MASTER PLAN: CIRCULATION ELEMENT
SUGGESTIONS FOR IMPLEMENTATION

Prepared by

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For the Master Plan Committee

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In addition, a separate Technical Appendix Binder (TAB) is at the above address and with Eugene Jud, Faculty at Cal Poly, Civil and Environmental Engineering Department (805) 756-1729, or at Jud Consultants (805) 545-5919.
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2. Guiding Framework

MISCELLANEOUS

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EXECUTIVE SUMMARY

Main Physical Elements

This is the Consultant’s report to the Master Plan Circulation Group, which is a subgroup of the Master Plan Committee. It attempts to supplement and amplify the information provided in the Master Plan of March 21, 2001, and create an effective circulation system balancing the automobile with the pedestrian, bicycle, and bus. The report is in agreement with the Master Plan and proposes steps for implementation along with minor changes to the plan.

The main physical elements are summarized in Exhibits i-iii. Exhibit i schematically shows the following main issues and solutions in the year 2020. Comparisons with the Master Plan are in parentheses and more comparisons can be found in Chapter 1.2:

- Pedestrian/vehicle conflict zones,
- Transportation Center north of Campus Market: buses, car rental, and mobility consulting (new location),
- Bicycle Station near Transportation Center: parking, service, lockers, and showers (new location),
- Key bicycle parking locations (new locations under buildings),
- Full pedestrian zones (two are new),
- Major bus stops (new locations), and
- Parking structures (not all may be needed).

Exhibit ii displays the interim improvements in more detail through the year 2009. Pedestrian and bicycle circulation zones are overlaid on the proposed street layout and buildings. The phasing of the plan was done according to the “Phasing Strategies” section of the Master Plan on pages 346-347. Possible phasing is as follows:

Year 2004:
- California Boulevard is extended to connect with Highland Drive, allowing the creation of a pedestrian/bicycle boulevard on North Perimeter, west of University Drive.

Approximate Year 2009:
- South Perimeter is blocked off to automobile traffic and becomes a pedestrian/bicycle boulevard. Traffic is rerouted through California Boulevard. Deliveries are allowed in specified areas and emergency access is always allowed.
- Via Carta becomes a wider pedestrian/bicycle boulevard.
- The Transportation Center is moved to the north of the campus at a temporary site near the intersection of North Perimeter Road and Via Carta.

Exhibit iii displays the main physical elements in the year 2020. Possible phasing is as follows:

Approximate Year 2018:
- Highland Drive extension is finished, traffic is rerouted, and the entire North Perimeter Road is established as a pedestrian/bicycle boulevard.
- The permanent Transportation Center and Bicycle Station are created in the area north of Campus Market.

This report covers the instructional core as well as some outlying areas such as major city intersections. It contains 36 “Policies” and 39 “Guidelines”; which are listed at the end of the Table of Contents.
Mobility Activities

The chapters of this report propose modifications and additions to the corresponding sections in the Master Plan, especially the Public Transit chapter. This update calls for the installation of a transportation center, the expansion of the SLO Transit bus lines, and implementation of environmentally friendly, Santa Barbara-style electric shuttle buses to and from campus. Fuel cell buses can also be considered in intermediate range planning.

Another component needing an update is Transportation Demand Management (TDM). This activity deals mostly with non-motorized modes of mobility and is managed by University Police. TDM urgently needs strong, visible support from Cal Poly management, which also means more personnel and financing. The benefit-cost ratio of these activities is very positive, as small financial input saves many expensive parking spaces.

The revisions are contained in twelve chapters that address the main points in the Master Plan. The guiding imperatives in these twelve chapters are directly from the Master Plan or are derived as follows:

- Implement a sustainable mobility system
- Change the mobility culture
- Ensure that short-term activities are consistent with long-range goals and principles
- Prioritize mobility modes according to the sequence of:
  - Pedestrian
  - Bicycle and bus at equal priority
  - Van and carpool
  - Individual motorized transportation
- Practice deferred infrastructure investment (from inexpensive to expensive solutions; this is a relatively new principle)
- Monitor travel behavior and set mobility objectives
- Set up a stable financial network for infrastructure construction and operations.

Frequently Asked Questions

1. Living on-campus without a car is no big deal during the week, but what will students do if they need mobility over the weekend, especially for visiting their parents?

It is true that some proposals in the report encourage a reduction in parking. However, this does not mean the end of a student’s mobility. Many of the proposals in this plan expand on alternative means of transportation, several of which can be active over the weekend.

For longer weekend trips, or when public transit is just not feasible:

- Car rental services are available for those over the age of 21. For students expecting to go home over the weekend, the rental car may be their best option. It is still much cheaper than bringing a car to Cal Poly. The University should look into negotiations with rental car agencies and insurance companies regarding reducing the minimum age to rent to 18 years, as currently done by Stanford University.
- Amtrak and Greyhound have connections to many places, for a minimal fee.
- Ridesharing is also a cost-effective solution.
For local trips:

- The proposed additions to SLO Transit will greatly help students get around town. Buses will remain free to students and employees.
- Central Coast Area Transit would also be expanded in this time period, offering more flexible access to destinations within the county.
- The expansion of Cal Poly’s bicycle network, and the completion of the Regional Bike/Pedestrian Path should improve the effectiveness of bicycle transportation in the town as well.

For emergencies, or times when other modes are not preferable:

- Cal Poly’s proposed guaranteed ride home service for members of the “Student Commuter Club” would help bring students back to their residences. Modeled after a similar program at Stanford University, the program allows for the user to: get picked up in a cab for shorter distances or rent a car for longer distances. Both options will be free for limited use under an annual fee.

2. Why aren’t you restricting students from driving to campus from only half a mile away?

Preventing people from driving based solely on geographic boundaries would require a complicated and expensive administrative process.

The proposals herein will help reduce the number of students driving to campus from the surrounding neighborhoods by providing more attractive alternatives. The expanded bus service and upgraded bicycle system will help achieve this. Stressing socially responsible behavior can help as well. The personal example set by campus leaders, both student and faculty, may significantly change some of these habits.

3. If pedestrian/vehicle conflicts are to be avoided, why not build a system of pedestrian overpasses?

The safety of the pedestrian is of outmost concern. However, a system of bridges over major roads is expensive and not foolproof. Many pedestrians will avoid a circuitous route to a bridge, even if their safety is put at risk.

The combination of a strong pedestrian plan with traffic calming will be a less expensive and more aesthetically pleasing solution. The elimination of most car traffic from the central instructional core, traffic calming, and well-marked, raised pedestrian crossings will limit these conflicts. Roundabouts are a proven method of safely and effectively balancing the pedestrian and the automobile, and will play a key role in the proposed plan.

4. Why is so much money planned to be spent on the bus system and bicycle paths? Why not use that money to expand parking?

While expanding parking to fill every perceived need might be an option, it is certainly not the most desirable one. Parking is a major land use and there is a direct relation between the expansion of parking and an increase in vehicle trips. Comparisons with other campuses show that Cal Poly is highly car-oriented and charges relatively little for parking.

The solution to the problem is shown in this plan. Money spent to expand the bus and bicycle system will help reduce vehicle trips. Both forms of transportation take up much less space than a car, and have the ability to move many more people. One bus may take up the space of two or three automobiles, but it has the capacity to carry many times the number of persons those cars would carry.
5. How is campus parking financed?

Parking at Cal Poly, including residential parking, is a self-supporting program of the University. No state tax or instructional funds are used to subsidize the program. The users of the campus parking facilities pay parking fees. Parking fees collected are used for construction, maintenance and operation of the parking facilities. Parking fines collected through enforcement are used solely for alternative transportation programs such as local and regional bus subsidies, rideshare programs, vanpools and bike racks, lockers, and path enhancements.

6. How is alternative transportation financed?

Unless otherwise directed by campus administration, alternative transportation on campus (i.e., contracted transit services) is financed through the collection of parking fines. In addition, campus administration may direct a portion of the parking fees collected for alternative transportation programs.
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EXHIBIT ii

MAIN PHYSICAL ELEMENTS - 2009

For easier reading of this report, detach this map and lay it on your desk for reference.

LEGEND

Circulation
- Vehicles
  - Major Road
  - Minor Road/Pathway
  - Car Dropoff
  - Elevated Intersection

Pedestrians
- Major Pedestrian Zone
- Pedestrian Zone
- Pedestrian/Bicycle Blvd.
- Main Ped. Connection
- Elevated Crosswalk
- Tiled Crosswalks
- Regional Bike/Ped. Path
- Temporary Bicycle Station

Transit
- Temporary Transportation Center
- Bus Station
- Shuttle Bus Station

Buildings
- Existing Buildings
- New or Under Construction

Greens/Plazas
- Dexter Green
- California Green
- University Union
- Dining Complex

Pedestrian/Bicycle Boulevards
- South Perimeter
- Mid Yn Carts
- Library/Agriculture

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Major Changes to Master Plan
- Temporary Transportation Terminal on N. Perimeter Rd. near Ag. Science Bldg.
- Temporary Bicycle Station near Bonderson Bldg.
- Access to Student Housing North (SHN) differs

1/4 mile = 1,320' = 402.3m = 5 minute walk
EXHIBIT iii
MAIN PHYSICAL ELEMENTS - 2020

For easier reading of this report, detach this map and lay it on your desk for reference.

LEGEND

Circulation
- Major Road
- Minor Road/Pedway
- Car Dropoff
- Elevated Intersection
Pedestrians
- Major Pedestrian Zone
- Pedestrian Zone
- Pedestrian/Bicycle Blvd.
- Main Ped. Connection
- Elevated Crosswalk
Bicycles
- Regional Bks/Ped. Path
- Bicycle Station
Transit
- Transportation Center
- Bus Station
- Shuttle Bus Station
Buildings
- Existing Buildings
- New or Under Construction
Greens/Plazas
- Centennial Green
- Dexter Green
- California Green
- Northwest Green
- Northeast Green
- University Union
- Dining Complex
Pedestrian/Bicycle Boulevards
- South Perimeter
- Mid Via Carta
- Library/Agriculture
- North Perimeter

EXHIBIT iii
MAIN PHYSICAL ELEMENTS - 2020

For easier reading of this report, detach this map and lay it on your desk for reference.

LEGEND

Circulation
- Major Road
- Minor Road/Pedway
- Car Dropoff
- Elevated Intersection
Pedestrians
- Major Pedestrian Zone
- Pedestrian Zone
- Pedestrian/Bicycle Blvd.
- Main Ped. Connection
- Elevated Crosswalk
Bicycles
- Regional Bks/Ped. Path
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- Centennial Green
- Dexter Green
- California Green
- Northwest Green
- Northeast Green
- University Union
- Dining Complex
Pedestrian/Bicycle Boulevards
- South Perimeter
- Mid Via Carta
- Library/Agriculture
- North Perimeter

Major Changes to Master Plan:
- Transportation Center and Bicycle Station near the realigned Highland Dr.
- Access to Student Housing North (SHN) differs
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  Guideline BE 4: Increase Support for a Rail Station

Total: 75 Policies and Guidelines; 36 Policies, 39 Guidelines.

CONTENTS OF THE TECHNICAL APPENDIX BINDER (TAB)

This 400 page binder is at Cal Poly, Facilities Planning, and in the office of E. Jud.

1. Report Chapters 1-11
2. Other Campuses: Overall Comparison
3. Other Campuses: Transit
4. Other Campuses: Persons with Disabilities
5. Other Campuses: Bicycle
6. Other Campuses: Service Access
7. Other Campuses: Pedestrian
8. Other Campuses: Parking
9. Other Campuses: Goals, Objectives and Policies
10. Other Campuses: Maps
11. Meeting Minutes, Work Papers and Charettes
12. Long Bibliography

Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
1. INTRODUCTION

1.1 Relation to Other Documents

The Cal Poly Master Plan should be revised every few years. The Cal Poly Master Plan of March 2001, Volume 1 (MP) contained limited information about public transportation and other circulation issues. It was therefore necessary to expand the Master Plan and create a plan for implementation. For reference, the MP and most other documents can be downloaded from the Internet.¹

The following report is graphical in nature and assumes the reader is familiar with the MP, specifically the sections regarding Circulation, Alternative Transportation, and Parking (pages 164-196). The structure of these pages is summarized in Appendix 1.1. This report is in agreement with the MP. The contents hereafter provide either greater specification or further developments of what is already stated in that document. The main external documents influencing the work were:

- The SLO Public Works Department Circulation Element of 1994
- The SLO Public Works Department Short-Range Transit Plan of August 2003, effective January 1, 2004
- The SLO Council of Governments Regional Transportation Plan of 2001
- The SLO County Air Pollution Control District Clean Air Plan of 2001.

This is the Consultant’s report to the Master Plan Circulation Group, which is a subgroup of the Master Plan Committee. By no means is this report the final proposal for a revised Circulation Plan. Several committees must review it, and changes in other MP chapters, such as Land Use, may influence the plan. Defining the further steps of work is up to the Master Plan Committee.

1.2 Main Changes From Master Plan

Guiding Framework
The guiding principle of the Master Plan is to foster the use of alternative transportation and to discourage the use of single-occupant automobiles as specified in 17 policies. Four of them are mentioned here:
- Prioritize mobility modes: First pedestrian, then bicycle and bus, and last individualized motorized transportation
- Practice “deferred infrastructure”: Do not build infrastructure that may only be needed later or never. Instead, keep the space open, for example, for parking garages. Develop infrastructure from least expensive to more expensive. This principle is new in the Master Plan thinking.
- Implement a campus-wide slow speed scenario: Use traffic calming techniques. Not everybody may be familiar with the wide application of these beneficial techniques, which sometimes can be dramatically different from traditional traffic engineering.
- Do not install traffic lights on campus: Rather go for the “park-like Campus”. This is also new.

Vehicles
Three guidelines are mentioned here:
- Promote “Skinny Roads”: In a low speed scenario traffic lanes must not be as wide as on a freeway.
- Use “overrunable” medians: Few elevated medians will be built in the roads. The medians will be flat, but textured, thus allowing more flexibility in the use of the roads.
- Build raised crosswalks: They slow down traffic and make the pedestrian much more visible and safe when crossing the street.

¹ Documents can be found at www.calpoly.edu, directories, facilities planning
Pedestrians
The main policy is to strongly enhance the pedestrian atmosphere and to introduce a pedestrian zone north of the Library in the year 2004 and a pedestrian zone south of the University Union a few years later.
An important guideline is now:
- Use pedestrian refuge islands: This enhances the pedestrian feeling as well as overall traffic safety
  This element was not of high importance in the Master Plan.

Bicycles
The main guideline is now:
- Expand bicycle facilities: The regional bicycle path gets high priority. A multipurpose “Bicycle Station” is proposed on the north-west Campus as well as are 2,000 more bicycle racks.

Service Access
Contrary to the Master Plan, big delivery vehicles will not be allowed in the pedestrian zones near the Library and near the University Union. See Exhibit 6.1.

Transit
A new multipurpose Transportation Center for approximately 10 buses and other vehicles is proposed in the north-west area of the Campus. Electric, hybrid or fuel cell shuttle buses covering the campus and surroundings are also proposed. They will be financed by different methods, e.g. higher parking fees as done in the UC system.

Parking
More flexible parking scenarios and forecasts have to be developed. Depending on the applied management policies and their acceptance, the campus might function very well with 4,000 to 7,000 parking spaces as opposed to the fixed figure of 6,694 in the Master Plan.

Transportation Demand Management (TDM)
The enormous potential of TDM must be investigated further and put to work. Examples from other campuses underline the high benefit/cost ratio.

Implementation
A detailed seven-phase implementation plan is proposed.

1.3 Work Done

In Fall 2002 the following work was accomplished:

- Review of key documents such as:
  - The work of the Master Plan Circulation Task Force 1999-2000
  - The Cal Poly Master Plan Traffic and Parking Study by ATE Engineers, 2000
  - The Cal Poly Master Plan of March 2001, Volumes 1 and 2
  - Cal Poly: The First Hundred Years, 2001
  - Master Plan Transportation Subcommittee, Vicki Stover, Parking Pricing Options, 2002
- Widespread literature research and surveys about other campuses, as documented in Chapter 12 and the Technical Appendix Binder (TAB)
- By Class CE 424 under Eugene Jud:
  Traffic counts, accident map, surveys of other campuses, circulation proposals
- By Class CE 528 under Professor Ed Sullivan:
  Evaluation of Pricing Policies for Parking at Cal Poly
- Contacts with all department heads of the School of Architecture and Environmental Design concerning possible planning and design labs in connection with the Cal Poly Circulation Plan.
In Winter and Spring 2003 the following work was accomplished:

- Contacts with outside agencies mentioned in the Acknowledgements Section of this report
- Sessions with the Master Plan Circulation Group (MPC Group) about policies and design based on 14 Working Papers (WPs)
- Open circulation charettes (workshops) under Eugene Jud
- Student design team formation
- Comments about the SLO Public Works Department Draft Short-Range Transit Plan (SRTP)
- Proposal how to improve the biannual Commuter & Access Services Modal Split Survey
- Preparation for installing automatic traffic counters under some Cal Poly streets
- By Class CE 222 under Diana Gould-Wells:
  Traffic counts of all modes at the Cal Poly cordon and at internal points. This is to be repeated in coming quarters.

In Summer 2003 the following work was accomplished:

- Participation in the Cal Poly Land Use Charettes for the Southwest and the Northwest Areas
- Freight survey
- Report.

In Fall 2003 the following work was accomplished:

- Final analysis and sketches
- Report.

This process of the Circulation Plan was altered by the advent of a major project, Student Housing North (SHN), which necessitated many plan changes. The Chancellors certified the Environmental Impact Report (EIR) for SHN on September 17, 2003. The permitting process and campus workshops for SHN are still on going.

Some short-term design changes in the current project for California Boulevard were proposed in sketch form to Facilities Planning and accepted. These are not documented in this report.

The Master Plan Circulation Group met 10 times during the whole project.

1.4 Organization of Report

The text contains 12 chapters divided into:

- General Approach
  Two chapters
- Circulation Modes I and II
  Six chapters
  Generally follows the sequence of the previously mentioned Chapters “Circulation,” “Alternative Transportation,” and “Parking” of Section 5 “Physical Plan Elements” of the MP
- Miscellaneous
  Four chapters
  Namely “Special Challenges,” “Implementation” including “Future Studies,” and “Beyond 2020.”
  The last chapter contains a glossary, a summary of research about other campuses, and a short bibliography.

The Appendix follows the above text structure.
A separate *Technical Appendix Binder (TAB)* contains further tables, comparisons with other campuses, and more according to the above 12 chapters. It also contains minutes of meetings and charrettes, work papers, other distributed materials, and a “Long Annotated Bibliography” of more than a dozen pages. This binder only exists in two copies, which are at Cal Poly.

The following *color code* is used in the plans:

<table>
<thead>
<tr>
<th>Color</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>•</td>
<td>Pedestrian:</td>
</tr>
<tr>
<td>Blue</td>
<td>•</td>
<td>Bicycle:</td>
</tr>
<tr>
<td>Red</td>
<td>•</td>
<td>Bus:</td>
</tr>
<tr>
<td>Black</td>
<td>•</td>
<td>Roads:</td>
</tr>
<tr>
<td>Brown</td>
<td>•</td>
<td>Service Access:</td>
</tr>
</tbody>
</table>
2. GUIDING FRAMEWORK

2.1 General Guiding Framework

2.1.1 Main Points in Master Plan

The main transportation principle found on page 188 of the Master Plan reads as follows: “Cal Poly should continue its regional leadership role in fostering the use of alternative transportation and discouraging the use of single-occupant automobiles.” An important step toward achieving these goals should be to modify the culture of Cal Poly students, faculty, and staff regarding the use of the automobile.\(^2\) This addresses the following points:

2.1.1.1 Sustainability

Sustainability is mentioned several times in the Master Plan. The classic definition of sustainability, by the U.N. Brundtland Commission of 1987, reads as follows: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their needs.” Originally, sustainability was summarized as EEE: Economy, Ecology, and Social Equity, where each has the same weight. Recently the more easily to remember P3 acronym, Prosperity, Planet, and People was popularized\(^3\). A definition of sustainable mobility and information about research at Cal Poly regarding “Sustainable Transportation Indicators” and how to measure them is given in Appendix 2.1.

A very successful “Regional Smart Growth Conference” was held in February 2003 in San Luis Obispo. It assembled 350 stakeholders around the topic of “Sustainability in Our Region”. Mobility was of high interest. The Cal Poly School of Architecture and Environmental Design (CAED) was highly involved in the management of the conference. While the word sustainability may still sound strange in the ears of some readers, the purpose of this report is not to indulge in semantics but to propose the right steps for Cal Poly’s route into the 21\(^{st}\) century.

2.1.1.2 Less Car Dependence

Cal Poly seeks to encourage both on-campus residents and commuters to reduce their dependence on the automobile, leading to a more pedestrian-oriented campus.

2.1.1.3 Change Mobility Culture

This shift in culture will reduce conflicts between modes of mobility and lead to a more pedestrian-friendly and “park-like” campus. Elements in this change of mobility culture will be:

- Education and strong participation of the campus community in further development of the Master Plan and its implementation, including its main physical components, such as traffic calming, a campus transportation center/bicycle station and a satellite Student Union (UU)
- A good example set by leaders of students, faculty, and staff
- Consistent infrastructure design and management of campus mobility.

\(^2\) Based on meetings with the President and senior campus executives during Master Plan preparation and recommendations by the campus/community Circulation and other task forces during Spring 1999.
\(^3\) See [http://es.epa.gov/ncer/P3/](http://es.epa.gov/ncer/P3/).
2.1.1.4 Relative Importance of Transportation Modes

Although the Master Plan does not explicitly specify the relative importance of different transportation modes, the following planning priorities appear to be assumed:
- Pedestrian
- Bicycle
- Public Transportation
- Individual Motorized Transportation.

2.1.1.5 Cal Poly as an Example for Others

Since the Middle Ages, universities have set examples of advanced thinking and design in their countries. Cal Poly must send out a clear message about its own sustainability, which includes “green building,” mobility management, and the corresponding design. Its reputation as having excellent Schools of Architecture and Environmental Design and Engineering compels this.4

2.1.2 Proposal

The points stated above have been fully approved and enhanced in Meeting 1 and 2 of the Master Plan Circulation Group. This can be seen in the Minutes section of the TAB. Therefore, the following policies are proposed:

2.1.2.1 Policy GF 1: Implement a Sustainable Mobility System

All physical and operational planning for the campus should be compatible with modern concepts of sustainable mobility and the sustainability goals for the campus.5

2.1.2.2 Policy GF 2: Commit To Less Car Dependence

Promote mostly pedestrian access and amenities as well as bicycle and bus facilities. Discourage the use of individual motor vehicles, e.g. through strict but creative parking policies. Promote strong Transportation Demand Management (TDM), including additional personnel and finances. Use financial incentives and disincentives.6 In order to achieve less car dependence, it was decided that the normal walking distance from a bus stop to a campus destination should be no more than five minutes and the respective value from a parking garage should be ten minutes.

2.1.2.3 Policy GF 3: Change the Mobility Culture

Use education and strong participation of the campus community in the implementation of the Master Plan. Before imposing stringent restraints on private motor vehicles, the approach should be: “You do not need to bring your car to Cal Poly because we offer so much alternative mobility.” Walking, bicycling, and the use of public transit should surpass the inclination to drive. Promote good examples of mobility behavior by leaders of students, faculty, and staff. Manage campus access and infrastructure design accordingly.

4 Comparisons with other universities show that there is room for improvement in Cal Poly’s TDM, especially for better public transportation and parking management. While Cal Poly has done a lot of good for the County, its management should reiterate the commitment to regional leadership, especially in the field of sustainability, as done e.g. by the 13 universities mentioned in Chapter 12.
5 Strategies for this are contained in the Institute of Transportation Engineers (ITE) publication Smart Growth, Transportation Guidelines of 2003.
6 Excellent examples of TDM on campuses including financial calculations can be found on www.vtpi.org and www.colorado.edu/cuenvironmentalcenter -> alternative transportation. See also the “Bibliography” in Appendix 12.2. In California, UC Davis and Stanford are especially good examples, with a very high percentage of commuters on foot and on bicycles.
2.1.2.4 Policy GF 4: Prioritize Mobility Modes

Apply the following sequence:
- Pedestrian
- Bicycle and Bus (same priority), and
- Individual Motorized Transportation.

Design the mobility networks, as can be seen from the sketch in Exhibit 2.1, so that:
- Pedestrians enjoy very direct connections between activity centers,
- Cyclists and bus passengers get relatively direct connections, and
- Car drivers get indirect connections.

2.1.2.5 Policy GF 5: Practice Deferred Infrastructure Investment

If possible, do not build infrastructure that may only be needed later or never. Instead, keep the space open, for example, for parking garages. Drought resistant greenery is less expensive to maintain than asphalt. This follows the principle of developing infrastructure from least expensive to more expensive. However, higher initial capital costs can be justified if the later operational costs are lower, which can mean lower life cycle costs overall. This policy reduces “induced traffic” and is especially appropriate in times of reduced budgets. This principle is new in the Master Plan thinking.

2.1.2.6 Policy GF 6: Ensure that Short Term Actions are Consistent with Long Range Goals and Principles

It is important the public knows that at every implementation step the University is consistently moving towards the goal of reducing auto dependency. For example, if a new road is built, it should not be emphasized as a “road”, but as a means to create a pedestrian zone in another place on campus as soon as possible.

2.1.2.7 Policy GF 7: Continually Check Consistency With Master Plan

It is important for reasons of internal management to continually check consistency with the Master Plan and not get sidetracked by any specific project. It might even be helpful to appoint one person in Facilities Planning to be the “watchdog” for Master Plan consistency.

2.1.2.8 Policy GF 8: Create a Means to Respond to Unanticipated Developments

It can happen that opportunities for projects get out of sequence, for example, through special finance conditions, or that a totally new project shows up. In this case it is very helpful to have alternative mobility concepts (contingencies) for the Master Plan, or parts thereof, or to produce them because of this new project. This is the practical implementation of Policy GF 7.

For example, the appearance of the Student Housing North concept, ten years earlier than scheduled in the Master Plan, raised several questions. On the one hand there were indisputable opportunities and on the other hand existing and new mobility concepts had to be analyzed and compared to the original Master Plan goals and principles. This process is on-going. Similarly the proposal to build a Technology Park on the west side of Stenner Creek Road calls for analysis and mobility options not addressed in the Master Plan.

2.1.2.9 Policy GF 9: Conduct an Access Study North of Brizzolara Creek

Among others, SHN and subsequent discussions with faculty and students indicate, that an access study for all mobility modes of the whole area north of Brizzolara Creek is needed. This study must clearly define, what sustainable mobility means for the northern part of the Campus and it must contain different phases up to year 2020+. It must cover the whole area from SHN in the east to Mount Bishop Road in the west. See also Chapter 10.5.1.
2.1.2.10 Policy GF 10: Monitor Travel Behavior and Set Mobility Objectives

The City of San Luis Obispo monitors travel behavior based upon a table of measurable objectives on page 10 of their *Circulation Element*. However, in order to set objectives, one must know the current travel behavior and volumes well and be sure that today’s numbers are representative of a “normal” situation. It is therefore proposed that monitoring occur at Cal Poly for another two years before final objectives are set. See Appendix 2.2 for recommendations and possible measurable objectives in Chapter 2.1.4.4.

2.1.2.11 Policy GF 11: Set up a Stable Financial Framework

Setting up a stable financial framework is not easily done in governmental institutions, but is much needed in order to minimize the need for improvisation in infrastructure construction and management. As private industry discovered a long time ago, capital expenditures and operational monies should not be handled by different agencies. This prevents the minimization of life cycle costs and can lead to waste of money.

Cal Poly should enhance their internal “building permit process” by creating a general “infrastructure account” that is fed by specific budget allocations from individual building projects, whether state or privately funded. This fund would pay for utilities, roads, transportation demand management, etc.

The true costs of transportation must be made explicit. They include consideration of external costs, such as air pollution, traffic accidents, visual intrusion, etc. The public should at least know that nothing is “free,” especially not freeways. New sources of finance must be found and users of facilities should pay for them, for example, through higher parking prices for commuters. The building and operation costs for residential parking garages should be fully paid by their users. Non-car-owning residents should not have to indirectly subsidize parking spaces for car owners.
EXHIBIT 2.1

DESIGN PRINCIPLES FOR DIFFERENT MODES OF MOBILITY

Pedestrian

(Very sensitive to distance and topography)

A  B

Very small grid

Bike

(Sensitive to distance and topography)

A  B

Small grid

Bus

(Sensitive to distance and topography)

A  B

Small grid

Cars

(Relatively insensitive to distance and topography)

A  B

Big grid

The lines on the left show how direct the connection can be, and the lines on the right illustrate how wide the grid of the network should be.
2.1.3 Rationale

The rationale for the preceding policies is as follows:

2.1.3.1 General

The pedestrian oriented, safe and park like Campus is one of the Master Plan goals.

In addition to that, considerations of health, e.g. obesity due to a lack of walking, are important. Environmental concerns and budget restraints should also be taken into account.

2.1.3.2 California

Several guidelines and executive orders by the Governor and the UC Regents address the question of saving energy on all levels. The California State University (CSU) system is likely to adopt such policies in January 2004 according to the Sustainability Coordinator for the Division of the State Architect, Panama Bartholomy.

The air pollution situation in San Luis Obispo County is not dramatic but needs to be improved, especially when it comes to particulate matters (PM 10) and ozone. According to Larry Allen, Head of the Air Pollution Control District, there is a tendency towards more stringent air pollution regulations in San Luis Obispo County. This is because the air quality in the counties east of San Luis Obispo is deteriorating fast due to heavy development.7

2.1.3.3 Cal Poly

The Energy Crisis of 2001 made it clear that saving gasoline is necessary. An experiment at Cal Poly showed that a reduction by 27 percent in the use of electricity was easily achieved. Something similar, but less spectacular, could happen with vehicular traffic. Other universities, like Stanford and the University of Washington at Seattle, report that they were able to reduce vehicular traffic despite a growth in buildings and enrollment during recent years8.

At Cal Poly there is a growing sustainability movement. For example, there is a group called Cal Poly Sustainability Initiative (CSI), an Academic Senate resolution10, as well as a resolution by the Associated Students Incorporated (ASI)11 for sustainability specifically mentioning sustainable mobility. This will probably lead to Cal Poly signing the Talloires Declaration, which commits to sustainability and environmental literacy in teaching and practice. 340 university presidents have signed the Talloires Declaration so far.12

Being a good neighbor to the City of San Luis Obispo is important. This means less vehicular traffic from Cal Poly into San Luis Obispo neighborhoods, and less air pollution and noise produced.

Further reasons are given in later chapters.

7 Conversation with E. Jud on August 9, 2003.
8 See www.colorado.edu/cuenvironmentalcenter/
9 http://groups.yahoo.com/group/campus_sustainability_initiative/
10 Academic Senate Business Item V: Amendment to resolution of Professor D. Gregg Doyle about LEED certification for Student Housing North, 10/28/03.
11 ASI Resolution #04-03: Sustainability and Future Campus Development, 11/05/03
2.1.4 Data

2.1.4.1 Enrollment, Beds, and Parking Spaces

Some main data are given in Table 2.1 below.

