout the campus, especially to improve bicycle access to the east side of campus and the restricted foot/bicycle entrance near the Cardiff House.

Class II bike lanes (one-way, 5-foot minimum width, striped lanes along campus roads) are proposed along Hagar, Heller, Coolidge, and Meyer drives where topography permits. Where sufficient space does not exist for a bike lane, alternative routes, such as separate bicycle paths, are proposed. Where a separation of bicycles and pedestrians is warranted, such as along Steinhart Way, distinct pedestrian and bicycle lanes should be clearly marked. In the interest of safety, certain paths should be designated exclusively as pedestrian paths and the use of bicycles on these paths should be prohibited.

To increase bicycle safety, pathways and lanes should be adequately lit, signed, and marked, and reflectors should be installed along Class I bikeways. Mopeds (motorized bicycles) will be restricted to the far right shoulder of roadways, and, where steep roadways include a Class II bike lane, it is proposed that uphill bike lanes be eight feet wide to accommodate both moped and bicycle traffic.

If feasible, a shuttle bus equipped with a bike rack will loop from the main campus entrance to the central campus and other campus locations. Such shuttle service would foster bicycle use by those unlikely to ride the entire uphill distance to the Campus Core. In addition, it is proposed that bicycle parking facilities be provided at all major buildings and gathering places and that bicycle lockers be provided to encourage dormitory residents to use bicycles. Additional amenities, such as personal lockers, showers, and discount prices on bicycle equipment should also be provided.

Figure C: UCSC 1988 LRDP

Page 51 of the 1988 Long Range Development Plan outlines some of UCSC's goals and objectives for development of bicycle infrastructure.

MITIGATION MEASURES

- Increased traffic volumes on local off-campus roadways, resulting in increased traffic congestion at local intersections with decreases in level of services

4.12-1: The campus will strengthen its TSM programs with the goal of directing at least 40% of all passenger trips to and from campus to alternatives to the single-occupant automobile.

- Potential conflicts would occur between pedestrians, cyclists, and vehicles.

4.12-14: 1) Provide signage to warn pedestrians and bicyclists of potentially dangerous areas of campus;

2) Require licensing of bicycles on campus. For an appropriate fee a bicyclist will receive a license and information on safety equipment and safe procedures. Such fees may also be used to fund additional measures to benefit bicyclists; and

3) Campus bicycle regulations will be enforced with appropriate fines.

Figure D: UCSC 1988 LRDP Final EIR

The Final Environmental Impact Report on the 1988 LRDP includes these two mitigation measures concerning bicycles. These appear in Table A: Revised Summary of Environmental Effects, Volume 1, May 1989.

formally adopted by Campus Facilities or the Chancellor, it has informally guided numerous campus developments during the last four years, and serves as the basis of this Plan.

1.3 Scope of the 1992 UCSC Bike Plan

The 1992 Bike Plan is based on the materials presented in the 1988 Draft Bicycle Plan. The 1992 Plan, however, addresses several additional issues:

- The 1992 Plan separates the policy guidelines and design standards into two separate sections, thereby making the policy elements more concise while providing all essential technical details in one place;
- The 1992 Plan places the list of physical improvement projects first proposed in the 1988 Plan in an implementation appendix, to be reviewed and updated annually to reflect changing conditions and priorities;
- The 1992 Plan addresses the increasing use and impacts of off-road bikes for both commute and recreational purposes.

Recognizing that campus development schedules, enrollment growth and fiscal resources may vary from today's best projections, the 1992 Plan attempts to focus on "time independent" policies and guidelines.

1.4 Organization of the 1992 Bike Plan

The 1992 Bike Plan is organized into a policy document, a set of design standards, and several appendices:

- Part I: Policy Statements and Guidelines
- Part II: Application of the Policies — A Bicycle Circulation Plan
- Part III: Bicycle Design Guidelines and Standards
- Appendix A: Program and Project Priorities List
- Appendix B: Mitigation Monitoring Program — Excerpts from the Operational Handbook
- Appendix C: Campus Bicycle Accident Summary

A series of "Policy Tables" is presented throughout this Plan which identifies the range of policy alternatives considered in conjunction with specific issues. These tables are provided to help identify the various conditions and parameters considered in selecting specific policy statements for adoption. **Policy alternative currently deemed unacceptable appear in shaded areas throughout the tables.**

Part II presents a model of how the policies and guidelines identified in Part I might be implemented. While many of the capital improvements detailed in this section are included in Appendix A, others are recommended for consideration as the campus bike circulation system evolves and develops. In general, Part II serves as a "best estimate" of how the 1992 Bike Plan might be implemented.

Part III is specifically intended as a "Design Standards Manual" for use by campus planners, architects and consultants to integrate adopted bicycle design criteria into each campus development project; it is therefore more technical than Parts I and II, and may be of less interest to the layperson. Part III may be modified as needed to incorporate new design standards or eliminate old standards that have proven ineffective or infeasible.

Appendix A is a prioritized list of bicycle programs and improvement projects slated for implementation and/or construction as funding becomes available. This appendix will be reviewed and updated annually by the Director of Transportation and Parking Services (TAPS), in consultation with campus advisory committees and concerned bicyclists.

Other appendices summarize the Mitigation Monitoring Program associated with the 1988 LRDP Final EIR (Appendix B), all reported bicycle accidents occurring on campus since 1985 (Appendix C), and a variety of other materials relevant to bicycle planning at UCSC. Appendix C should be updated annually to provide campus planners and the bicycling community with information on accident patterns.

Throughout this Plan, certain "over-arching" planning concepts or principles are presented in italic typeface. These planning principles are included as a means of identifying the intent or spirit of the Plan in straightforward, non-technical language.

2.0 GOALS AND OBJECTIVES OF THE 1992 BIKE PLAN

This Plan has been developed with six general goals in mind:

- Development and implementation of a Bicycle Program to better serve the needs of the existing campus bicycling community, and to promote the use of the bicycle as a viable transportation alternative;
- Design and development of a safe, convenient campus Bicycle Circulation System that minimizes potential conflicts between bicyclists and pedestrians and/or other vehicles;
- Design and development of adequate, convenient amenities to serve the growing campus bicycling community;
- Development and implementation of policies and practices to mitigate the impacts of off-road bike use and protect both the undeveloped and developed campus lands;
- Development and implementation of a campus bicycle education program to promote safe, low-impact bike use and increase non-cyclist awareness of bicycles;
- Development and implementation of a campus bicycle enforcement program to promote safe, low-impact bike use.

In addition, an effective campus bicycling program will aid in achieving the following goals identified in the 1988 LRDP EIR:

- Mitigation of campus-related traffic impacts on the campus and surrounding community;
- Mitigation of parking demand;
- Mitigation of the incremental increase in mobile air emissions.

Associated with these last three goals are new regulations being implemented by local agencies to mitigate traffic-related impacts throughout the Santa Cruz and Monterey Bay region. The Santa Cruz County Regional Transportation Commission (SCCRTC) has overseen development of a Congestion Management Plan (CMP) for implementation throughout Santa Cruz County by 1993. Meanwhile, the Monterey Unified Air Pollution Control District (MBUAPCD) has drafted an Indirect Source Review Rule to control air emissions from, among many things, automobiles. An important feature of both of these plans is a series of Trip Reduction Ordinances (TRO) intended to increase the Average Vehicle Occupancy (AVR), reduce Vehicle Miles Traveled (VMT) and promote the use of alternatives to the single-occupant car.

UCSC has already implemented many elements of these TROs, including parking management, parking fees and increased use of high-occupancy vehicles (carpools, vanpools and transit vehicles). Through its efforts, the campus has attained a very high level of reliance on alternative modes of travel among commuters: in 1991, more than 53% of all passenger trips to and from UCSC were made via some mode other than a single-occupant auto.

Increased bicycle use can help to maintain and improve UCSC's successful record of Travel Demand Management. Bicycles generate no air emissions, and require no fossil fuels for operation. Because of their relatively small size and weight, infrastructure costs are comparatively lower than those associated with automobiles. Furthermore, the cost of owning and maintaining a bicycle is much lower than similar automobile costs. Combined with other life-style and socioeconomic considerations, bicycles are an ideal means of travel for a significant share of the campus's residential and commuting population. And while bikes will certainly not be used by everyone who studies, works, visits or lives at UCSC, increased reliance on bicycles will reduce our dependence on other modes of travel, including the single-occupant car.

3.0 DEFINITIONS AND SAFETY CONSIDERATIONS

Before proceeding, it is important to identify some general terms and assumptions that serve as the basis for the Bike Plan.

3.1 Definition of Terms

In consonance with accepted CalTrans standards, this Plan uses the term *bikeways* to indicate any paved surface for bicycle travel, and distinguishes between three different types of bikeways:

- A *Class I bikeway* (or *bike path*) provides for dedicated bicycle travel on a right of way completely separated from any street or highway.
- A *Class II bikeway* (or *bike lane*) provides a striped lane for one-way bike travel on a street or highway.
- A *Class III bikeway* (or *bike route*) provides for shared use with pedestrian or motor vehicle traffic.

This Plan also considers a fourth type of bikeway:

- The *bike trail,* an unpaved or stabilized route designed for use by off-road bikes.

Bike trails could be used for either recreational or commute purposes, and would be designated only in undeveloped areas of the campus lands (see Section 4.14 for a thorough discussion of these issues).

3.2 Bicycle Safety Considerations

The character and form of campus bikeway development depends on a variety of factors, with safety primary among them. The majority of bike accidents are simple falls, usually resulting from a combination of poor riding surface, poor judgement, and inept bicycle handling. While such accidents might be expected to cause minimal harm to the bicyclists, serious injuries have resulted when riders failed to wear bicycle helmets. Considering that bicyclists at UCSC often travel at high speeds or in relatively isolated areas of campus (particularly travelling downhill on the Great Meadow Bike Path), even a simple fall can lead to serious injuries.

Accident statistics (on this campus and nationwide) show that only a small percentage of bicycle accidents are bike-car accidents (17-18% among adult riders), and that the bike-car accidents are rarely a result of motorists overtaking bicyclists.[6] Interestingly, accident rates for experienced bicyclists riding on urban Class I bike paths are about 2.6 times higher per mile traveled than comparable accident rates on roads[7] (insufficient data on miles travelled is available to determine whether this ratio holds for UCSC). Appendix C of this Plan includes a summary of bicycle accidents on campus since 1985.

Some of the most serious bike accidents at UCSC have involved collisions with pedestrians. Because pedestrians and bicyclists often share roadways and paths at UCSC, the difference in relative speeds and the relative silence of the bicyclist (as compared to motor vehicles) can

6 John Forrester, *Effective Cycling*. MIT Press, Cambridge, MA, 1984, Page 156-160.

7 *Ibid*., Page 158.

result in serious injuries to both parties. Similarly, pedestrian use of the existing Class I Bike Path create unsafe conditions. When one further considers that bicyclists coasting downhill on campus reach speeds of 35 mph or more, it becomes even clearer that bicyclists and pedestrians do not mix well. Due to these differences in relative speeds, bicycle traffic is more safely integrated with motor vehicle traffic than with pedestrian traffic.

4.0 GENERAL BICYCLE POLICIES

This section identifies the basic planning policies and guidelines for development of bicycle infrastructure throughout the campus. As noted above, the specific design standards are compiled in Part III of this Plan, while Part II presents a model bicycle circulation system for the campus.

4.1 Bikeway Preferences

These bikeway preferences assume that bicycle traffic mixes more safely with motor vehicles than with pedestrians. This assumption leads to three essential principles concerning bikeways:

- *Bike traffic using roadways must be provided with appropriate infrastructure to assure safe and convenient use;*
- *Bikes traffic using pedestrian paths must be carefully managed and controlled;*
- *Education of all users (bicyclists, pedestrians and drivers) is the most effective means of managing any system where the individual maintains responsibility for his or her actions.*

4.2 Class II Bike Lanes and Class I Bike Paths

In general, Class II bike lanes are the most desirable form of bikeways. As such, UCSC should provide Class II bike lanes along existing campus roadways wherever possible. In addition, all new major campus roadways should be designed with integrated Class II bike lanes. These same policy standards are being adopted by other university campuses and municipal agencies, and are summarized in Table A on the following page.

Pedestrians should be prohibited from walking upon all Class I bike paths and Class II bike lanes. This has been identified as a serious safety issue along the existing Bike Path, by which pedestrians often walk or jog to the Farm & Garden Project or across the meadow. In such areas, stencils will be installed warning pedestrians to stay off the paved bike path. In most instances, ample space exists along the paved path for pedestrian use; on others, adequate pedestrian paths should be developed. In areas where pedestrians regularly cross Class I bike paths, a crosswalk should be identified by stencils or signs to warn both pedestrians and bicyclists.