Enrollment is normally measured in Full Time Equivalent Students (FTES) or in Fall Head Count Students, which is higher than the FTES because students are counted as individuals regardless of their course load. The Fall Head Count of students plus faculty, staff, and administration personnel is roughly 16 percent higher than the Head Count of students alone. This is explained in the Glossary in Chapter 12. For reasons of simplicity, mostly Head Count numbers are given in this report, which is based on the numbers on page 33 of the Master Plan and newer figures. The table below with approximate figures shows that in Fall 2003 there was a Head Count of 18,300 students, to remain stable over the next few years. This number is estimated to grow to 21,000 in the year 2020, which is an increase of 15 percent over Fall 2003, and therefore, not a strong growth.

Beds will considerably increase from approximately 3,600 in Fall 2003, to 7,700 in Fall 2020.13

The total number of parking spaces is assumed to increase by approximately 6 percent, less than the expected student growth of 15 percent. This is the projected Adjusted Parking Demand of the Master Plan.14 Depending on the TDM measures, there is a big elasticity in these numbers. The parking demand could be considerably lower if stronger TDM measures were employed. This is because Cal Poly is presently a relatively “car-friendly” university, as comparisons with other campuses show according to Chapter 8.1 Parking. Note that the total number of spaces is not influenced by the increased Student Housing North parking. There would simply be more resident parking spaces and less commuter parking spaces than previously assumed.

Table 2.1: Enrollment, Beds, and Parking Spaces (round numbers)

<table>
<thead>
<tr>
<th>ACADEMIC YEAR (AY)</th>
<th>FACILITY CAPACITY (STUDENT: NET AY FTES)</th>
<th>STUDENT: FALL HEAD COUNT</th>
<th>STUDENTS +FACULTY +STAFF: FALL HEAD COUNT</th>
<th>BEDS ON CAMPUS</th>
<th>TOTAL PARKING SPACES</th>
</tr>
</thead>
<tbody>
<tr>
<td>AY 00-01</td>
<td>15,000</td>
<td>16,900</td>
<td>19,400</td>
<td>2,800</td>
<td>5,800</td>
</tr>
<tr>
<td>AY 01-02</td>
<td>15,350</td>
<td>18,100</td>
<td>20,600</td>
<td>2,800</td>
<td>6,600</td>
</tr>
<tr>
<td>AY 02-03</td>
<td>15,350</td>
<td>18,500</td>
<td>21,100</td>
<td>2,800</td>
<td>6,600(^{15})</td>
</tr>
<tr>
<td>AY 03-04</td>
<td>15,350</td>
<td>18,300</td>
<td>20,900</td>
<td>3,600</td>
<td>6,600</td>
</tr>
<tr>
<td>AY 20-21</td>
<td>17,500</td>
<td>21,000</td>
<td>24,000</td>
<td>7,700</td>
<td>7,000</td>
</tr>
</tbody>
</table>

2.1.4.2 Relative Accuracy of Forecasts

A word of caution should be sounded. As mentioned above, while the head count for 2020 is based on the facility capacity given, the derived numbers for parking spaces, traffic, etc. are not fixed but can vary considerable according to different scenarios of:

- Societal and personal values leading to individual mobility behavior
- Outside factors such as general transportation improvements, gas prices, etc.

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13 Master Plan tables on pages 130 and 137 + 1,100 beds added north of the Brizzolara Creek through SHN
14 Master Plan tables on pages 191 and 193
15 University Police Department Parking Lot Survey April 2003, website University Police
The parking forecasts, for example, could be misleading when the MP predicts a “parking demand of 6,694 spaces” for the year 2020. It would be more appropriate to mention a minimum and a maximum value, for example 4,000 and 7,000 spaces. Comparisons with other campuses indicate that this is a realistic range. The considerable elasticity of parking demand in relation to societal and outside factors is discussed in Chapter 8.1.

Giving one “exact” forecast based on only one scenario creates the danger of the “self-fulfilling prophecy”. In forecasts it is often better to be “approximately” right than “exactly” wrong.\(^{16}\)

In short, it is more appropriate and certainly more economical for Cal Poly to quickly implement some of the promised TDM measures of the MP instead of getting fixated on some “exact” forecasts of parking spaces. The recent introduction of a lottery for on-campus residents’ parking permits for freshmen is a step in the right direction and appears to be successful.

The MP traffic model is helpful in comparing the relative magnitudes of traffic in certain corridors or at certain intersections. But this model must also be seen in light of the above remarks. It assumes the same basic travel behavior and the same general circumstances as today for the long-term future. It does not, however, contain a modal split component (the usage split of different modes of mobility); it is only geared to cars. It forecasts the same amount of vehicular traffic regardless of the degree of TDM measures, which can greatly influence the amount of non-motorized travel. A new traffic model for San Luis Obispo County will be developed in the next two years by a consultant. It will probably contain a modal split and a TDM component.

The generally applied levels of service (LOS) are helpful to compare the time losses for car drivers when traveling through certain corridors or intersections. Obviously, forecasting the LOS for the peak hour in 2020, contains high uncertainties.\(^{17}\) In addition, limiting LOS to cars only, as many models including the Cal Poly model do, is one-sided. If the waiting time of more than one minute for a car is termed LOS F (failure) then what is the level of service for a person who has to wait 30 minutes for the bus to come? Therefore, more imaginative levels of service are applied in modern transportation planning. These models also attempt to measure the qualities of the ride or the walk. In Chapter 4, some hints are given on how to measure levels of quality for pedestrians (LOQ). Several towns have established such quality measures for pedestrians.

2.1.4.3 General Mobility Data

2.1.4.3.1 Pedestrian

No pedestrian counts were taken for the MP. During AY 02-03, several counts were made by CE 222, CE 424 and senior project students along a cordon around the Campus, at internal cross sections and intersections. Most of these counts are shown in Chapter 4.

2.1.4.3.2 Bicycle

No bicycle counts were taken for the MP. A student does sporadic bicycle rack occupancy counts for the Cal Poly Commuter Access Coordinator. During AY 02-03, several counts were undertaken by CE 222 and CE 424 students along the cordon around the Campus and at internal cross sections. The Public Works Department of San Luis Obispo has some counts for the intersection of Foothill and California Boulevard on their website. This is in connection with their biannual bicycle counts.\(^{18}\) In the future, automated bicycle counts could be considered. The City concluded that city bicycle travel tends to be stable or declining, but weather conditions can influence bicycle counts considerably. Most of the bicycle counts are shown in Chapter 5.

\(^{16}\)Professor Donald Shoup, UCLA in his many publications about traffic and parking

\(^{17}\)Journal of the Institute of Transportation Engineers (ITE), November 2003, page 10

\(^{18}\)See www.slocity.org
The planned regional bicycle/pedestrian trail along the railroad will greatly enhance bicycle ridership.

2.1.4.3.3 Bus

Bus drivers have counted bus passengers for years. However, it is said that these counts are not fully reliable. Nevertheless, it was estimated that in early 2001 SLO Transit carried 5,000 passengers on an average workday, whereof more than 3,000 were students. In July 2001 SLO TRANSIT introduced two user-unfriendly features: The hourly repetitive memory schedule was eliminated so that passengers had to carry a timetable with them, and all evening service was cancelled. This resulted in an estimated drop of overall passengers by 30 percent and a drop of student passengers by 40 percent.  

In connection with the Short Range Transit Plan (SRTP), a consultant performed counts and origin-destination surveys on the buses in Spring 2002. A new bus schedule will go into effect in January 2004 and hopefully bus ridership will increase again. See Chapter 7 about the transit system.

2.1.4.3.4 Individual Motorized Transportation

No automatic traffic counters are installed on campus. Some data may be available from traffic light detectors at the intersections of California and Foothill, and HWY 1 and Highland Dr. The Master Plan, in the Appendix of Volume 1, contains a lot of data from the year 2000 and prognoses concerning vehicular traffic on campus including turning movements at intersections. The most important volumes of the average daily traffic (ADT) are shown in the diagrams of Chapter 4 in connection with vehicle/pedestrian conflicts.

During AY 02-03, several counts were undertaken by CE 222, CE 424, and senior project students along the cordon around the Campus, at internal cross sections and internal intersections. Most of these and other vehicular statistics are shown in Chapter 3.

A long-term automatic traffic counting program could be installed on the Campus by the Civil and Environmental Engineering Department if Facilities Planning wishes to do so. The equipment was purchased by the Civil Engineering Department but needs to be tested and set up. See Chapter 10 and WP 2 in the TAB. A detailed parking inventory exists and once per quarter the Campus Police Department takes occupancy counts during certain hours.

2.1.4.4 Specific Modal Split Data

During the last few years, a dramatic shift away from non-motorized modes of transport towards single occupancy vehicles (SOVs) occurred. The biannual Staff/Student Transportation Survey shows a continuous drop in Average Vehicle Ridership (AVR), or persons per car. AVR for students dropped from 3.16 in the year 1997 to 3.03 in the year 1999 and then to 2.50 in the year 2001. The Clean Air Plan sets an AVR goal of 3.0 for the year 2005 at Cal Poly.

For students, SOVs rose from 31 percent to 42 percent between 1999 and 2001. In the year 1999, approximately 60 percent of the students did not use cars when coming to campus; so at this time, the “alternative” mode of transport was - the car! In 2001 only 50 percent of the students did not use cars. Therefore, the word “Alternative Transportation” can be misleading in connection with students. It is better to distinguish between “motorized individual traffic” and “other”, namely non-motorized

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20 http://www.afd.calpoly.edu/police/parking/parking_stats.htm
21 See also Master Plan table 5.6 on page 190.
22 Survey numbers adjusted to 100 percent.
transportation including pedestrians, cyclists, passengers of public transportation, and users of van and carpools.\textsuperscript{23}

One reason for the accelerated move towards the car could have been the opening of the parking garage in the year 2000.\textsuperscript{24} The adage “build it, and they will come” may apply. The 2003 transportation survey is not yet processed.

The most probable modal split numbers result from a combination of the 2001 survey and a 2003 cordon count. This count included all entrances and exits of the Campus and all persons in all possible mobility modes as shown in Chapter 3. The result can be seen in Table 2.2 and it is evident that, apart from the car, walking is by far the most prominent mode.

### Table 2.2: Modal Split To and From Campus

#### A. Students+ Employees

<table>
<thead>
<tr>
<th>Mode</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Car</td>
<td>60%</td>
</tr>
<tr>
<td>By Foot</td>
<td>22%</td>
</tr>
<tr>
<td>By Bus</td>
<td>10%</td>
</tr>
<tr>
<td>By Bicycle</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

#### B. Students Only

<table>
<thead>
<tr>
<th>Mode</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Car</td>
<td>50%</td>
</tr>
<tr>
<td>By Foot</td>
<td>29%</td>
</tr>
<tr>
<td>By Bus</td>
<td>12%</td>
</tr>
<tr>
<td>By Bicycle</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>


---

\textsuperscript{23} See Glossary in Chapter 12 for more definitions.

\textsuperscript{24} Commuter Services in their comment about the 2001 survey
2.2 Guiding Framework for Road Concepts

2.2.1 Main Points in Master Plan

These are:

2.2.1.1 Access from Regional Roads to Gateways

Pages 169 and 171 of the Master Plan describe the three campus entrances as *very different* in context and design:

- Grand Avenue as a kind of ceremonial entrance,
- Highland Drive as a reminder of the agricultural heritage, and
- California Boulevard as the historic palm lined entrance evoking railroad history.

2.2.1.2 Campus Road System

Page 178 of the Master Plan reads as follows: “The campus vehicle circulation system should be redesigned to *surround the campus* instructional core, not run through it. The system should consider *medians* in roads to create a boulevard effect”.

2.2.1.3 Traffic Calming Design for Reducing Conflicts between Modes

Page 168 of the Master Plan especially addresses intersections and also says, that “traffic calming techniques and grade separated pedestrian crossings should be considered”.

2.2.2 Proposal

The above points were reconfirmed in Meeting 1 based on WP 3. However, concerning *access from regional roads*, there was consensus that not all three access routes are created equal in terms of traffic. Some rethinking is recommended in order to minimize:

- Through traffic within neighborhoods
- Through traffic within Cal Poly,
- Vehicle/pedestrian conflicts.

Concerning *medians* in roads, it was proposed to go for flat, nice looking but overrunable medians in order to maintain flexibility of use. If justified by traffic operations, real medians with trees, for example, can be discussed after 2020. This would apply especially for East Perimeter between Grand Avenue and Poly Canyon Road.

Concerning *grade separated pedestrian crossings*, there should be an approach in phases depending on real needs and finances. At first, problems should be mitigated by traffic calming, including slightly elevated zebra crossings. Second, probably after 2020, grade separated crossings could be built, as shown in the phasing plan of *Chapter 10*. Therefore, the following policies are proposed:

2.2.2.1 Policy GF 12: Discourage Through Traffic

Reduce non-University through traffic while providing access to origin and destination traffic. Use signage, gateway capacity limitations, and traffic calming. Mechanical/electronic access control can be deployed as a last resort. This is explained in *Chapter 8* under Intelligent Transportation Systems (ITS). Promote Highland Drive as the least intrusive access road from regional highways, as shown in *Exhibit 2.2*. 
2.2.2.2 Policy GF 13: Strategically Plan Road and Garage Capacities and Locations

Basically roads should be two lanes only, with additional lanes as needed for buses and bicycles and for use at special events. A high level of service (LOS) for vehicles on campus intersections is not the objective and could be counterproductive for pedestrians and the “green campus”. The design should be for “skinny roads” as explained in Chapter 3. The main objective is a high level of quality for pedestrians and bicycles, as illustrated in the appendix of Chapter 4.

Garage holding capacities should be adjusted in order to promote the Highland access. This gives Parking Structure 3 (PS 3) a higher priority than PS 2, as can be seen in Exhibit 2.3.

2.2.2.3 Policy GF 14: Especially on California Boulevard, Keep Traffic low

California Boulevard may soon become the most attractive north-south through route time-wise, as illustrated in Exhibit 2.4. Therefore, among other measures, traffic calming according to Appendix 3.2 on the whole length of California Boulevard through campus is imperative starting in 2004, when it will be a through street between Foothill and Highland. The main traffic must remain on Highway 1.

2.2.2.4 Policy GF 15: Implement a Campus-Wide Slow Speed Scenario

In order to support the above policies, this should be implemented step by step by introducing traffic calming measures starting in 2004 on California Boulevard. The concept for 2020 is shown in Exhibit 2.5.

2.2.2.5 Policy GF 16: Do Not Install Traffic Signals On Campus

Professionally prepared traffic calming is the superior alternative and respects the park-like character of the campus and the cultural and historical heritage. Nationwide, most accidents happen because drivers run a traffic signal or stop sign. At Cal Poly, the attempt is to eliminate stop-and-go traffic and instead create consistent, but slower moving traffic through traffic calming. This is the best solution from the point of view of safety, air and noise pollution, and the pedestrian atmosphere. However, small electronic traffic guidance signs to parking locations according to Chapter 8 are acceptable.

2.2.2.6 Policy GF 17: Consider Cultural Heritage along Roads

Along California Boulevard, there could be a memorial railroad path. On the wide sidewalk on the south side of Highland Drive, there could be a meandering educational agricultural footpath with vista points.

2.2.3 Rationale and Data

The above proposals appear to be less expensive and safer than wide and fast roads. For example traffic calming is often less expensive than solutions with traffic lights, and it produces less air pollution and aesthetic intrusion than traffic lights. More reasons and data are given in the following chapter.

Concerning the main access routes, it must be repeated, that according to Policy GF 4 the pedestrian has the highest priority among the mobility modes, and the car has the lowest. According to point “2.2.2 Proposal” on the previous page, vehicle/pedestrian conflicts must be minimized. These conflicts are graphically displayed in Exhibits 4.4. and 4.5 and show clearly, that traffic should be concentrated on Highway 1 and not on California Boulevard or Grand Avenue in order to avoid vehicle/pedestrian conflicts and impacts on neighborhoods.
This can be done by upgrading Highway 1 or by enhancing the capacity of the Santa Rosa Street and Foothill Boulevard intersection. In the long run, constructing an underpass for Santa Rosa Street under Foothill Boulevard merits discussion. This is basically acknowledged in the Final EIR for Student Housing North (SHN).

Based on the previous Chapter 2.1.4.2 “Relative Accuracy of Forecasts” about the traffic model and the levels of service (LOS), a word of caution is again necessary. Detailed LOS are presented in most environmental impact reports (EIRs), showing current and future waiting times for cars with an “accuracy” of a tenth of a second, suggesting a high level of accuracy. In reality a very small change of traffic volume or waiting time can change the “grading” of the LOS from B to D, from “good” to “bad”. When traffic is projected into the future, these uncertainties become even bigger. In addition to that, most LOS calculations do not include the influence of pedestrian volumes or quality or preferential treatment for public transportation, which often lower the LOS (for cars). Such calculations, if done in urban areas, can be highly questionable and misleading for lay persons. For example, LOS calculations for the intersection of Foothill and California Boulevard, can be extremely biased if the high pedestrian volumes and their possible treatment in a special pedestrian traffic light phase are neglected. At this intersection, special phases for bicycles and buses must also go into the LOS calculation. Therefore LOS must be tasted with “a grain of salt” and should be improved in the future. This is well known among professionals, but not highly publicized.

Concerning the traffic model, the SHN EIR says that as the campus grows, vehicular traffic grows too. While this is generally true, there are laudable exceptions. As already mentioned and further explained in Chapter 8.1, UW at Seattle claims that they have reduced vehicular traffic over more than 10 years, despite considerable growth of the university. A similar statement is made by Stanford University. The next traffic model for Cal Poly must include such a scenario.

For the intersection of Foothill and California Boulevard, the design priorities must be:

- Pedestrian
- Bicycle
- Bus
- Car.

The City of San Luis Obispo agrees with these concerns and proposes similar priorities.

At this intersection detailed traffic counts including all modes of mobility, and a senior project have been done by a Civil Engineering student. These are described in Chapter 9.1.1.

The following Chapters 3-8 discuss the different modes of circulation.

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25 For example in Attachment “A”, page 10, about the Highway 1/Highland Drive intersection: “The above mitigation measures would ensure that the project will not have a significant adverse traffic impact”.

26 For example in MP EIR, Traffic Section Tables 1 and 15, or in SHN EIR, Tables 5.6-1 and 5.6-11.

27 The SHN EIR acknowledges this on page 80, footnote 5, and adds, that there are also different methods of calculation leading to different results.

28 Conversation of E. Jud with Terry Sanville, Principal Transportation Planner City of SLO, at a lunch in March 2003.
Primary access to Cal Poly, avoiding neighborhoods and practically all pedestrian crossings.
EXHIBIT 2.3

PRIORITIES FOR ACCESS ROADS

Original Access Concept: Three roads of equal importance

New Access Concept: Three roads of different importance

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Note: Traffic time counts/estimates performed by CE 424 students on workdays fall 2002.

Distance from A to B by road is approximately two miles.

Which route from A to B?

Today: all 3 routes are approximately 6 – 7 minutes by car. (average of measurements around 8 am, 11 am and 5 pm)

Future: Route 2 (California Boulevard) may become the fastest, which is highly undesirable. Special measures need to be taken to discourage the use of California Boulevard.
EXHIBIT 2.5
PROPOSED SPEED ZONES – 2020

All unshaded roads are 25 mph
Grand Ave South of Slack St. to be proposed as 25 mph

Reduced from 35mph– 25mph
3. VEHICLE CIRCULATION

3.1 Main Points in Master Plan

Apart from the main points discussed above, the Master Plan gives six cross sections for roads and bicycle ways on pages 176-182. The road cross sections are based on the traditional convention that a traffic lane is 12 feet wide.

3.2 Proposal

We propose the following:

3.2.1 Guideline VEH 1: Promote “Skinny” Roads

Table 3.1: Width of Traffic Lanes

<table>
<thead>
<tr>
<th>TYPE OF LANE</th>
<th>MINIMUM WIDTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEED 25-35 MPH</td>
<td></td>
</tr>
<tr>
<td>Through Travel Lane</td>
<td>10 feet (If more than one lane in the same direction or if a bicycle lane of 5 feet or more is adjacent: 9 feet possible)</td>
</tr>
<tr>
<td>Turning Lane</td>
<td>9 feet</td>
</tr>
<tr>
<td>Middle Island</td>
<td>6 feet</td>
</tr>
<tr>
<td>Bicycle Lane</td>
<td>4-6 feet (depending on bicycle volume, grade, and parking situation)</td>
</tr>
<tr>
<td>SPEED LESS THAN 25 MPH</td>
<td></td>
</tr>
<tr>
<td>Through Travel Lane</td>
<td>9 feet</td>
</tr>
<tr>
<td>Turning Lane</td>
<td>8.5 feet</td>
</tr>
<tr>
<td>Middle Island</td>
<td>6 feet (5 feet with low pedestrian volumes)</td>
</tr>
<tr>
<td>Bicycle Lane</td>
<td>4-6 feet (depending on bicycle volume, grade, and parking situation)</td>
</tr>
<tr>
<td>COMBINATION OF BUS AND BICYCLE LANE</td>
<td></td>
</tr>
<tr>
<td>Down Hill</td>
<td>10 feet</td>
</tr>
</tbody>
</table>

This is a guideline, not a norm. Such “skinny” roads are allowed in the recently updated Manual 2001 of the American Association of State Highway and Transportation Officials (AASHTO), called “A Policy on Geometric Design of Highways and Streets”. Examples of such “skinny” lanes can be found in downtown San Luis Obispo.


The special needs of Event Parking Management were generally discussed with involved staff of the police department. A later study of the optimal traffic management of Events is needed, however. The proposed road system contains flexibility and additional queuing capacity because of the overrollable medians and the possible temporary use of bike lanes for vehicular traffic. The road planning considered the special needs of on-campus Events by proposing overrollable medians and, in some cases, overrollable median islands that allow lanes that are normally used for one line of traffic to be used by two lines of traffic.
3.2.2 Guideline VEH 2: Use Overrunable Medians

Today, the primary campus roads are designed for the efficient flow of vehicles with minimal consideration for pedestrians. The roadways at a university environment need to be designed with the pedestrian as a priority, not the vehicle. The first step in creating the ‘boulevard’ atmosphere is to redesign the primary campus roadways with some kind of median.

An overrunable, multi-purpose median is proposed as an initial treatment for the primary campus roadways. This type of median is textured, can be composed of cobblestone or similar materials, and is kept flush with the roadway surface. The pictures in Exhibit 3.1 show an example of median dimensions and how it functions. A typical median would be six feet wide, which gives enough space for a small turning lane or for refuge used by a jaywalking pedestrian. It should be noted that in a low-speed scenario, some jaywalking is not uncommon and can be seen in many downtowns.

There are many benefits of an overrunable median. The most important is its flexibility. In an emergency it can serve as an additional travel lane as can be seen in the left picture of Exhibit 3.1. The street shown in the exhibit is less than 32 feet wide and handles 20,000 cars per day in a suburb of Berne, Switzerland without any problems. It has a grade of approximately two percent. More about this type of road is explained in Appendix 3.1. Medians also serve as traffic calming tools because they make the road appear narrower to drivers. They also provide visual enhancements for the pedestrian. Adding these medians is relatively inexpensive. These medians can easily be replaced by real, landscaped medians in the future.

EXHIBIT 3.1

MULTI-PURPOSE OVERRUNABLE MEDIAN

3.2.3 Guideline VEH 3: Introduce Roundabouts

Although other solutions are possible, roundabouts (modern rotaries) are safer than other solutions because they have less conflict points as shown by Exhibit 3.2. Roundabouts have a high capacity, are aesthetically pleasing, and are normally less expensive to build and operate than traffic lights. Roundabouts are part of traffic calming techniques as shown in the fold out map of Appendix 3.2.
EXHIBIT 3.2

ROUNDABOUT CONFLICT POINTS

Typical intersection conflict points:

Roundabout conflict points:

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3.2.4 Guideline VEH 4: Build Raised Crosswalks

Use slightly raised crosswalks with special paving if possible, at all major pedestrian crossings. The City of San Luis Obispo has successfully installed such crosswalks on Augusta Road and Ramona Road. Especially if used in mid-block locations they strongly enhance pedestrian safety and slow down traffic.

3.2.5 Guideline VEH 5: Apply Curb Bulbouts

Apply curb bulbouts and similar devices at intersections or in mid-block where appropriate. Curb bulbouts are simply “bulges” in the curb line that narrow roadways at intersections or at mid-block to help pedestrians cross the street and make pedestrians more visible. They can be combined with planter boxes and “street furniture”. Examples can be seen in downtown San Luis Obispo.

3.2.6 Guideline VEH 6: Name Streets and Walkways

Unclear names of streets and other access facilities should be better defined, and new facilities should receive names as soon as possible.

3.2.7 Main Proposal: Road Network As Shown In The Executive Summary

Based on all the above guidelines and policies, the three maps in the Executive Summary were developed. They show:
- Exhibit i: Circulation: Main Issues and Solutions – 2020. Shows the main road alignments, the overall picture of proposed facilities, and the danger points between vehicles and pedestrians.
- Exhibit iii: Main Physical Elements – 2020. Shows that the extension of Highland Drive will be different from the Master Plan alignment as it swings out further East through Poly Canyon Road and then joins Perimeter Road. Some alternatives in the alignment and function of side streets are possible. Traffic calming elements are indicated, but can be adapted to changing requirements.

3.2.8 Intersections And Cross Sections of Roads

In order to explain the road details, Exhibit 3.3: Numbering Of Intersections and Street Links and Possible New Street Names was created. It in, each main intersection and each main street link is numbered for better identification. In addition, for reasons of clarity, the following tentative new street names were introduced:
- East Perimeter (Perimeter Road between Grand Avenue and Poly Canyon Road)
- Bull Road (North of extended Highland Drive towards Student Housing North)
- Sheep Road (North of Highland Drive leading to parking H12/PS 3), and
- Camino Verde (the central pedestrian East/West axis through the campus core).

Many intersections on the campus today operate inefficiently because one single pedestrian on a zebra crossing can practically block the entire intersection. For example, a pedestrian on the western side of Via Carta at Highland using the zebra crossing can block the whole intersection. A first and relatively inexpensive solution would be to build pedestrian refuge islands in the middle of the approaches to intersections. Traffic would then flow much more smoothly because pedestrians would block traffic only one lane at a time.

The possible development of intersections is commented on below. Intersection design may change according to development phase, Highland extended or not, and other circumstances. Because of the advantages mentioned in Exhibit 3.2, many roundabouts are shown but alternatives are possible.
The main documentation about roundabouts is Roundabouts: An Informational Guide by the Federal Highway Administration, 2000. The book illustrates in its Exhibit 4-7 that the effects of conflicting pedestrians on the approach capacity decreases when vehicular volumes are relatively high. Entering vehicles will more likely have to slow down regardless of whether pedestrians are present or not. Therefore, a relatively high amount of pedestrians at the roundabouts being considered will not impede vehicular flow much.

Additional advantages of roundabouts in this situation are, that they allow easy u-turns for buses and larger delivery vehicles. As they are not normally elevated, roundabouts are not difficult on heavy farm equipment. They are also less offensive to some drivers than vertical elements like elevated crosswalks or speed humps. Advantages and disadvantages of roundabouts are discussed by many agencies, for example, at the Roundabouts USA website, which also gives formulas for capacity calculations. The formulas show that the two roundabouts at Grand and Perimeter, and Via Carta and Highland, will handle more than two-times today’s traffic relatively easily. It should also be mentioned that vehicular and pedestrian delays at roundabouts are much smaller than at traffic lights. Roundabouts tend to produce less noise than intersections with stop and go traffic.

The U.S. Insurance Institute for Highway Safety publishes surveys that show that even skeptical drivers, after one year of operation, like roundabouts. Several campuses have roundabouts, some even with light rail included.

Table 3.2: Possible Design of Intersections - 2020 and Interim Phases

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
<th>Design, Possibly in Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Grand/Perimeter</td>
<td>Roundabout to be built approximately in 2006 for higher pedestrian safety</td>
</tr>
<tr>
<td>5</td>
<td>Entrance to Admin. Parking</td>
<td>Change to right-hand traffic flow and small changes on the parking lot, internally, around 2006.</td>
</tr>
<tr>
<td>7</td>
<td>Perimeter/Poly Canyon Rd.</td>
<td>Middle islands as soon as possible; change stop sign on N. Perimeter eastward into a Yield sign. Later roundabout possible.</td>
</tr>
<tr>
<td>10</td>
<td>Highland East/ &quot;Bull Rd.&quot;*</td>
<td>There will be no intersection until the missing Highland East link (#308) is completed. When completed, it could be with middle islands and/or a whole elevated intersection or roundabout.</td>
</tr>
<tr>
<td>11</td>
<td>Highland/Via Carta*</td>
<td>In the short term, pedestrian islands should be installed or a roundabout considered. Via Carta/University Dr. should not be made a one-way pair because of conflicts with pedestrians as explained in Chapter 10. For the long term, a roundabout is the preferred solution because it allows buses an easy U-turn.</td>
</tr>
<tr>
<td>12</td>
<td>Highland/University*</td>
<td>Short and long term elevated crosswalks on the south side of Highland. Whole elevated intersection possible.</td>
</tr>
<tr>
<td>13</td>
<td>Highland/ &quot;Sheep Rd.&quot;*</td>
<td>Roundabout preferred because it would allow the much discussed left-turn prohibition for vehicles moving northbound on California Blvd. Roundabout would allow an easy U-turn for misguided vehicles and would help reduce thru-traffic from California Blvd. to Highway 1.</td>
</tr>
<tr>
<td>14</td>
<td>Highland/California Blvd.</td>
<td>Currently being designed with “skinny lanes” and two painted pedestrian islands, with a later possibility of the left-turn prohibition mentioned under No. 13.</td>
</tr>
</tbody>
</table>

31 http://www.roundaboutsusa.com/design.html
32 At an intersection with an ADT of 13,000 vehicles in Basel, Switzerland, before-after noise measurements were taken. The reduction was 1.7 dB during the day and 2.9 dB during the night. Journal tec21, Fachzeitschrift fuer Architektur, Ingenieurwesen und Umwelt, August 29, 2003
33 http://www.highwaysafety.org/srpdfs/sr3607.pdf
<table>
<thead>
<tr>
<th></th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Highland/Mount Bishop Rd.</td>
<td>Interim phase: pedestrian islands. Later: roundabouts or traffic lights possible. Traffic lights would “filter” traffic coming to the campus.</td>
</tr>
<tr>
<td>16</td>
<td>California Blvd./N. Perimeter</td>
<td>For reasons of traffic calming on California Blvd. and pedestrians crossing from N. Perimeter west to the footpath leading to Highland, an elevated intersection is preferred. Alternative: elevated crosswalk on the east side of California Blvd. is possible.</td>
</tr>
<tr>
<td>17/18</td>
<td>California Blvd./Poly Grove and further South</td>
<td>In the interim, the entrance to the parking lot could be an elevated intersection. In the long term, an elevated crosswalk leading from Poly Grove to the Regional Pedestrian/Bicycle Blvd. would be appropriate. Traffic calming south of Poly Grove could be discussed.</td>
</tr>
<tr>
<td>19</td>
<td>California Blvd./private rd. crossing RR tracks to Mustang Village</td>
<td>Elevated crosswalk with middle island near the third palm tree north of the intersection.</td>
</tr>
<tr>
<td>20</td>
<td>California Blvd./current Parking C1</td>
<td>In the interim, an elevated crosswalk is possible. The long-term solution may be an elevated intersection. Design depends on future stadium expansion and parking garage.</td>
</tr>
<tr>
<td>21</td>
<td>California Blvd./Campus Way</td>
<td>In the interim, an elevated crosswalk east of California Blvd. is possible. Long term: an elevated intersection is preferred.</td>
</tr>
<tr>
<td>30/31</td>
<td>N. Perimeter: western part</td>
<td>Pedestrian zone possibly in 2004, first “primitive” then enhanced.</td>
</tr>
<tr>
<td>32</td>
<td>N. Perimeter/University</td>
<td>In the interim, pedestrian islands are possible. A roundabout is recommended as soon as possible.</td>
</tr>
<tr>
<td>34</td>
<td>N. Perimeter/Safety Way E.</td>
<td>Until Highland is extended, more traffic calming though middle island or elevated crosswalk recommended.</td>
</tr>
<tr>
<td>33</td>
<td>N. Perimeter/Via Carta</td>
<td>Design will be different when Highland is expanded east. In the interim, with heavy traffic on it, pedestrian middle islands recommended. In the long term, an elevated intersection is appropriate.</td>
</tr>
<tr>
<td>41/42/43</td>
<td>On city property</td>
<td>Discussed in Chapter 9: Special Challenges.</td>
</tr>
</tbody>
</table>

* A study is needed for the whole road network north of Brizzolara Creek and its development in phases. Several alternatives are possible. The EIR for Student Housing North proposes several alternatives for the intersections of Highland and Via Carta, and Highland and University Drive. Some of them appear to contradict principles of this report, for example, no traffic lights on campus and minimal vehicle/pedestrian conflicts.