While Class II bike lanes are the preferred alternative, it is unlikely that the UCSC campus can be adequately served by bike lanes alone. Due to the campus's unique topography, existing site conditions and the phasing of bicycle infrastructure improvements, the UCSC bicycle circulation system may also include a mix of permanent Class I bike paths, some temporary and permanent Class III bike routes, and some designated bike trails in the undeveloped campus lands. The criteria concerning when and where each of these bikeway options is most practical are discussed below and in Section X.xx, Part II of this Plan.

Table A: Policites Concerning Class I and II Bikeways

Policy Alternatives		Precedents	Potential Use at UCSC	Safety Concerns	Education Concerns	Economic Concerns	
1	Include Class II bike lanes in design of all new major campus roadways.	1988 LRDP	Meyer Drive Extension, North Loop Road, Eastern Access, Inclusion Area access roads.	Provides adequate room for bike traffic on roadways.	Promote understanding that bicycles are vehicles, encourage use of roadways as a pattern language.	Minimal, when included in road development costs; higher costs for roads on cross slopes.	
2	Improve existing campus roadways to accommodate Class II bike lanes, where feasible.	1988 LRDP	Hagar, Heller, McLaughlin Drives.	Provides adequate room for bike traffic on roadways.	Same as above.	Based upon the Sacramento 2010 Plan, estimated costs are $30,000/mile of lane.	
3	Class II bike lanes are preferred over Class I bike paths.		Throughout campus.	Less chance for ped/bike or bike/bike conflicts.	Educate peds to stay off Class I bike path pavement.	Based upon the Sacramento 2010 Plan, estimated costs are $100,000/mile of path.	
4	If space permits, widen Class II bike lanes on grades where bike speeds may reach 30MPH.	Caltrans Highway Design Manual	Heller Drive, Hagar Drive.	Widen enough to provide a buffer between the rider and the edge of pavement (min. 6' is desirable).	Utilize signs to alert bicyclist and motorist of grade.	Cost will vary with setting and conditions.	
5	"Shared Traffic" lanes should be designated where Class I and II routes are unavailable.	City of Eugene, Draft 2010 Sacramento City/County Bikeway Master Plan of 1991	Hagar between McLaughlin and East Remote, Heller between Meyer and Koshland.	Vehicle speed limits should be adjusted to reflect average bicyclist speed.	Post signs indicating bikes sharing lane and adjust speed limits.	Minor costs for surveying speeds, installing new signs.	
6	Prohibit pedestrian traffic from both Class I paths and Class II lanes.	UCSB, UCD, CSU Chico	Great Meadow Bike Path, existing Class II bike lanes.	Must review ped circulation and develop a safe network of dedicated ped paths.	Stenciling and flyers notifying peds of safety issues.	Minor costs.	

4.3 Class III Bikeways: Roadways Shared by Bicycles and Motor Vehicles

There are several locations on campus where existing road width and site conditions restrict widening the road to provide Class II bike lanes, and no alternative Class I bike paths are available. In such circumstances, this Plan recommends adopting a "shared traffic lane." Shared lanes consist primarily of signs and pavement stencils warning both bicyclists and drivers of upcoming merging of bike and vehicle traffic; reduced speed zones may also be installed to reflect the average speed of bicyclists using the shared lane.

Shared traffic lanes are especially appropriate along roadways with steep downgrades. As indicated in the 1988 Bike Plan, bicyclists demonstrate a natural movement from the bike lane or roadway edge to the center of the roadway as speeds increase. Even in areas where ample road width allows for Class II bike lanes, bicyclists may choose to remain in the lane or share the traffic lane on steep downgrades. Furthermore, if space permits, such road segments should be striped with Class II bike lanes widened to six feet width.

The existing campus roadway network includes several segments too narrow for the addition of bike lanes to the regular traffic lanes. Several of these road segments may potentially be closed to regular through-traffic in the future, with access restricted to emergency and service vehicles, transit buses and shuttles, and bicycles. If these steps are indeed implemented, then the presence of bicycle traffic should be indicated by the use of appropriate speed limits, stencils and signs.

This policy is already in use in Eugene, Oregon and has been incorporated into the Draft 2010 Sacramento City/County Bikeway Master Plan of 1991, but was not found at any other university campus. Table B summarizes identified policy options associated with mixed bicycle/ motor vehicle routes.

4.4 Class III Bikeways: Roadways Shared by Bicycles and Service Vehicles

All campus roads, including service roads, should be reviewed to determine whether Class II bike lanes may be accommodated. Overall, this policy should reinforce a pattern language of bicyclists and motorists sharing the road. Efforts should be made to direct pedestrian traffic away from such service roads, or at least away from the designated Class II bike lanes. Additionally, the volume and character of traffic on these service roads should be considered.

Where service roads are not wide enough to accommodate Class II bike lanes and no other Class I or Class II bikeways provide access to a destination, the service road should be designated a Class III bike route and appropriately identified. In summary, Class III bike routes should be designated only in areas where other bike routes cannot be installed, or as temporary measures pending construction of Class I or Class II bikeways. Table C summarizes other policy options related to Class III bikeways shared with service vehicles.

4.5 Pathways Shared by Bicycles and Pedestrians: Restricted Bicycle Access

It is **not** recommended that the campus encourage shared use of pathways by bicyclists and pedestrians. A review of several other campuses revealed that elimination of shared paths was nearly universal,

Table B: Policies Concerning Class II & III Bikeways Shared with Vehicles

Policy Alternatives		Precedents	Potential Use at UCSC	Safety Concerns	Education Concerns	Economic Concerns	
1	Stripe Class II bike lanes along service roads, where width permits.	UC Davis, CSU Chico, Stanford, U. of Oregon at Eugene	Many service roads near colleges.	Provides clearly defined areas for bicyclists, vehicles and peds. Safest solution.	Educate pedestrians to understand and respect bike lanes.	Minor costs of striping.	
2	Indicate Class III routes along service roads, shared by bikes and vehicles.	UC Davis, CSU Chico, Pepperdine, C.U. Boulder	Most service roads in core and colleges.	For low traffic volume roads, provides a safer route than shared ped paths.	Alert service and delivery drivers to mixed use.	Least costly, requires signs and stencils.	
3	Provide limited and one-way access with contra-flow bike lanes.	Eugene, OR, Washington D.C.	Sections of Steinhart Drive	Limits vehicle travel on Steinhart, provides well-defined bikeway for bicyclists.	Educate bicyclists and vehicle operators of the contra-flow system.	Minor costs for restriping. Higher costs for provision of adequate ped paths.	
4	Restrict auto access with physical barriers (bollards, arms, auto-stops)	Stanford	Steinhart Drive	Can damage vehicles if motorists are unaware of barriers.			Not vey attractive; can potentially cause damage to unwary motor vehicles.
5	Prohibit vehicles from service roads from 8am to 5pm.	UC San Diego	Steinhart Drive, Hagar from Steinhart to McLaughlin.	Reduces amount of traffic through campus core.			Reduced traffic in campus core a benefit to peds, but signficant complication for maintenance staff.
6	Sign and enforce restricted vehicle areas.	Current campus policy	Maintain clear and concise signs at all major intersections.	Reduces potential conflicts between motor vehicles and peds and/or bicycles.	Inform students, staff, faculty and visitors.	May require additional Parking Enforcement staff; might generate citation revenues.	

Table C: Policies Concerning Class III Bikeways Shared with Pedestrians

Policy Alternatives		Precedents	Potential Use at UCSC	Safety Concerns	Education Concerns	Economic Concerns	
1	Bike use shall be prohibited from all pedestrian paths.	CSU Chico, UCSB, UCD, Cal Poly SLO	Difficult, due to topography, existing infrastructure.	Reduces ped/bike risks, but may increase bike/vehicle risks if alternate routes are inadequate.	Requires significant education and enforcement programs to change existing habits.	Unlikely that adequate funds would be available for effective enforcement program.	Very difficult to enforce at UCSC.
2	Ped paths shall be widened to provide unstriped bicycle paths.	UC San Diego, U. of Michigan	Throughout UCSC.	Risk of ped/bike conflicts.	Need to educate peds and bicyclists about path use.	Could be very costly, due to removal of existing elements, grading & construction.	Would require removal of many trees and extensive grading.
3	Mixed use paths (ped/bike) shall be less than 5' wide and unstriped to prohibit motor vehicle access.	Stanford	Condition exists on campus paths already.	High risk of ped/bike conflicts	Same as above.		Impractical for the UCSC campus.
4	Maintain a pattern language that promotes bike use on roadways and bikeways, rather than pedestrian ways.	UCD, UCSB, CSU Chico, Cal Poly SLO	Steinhart, Heller, service roads.	Reduces ped/bike risks.	Provide signs indicating alternate bike route with destinations.	Minimal cost for signs; potentially high cost for construction of new bikeways.	
5	Unless otherwise noted, all campus ped paths will be designated bike "slow zones."	Safe speed law	All narrow paths where no resonable alternative bikeway is available.	Reduces bike/ped risks by decreasing speeds, but does not eliminate risks.	Requires an education and enforcement program.	As a temporary measure, very cost efficient. Minimal costs for stenciling.	
6	Designate campus ped paths as "walk zones" wherever necessary.	UCB, UCSB, CSU Chico, Cal Poly SLO, Pepperdine, Boulder, Eugene	Paths to bridges, stairs, and other developed areas.	Narrow, steep paths with low visibility would be designated "walk zones."	Requires an education and enforcement program.	Minimal costs for stenciling.	

with several notable exceptions (see Table C), and has included prohibition of bikes from pedestrian paths. At UCSC, however, the prohibition of bicycles from all campus pedestrian paths cannot effectively occur until other more suitable bikeways are developed. This Plan recommends two related policies which mitigate the risk of dangerous bike-pedestrian interactions while maintaining bicycle access to pedestrian paths: “slow-zones” and “walk-zones.” Part II of this Plan includes a list (Table I) of specific existing pedestrian paths and areas where implementation of these policies should be considered.

As the campus develops new facilities, it is recommended that consideration be given to differentiating pedestrian areas from other pathways, roads and parking lots through the use of distinguishing paving surfaces. For example, some institutions use concrete pavement in pedestrian areas and asphalt pavement along vehicle roadways and parking lots. Such a measure reinforces the sense that certain areas are intended for pedestrian traffic while others are intended for bikes and vehicles. This may, however, prove impractical at UCSC, due to the significant dependence on asphalt pedestrian paths.

4.6 Slow Zones

In areas designated as “slow-zones,” bicyclists must travel no faster than a walking pedestrian and must always yield to pedestrians. In some regards, this policy is similar to California's "Safe Speed Law," in that it requires riders to behave responsibly depending on varying conditions. Unless otherwise noted, it is recommended that all campus pedestrian paths be designated “slow-zones.” Such areas will be indicated with signs or stencils on the walkway. This policy will require a substantial education and enforcement program, but can be effectively integrated with ongoing Bicycle Education and Enforcement Program (BEEP) activities discussed in Section 4.22).

4.7 Walk Zones

“Walk-zones” are areas in which bicyclists are required to dismount and walk their bikes. It is recommended that the campus designate all hardscaped plazas and courtyards, particularly those in the colleges and around certain facilities in the central campus, as “walk-zones.” This policy is most applicable in areas such as college courtyards or the patios and plazas surrounding Kerr Hall, McHenry Library, or the Science Library entryway. Furthermore, pedestrian bridges found to be too narrow to accommodate both pedestrian and bicycle lanes should also be designated “walk-zones,” as should certain pedestrian paths with narrow pavement or poor visibility. Walk zones may be indicated by stencils, by a change in pavement texture or color, or by a specific set of architectural patterns.

4.8 Stairways

In several areas of campus, bicycle traffic has created ad hoc “use” paths around stairways associated with paved pedestrian paths. These use paths have generated significant erosion problems while creating visual eyesores; steep descents around stairways also increase potential conflicts between pedestrians and bicyclists. Table D identifies six possible policy guidelines, including several that provide natural barriers around stairways and bike "tracks" along the stairs themselves.

Further discussion of these potential policy guidelines is necessary before a specific policy will be recommended for implementation throughout the campus. In the meantime, it is recommended that each case be evaluated individually to select the most appropriate solution.