A perspective sketch of the proposed roundabout at Grand and Perimeter is shown in Exhibit 3.4.

Concerning the cross-sections of roads, Exhibit iii pinpoints the location of 11 of them with letters A through J. The cross-section sketches can be found in Appendix 3.5.
3.3 Rationale

The following data led to the design.

3.3.1 Accident Data

The accident map in Exhibit 3.5 shows that most injury accidents occur on South Perimeter near the UU and, to a lesser extent, on North Perimeter between University Dr. and Safety Way East. This indicates that making these stretches of roads car-free is the right solution.

3.2.2 Skinny Roads Work

Appendix 3.1 illustrates the point made before in Exhibit 3.1 regarding the advantages of multipurpose, overrunnable medians. It also shows on the second page the delays at traffic lights and roundabouts. The delays at a roundabout are much smaller than at a traffic signal, which is why, in the case of the Bern Strasse, the two existing traffic lights were torn out and replaced with roundabouts.

3.3.3 Traffic Calming Has Many Proven Tools

Examples and benefits of traffic calming are shown in the colorful folding map of Appendix 3.2.

3.3.4 Cordon Counts

The counts are illustrated in Appendix 3.3. They were taken during the evening peak hour in Winter 2003 by class CE 222 along a seamless cordon around the campus, meaning all entrances and exits to the campus were counted. Counts were also taken at five internal points on campus. The counts show the importance of different roads and the number of people who travel on them by all possible modes of mobility, as shown by the following table. It also makes the comparison with the counts of ATE (Associated Traffic Engineers) in the year 2000 for the calibration of the traffic model:

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CARS</th>
<th>PEOPLE IN CARS</th>
<th>PEOPLE/CAR</th>
<th>BUS PASS.</th>
<th>CYCLISTS</th>
<th>PEDESTRIANS</th>
<th>TOTAL PEOPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 222, 2003</td>
<td>2729</td>
<td>3237</td>
<td>1.2</td>
<td>299</td>
<td>335</td>
<td>940</td>
<td>4811</td>
</tr>
<tr>
<td>ATE Eng. 2000</td>
<td>2401</td>
<td>Not Done</td>
<td>Not Done</td>
<td>Not Done</td>
<td>Not Done</td>
<td>Not Done</td>
<td>Not Done</td>
</tr>
</tbody>
</table>

The total cordon traffic per day according to ATE was 32,300 cars. This means that the evening peak hour brings 7.4 percent of the daily traffic.

More counts were taken by students of different classes and in connection with senior projects. They are not shown here or are not processed yet.

3.3.5 Existing Road Widths

Appendix 3.4 is an inventory map that shows that most Cal Poly roads are 44-49 feet wide. They are basically usable as four-lane roads, or at bus stops, as two-lanes for both waiting buses and traffic. The map also shows the low clearances under two bridges:
- 12' 6" under the railroad bridge crossing Highland and,
- 14' 6" under the freeway bridge crossing Grand Ave.
Desirable clearance is at least 15 feet.
3.4 Plan Components

Appendix 3.5 illustrates the cross sections at locations A-J, according to Exhibit iii.

Appendices 3.6 and 3.7 show the roundabout design and traffic volumes at Grand and Perimeter. A traffic simulation using PARAMICS software was done here at Cal Poly.  

Appendices 3.8 and 3.9 depict the roundabout design and traffic volumes at Highland and Via Carta.  

34 Senior project by Greg Nakamura, Civil Engineering Department, June 2003.  
35 Senior project by Esmeralda Aranda, Civil Engineering Department, December 2003.
Note: Accidents with injury are mostly along roads and not in parking areas.
Note: Accidents with injury are mostly along roads and not in parking areas.
4. PEDESTRIAN SYSTEM

4.1 Main Point in Master Plan

The Master Plan recognizes on page 174 that pedestrian access and connections need to be improved. Walkways and road crossings need to become safer as well as more attractive for pedestrians while maintaining ADA (Americans with Disabilities Act) compliance. Therefore, reducing pedestrian conflicts with other modes of transportation, such as vehicles and bicycles, is essential for creating a safe environment. The Master Plan describes visions of pedestrian promenades within the campus core. However, exact details are not mentioned. This section proposes a more differentiated system of pedestrian facilities than is mentioned in the Master Plan.

4.2 Proposal

4.2.1 Policy and Guidelines

4.2.1.1 Policy PED 1: Enhance Pedestrian Atmosphere

Pedestrians are the most prominent form of mobility on campus. The Pedestrian Levels Of Quality (LOQ) should be applied as shown in the illustrations of Appendix 4.1.

4.2.1.2 Guideline PED 1: Use Pedestrian Refuge Islands

If a road carries more than 8,000 vehicles and there are more than 800 crossing pedestrians per day, special measures should be taken. There should be a middle island and/or elevated crosswalk, or there should be a roundabout with a pedestrian refuge island in its approaches.

4.2.1.3 Guideline PED 2: Apply ADA With Imagination

Although Cal Poly generally implements the Americans With Disabilities Act successfully, continuous effort is needed. The main points are:

1. Mainstream Inclusion: A student with a disability should be able to make his/her way to class together with colleagues, without having to take long detours.

2. Minimal Topographical Grades: Walkways should be as flat as possible. Elevators inside or outside of buildings are helpful and should always be accessible. If needed, a key could be provided to persons with a disability who need to use the elevator.

3. “Visitability”: All buildings including residence halls should be well equipped for persons with a disability who want to visit. Persons with a disability should not be limited in the buildings or areas they wish to visit. Adding accommodations such as elevators would be helpful in several cases.

4. Accommodate All Disability Types (“Universal Access”): Usually when people try to accommodate a person with a disability, they think of only those in wheelchairs. However, there are many other less visible types of disabilities. All buildings should be adapted to take care of all disabled persons.  

36 www.usdoj.gov/crt/ada/adahom1.htm
37 Several interviews with William Bailey, the Cal Poly Director of the Disability Resource Center, in Spring and Summer 2003.
4.2.1.4 Guideline PED 3: Enhance Pedestrian Safety

Enhance safety by:

1. Adding traffic calming measures where pedestrian and vehicle conflicts exist
2. Widening certain corridors
3. Locating transit stops at safe and convenient locations
4. Providing ample police protection and regulation
5. Providing well lit paths
6. Adding more emergency alarms (Code Blue type), and
7. Not allowing bicycles on Poly View Drive, east of Via Carta.

4.2.1.5 Guideline PED 4: Create Short Walking Distances to Major Campus Destinations

According to Policy GF 2, the normal walking distance from a bus stop to a campus destination should be no more than five minutes, and the respective value from a parking garage should be ten minutes. As can be seen from Exhibit 4.1, the walking distance along Via Carta from North Perimeter to South Perimeter is a quarter mile and takes five minutes. Cal Poly is indeed a walking campus. A tightly knit network of pedestrian connections should be made to reach these destinations, since pedestrians are very sensitive to distance (refer to Exhibit 2.1).

4.2.2 Main Proposal

4.2.2.1 Pedestrian Circulation

Exhibit 4.2 shows the pedestrian circulation plan. In it five levels of hierarchy for pedestrian facilities are proposed:

- Major Pedestrian Zones
- Other Pedestrian Zones
- Pedestrian/Bicycle Boulevards
- Important walkways, and
- Regional pedestrian/bicycle path.

The connections for pedestrians and bicycles from outside the campus are shown in Exhibit 4.3. While the connections from the south are acceptable, the connections from the west (Foothill and Highland areas) are highly unattractive. Solutions are urgently needed, but may be expensive and infringe on private property. Some are sketched out on the map as follows:

- From the northern part of Boysen Avenue and Chorro Street, there are two alternatives to join Highland leading into Cal Poly:
  - 5A on the map is a pedestrian/bicycle bridge over Highway 1
  - 5B on the map is a pedestrian/bicycle underpass under Highway 1

- Alternative 6 on the map shows at Boysen Avenue south and Mustang Village west, there is a possibility to go north and then west with pedestrians and bicycles through agricultural land to a bridge over the railroad and California Boulevard into Cal Poly. This bridge could eliminate today’s at-grade pedestrian/bicycle crossing of the Union Pacific Railroad near Mustang Village. This could be attractive if another bicycle/pedestrian boulevard were built on the west side of the railroad. Union Pacific is interested in eliminating the at-grade crossing.

In the long term, a bridge could fully replace the at-grade railroad crossing at Mustang Village.
EXHIBIT 4.1

FOUR - SIX MINUTE WALKING DISTANCES

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EXHIBIT 4.2
PEDESTRIAN SYSTEM – YEAR 2020

Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
Note: The pedestrian/bicycle bridge over the railroad would make fencing on the west side of the railroad tracks necessary.
4.2.2.2 Main Pedestrian Facilities

1. “Camino Verde”
   “Camino Verde”, or the “green path”, will be the most beautiful walkway on the campus. Central plazas and greenery will provide a comfortable environment for pedestrians to relax, mingle, eat, study, and feel safe. Pedestrian zones, such as this will improve outdoor interaction. Adding fountains, artwork, and/or sculptures in the Centennial Green will create a more inviting environment.

   The cross sections in Appendix 3.5, mentioned in the previous chapter, show the following:

2. Via Carta
   Via Carta will be widened and become the main pedestrian and bicycle boulevard. Pedestrians would have a wide sidewalk raised above the bicycle lanes on the asphalt surface. This design would mitigate today’s conflicts.

3. “Via Carta Alta”
   “Via Carta Alta” is a proposed pedestrian walkway for the short or intermediate term, while Building 52 still stands. It runs east of mid Via Carta at a higher elevation on the eastern hillside.

4. Historical Memorial Path
   A memorial railroad path along California Boulevard near the old buildings, as mentioned in Chapter 2, would be a charming addition to this historic campus entrance. The path would be educational and would preserve some Cal Poly cultural heritage. It should contain historical facts about the railroad and early campus buildings. This proposal may conflict with the high density developments planned for this area.

5. Highland Drive Educational Path
   An agricultural educational path along the south side of Highland Drive, west of Bishop Peak Road, would make this scenic walk more enjoyable. Wide, meandering walkways and greenery along the path should be considered. The path would have various vista points and signs with agricultural facts about the Cal Poly agriculture land.

4.2.2.3 ADA, Elevators, and Pedestrian Bridges

As shown in Exhibit 4.2, elevators are proposed at several locations on the campus to help persons with disabilities. These are located at:

   1. Mid Via Carta
   2. Poly Canyon Road, across from Cerro Vista
   3. East Highland, west of “Bull Road”.

Pedestrian/vehicle conflicts can be solved mostly through traffic calming. If necessary, pedestrian bridges can be built later in accordance with Policy GF 5, which advocates a building process from least expensive to more expensive. See Exhibit 10.4 for possible locations and phases of these pedestrian bridges.

4.2.2.4 Connection to Roads

Traffic and parking will be discontinued on both North and South Perimeter in order to convert the streets into pedestrian and bicycle oriented boulevards. Both of these roads are very wide and the travel lanes will be used later for bicycle parking, greenery, etc. Beautification of North and South Perimeter will add aesthetical qualities near principal social areas, such as the dining complex, University Union, Library, and Campus Market. Vehicles will be prohibited along interior campus roads, except for some access and deliveries. Consequently, drop off locations for cars will be mostly
at the edge of the campus core. Large delivery vehicles can use the roundabouts as turnarounds, as they will no longer be allowed to drive through the instructional core, except in specified locations. Small non-polluting buses will be allowed on North and South Perimeter because they would not interfere with the pedestrian atmosphere.

4.2.2.5 Wayfinding

Wayfinding signs should be installed at key locations around campus in well-lit areas. Signage will be used to help people locate themselves on campus. Signage should focus on main facilities rather than streets as people reading the signs will be on foot looking for a certain destination. Sign information should be concise. For example, it could read: “Recreation Center”, “Bookstore”, “Health Center”, “Information Center”, “Sports Fields”, “Library”, etc. Exhibit 4.2 shows proposed wayfinding sign locations.38

4.3 Rationale

4.3.1 Ideal Pedestrian Environment

Based on the concept of the “park-like campus,” the Northwest Area Charette of July 22, 2003 reaffirmed that green spaces shall be a unifying element across the campus to establish identity within all quadrants of the campus.

4.3.2 Pedestrian and Vehicle Conflicts

In many locations, pedestrians, bicyclists, and drivers all compete for the same use of space, leading to conflicts and accidents. The existing conflicts of pedestrians versus cars on major campus roadways are illustrated in Exhibit 4.4. The same conflicts have been forecast for the year 2020 in Exhibit 4.5. The amount of pedestrian traffic on the campus will increase significantly due to increased enrollment and Student Housing North. Therefore, this problem has a high priority. When comparing pedestrian/vehicle conflicts (multiplying pedestrians by vehicles), Exhibit 4.5 shows that conflicts are higher on the axis of Grand and Perimeter than on California Blvd. Nevertheless, they are very high on both corridors.

4.3.3 Cordon Counts

A Cal Poly student39 counted pedestrians traveling in and out at a peak hour at all campus entrances along a seamless cordon similar to the one mentioned in Chapter 3. The counting locations and the results are shown in Appendix 4.2.

The second page of the above appendix divides the campus into three main sections: lower, middle, and upper. The graph shows that the upper campus, namely Grand Avenue, has a very low number of pedestrians crossing the cordon. The middle campus has many more people crossing, totaling approximately 600 pedestrians. The most significant numbers are in the lower campus, totaling about 900 pedestrians. The majority of these pedestrians, 500 persons, cross California Blvd. (to and from residences west of the railroad tracks) near Mustang Stadium. A large number of off-campus students live west of the railroad as shown on Exhibit 4.4. Pedestrian volumes along California Blvd. are also very high, as illustrated in the second page of this appendix.

38 Guidelines for wayfinding systems on campuses exist or are currently being developed, for example in Arizona on a statewide level.
39 Jerod McCully, CE 424 student, Fall 2002
EXHIBIT 4.4
PEDESTRIAN VS. CARS – 2002

LEGEND

1,000 Students Living

Ped. Volumes/Day

11,000 ADT Veh/Day

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EXHIBIT 4.5

PEDESTRIAN VS. CARS – 2020

LEGEND

1,000 Students Living

Ped. Volumes/Day

16,000 ADT Veh/Day

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These results strengthen the argument that traffic on California Boulevard should be kept as low as possible, also in the interest of the general pedestrian and environmental atmosphere. In addition, establishing pedestrian zones that connect from major pedestrian entrances to the inner campus is highly desirable.

4.4 Plan Components
The legends of Exhibit 4.2 and 4.3 contain:

4.4.1 “Major Pedestrian Zones”
These zones contain the mainstream pedestrian traffic within the campus core. Cal Poly’s signature park-like zone will be “Camino Verde”, a lush landscaped path through the heart of the campus along the major greens. These zones should be well lit and beautified with decorative lighting, fountains, benches, and trees. Strictly for pedestrians, bicycles and motorized vehicles will not be allowed in these zones, with exceptions made for emergency and service vehicles.

4.4.2 “Pedestrian Zones”
These are distinguished as the campus walkways that lead to major classroom buildings and other areas just outside the main greens. These walkways could be designed as wide meandering paths, at least 10 feet wide.

4.4.3 “Pedestrian/Bicycle Boulevards”
These are pathways designed for the shared use of people on foot and bicyclists in a manner that is enjoyable, safe, and effective. North Perimeter and South Perimeter are the main ped/bike boulevards in which small electric buses will be allowed. The Via Carta boulevard is strictly for pedestrians and bicycles only.

4.4.4 “Important Walkways”
These include the main sidewalks to get to and from residential areas and parking lots. They should be 8 to 10 feet wide.

4.4.5 “Regional Pedestrian/Bicycle Path and Possible Pedestrian/Bicycle Connections To Campus”
The regional path will be constructed along the railroad and will connect to the city and campus pedestrian/bicycle network. It should be at least 10 feet wide. The possible pedestrian/bicycle connections west of the campus are seen in Exhibit 4.3.

4.4.6 Wayfinding Signs
These signs are proposed for pedestrians and bicycles at five major campus intersections where pedestrian ways connect:
- Via Carta and Highland
- Highland and California Blvd
- California Blvd and Campus Way
- South Perimeter, west of Recreation Center
- South Perimeter and Grand Ave.

4.4.7 Elevators
The locations of the three elevators were described previously, under paragraph 4.2.2.3.
5. BICYCLE SYSTEM

5.1 Main Point in Master Plan

The principle in the Master Plan on page 167 states that the campus should have “safe and effective bicycle connections to the surrounding street system, a clear bike path system on campus, and convenient bike parking and storage.” It continues to say that these efforts “can and should increase bike use as a preferred commuting choice”.

5.2 Proposal

5.2.1 Policy and Guideline

5.2.1.1 Policy BI 1: Improve Bicycle Circulation on Campus

We propose a more differentiated bicycle system than in the Master Plan and give preferential treatment to bicycles in the lower part of the campus where most of the bicycle activity occurs.

5.2.1.2 Guideline BI 1: Expand Bicycle Facilities

Take the following steps:

- Push for the construction of the Regional Pedestrian/Bike Path near the railroad
- Build a bicycle station near the Transportation Center
- Double the number of existing bike racks in the core from 2,000 to 4,000 within 10 years
- Place smaller bicycle parking adjacent to all buildings
- Provide bike lockers or covered storage, and add bike racks near residence halls
- Provide adequate nighttime lighting along bikeways.

5.2.1.3 Guideline BI 2: Educate People and Enforce Bicycle Programs

Mobility training should be provided beginning at WOW week, and a “bike buddies” system should be provided, where an experienced bicyclist advises younger beginners about cycling to and at Cal Poly. This creates a positive atmosphere on the campus and reduces accidents because most car drivers and beginning bicycle riders do not know correct behavior. It is rarely taught in schools.

5.2.2 Main Proposal

Exhibit 5.1 shows four types of bicycle circulation:

- Pedestrian and Bicycle Boulevards
- Regional Pedestrian/Bicycle Path
- Bicycle Lanes
- Bicycle Routes.

Bicycle circulation will be limited in the instructional core. The proposed bicycle system will provide an easy north/south connection along Via Carta from the bicycle station as well as from the Transportation Center. The bicycle connections outside of the campus are shown in Exhibit 4.3 of the previous chapter.

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40 Several meetings with Joe Gilpin, Civil Engineer, Executive Director of SLO County Bike Coalition in Summer 2003
EXHIBIT 5.1
BICYCLE SYSTEM – 2020

For outside connections see Exhibit 4.3

LEGEND
Circulation
Vehicles
- Major Road
- Minor Road/Pathway

Bicycles
- Regional Bike/Ped. Path
- Pedestrian/Bicycle Blvd.
- Bike Lane (on roads)
- Bicycle Route

Wayfinding Signs
(for pedestrians & cyclists)

Bicycle Station
Underground Bike Storage
Main Surface Bike Storage

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5.3 Rationale

5.3.1 Cordon Counts

Appendix 5.1 illustrates the bicycle counts taken by the same student who performed the pedestrian counts mentioned in Chapter 4. As with pedestrians, the upper campus sees very few cyclists, more are in the middle campus, and the largest number of cyclists is in the lower part of campus. However, the number of cyclists is more than three times lower than the number of pedestrians.

5.3.2 Promoting Bicycle Use

Currently, about only eight percent of people ride a bicycle to Cal Poly. Improving bicycling on campus would encourage people to use this mode of mobility.

Many benefits would result from promoting this alternative mode of transportation, such as reduced vehicular congestion and improved air quality. Bicyclists would also enjoy a healthy bike ride and save money, since this mode is cheaper than driving an automobile.

Currently, about 1,500 persons ride to campus by bicycle everyday. As a comparison, UC Santa Barbara has only ten percent more students than Cal Poly, but counts 10,000 to 15,000 cyclists per day. This university is situated on more level terrain than Cal Poly and has excellent bicycle facilities, such as bicycle underpasses and bicycle roundabouts. Nevertheless, it appears that Cal Poly can improve bicycle facilities and ridership considerably. When compared with other campuses, expanding the current number of 2000 bike racks in the campus instructional core to 4000 appears to be reasonable.

5.3.3 Bicycle Parking in Residence Halls

Bicycle facilities in residence halls today are very limited. The following table suggests that residence halls are “over parked” by cars and “under parked” by bicycles. Due to a lack of adequate bicycle parking, many students take their bicycle to their rooms. It appears that newer residences are equipped with less bicycle racks than older ones – an unfortunate trend. These numbers may indicate that the campus is moving away from bicycles to stronger car orientation.

Table 5.1: Bicycle and Car Parking Per Resident Bed

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>BIKE P</th>
<th>CAR P</th>
<th>BEDS</th>
<th>BIKE P PER BED</th>
<th>CAR P PER BED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Residences 2002 (mostly freshmen)</td>
<td>1,200</td>
<td>1,500</td>
<td>2,800</td>
<td>0.43</td>
<td>0.54</td>
</tr>
<tr>
<td>Cerro Vista Residences 2003</td>
<td>280</td>
<td>30</td>
<td>800</td>
<td>0.35</td>
<td>0.04</td>
</tr>
<tr>
<td>Student Housing North 2006 (more sophomore students)</td>
<td>?</td>
<td>2,000</td>
<td>2,700</td>
<td>?</td>
<td>0.74</td>
</tr>
</tbody>
</table>

The number of bicycle parking spaces at Student Housing North and their quality is unknown. In public meetings in Spring 2003, the developer was asked to provide less car parking but ample bicycle parking. Adequate guidelines for the number and quality of bicycle parking spaces should be developed as soon as possible. Precedents can be found.

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41 For comparison, Stanford has an overall ratio of 0.44. CSU Monterey Bay has a ratio of 0.66 for upper level students according to their Master Plan 1998, page 160.
42 Leads to parking lottery in 2003 for freshmen
5.4 Plan Components

5.4.1 Proposed Distribution of Additional 2,000 Bicycle Parking Spaces

The additional spaces could be distributed as follows:

- In locations shown in Exhibit 5.1 with a blue ring, additional spaces are under future buildings and others could be near the PAC. Examples of well-camouflaged bike parking near cultural centers exist in many towns. In locations shown with a blue circle main surface bike storage is proposed.
- Smaller bicycle parking near all buildings, some only accessible through bicycle “walk zones.”
- Along the pedestrian/bicycle boulevards on North and South Perimeter.

5.4.2 Short Term Network of Bikeways

A coherent network of bicycle lanes and routes in the instructional core could be created merely with paint and signage on streets. Counter flow bicycle lanes, wayfinding signs, etc. could be used. Minor construction may be needed.

5.4.3 Bicycle Station

Cal Poly wants to encourage bicycle transportation by implementing a bicycle station in phases. Today there exists a self-help bike repair facility in the University Union. In a subsequent phase, an additional bicycle repair and well-organized safe parking facility should be provided, for example in Student Housing North. Later, a temporary bicycle station could be erected near the intersection of Via Carta and North Perimeter, where most of the classrooms are. The final location of the bicycle station would be in or near the Transportation Center at the intersection of Via Carta and Highland.

The final bicycle station would include amenities such as:

- Secure indoor storage
- Shower & locker facilities
- Bike maintenance supplies (repair & adjust bikes)
- Bike rentals & sales
- Mobility information (transportation, safety, maps, & travel)
- Car-sharing services (see Chapter 8 for more details)
- Bicycle registration.

Bike stations have been successful at many cities in the U.S. and around the world. Some of these cities include:

- Palo Alto
- Berkeley
- Long Beach, and
- Seattle.

Appendix 5.2 shows bicycle stations in Long Beach and Luzern, Switzerland. The bike station in Long Beach is an award-winning facility comparable to those in Europe and Japan with valet parking and other amenities. This is a deluxe example of a bike station; a smaller and less expensive facility could be built in a first phase, similar to the one in Luzern, Switzerland.

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43 [http://www.ci.long-beach.ca.us/aboutlb/gallery/transportation.htm](http://www.ci.long-beach.ca.us/aboutlb/gallery/transportation.htm)

5.4.4 Part Time Bicycle Coordinator

Three campuses in the U.S. have full time bicycle coordinators. These are Stanford, UC Davis, and Cornell University in Ithaca, NY. Cal Poly should consider such a job on at least a part time basis.

5.4.5 Components of Bicycle System

The legend of Exhibit 5.1 shows the following components:

- Regional Bike/Pedestrian Path: To be constructed along the railroad and link to the city bicycle network.
- Bicycle Station: To be built at or near the Transportation Center at the intersection of Via Carta and Highland.
- Pedestrian/Bicycle Boulevards: Pathways designed for the shared use of pedestrians and cyclists in a manner that is enjoyable, safe, and effective. North Perimeter and South Perimeter are the main pedestrian/bike boulevards in which small electric buses will be allowed. Via Carta Boulevard is strictly for pedestrians and bicycles only.
- Underground Bike Storage: Two main areas will be located under buildings near Via Carta in the future.
- Main Surface Bike Storage: Four larger areas located on campus where bicycles will be stored with or without bike lockers.
- Wayfinding Signs: For bicycles and pedestrians at five campus intersections where bikeways connect:
  - Via Carta and Highland
  - Highland and California Blvd
  - California Blvd and Campus Way
  - South Perimeter, west of Recreation Center, and
  - Perimeter and Grand Ave.
- Bikeways:
  - Class I Bike Path: Bikeway that is completely separated from roadways by at least five feet.
  - Class II Bike Lanes: Bike only lane that is at least four feet wide and part of a roadways. These are located along all major campus roads.
  - Class III Bicycle Routes: suggested routes with signage only. These will lead to main surface bike storage and to adjacent neighborhoods south of the campus.

5.4.6 Alternative Studied

A bike path loop around the lower part of campus leading from Via Carta to the Library, to California Blvd., then up through South Perimeter to Via Carta was studied. It was abandoned because the system would have needed too much construction and would have been inflexible.
6. SERVICE ACCESS

6.1 Main Point in Master Plan

The main principle on page 168 of the master plan reads, “While removing vehicles from the instructional core, access by service, emergency, and vehicles for disabled persons must be provided. Functions such as deliveries, trash pick-up, maintenance, and emergency services are a vital necessity.” Page 183 states; “These vehicles need to circulate throughout the core while sharing circulation routes with pedestrians and bicyclists. Conflicts between these users should be reduced through design and routing plans. Most, if not all, buildings need to be accessed for routine maintenance and service on a daily basis.”

6.2 Proposal

The following is proposed:

6.2.1 Policy SA 1: Designate Primary and Secondary Service Access Routes

Service access to the campus core should be restricted to specifically defined routes that should link service centers on campus to primary loading facilities. See Exhibit 6.1, Campus Service Access Routes - 2020.

Larger vehicles, such as tractor-trailers and large trucks, are difficult to maneuver and have the highest potential to interfere with pedestrian and bicycle traffic. These vehicles should be permitted only on primary service access routes. Smaller vehicles, such as pick-up trucks and small carts, should be permitted to travel to additional areas of campus, but only on defined, secondary service access routes. The service access routes should avoid strategic areas of the campus core entirely, allowing for strictly pedestrian zones. Specifically, two highly pedestrian areas should be avoided: one along North Perimeter near Kennedy Library, and one along South Perimeter near Mott Gym. Note that the MP allows heavy delivery vehicles in these two areas.

The foundation is basically willing to replace most articulated trucks if needed in the future and to replace by them by “small panel trucks,” approximately twenty feet long which would operate between the campus and the warehouse.

6.2.2 Guideline SA 1: Provide Loading Space as Needed

As a rule of thumb, one loading space for heavy commercial trucks is needed per 100,000 gross square feet of building area. However, loading dock spaces must be calculated on a building-by-building basis.

6.2.3 Guideline SA 2: Camouflage Loading Docks

Loading facilities should be camouflaged with aesthetic walls or vegetation. This improves the visual appearance of the campus and reinforces the campus pedestrian atmosphere. Plans for such camouflage are discussed for the loading area of Campus Dining.

6.2.4 Guideline SA 3: Be Prepared for a Worst Case Scenario

If problems arise in the future, there are several options to manage service access:

- Requiring loading permits for all service vehicles entering campus could help monitor service vehicles.
Limiting the length of time service vehicles are allowed to stay could potentially manage congestion at loading facilities.

Congestion on access routes might be managed by limiting times throughout the day in which service vehicles are permitted, or by developing a strict service access schedule.

Allowing minor service access on wide sidewalks with few pedestrians would help to create a more pedestrian atmosphere. These sidewalks should be at least 10 feet wide to accommodate smaller vehicles such as MicroVans. MicroVans can not operate on normal public streets.

Future loading areas should be located such that pedestrian paths are crossed infrequently.

An underground delivery tunnel was considered under Mid Via Carta and Eastern Polyview Dr. in order to serve future buildings that will replace Building 52. Plans for this tunnel were given up due to high costs and aesthetic interference from required ramps.

6.3 Rationale

A more pedestrian-oriented campus is a main goal of the Master Plan. Restricting vehicles from selected areas allows the development of a more pedestrian atmosphere and reduces the number of conflicts between vehicles and pedestrians, creating a safer pedestrian setting.

Visual improvements help to provide a more pleasant atmosphere for pedestrians, and disguising service access facilities creates a sense of separation between pedestrians and service activities.