Table D: Policies Concerning Bikeways and Stairways

	Policy Alternatives	Precedents	Potential Use at UCSC	Safety Concerns	Education Concerns	Economic Concerns	
1	Provide a two-foot wide ramp on each side of the stairway to allow cyclists to walk bikes up or down the stairs.	Draft 2010 Sacramento Bike Plan	At most stairways along pedestrian pathways on campus.	Presence of ramps encourages bicyclists to continue riding around the stairways.	Need to educate bicyclists about proper use of paths. Must include enforcement (may require additional regulations?).	May be relatively costly to implement in every desired location.	
2	Provide an alternate path with ramp or walk so bikes may ride around stairs.	Disabled access ramps.	Same as above.	In addtion to problems metntioned in #1, separate paths may attract disabled users, creating addtional conflicts.	Need to educate bicyclists about proper use of paths.	Potentially much more costly than #1.	
3	Provide a narrow (2") track or bar along one edge of stairway to wheel bikes up and down.	Some European communities	Same as above.	Users would have to dismount and walk bike; track would be too narrow to ride.	Need to educate bicyclists about proper use of track.	Potentially a minimal cost.	
4	Install barriers around existing stairways, possibly in the form of rocks or other natural materials.	Similar to hiking trail barriers used in some State and National Parks.	Same as above.	Barriers may be hazard to unwary bicyclists or an added challenge to some off-road bikers.	Need to warn bicyclists of presence of barriers, reasons for installation.	Relatively cost-effective.	
5	Increased education and enforcement about walking and carrying bikes over stairways.		Same as above.	Increased education and enforcement may promote safe bicycling practices.	Requires dramatically increased education for bicyclists, in addition to increased bicycle enforcement.	Relatively cost-effective. Increased bike education and enforcement costs.	
6	Maintain the current mixed use policy.	Current campus practices.	Same as above.	Increased sand and gravel on pathways adjoining stairways, potential for bike/pedestrian conflicts.	Need to educate bicyclists about proper use of paths.	Long-term cost of stairway repair, revegetation, maintenance of pathways may be great.	

4.9 Bridges and Underpasses

Bicycle traffic currently uses many of the campus pedestrian paths and bridges, creating safety risks and generating some environmental damage. This Plan recommends the eventual elimination of most bicycle traffic from pedestrian paths by creating adequate bikeways along roadways, service roads and dedicated bike paths. At the same time, this Plan recognizes that some bike traffic will continue to use pedestrian paths, and recommends adoption of policies to manage and mitigate these potential impacts immediately.

Given the overriding concept that bicycle and pedestrian traffic should be separated, it is not recommended that bridges be designed for mixed uses unless separate Class I or II bikeways are designed and constructed to and from the bridge. Otherwise, pedestrian bridges should be designated "walk zones" and be designed for pedestrian use only.

The existing pedestrian bridges are too narrow (typically ten feet) to accommodate two lanes of bicycle traffic and pedestrian traffic (twenty feet). Because of these physical limitations, it is recommended that all existing pedestrian bridges be designated as "walk zones" as described above. In order for this policy to be effective, consistent monitoring, education and enforcement must be implemented until this pattern of behavior is well established.

Future bridges serving vehicles should be designed with ample width to accommodate bike lanes and pedestrian sidewalks, as well as traffic lanes. Future pedestrian bridges may be designed with ample width to accommodate both pedestrians and bicyclists. If this is not possible, the bridges should be designed to serve only pedestrians and be designated as "walk zones" for bicyclists. If funding is available to provide bridge widths capable of accommodating both bicycle and pedestrian traffic, consideration must be given to the construction of adequate bikeways connecting to the bridge (refer to Part III, Section 12.0 for specific design standards).

In the event that bicycle underpasses are constructed on campus, they should be built to the standards identified in Part III, and should also incorporate adequate striping, signs, and in some instances, have metal handrails to separate bicycle traffic from pedestrian and vehicle traffic.

See Table E for a summary of policy options regarding bicycle bridges and underpasses.

4.10 Design and Maintenance of Bikeways

Good engineering of bikeways makes enforcement and education easier, since the obvious way to ride is also the safest. When new bikeways are planned or changes are made to existing bikeways, the campus shall follow the campus design standards (as identified in Part III of this Plan) insofar as possible. Care shall be taken to ensure that campus bikeways meet these standards for width, stopping sight distance, lateral clearance, intersection designs, and superelevation (cross-slope). Wherever possible, existing bikeways should be upgraded to these standards.

The Caltrans Highway Design Manual stresses the need for maintenance of bike lanes: "Measures must be taken to ensure the surface of bikeways are maintained in a smooth condition free of potholes and corrugations, and that gravel, broken glass, and other debris are not

Table E: Policies Concering Bikeways at Bridges and Underpasses

Policy Alternatives		Precedents	Potential Use at UCSC	Safety Concerns	Education Concerns	Economic Concerns	
1	Bike use shall be prohibited from all pedestrian bridges and underpasses.		All bridges.	Eliminates any risk of ped/bike conflicts on bridges.	Requires education, enforcement and alternate bikeways.	Cost of signs for alternate bikeways, education and enforcement activities.	Difficult to enforce, unpopular among bicyclists.
2	Designate existing ped bridges as "walk zones."	UCSC, CSU Chico, CU Boulder	All bridges.	Reduces risk of ped/bike conflicts on bridges.	Requirs education and enforcement.	Minor costs for stenciling, education and enforcement.	
3	Design future ped bridges for peds only and designate as "walk zones."		Same as above.	Same as above.	Requires education and enforcement.	Minimal cost increase associated with signs and stenciling.	
4	Existing ped bridges will be widened to 20' to accommodate bike lanes.		Bridge between Kerr Hall and Kresge/Porter.	Reduces ped/bike conflicts on bridges, but may increase ped/bike conflicts on approaching paths.		Costly, but may not require additional engineering.	Would compete with other bike projects for funding. Best done in conjunction with later phase of Meyer Drive Extension.
5	Future ped bridges and underpasses should be designed to accommodate peds and bicyclists.	UCSB, CSU Chico	Future pedestrian bridges.	If traffic is physically separated, risk of ped or bike travelling on wrong side of separator.	Stencil to separate pedestrian and bike use areas.	Increases cost of bridge projects (doubles), potential costs of separate bikeway connecting to bridge.	

allowed to accumulate to the extent they might cause tire damage, loss of control, or inconvenience."[8] Since conditions vary, the manual does not stipulate any specific frequency for sweeping. Based on local experience, bike lanes under the redwoods should be swept two or three times during each rainy season, and bike lanes in the meadow should be swept at least once a year. When there is traffic to unpaved areas (particularly construction vehicles transporting sand and gravel), more frequent sweeping may be needed. Additionally, all road edges should be swept with this same frequency.

Furthermore, consideration should be given to identifying areas where drainage and runoff patterns deposit sand and gravel onto existing bike paths and lanes. Measures should be taken to reduce or eliminate these problems, in order to improve overall safety and reduce maintenance costs. Such problems already exist along sections of the Bike Path below the Great Meadow and in the vicinity of the Blacksmith Shop.

All bike lane and road edge stripes should be repainted at least every two years, to ensure that they are sufficiently reflective to be visible with the relatively weak headlights available for bicycles. Furthermore, the metal plates that cover utility boxes (manhole covers) are extremely slippery when wet. The metal plates should be coated with anti-skid paint (paint or epoxy with sand in it), and the anti-skid surface should be renewed when it wears off.

The campus should request that the County of Santa Cruz Public Works Department insure that the bikelanes along Coolidge Drive and Empire Grade are adequately maintained in a manner consistent with the guidelines identified above. Similar arrangements should be made with the City of Santa Cruz Public Works Department regarding bike lanes along Bay and High streets.

A procedure for reporting bicycle hazards, based on existing Campus Facilities maintenance procedures, should be implemented and publicized among the campus bicycling community. This would be the easiest means of monitoring the condition of campus bicycle infrastructure.

4.11 Nighttime Bicycle Routes

This Plan recommends that a nighttime bicycle route along Heller Drive and Empire Grade be designated once the County completes the installation of bike lanes along Empire Grade. While this route will require some additional improvements to sections of Heller Drive, much of the route is well lighted and the eight-foot wide bike lanes of Empire Grade make for a safe and secure nighttime bicycle route.

Furthermore, the current prohibition of nighttime use of the Bike Path should be continued. While the edges of the existing Bike Path have recently been striped with reflective white paint, this route is not recommended for use at night. Pedestrians, fauna and other bicyclists offer potential obstacles to the unwary bicyclist. As bicycle enthusiast, educator and engineer John Forrester has noted,[9]

> "Cyclists' headlamps are not satisfactory for nighttime descents of that path... Edge stripes of glass-beaded reflective paint are effective for cyclists with headlamps whose beam strikes the surface, but are ineffective for cyclists with just marker-type lamps or at sharp turns where the headlamp beam points in the wrong direction."

[8] Caltrans. Bikeway Planning and Design, in *California Highway Design Manual*, July 1983, chapter Section 7-1003.5(2).

[9] John Forrester, letter to Peter Scott, April 24, 1988.

Forrester goes on to note that low, unobtrusive light fixtures would not provide adequate illumination; taller light fixtures might provide ample illumination, but campus faunal studies suggest that wildlife in the Great Meadow might be adversely impacted. In either case, installation of night lighting along the existing Bike Path would be quite expensive. For these reasons, nighttime illumination of this route is not recommended.

This Plan encourages Campus and City Police to enforce the California Vehicle Code (Section 21200) requiring any bicyclist riding at night to have lights and reflectors.

4.12 Disruptions Due to Construction

This Plan recommends that the campus prepare construction detour plans as part of the planning program for all new buildings and any miscellaneous construction. Such practices are already used at UC Santa Barbara and at the University of Colorado, Boulder.

Prior to commencement of any work, notices announcing the closure dates, duration of closure and alternate detour routes should be posted at the junction points of the detour. Announcements might also be posted on the "bikepeople" email network and at a new bike information kiosk (Figure E illustrates one possible design) at the entrance to the existing Bike Path.

In addition to the information described above, a detour plan should include temporary stenciling and information signs. All temporary signs and stenciling should conform to the design standards for post height, symbol, color and shape. Existing stenciling and signs should

Figure E: Sketch of Proposed Bike Information Kiosk

Bike information kiosks are proposed for construction adjacent to the existing Bike Path and at several other locations on campus, as described in Part II of this Plan.

be covered to reduce confusion. Prior to implementation, the plan should be reviewed by Campus Facilities and TAPS staff, and include consultation with representatives of the campus bicycling community.

While every effort should be made to inform the campus community of disruptions due to construction, it should be understood that these schedules are estimates at best. Unforeseen conditions, such as weather, may delay or extend construction work beyond the announced closure dates. In this event, updated estimates of closure dates should be posted as early as possible.

4.13 Bicycles and Transit Vehicles

This Plan does **not** recommend that campus Day and Night Shuttles be equipped to accommodate bicycles. While such service may be desirable, the campus transit system's primary priority is carrying pedestrian passengers and persons with disabilities. Attempts to accommodate bicycles on the existing Shuttle vehicles would likely detract from both ridership capacity and service headways. Similarly, this Plan does **not** recommend that SCMTD Route 1 buses be equipped to accommodate bicycles unless it can be shown that neither ridership capacity nor headways are adversely impacted.

However, this Plan strongly recommends that steps be taken by local jurisdictions and the SCMTD to provide ample, safe and convenient bike parking facilities along primary SCMTD transit corridors. In the event that transit service along outlying "feeder" routes is reduced, people could bicycle to meet the remaining SCMTD transit routes; possible examples include Route 1 to the University, Route 71 to Cabrillo and Watsonville, and Route 35 to the San Lorenzo Valley. In this way, mixed-mode travel could be accommodated by the provision of improved bike parking facilities (bicycle "park-and-ride" lots) along primary transit corridors. In 1992 UCSC was awarded a $15,000 grant by the SCCRTC to help provide this kind of bike parking along the SCMTD Route 1 corridor and at several park-and-ride lots in Santa Cruz County.

It is recommended that some form of Bike Shuttle (similar to that described in Section 1.2) be considered for future implementation. Because of the low cost-effectiveness of such a service, other bicycle infrastructure projects will continue to have higher priority for funding.

4.14 OFF-ROAD BICYCLE USE

With the explosion in mountain bike ridership have come significant environmental impacts on the undeveloped areas of the campus due to off-road recreational bicycling. In 1987, Natural Areas Reserve Director Margaret Fusari warned the Campus Land Use Policy Committee of detrimental impacts of off-road bicycling in the Reserve, lands near the Arboretum, and in other relatively undeveloped areas of campus. Figure F illustrates existing fire roads and single-track bike trails throughout the campus. In 1990, Environmental Studies student Daniel Dewey prepared a senior thesis on off-road mountain bike impacts, and recommended a series of campus management policies.[10] His thesis presents a methodology for assessing the level of impact for six aspects of the problem: creation of ad-hoc trails, atmosphere, safety, erosion, trail widening, and transportation (in descending order of significance).

[10] Daniel J. Dewey, "All Terrain Bicycles on the UCSC Campus", Environmental Studies Thesis — Spring 1990, Advisor: Jim Pepper.

Figure F: Existing Fire Roads and Ad Hoc Bike Routes, 1992

Twin Gates to Cave Gulch: This ad hoc single track trail passes through both Campus Resource Lands and the Environmental Reserve lands in Marshall Field.