6.4 Data

There are five main agencies that deal with freight and service access. These agencies are, in approximate order of most to least vehicular trip generation:

- Foundation Dining (heavy trucks)
- Facilities Warehouse (heavy trucks)
- Foundation Warehouse serving both Campus Dining and El Corral Bookstore (heavy trucks)
- Facilities Services (light trucks), and
- ASI (light trucks).

Student Housing produces very little access traffic and need not be analyzed further.

An investigation of campus loading areas was conducted to identify major service destinations, as shown on Exhibit 6.2, Existing Loading Facilities – 2003.

A survey of the campus freight organizations was conducted through interviews with key individuals. The survey questionnaire can be found in Appendix 6.1. A summary of these interviews is in Appendix 6.2. It became apparent that there are two types of freight operations:

- Truck from Outside to Warehouse Only
- Truck from Outside Directly to Loading Dock of end user.

This is shown in the diagram of Exhibit 6.3. Distribution Services of Facilities Planning recently made considerable improvements to their operation by dividing the campus into four delivery quadrants. Each of these quadrants requires only one trip per day with a small MicroVan, which is also capable of traveling on sidewalks. Appendix 6.3 contains photos and descriptions of the loading areas.

The main concerns of the individuals surveyed included restricted maneuverability for trucks due to limited space near loading docks, and truck traffic congestion when loading areas are occupied. Many of those interviewed share the concern for pedestrians and bicyclists and are willing to minimize conflicts. 44

According to the inventory of Transportation Services, there are approximately 400 state vehicles on campus, including 175 trucks, 4 buses, 76 electric vehicles, 39 sedans, 83 vans, and 2 SUVs.

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44 Based on interviews in August 2003 with Taffy Duran, El Corral Bookstore Distributions Manager, Frank Limon, Jr., Distribution Services Manager, Robert Pahlow, Facilities Services Assistant Director, Gerald Rowan, Campus Dining Warehouse Specialist, and Robert Weaver, ASI Operations Coordinator
EXHIBIT 6.1

CAMPUS SERVICE ACCESS ROUTES - 2020

LEGEND

- Primary Campus Service Access Ways
- Secondary Campus Service Access Ways

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EXISTING LOADING FACILITIES – 2003

The numbers correspond to building numbers; see also Appendix 6.3, Loading Area Photos and Descriptions.

LEGEND
- Multiple Truck Dock
- Single Truck Dock
- Marked or Gated Area
- Unmarked or Garbage only Area

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EXHIBIT 6.3
TWO TYPES OF FREIGHT OPERATIONS

Type 1: Truck from Outside to Warehouse Only
(Facilities Warehouse and Foundation Warehouse)

Outside deliveries are made directly to warehouse

Goods are delivered on set routes from warehouse to different areas of campus

Type 2: Truck from Outside Directly to Loading Dock of End User (Foundation Dining Dock)

Outside deliveries are made directly to loading dock
7. TRANSIT

7.1 Main Points in Master Plan

The Master Plan acknowledges the importance of public transit to improve the quality of a continually growing campus. This transportation plan fully explores the options available to advance public transportation on- and off-campus to a new level of quality and efficiency. While it comprises a large portion of the Alternative Transportation section of the Master Plan, this supplemental plan is expanded. Transit is mentioned in several other areas of the Master Plan, in which it is seen as part of a solution to an accompanying problem. The points addressed are as follows:

7.1.1 Vehicle Trip Reduction

Vehicle trip reduction is seen as a major step towards lessening the car-oriented lifestyle the campus holds today. The Master Plan states on page 198 that “Traffic congestion can be reduced by increasing the number of persons in a vehicle and substituting alternative transportation, including public transportation, bicycles and pedestrians.”

Currently, public transit accounts for approximately one-tenth of the total trips to and from campus by students and employees, as seen in Table 2.2. While this helps reduce the number of daily trips, it is nowhere near as substantial as it could be.

7.1.2 Connecting the Campus to the Public Transit Network

Though Cal Poly has access to all SLO Transit and Central Coast Area Transit (CCAT) bus routes, they are not optimally connected to the campus. Changing roadways, and more importantly, changing buildings, can improve the current transit effectiveness. On page 208, the Master Plan states “Cal Poly should continue to work with local transit providers to enhance access to Cal Poly and integrate transit access into the campus circulation system.” With the new classrooms moving the instructional core northward, it is only logical that the bus routes follow as well.

7.2 Proposal

The new SLO Transit Short Range Transit Plan (SRTP) was approved by the City Council on August 28, 2003 and will go into operation in January 2004. It has been established to guide the growth of the city bus system in the coming years. The SRTP45 will remove several inefficient routes from servicing Cal Poly, and instead add two circulator routes (6a and 6b) to better shuttle students and employees to and from school. These routes are planned with 30-minute headways for quick service.

Based on the Master Plan and information taken from the SRTP, a proposal has been developed regarding the evolution of the transit system at Cal Poly. This proposal is shown here through a series of policies and guidelines46:

7.2.1 Policy T 1: Expand the Effectiveness of Public Transit

“Transit Effectiveness” means that students, faculty, and staff can easily walk to board a bus and arrive at their destination within a short time period. To accomplish this, several features must be implemented, including better signage, memory schedules, a centralized Transportation Center, connections to important campus and City locations, and ease of access.

46These proposals were discussed with City Transit Manager Austin O’Dell and CCAT Transit Manager David Lilly in March of 2003 and favorably received.
7.2.2 Guideline T 1: Create a New Transportation Center

After long discussions it was decided that Cal Poly needs one multimodal Transportation Center and that this center should be in the area of the (expanded) Campus Market.

A multimodal Transportation Center is needed for user-friendliness as well as for efficient bus operation. It has the following functions:
- adjust bus schedules
- board many passengers, some in wheelchairs
- allow some passengers to switch buses
- give rest to drivers or allow for driver shift changes.

Such a main center “where mobility happens” ideally contains:
- information service for all modes of transportation, travel agency, ticket sales
- shelter
- ride share and bus managers office
- convenient services, including food close by, such as:
  - newsstand, banking
  - branch post office
  - vending machines
  - copy machine
  - attended "bicycle station" containing deluxe as well as free bicycle parking, repair and training service, sale and rental of bicycles, lockers with showers, ideally with fully automated function at night.
  - car rental agency including car sharing and electric vehicles
  - eventually, rooms for bus drivers waiting for shift changes and containing some equipment.

The Transportation Center should be “where students want to go en route to and from class or the Library”. As previously mentioned, continual growth of classrooms will shift the main instructional core northward. Therefore, the new Transportation Center is proposed to reside in the northwestern area of the campus, ideally between Highland Drive and North Perimeter Road. Until campus roads and buildings have developed further, a Transportation Center at a temporary location is proposed on North Perimeter in approximately 2009. Both the 2009 temporary Transportation Center and the 2020 permanent Transportation Center can be seen in the Executive Summary: Exhibit ii and Exhibit iii, as well as in Exhibit 7.4 and Exhibit 7.5 of this chapter. The Transportation Center should offer room for 7-14 buses, depending on the type of operation.47 Possible designs, are shown in Appendix 7.1. Examples of transportation centers on four other campuses are shown in Appendices 7.2 to 7.5. The Transportation Center should have an approximate footprint of one acre.

7.2.3 Guideline T 2: Expand SRTP Circulator Routes

The two circulator routes proposed by the Short Range Transit Plan, effective January 2004, work well for the current enrollment at Cal Poly. But as enrollment continues to increase, more public transit will be needed. Exhibit 7.1 shows the two SRTP circulator routes, along with an approximate count of students living in each area of the city. Exhibit 7.2 shows the SRTP operation starting in January 2004. The proposed 2006 establishment of Routes 6c, 6d Shuttle, and 6e Shuttle would help provide more effective service to these student-dense surrounding neighborhoods, Student Housing North (SHN), and the rest of Cal Poly. The alignment of these routes is described in the below section 7.4 Plan Components and in Exhibit 7.3. Some of these services can be implemented prior to the proposed installation year or later.

47 Meeting of Eugene Jud with Austin O’Dell, SLO City Transit Manager, in Spring 2003
7.2.4 Guideline T 3: Reconnect North Campus with San Luis Obispo

With the SRTP removing the current Route 1 service from Cal Poly, the northern portion of campus will be without immediate access to the Downtown. The newly proposed Route 1a in this study will provide a direct link with this portion of the campus to the Downtown by traveling south on California Blvd., which will be open to thru-traffic by 2004.

7.2.5 Guideline T 4: Establish Campus Shuttles

Proposed as a valid service in the Master Plan and complementary to the expanded bus schedule, shuttle buses will allow quick and efficient access on-campus and up to approximately one-mile off-campus. Powered by electricity, hybrid propulsion or fuel cells, these shuttle buses, modeled after Santa Barbara’s “Fun Shuttle” (see Appendix 7.6), are quiet, clean, and modern. Except for the shuttle service of Routes 6d and 6e, shuttle plans have not been fully generated. Expected stops for 2020 include the pedestrian/bicycle boulevard portions of South and North Perimeter Roads, as well as the Transportation Center. If found economically and legally viable, these shuttles could be staffed by student workers, thus reducing the costs of hiring outside professionals. Shuttle buses could be financed by different methods, for example; considerably higher parking fees as practiced on most UC campuses.

7.2.6 Policy T 2: Alter Transit Routes to Fit Changing Roads

Cal Poly in 2020 will have a much different road system than the current campus structure. Thus, transit routes that exist today need to be adjusted to fit the updated roadways. The completion of the California Blvd. and Highland Dr. extensions will allow for a more circular transit flow throughout the campus.

7.2.7 Policy T 3: Provide a High Level of Service

By 2006, it is proposed that every route servicing Cal Poly be established on regular, 30-minute intervals. This allows students to arrive in time to walk to class and leave in a similar fashion. By 2020, 15-minute intervals for most routes are proposed.

7.2.8 Guideline T 5: Expand and Improve Bus Stops

In accordance with the 2020 transit proposal, bus stops will be created as a circular ring around Cal Poly. This calls for the establishment of two new, major stops: one on California Blvd., the other at the Administration Building to serve not only SLO Transit, but CCAT and Amtrak Buses as well. Located at major points on the campus, these new stops will allow for easier access from two of the major locations on Cal Poly: the University Union and the Business/Architecture area. An additional bus stop should be considered to serve Cerro Vista residents on Poly Canyon Rd.

7.2.9 Policy T 4: Improve Passenger Information

Certain SLO Transit and CCAT schedules are difficult to memorize, and the current conveyance of bus arrivals and departures (electronic SMART Transit Signs) sometimes fails to predict bus times. With the implementation of 30-minute intervals, arrival and departure confusion will be reduced. Also

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48 See [http://www.sbeti.com](http://www.sbeti.com) publications, especially “Six Years of Battery Electric Buses...”

49 See also Bridget Gauthier of class ENGL 149 Fall 2003, Technical Writing, Professor Webber: Proposal to Replace existing diesel buses on Routes 4 and 5 with electric “Santa Barbara” Buses. However, in a meeting in November 2003, the City Transit Manager mentioned, that he would prefer fuel cell buses over electric buses.

50 See also proposal of class CE 424 Fall 2003 Group 4, Michelle Heiser, Travis Hurt, Nick Tracy, and Alison Anderson about Cal Poly Shuttle Bus System, Instructor E. Jud.
the existing electronic SMART Transit Signs could be updated more frequently to accurately represent the location of the vehicles.

7.2.10 Policy T 5: Improve Awareness of Commuter Alternatives

Cal Poly provides several options to reduce automobile use on campus. These include Emergency Ride Home, Disability Resource Center trams, the Escort Van program, and the three Cal Poly owned buses.

Another important resource, Ride-On, has numerous options for faculty and staff members living both in and out of town. Services like vanpools, Guaranteed Ride Home, and Lunchtime Express offer a cheap or free way to get around the area. Cal Poly could work to improve awareness of Ride-On and similar services, saving parking and vehicle trips.

7.2.11 Policy T 6: Integrate All Transit Services at Cal Poly

SLO Transit services should be further integrated into the whole system of County public transportation and all transit and paratransit systems servicing Cal Poly, including the Disability Resource Center (DRC) vehicles. While the enhanced bus stops and new Transportation Center do much to centralize many of these systems under one roof, greater integration is essential. See Table 7.1 for an analysis of current commuter options, and Table 7.2 for a set of proposed services. Appendix 7.7 highlights a general map of the countywide CCAT services proposed for the year 2016. The site www.Rideshare.org gives schedules and proposals, how to get from A to B by transit.

7.2.12 Policy T 7: Consider Possible Light Rail or Commuter Rail Station

Such a station would be established along California Bvd. near the Mustang Stadium or the School of Business, as seen in Exhibit iii. Both the Circulation Element of the City (1994) and the Regional Transportation Plan (RTP 2001) do not discount the possibility of future commuter or light rail access through SLO County, if the institutional and financial framework changes. Newer technical developments, for example, Diesel Multiple Units (DMU) now produced in the USA, are promising. Surveys in the City and in the County show that citizens rank rail “very high” or “high” as a possible County mobility solution.

Cal Poly has a strong historical connection to the railroad. Thanks to big political pressure from Southern Pacific Rail, Cal Poly was located where it is today, namely a place visible from the train. Also, along California Boulevard., William Randolph Hearst planted palm trees to signify the transition from train to coach, as he and guests would venture northward to Hearst Castle.

Such a rail station would be a maximum of 300 feet long, and is proposed after the year 2020. However, rail could be used earlier for special Cal Poly events, for example, at Alumni days and Open House. Trains could travel from Northern and Southern California and guests could disembark right in front of Cal Poly.

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51 Proposal how to get from A to B with several bus lines currently only works with Internet Explorer.
52 Korve Engineering “Route 101 Major Investment Study”, South County, 1997 and “CE 221 Survey” in downtown San Luis Obispo in 1996, both with approximately 1000 respondents.
<table>
<thead>
<tr>
<th>Name</th>
<th>Days Operational</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 6 (a/b)</td>
<td>Mon.-Thur. Fri.-Sat.</td>
<td>7:30am-8:30pm 9:00am-8:00pm</td>
<td>30 minute intervals 60 minute intervals No Sun. service until 2005 study.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>~6:00am-6:30pm 8:00am-6:00pm</td>
<td>Routes through Madonna area remain unchanged. 30-minute intervals.</td>
</tr>
<tr>
<td>Route 4/5</td>
<td>Mon.-Fri. Sat.-Sun.</td>
<td>~6:00am-6:30pm 8:00am-6:00pm</td>
<td>Covered by Route 6. Hourly. Only evening service for Cal Poly.</td>
</tr>
<tr>
<td>Evening Service</td>
<td>Mon.-Thur. Fri.</td>
<td>~6:00am-6:30pm 8:00am-6:00pm</td>
<td>Provided by Ride-On. Free to restaurants in San Luis Obispo. Must have 2 or more riders.</td>
</tr>
<tr>
<td>Lunchtime Express</td>
<td>Mon.-Fri.</td>
<td>11:00am-2:00pm</td>
<td>Guaranteed Ride Home Mon.-Sun. 24 hours Provided by Ride-On. Pickup within 15 minutes of call. Trips between 5:00pm-6:30 am must be called in the previous day. Have to be a member of Regional Rideshare or registered with Cal Poly Commuter Services.</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>Mon.-Sun.</td>
<td>24 hours</td>
<td>Safe Ride Home Thur.-Sat. 9:00pm-3:00am Provided by Ride-On. Options available.</td>
</tr>
<tr>
<td>University Escort Van</td>
<td>Sun.-Thur.</td>
<td>Dusk-12:00am</td>
<td>Three locations for pickup on campus: UU, Library, &amp; Crandall Gym. 60-minute intervals. Delivers up to 1/2-mile off-campus. Only Fall, Winter, and Spring.</td>
</tr>
<tr>
<td>DRC Tram</td>
<td>Mon.-Fri.</td>
<td>7:45am-4:30pm</td>
<td>Picks up/drops off and designated stops. Scheduled or on-call service.</td>
</tr>
<tr>
<td>CCAT Route 9/10</td>
<td>Mon.-Fri.</td>
<td>6:30am-6:00pm</td>
<td>Provided by CCAT. Check <a href="http://www.slorta.com/ccat">www.slorta.com/ccat</a> for schedule.</td>
</tr>
<tr>
<td>CCAT Route 12</td>
<td>Sat.</td>
<td>7:00am-7:00pm</td>
<td>Provided by CCAT. Check <a href="http://www.slorta.com/ccat">www.slorta.com/ccat</a> for schedule.</td>
</tr>
</tbody>
</table>
### Table 7.2 Proposed Transit Affecting Cal Poly 2020

<table>
<thead>
<tr>
<th>Name</th>
<th>Days Operational</th>
<th>Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 1a</td>
<td>Mon.-Sun.</td>
<td>8:00am-7:00pm</td>
<td>Campus to Downtown connection. 15 min. intervals.</td>
</tr>
<tr>
<td>Route 4/5</td>
<td>Mon.-Sun.</td>
<td>7:00am-7:00pm</td>
<td>City loop routes. 15 min. intervals.</td>
</tr>
<tr>
<td>Route 6a</td>
<td>Mon.-Sat.</td>
<td>7:30am-8:30pm</td>
<td>Cal Poly circulator route serving campus and the NW neighborhoods. Counter-clockwise. 15 min. intervals.</td>
</tr>
<tr>
<td>Route 6b</td>
<td>Mon.-Sat.</td>
<td>7:30am-8:30pm</td>
<td>Cal Poly circulator route serving campus, Grand Ave., and Downtown. 15 min. intervals.</td>
</tr>
<tr>
<td>Route 6c</td>
<td>Mon.-Sat.</td>
<td>7:30am-8:30pm</td>
<td>Cal Poly circulator route serving campus and the northwest neighborhoods. Clockwise.15 min. intervals.</td>
</tr>
<tr>
<td>Route 6d Shuttle</td>
<td>Mon.-Sun.</td>
<td>8:00am-7:00pm</td>
<td>Shuttle route serving SHN, Campus Market, and Foothill area.15 min. intervals.</td>
</tr>
<tr>
<td>Route 6e Shuttle</td>
<td>Mon.-Sun.</td>
<td>8:00am-7:00pm</td>
<td>Shuttle route serving SHN, Admin. and Grand Ave. area. 15 min. intervals.</td>
</tr>
<tr>
<td>Lunchtime Express</td>
<td>Mon.-Fri.</td>
<td>11:00am-2:00pm</td>
<td>Provided by RideOn. Free service to SLO restaurants. 2 or more people needed.</td>
</tr>
<tr>
<td>Guaranteed Ride Home</td>
<td>Mon.-Sun.</td>
<td>24 hours</td>
<td>Provided by RideOn. Must be member of Regional Rideshare or registered with Cal Poly Commuter Services.</td>
</tr>
<tr>
<td>Safe Ride Home</td>
<td>Thur.-Sat.</td>
<td>9:00pm-3:00am</td>
<td>Provided by RideOn. Serves Cal Poly and Downtown for a small fee.</td>
</tr>
<tr>
<td>University Escort Van</td>
<td>Sun.-Thur.</td>
<td>8:00pm-12:00am</td>
<td>Active Fall, Winter, and Spring Quarters. Several locations on campus. Up to 1/2 mile off campus.</td>
</tr>
<tr>
<td>DRC Tram</td>
<td>Mon.-Fri.</td>
<td>7:45am-5:00pm</td>
<td>Picks up/drops off and designated stops. Scheduled or on-call service.</td>
</tr>
<tr>
<td>Cal Poly Flyer</td>
<td>Mon.-Fri</td>
<td>24 hours</td>
<td>Flexible bus &quot;taxi&quot; for reserved or on-call trips for educational purposes around SLO.</td>
</tr>
<tr>
<td>CCAT Routes</td>
<td>Mon.-Sun.</td>
<td>7:00am-8:00pm</td>
<td>Several routes accessing Cal Poly at regular intervals</td>
</tr>
</tbody>
</table>

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7.2.13 Policy T 8: Expand Financing Options for Transit

Free SLO Transit ridership for students, staff, and faculty is provided through Cal Poly funding, which is obtained in parking revenue. With the reduction of parking and the proposed increases in transit, supplementary sources of funding are likely to be needed if the services are to remain free. One option available is to initiate a small, yearly student fee to help provide transit funding. The yearly fee can also provide students with emergency ride home and taxi services if needed, on a limited basis. Plans like these have been proposed and passed, with excellent results, at several universities, including UC Santa Cruz and UC Davis, as seen in Chapter 8. Higher parking fees could also be used for Transit.

Concerning SLO Transit, Cal Poly should acquire better negotiated services based on more influence (financial, political, etc.).

7.2.14 Policy T 9: Plan and Implement Preferential Treatment for Transit

Preferential treatment for transit has been shown to decrease route times and effectively keep schedules exact. Implementing preferential treatment for SLO Transit would assist in maintaining the proposed 30-minute route times for every Cal Poly-accessing route. By programming traffic lights at key intersections to recognize buses and altering the signal appropriately, buses are allowed to pass before the light changes. While enacting this type of treatment would take a major effort, the beneficial results would be immediate.

7.2.15 Policy T 10: Expand Cal Poly’s Existing Transportation Unit

The Transportation Services Unit of Cal Poly should have more university-owned buses that can provide on-call trips or service by reservation similar to the Disability Resource Center (DRS) tram system. Tentatively dubbed the “Cal Poly Flyer,” these buses could be used by professors to bring students to outlying areas, for example. This transportation unit could also operate a taxi-service using electric or other environmentally-friendly vehicles, 24 hours a day. The Campus Commuter Access Coordinator could integrate this service into her efforts. A “Commute Club” like that of Stanford University could be established, allowing people to use a taxi service at a free or reduced rate, combined with many other services, such as regionally guaranteed ride home at any time.

7.3 Rationale

The walk-time maps of Appendix 7.8 and Appendix 7.9 justify the locations of the proposed bus stops. Appendix 7.8 shows the three main stops: the Transportation Center, Administration Bldg., and California Blvd. Circles illustrating five-minute walking zones show that the locations of these major transit stops are easily accessible and cover the whole campus. As a comparison, Appendix 7.9 shows the same transit stops, but circled with ten-minute walking zones.

Buses use much less space per person than cars. For example, the Transportation Center would require approximately 30,000 square feet of ground space. The 7,000 parking spaces at Cal Poly use approximately 2,100,000 square feet. By implementing a system of ratios, it can be seen that the space needed for bus parking as opposed to car parking is 1/99. However, the ratio of persons transported by bus over car for Cal Poly is 14/86. Chapter 12 of this report shows several excellent transportation centers at other university campuses, including UCLA.

Transit is relatively reliable and efficient; the implementation of the above policies and guidelines will make it more so. Surveys have shown that a large majority of Cal Poly students live within easy transit access to Cal Poly. Circulator routes at frequent intervals eliminate the need for these students to drive to campus, saving parking and vehicle trips. Students, staff, and faculty living further away still have some direct routes or can transfer at the Downtown Transit Center to a circulator route, lessening parking even further. With the proposed changes, SLO Transit should be able to recapture sizeable numbers of students.

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7.4 Plan Components

The route maps can be described as follows:

7.4.1 2004 SRTP: Exhibit 7.2

- As per the SRTP, Routes 1, 2, and 3 are rerouted and Cal Poly access is eliminated.
- Circulator Routes 6a and 6b are established, servicing Cal Poly and the vicinity. Route 6a travels counterclockwise and serves those living in the Highland Dr./Foothill Rd. area. Route 6b travels clockwise and serves those living between the City’s Downtown and the Mill St/Grand Ave. area.
- Routes 4 and 5 now operate on 30-minute intervals.

7. 4.2 2006: Exhibit 7.3

- Addition of Route 1a, serving the north end of campus. Proposed as a major route connecting the campus with the Downtown, via the newly extended California Blvd.
- Addition of Route 6c, serving the neighborhoods northwest of campus. Route 6c is simply Route 6a, but in a clockwise direction, allowing for quicker campus access.
- Addition of Route 6d Shuttle, serving Student Housing North (completed in 2006) and the Foothill Blvd. area. This new route provides access to the new student housing development, as well as campus and the surrounding neighborhoods.
- Addition of Route 6e Shuttle, serving Student Housing North and the Administration Bldg., as well as the Grand Ave./Mill St. area. Proposed to be an additional route for the south end of campus, 6e travels down Grand Ave. and reverses direction in the area of the Veteran’s Hall.
- Approximately 180 buses should be servicing Cal Poly with intervals of 30 minutes.

7.4.3 2009: Exhibit 7.4

- No new routes proposed.
- Following the shift of the instructional core, the temporary transit center is established on North Perimeter Rd. and Via Carta to better serve riders.
- Routes shift following the campus core northward.
- South Perimeter Rd., west of Grand Avenue is expected to become a pedestrian/bicycle boulevard. Thus only shuttle routes will have access. These can be diverted if the boulevard is in use for a special event.
- Approximately 180 buses should be servicing Cal Poly with intervals of 30 minutes.

7.4.4 2020: Exhibit 7.5

- No new routes proposed.
- Establishment of the permanent Transportation Center in the northern portion of campus.
- Cal Poly’s transit system should become fully operational, effectively shuttling thousands of students and employees daily.
- Approximately 360 buses should be servicing campus daily, mostly with intervals of 15 minutes.

Note that the planned 17-acre Cal Poly Research Park north of Stenner Creek Road near the new Poultry Unit is not included in the routing plans. This project, by the California Central Coast Research Partnership, is still in an initial phase. A shuttle bus connection 6f to the site should be considered as plans for the Research Park progress.
EXHIBIT 7.1

SRTP CAL POLY ROUTES AND STUDENT NEIGHBORHOODS - JANUARY 2004

Large Numbers:
Approximate number of students living in each area

Routes serving the southern area will require a transfer at City Hall

and SRTP (Short Range Transit Plan), City of San Luis Obispo, Summer 2003
81

EXHIBIT 7.2

TRANSIT ROUTE MAP - 2004

Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
30 minutes intervals
Approx. 182 buses daily

Routes Serving Cal Poly:
~ Route 4 - Alignment: Downtown, South St., Madonna Rd., Los Osos Valley Rd., UU, Downtown
~ Route 5 - Alignment: Downtown, UU, Los Osos Valley Rd., Madonna Rd., South St., Downtown
~ Route 6a - Alignment: UU, Highland Dr., Ramona Rd., Foothill Rd., California Blvd., UU
~ Route 6b - Alignment: UU, Grand Ave., Mill St., Downtown, Mill St., California Blvd., UU
~ Route 6c (NEW) - Proposed Alignment: Reversed 6a
~ Route 6d Elec. Shuttle (NEW) - Proposed Alignment: SHN, Campus Market, California Blvd., Foothill Rd., California Blvd., Campus Market, SHN
~ Route 6e Elec. Shuttle (NEW) - Proposed Alignment: SHN, Campus Market, Grand Ave., Mill St., Grand Ave., Campus Market, SHN
~ Route 1a (NEW) - Proposed Alignment: Campus Market, California Blvd., Mill St., Downtown, Mill St., Highland Dr., Campus Market
EXHIBIT 7.4
TRANSIT ROUTE MAP – 2009

30 minutes intervals
Approx. 182 buses daily

Routes Serving Cal Poly:
~ Route 4 - Alignment: Downtown, South St., Madonna Rd., Los Osos Valley Rd., UU, Downtown
~ Route 5 - Alignment: Downtown, UU, Los Osos Valley Rd., Madonna Rd., South St., Downtown
~ Route 6a - Alignment: UU, Highland Dr., Ramona Rd., Foothill Rd., California Blvd., UU
~ Route 6b - Alignment: UU, Grand Ave., Mill St., Downtown, Mill St., California Blvd., UU
~ Route 6c - Proposed Alignment: Reversed 6a
~ Route 6d Elec. Shuttle - Proposed Alignment: SHN, Campus Market, California Blvd., Foothill Rd., California Blvd., Campus Market, SHN
~ Route 6e Elec. Shuttle - Proposed Alignment: SHN, Campus Market, Grand Ave., Mill St., Grand Ave., Campus Market, SHN
~ Route 1a - Proposed Alignment: Campus Market, California Blvd., Mill St., Downtown, Mill St., Highland Dr., Campus Market
EXHIBIT 7.5
TRANSIT ROUTE MAP – 2020

15 minutes intervals
Approx. 350 buses daily

Routes Serving Cal Poly:
~ Route 4 - Alignment: Downtown, South St., Madonna Rd., Los Osos Valley Rd., UU, Downtown
~ Route 5 - Alignment: Downtown, UU, Los Osos Valley Rd., Madonna Rd., South St., Downtown
~ Route 6a - Alignment: UU, Highland Dr., Ramona Rd., Foothill Rd., California Blvd., UU
~ Route 6b - Alignment: UU, Grand Ave., Mill St., Downtown, Mill St., California Blvd., UU
~ Route 6c - Proposed Alignment: Reversed 6a
~ Route 6d Elec. Shuttle - Proposed Alignment: SHN, Campus Market, California Blvd., Foothill Rd., California Blvd., Campus Market, SHN
~ Route 6e Elec. Shuttle - Proposed Alignment: SHN, Campus Market, Grand Ave., Mill St., Grand Ave., Campus Market, SHN
~ Route 1a - Proposed Alignment: Campus Market, California Blvd., Mill St., Downtown, Mill St., Highland Dr., Campus Market

For a possible shuttle route 6f, see text 7.4.4.
8. PARKING, INTELLIGENT TRANSPORTATION SYSTEMS, AND TRANSPORTATION DEMAND MANAGEMENT

8.1 Parking

8.1.1 Main Point in Master Plan

Parking is a major land use at Cal Poly. Easily visible in the modal split table of Chapter 2, 60 percent of the students and employees commute to campus via automobile. The Master Plan says on page 73 “…the Master Plan must designate some land for surface lots and proposed parking structures to replace parking areas identified for other uses and projected parking needs.” Page 74 reads: “The Master Plan accommodates parking by adding some additional capacity, but also by reducing the demand through policy alternatives.” Therefore, the Master Plan assumes that more physical parking is inevitable, even if strong and creative TDM measures are implemented.

8.1.2 Proposal

The need for more parking can be questioned, given the many comparisons with other universities done in the years 2000, 2002, and 2003 at Cal Poly. Appendix 8.1 shows that, for example, CSU Chico and UC Davis are considerably less car-oriented than Cal Poly.53 UW at Seattle claims that they have reduced vehicular traffic over more than 10 years, despite considerable growth of the university.54 Stanford makes the same claim. Stanford is under a mandate by Santa Clara County to observe an absolute cap of parking spaces and a cap on vehicular trip generation. They do this successfully through an exemplary TDM program. Considerable research about parking and other topics is documented in Chapter 12 under “Other Campuses” and in the TAB.

8.1.2.1 Policy P 1: Estimate Minimum and Maximum Parking Needs

The Master Plan projects the parking demand to be 6,694 spaces in the year 2020.55 As mentioned under 2.1.4.2 “Relative Accuracy of Forecasts,” the number of future parking spaces could be between 4,000 and 7,000, depending on societal influences, outside factors such as the economy, and policies of Cal Poly management. Given today’s relatively liberal parking policy, there appears to be big potential for even a reduction of the existing 6,611 spaces. In the best case, no additional parking garage, or only a very small one, would be needed at all 56. This is explained under Chapter 8.3 Transportation Demand Management. Parking planning can only be done within the framework of overall access by all mobility modes.

The case of the proverbial student who lives a quarter of a mile away from campus and drives to Cal Poly’s Recreation Center in order to exercise should be explored further. Evidently, there is a potential for reduction. Before Parking Structure 1 Cal Poly was absolutely able to live with less parking than today. At that time the use of environmentally friendly modes of travel was simply higher than today, also because SLO Transit offered much better service at this time. Although no statistics are available, it appears that the number of complaints about inadequate parking is the same today as it was before Parking Structure 1.

Cal Poly parking policy must be to satisfy real needs and not perceived ones. A convincing parking policy must be based on thorough demand studies and market research. A detailed, time-dependent

53 See also working paper 12, discussed at committee meeting number six
54 See also Appendix 8.7 under TDM
55 Master Plan page 193
56 Based on a Senior Project by CE student Travis Hurt. Cal Poly Parking: Demand Management and Location, December 2003.
parking allocation model for each building complex should be developed by Cal Poly planners, as this could not be done in the present report. However, preliminary calculations were made by E. Jud.

8.1.2.2 Guideline P 1: Minimize Vehicular Trip Generation Via Creative TDM

Parking is not inherently evil, but a minimum of it is needed. It is the vehicle trips that are the problem, especially when an excessive amount of students drive through neighborhoods and city streets. In this case, Cal Poly is probably not the good neighbor to the City that it hopes to be. Therefore, in cases where parking cannot be reduced, at least the related trip generation can, as other universities prove.

8.1.2.3 Guideline P 2: Prioritize Parking Categories

The priority rating today appears to be: guests, faculty and staff, students, however, this rating should be discussed under the soon to start “Mobility Study” dealing with access, parking, and alternative transportation.

Before Student Housing North is built, there should be one uniform policy for residential parking all over the campus.

8.1.2.4 Guideline P 3: Charge “Market Prices”

Parking is heavily subsidized. Fees for parking structures, for example, rarely cover its cost. At least for new residential parking structures, “market prices” should be charged. Even if the value of the land is excluded, just including construction costs and maintenance costs of a parking space would probably lead to a fee of over $400 per quarter for a residential parking space in a garage. Such a fee might reduce the residential parking demand in half of what it is today, given today’s low parking permit prices of $60 per quarter.

Parking should be an enterprise fund, honestly calculating “true costs in transportation.” The current system of financing and operating infrastructure is unfortunate and should be changed on the state level. It prevents the minimizing of life-cycle costs that is normally done in private industry. With state projects, the building is financed by the legislature, the operation is financed by the Governor through general funds, and the two are legally unrelated. This normally leads, among others, to more construction of garages and less funds for TDM, although more funds for TDM would save high construction costs with a very high cost-benefit ratio. This is explained later under TDM.

8.1.2.5 Guideline P 4: Build Where Needed First

Building where needed follows Policy GF 5: “Practice Deferred Infrastructure”. Analysis indicates that Parking Structure 3 north of Brizzolara Creek, if needed at all, should be built first. See Section 8.1.4 Plan Components below.

8.1.2.6 Guideline P 5: Reevaluate Remote Parking

The Master Plan shows on page 76 a remote parking option along Stenner Creek road near the New Poultry Unit and the planned Cal Poly Research Park. This remote parking might be moved closer to Highway 1, where regional buses could stop. This would provide a connection to the Campus, although a relatively infrequent and convoluted one. In due time, there should be a direct shuttle bus route 6P serving this area.

In the short and intermediate term a remote parking of approximately 300 spaces should be considered in the area of the Old Poultry Unit - Foundation Warehouse – old baseball field, along Mount Bishop Road. This location might be served on demand by the Highland Circulator buses. It is also in walking distance from the campus instructional core, namely only a quarter of a mile away.
This would provide cheaper parking than in garages to students who only use their cars occasionally, mostly resident students. This option should be studied without delay.57

8.1.3 Rationale

8.1.3.1 Costs
Construction of a garage, including finance costs, is approximately $20,000 per space. The yearly operating cost minus income from parking fees is around $200 per space. Assuming a possible reduction of 1,200 planned parking spaces, the following calculation can be made:

Table 8.1: Parking Spaces in a Garage, Capital and Operations Costs

<table>
<thead>
<tr>
<th>ITEM</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,200 P * $ 20,000</td>
<td>24,000,000</td>
</tr>
<tr>
<td>At annual interest of 5 %</td>
<td></td>
</tr>
<tr>
<td>Operations costs: 1,200 P * $ 200</td>
<td>240,000</td>
</tr>
<tr>
<td>TOTAL ANNUAL SAVING</td>
<td>1,440,000</td>
</tr>
</tbody>
</table>

For this yearly saving of approximately 1.5 million dollars, the University could perform very effective TDM similar to Stanford. Among other options, Cal Poly could run several additional circulator and shuttle bus routes. Note that today Cal Poly pays SLO Transit $250,000 a year to make the bus free for students, faculty and staff.

8.1.3.2 Budget Crisis
As mentioned under 2.1.3, low cost solutions are urgently needed as a result of the budget crisis.

8.1.3.3 Energy and Air Pollution
As mentioned under 2.1.3, energy and air pollution are real concerns. It is interesting to note that the Central Coast Clean Cities Coalition (C-5) hopes to earn the U.S. Department of Energy’s Clean City Designation for the Central Coast by next year. This would bring additional money into the County. The Air Pollution Control District is part of the coalition and emphasizes less polluting vehicles and traffic reduction. Cal Poly could play a significant role in obtaining the Clean Air Designation through a balanced parking policy.

8.1.3.4 Beauty of the Campus
The Cal Poly Campus was recently named one of the most beautiful campuses in the USA.58 It is imperative to maintain this status and to minimize the surface dedicated to parking lots, garages and roads.

8.1.4 Plan Components
Independent from the actual size of the parking garages, Exhibits 8.1 to 8.3 indicate that Parking Structure 3 (PS 3) might be the next project, if really needed. The comments below are only first evaluation tools, and not final conclusions.

8.1.4.1 Walking Distances and Covered Area
Exhibit 8.1 illustrates the five-minute walking distances from possible garage locations. It is clear that this arrangement does not serve the center of campus and that the postulated ten-minute walking distance makes sense. Exhibit 8.2 shows these 10-minute walking distances, which would provide redundant coverage to the whole campus if all garages were built. Exhibit 8.3 presents the sole...

57 This might also lessen the parking demand in the planned SHN and the very high costs of the planned parking there.
combination where only two garages, PS 1 and PS 3, cover the whole campus core. From this point of view, PS 2 at the California Street entrance and PS 4, the planned southern garage of SHN, would be unnecessary.

8.1.4.2 Zones of Influence for Parking Garages

Appendix 8.2 measures the “relative parking hardship” in the zones of PS 1, PS 2 and PS 3 and draws some conclusions for the future.

The map shows the zones of influence as follows:

1 Existing Parking Structure PS 1
2 Existing Parking Lots C1/C3 (possible future PS 2)
3 Existing Parking Lot H2 (possible future PS 3).

A five-minute walk time was assumed for each of the above existing parking lots to the edge of the respective zone.

The rest of the appendix shows the following calculations:

First, the “capacity”, the number of persons allowed in classrooms and offices, of each zone was computed.59

Second, the existing parking spaces in each zone were calculated. Resident parking spaces were excluded. Not directly connected to the analysis are numbers in brackets, which show how many spaces will be eliminated in the future due to new buildings including garages, and greenery. Approximately 2,000 spaces will be eliminated.

Third, today’s available parking spaces per person were derived. The results are:

- Zone 2 around the California Boulevard entrance has a very comfortable ratio of one space per person.
- Zone 1 around the existing parking structure has one parking space per 2.5 persons.
- Zone 3 around the Library has one space per 4 persons and is under the biggest “hardship.”

Although several assumptions had to be made for this calculation, it nevertheless appears that Zone 3 deserves to have more parking first. Therefore, PS 3 should be constructed earlier than any other garage. The fact that most of Lot H2 near the library will be eliminated and that many new classrooms are going up quickly in this area emphasizes the priority of PS 3.

8.1.4.3 Optimal Access Route

Parking structures attract high traffic volumes and should therefore be situated along access routes that have minimal conflicts with pedestrians and neighborhoods. Therefore, PS 3 with main access from Highland is superior to PS 2 with full access from California Blvd. As shown in Chapter 4, California Blvd. has heavy conflicts with pedestrians, especially at Mustang Village, and should not be overloaded with traffic. This is also explained in Exhibits 2.2 to 2.5, and more clearly in Exhibit 2.3, in connection with the three parking garages on the lower diagram.

8.1.4.4 Intrusion into Surroundings

The location of PS 3 appears to be less delicate than the location of PS 2, an area full of cultural heritage and buildings potentially under historical protection. The Southwest Charette in Summer 2003 made this very clear.

59 This was done by sorting the “Space and Facilities” databank of www.facilities.calpoly.edu/Facilities_Planning

Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
EXHIBIT 8.1

FIVE MINUTE WALKING DISTANCES FROM PARKING STRUCTURES
Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
EXHIBIT 8.3

10 MINUTE WALKING DISTANCES FROM PARKING STRUCTURE 1 & 3

10 Minute walk for Parking Garages
PS1 & PS3 cover the whole campus

Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them
8.2 Intelligent Transportation Systems (ITS) and Other Technology

Some aspects of this topic are connected to parking.

8.2.1 Main Points in Master Plan

Even though the Master Plan does not convey much about ITS, it indirectly recognizes its uses on page 177 with regard to the public transit system. The Master Plan says that Cal Poly’s transit access should be enhanced with “state-of-the-art technologies to add to the convenience and efficiency of transit use”.

Additional comments are made on page 189 about energy technology: Cal Poly should “collaborate with SLOCOG and public transportation providers in exploring alternative technologies, including vehicles not dependent on fossil fuels, ‘real time’ arrival/departure information, etc.”

8.2.2 Proposal

8.2.2.1 Policy ITS 1: Develop ITS on Campus and Outside

Development of ITS on- and off-campus has been encouraging: support of SLO Transit with the online arrival time displays at bus stops and traffic management outside and on campus (Jeff Gerfen, ARDFA), “Future Truck” and “Solar Car” groups at Cal Poly, and outside contacts, including one with Lockheed Martin concerning Maglev technology and applications (CENG Deputy Dean Dan Walsh, Professor Ed Sullivan, E. Jud). For the image of Cal Poly, it is important to show that ITS and sustainability are not enemies but support each other in most cases.

8.2.2.2 Guideline ITS 1: Make Campus a Test Bed for ITS

Possible fields are:

- Transit
- Parking Guidance Systems later combined with a city system. An example exists in Minneapolis around the downtown and on the campus.
- Parking fee collection systems with real or virtual barriers, and/or touchless cards to enter garages and lots.
- High-tech traffic security and management for parking pricing and road pricing as currently operating in downtown London.

8.2.3 Rationale

8.2.3.1 Leadership in ITS

Leadership in ITS can bring money, prestige, and educational opportunities to Cal Poly, especially if combined with industry.

8.2.3.2 Smart Transit Systems

Using more ITS for transit systems will benefit users as well as transit managers. ITS will allow people to easily access current transit data, such as bus arrival times and route information. The information will be accessible through the Internet, cell phones, or hand-held digital organizers. A web page can display maps with moving bus icons to inform people of the exact location of their bus at all times. Also, smart transit signs already show people in San Luis Obispo estimated bus arrival times.
Several places in the State of Washington are using such high-tech systems for their transit operations, including:

- King County, including a countdown system (Metro ITS Project\(^60\))
- University of Washington, Seattle (“Smart Trek”\(^61\))
- City of Seattle, and
- City of Bellevue.

A transit database would collect information from buses during their route. Transit managers can use this information to calculate schedule adherence and the operational efficiency of the bus.

### 8.2.3.3 Parking Guidance System

A Parking Guidance System at Cal Poly would:

- Increase parking efficiency
- Decrease travel time
- Improve air quality due to decreased emissions
- Reduce the number of vehicles roaming around for a parking space
- Alleviate parking frustration
- Display information about special events, and
- Improve traffic flow entering/leaving parking structure/lot
- Save gasoline.\(^62\)

### 8.2.3.4 Advanced Parking Fee Collection System

An advanced parking fee collection system gives better control, may use less personnel, and brings in money.

### 8.2.3.5 Campus Security and Traffic Management with Possible Road Pricing

One of the most important reasons for having cordon barriers is campus security. Image processing technology would identify vehicles by their license plate. Cal Poly could keep a computer record of vehicles (license plate number and vehicle image) entering or leaving the cordon at all times. It would also give them the ability to grant or deny access to certain areas.

Virtual cordon “barriers” are successfully used in some gated communities and in downtown London.

### 8.2.4 Plan Components

#### 8.2.4.1 Advanced Transit Systems

These are comprised of:

- Real time arrival/departure time information
- Use of Global Positioning Systems (GPS) and Geographic Information Systems (GIS)
- On-board annunciation and signage (ADA dictates announcement of arrival/departure)
- Information via telephone/internet


\(^62\) It was estimated by E. Jud, that due to less idling $100,000 of gasoline costs could be saved per year. This would be an ideal demonstration project for Cal Poly, perhaps even funded by the Environmental Protection Agency (EPA). See [http://es.epa.gov/ncer/P3/](http://es.epa.gov/ncer/P3/), Student Design Competition for Sustainability.
8.2.4.2 Parking Guidance System

A group of Cal Poly students\textsuperscript{63} did a study on a Parking Guidance System (PGS) for Cal Poly. The PGS would use electronic signs placed at strategic locations to inform drivers of the occupancy status of parking lots and structures. This information would guide drivers to the closest available parking structure or lot and then to the empty space.

As illustrated in Appendix 8.3, the PGS would consist of:

- Three main parking advisory signs, one at each primary campus entrance, that display real time information about parking. Appendix 8.4 shows one type of display panel.
- Several "space availability" signs located at the entrances of each parking structure and major parking lots which will display occupancy information.
- Parking structures with illuminated arrows that direct drivers to the nearest open parking space.

8.2.4.3 Real or Virtual Cordon Barriers – 2020+

These barriers would be installed at all campus entrances for the purpose of security, traffic management and parking guidance. Camera surveillance and vehicle identification devices would keep a record of who is inside the campus at all times.

Appendix 8.5 shows four different cordons with barriers:

- a) Cordon outside campus core: four checkpoints (not all manned)
- b1) Cordon outside instructional core, before parking garages: three checkpoints (not all manned)
- b2) Cordon outside instructional core, after parking garages: four checkpoints needed
- b3) Cordon outside instructional core, partially before and after parking garages: three or four checkpoints.

Scenario “b3” is the most probable alternative.\textsuperscript{64}

8.2.4.4 Alternative Technologies

Improve contacts and coordinate with campus and outside sources about:

- Hybrid vehicles (including buses)
- Solar powered vehicles
- Fuel Cell vehicles, etc.

\textsuperscript{63} CE 423 “Intelligent Transportation Systems” course taught by Jeff Gerfen in Winter 2003. Group work done by: Travis Hurt, Karthikeyan Dhandapani, Jon Viscay, Bill Cribbs, Thomas Razo, and Esmeralda Aranda.

\textsuperscript{64} See minutes meeting 1, WP 3
8.3 Transportation Demand Management (TDM)

This topic is also related to parking.

8.3.1 Main Point in Master Plan

On page 189, the Master Plan lists ten TDM measures that should be looked at in more detail:

- Vanpools
- Carpools
- On-campus Transit
- Integrated Transit Plan
- Energy Technology
- Bike/Pedestrian Enhancement
- Faculty/Staff Incentives
- Entertainment and Other Services
- Subsidy, and
- Parking Fees.

The issue regarding parking is described further on page 195 of the MP. It says, “a campus access and parking management plan will be developed to implement the Master Plan.” This work still needs to be done, but the present report did some groundwork for it. The following should be considered:

- Freshman parking restrictions
- Geographic controls.

The EIR of the Master Plan describes circulation and parking issues that would benefit from TDM. Page 447 of the MP EIR (web version) states “parking demand ratios would decrease from current levels based on the proposed revisions to the campus layout, TDM plans, and parking restrictions.” Page 454 of the EIR shows a table of potential trip reductions resulting from implementing TDM policies, such as:

- On-campus parking restrictions for freshman (e.g. limiting permits)
- Commuter control measures
- Implementation of a campus transit/shuttle service, and
- Promoting of carpooling, vanpooling, bicycling, and telecommuting.

Page 454 asserts that, “a combination of TDM measures would be implemented to decrease the number of trips generated by commuting students and faculty/staff members. Implementation of these measures would likely generate a demand for a local shuttle/bus transit service to transport those students to key campus areas during peak times. In addition to parking restrictions, enhanced bicycle facilities and an improved on-campus commercial environment and community atmosphere, as well as telecommuting incentives, would reduce trips to and from the campus.”

8.3.2 Proposal

Implementation of some of the above has started. In the meantime, the following is proposed:

8.3.2.1 Policy TDM 1: Provide High Level of Support for TDM

TDM deals mostly with non-motorized modes of mobility and is managed by University Police. TDM urgently needs strong, visible support from Cal Poly management, which also means additional personnel and financing. The benefit-cost ratio of these activities is very positive, as a small financial
input saves many expensive parking spaces. It could be an enlightening experience for Cal Poly management and professors to try to live without a car for one week, as a very high percentage of students do not own cars. This has been done at other universities with very positive consequences.

8.3.2.2 Guideline TDM 1: Hire an Additional Person to Assist the Cal Poly Commuter Access Coordinator

This person could work half time as a bicycle coordinator and half time for other issues. In the long term, the campus Commuter Access Coordinator office should be located in the Transportation Center.

8.3.2.3 Guideline TDM 2: Establish a Campus Group for Non-Motorized Transport

This group would bring in “grass root” proposals, do educational work, and coordinate with other groups such as the SLO County Bike Coalition and city committees for bicycle and mass transit.

8.3.2.4 Guideline TDM 3: Put the Right Students into the Right Building/Residence

This is a planning issue that influences vehicular trip generation. It is preferable to have a high level of younger students on the campus because parking reductions affect them less than older students. TDM will appeal more to them than to older students. This policy should also apply to SHN.

8.3.2.5 Guideline TDM 4: Apply an Appropriate Array of Creative TDM Measures

Many good ideas can be imported from other campuses, and intense contacts with these model campuses should be fostered. Some of them have already been mentioned or are listed in Chapter 12 under “Other Campuses”. The three-legged stool below shows the main TDM components and the preferred measures are listed under 8.3.4 Plan Components.
8.3.3 Rationale

8.3.3.1 Benefit/Cost Ratio of TDM

A. Costs

TDM costs approximately $50 to $250 per year for each person, based on 49 TDM programs all over the U.S.\(^65\)

B. Benefits

At Stanford, every commuter shifted out of his/her car saves $2,000 per year. According to the following breakdown:

- $450 per year for maintenance and operation
- $1,550 for finance, policing, and general administration

C. Ratio: Point “B” divided by point “A” gives a benefit/cost ratio between 40 and 8, which is very good.

8.3.3.2 Geographic Controls

Utilizing geographic controls would not allow students to buy a permit if they live within a mile of campus. Exceptions are made for special circumstances.

The table below shows the current number of students with parking permits who live within a mile from Cal Poly.

Table 8.2: Students With Parking Permits Living Close To Campus\(^66\)

<table>
<thead>
<tr>
<th>MILES FROM CAMPUS</th>
<th>STUDENTS WITH PERMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – ¼</td>
<td>130</td>
</tr>
<tr>
<td>¼ - ½</td>
<td>428</td>
</tr>
<tr>
<td>½ - ¾</td>
<td>569</td>
</tr>
<tr>
<td>¾ - 1</td>
<td>353</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,480</td>
</tr>
</tbody>
</table>

There is a potential saving of up to 1,480 parking spaces if geographic controls were applied. This would be very effective, but is seen by staff as an “administrative nightmare.”

A group called Master Plan Transportation Subcommittee within the administration, under the guidance of Vicki Stover, did considerable research in the year 2002 about parking pricing policies.\(^67\) A summary of their report and their conclusion about different TDM methods can be found in Appendix 8.6. In this report staff prefers to promote carpools, bike paths, shuttles, and subsidized bus service as well as using different pricing options. The full report, including surveys that the police department performed at other universities, can be found in the TAB.

A further TDM study is needed as also mentioned in Chapter 10.5.6.

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\(^{65}\) TRB TDM Report May 1996

\(^{66}\) See Master Plan page 196, Table 5-9.

\(^{67}\) E. Jud was part of this group
8.3.3.3 Freshman Restrictions

The freshman restrictions would be very effective in reducing campus parking demand and alleviating the need for an additional parking structure. According to calculations, freshman restrictions would free up to 1,200 spaces. As noted above in Table 8.1 this would save the University $1.7 million annually. There is a big potential for TDM. The campus is moving in this direction by issuing permits to only half of the Fall 2003 resident freshman that applied for them. While not located in the same area as the H2 lot, this reduction more than compensates for the spaces that will be lost there.

8.3.3.4 Cal Poly’s Attractiveness

Cal Poly’s popularity does not depend on parking. Cal Poly is one of the most selective public universities in the nation, and only accepts 12 percent of the applicants.68 If any university in the states could afford to implement strict TDM measures, for example, to mandate freshmen and sophomores to live on campus without cars, then it would be Cal Poly, given its considerable popular appeal.

Surveys among students show that they mostly want quality and education to graduate quickly. Access to campus is not of high priority. Therefore, when it comes to the tough question of financing projects, most students would rather build classrooms than parking garages.

Worldwide, there appears to be little if not a negative correlation between parking and academic performance. If one looks at the universities that have produced most Nobel Prize winners, like Stanford, Berkeley, MIT, or the Swiss Federal Institute of Technology in Zurich, one notices that all these universities live in a permanent “parking crisis” but perform very well academically.

8.3.3.5 University of Washington, Seattle, as a Good Example

As described in Appendix 8.7, TDM strategies at the University of Washington in Seattle have reduced the number of vehicle trips to/from the university over ten years, even though the university’s population increased. It asserts that in order for the university’s efforts to be effective, private and public agencies around the university must also be dedicated to reducing traffic growth.

8.3.4 Plan Components

8.3.4.1 List of TDM Measures

In meeting six of the Master Plan Circulation Group, WP 11, the following ranking of TDM measures was accepted.

Table 8.3: List of Positive and Negative TDM Measures

<table>
<thead>
<tr>
<th>Rank</th>
<th>TDM Reached by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Better shuttle and bus services</td>
</tr>
<tr>
<td>2.</td>
<td>Improve bike paths</td>
</tr>
<tr>
<td>3.</td>
<td>Remote parking for resident students</td>
</tr>
<tr>
<td>4.</td>
<td>Car rental, car sharing</td>
</tr>
<tr>
<td>5.</td>
<td>Mobility training (e.g. Bicycle)</td>
</tr>
<tr>
<td>6.</td>
<td>Guaranteed ride home for students also (not just for faculty and staff)</td>
</tr>
<tr>
<td>7.</td>
<td>Cash out for people who do not drive to campus as done in Stanford</td>
</tr>
</tbody>
</table>

68 According to U.S. News, as mentioned in “Cal Poly Report Digest”, August 27, 2003
NEGATIVE

<table>
<thead>
<tr>
<th>Rank</th>
<th>TDM Reached by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Restrict freshman from bringing cars</td>
</tr>
<tr>
<td>2.</td>
<td>Lottery system for permit distribution</td>
</tr>
<tr>
<td>3.</td>
<td>Raise general student parking permit prices</td>
</tr>
<tr>
<td>4.</td>
<td>Parking prices reflect financing costs of the garage</td>
</tr>
<tr>
<td>5.</td>
<td>“The more you park, the more you pay”; charge by time or number of entrances/exits per day</td>
</tr>
<tr>
<td>6.</td>
<td>Different prices for different lots (location); smoothes traffic flow</td>
</tr>
<tr>
<td>7.</td>
<td>Geographic boundaries (walk-ability zones), as a last resort</td>
</tr>
</tbody>
</table>

8.3.4.2 Car Sharing

Car sharing is a short-term rental, perhaps for a few hours, and is very popular in some European countries. It is now growing fast in the United States, especially among academia.

Car sharing services should be provided as soon as possible in Student Housing North, and then be moved to the temporary Transportation Center in the northern part of the campus approximately in the year 2009. Car sharing has been successful at other universities such as MIT since Fall 2002, with its ZipCar program, described in Appendix 8.8. UC Riverside works with the IntelliShare program, while Stanford works with City CarShare program.

8.3.4.3 Car Rental Services

Traditional car rental should be located at the Transportation Center and be widely advertised on campus. Car rentals are helpful to all students, especially freshmen, who are now restricted from bringing their cars on campus. Freshmen and others should be able to rent cars, and the minimum rental age should be changed from 21 to 18, as Stanford is currently considering. 69 Cal Poly should work for a similar reduction of the age for renting a car.

Car rental is especially helpful for students who want to go home over the weekend. If a student rented a car every second weekend of the quarter this would cost him/her approximately $1,000 per year. This is still five to ten times cheaper than bringing a car to Cal Poly when all costs are accounted for.

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69 Stanford has a student “commute club” which offers to its members very advanced services, for example a 24 hour guaranteed safe ride home program within the city and up to the whole bay area. This program is based on taxis, car sharing, and conventional car rentals.

9. SPECIAL CHALLENGE: INTERSECTIONS OUTSIDE OF CAL POLY

9.1. Foothill and California Boulevard (City Jurisdiction)

A major intersection leading into the campus, California Blvd. at Foothill, facilitates entrance from one of the most highly populated student neighborhoods. While the intersection has major access by car, the large number of pedestrians and bicycle users coming from the neighborhoods are disadvantaged. Traffic counts done in Spring 2003 found 300 pedestrians, 150 bicycles, and 200 bus passengers in the evening peak hour.70 With apartment complexes like Mustang Village providing housing for large groups of students very near Cal Poly, it is only natural that many of them choose to walk or ride a bike to and from campus.

9.1.1 Main Point in the Master Plan

The Master Plan does not specifically treat this intersection with a solution. However, on page 171, it notes that this intersection and intersections north of Foothill and California “should address bicycle and pedestrian access and safety as well as provide for motor vehicles.”

9.1.2 Proposal

According to Policy GF 11, traffic should not be allowed to grow too large on California Blvd, as also illustrated by Exhibit 2.2 to Exhibit 2.4. The City would receive these recommendations for the Foothill and California Blvd. intersection favorably.71

The intersection does not efficiently facilitate its heterogeneous mixture of modal types and is in need of an update. Because of its location on City property, funding is likely to be scarce. But several options are open and can lead to the intersection providing more efficient access to and from campus for all modes of mobility. These options are discussed in a series of policies and guidelines:

9.1.2.1 Policy OUT 1: Create Balanced Intersection For All Modes

As the Regional Bike/Pedestrian Path is completed, a greater number of pedestrians and bicycles are bound to access the intersection. The location of the railroad tracks and the new trail pose a problem with street traffic. By giving preferential treatment to pedestrians, bicycles, and even bus access, the intersection will benefit.

9.1.2.2 Guideline OUT 1: Block Automobile Access to East Foothill

Blocking access to East Foothill would help create a more simple 3-way intersection. This may also encourage many students living in the area and driving to Cal Poly to walk to campus as automobile access will be less direct. The removal of this street link also reduces the impact on pedestrians, as they would have a full sidewalk east of California Blvd as a result of the closure. The neighborhood on East Foothill can still be accessed via alternate side streets.

9.1.2.3 Guideline OUT 2: Simplify Intersection Phasing

Removing the through-traffic lane simplifies the signal-light phasing. Several options have been addressed and can be seen in Appendix 9.1. Safety and the needs of the pedestrian are addressed in

70 Senior project by Lori Thompson, 2003, Civil Engineering Department
71 Several talks by E. Jud with Terry Sanville, Transportation Planner of the City of San Luis Obispo
both phasing options. The first option is comprised of three phases. The striping of pedestrian crossings helps facilitate easier pedestrian movement. The second option is a four-phase plan, with the fourth phase being a pedestrian “scramble phase”. This last phase provides red lights for every approach street, allowing pedestrians to cross, even diagonally, through the intersection. A great example of such is Colorado Blvd. in Pasadena, CA. The inclusion of bike pockets, providing a safe zone for bicyclists in front of stopped traffic, is another excellent idea and should be implemented.72 As mentioned in Chapter 7, preferential treatment for buses should be implemented to give the bus a pre-green phase, longer green phase, or other special treatment.

9.1.2.4 Guideline OUT 3: Provide Better Integration For All Modes

The phasing of improvements is dependent on the availability of finances. Several options are possible, from the fairly tame to the extravagant.73 Each provides different ways for easier access of all modes. The main steps of improvement could be:

- Blocking Foothill East
- Improvements in the phasing of intersection traffic lights as described above
- Building an underpass for the Regional Bike Path parallel to the railroad. A median of sorts, allowing sunlight to shine into the underpass could be worked in easily (see Appendix 9.2). While this option successfully balances the automobile with pedestrians and bicycles, it only does so for one side of the road, and the problem with the railroad tracks is still present.
- A more elaborate solution would be a sunken intersection. All vehicular traffic would decline to an underground T-intersection or roundabout, leaving the above ground free for the railroad and a pedestrian and bicycle paradise. This solution would be very costly. An even more expensive solution could take the crossing of pedestrians and bicycles under the railway as well, but it does not seem to be realistic at this point in time.

9.2 Grand Avenue and Slack Street (City Jurisdiction)

9.2.1 Main Point in Master Plan

Nothing is said regarding this intersection design in the Master Plan.

9.2.2 Proposal

Guideline OUT 4: Implement Traffic Light and Bus Lane

A traffic signal is proposed as this intersection at a later stage. The blocking off of Slack St. East would simplify the phasing. Preferential treatment can be given to the bus approaching Cal Poly by painting in a bus lane on Grand Ave. in the northern direction. No curb line changes would be needed.

9.3 Highway 1 and Highland Drive (Caltrans Jurisdiction)

9.3.1 Main Point in Master Plan

Nothing is said regarding the intersection design in the Master Plan.

9.3.2 Proposal

Guideline OUT 5: Improve Traffic Light With Preferential Treatment for Buses

As mentioned under Chapter 2.2.3 Caltrans is working on this design. Main improvements appear to be dual left-turn lanes according to the SHNEIR.

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72 This has been suggested by several well-known bicycle organizations
73 Sketches of many options can be seen at Professor Eugene Jud’s office, Civil Engineering Department
10. IMPLEMENTATION

10.1 Main Point in Master Plan

Beginning on page 345, the Master Plan describes some activities needed before implementation can take place, including: detailed plans, development of design guidelines/standards, focused studies, and phasing strategies.

Phasing strategies, as explained on page 347, list essential phasing characteristics, such as: relocating facilities, budget, parking/alternative transportation programs, and subsequent phasing per main phase.