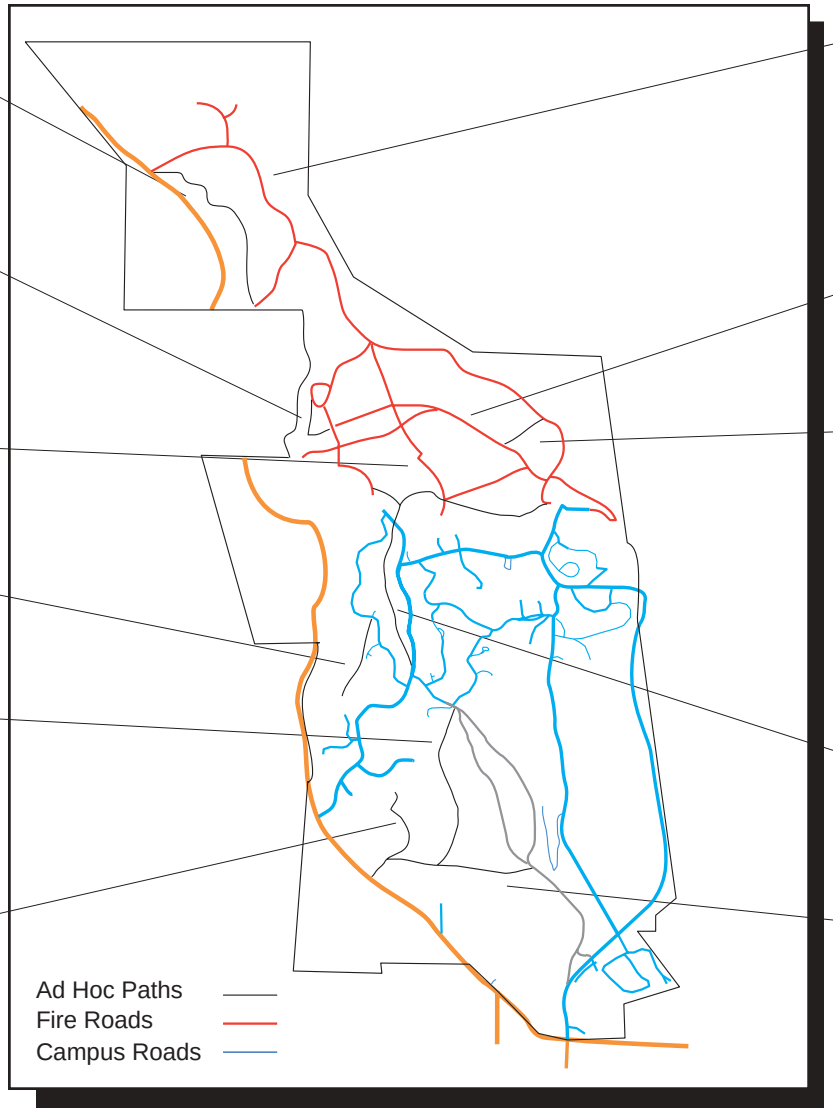
This ad hoc single track bike route extends between Loop Road and the west end of Fuel Break Road. Steep slopes and soil conditions result in a relatively dangerous ride with potentially signficant erosion impacts.

Red Hill Road is a very steep fire road crossing the central upper campus lands.

The ad hoc single track bike route across the Porter Bowl generates some erosion and visual impacts on this grassland.

This heavily-used route follows an old ranch road from the University House to a service road south of the Farm. Single track trails on the University House knoll currently suffer from significant erosion and visual impacts.

This ad hoc single track route extends from Oakes College to Empire Grade, passing near sensitive riparian lands of the Environmental Reserve.



Chinquapin Road serves as a primary bicycle and pedestrian route through the upper campus lands. Much of this route suffers from eroded banks and muddy "corduroy" tracks where bikes have traveled through puddles during wet weather.

Fuel Break Road passes through the Environmental Reserve lands of the upper campus, and experiences some of the same impacts as Chinquapin.

This unnamed ad hoc bike trail passes through the Environmental Reserve between Chinquapin and Fuel Break roads. Another very steep trail named "Lock 'Em Up" extends northeast from Chinquapin to Highway 9.

The Moore Creek area is both heavily used by off-road bicyclists and heavily impacted. It is also part of the Environmental Reserve.

This unpaved service road extends from the Bike Path to Empire Grade, passing near the edge of the Farm Project and through the Arboretum lands.

Table F: Policies Concerning Off-Road Bike Use

Policy Alternatives		Precedents	Potential Uses at UCSC	Safety Concerns	Education Concerns	Economic Concerns	
1	Prohibit off-road bike use from all unpaved campus lands.	Pepperdine	Upper and lower campus lands, fire roads.	Eliminate conflicts between bicyclists and other users.	Awareness and enforcement of the prohibition.	Enforcement may be expensive.	Reduces environmental impacts on wildlife, land. Almost impossible to enforce, impacts on commute users.
2	Restrict off-road bike use to fire roads and designated bike trails.	California State Parks & Rec.	Upper and lower campus lands, fire roads, Allan Road.	Risk of conflicts between bicyclists and other users remains.	Establish and promote a "trail etiquette" standard and a clear "right of way" description sign.	Minor costs of signing.	
3	Develop and maintain bike trails specifically for recreational users. Could minimize ad hoc trail use.	No other UC campuses.	Designated areas of the upper and lower campus lands.	Designed for off-road bike use only, peds should be prohibited.	Important to identify use guidelines for both bicyclists and peds.	Unknown. Potential costs could be high, but must be weighed against environmental damage to meadows and other campus lands.	
4	Adopt "Use Days" to separate hikers and off-road bicyclists.	Marin County Openspace areas	Upper and lower campus lands, fire roads.	Reduces conflicts between bikes and peds, also horses.	Inform all potential users of days available.	Minimal costs for educating and informing users of available days.	Difficult to establish, since many fire roads serve as bike commute routes.
5	Promote the creation of an organized campus or local off-road bike group.	SCCCC, NORBA, COBA, ROMP	Connection to OPERS, trail maintenance days, seminars and outings on campus lands.	Increased awareness of safety issues should decrease accidents and improve relations with other users.	Utilize club/group to educate and inform bicyclists of environmental impacts, responsible riding, etc.	Unknown, but should be minimal.	

Dewey found that the creation of ad-hoc trails is disrupting previously undisturbed areas, harming the natural habitats of existing flora and fauna, and generating a negative aesthetic impact. Dewey notes that "damaging [these] natural habitats erodes the academic value of the land." Similarly, the issue of atmosphere centers on "the conflict between distinct user groups looking for different experiences", namely mountain bikers, runners and hikers. "The mountain bike rider is looking for a challenging, exciting, demanding recreational outlet while the joggers and hikers are hoping to find some peace and quiet and a chance to escape from the hectic demanding life... The conflict occurs when the mountain bikers infringe upon the pedestrians." Such conflicts also lead to potentially significant safety concerns along single track trails, which "are more curvy... resulting in limited vision and many blind corners." Dewey found that, due to their width and generally straighter sightlines, "there is less of a potential problem when mountain bikers meet other users on a fire road; there is [also] more room to avoid collisions."

Contrary to previous perceptions, Dewey found that "relatively little erosion [of fire roads] in the upper campus [is] due to mountain bikes." He notes that "erosion resulting from mountain bikes is caused primarily by compaction of the soil" and notes that "single track trails are far more susceptible to erosion from mountain bikes" than the graveled fire roads.

It should be noted that existing campus policies prohibit vehicular traffic, including bicycles, within in the Natural Areas Reserve except on established and designated roads and trails.

4.15 Regulation of Off-Road Cycling

Dewey recommends that the campus adopt policies similar to those of the State Park System and enforce them with "indirect management" techniques. These include the installation of informational signs and postings, the formation of a campus mountain biking group, and the production and distribution of educational materials addressing responsible off-road mountain bike use.

After consideration of the policy alternatives presented in Table F, this Plan recommends adoption of these measures, as outlined in the following two sections.

4.16 Education and Outreach

Both Dan Dewey and the consulting landscape architect, Joni L. Janecki and Associates (JLJA), recommend that the most effective means of mitigating the impacts of off-road bicycling is through education. The campus should develop and distribute educational materials concerning the environmental impacts of off-road bicycling, responsible off-road riding, and respect for other outdoor users. The campus should seek to distribute educational information via local bike shops and local cycling groups, as well as throughout the campus community.

Information regarding these bicycle impacts and rider responsibilities should be posted at all entrances to the open space areas, and may include posting of the National Off-Road Bicycling Association's (NORBA) code of ethics or similar "trail etiquette" guidelines (see Figure G). Responsible off-road bicycling techniques should also be incorporated into any campus Effective Cycling courses, as described in Section 4.26 below.

Share The Trail

Your mountain bike will bring you the easiest and simplest form of high adventure known in modern times. Pine forests, grassland meadows, rolling hills; some of these experiences are as close as your local county or city park. Be aware that you'll be sharing these lands with hikers, runners and equestrians. You are all out there for the same reason—to enjoy the sites—**so be considerate of other trail users.**

When encountering hikers:

• Slow down, stop or pull off the trail altogether. Say hi, be friendly. If approaching from the rear, let them know you're there.

When encountering equestrians (and their hooved friends):

• If approaching from the front, ALWAYS stop and let them pass. If from the rear, ask them if it's safe to ride slowly or walk your bike around them. Say hi, be friendly.

Riding habits for all times:

• *Don't skid*. Neither a safe nor efficient way to ride, it can degrade sensitive trails. Take that turn slowly, or if it's a tight switchback, dismount and walk around it.

• *Avoid extremely muddy areas*. Ride or walk around ruts and puddles, or you'll just make them worse.

• *Ride in small groups*. Whenever possible, keep groups smaller than five.

• *Wear a helmet.* Park rangers appreciate your concern for your own safety, as well as for others'.

• *Make some new friends.* Get to know staff at the park you typically ride in. Mountain bike riders are the newest trail user group, and are rapidly becoming the largest. A positive impression made now will help assure cyclists' future access to parks and public lands.

International Mountain Bicycling Association (IMBA)

IMBA is a grass roots volunteer organization concerned with cyclists' access to public lands. IMBA's goals are to educate cyclists about responsible trail riding, advocate for access rights and to further a positive image of mountain bicycling. Join the IMBA and help keep the mountain in mountain biking. **Individual membership $15.00**

IMBA Route 2, Box 303 Bishop, CA 93514

Shop Name:

SPECIALIZED.

Figure G: Trail Etiquette

One example of a trail etiquette guide for off-road biking. This flyer was prepared by Specialized Bicycle Components for distribution through bike shops.

4.17 Use of Campus Fire Roads

JLJA found no university campuses with a developed system of mountain bike trails. In fact, the consultant found that most campuses facing rapid growth are also experiencing reductions in the availability of undeveloped open space for off-road riding. Policies concerning off-road bicycle use were found among County, State and Federal park systems. In general, all allow off-road riding on fire roads; nearly all restrict single-track use; most sources emphasize the need for comprehensive education programs to maintain safe, low-impact uses of all off-road areas.

This Plan recommends maintaining the fire roads of the upper campus for use by mountain bikes. JLJA has identified Chinquapin (a major commuter route), Fuel Break, and West Roads as suitable mountain bike routes. Spring Road may serve as a seasonal route, due to its moisture content and erosion problems. Due to its steep grade and poor visibility, JLJA recommends that Red Hill Road be closed to all users, with the steepest and most damaged sections of the road being restored. Furthermore, this Plan recommends that areas restricting mountain bike use be clearly identified through the use of standardized signs.

4.18 Development of Campus Bike Trails

This Plan recognizes the appeal of providing some off-road bicycling opportunities for the local community while protecting the campus environment; it also recognizes the futility of attempting to ban all off-road recreational bicycling. Therefore, it is recommended that some off-road bike routes or “bike trails” be developed, designated and maintained for the specific purpose of off-road bicycle recreation. Part III presents guidelines for development and design of single- and double-track bike trails, based on research conducted by the consulting landscape architect. Any such bike trails should be designed in consultation with the campus Land Use Policy Committee, the Natural Reserve committee, the local off-road contingent of the Santa Cruz Cycling Club, staff of the Office of Physical Education, Recreation, and Sports (OPERS), the campus Bicycle Subcommittee and Campus Facilities staff. A program similar to the local Association of Concerned Trailriders' (ACT) "trail days' could help construct and maintain bike trails on campus.

4.19 BICYCLE PARKING, SIGNS AND OTHER AMENITIES

Bike ways are not the only element of a bike plan; additional facilities are as important as the lanes and paths of a bike circulation system. Most of the existing bike parking facilities in the campus core and colleges are inadequate for the current demand; some are poorly sited, while others are of unpopular design or incompatible with U-locks. As a result, bicycles are commonly locked to stairway handrails, light standards and signposts. This practice creates access problems for mobility-impaired individuals, increases maintenance costs associated with handrails, light standards, and signposts, and occasionally creates other access problems for Grounds staff, maintenance staff, and emergency response persons.

While additional bike parking is needed near core facilities, the most dramatic increase in demand has been experienced at each of the eight colleges. Historically, most bike parking in the colleges has been provided by the colleges and the campus Housing Office for use by residential students. The recent surge in bicycle use has resulted in far more commuter parking demand near classrooms and academic offices within the colleges, as well as throughout the campus.