10.2 Proposal

10.2.1 Policy IMP 1: Be Aware of Public Opinion and Conduct Public Education

The proposed emphasis on non-motorized transportation and an emphasis on measures such as traffic calming may be well known by the public on some campuses and cities. However, on the west coast of the United States, the public needs information. Students and faculty should also be heavily involved in implementing the above measures.

It could be a highly educational experience to do some mobility trials and to judge them as a campus community. This would avoid “driver’s revolt,” which can happen if the public does not understand the objectives of certain measures.

In regard to public opinion, monitoring success is important. This can be done by periodically performing automatic traffic counts, among others. For this purpose, Facilities Planning should contact CE Department technician, Doug Allen. He can assist in laying traffic loop detectors under Cal Poly streets and periodically monitor them with automatic traffic counters available to the CE department. This would also provide Civil Engineering students with valuable exercises in the field, on campus.

10.2.2 Main Proposal

Three main phases are proposed for several key physical elements. Exhibit 10.1 shows a simple illustration of the road phases for years 2006, 2009, and 2020. Proposals include:

First Main Phase Year 2006:
- Major vehicular traffic will no longer travel on North Perimeter between California Blvd and Via Carta (thus, no access through University Drive).
- Minor vehicular traffic will travel on new “Sheep Road” across creek
- Initial bike station located at Student Housing North.

Second Main Phase Year 2009:
- Major vehicular traffic would no longer travel on South Perimeter.
- Transportation Center and bike station will be moved to North Perimeter.

Third Main Phase Year 2020:
- Major vehicular traffic will no longer travel on North Perimeter.
- Highland will be realigned to accommodate the final location of the Transportation Center.
- Final location of bicycle station on Via Carta.

Details regarding proposed phasing of construction are explained later in Chapter 10.4.
10.3 Rationale

10.3.1 Routing Major Vehicular Traffic Through Via Carta in the Interim Phase

Beginning in 2006, major vehicular traffic will be routed through Via Carta north of North Perimeter to access Highland Drive. This is due to the large pedestrian volumes on North Perimeter west of Via Carta, as shown by Exhibit 10.2. Pedestrians crossing North Perimeter head towards major destinations, such as the Library and Campus Market. Interrupting these pedestrian flows with vehicle traffic would diminish the pedestrian atmosphere. Routing traffic through North Via Carta in both directions, rather than through University Drive, will eliminate most conflicts between pedestrians and vehicles on North Perimeter. This will create a highly desirable pedestrian zone between these two roads. This routing choice also corresponds with the best alternative for phasing of pedestrian zones, as shown in Appendix 10.1.

It should be noted that Via Carta North of North Perimeter would be a pedestrian bicycle boulevard in the final phase.

10.3.2 Phasing of Buildings

The phasing of campus buildings helps determine the phasing of roads and other construction projects. The possible phasing of new buildings can be seen in Exhibit 10.3.

10.3.3 Sustainability

Project impacts on sustainability (equity, ecology, and economy) could be visualized by Cal Poly through the “sustainability rose,” which compares before and after results of projects based on calculated indicators. An example of a “rose” plot for two built road projects is given in Appendix 10.2. Project impacts can be graphed to see improvements or deteriorations of sustainability. Improvements occur when the large dots are above the zero line and deteriorations occur when the large dots are below the zero line. Such analysis is done by agencies who apply sustainability consistently, sometimes voluntarily and sometimes forced by law.

10.4 Plan Components

The three main phases described previously are broken down into seven detailed construction phases, and are illustrated and described in Exhibit 10.4. Several possible projects for 2020 + are shown as well.

10.5 Future Studies and Work

The following are possible studies to expand the topics treated in the Master Plan, newer documents and here:

10.5.1 Vehicle Circulation

Intersection Design
Further studies should be done to determine appropriate intersection designs for each vehicular-accessed intersection on campus.

California Blvd. Corridor Study
A design study should be done for all modes of transport along California Blvd. once it is extended to Highland Dr. This would include a possible bridge over California Blvd. and the railroad, and/or a possible underpass between Mustang Village and California Blvd. for pedestrians, bicycles, and some access traffic. A pedestrian/bicycle boulevard on the west side of the railroad and a light rail or commuter rail station should also be considered.
EXHIBIT 10.2

NORTHWEST AREA: MINIMIZING PEDESTRIAN/VEHICLE CONFLICTS IN THE INTERIM PHASE

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POSSIBLE PHASING OF BUILDINGS
Sequence is more important than date.
EXHIBIT 10.4
POSSIBLE SEVEN PHASES OF CONSTRUCTION
PROJECTS

YEAR

2004/05
Extend California Boulevard & Create A Pedestrian Zone
1a Extend California to Highland & create pedestrian zone on N. Perimeter near library
1b Bypass bridge to H12 parking lot over Brizzolara Creek (alternative possible)
1c Simple intersection at Highland/Via Carta
1d Build Student Housing North (SHN)

2006
2 Prepare for More & Safer Traffic on North and East Perimeter (e.g. elevated crosswalks) including roundabout at Grand/Perimeter

2009
Temporarily Move Transportation Center
3a Close South Perimeter to traffic
3b Temporarily move Transportation Center to North Perimeter
3c Bus stop along California Blvd.
3d Intersection California/Foothill more friendly for bikes, peds, and buses

2012
Beautification & Traffic Calming
4a Beautification and traffic calming on Grand Ave., south of parking garage PS1
4b PS3, at least a first phase
4c Final beautification of the two pedestrian zones on North Perimeter (west of University Drive) and South Perimeter

2018
Extend Highland Drive and Build Final Transportation Center
5a Extend Highland Drive eastwards with pedestrian bridge over it to SHN
5b Move Highland slightly north (Via Carta & University Dr.), & build final Transportation Center, including roundabout at Highland & Via Carta
5c If needed PS2, perhaps a smaller version

2020
6 Final Beautification of North Perimeter (between Via Carta & East Perimeter)
More greenery & bicycle parking

Possible Projects
7a Install "filter traffic lights" at Grand/Slack and Highland/Mount Bishop
7b Light rail/commuter rail station (90 m) near Business Bldg./Mustang Stadium
7c Bike parking under Central Green and Dexter Lawn
7d Pedestrian bridges if needed

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North of Highland/Eucalyptus Road Access Study (Urgent)
Study of alternatives for all modes from SHN to Mt. Bishop Rd., including alternative alignments for the bypass road of North Perimeter.

Highland Dr. Corridor Study
Study to determine best approach for the corridor leading to Cal Poly from Highway 1. Coordination with Caltrans is necessary. Include the agricultural educational path.

New Bridge Over Railroad North of Highland Drive
Study of an additional road link as explained in paragraph 11.2.1 below.

Event Traffic
Detailed study of event traffic management.

10.5.2 Pedestrian System

Design of Pedestrian/Bicycle Boulevards
Study and design the new pedestrian walkways spanning Cal Poly for greatest possible use and aesthetics. Areas of interest include S. Perimeter, N. Perimeter, and Via Carta.

Outside Connections Study
To study further the use of connections to Cal Poly and assess their importance and role in the campus circulation system.

10.5.3 Bicycle System

Bicycle Parking
Determine in more detail where future parking will be, and what kind, and how to decrease bicycle theft, especially around the residence halls.

Wayfinding Points Study
Study to determine all wayfinding locations, and to determine what points should be highlighted as important on campus for both bicycles and pedestrians.

Recreational Routes Study
To study the possible layout of expanded recreational routes north of the main core of Cal Poly for use by pedestrians, bicycles, and horses. Coordination with San Luis Obispo County Trails Plan should be established.

Temporary Bicycle Routes Study
Study to determine short-term solutions to increase bicycle use and develop more efficient bicycle flow, mostly within the campus. Use of simple painted lines and the like to establish temporary bike routes.

Bicycle Station Design
Study the best possible location and design for setting up and running an effective bicycle station that can serve the entire campus.

10.5.4 Service Access

Emergency Access Study
Study with the city Fire Department and University Police on how to best provide emergency access for all kinds of incidents, mostly flood and fire.
10.5.5 Transit

Shuttle Study
Study to determine the possible design of the proposed shuttle system, in regard to alternative power sources such as electricity and fuel cells, funding, routing, scheduling, and the possibility of student drivers.

Transportation Center Design Study
Study and design of the proposed Transportation Center in the northern portion of campus. Based upon proposed, long-term bus scheduling, how to most effectively transport buses in and out of the area, and how to draw riders in.

10.5.6 Parking, ITS, TDM

Parking Needs Study (urgent)
Dynamic model of parking needs by building or by campus area in scenarios of mobility behavior and campus build out (mini, midi, maxi numbers). Special analysis of current residential parking use, trip purpose, and real and perceived “needs”. The Broeg\(^\text{74}\) method of individualized mobility marketing should be applied to the whole campus community.

Parking Location Study
Optimal location of future lots/garages based on the needs study. Study also remote parking near Foundation Warehouse on Mount Bishop Road as a short/intermediate term solution for approximately 300 parking spaces.

Parking Management Study (urgent)
Assignment schemes by “hardship,” different prices for close and remote lots, influence of union contracts etc. A more differentiated scheme than today appears to be needed. Stanford, Berkeley, Davis or UCLA could serve as an example.

ITS: Parking Guidance Study
Analyze feasibility of automatic, frequently updating parking lot indicators showing open parking spaces on campus. Further integration with a city system is possible. An overall high tech traffic management study could be added. This study might be inspired by the traffic scheme introduced in downtown London in Spring 2003.

Further Study of TDM Alternatives
Also in connection with SHN.

10.5.7 Special Challenges

Outside Intersection Study
Further studies to determine best possible design of several intersections on City property, including California Blvd./Foothill Blvd., and to determine how best to funnel students and employees using all modes of transportation in and out of campus.

\(^{74}\) Lecture of mobility sociologist Dr. Werner Broeg (Munich D and Portland, OR) of September 26, 2003 for CRP and CE students at Cal Poly about “Individualized Marketing” in mobility. Dr. Broeg has been retained by cities worldwide. He claims that he can reduce vehicular traffic and parking needs in most towns by 5 to 15 percent just by systematic individualized marketing of all environmentally friendly modes of mobility with a very attractive benefit/cost ratio. His presentation confirmed the notion of the Master Plan, page 196, Table 5.9, that creative TDM alone could reduce Cal Poly’s parking “needs” considerably. A senior project applying his method to Cal Poly is currently being written by a CE student.
11. BEYOND 2020

11.1 Main Point in the Master Plan

The concepts of Cal Poly after the year 2020 are not addressed in the Master Plan.

11.2 Proposal

Once the Master Plan has been fully implemented in the year 2020, the evolution of Cal Poly does not end. Thinking ahead and planning for the future is the next logical step.

11.2.1 Policy BE 1: Anticipate and Plan for Post-Master Plan Growth

Much of this has already been accomplished in many of the proposals found in this report. They are long-term proposals that are likely to last far beyond the current Master Plan. However, as Cal Poly student numbers increase, so must Cal Poly. It is estimated that the proposed circulation system could handle up to 30,000 students with appropriate TDM.

11.2.2 Guideline BE 1: Increase Density in a Balanced Way

To keep the 10-minute walking distances intact, Cal Poly will have to grow up, rather than out. This means an eventual increase in density, rather than acreage.

Several options exist to increase campus density and a selection is listed here:

- Growth up to eight-stories is likely the maximum.\(^\text{75}\) This would provide sufficient educational space for many years.
- Buildings built in phases. Seen mostly in other parts of the world, buildings can be built a few stories at a time, with additional floors added when necessary. This reduces the all-at-once cost and allows for greater flexibility and customization of the campus core.
- Buildings sunken into the hillside or underground. Concerns have been brought to attention regarding an underlying rock layer near the surface that could pose problems with this. However, underground or sunken buildings, flooded with natural light via skylights, might be methods of keeping Cal Poly’s footprint somehow equivalent to the current.\(^\text{76}\)

11.2.3 Guideline BE 2: If Needed, Go North of Brizzolara Creek With Instructional Facilities

If more instructional space were needed, or if current studies show that, for example, the southwest quadrant of the campus will be overloaded with buildings and transportation facilities, then Cal Poly might consider moving out in a very late phase. This would transform the 10-minute walking campus into a 15-minute walking campus, as is the case in many other universities. The area north of Brizzolara Creek could then house some instructional buildings, for example from the School of Agriculture, and additional pedestrian zones.

As mentioned in Chapters 2.1.2.8 and 10.5.1, the access to the northern part of campus for non-motorized and motorized modes should be studied, also for the year 2020+. Among other additions, a two-lane bridge over the railroad leading from the Veterinary Hospital on Mount Bishop Road into the

\(^{75}\) As noted by Robert Kitamura, Director of Facilities Planning at the South West Charrette in Summer 2003.

\(^{76}\) Examples of such buildings on campuses exist in Minneapolis and in Bern, Switzerland.
Sports Complex roundabout along Pinnacles Road was proposed. In the very long term, this link could become the main access to SHN and relieve Highland and Via Carta of traffic.

11.2.4 Guideline BE 3: Continue to Emphasize Non-Motorized Transportation

The proposals formulated in this report provide an excellent foundation for the establishment of an alternative-transportation culture here at Cal Poly. Focusing on non-motorized transportation as the preferred major mode of commute after 2020 will guarantee that Cal Poly remains a clean and efficient university, appealing to all students.

- While some under-building bicycle parking is proposed, even greater numbers of bicycles could be added under areas such as Dexter Green, and the Northwest and Northeast Greens.
- Continuing to support the pedestrian/bicycle boulevards will result in an excellent pedestrian and bicycle system throughout the campus. If the campus footprint is expanded, these connections must be extended as well.

11.2.5 Guideline BE 4: Increase Support for a Rail Station

As mentioned in Chapter 7, the implementation of a rail station alongside Cal Poly would be adhering to the university’s roots. While current funding for such a project would be hard to come by, it remains an option for the year 2020+. Useful as a light rail or commuter rail station, the train could shuttle faculty, staff, and students from downtown to campus from both North and South County. The train station could also be used, in conjunction with Amtrak, to transfer alumni from other areas in California for Open House and other major events.

11.3 Rationale

As Cal Poly continues to grow, so must its infrastructure. Planning for this time, by seeding the ideas of the future now, is important if Cal Poly is to actively support its growth through smart and sustainable means.
12. OTHER CAMPUSES, BIBLIOGRAPHY, GLOSSARY

12.1 Other Campuses

The summary of this research has been presented in the comparative listing of universities of Appendix 8.1. Additional research is located in Appendix 12.1 and in the TAB, including other campus mobility maps. The table below shows universities that best exemplify the ideas proposed in this document.77 The following table shows examples of universities with sustainable mobility.

<table>
<thead>
<tr>
<th>University</th>
<th>Website</th>
<th>Phone</th>
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</thead>
<tbody>
<tr>
<td>University Colorado at Boulder</td>
<td><a href="http://www.colorado.edu">www.colorado.edu</a></td>
<td>303-492-1411</td>
</tr>
<tr>
<td>Cornell University</td>
<td><a href="http://www.cornell.edu">www.cornell.edu</a></td>
<td>607-254-4630</td>
</tr>
<tr>
<td>University Washington at Seattle</td>
<td><a href="http://www.washington.edu">www.washington.edu</a></td>
<td>206-543-2100</td>
</tr>
<tr>
<td>Stanford University</td>
<td><a href="http://www.stanford.edu">www.stanford.edu</a></td>
<td>650-723-2300</td>
</tr>
<tr>
<td>University California Santa Barbara</td>
<td><a href="http://www.ucsb.edu">www.ucsb.edu</a></td>
<td>805-893-8000</td>
</tr>
<tr>
<td>University California Davis</td>
<td><a href="http://www.ucdavis.edu">www.ucdavis.edu</a></td>
<td>530-752-1011</td>
</tr>
<tr>
<td>University California Berkeley</td>
<td><a href="http://www.berkeley.edu">www.berkeley.edu</a></td>
<td>510-642-6000</td>
</tr>
<tr>
<td>University California Los Angeles</td>
<td><a href="http://www.ucla.edu">www.ucla.edu</a></td>
<td>310-825-4321</td>
</tr>
<tr>
<td>Humboldt State University</td>
<td><a href="http://www.humboldt.edu">www.humboldt.edu</a></td>
<td>707-826-3011</td>
</tr>
<tr>
<td>California State University Monterey Bay</td>
<td><a href="http://www.monterey.edu">www.monterey.edu</a></td>
<td>831-582-3000</td>
</tr>
<tr>
<td>Sonoma State University</td>
<td><a href="http://www.sonomoa.edu">www.sonomoa.edu</a></td>
<td>707-664-2880</td>
</tr>
<tr>
<td>San Diego State University</td>
<td><a href="http://www.sdsu.edu">www.sdsu.edu</a></td>
<td>619-594-5200</td>
</tr>
<tr>
<td>California State University Chico</td>
<td><a href="http://www.csuchico.edu">www.csuchico.edu</a></td>
<td>530-898-4630</td>
</tr>
</tbody>
</table>

The following websites connect directly to some of these Universities’ Master Plans:
http://www.csuchico.edu/fcp
http://www.stanford.edu/dept/archplng/publications.html
http://www.ucdavislrdp.org
http://bap.ucs.edu/planning/3.planning.stuff/download.html
http://www.colorado.edu/masterplan
http://www.washington.edu/community/cmp/cmp.html
http://www.csuci.edu/about/landdevelopment.html
http://fmsc.fullerton.edu/mdp/mdp.htm

A SHORT ANNOTATED BIBLIOGRAPHY IS LOCATED IN APPENDIX 12.2

77 CSU websites can be located at: http://www.calstate.edu/search_find/campus.shtml, or UC websites can be located at: http://www.ucop.edu

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12.2 Glossary

12.2.1 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AVR</td>
<td>Average Vehicle Ridership</td>
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<tr>
<td>AY</td>
<td>Academic Year</td>
</tr>
<tr>
<td>MPC</td>
<td>Master Plan, Circulation</td>
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<tr>
<td>DEIR</td>
<td>Draft Environmental Impact Report</td>
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<tr>
<td>GIS</td>
<td>Geographic Information Systems</td>
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<tr>
<td>ITS</td>
<td>Intelligent Transportation Systems</td>
</tr>
<tr>
<td>LOQ</td>
<td>Level of Quality (mostly for non-motorized modes of mobility)</td>
</tr>
<tr>
<td>LOS</td>
<td>Level of Service (mostly for cars)</td>
</tr>
<tr>
<td>MP</td>
<td>Master Plan</td>
</tr>
<tr>
<td>SHN</td>
<td>Student Housing North</td>
</tr>
<tr>
<td>SOV</td>
<td>Single Occupancy Vehicle</td>
</tr>
<tr>
<td>SRTP</td>
<td>Short Range Transit Plan</td>
</tr>
<tr>
<td>TAB</td>
<td>Technical Appendix Binder</td>
</tr>
<tr>
<td>TDM</td>
<td>Transportation Demand Management</td>
</tr>
<tr>
<td>WP</td>
<td>Work Paper</td>
</tr>
</tbody>
</table>

12.2.2 General

Access in general
How people come to campus and move around in it

Note:
In the 1950s traffic engineers talked about “capacity”,
In the 1970s traffic engineers talked about “mobility”,
In the 1990s transportation engineers started to talk about “access”.
The Master Plan is more access-oriented than capacity-oriented

Access in special cases
Can mean access for people with disabilities according to the American’s with Disability Act (ADA), also called “universal access”

Safety
The attempted prevention of traffic accidents, or reference thereof

Security
The attempted prevention of criminal incidents, or reference thereof

Short Range Transit Plan (SRTP)
A plan, prepared by the city and often an outside consultant, guiding the evolution of the transit system over a relatively short time period, normally around five years

12.2.3 Master Plan (MP)

Net academic full time equivalent student enrollment (Net AY FTES)
Equals total credit units taken by all students divided by 15, minus all instruction that is not scheduled in a classroom or laboratory on campus. Used for instructional space planning.78

Fall head count of students
A measure of student enrollment counting individual students, full or part-time, as equal, including students off-campus as well. Is approximately 20 percent higher than net AY FTES.

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78 See Master Plan pages 24 and 25, and Cal Poly Fact Book 2002-2003, Resources, Links and Terms 2, Definition of Terms by Institutional Planning and Analysis Office.
Total fall head count
The fall head count of students, plus faculty, staff and administration, which, in the case of Cal Poly, is approximately 16 percent higher than the head count of students.

Principles
Contain in hierarchical order:
Goals: highest level
Objectives: sometimes measurable
Strategies: general course of steps leading to individual policies
Policies: lead to concrete programs or actions, standards and design guidelines.

Plan Components
May also contain strategies and policies.

Standards
Are models or examples generally accepted and adhered to, regarded as a measure of adequacy, e.g. levels of service for cars or levels of quality for pedestrians and cyclists

Sustainability
Can be summarized in three “Es”: Economy, Ecology, and Social Equity. The goal of sustainability is preserving resources and options for future generations.

Design Guidelines
Define the basic parameters of a project

12.2.4 Geography

Instructional Core
Area approximately between California Street, Highland Drive, future Highland Drive Extension, East Perimeter Road, Grand Avenue, Slack Street and Campus Way with the exclusion of sports fields and parking garages

Main Campus
As above, plus existing and future student housing, the new sports complex north of the Brizzolara Creek, Mount Bishop Road and Highland Drive up to Highway 1

12.2.5 Circulation

Circulation
All motorized and non-motorized transportation

Transportation
Same as circulation

Modal Split
The split of totally transported persons, or freight, into the various modes of mobility

Alternative Transportation
Pedestrians, skaters, cyclists, passengers of public transportation (PT), users of vanpools and carpools etc.
Note: Until recently the “Alternative Mode of Transportation” for students coming to campus was the single occupancy vehicle (SOV). That means, more students came on foot, by bicycle, public transportation, van and car pool than by SOV. Therefore a more appropriate modal split distinction is:
Motorized individual traffic
Motorized traffic with the exclusion of public transport and van and car pools

Other, or non-motorized transportation
Pedestrians, skaters, cyclists, passengers of public transportation (PT), users of vanpools and car pools etc.

Average Daily Traffic (ADT)
In vehicles normally per 24 hours

Evening Peak Hour Traffic
Approximately 4:50 – 5:50 pm and amounting to 7- 8 percent of the ADT

Mobility Coordinator
Official Commute Access Coordinators of Cal Poly. Today this is a one-person job. In the future there should be more specialists in this function.

Morning Peak Hour Traffic
Approximately 7:50 – 8:50 am and amounting to ~5 percent of the ADT

Traffic Calming
Method for slowing down traffic to create a safer and more pedestrian-friendly atmosphere

Intelligent Transportation Systems (ITS)
Intelligent Transportation Systems use high tech for more safety and efficiency in transport

Transportation Demand Management (TDM)
Transportation Demand Management helps reduce vehicular traffic by promoting a different culture and non-motorized mobility mostly through the abovementioned mobility coordinator.

Bicycle Station
Location where a bicycle rider can park, repair and lock his bike, take a shower, get advice etc.

Transportation Center
Transit hub that facilitates city and county buses. Enough space for many buses, as well as ticket facilities, a mobility coordinator, etc.

Pedestrian/Bicycle Boulevard
A pedestrian/bicycle “paradise” where no automobiles are allowed to travel

12.2.6 Agencies

Public Works Department
An agency of the City of San Luis Obispo concerned with public infrastructure

SLOCOG
San Luis Obispo Council of Governments

APCD
Air Pollution Control District

Caltrans
California Department of Transportation

SLO Transit
San Luis Obispo Bus System

RTA
Regional Transit Authority, covers mostly the County buses, formally called Central Coast Area Transit (CCAT)

CCAT
Central Coast Area Transit as mentioned above.
SUMMARY CONTENTS OF CHAPTERS “CIRCULATION, ALTERNATIVE TRANSPORTATION AND PARKING”, PAGES 164 – 196

1. CIRCULATION (page 164)

1.1 Background and Issues
Regional, local and campus scale

1.2 Principles
Goal: Reduce automobile dependence
Objective: Reduce conflicts between pedestrians, bicyclists and autos
Strategies:
1. Alternative Transportation
2. Public Transportation
3. Vehicle Trip Reduction
4. Access to Campus
5. Strategic Parking Locations
6. Bicycle Friendly
7. Compatibility of Circulation Systems
8. Pedestrian Orientation
9. Service Access
10. Organization
11. User Friendly
12. Safety
13. Beautification

1.3 Plan Components
1. Entrances and Gateways
2. Pedestrian System
3. Bicycle System
4. Connection to Public Transit System
5. Campus Shuttle
6. Vehicle Circulation System (including Service Access)

2. ALTERNATIVE TRANSPORTATION (page 186)

2.1 Background and Issues
Current operators etc.

2.2 Principles
Goal: Continue regional leadership role in fostering alternative transportation
Objective: Modify the culture regarding the use of the auto
Strategies:
1. Education
2. Encouragement
3. Support (more money for TDM and less for parking garages)
4. Convenience

2.3 Plan Components
1. Vanpools
2. Carpools
3. On-Campus Transit
3. PARKING (page 191)

3.1 Existing Conditions and Issues
Inventory of spaces and issues

3.2 Principles
Goal: Parking close to campus without overwhelming the campus environment
Objective: Modify the culture regarding the use of the auto
Strategies:
1. Culture
2. Reduction Of Demand
3. Location And Access
4. Alternatives
5. Parking Management
6. Neighborhoods
7. Visibility And Safety

3.3 Plan Components
1. Parking Supply (Two structures, remote storage etc.)
2. Parking Demand (freshmen, geographic controls, enrollment scenarios; numbers of P reduced by these controls)
APPENDIX 2.1

SUSTAINABILITY

NEWER DEFINITION OF SUSTAINABLE MOBILITY (CANADA, EU):

- Allows basic access to be met safely in a manner consistent with human and ecosystem health and with equity within generations
- Is affordable, operates efficiently, offers choice of transportation mode and supports a vibrant economy
- Limits emissions and waste within the planet’s ability to absorb them, minimizes consumption of renewable resources, limits consumption of non-renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.

RESEARCH AT CAL POLY

In the year 2003, Prof. R. Lee (Chair), P. Wack, and E. Jud finished their report “Sustainable Transportation Indicators…”, with proposals of how to measure them. The report was published by the Mineta Transportation Institute at CSU San Jose, CA, in print and on the web under http://transweb.sjsu.edu/pubs.htm.

Excerpt: When is a mobility project a good project? The City Council of Zurich, Switzerland, rates each project with –2 to +2 points according to the following list:

1. Economical Dimension, “Wirtschaftliche Dimension”
   - W1 True costs and understanding of costs
   - W2 Competitiveness
   - W3 Adequate access
   - W4 Capacity of the mobility infrastructure
   - W5 Efficiency of freight traffic
   - W6 Reliability
   - W7 Comfort

2. Ecological Dimension, “Oekologische Dimension”
   - U1 Energy efficiency of the transportation system
   - U2 Greenhouse gas emissions
   - U3 Air pollution
   - U4 Traffic noise Emissions
   - U5 Protection of habitats
   - U6 Ecological networking
   - U7 Use of surfaces and sealing of soil

3. Societal Dimension, “Gesellschaftliche Dimension”
   - G1 Quality of dwellings and their surroundings
   - G2 Connection between dwellings and their surroundings
   - G3 Attractiveness of neighborhood centers and of the CBD
   - G4 Traffic safety
   - G5 Personal security
   - G6 Access for everybody
   - G7 Public participation/Individuality
APPENDIX 2.2

RECOMMENDATIONS FOR SETTING MEASURABLE OBJECTIVES

Suggestions by Terry Sanville, Planner City of SLO, at a lunch with E. Jud in March 2003

1. Develop Good Reoccurring Survey Data:
   a. Establish random sample survey of spring quarter student population. Suggest sample size of 20 percent of full enrollment. (Need to decide if staff and faculty should be included in policy.)
   b. Establish method of distributing, publicizing, and retrieving questionnaire that maintains the random sample’s integrity.
   c. Calibrate survey response based on adjustments made to reflect known demographic indicators (e.g. class status, age, or some other population indicator).
   d. Publish survey response and repeat process for at least one more year to test for degree of variance since external factors (e.g. fuel costs) could skew initial response.

2. Understand and Chart Planned Cal Poly Enrollment Changes:
   a. Establish profile of enrollment increase for the next ten years following the last survey date (from task 1 above).
   b. Compare profile with Master Plan policies relative to enrollment and capital programs (e.g. classrooms, on-campus housing) needed to accommodate enrollment, and adjust enrollment profile accordingly.

3. Evaluate the Elasticity of Alternative Mode Participation:
   a. Evaluate the performance of programs employed by other universities (incentives, disincentives, coercive policies, capital investments) that achieve mode shift objectives.
   b. Evaluate these programs’ application at Cal Poly and in San Luis Obispo City and County.
   c. Determine change in participation levels as they relate to desired changes in mode shift percentages.

4. Promulgate and Monitor Modal Split Policy:
   a. Adopt policy that establishes percentile participation levels for various transportation modes (bikes, walking, transit (local and regional), carpool/vanpool, private vehicles, other) for the next ten years.
   b. Establish and implement an annual or biennial monitoring program that charts changes in modal split and compliance with established policy.

5. Establish Ten-Year Support Program:

   Identify the content, cost, timing, phasing, and implementation responsibility for an array of activities targeted at achieving the desired modal split (item 4) including:
   - Policy changes (e.g. Freshmen must live on campus and are not eligible to receive parking permits)
   - Capital projects and programs (e.g. establish a “Bicycle Central” on Cal Poly campus)
   - Operating programs (e.g. fee incentives for agreement to not bring a private vehicle to school)
   - Development standards for on-campus facilities (e.g. bicycle parking, transit stops, pedestrian connections, preferential carpool parking or differential parking rates).
"The Main Street" in Europe and the US

Eugene H. Jud, FTIE
ITE, Toronto 1998, Section 19

Coexistence in Street Use, instead of Dominance

Methodology:

Returning to the traditional main street will revitalize a community and bring it back together, through the following process:

A. Traffic Calming
B. Increasing pedestrian use and crossing safety
C. Creating a bicycle friendly atmosphere
D. Enhancing the aesthetics

When the community is heavily involved in the planning and design process, the project will gain more support from the community and the final product will ultimately better serve the community.

Traffic Calming of Roads with more than 7,000 vehicles/day

Vertical deviations:

Not recommended for roads bearing more than 7,000 ADT in Switzerland and 3,000 ADT in the US.

Notable exceptions
Champery-France with 17,000 ADT
Shenley Rd Borehamwood, UK 18,000 ADT

In Switzerland, mostly channelization with islands is recommended if ADT>7000 vehicles/day. Also no more bus bays, instead "obstructing bus stops" are recommended.

Also in Europe there is an explosion of roundabouts. Roundabouts, with a minimal outer diameter of 22m, are effective in maintaining traffic flows and reducing speeds and accidents. By reducing stop and go traffic they help the environment too.

Example: Bern Strasse
In Zolliken, Switzerland (near Berne)

Bern Strasse is the main street in the community of Zolliken, and has become a main arterial road, funnelling traffic into the city of Berne. This small roadway with its large traffic volume, tended to divide the community. In an attempt to revitalize the "divided" community, The Kanton of Berne adopted a new philosophy concerning the "main street". The main street should serve the community first and the commuter second. A well designed downtown main street should even invite "safe jay walking". So the communities input was sought and technical studies were performed before, during and after the project.

Bern Strasse, before the redesigning, withstood a load of 20,000 ADT. Residents, shoppers and pedestrians found it uninviting and considered it unsafe to cross the roadway. This contributed to the feeling that the community was divided. The renovations included replacing existing traffic signals with roundabouts as seen in the picture to the left. Also a 1.8m "multipurpose" lane with cobble stone was constructed, as seen below. With these renovations pedestrian traffic has increased, residents feel more at ease with their children playing in the neighborhood and crossing of the street by pedestrians has more than doubled.

Normal Cross Section (9.5 M, curb to curb)
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The Project was done in several different stages. The Roundabout at Kreuzplatz was constructed first, while Bärenplatz kept its Traffic signal. With nearly equal traffic flows in both directions this provided an unique opportunity to compare the two intersections. The results from the survey are below:

**Trip Distance 550m**

**Traffic signal (Bärenplatz)**
- 9097 vehicle/day
- Time per Trip: 99 sec
- Stopped per Trip: 1.55
- Pedestrian Wait Time per Crossing @ intersection: 60-90 sec
- Nitrous Oxide emissions (base): 100%

**Roundabout (Kreuzplatz)**
- 9333 vehicles/day
- Time per Trip: 76 sec
- Stops per Trip: 0.55
- Pedestrian Wait Time per Crossing @ intersection: 7 sec
- Nitrous Oxide emissions: 66%

The results give us a picture of how a roundabout benefits everyone. Smoother traffic flow decreases travel time by reducing stops and goes. It decreases air pollution and pedestrian wait time too.

**Bärenplatz: Before and After!**

**Literature Cited**
1. Traffic Calming in Practice: 85 Case Studies from the U.K. 1994
2. Le Temps Des Rues, IREC Lausanne, CH 1990
3. "Ojai Avenue Alternatives to Signalization Study", Jud Consultants, California 1996

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San Luis Obispo CA, 93406
(805) 545-5919
ejud@calpoly.edu
# Traffic Calming -- Intersection Tools

## Tool Description

### Curb Extensions
- Curb extensions are great tools for slowing speeds at intersections and midblock locations. They are often used in combination with other tools, such as refuge islands, or part of a modified intersection. They are very helpful in increasing safety, and reducing pedestrian crossing times and distances.

### Refuge Islands
- Refuge islands slow traffic in three ways. They visually tighten the road, slow turning speeds, and help create narrow channels. They separate conflicts, create 10’ wide driving lane channels (when used with curb extensions), minimize pedestrian crossing conflict speeds.

### Modified Intersections
- Modified intersections take back unwarranted asphalt, returning it as green space. Often motorists turn too fast when curb radii were made too wide for safety. Some intersections can be turned into small parks, greatly increasing safety, beauty and a gateway appearance.

### Raised Intersections
- Raised intersections provide a colorful vertical intersection effect. They slow traffic in three ways. First they create an attractive, distinct shape. Second, they create a vertical deflection forcing a low speed approach. Third, they highlight the area as a pedestrian space.

### Roundabouts, Mini-Roundabouts
- Roundabouts and mini-roundabouts are the most effective and popular traffic calming feature. These horizontal deflection tools lower speeds to 15-20 mph, shorten pedestrian crossings to 12-14 feet at a time, decrease injury crashes about 90%, reduce noise and pollution, and increase area property values.

## Added Benefits

### Main Street
- Helps protect and preserve sight lines, eliminates illegal parking, helps assure emergency responder access to critical streets. Can be used for emergency responder operations area. Use to create chokers, chicanes, neckdowns.

### Neighborhood
- Minimum preferred width 8.0 feet. Best when landscaping is used to help motorist see treatment in advance. Keep ADA ramps at grade or with light crown for drainage. Use full width ADA ramps, and create 45 degree bend, if midblock.

## Cost / Other

### Main Street
- Costs range from $5-30,000 per corner. Costs are reduced if drainage is left open. This can increase maintenance costs, so these details must be worked out by a city/county team.

### Neighborhood
- One of the most affordable tools. Does not affect drainage. Can be landscaped at added cost with or without irrigation. Used effectively in high pedestrian areas, such as schools, parks, stores.

## Plan View

### Main Street
- Very popular as a gateway to a neighborhood, or any place where excessive asphalt exists. Very high return on investment, especially where pedestrian crossings are risky. Avoid ugly temporary treatments.

### Neighborhood
- Very popular as a gateway to a neighborhood, or any place where excessive asphalt exists. Very high return on investment, especially where pedestrian crossings are risky. Great range in costs. Mini-roundabouts can be $10-50,000, while roundabouts can be $50-500,000 for many sizes. Greatest safety benefit of all traffic calming tools.
CORDON COUNTS 4:50 – 5:50 PM
Workday Winter 2003 (Persons in Different Modes)
Evening Peak Hour (4:50 PM - 5:50 PM)
Total People In and Out Over Cordon

- Pedestrians 19.5%
- Bicyclists 7%
- Bus Passengers 6.2%
- People in Cars 67.3%

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CORDON
Evening Peak Hour (4:50 PM - 5:50 PM)

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APPENDIX 3.5

CROSS SECTIONS OF ROADS
Based on the “skinny roads” principle. Alternatives possible.

LEGEND:

Overrunable median (gives flexibility in operations)

GRAND AVENUE
(Looking North)

Can be used as 2 lanes when events at PAC are out

Preferential bus lane on some stretches

EAST PERIMETER
(Looking North)

Preferential bus/bike lane

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Elevators ADA & possible pedestrian bridges

(Today’s width, bicycle parking removed & relocated under buildings)
Consider meandering walkway and greenery. Agriculture educational path, vista points, etc.
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APPENDIX 3.6

GRAND AVE & SOUTH PERIMETER ROUNDBOUT: SCHEMATIC

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APPENDIX 3.7

ROUNDABOUT AT GRAND AVE. & SOUTH PERIMETER:
PEAK HOUR VOLUMES

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Total entering in "peak hour" = 838 peu
⇒ ADT=8380 peu
(compare total ped = 318)
APPENDIX 3.8

ROUNDABOUT AT HIGHLAND AND VIA CARTA: DESIGN

Highland Drive is moved to the northern edge of the H2 Parking Lot. Transportation Center to be designed later. Alternative locations possible.
APPENDIX 3.9

ROUNDABOUT AT HIGHLAND & VIA CARTA: PEAK HOUR VOLUMES
Workdays May & October 2002

Vehicle Counts:
Date: 5/22/02
Time: 4pm

Pedestrian Counts:
Date: 10/22/02
Time: 6pm

LEGEND

Vehicles per hour (TOTAL 776)
Pedestrians per hour (TOTAL 676)
### Walking -- Levels of Quality

<table>
<thead>
<tr>
<th>Sidewalks</th>
<th>Exemplary</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Hall of Shame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walkability increases with added width, buffers to the street, many eyes on the walk, attractive edges. Five-foot minimum widths are needed. Conditions improve as numbers of driveways are reduced, or set back. Non-mountable curbing is important.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Main Streets | | | | | | |
|--------------|---|---|---|---|---|
| Main Street walks should be wide, attractive, with many shops and residential units watching over the street. Many activities are needed to keep sidewalks in use many hours a day. Good lighting and street furniture are essential. Maintenance is key. |

| Local Streets | | | | | | |
|---------------|---|---|---|---|---|
| Local streets should be narrow, well landscaped, with on-street parking set as sidewalk buffers. Driving speeds of 15-20 mph are best, 20-25 are acceptable. Homes should be proximate to the street. |

| Avenue/Boulevard | | | | | | |
|------------------|---|---|---|---|---|
| Avenues and boulevard sidewalks should be 5-6 feet wide in most applications. Planter strips and bike lanes create essential separation from motorists. Trees, other landscaping, medians help slow motorists. Lanes can be as narrow as 10 feet. |

| Crossings | | | | | | |
|-----------|---|---|---|---|---|
| Crossings should be well marked, accentuated by curb extensions. On multi-lane boulevards it is essential to have exceptionally well marked crossings. In some cases signals are warranted. |
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APPENDIX 5.1

CORDON COUNTS BICYCLES
“Peak Hour” Workday Fall 2002

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APPENDIX 5.2
EXAMPLES OF BICYCLE STATIONS

Long Beach Bikestation located at the Transit Mall. Amenities: 24-hour attended bike parking/lockers, bike sharing, bike repairs, bike sales/rentals, changing/restrooms, bike accessory shop, electric bike/scooter rentals, internet access for transit/commute info, car-sharing services including electric cars, refreshment bar, outdoor seating, and maps/safety information.

Luzern, Switzerland bike station under a school building near the Luzern railway station and near the Performing Arts Center; stores 418 bikes (http://www.velostation.ch/start/frameset.htm).
APPENDIX 6.1

LOADING AREA QUESTIONNAIRE

A. TODAY’S OPERATION OF YOUR DEPARTMENT

1. Your department/entity:
   Location:

2. How many loading areas do you have and where are they located?

3. How often in an average week are deliveries, pick-ups, or a combination thereof, made here?

<table>
<thead>
<tr>
<th>Deliveries</th>
<th>Pick-ups</th>
<th>Pick-up and Delivery</th>
</tr>
</thead>
</table>

4. How large are the goods being delivered or picked-up? (small packages can be handled by one person, large packages require a cart/hoist/etc.; How many of each per week?)

<table>
<thead>
<tr>
<th>Small packages</th>
<th>Large Packages</th>
</tr>
</thead>
</table>

5. How many of these types of goods are being handled per week? (small and large packages together)

   a. Perishable | Non-Perishable
   b. Hazardous | Non-Hazardous

6. What quantities of the goods are typically delivered or picked-up per week?

   # small packages  # large packages  and/or  # of pounds

7. At what times during the day are these activities typically done?
8. **How large** are the usual transport vehicles?

- Tractor-trailer (type A license)
- Large 2-3 axle truck (type B or C license)
- Small truck/ car (type C license)

9. If transport vehicles enter or leave campus, **which streets** are used?

- Grand Ave.
- California St.
- Highland Dr.

10. **Internal Transportation**

   10.1. On Campus

   10.1.1. **From where or to where** do transported goods go?

   - Large truck
   - Small truck
   - Electric cart
   - Other (specify)

10.2. Within your building/area

   10.2.1. **From where or to where** do transported goods go?

   - Manually carried
   - Push cart
   - Forklift
   - Other (specify)

B. **PROBLEMS AND SOLUTIONS**

11. Have you had any **problems** with delivery access, and if so, what problems have you had?

12. Can you suggest any **solutions** to these problems?

C. **FUTURE OPERATIONS**
13. If the **number** of deliveries/pick-ups per week were **limited**, what effect might this have on your operations?

14. If deliveries/pick-ups were **limited** to certain **times** of the day, such as before 11:30 am, what effect might this have on your operations?

15. If the **type** of transport vehicle at this location were **limited** (to small trucks, or electric carts for example), what effect might this have on your operations?

16. If applicable, would you be willing to go to a **warehousing** concept? This means large deliveries would go to a warehouse on campus and then be distributed with smaller vehicles to your building/area.

17. **Comments:**

18. **Your name:**
    **Phone number:**
    **Email address:**

    **THANK YOU VERY MUCH**
APPENDIX 6.2

SUMMARY OF FREIGHT INTERVIEWS

1. Frank Limon Jr. – Distribution Services Manager (Facilities Warehouse)

Distribution Services distributes deliveries to the entire campus, excluding Cal Poly Foundation deliveries. Most incoming freight shipments do not follow a regular schedule. Mr. Limon estimated the number of shipments made to the warehouse on a typical day is probably 5 to 10 deliveries. Mr. Limon estimated that a large tractor trailer typically delivers a shipment to the warehouse about once a week. The drivers of the large trucks typically have problems trying to access the warehouse due to a parking area located at a relatively short distance in front of the loading dock, which they must avoid.

Mr. Limon has divided the campus core into four delivery quadrants for convenience. Each quadrant requires 1 daily trip by a small MicroVan. Larger packages, which are too big to be delivered by the small MicroVans, must be delivered separately by a larger truck. Some deliveries are too large to be efficiently moved with a truck, and require delivery by a forklift to a loading dock. Roughly 60 percent of the material that Distribution Services delivers is distributed by the MicroVans, 20 percent by the trucks, and the remaining 20 percent by forklift. Mr. Limon would like to get small trailers for the MicroVans, which would reduce the operation of larger trucks. These MicroVans, even with trailers, could use existing sidewalks.

2. Gerald Rowan – Campus Dining Warehouse Specialist

Campus Dining handles all campus food deliveries, as well as other items ordered through the Foundation. Most Foundation shipments come to the Campus Dining loading dock at Building 19, although some deliveries, such as cups and plates, along with all El Corral Warehouse deliveries, go to the warehouse on Mount Bishop Road (Building 82). From the loading dock at Building 19, Campus Dining distributes food all over campus.

Mr. Rowan estimated that there are 10 to 15 truck deliveries each day at the Campus Dining dock, about half of which come by tractor trailers. Most deliveries come before 2:00 p.m., but they are on no set schedule. Trucks sometimes, though not often, are forced to wait on South Perimeter to make deliveries to the Campus Dining dock, because only 2 trucks can be accommodated simultaneously at the dock. Sometimes trucks have difficulty maneuvering to the dock because of limited space.

Large trucks are used to deliver to several locations because the loads will not fit on smaller vehicles. Trucks are used to deliver to the Vista Grande Restaurant, and the Lucy’s Too/Tapangos/Park area located at the Dexter Building. If large trucks are not necessary, smaller vehicles are used. Campus Dining has 2 small pick-up trucks, 3 small electric carts, and 3 larger trucks; most deliveries are made by carts, but a larger number of goods are delivered by large trucks. Occasional deliveries are made by forklift. There is an underground freight tunnel accessing the University Union from the Campus Dining dock.

3. Taffy Duran – El Corral Bookstore Distributions Manager

All shipments for El Corral Bookstore arrive at the Foundation Warehouse. Shipments are sorted at the warehouse into items for El Corral Bookstore, Cal Poly Books, Cal Poly Downtown, and private orders. Trucks arrive at the warehouse throughout the day, following no set schedule. Only one truck is processed at a time, and trucks are sometimes forced to wait to be unloaded. Ms. Duran said there is usually enough space for trucks to wait, so this is not generally a problem for her operation. Trucks do not have any other access problems.
Deliveries to El Corral Bookstore are made up to eight times per day from the Foundation Warehouse, usually by 2:00 p.m. These deliveries are typically made using a large 16-foot truck. El Corral also has a small van and a pick-up truck at their disposal. However, due to the volume of materials being moved, the latter vehicles are impractical for most deliveries. Deliveries to El Corral Bookstore are usually made through the tunnel from the Campus Dining loading dock.

4. Robert Weaver – ASI Operations Coordinator

The only regularly scheduled operation of ASI is picking up mail from the Facilities Warehouse and delivering it to the University Union, the Recreation Center, and the Children’s Center. This is typically done between 11:30 a.m. and 12:30 p.m. each day using a small pick-up truck. ASI also sets up events for the Children’s Center, Open House, and student elections, but these are occasional events.

ASI has six vehicles at their disposal: three pick-up trucks, one passenger van, one electric car, and one forklift. Regular deliveries are made using a pick-up truck, but approximately once a week, a large package arrives that must be delivered by forklift to either the Recreation Center or the University Union. ASI Operations generally experiences no access problems.

5. Robert Pahlow – Facilities Services Assistant Director

Facilities Services repairs and maintains mechanical equipment on campus, such as refrigerators, generator, etc. Pick-up trucks are usually used to access equipment and to transport tools. Larger specialized vehicles are sometimes required to service certain equipment. When these vehicles are required, the work is contracted out to a private company. Equipment throughout the campus is serviced regularly. Mr. Pahlow expressed no problems or concerns with access to the equipment.

6. Tim Jones – Transportation Services Supervisor

Mr. Jones provided an inventory of all Cal Poly vehicles in spreadsheet form. According to the inventory, Cal Poly has approximately 400 motor vehicles.
01 – The Administration Building loading dock accommodates one truck. The dock must be accessed from Polyview Drive. There is a garbage area next to the dock.

02 – The Education Building has a small dock that can accommodate one truck. Access is from College Avenue. Larger trucks may have trouble maneuvering to this dock because there is another building located in front of the dock.

05 – The Architecture Building’s small courtyard area is frequently used for service access. It is reached by walkways from California Street or from College Avenue.

06 – The Performing Arts Center loading dock is a large dock that can accommodate several trucks at once. This dock can only be accessed from Tahoe Road.

007 – The Advanced Technologies Laboratory has a small gated area located near garages. This area is often used for equipment and vehicle storage, and must be accessed from North Perimeter.

08A – The Agricultural Engineering Shop has a large, gated area which accommodates many vehicles, and which accesses many garage areas. This area can be reached from Feed Mill Road or from Truckee Road.
09 – A large area east of the Farm Shop is used for large vehicle storage. This area is accessed from Feed Mill Road. A fuel tank is found here as well.

10 – The Agriculture Building has a frequently used marked loading zone which accommodates several vehicles. This zone is accessed from Via Carta and North Perimeter.

10 – The Agriculture Building has a small, one truck, loading dock. This dock can be accessed from Via Carta or from North Perimeter. There is also a garbage area here.

13 – The Engineering Building houses a small dock capable of accommodating one truck. The dock is accessed from Dexter Road, but could potentially be accessed from North Perimeter, or from California Street. There is also a garbage area located here.

13 – The Engineering Building has a frequently used unmarked area, also used for vehicle storage. This area is reached from Dexter Road. A garage is located here also.

19 – Campus Dining operates a large dock capable of accommodating two trucks at once. Trucks must access the dock from South Perimeter and exit along Via Carta. Space for trucks to maneuver in front of the dock is somewhat restricted. Garbage is also collected here.
20 – Garbage is collected at the southeastern corner of Engineering East. Access is from Polyview Drive.

21 – Engineering West has a small gated area, accessed from Cuesta Avenue, which can accommodate one to two vehicles.

21 – Engineering West has a large, gated area that has room for many vehicles. This area is accessed from Cuesta Avenue.

23 – The Feed Mill can be used to load large vehicles. It is reached from Feed Mill Road.

24 – Campus Market has several large docks that can accommodate many trucks at once. The docks are accessed easily from University Drive, but space between the docks and the road is somewhat small. There is also a garbage area here.

26 – The Graphic Arts Building houses two small, loading docks adjacent to one another. Each dock can accommodate one truck, but due to the layout of the docks, these docks can only accommodate one truck at one of the docks at a time. There is also a garbage area located here. This pair of loading docks must be accessed from Polyview Drive.
27 – The Health Center has one small, single truck dock. This dock can be accessed from Campus Way, and there is a garbage area at this site as well.

27 – The Health Center has a small-unmarked area from which garbage and infectious waste is removed. Access is from Campus Way.

34 – The courtyard area of the Dexter Building is often used for service access. This area is reached from University Drive.

34 – A small, single truck, loading dock is located on the eastern side of the Dexter Building. This dock can be accessed from University Drive; however, maneuvering a large truck to this dock would be difficult due to parking located a short distance away. Garbage is picked up here as well.

35 – The library has a loading dock that can accommodate two trucks. Access to this dock is from Dexter Road, which must be accessed from North Perimeter. Garbage is collected here as well.

40 – Engineering South has a large gated area that accommodates many trucks. This area can be accessed from Polyview Drive or from South Perimeter.
41 – Engineering III has a large gated area which can accommodate several vehicles, and which accesses many garage areas. This area can be reached from North Perimeter.

42 – The area south of Mott Gym is sometimes used for vehicle storage. This area can be reached from the service road between South Perimeter and Longview Lane.

43 – The Recreation Center has a small, unmarked loading area at its northeast corner. Access is from South Perimeter.

43 – The Recreation Center can accommodate several trucks at once at a loading dock on the western side of the building. The dock can be accessed either from South Perimeter or from Campus Way, behind the Health Center.

44 – The Music Department uses a small, single truck, dock located on the northern side of the building. The dock must be reached from South Perimeter.

52 – The Science Building has one small, single truck dock at the northern side of the building. This dock must be accessed from Polyview Drive, and garbage is picked up here as well.
52 – The Science Building has several single truck loading docks located near the southeastern side of the building. These docks are small and capable of accommodating one truck at a time between them. There is a garbage area here also.

53 – There is a small, single truck loading lift-gate adjacent to Science North. This area must be reached from Polyview Drive. Infectious waste and garbage are picked-up here too.

65 – The University Union has a small signed space for a single truck. This space must be reached from Polyview Drive.

65 – The University Union/Dining Complex area has a frequently used marked loading zone along Polyview Drive. This zone has space for several smaller vehicles.

70 – Cal Poly Distribution Services operates a large loading dock, which can accommodate several trucks. The dock must be accessed from Truckee Road. Parking located relatively close to the dock limits space for large trucks.

105 – The South Mountain Halls have garbage areas located behind them. These areas are reached from East Perimeter, Klamath Road, and Mountain Lane.
112 – The Vista Grande Restaurant has a large dock, which can accommodate several trucks. This dock can be accessed from Deer Road. A garbage area is also located here.

113 – Sierra Madre dorms have garbage areas reached from Deer Road.

114 – Yosemite Hall garbage areas are reached from Deer Road.

133 – The Children’s Center has a small loading dock that is accessed from Campus Way. Garbage is also collected here.

170 – Cerro Vista student housing has garbage areas, which are reached from Klamath Road.
APPENDIX 7.1

CAMPUS TRANSPORTATION CENTER DESIGNS
Examples of Alternative Locations

1. PREFERRED ALTERNATIVE NORTH
Highland Dr. slightly realigned towards North

2. OTHER ALTERNATIVE NORTH
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APPENDIX 7.2

SAN DIEGO STATE UNIVERSITY: TRANSPORTATION CENTER

Underground Light Rail Station under Construction. To Open in 2004.
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APPENDIX 7.4

UCLA: TWO TRANSPORTATION CENTERS

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APPENDIX 7.5

UCSB: TRANSPORTATION CENTER

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APPENDIX 7.6

SANTA BARBARA ELECTRIC “FUN SHUTTLE”

Source: members.aol.com/gsoma/santabarbara.html
Executive Summary
On October 18, 2003, Cal Poly CE 424 witnessed a public transit marvel. They rode on the newest model (the “stingray”) to result from Santa Barbara Metropolitan Transit District (MTD)’s electric bus project. Santa Barbara now has the largest fleet of electric buses (26) in North America. The students talked with one of the designers, Paul Griffith, and visited the charging facility in Santa Barbara. The “stingray” is 30’ long and carries up to 45 passengers. It has been tested to be very safe and reliable. It also has low floors, which provides easy access. In the first year that Santa Barbara used electric buses, ridership increased fivefold from 200,000 to 1,000,000. San Francisco MUNI has ordered 25 of these buses recently. Mr. Griffith explained that with proper funding and marketing, electric buses could work at Cal Poly and in San Luis Obispo. It could reduce vehicle traffic and air pollution, and provide a safe, efficient and fun mode of travel.

Introduction
On October 18, 2003, Cal Poly CE 424 students witnessed a public transit marvel. They rode on the newest model to result from Santa Barbara Metropolitan Transit District (MTD)’s electric bus project. (See Figure 1) The “Stingray” provided Cal Poly with a clean, comfortable and quiet ride. (See Figure 2) Paul Griffith, President of the Santa Barbara Electric Transportation Institute (SBETI), guided the class throughout the city. He filled their heads with facts about the “stingray” and its operation. They also visited the charging facility, where the buses are housed and charged. Mr. Griffith explained that with proper funding and marketing, electric buses could work at Cal Poly and in San Luis Obispo.

History
Santa Barbara began operating electric buses in 1990. When they started, reliability was the biggest problem. The in-service failure was twice as frequent as with diesel buses. The lead acid battery used, contained a series of cells. Any bad cells would lose capacity quickly, resulting in a low power event. The battery was only as strong as the weakest link, so many service problems resulted. Lead acid batteries also lost 20-40% of their capacity when operating at freezing or below freezing temperatures. They had to be watered as well, because dirt and grime on top of the terminals could cause fires. (See Figure 3) All of these issues left Santa Barbara MTD looking for other power sources to operate their electric buses.

After 1994, lead acid battery use was discontinued, and Santa Barbara was the first in North America to use nickel cadmium batteries. Nickel cadmium was an improvement on lead acid batteries, but still proved finicky during operation. The batteries’ ideal operating temperature was 30º C. When operated above this temperature, due to reactions in the battery, they lost capacity. However, they were lighter and smaller than lead acid batteries, and were more resistant to failure from bad cells.

Santa Barbara MTD gained experience with the operation of electric buses. They began manufacturing the buses on their own. Also, in the mid 1990’s, the Santa Barbara Electric Transportation Institute (www.sbeti.com) was founded. This organization’s goal is to conduct research and development in coordination with Santa Barbara MTD. Santa Barbara now has the largest fleet of electric buses (26) in North America.

“Zebra” Battery
The “stingray” bus, which Cal Poly rode, uses the “zebra” or sodium nickel chloride battery made in Switzerland. It operates between temperatures of -40 to 158 degrees Fahrenheit, without any loss in capacity. The “zebra” is a third of the size and weight of the lead acid battery. No maintenance is required. The “Zebra” is very efficient. It consumes 1.5 kW/h, whereas diesel buses consume 18 kW/h. It is also resistant to failure if one of its 12 cells fails. In such a case, the battery would lose range but not power. (See Figure 4)
The “stingray” was recently tested in San Francisco, on the hills, against diesel buses. It exceeded diesel buses in power when climbing hills. The “stingray” is 30’ long and carries up to 45 passengers. The bus can operate 12 hours non-stop or 144 miles. It has been tested to be very safe and reliable. It also has low floors, which provides easy access to elderly. San Francisco MUNI has ordered 25 of these buses recently.

Infrastructure
Very little infrastructure is needed to use these electric buses. A garage with a 45kW charging station is necessary. A 240 volt, 3-phase AC electric charger would come with purchase of a “stingray”. Also, a meter should be installed to collect a charge profile to insure the battery is charged in accordance with the batteries’ manufacturer’s warranty. Thus, a periodic e-mail to the manufacturer with the charge profile is recommended. A 5-hour period of recharge is necessary.

Ridership
The American public sees a sign reading “loser” over the door of any public diesel bus. Americans believe that anyone riding a diesel bus probably doesn’t have a car, has a suspended driver’s license or is mentally disabled. Santa Barbara citizens enjoyed the clean, quiet electric buses. In the first year that Santa Barbara used electric buses, ridership increased fivefold from 200,000 to 1,000,000. In 2001, the ridership exceeded 7 million. Finally, the stereotype is lifting.

Cost
Electric buses cost about $450,000, nearly twice the amount of diesel buses at $230,000. Electric buses cost $0.13 per mile to operate, and $0.60 per mile to maintain. Diesel buses cost $0.32 per mile to operate, and $0.38 per mile to maintain. An additional $1.46 per mile is used to pay the driver. Overall, electric buses cost $3.04 per mile, and diesel buses cost $2.57 per mile. However, federal funding is available to subsidize the batteries used in electric buses, which reduces the cost to $2.78 per mile. After such funding, the difference in operational costs is small; especially when the environmental benefits and increased ridership is considered. Also, it should be noted that the driver is half the operating cost of the bus.

Can Cal Poly do it?
Yes, with knowledge and funding. Riders would enjoy the electric buses because they are quieter and cleaner than diesel buses. Electric bus use could reduce vehicle traffic and air pollution, and provide a safe, efficient and fun mode of travel. The “stingray” is virtually maintenance free, so a driver with little expertise could easily operate it. SBETI will soon be able to access the bus’ computer monitoring system (CAN-bus) on board the bus, via a cell phone. With such technology, little driver expertise is necessary.

About 10 electric buses are also in use in Chattanooga, TN and Miami Beach, FL. Their experiences could also be helpful to Cal Poly and San Luis Obispo. Some intensive marketing would be necessary to change the stereotypical public transit user. However, Mr. Griffith said SBETI would gladly help Cal Poly and San Luis Obispo make electric bus use a reality.

Contact information:
Paul Griffith, (805) 568-1985, 895-6949 (cell); paulgriffith@directway.com.
Santa Barbara Electric Bus Works, Inc. 550 Olive Street. Santa Barbara, Ca
www.sbeti.com (Santa Barbara Electric Transportation Institute)

Metropolitan Transit District (MTD): (805) 963-3364
550 East Cota Street Santa Barbara, Ca 93103

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Figure 1: The “Stingray” Cal Poly CE 424 rode.

Figure 2: Cal Poly CE 424 aboard the “stingray.”
Figure 3: The lead acid batteries at the Santa Barbara charging facilities. These must be watered and clean to prevent fires.

Figure 4: The 12 zebra batteries in the “stingray.”
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APPENDIX 7.9

10 MINUTE WALKING DISTANCES FROM BUS STOPS
A. Survey, Jud 2002, with CE 424 (details in TAB)

### APPENDIX 8.1

**Comparison with Other Campuses**

**Conclusion:** Cal Poly is considerably car-oriented.

<table>
<thead>
<tr>
<th>Campus Location in Relation to City</th>
<th>within city, 1 mi. from downtown</th>
<th>downtown</th>
<th>within city, 1 mi. from downtown</th>
<th>within city, 12-15 mi. from downtown</th>
<th>within city, 2 mi. from downtown</th>
<th>within city, 3 mi. from downtown</th>
<th>at edge of city, 3 mi. from downtown</th>
<th>at edge of city, 6 mi. from downtown</th>
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<tr>
<td>Total Student Population</td>
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<td>32,126</td>
<td>27,292</td>
<td>7611</td>
<td>18,799</td>
<td>16,800</td>
<td>7600</td>
<td>14,000</td>
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<td>1,975</td>
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<td>4,900</td>
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<td>1,600</td>
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<tr>
<td>Total Population</td>
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<td>45,871</td>
<td>8000</td>
<td>24,299</td>
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<td>15,800</td>
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<td>Total Number of Car Parking Spaces</td>
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<td>Car Parking Spaces/1000 Persons</td>
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<td>266</td>
<td>272</td>
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<td>% of Total Students Living on Campus</td>
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<td>14.7</td>
<td>19.7</td>
<td>20.2</td>
<td>16.5</td>
<td>5.3</td>
<td>43.3</td>
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*Includes the medical facilities on campus

Note: Population and parking space totals include residences on campuses.

---

B. Survey, Jud 2000 with CE 424 (on web*)

Comparison with other campuses:
The comparison with six other campuses indicates a high car use at Cal Poly, given the fact that the campus is relatively close to downtown. At UC Santa Barbara, bike use is six times higher than at Cal Poly. Santa Barbara reported that, on a nice day, out of 20,000 students, 14,000 reach the campus by bike.

The yearly parking fees at Cal Poly appear to be three-times less than at the UCs of Davis, San Diego, and Santa Barbara, and slightly less than at the state universities of Chico and Pomona. Some campuses restrict parking permits through lotteries. The traffic reduction measures at some campuses are impressive. The number of buses on campus per day is considerably lower at Cal Poly than at the campuses of Pomona, Chico, and Santa Barbara.