This section addresses the design and installation of bicycle parking, informational signs and other amenities.

4.20 Types of Bicycle Parking

A variety of bicycle parking facilities have been identified by the consulting architect. JLJA's survey of other campuses found a variety of bicycle parking facilities in use, as well as a wide range of policies and practices. Several issues to be considered include:

- The size of bike parking lots — large, concentrated lots of 150-750 spaces versus smaller decentralized parking areas;
- The location of bike parking — immediately adjacent to building entrances versus sites outside the "walk zones" surrounding facilities;
- Enforcement policies — these range from impounding improperly parked bicycles to issuing parking citations or warnings.

Obviously, the size and character of bike parking facilities should vary with the level of demand, the type of user, and the site. For example, parking lots of 100-150 spaces are most appropriate in areas of high demand, such as the South Entrance (near the Barn Theater). Medium-sized lots (24-149 spaces) are appropriate at the edges of "walk zones," especially in high-use areas like Science Hill and many of the colleges. Smaller pockets of bike parking (less than two dozen spaces) are appropriate when situated near specific traffic generators within walk zones (college offices, faculty office buildings, etc.) or where larger parking lots are infeasible or impractical.

This Plan recommends that bike parking be sited so that bicycle traffic through predominantly pedestrian areas, such as college courtyards and plazas, be minimized. In general, moderate and large parking facilities should be located at the perimeter of "walk zones" while only small pockets of bike parking may be allowed within these areas.

It is also important to consider the surface beneath bike parking facilities. In general, all bike parking should be installed on solid or semi-permeable pavement materials. These may include existing concrete or asphalt pavement, pavers, stabilized decomposed granite, or numerous other surfaces. This Plan recommends determining the type of surface on a case-by-case basis that considers issues of drainage, erosion, runoff, soil compaction, local vegetation, visual and aesthetic character.

JLJA found that most campuses have a bike education and enforcement program, including bike licensing programs, that include specific policies reprimanding bicyclists who park illegally. In cases where the bicycle is registered to a campus user, parking citations are sometimes issued. More severe action may be taken, including the "booting" of a bike (impounding on-site with a U-Lock belonging to the Enforcement Office) or confiscation (which generally requires destruction of any lock securing the bike).

Bicycle parking regulations were adopted by the UCSC Campus Police in Fall 1991, but enforcement will be curtailed until adequate legal bicycle parking is provided in each area of campus. Enforcement techniques are still under discussion, but could range from leafletting of offending bikes or issuance of citations if the bikes are registered. This Plan does not recommend impoundment unless the offending bike is obstructing emergency or disabled access.

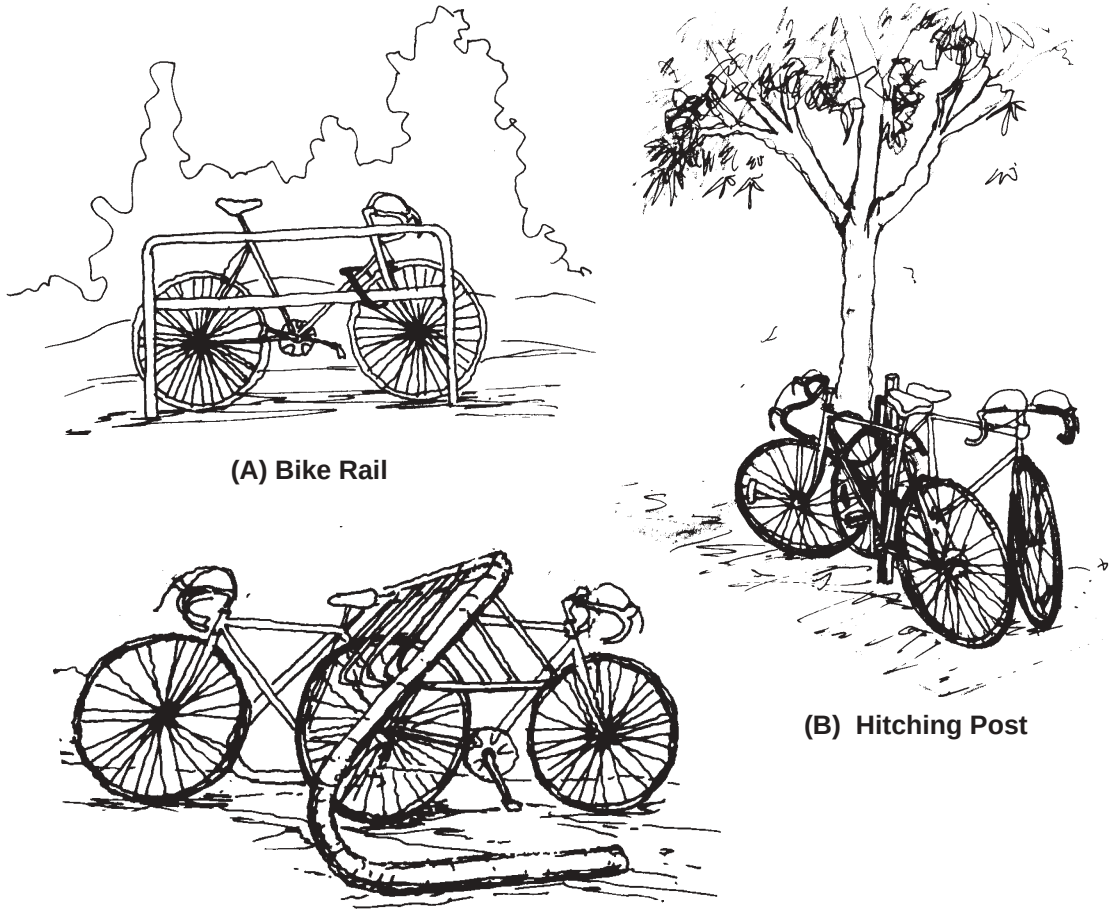
Table G presents a variety of bike storage facilities styles.

Hitching Posts

The predominant form of bicycle parking facilities currently available on campus are the two-eared bicycle “hitching posts” illustrated in Figure H. Set into asphalt, concrete or compacted soil, these posts are found in small pockets (such as the parking area south of McHenry Library) and relatively large parking lots (the Barn Theater parking area). These five-foot-long metal posts are set two feet into the ground (typically asphalt or concrete); two bikes may be locked to the steel “ears” protruding from each post. While relatively simple to install, hitching posts have several significant drawbacks:

- The exposed metal posts often scratch bicycle frames;
- Parked bikes have only one axis of support, leaving many bikes to fall over (even though they remain locked to the post);
- The current design cannot be installed securely on existing concrete pads.

Still, these are one of the most cost-effective and prevalent form of bike parking facility on campus and in the Santa Cruz community. This plan recommends that bicycle hitching posts be used in areas where small pockets of bike parking, such as within walk zones, or where moderate-density bike parking is desired (such as near the south entrance). It is also recommended that some existing hitching posts be removed and reinstalled in more accessible arrangements, or in areas of greater demand.



(A) Bike Rail

(B) Hitching Post

(C) Bike Racks

Figure H: Styles of Bicycle Parking Facilities

The three styles of bike parking illustrated here are anticipated to be the most frequently used at UC Santa Cruz.

(A), the Bike Rail, resembles handrails adjoining pedestrian stairways. This design supports bikes and is relatively space-efficient. Groups of bike rails may be most appropriate in areas with low to moderate parking demand, but high or "formal" pedestrian travel (college circles, etc.) This style also has a relatively high cost per bike. Finally, when not in use as bike parking, people can lean or sit on the rails.

(B), the Hitching Post, is currently the most common form of bike parking at UCSC. Posts are best used in areas where space is confined by natural features (trees, slope, etc.) and generally cost less per bike than Bike Rails. This style generally provides less stability than either the Bike Rail or Rack. For greatest security, Posts should be set in pavement or concrete; this also makes posts more difficult to relocate.

(C), the Bike Rack, is relatively new to UCSC. The design shown at left is sometimes referred to as a "coat-hanger" style: bikes lock to a steel triangle suspended from a tube passing above. Racks can be installed on existing pavement or set onto dirt; they can also be relocated easily. This style also offers the most bike parking per surface area, and minimizes the amount of metal in contact with the bike frame. Finally, Racks are generally the most cost-effective of these three styles of bike parking.

Table G: Styles of Bicycle Parking Facilities

Policy Alternatives		Precedents	Application at UCSC	Benefits	Drawbacks	Costs	
1	Hitching Posts	UCSC, City of Santa Cruz	Large parking lots near campus entrances, small locations within "walk zones."	Allows high density bike parking.	Bikes fall over easily; posts sometimes scratch bike frames; cannot be effectively secured to existing concrete pavement.	Between $50 and $70 per post.	
2	Inverted-U or Rail design	Palo Alto, some locations in Santa Cruz.	"Formal" areas (college circles) where visual character is especially important, small parking areas.	Bikes are held in more stable position than with posts, less visually obstrusive.	Provides lower density bike parking, requires some education about proper use.	Somewhat more expensive than posts.	
3	"Paperclip" design	UC Santa Barbara, UC Davis	Moderate to large parking areas, especially in the campus core and colleges.	Highest density parking at lowest cost, install on existing pavement, easily relocated to other locations.	Requires some education about proper use; security is poor.	Lower cost/bike than individual posts or rail.	Ideal in areas where temporary relocation may be necessary.
4	"Coat Rack" design	UC Davis, Univ. of British Columbia	High density parking areas, especially in the campus core and colleges.	Many of the benefits of the paperclip but with better security. Can easily be relocated.	Requires some education about proper use.	Comparable to hitching posts.	
5	"Clamshell" design	UCSC (Classroom Unit, Performing Arts)	Performing Arts Complex, Classroom Unit.		Awkward to use, can damage spokes, relatively low density parking.		Tendency to be misused resulting in theft; existing racks should be removed.
6	Bike Storage Lockers	Pepperdine, Stanford	Adjacent to large core and college buildings.	Provides secure long-term parking; could minimize bike storags in academic buildings.	Costly, requires managed use, visually unattractive, very low density parking.	Very expensive, rental rates rarely cover the cost of management.	
7	Bike Cages	Stanford Shopping Center	Adjacent to large core and college buildings.	Provide relatively secure long-term parking; less visually obtrusive than lockers; ease of use.	Not as secure as bike lockers.	Unknown.	
8	Covered bike parking facilities		Wherever feasible.	Define parking area and protect bikes from the weather.	Integration of standardized design may conflict with architecture of colleges.	Unknown.	

Bicycle Rails

This design, shown in Figure H, consists of a steel tube bent to the form of an inverted U with dimensions matching the average bicycle, which is then bolted or set in the ground; it most closely resembles the handrails adjoining stairways and ramps (which have proven to be very popular bicycle parking areas!). The advantage of the rail design over the hitching post is that bikes have two points of support, and are less likely to fall over when locked up; rails are also more easily installed on existing concrete slab. Additionally, when not occupied by bicycles, rails may appear less obtrusive than the standard post design. Rails require more land area than hitching posts to park the same number of bikes, and may have a greater incidence of improperly-parked bikes. Several cities have found this design effective in reducing theft and damage to bicycles. This Plan recommends the use of bike rails in highly visible, formal areas (such as near college entrances or courtyards).

Bike Racks

JLJA found that campuses with large numbers of bicyclists, such as UC Davis and UC Santa Barbara, use long metal racks bolted to the pavement. These racks are most cost- and space-efficient in high-demand areas, and can also be easily relocated to meet changes in parking demand.

One bike rack identified by JLJA is commonly referred to as the “paperclip” rack, a design that offers lower support to hold the bike and adequate space to lock the front wheel to the frame and rack. These racks generally hold twelve bicycles, if bikes are parked properly (stripes of paint on the adjoining pavement may promote proper use of the racks). Additionally, the paperclip design can be easily installed on existing pavement. Unfortunately, some "paperclip" designs do not accommodate U-Locks or are too low to secure the bicycle frame.

Another popular bike rack design found at UC Davis is the “coat rack” style (shown in Figure H), in which bikes are parked beneath a bar and locked to suspended metal loops in the shape of a coat-hanger. This Plan recommends the use of this style in many areas of campus, particularly in moderately-sized parking lots near facilities in the campus core and the colleges.

A third form of rack recently identified by TAPS staff resembles the Bike Rail mentioned in the previous section. This design appears to offer the security of the Bike Rail at the higher density of the "coat rack;" it may also prove more efficient and aesthetically appealing than the "coat rack" design.

One style of rack currently used at UCSC, the "clamshell", is recommended for removal. This design requires a set of "teeth" to pass through the spokes of a bicycle's wheel without bending them; it also lacks any effective means of securing the frame of the bike to the rack itself. This design is **not** recommended for use.

Parking Corrals

This is a general term for the style of bike parking facilities currently available at the Barn Theater, but may refer to any large (more than twelve) collection of bike parking posts or rails. Corrals may use any of the three lockup designs described above: hitching posts, rails or paperclip racks.

Corrals should be designed to maximize bicycle parking while maintaining easy access for the bicyclist. Bike parking areas of this scale should be located at the edges of "walk zones" associated with courtyards or plazas, but should be conveniently situated near the obvious entrance to an area or facility.

Covered Corrals

This version of the standard corral features some form of cover to protect parked bikes from the weather. This would most often consist of a roof, but could also take the form of a corral located underneath a second-story building. It is recommended that moderately-sized bicycle parking areas (12-23 spaces) be located so that they might be covered by a roof structure or a building overhang.

One possible design for covered bike parking is the "Hay Barn" illustrated in Figure I. This design offers maximum coverage and access at relatively low cost, and a standardized design can be implemented throughout the campus.

Bike Lockers

While offering the maximum in security, traditional bike lockers are relatively large, blocky, unaesthetic structures that do not easily fit the general palette of campus architecture. Furthermore, they typically require greater attention and management, generally being rented to individuals on a monthly or quarterly basis. This plan does not recommend their use on campus at this time. However, the campus might consider their integration into the design and/or construction of new buildings in the campus core, particularly in Science Hill. Bike

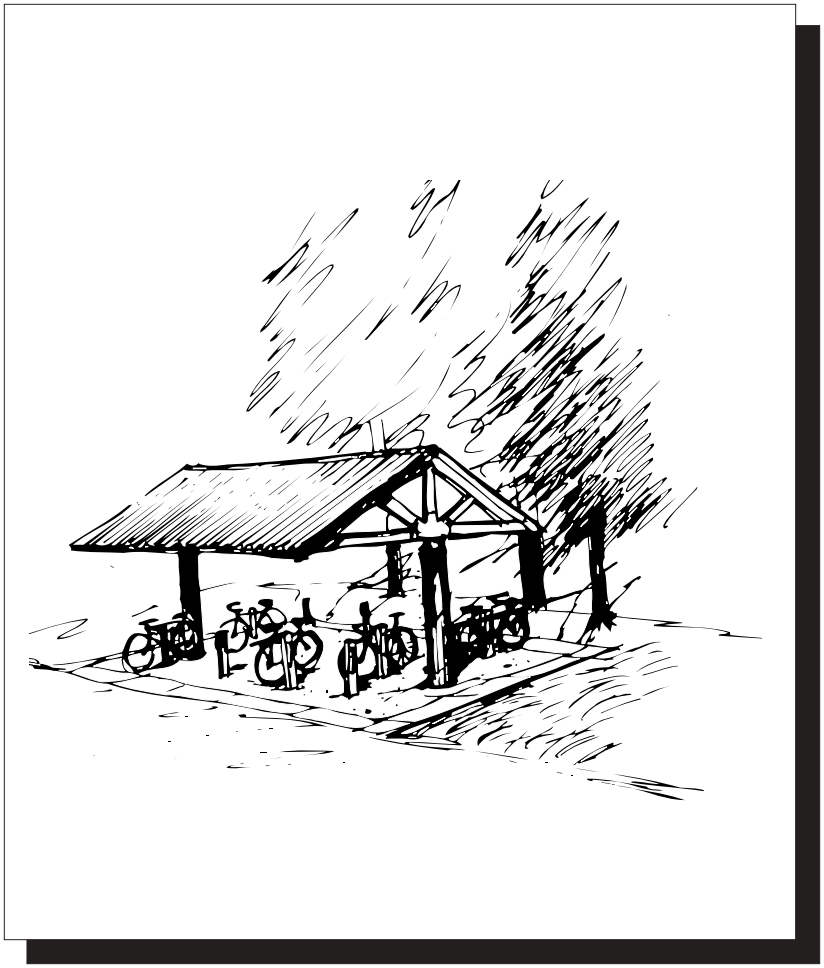


Figure I: Sketch of Covered Bike Parking
One possible design for covered bike parking areas is modeled after traditional California Hay Barns, as might have been found on the Cowell Ranch.

lockers may be an attractive alternative to those faculty and staff members who currently store bicycles in their office during the daytime.

Bike Cages

Bike cages offer security similar to that of bike lockers, but without their standard blocky form and high cost. A good example of bike cages may be found at the Stanford Shopping Mall, where a row of more than two dozen chain-link cages adjoin the wall of a building; a canvas roof protects bikes from the weather, while individual gates may be locked closed. This form of bicycle parking may be attractive in some areas of campus, especially if constructed immediately adjacent to a building.

4.21 Commuter Showers

As of the end of 1991, only one shower has been developed on campus specifically for use by commuting bicyclists. This single-stall shower was added to a lounge adjacent to the women's restroom in the Communications Building basement during the summer of 1991, following several years of discussion and planning. Funding for this renovation came from both TAPS and the Chancellor's Office. While not intended specifically for commuter use, other shower facilities are also available within some core buildings, including Applied Sciences, Kerr Hall, and Campus Facilities.

Larger "commuter lounges" with showers and locker rooms were installed in the basements of some dormitories in several residential colleges constructed during the 1960's, but have been dismantled or closed during the last ten years. Current plans call for the inclusion of a commuter shower in the College Nine Academic Building, slated for completion by Fall of 1993.

In the Summer of 1992, TAPS began a program with OPERS that allows registered bike commuters free access to the showers and locker rooms at the East and West Field Houses. The program will be monitored during Fall 1992 to determine its cost-effectiveness and popularity. Such arrangements have been in place at UC Davis for several years and have proven quite popular.

This Plan recommends that, wherever possible, commuter shower facilities be installed in new campus buildings. Furthermore, it is recommended that TAPS continue its bike commuter shower program with OPERS, pending review during Fall 1992.

4.22 Signs, Stenciling and Maps

An essential element of any circulation system is signs. Without adequate signs, people using an area may become lost or confused; they may also be unaware of policies and regulations affecting their use of that area. Given the character of the campus lands, the diversity of people using the campus, and the range of polices recommended for adoption by this plan, the institution of useful sign standards is essential to the success of any program attempting to manage on-campus bicycle use.

JLJA's survey of other university campuses indicates that a combination of Caltrans Design Standards, American Association of State Highway and Transportation Officials (AASHTO) recommendations, the Manual on Uniform Traffic Control Devices (MUTCD), and the International System for Universal Language are being adopted. This Plan concurs with this trend, and recommends adoption of a comprehensive and consistent bicycle sign and stenciling plan. If possible, this system should be coordinated with both the City and County of Santa Cruz, in order to maximize the commonality of these standards.

Section 11.5, found in Part III of this plan, presents all of the sign standards recommended for campus adoption. These rely heavily on existing standards adopted by CalTrans, the State of Arizona, and the City of Eugene, Oregon, and the sign standards recommended for adoption in the draft Bicycle Plan for the City of Sacramento.

In general, this Plan recommends that signs be used where motor vehicles and high-speed bicycle traffic are present, while stencils are more appropriate and less visually obtrusive in areas where pedestrians and moderate-speed bicyclists are the "target audience." In either case, the use of signs and stencils must be consistent throughout the campus, and should occur at all junctions and at particular or unique conditions.

Signposts provide a variety of information for use by both the bicyclist and the motorist. Information provided by signs might include:

- Destination of route or bikeway;
- Merging of motor vehicles with bikes and of bicycles with other bicycles;
- Alternate route or bikeway;
- Bicycle parking areas or storage facilities;
- Pedestrian crossings and caution areas;
- Designation of restricted areas, particularly in off-road or one-way routes.

Stencils may be incorporated into areas where messages are directed to a specific type of user, typically a bicyclist or pedestrian. The following circumstances should be considered for stenciling:

- Pedestrian path and bicycle crossing. Pedestrian paths should have a yellow band with the written description of "Caution: Bike Xing" and a band of grooving for the visually-impaired;
- Areas where bicyclists are merging with one another;
- In areas where bikeways diverge, arrows should be painted to define and direct the cyclist in the appropriate direction;
- Walk-zones and slow-zones;
- Directional arrows to bicycle parking facilities;
- No Bike Parking areas.

Although stenciling is an effective means for informing pedestrians and bicyclists of upcoming conditions, the maintenance of stencils will result in increased lifetime costs. This Plan recommends that stencils be repainted on a biannual basis, or as needed to maintain a clearly defined demarcation.

This Plan also recommends that TAPS staff, in consultation with the campus community, develop a new campus map that indicates bike routes, bike parking, shower facilities, and recreational facilities. In its printed format, the back of this map might summarize campus bicycle policies and local bicycle resources. Similarly, any posted campus maps (such as the "You are here" series recommended in the Pedestrian Circulation and Access Plan) should include bicycle amenities.

4.23 EDUCATION, OUTREACH AND ENFORCEMENT

Much of this Plan addresses the engineering of safe, convenient bike ways and related amenities. However, the single most effective means of encouraging safe, responsible bicycle use is education. Without it, the most responsive engineering solutions may still allow unsafe practices to occur. An effective education program must be addressed to all campus travelers, be they bicyclists, pedestrians or drivers, as each should know and understand the reasons behind these policies.

Outreach is essential to the Plan, both for dissemination of information (education) and for feedback on the effectiveness of the programs. The campus believes it is valuable to work together with the bicycling community to achieve our common goals.

Enforcement is, in some ways, a last resort: what cannot be accomplished through good engineering practices and education may require enforcement. Enforcement can also be a form of education, as indicated by the proposed Bike Diversion Program. In either case, the desirable approach is to apply indirect enforcement methods (self-policing by the bicycling community, for example) that complement the education and outreach functions of this Plan. Still, direct enforcement will undoubtedly be necessary in some instances.

In total, these elements comprise the most challenging and "human" aspect of the campus Bike Plan. Few "standards" are available to guide us; much depends on the energy and creativity of the individuals involved and the responsiveness of the campus community to these efforts. The very first step in this area was made during 1991-92 with the creation of the BEEP program.

4.24 BEEP: Bicycle Education and Enforcement Program

The Bicycle Education and Enforcement Program was instituted in Fall 1991 as a step toward promoting safe, responsible bicycle use an accepted norm at UCSC. Implemented on a two-quarter trial basis, BEEP set out to meet three goals:

- Develop a bicycle education program that reaches all elements of the campus bicycling community, including visitors;
- Implement a voluntary bicycle registration program on-campus;
- Supplement the Campus Police efforts to increase enforcement and awareness of applicable bicycle regulations.

With start-up funds provided by the Chancellor, UCSC's first Bicycle Safety Officer (BSO) was hired in November 1991. However, after eight months, it became clear that BEEP attempted to combine too many tasks under one job description and has since been reorganized: Bicycle enforcement activities remain with the Campus Police, while the Bike Education role has shifted to TAPS.

During spring and summer of 1992, the BSO (now called the Bike Coordinator) succeeded in securing a two-year, $180,000 grant from the State Office of Transportation Safety to develop a bike safety film series and curricula for elementary, secondary and post-secondary schools in California. Based on this grant and additional funding from TAPS, the education and safety programs have taken on an expanded scope. The Bike Coordinator will continue to work one-quarter time on campus bike programs.

Where education ends, the Campus Police must turn to enforcement of campus and state bicycle regulations. This may include issuance of warnings, “fix-it” tickets, and citations. Beginning in Winter 1992, Campus Police began issuing "SpokeStokes," a “positive reinforcement” program that promotes responsible bike behavior by issuing “tickets” redeemable for free or discounted goods and services at local businesses.

This Plan recommends that additional staffing be provided to assist Campus Police and the Bike Coordinator in the areas of outreach and enforcement. UC Davis (upon which UCSC based the BEEP) hires approximately fifteen students each quarter for a “Bike Patrol” operation that monitors and enforces campus bicycle regulations; CU Boulder has a similar but larger program. UCSC might rely on student employees or possibly some on-campus bicycling organization, such as People Power, to help enforce campus bicycling policies and responsible riding techniques.

4.25 Education

The first generation of bike education materials at UCSC consisted of pamphlets describing basic safe biking practices and responsible riding techniques. More recent materials have focussed on "Smart Locking" techniques (to increase bike security and deter thefts), bicycle awareness for drivers, and promotion of the campus bike helmet program. Additional materials now being planned include a campus bike map (mentioned in a previous section of this Plan), off-road biking practices, and a list of bike shops in Santa Cruz County. These printed materials have been distributed through the campus Transportation Information Centers, campus residential staff, OPERS, TAPS and Campus Police staff, and local bike shops.

Another popular form of bicycle education implemented in Spring 1992 is the "group ride" or "shifting class" in which relatively novice bicyclists can learn some basics of bike maintenance and safety while having a good time. Such events are generally low-cost, require minimal time commitment on behalf of instructors and participants, and attract people new to riding a bicycle. Such programs can be implemented cooperatively by TAPS and OPERS staff, possibly in conjunction with members of the local cycling community.

An effective bicycle education program must address bike awareness among non-bicyclists. Pedestrians and drivers need to understand their responsibilities when bicyclists share their paths and roadways, and recognize the rights and concerns of bicyclists.

4.26 Development of an Effective Cycling Course

Created in 1974 by bicycle enthusiast, educator and engineer John Forester, Effective Cycling Programs are designed to make a bicyclist “ride comfortably and efficiently, without worrying about traffic, on a machine that you trust” so that the rider may “experience the full joys of cycling.”[11] Furthermore, Effective Cycling promotes a proactive, responsible style of using a bicycle; in some ways it might be compared to what “Drivers Education” instructors have called “Defensive Driving.” In addition to teaching riders safety techniques in the classroom, Effective Cycling courses rely heavily on actual experience riding on the bike in various real-life conditions . TAPS, in coordination with the Campus Police and OPERS, is working to develop and implement an Effective Cycling Program at UCSC.

[11] John Forrester. *Effective Cycling,* MIT Press, Cambridge, MA, 1984.

4.27 Development of a Bicycle Diversion Program

The Campus Police and TAPS are interested in providing the Effective Cycling Program to persons receiving citations for moving violations while riding a bicycle. Such "diversion" programs are common for automobile drivers who might choose, for example, to attend safety school in lieu of paying a hefty fine. The offender opts to pay a low-price course fee instead of the citation, while the court system benefits from a reduction in caseload. Similar programs are being planned or implemented at UC Davis and UC San Diego. If this proposal is approved by the local Court system, UCSC should pursue implementation of a bicycle diversion program locally.

4.28 Distribution of Bike Safety Equipment On-Campus

As of Fall 1991, there is nowhere at UCSC to purchase bicycle helmets, gloves, or effective bicycle lights. Discussions are underway with several campus groups to begin selling these items to the campus cycling community as soon as possible. UCSC recently received a gift of $6,000 for the distribution of bicycle helmets to members of the campus community, and efforts are underway to find the most cost-effective and long-term use of these funds.

Beginning in Spring 1992, UCSC began offering students, faculty and staff a low-cost series of bicycle helmets. Using a $6,000 donation to the campus, TAPS, the Campus Police and the Cowell Student Health Center have cooperated to sell three styles of Snell/ANSI approved bike helmets. In the first six months of the program, more than 500 helmets were sold. Additionally, the BayTree Bookstore began selling Giro bike helmets and bicycle lights.

4.29 Relations with Local Bicycle Groups and Organizations

As of Fall 1992, there are four active bicycle organizations in the Santa Cruz area: the Santa Cruz County Cycling Club, People Power, the Association of Concerned Trailriders (ACT), and Santa Cruz Cyclists United In Dirt (SCCUID). This Plan recommends that UCSC staff associated with bicycle development and planning, including TAPS, OPERS, and the Campus Police, work with these groups to promote safe and responsible bicycle ridership. Furthermore, it is recommended that efforts be made to help develop a local chapter of the National Off Road Biking Association (NORBA) or Responsible Organized Mountain Pedalers (ROMP) headquartered on-campus.

4.30 Data Needs and Monitoring

Data regarding bicycle accidents are particularly useful in planning for improved safety in bicycle routes. During one three year period (August 1984-February 1988), 66 bike accidents have been documented by either the Campus Fire or Campus Police Departments; these are summarized in Appendix C. Such data should continue to be compiled by the Bicycle Coordinator for use in planning and prioritizing bicycle infrastructure improvements.

Maps of accident locations can be used to identify trouble spots, and classification of accident causes can help planners to determine what remedies would be most effective in reducing accidents. These accident maps and classifications should be maintained on an on-going basis.

To provide guidance for prioritization of bicycle programs and capital improvement projects, it is helpful to have data available concerning current and projected numbers of bicyclists using various routes. Bicycling traffic is subject to considerable variation due to weather, time of day, and time of year. Current behavior may be easily monitored through traffic counts, if care is taken not to introduce biases from limited sampling. Similarly, surveys of bike parking areas should be conducted annually to determine the priority for installation of new or additional bicycle parking facilities. These data should continue to be collected by TAPS or the Environmental Assessment Group (EAG).

Bicycle parking and circulation patterns must be considered in any project planning and/or site development associated with campus capital improvements. This should include both Major and Minor Capital Improvement Programs, Housing projects, and development of the campus Inclusion areas. Furthermore, bicycle traffic patterns and parking demand should be included in any campus circulation studies, especially those studies that rely on origin-destination studies.

5.0 PROGRAM IMPLEMENTATION

An effective plan must be successfully implemented to achieve its goals. This section describes the means of reviewing, adopting and implementing the elements of this Plan.

5.1 Adoption of the 1992 UCSC Bicycle Plan

This Bicycle Plan and its associated appendices shall be (have been) reviewed by the following Chancellor's Advisory Committees:

- Transportation, Parking and Circulation Committee;
- Campus Land Use Policy Committee;
- Bicycle Subcommittee of the Transportation Committee;
- Safety Committee;
- Natural Reserve Committee.

Additionally, the Plan shall be (have been) reviewed by numerous campus administrators, including the Superintendent of Grounds, the Risk Manager, the Campus Architect, and the Vice Chancellor of Business and Administrative Services. Following receipt and review of comments submitted by these committees and administrators, the TAPS Director and staff will revise the Bike Plan as necessary. Upon completion, it will be forwarded to the Chancellor for formal adoption as an element of the Campus Comprehensive Transportation Plan.

As noted elsewhere, the prioritized projects listed in Appendix A should be reviewed annually for modification; new projects should be added as needed, while those projects completed during the last twelve months should be eliminated from the list. This review should be conducted by the TAPS Director, in consultation with the Bicycle Subcommittee, the Campus Land Use Policy Committee, the Safety Committee, OPERS staff, the Risk Manager, the Campus Architect, and other representatives of the campus community; final review should involve the Transportation, Parking and Circulation Committee.

Actual implementation of projects and programs resulting from the policies identified in this Plan will require a cooperative effort of several campus units, including TAPS, Grounds, Physical Planning and Construction, the Environmental Assessment Group , Physical Plant staff, Campus Police, OPERS, and administrative staff of each college. Campus and community groups, such as People Power or the Association of Concerned Trailriders, may offer assistance as volunteers, while local planning and regulatory agencies may play other roles in improving bicycle infrastructure at UCSC.

5.2 Funding Sources

Currently, only two sources of funds are available for on-campus bicycle improvements: TAPS funds and Chancellors Discretionary Funds. While it is reasonable to continue using TAPS funds (which come from parking fee revenues) to provide for bicycle improvement programs, additional funding must be identified in order to pay for expensive items (such as bike lanes along Hagar Drive). The campus should pursue incorporation of bicycle improvements in major capital improvement projects as necessary, and should consider identification of bicycle projects with other campus infrastructure improvement proposals.

Perhaps the most obvious source of potential funds for bicycle improvements are the registration fees charged for bike licenses. However, the standard rate of $6 for a three-year license is unlikely to generate revenues on the scale necessary for supporting the campus bicycle improvement program. Furthermore, while higher registration fees have been discussed, it has been noted that bike registration fees rarely become significant revenue generators.

A potential source of funds for bicycle improvements are grants, especially those associated with air quality and traffic congestion. TAPS shall continue to pursue grants from the Santa Cruz County Regional Transportation Commission, CalTrans, the Monterey Bay Unified Air Pollution Control District, and the State of California on an ongoing basis.

Another potential source of funds are parking fine revenues collected by the campus. Already the primary funding source for bicycle programs at other UC campuses, recent legislation may make these funds available specifically for use in developing and maintaining alternative transportation modes. These funds currently support the Parking Enforcement operation, with surplus funds accruing to a special projects account (which has been used in the past to fund requests for specific bicycle infrastructure improvements). Revenues generated through bicycle parking citations and moving violations should be applied toward campus bicycle programs and improvements.

PART II: APPLICATION OF THE POLICIES

6.0 INTRODUCTION

In order to illustrate the impact and meaning of the policies and guidelines identified so far, the consultant has developed a Bicycle Circulation Plan for UC Santa Cruz. The following section is intended to serve as a "best estimate" of how the 1992 Bike Plan could be implemented, and to help direct campus planners toward realizing the proposed improvements. It is important to note, however, that the following section serves as a model and not as "the final word" in campus bicycle planning.

7.0 BICYCLE CIRCULATION ROUTES TO AND FROM THE CAMPUS CORE

A comprehensive long-term campus bicycle circulation system has been devised by the consulting landscape architect which will provide bicycle access to all existing and planned campus facilities. **Figure xx** illustrates the proposed bicycle circulation system for the campus, while each bikeway segment is identified in **Table I**. This circulation system is expected to evolve to incorporate new facilities as they are sited and planned, and should be updated as needed.

The campus bicycle circulation network will provide connections between the central campus core and High Street via Cardiff Drive, the South Entrance, Empire Grade near the Arboretum, the West Entrance, and Empire Grade via Marshall and Chinquapin roads. **Table I** indicates which of these routes are currently available and which require additional development before being formalized.

Access from the South Entrance

7.1 Coolidge Drive

Currently, Coolidge Drive serves as the primary bicycle access route in the vicinity of the South Entrance. Bike lanes were indicated along this County roadway during the 1970's and were included in the Santa Cruz County Bikeways Map of 1989; however, additional striping and resurfacing is required to improve the existing bike lanes to Caltrans standards for Class II bike lanes. Coolidge serves as access to the lower end of the existing Bike Path at the Campus Facilities intersection, and to Hagar Drive. In the outbound direction, traffic from the Bike Path merges with bike lanes along Coolidge as it passes the Cookhouse and Barn Theater facilities of the South Entrance. Landscaping in this area should be carefully maintained, so that visibility for both bicyclists and auto drivers leaving the Barn Theater parking lot is not reduced. Beyond Hagar Drive to the northeast, Coolidge continues to provide bike lanes as far as the sharp curve into McLaughlin Drive; unfortunately, this entire roadway section is quite rough.

Figure xx goes here

TABLE I GOES HERE

At the south campus entrance, the outbound left-turn pocket should have bike lanes integrated. Traffic signals should be resynchronize to allow bikes to exit without fear of oncoming left turns.

If additional bike parking is provided on the east side of Coolidge Drive at the South Entrance, the existing island should be modified to provide a "holding pocket" or safety zone for outbound bicyclists merging with southbound traffic on Coolidge. Additional warnings (stencils on pavement, xing signs) will be installed.

The County should resurface the existing bike lanes along Coolidge Drive. The drain inlets should be considered while doing this redesign, and utility covers should be reset flush with the pavement in the lanes. They should also be painted with non-skid surfaces.

7.2 Cardiff Drive

Cardiff Drive serves as an alternate route from High Street to the Campus Facilities intersection with Coolidge and the Bike Path entrance, and winds its way past the Cardiff House and Carriage House, through several parking lots and Campus Facilities access roads. Much of this existing route requires resurfacing; the chain restricting vehicle access at the south end of the road should be replaced by a series of bollards to more conveniently allow bicycle access.

The consultant suggests constructing a two-way Class I path and III bikeway (along existing but improved Cardiff Drive) between the Cardiff House and High Street, with pedestrian access provided by a separate path. A bike path will be constructed at the north end (between the Cardiff House Circle and the Carriage House parking lot) to divert bicycle traffic away from the service road accessing the Corporation Yard.

Option 1: Use existing Cardiff Drive as bikeway, following regrading, resurfacing and striping. Pedestrian traffic moves to a new path east of existing roadway, utilizing ped gate at base of hill, thereby providng separate entrances to peds and bikes/ vehicles.

Option 2: Construct a new Class I path west of existing roadway, use the existing roadway as a pedestrian path. Advantage: decrease the steepness of the slope and increase visibility for bicyclists.

7.3 CamFac/Coolidge Intersection

The Campus Facilities intersection at Coolidge has long been identified as a significant problem affecting bicycle access. Vehicular traffic through this area is quite heavy during the morning, noon and evening peaks; sight lines for inbound traffic are poor; bicyclists entering the Bike Path must merge with vehicle traffic at the top of a hill and make a left turn, or cross at the crosswalk. While numerous solutions have been suggested,

the most effective means of improving bicycle, vehicle and pedestrian traffic entails installation of a traffic signal. This may be installed in conjunction with an access road to Inclusion Area D, but these plans have not yet been finalized.

Option 1 : Signalize the intersection. Install left turn pockets in both directions along Coolidge, and bike sensors at all approaches. The de facto roadway between Coolidge and the Blacksmith Shop/ Hay Barn should be formalized as far as the existing Bike Path, with Class II bike lanes on both sides. A turnoff for northbound bike traffic should be constructed between the new road and the Bike Path. This could serve as a future access road to Includion Area D, the Hay Barn, and the Farm and Garden.

Option 2: In the interim (before signalization), there is no effective solution that provides a safe left-turn movement for bikes while preserving vehicle access to the Blacksmith Shop.

7.4 Bike Path

The existing Bike Path stretches from an area near the Blacksmith Shop north along the west edge of Jordan Gulch to a point north of the Farm & Garden, where it separates into uphill and downhill paths and travels across the meadow; it eventually joins Meyer Drive near the intersection with the University House driveway and the McHenry Library access road. This Class I path includes several areas which warrant improvement, including the curve at the lower intersection of the uphill and downhill paths, the Farm & Garden roadway crossing near the lower quarry, and the vehicle parking area adjacent to the downhill path behind the Blacksmith Shop.

Additionally, the existing one-way entrance path should be widened to provide downhill bicyclists safe access to the Campus Facilities and Cardiff Terrace areas, as well as the Cardiff Drive bike way.

Widen the lower section of the Bike Path (along the gulch) about one foot and trim vegetation to improve sight-lines.

Straighten the curve north of the Farm & Garden.

Immediately east of the Farm & Garden a series of ad hoc paths have been worn between the Bike Path and the Farm access road. These should be blocked with natural barriers and revegetated; this should include signs desribing the restoration process. Elsewhere to the north, ad hoc paths lead across the Great Meadow, creating addition erosion problems and visual impacts. Although these are not caused soley by off-road bike use, bikes generate the most significant impact. These paths shold temporarily blocked and restored with indiginous plant species.

Another problem along the Bike Path path is the "banking" or "swerving" of bicyclists off the edges of the bike path, causing increased erosion around and onto the bike path. This should be reduced through education.

7.5 Hagar Drive

Hagar Drive currently provides the most direct route from the South Entrance to the East Field House, but provides no shoulders or bike lanes for uphill bicycle traffic; an increasing number of mountain bike riders are using the pedestrian trail adjoining Hagar, rather than risk riding in the traffic lane. Downhill cyclists typically ride in the traffic lane as well, but find this less risky due to their relatively common speeds. This "shared lane" practice should be identified by signs warning auto drivers of mixed bike and vehicle traffic.

This Plan recommends the addition of Class II bike lanes on Hagar Drive from Coolidge to the transit stop adjacent to the East Remote parking lot. At that point, the northbound bike lane splits to the east as a new ten-foot wide one-way Class I bike path, heading northeast across the hillside between the East Field and the East Remote lot; this eventually joins with the service road at the west edge of the Field. This path has been identified as a mitigation measure associated with the Meyer Drive Extension Phase I project. Additional pavement and/or striping would identify this as a bike route to the Cowell/Stevenson service road, which joins Hagar at Steinhart; this service road is intended as a primary bike route to Cowell and Stevenson Colleges. Completion of this route will provide bike access to the east OPERS facilities, two colleges, the BayTree Bookstore and eastern campus core.

When Meyer Drive Extension Phase I is constructed, this Class I path should become two-way and be carefully integrated into the design of the Meyer/Hagar intersection.

Access from the West Entrance

7.6 Heller Drive

Heller Drive currently offers an incomplete system of Class II bike lanes between the West Entrance at Empire Grade and the intersection with Meyer Drive. Over most of this segment, northbound bicycle traffic has a lane designated on the shoulder of the roadway; however, it does not currently meet Caltrans standards for a Class II bike lane. Southbound traffic must travel in the traffic lane between the College Eight access road and the access road to Family Student Apartments, while the road segment between Koshland and Empire Grade offers a shoulder for bike traffic.

This Plan recommends the addition of Class II bike lanes along Heller Drive from the West Entrance to Meyer Drive. If this is not feasible, the southbound lane of this segment should be designated as a "shared lane" such as has been recommended for the upper section of Hagar Drive.

The northbound sections of the Class II bike lanes in this area should be upgraded or completed.

The Heller/Empire Grade intersection should have a left-turn bike lane for the outbound traffic to connnect with the bike lanes on Emipre Grade. If a signal is added in the future, it should incorporate bike sensors and stencils.

Other Access Points

Several other informal bike routes have evolved from repeated use by off-road mountain bikers in the vicinity of the Arboretum and in Marshall Field.

7.7 Arboretum Bike Trail

The route from Empire Grade to Oakes College passes across the meadow northwest of the Arboretum through the eastern edge of Inclusion Area E. This de facto route also connects with an east-west route that extends along the north edge of the Farm & Garden to intersect with the Bike Path; another longer route stretches north across the meadow to join the Bike Path in the vicinity of Meyer Drive east of University House. These routes are currently generating significant erosion and sedimentation impacts on the Natural Areas Reserve in the lower campus. In order to mitigate these impacts, it is recommended that the campus formalize selected routes as "bike trails" and prohibit off-road bike use elsewhere in the lower campus.

The proposed bike trail may eventually connect with Inclusion Area D and the existing Great Meadow Bike Path.

Any proposals for a bike trail in the vicinity of the Arboretum lands should be reviewed by Arboretum staff.

7.8 Chinquapin Road

Many recreational bicyclists use the fire roads of the upper campus, and some commuting bicyclists enter the campus from Empire Grade at Chinquapin Road in Marshall Field. As discussed in Section xx, Off-Road Bicycle Use, the developed but unpaved fire roads of the upper campus should remain open to bicycle users.

7.9 Other Campus Fire Roads

[talk about signs, informational kiosk, warnings of sensitive or restricted areas, maps of the campus bikes and trails, recommended closure of Red Hill Road due to poor design and steep slopes]

8.0 BICYCLE CIRCULATION ROUTES WITHIN THE CAMPUS CORE

East-West Circulation Routes

8.1 Steinhart Drive

[current conditions; problem areas at intersection with McHenry access road, and in vicinity of Whole Earth, and west of divided roadway; conflicts with pedestrians, shuttles, and service vehicles; requirement for handicap access to Classroom Units, McHenry Library; proposal for one-way vehicle traffic westbound; could share lane with bikes if two bike lanes cannot be accommodated; would probably consider one east-bound bike lane, a pedestrian lane, and westbound vehicle and bike lane; add stop sign at bottom of Classroom Unit access road, possibly at eastbound intersection with McHenry access road (for bikes).

In its current form, Steinhart is wide enough to accommodate contra-flow bike lanes in the west-to-east direction.

Motor vehicle access along the service road immediately west of McHenry Library should be prohibited, except in emergency situations. This could be implemented immediately, but will require consultation with Disabled Student Services and the Library staff to determine whether additional signs will be necessary to guide disabled visitors to the handicap parking spaces on the north side of McHenry Library. In any event, access to these spaces can be provided along Steinhart Drive.

8.2 McLaughlin Drive

[current conditions, possibilities for addition of adequate Class II bike lanes; options available if roadway is closed to through traffic, with the exception of buses and shuttles]

Potential for "down-scaling" McLaughlin Drive to transit, service and emergency vehicles only. This would reduce traffic to more desireable levels while providing improved bike access (shared lanes at the McLaughlin Bridge and Class II bike lanes elsewhere) across campus.

8.3 Meyer Drive Extension

Meyer Drive Extension is planned to include Class II bike lanes in both traffic directions. A mitigation measure identified for Phase I of this project calls for the construction of a Class I bike path from the vicinity of the new Meyer/Hagar intersection (near the transit stop at the East Remote parking lot) to the East Field House, as described above. This would benefit bike traffic traveling northbound along Hagar Drive.

8.4 Meyer Drive Extension Phase II

Development of a pedestrian path and bikeway between the East Field House and the Student Center is currently planned for construction in 199x-9x.

[refer to problems of combining bikes and peds]

8.5 Meyer Drive Extension Phase III

Development of grade-separated pedestrian crossings between Performing Arts and Porter, Kerr Hall Bridge and Porter/Kresge, and Science Hill and Kresge College are currently slated for construction in 199x-9x. The design of each of these projects should consider the issue of bicycle access adjacent to the pedestrian way.

[refer to problems of combining bikes and peds]

8.6 North Loop Road

While identified as a future roadway in the 1988 LRDP, this Plan notes that the North Loop Road should be designed to incorporate Class II bike lanes throughout its length.

North-South Circulation Routes

8.7 Porter-Kresge Access Road

[shared traffic lane, possibility for designated bike lane in critical direction?]

8.8 Kerr Hall-West Steinhart

[shared with service and standard vehicles, low volume; possibility of designating a bike lane in the critical downhill direction?]

8.9 Hagar Drive to McLaughlin to Chinquapin

[From Steinhart to Crown service road. Want to discuss Hagar going up the hill from Steinhart?)

8.10 Slow Zones

As noted in Section xx, Class III paths which mix pedestrians and bicyclists are not desirable and should be eliminated as soon as possible. There are, however, some locations where bicycle traffic can be expected to share pedestrian paths prior to completion of the proposed campus bike circulation network. In these areas, limited bicycle access will be allowed; however, all traffic should be at speeds equivalent to that of a walking pedestrian.

One such location concerns the existing pedestrian bridges across Jordan Gulch (west of Hahn Student Services) and the Moore Creek canyons (west of Kerr Hall, and east of Kresge and Porter Colleges). These bridges are too narrow to accommodate separate travel lanes for pedestrians and bicycles, and are unlikely to be widened in the foreseeable future. While bicyclists will be allowed to use these bridges, bikes should be walked at the same speed as a walking pedestrian.

8.11 Walk Zones

The primary concept of walk zones is that all traffic passing through such zones (be it pedestrians, bicyclists, or service vehicles) travel at the speed of a walking pedestrian. Walk zones might be envisioned as tight envelopes surrounding the developed hardscape area central to a college (the Cowell Courtyard, for example) or some facilities in the core (the plaza adjoining the Science Library, Natural Sciences II and Sinsheimer Labs). These areas typically have large numbers of pedestrians milling about, generally knotted into small groups, as well as other individuals walking from building to building. Where necessary, walk zones shall be designated through the use of simple signs and stencils on the hardscape.

In general, medium-sized bicycle parking areas (12 to 40 hitching posts) will be sited at the edges of walk zones, and as close to the primary bike circulation routes as possible. With careful siting of bicycle parking facilities at the edges of most walk zones, few people will feel the need to ride through these courtyards and plazas. Some bike parking will be available within walk zones, but will consist primarily of scattered clumps of a half dozen exposed hitching posts.

Access to Core Facilities

In general, the bicycle circulation system should connect colleges and core facilities via service roads. This would help reinforce the pattern language of bicyclists and motorists “sharing the road.”

8.12 East Field House

8.13 Bookstore

8.14 Hahn Student Services

8.15 Classroom Units

8.16 McHenry Library

8.17 Student Center

8.18 Baskin Visual Arts

8.19 Performing Arts

8.20 Kerr Hall

8.21 Earth & Marine Sciences

8.22 Natural Sciences II

8.23 Thimann Lecture Halls and Thimann Labs

8.24 Old Science Library

8.25 Sinsheimer Labs and Science Library

8.26 Applied Sciences and Communications

Access to Colleges

8.27 Cowell/Stevenson

8.28 Crown/Merrill and the Crown/Merrill Apartments

8.29 Colleges Nine and Ten

8.30 Kresge/Porter

8.31 Kresge East and Graduate Student Apartments

8.32 College Eight

8.33 Oakes

9.0 BICYCLE CIRCULATION OFF-CAMPUS

Bike Routes Adjoining UCSC

9.1 Empire Grade

During the late 1980's, the City of Santa Cruz widened Empire Grade between Bay Street and the City Limit (between Western Drive and the Arboretum entrance) and provided Class II bike lanes in both directions. The County of Santa Cruz commenced a roadway widening project in September 1991 to provide eight-foot wide bike lanes in both directions from the City Limit north to the West Entrance at Heller Drive. Completion of this project in early 1992 is expected to provide a dramatically improved bike route to the campus's West Entrance.

9.2 Bay Street

In January 1991, Class II bike lanes were added to the segment of Bay Street between Escalona and Mission streets. On-street parking was prohibited in the section between Escalona and King Street, while restricted to evenings and weekends in the section between King and Mission.

9.3 High Street

9.4 Rincon Road

[discuss the U-Conn trail connection between Henry Cowell State Park, the Pogonip and the campus, as well as cross-campus links to Grey Whale and Wilder State Parks.]

9.5 Bike Routes Throughout Santa Cruz County

[provide a reduced copy of the 1989 county of santa cruz bikeways map]

[add piece on recreational bike route from Wilder Ranch to Grey Whale to UCSC to the Pogonip. Discuss practicality of City of Santa Cruz adopting off-road policies compatible with those identified in this Plan.]

9.6 Intermodal Connections: Bikes and Transit

[indicate bus stops with bicycle parking, existing and planned. Also describe the introduction of bike racks to all SCMTD buses, options for bike shuttles and/or bike trailers associated with other transit vehicles..]

9.7 Intermodal Connections: Bikes and Other TSM Alternatives

[Discussion of bike parking at park and ride lots, integration of bike racks on vanpools. Might also integrate discussion of bike auctions, bike storage over summers and holidays, bike promotional efforts (Bike To Work Week, Gearshift Gazette, introductory bike rides), the Bike Co-op, bike licensing, Ped Ex delivery services, and all other bike-related activities.]