*at Facilities Planning, Master Plan 2001, Volume 2, letter 24
APPENDIX 8.2

ZONES OF INFLUENCE FOR PARKING GARAGES

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<td>Faculty Offices</td>
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</tr>
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<td>Science</td>
<td>33</td>
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<td>Engineering South</td>
<td>40</td>
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<td>Matt Gym</td>
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<td>PE class/offices</td>
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</tr>
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<td>CP Theater</td>
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<td>Music Center</td>
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<td>Science North</td>
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<td>Bookstore &amp; UU</td>
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<tr>
<td>Visitor Information</td>
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<td>Heath Center</td>
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<td>Conference Center</td>
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<tr>
<td>Mustang Stadium</td>
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<td>Cottage</td>
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<td>Cottage</td>
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<tr>
<td>Chase Hall</td>
<td>115</td>
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<td>Jesperson Hall</td>
<td>116</td>
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<td>Heron Hall</td>
<td>117</td>
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<td>Student Services</td>
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<td>Children's Complex</td>
<td>133</td>
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<td>ARDFA</td>
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<td>English</td>
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<td>Graphic Arts</td>
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## PARKING SPACES

### ZONE OF INFLUENCE #1

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<tr>
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<td>S. Perimeter</td>
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<td>G-1</td>
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<td>Poly View Dr.</td>
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**Total:** 1717<br>
(Eliminated: 38)

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(Eliminated: 242)

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**Total:** 3055<br>
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## SUMMARY

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<tr>
<td><strong>BIKE PARKING SPACES</strong></td>
<td>372</td>
<td>57</td>
<td>1125</td>
<td>1554</td>
</tr>
<tr>
<td><strong>CAR PARKING SPACES</strong></td>
<td>1717</td>
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<td>3055</td>
<td>5145</td>
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<tr>
<td><strong>BIKE P PER PERSON</strong></td>
<td>0.08</td>
<td>0.16</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td><strong>CAR P PER PERSON</strong></td>
<td>0.39</td>
<td>1.06</td>
<td>0.25</td>
<td></td>
</tr>
</tbody>
</table>

(Equals 1 P per 2.5 Persons) (Equals 1 P per Person) (Equals 1 P per 4 Persons)
Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
APPENDIX 8.5
CORDON BARRIERS – 2020+

Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
Background

In April, the Master Planning Committee requested an analysis of geographic-based pricing and/or limits and for the exploration of pricing options. Since that time the Master Plan - Transportation Committee has been meeting weekly to discuss these issues, to collect and analyze data and to develop this report. It should be noted that these proposals do not totally fulfill the requirements of the parking section of the master plan but merely represent a first step.

Geographic-Based Pricing and/or Limits

Findings

A comprehensive analysis of the use of geographic controls within the CSU and UC system as well as information regarding other universities was developed (Attachment A).

Of the 21 California State Universities queried, no California State University campuses restrict parking by geographic controls. Three University of California campuses - Berkeley, Santa Barbara, and UCLA - restrict parking using geographic controls. Of the 15 out-of-state campuses that were queried, six have geographic controls.

A review of the data collected from campuses with geographic controls agreed that geographic controls reduced the number of vehicles on campus. However, it was also learned that geographic controls greatly reduces the quality of customer service. Verifying addresses at point of sale is considered cumbersome (creates longer lines, unable to assist other customers in a timely manner, cashiers experienced more confrontations, numerous students show up with no proof of address due to beginning of academic term) and audits are necessary to control abuse. In addition, the use of geographic controls increases the pressure of students to park in nearby residential areas. It is anticipated that further encroachment of student vehicles into the neighborhood would seriously impact the University’s relationship with the neighbors and the city of San Luis Obispo.

Proposal

It is proposed that other options for reducing demand be used (i.e., carpools, bike paths, shuttles, subsidized bus service for passengers on specified routes only, etc.) before geographic controls are used. Geographic controls should only be considered for implementation if other options fail due to the high customer service issues, administrative costs and impact on the neighborhood.

Pricing Options

Findings

The committee determined that higher costs for parking permits should be considered in an effort to reduce the number of single occupancy vehicles on the campus and to maximize the utilization of parking spaces. Committee members strongly support the approach of providing an incentive to utilize alternate transportation versus the method of denial of services (geographic controls) and an increase in alternate transportation services should occur as parking permit costs are increased. The committee developed a matrix that identified potential programs and revenues taking into account the associated pros and cons, the fiscal impact, and barriers to implementation (Attachment B).
Collective bargaining issues restrain the changes that can occur in the parking program. Currently the parking permit fees paid by non-represented employees and students is higher than the fee paid by represented employees. An increase in parking fees for non-represented employees must be bargained. In addition, the current location of staff parking cannot be changed due to past practice. These constraints should be considered before any future parking spaces (lot or structure) are designated for use.

Parking for resident hall students is currently restricted in that these students can only park in lots designated for residents (R1 and R2 parking lots). The number of resident hall parking spaces is limited and is one of the most effective methods for reducing parking demand on campus. A “lottery” system was used beginning in Fall Quarter, 2002 to determine who would have a resident parking space. Depending on the number of resident parking spaces available (availability may fluctuate due to construction), additional parking in a remote lot may be needed. Most of the resident hall students are first-time freshman. This is the opportunity to begin their education in the benefits and use of alternate transportation that will hopefully carry forward with them during their tenure at the campus.

The campus currently subsidizes the City of San Luis Obispo bus program to provide bus rides for no cost to Cal Poly passengers. There has been dissatisfaction expressed by riders of the city bus regarding long headways and the lack of evening service. The City of San Luis Obispo is currently developing a short range transit plan to address these issues, among others.

The committee recognizes the need to improve bike paths on campus. Cal Poly has sent a letter in support of the City of San Luis Obispo’s grant application to the Bicycle Transportation Account (BTA) stating that the University and the city both have an interest in safe bike paths that both benefit and serve the local community. Bike paths that are separate from the vehicle traffic are considered safer and more desirable.

The lack of a campus shuttle increases traffic congestion on campus and the perceived need by individuals to bring a car.

Proposal
1. The cost of parking permits should be increased and based on the following:
   - oversell ratio of parking spaces (i.e., lower oversell rates result in higher parking permit fees)
   - the type of parking spot (i.e., 24-hour residential parking rates should be higher)
   - comparable prices (i.e., other campuses and local parking structures), and
   - financial needs of the Parking program, including the current and future debt service ratio.

Restrict new lots/structures to those paying the higher fees.

2. Restrict the number of resident hall parking spaces available as a major mechanism for reducing parking demand on campus. Coordinate the completion of a remote lot to coincide with the fluctuating resident hall parking spaces.

Begin discussion with the City of San Luis Obispo with the intent of increasing bus ridership by creating routes that would be more direct to Cal Poly (i.e., maximum 15 minute headways), determine their interest in providing a campus shuttle, and for the coordination of bike paths between the city and the campus.

Develop a bike path plan that, when possible, separates bike traffic from vehicle traffic.

Initiate a campus study to determine the best method for providing campus shuttle services. Coordinate the campus shuttle to coincide with the completion of a remote lot.
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MIT Forms Alliance With Zipcar Service

By Jessica A. Zaman

STAFF REPORTER

Getting around Boston this fall will be easier for MIT staff and graduate students. MIT Parking and Transportation has formed an alliance with Zipcar, a company that allows subscribers to drive cars placed around the city.

In an effort to make Zipcar services more accessible for staff and graduate students, MIT recently moved to subsidize the standard deposit and application fees for membership with Zipcar.

Lawrence R. Brutti, operations manager of MIT Parking and Transportation, felt the initiative has proved itself successful within a few short months. “The program was just kicked off after a meeting in late July,” Brutti said. “We’ve already got a couple hundred graduates and staff participating.”

Subsidies make Zipcar affordable

MIT Parking and Transportation has formed a relationship with Zipcar over the years, said Steve Oakley, Zipcar director of operations.

Over the past few months, Zipcar has worked with MIT to make Zipcar transportation affordable for members of the MIT community.

MIT affiliates have the advantage of a significant price break in comparison to the typical Zipcar customers. MIT subsidies help cover the standard insurance deposit of $300 and the $50 application fee.

Staff and graduates pay only an annual fee of $20 in addition to rental charges. The fee is credited to driving time.

Hourly rental charges for MIT affiliates ranges from $5 to $7. Maximum daily charges are $55 to $75.

‘Car-sharing’ a big success

Oakley said “250 MIT staff and graduates are currently Zipcar members.”

Zipcar surveyed 50 MIT Zipcar customers.

“Twenty percent indicated that they would not be buying a car because of Zipcar services,” Oakley said.

“I’ve always had very good results with Zipcar,” said Erica Schultz, Electronic Publishing Coordinator for MIT Press. Schultz, who has been a Zipcar member for two years, is happy to see MIT supporting Zipcar. “This alternative transportation is very cutting edge,” Schultz said.
Publicity for MIT's alliance with Zipcar was primarily “distributed organically over MIT's e-mail network and spread by word of mouth,” Oakley said.

**Undergrads may soon be eligible**

Because of insurance coverage issues, Zipcar does not extend their services to MIT undergraduates. Zipcar driving restrictions make students under 21 ineligible. Past restrictions prohibited students ages 21-25 from driving on nights and weekends. This restriction has been lifted, but Zipcar is in the process of reducing other restrictions.

“This is still a very new concept,” Oakley said. “The insurance companies don’t know what to expect. We want to be very careful in the beginning.”

**Not your average rental car**

Zipcar, a company founded by MIT Sloan School graduate Robin Chase ’86, allows members to use their access cards (Zipcards) to drive the 90 Zipcars parked in locations throughout the Boston metro area.

Zipcar is not a typical rental-car company. It is based on a European idea, giving people who aren’t car owners access to cars whenever they need.

Operations for Zipcars are primarily Web-based. Interested consumers subscribe for membership online. When in need of a ride, members search for cars available in the area. Reservations may be made in advance, or on the same day at least an hour in advance.

Zipcar members can reserve cars throughout the city of Boston, and even have access to cars in New York City and Washington D.C.

To register for Zipcar, visit [http://www.zipcar.com](http://www.zipcar.com).
TWO POSSIBLE PHASING OPTIONS – CALIFORNIA BLVD./FOOTHILL

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Facilities Planning & Capital Projects is publishing this document for information only; the suggestions herein are meant to stimulate discussion and their inclusion does not indicate that Cal Poly has or will act upon them.
APPENDIX 10.1
POSSIBLE PHASING OF PEDESTRIAN ZONES

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LEGEND

New
Existing, but made safer
Pedestrian Zone, some access o.k.

Alternative 1 appears to enhance safety & campus atmosphere more than Alternative 2

(Recommended by Erik J. & E. Jud)
APPENDIX 10.2

EXAMPLE OF MEASURING SUSTAINABILITY
Sustainability Rose for Two Projects

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SUMMARY OF RESEARCH ON VARIOUS MODES OF TRANSPORTATION

At Campuses/Locations of:

University Colorado, Boulder
Stanford University
University California Los Angeles
University California Berkeley
University California Davis
Humboldt State University
California State University Fresno
University California Irvine
California State University Dominguez Hills
San Francisco State University
Sonoma State University
California State University Sacramento
Bike Station Long Beach
Cal Poly Pomona
University California Santa Barbara
San Diego State University
City of Anaheim

CONTENTS

1. Parking
   1.1 General
   1.2 Parking Rates
   1.3 Spaces Per Bed
2. Pedestrians
3. Bicycles
4. Transit
5. Persons With Disabilities
6. Service Access

MORE INFORMATION

- “Technical Appendix Binder”,
- at Facilities Planning,
- at Eugene Jud, 756-1729, Bldg. 04-03, ejud@calpoly.edu,
- CSU website: http://www.calstate.edu/search_find/campus.shtml, or
- UC website: http://www.ucop.edu/
1. PARKING

1.1 General

UNIVERSITY COLORADO, BOULDER

- Autopark: 412-space parking structure. Attendant operated, open to the public, hourly rate.
- Permits assigned to particular parking lots. If assigned lot is full, may park in "overflow" lots.

STANFORD UNIVERSITY

- Clean Air Cash Rewards Program (rewards up to $160 per year for not driving to campus).
- Permit rates based on lot location.
- Residents can only park in their designated house or dorm areas.
- Freshman not allowed to bring a car to campus.

UNIVERSITY CALIFORNIA LOS ANGELES

- Stack parking. Attendant operated.
- Point based system for permits (standing, employment/academic obligations, commuter distance). Student status and all info provided are verified with campus records and random audits. Have carpool permits.
- Limited number of permits issued. When pay quarterly fee automatically mailed a renewal form for the following quarter.

UNIVERSITY CALIFORNIA BERKELEY

- Permits issued only to those living outside a 2-mile boundary from campus.
- Stack parking. Attendant operated.
- Plan to remove existing parking to make room for new developments and improvements; parking will be replaced in new facilities in remote locations to be connected by shuttle buses.

UNIVERSITY CALIFORNIA DAVIS

- Freshman living on-campus not allowed to bring a car or purchase permit (90 percent of freshman live on campus as well as other undergraduate and graduate students).
- Parking lots constructed on campus financed solely by user fees.

CALIFORNIA STATE UNIVERSITY FRESNO

- No resident parking permits. Only general permits for everybody.

UNIVERSITY CALIFORNIA SANTA BARBARA

- Permits are required Monday through Sunday 7:30 am –10:00 pm
- “mag stripe”: Access card to receive free night and weekend parking form machines in lots.
- Students living within two miles of campus are not eligible to park on campus during regular business hours
- Residential student parking is assigned on a lottery basis to students who live in UCSB residential halls
- Residential permits are issued on an annual basis only

SONOMA STATE UNIVERSITY

- Plan to site new classrooms/laboratory/office buildings along road entrances and parking lots to reinforce academic image of campus
- Plan to create large parking lot on edge of campus to decentralize parking and ease traffic congestion at peak hours
- Want to eliminate most parking from the central campus core

### 1.2 Parking Rates

#### UNIVERSITY OF CALIFORNIA BERKELEY

<table>
<thead>
<tr>
<th></th>
<th>Student</th>
<th>Resident</th>
<th>Disabled</th>
<th>Faculty/Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/month</td>
<td>$69.00</td>
<td>$72.00</td>
<td>$40.00</td>
<td>$75.00</td>
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All permit holders must pay a non-refundable $36 Annual Transportation Fee along with any applicable parking fee.

#### STANFORD UNIVERSITY

<table>
<thead>
<tr>
<th>Duration</th>
<th>“A” (close to buildings)</th>
<th>“C/RES” (no frills/residential)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>$9</td>
<td>$3.50</td>
</tr>
<tr>
<td>Academic (10-Month)</td>
<td>$390</td>
<td>$130</td>
</tr>
<tr>
<td>Annual (12-Month)</td>
<td>$468</td>
<td>$156</td>
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</tbody>
</table>

#### HUMBOLDT STATE UNIVERSITY

General $54.00/semester

#### CALIFORNIA STATE UNIVERSITY FRESNO

General $68.00/semester

#### UNIVERSITY OF CALIFORNIA IRVINE

<table>
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<tr>
<th>Duration</th>
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<tbody>
<tr>
<td>Commuter Annual</td>
<td>$396.00</td>
</tr>
<tr>
<td>Commuter Academic Annual</td>
<td>$297.00</td>
</tr>
<tr>
<td>Commuter Academic Quarter</td>
<td>$99.00</td>
</tr>
<tr>
<td>Resident Annual</td>
<td>$456.00</td>
</tr>
<tr>
<td>Resident Academic Annual</td>
<td>$342.00</td>
</tr>
<tr>
<td>Resident Academic Quarter</td>
<td>$114.00</td>
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#### UNIVERSITY OF CALIFORNIA SANTA BARBARA

<table>
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<tr>
<th>Duration</th>
<th>$/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty and Staff Annual</td>
<td>$420.00</td>
</tr>
<tr>
<td>Graduate Annual</td>
<td>$420.00</td>
</tr>
<tr>
<td>Commuter Annual</td>
<td>$315.00</td>
</tr>
<tr>
<td>Residential Annual</td>
<td>$315.00 (Except remote lot which is $252.00/year)</td>
</tr>
</tbody>
</table>

#### SONOMA STATE UNIVERSITY

<table>
<thead>
<tr>
<th>Duration</th>
<th>$/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-reserved Semester</td>
<td>94.00</td>
</tr>
<tr>
<td>Motorcycle Semester</td>
<td>22.00</td>
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<tr>
<td>Reserved Semester</td>
<td>262.00</td>
</tr>
<tr>
<td>Reserved Evening</td>
<td>175.00</td>
</tr>
</tbody>
</table>

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1.3 Spaces Per Bed

STANFORD UNIVERSITY

Average spaces per student bed  0.44
Spaces/Grad student bed  0.70

In 1999:  
9354 on-campus residents
4131 residential spaces
2516 residential/commuter spaces

UNIVERSITY OF CALIFORNIA DAVIS

4100 undergrads on-campus (including 90 percent of freshman = 3970 approx. freshman)
400 (approx.) graduate students on-campus

CALIFORNIA STATE UNIVERSITY FRESNO

1100 beds on-campus
Residents buy general permits and park in adjacent lots with 1008 spaces (lot also used by commuters)
Approx. 50 percent of on-campus residents bring cars
Approx. 85 percent of off-campus residents commute by car each day

UNIVERSITY OF CALIFORNIA IRVINE

4831 residents in central academic core (lower division undergraduates)
2171 of these residents purchase a permit (= 0,45 permits/bed)
0.9 parking spaces used/permit

1487 beds under construction on east campus (upper division undergraduates and graduates)
0.79 space/bed planned

UCI Main Campus Traffic Model (vehicular trips):
1.6 ADT/student undergraduate dorms
1.9 ADT/space general commuter

2. PEDESTRIAN

UNIVERSITY OF COLORADO AT BOULDER

- Most circulation is outdoors (Boulder is a “health-oriented community”); walkways along creek
  as well, plan to add walkways along desired lines of travel (worn paths on campus lawns)
- Pedestrian underpass (Broadway) – 2000 people at peak hours
- “Park-like” atmosphere – remove streets and add architecture, plants, and water features
- Pedestrians always have priority until and unless grade separation occurs while crossing streets
- All walkways built to handicap standards

UNIVERSITY OF CALIFORNIA BERKELEY

- Upgrading pedestrian routes in and around core
- Improving signage in and leading to campus, hope to minimize pedestrian/vehicle conflicts

SONOMA STATE UNIVERSITY

- Plan to strengthen existing and proposed quadrangles to improve pedestrian circulation
Plan to provide easily understandable primary circulation paths connected by major nodes, making key campus destinations clearly accessible
- Plan reinforce gathering spaces along the primary pedestrian routes through campus
- Would like to add secondary pedestrian paths in many places and reinforce clear pedestrian circulation paths from student housing to informational centers

3. BICYCLES

UNIVERSITY COLORADO BOULDER
- Few separated bike paths; usually shared with cars
- Have grade-separated under-crossing from campus to housing
- Campus bike spaces are around main academic core, adding more around and not in “dismount zone” (where biking is not permitted)
- Any street modification considers bike usage
- Looking into covered spaces and a bike station on or near campus

STANFORD UNIVERSITY
- Have bike storage lockers and bike garages; also have Palo Alto Bike Station at railroad station
- Rewards: Clean Air Cash, clothes lockers, showers, free towels

UNIVERSITY CALIFORNIA DAVIS
- Bike speed limits 15 mph on roads and 10 mph in parking lots
- Traffic circles
- Summer bike storage
- Bike Barn – Do-it-yourself bike repair and maintenance
- Showers, lockers, clubs for bike commuters

CALIFORNIA STATE UNIVERSITY DOMINGUEZ HILLS
- No riding bikes except on streets and bike routes (not on pedestrian walkways or in quads)
- 15 mph – same as car

SAN FRANCISCO STATE UNIVERSITY
- Bike Barn – Indoor bike parking area under the gym, includes bike security and all day attendants
- Bike Match Up Program – Help to find a partner to ride to school with

SOMONA STATE UNIVERSITY
- Bicycles, skateboards, roller skates, and scooter shall be used on campus only as an alternative mode of transportation and in a manner that is consistent with public safety
- Cannot exceed 5 mph in pedestrian zones.

CALIFORNIA STATE UNIVERSITY SACRAMENTO
- Free, staffed bicycle parking is available in two Bicycle Compounds.

UNIVERSITY CALIFORNIA SANTA BARBARA
- Two shower locations for bicycle commuters, Roberson Gym and Broida Hall
- Full size lockers available for bikers, ($55 annual rental student, $75 annual rental faculty and staff)
- Associated Students Bike & Skate Shop: Provide bike repair and safety information to students, staff, faculty, and alumni. Non-profit organization. M-F 10 – 5. Free tool loan program allows customers to work on their own bicycles (free rags, chain oil, cleaning solvent, grease, and technical advice). Also services skateboards.

BIKE STATION LONG BEACH (not on campus)
- Nexus for light rail, buses, pedestrians, and local shuttle services
- Valet parking in secure areas, bike repair and rentals, changing room/restroom, bike accessory shop
- Access to vehicle sharing services (electric bike, scooter rentals, and Flexcar)
- Refreshment bar with outdoor seating
- Bicycle information

4. TRANSIT

UNIVERSITY COLORADO BOULDER
- Transportation Center on East Campus (does everything including motor pool)
- Student bus pass program has cut greenhouse gas emissions and reduced growth in parking demand
- Universal bus passes for continuing faculty and staff members (approximately 2x number of Cal Poly faculty and staff)
- Over a thousand buses are routed next to or through the campus on any given weekday
- Service offered 7am to midnight with five to ten minute headways; Thursdays and Fridays service is extended to 3am
- Bus financed by student fees and accessed by student passes; integrate costs into housing charges, parking charges and other sources or funds.

CAL POLY POMONA
- Master Plan calls for a new Transportation Center near new academic plaza, will have covered waiting area and ticketing
- Tram service uses pedestrian walkways, shuttle service uses vehicular streets and parking lots for circulation
- Getting rid of tram! Not safe (open, low performance in poor weather, old, no air circulation). Replace with more shuttle buses (34 seats, safer, disability access, community accessible).

UNIVERSITY CALIFORNIA SANTA BARBARA
- 204 buses per day through the campus.
- Free for UCSB students, $1 each way for everyone else.
- Master Plan proposes roundabouts to serve bus stops on campus, bus mall, preferential bus, and possible shuttle routes.
- Dept. of Transportation Services purchases, schedules, and maintains the UCSB fleet of assigned and rental vehicles (sedan, suburban, mini-van, van)
- Transportation Alternative Program (TAP) Incentive card provides: six days of complimentary parking per quarter, Emergency Ride Home free once per quarter, Monthly drawing of 2 $50 UCSB Bookstore gift certificates.

STANFORD UNIVERSITY
- Free transit system, runs until midnight on weeknights, runs until 2:30 am on Friday and Saturday.
- Free golf cart transportation on campus
- Free on-call escort service

UNIVERSITY CALIFORNIA DAVIS
- Use Double Deck buses on campus to offer fun alternative public transportation

UNIVERSITY CALIFORNIA BERKELEY
- Intercampus shuttle service on weekdays (Berkeley to Davis and Mills College)
- Daytime and night safety shuttles
- Students ride on campus shuttles for free

UNIVERSITY CALIFORNIA LOS ANGELES
- Campus express shuttle system

HUMBOLDT STATE UNIVERSITY
- Two regional bus systems serve the campus, students ride at a discount. Also serves Park-and-Ride locations.

CALIFORNIA STATE UNIVERSITY SACRAMENTO
- Hornet Express Shuttle service free to students, staff, and faculty
- Guaranteed ride home to employees

SAN DIEGO STATE UNIVERSITY
- Shuttle service M-F until 10 pm on 15-minute intervals. Free of charge. One-way loop around campus perimeter and peripheral parking lots.
- Six bus routes run through campus, all are bike and disability accessible.
- Escort service available to all students form dusk until dawn at request.
- Light rail station under construction.

SAN FRANCISCO STATE UNIVERSITY
- Free shuttle services to campus community, all are wheelchair accessible.

CITY OF ANAHEIM (not a campus)
- Anaheim Electric Transportation Program retrofits older buses and shuttles to use alternative fuels and electric motors.
- These buses/shuttle are 2x price of a diesel bus.

5. PERSONS WITH DISABILITIES

UNIVERSITY CALIFORNIA BERKELEY
- Disabled parking permits available to permanently or temporarily disable faculty, staff, and students. May use DP permits in any spots except those that are restricted.
- Accessible shuttle service can be provided upon request.
STANFORD UNIVERSITY
- Honor any state DP placard in all marked parking spaces on campus.
- Temporary Disable Parking Permits only available for 30 days.
- Golf car service available to all students, faculty, and staff with limited mobility, except those with wheelchairs. Must be prearranged.

UNIVERSITY OF CALIFORNIA DAVIS
- Intercampus bus service (Berkeley to Davis), call ahead for wheelchair accessibility.
- Maintains two open-air wheelchair accessible tram buses that can be chartered for tours or special events.
- Davis Community Transit Service, Woodland Handi-Van, and Community Care Car all operate door-to-door services for senior and disabled residents. Must be registered.
- Disabled visitors displaying a disabled placard/plate may park in disabled spaces, time zones, and at parking meters at no charge.

UNIVERSITY OF CALIFORNIA LOS ANGELES
- On-campus transportation is available for students with permanent or temporary disabilities. Free wheelchair lift-equipped van, call ahead of time.

SONOMA STATE UNIVERSITY
- On-campus golf cart rides available to students with disabilities on request.
- Accessible van or car parking spaces designate for disabled persons must have parking permit.

UNIVERSITY OF CALIFORNIA SANTA BARBARA
- When display DMV disabled permit may park in any meter spot without paying
- When display DMV disabled permit and parking permit may park in any handicapped accessible space, or any general permit lot or time zone.

6. SERVICE ACCESS

UNIVERSITY OF COLORADO BOULDER
- Absence of proximate roadway access to many buildings forces service vehicles to drive and park on campus sidewalks.
- Some physical barriers have been installed to close off vehicular access to the plazas and other pedestrian areas.
- Service, delivery, and vendor vehicles are expected to park in accord with campus Parking and Traffic Regulations (need valid permits and must park in appropriate areas).
- Not exempt from parking fees.
- Vehicles may only park in loading zones for 15 min max.
- Service and delivery parking meters are available accepting coin or debt card (issued by Parking and Transit Services).

UNIVERSITY OF CALIFORNIA BERKELEY
- Central distribution receives official freight, inspects and then ships small deliveries to the ordering departments. If freight is too large, the ordering department is notified and must pick up the shipment themselves.
- Service and delivery vehicles are restricted to specific times and routes.
CALIFORNIA STATE UNIVERSITY FRESNO

- Delivery Permits.

UNIVERSITY OF CALIFORNIA SANTA BARBARA

- Construction permits are available for vehicles on campus supporting construction or renovation. Available only in specifically designated areas; not valid in parking facilities or lots.

Vendor parking permits are required for vendors who park on campus to repair or maintenance services to departments. Available only in specifically designated areas.
APPENDIX 12.2

SHORT ANNOTATED BIBLIOGRAPHY

Additional information can be seen in the Long Bibliography, located in the TAB.

V = Very Important
I = Important

1. Cal Poly

1.1 Precursor to Master Plan 2001
   I1.1.1 Associates, National Transportation Consulting Group. “Free-Fare Funding Analysis.”
   California Polytechnic State University. 2000.
   Contains valuable data, where Cal Poly students live.

1.2 Master Plan 2001 and Subsequent Report
   V1.2.1 Smart Consulting: Iacuaniello, C.; Tsudama, B.; Bower, C.; Brown, J.; Weaver, M.;
   Wilkinson, W. “Proposed Parking Solutions for California Polytechnic State University: A
   Feasibility Study.” 3 March 2002.
   Synopsis: Favors lot re-striping and lot pricing, and estimates costs.

   V1.2.2 Facilities Planning, California Polytechnic State University. “Cal Poly Master Plan and
   Synopsis: Plan is designed to meet the educational needs of the Campus, respond to
   growing demand for higher education, and address the role of the University as a member of
   the community.
   The report acts as guidance for approximately the next 20 years for Cal Poly and
   addresses academic program demand, physical and environmental constraints and
   opportunities, and capital and operating budget requirements to support a larger future
   enrollment.

   I1.2.3 Facilities Planning, California Polytechnic State University. “Cal Poly Master Plan and
   Environmental Impact Report – Comments and Responses to Comments Received on the
   Synopsis: Comments and responses to comments received on the public draft EIR.
   This report includes 60 letters and their responses to all questions presented in the
   letters. Near the back of the report is a table that summarizes all of the comments made on
   the Master Plan DEIR. E. Jud is contributor Nr. 24.

   V1.2.4 Stover, V. “Alternative Transportation Subcommittee at Cal Poly, Proceedings.”
   February 2002.
   This binder includes committee member information, final product meetings, specific
   projects, background info like campus sustainability programs, and other miscellaneous
   information.

1.3 Student Work
   V1.3.1. McKinnon, E.; McNeel-Caird, L. “University Transportation Survey 2002.” CE 424
   Synopsis: Compilation of information gathered by CE 424 from a diverse group of twelve
   universities including: CSU Bakersfield, CSU Chico, CSU Fresno, CSU Humboldt, CSU San
   Diego, CSU Stanislaus, Stanford, UC Berkeley, UC Davis, UC Santa Barbara, UC Santa
   Cruz, and University of Colorado at Boulder.
1.3.2 California Polytechnic State University, Civil and Environmental Engineering. “Evaluation of Pricing Policies for Parking at Cal Poly.” CE 528 Prof. E. Sullivan: Transportation Analysis.

Discusses the current parking situation at Cal Poly including the number of spots, permit prices, and number of students enrolled. A good study of geographic parking pricing at Cal Poly showing how additional income could be produced.

2. City and County

2.1 City of San Luis Obispo


Synopsis: Contains valuable measurable modal split objectives. Sees some future for regional rail.

This document describes how the city plans to provide for the transportation of people and materials within San Luis Obispo with connections to county areas and beyond.


Synopsis: Some relevance to Campus.

The purpose of this plan is to reduce people’s use of their cars by supporting and promoting alternatives such as walking, riding buses and bicycles, and using carpools.

2.2 San Luis Obispo Council of Governments


Synopsis: The regional transportation planning process is to provide a rational mechanism for determining how regional needs can be met. The process is long-range (20 years or more), area-wide, continuous, coordinated, and comprehensive. Sees some possible future for regional passenger rail in county.

3. California

3.1 Other Universities and Cities


Synopsis: Bikestation in Berkeley, CA.

The Bikestation at Downtown Berkeley offers a variety of different services to make bicycle commuting easier and more comfortable including: free valet bicycle parking, bike/transit information, local community and advocacy information, overnight bicycle storage, free air for tires, bicycle transportation maps, bicycle lights, and free bike checkups every Friday.

3.1.2 Master Plan Task Force, “CSUMB Master Plan.” California State University Monterey Bay.

Synopsis: Guides the CSUMB physical development of the campus over the next 30 years in a manner that supports and enhances the University’s educational mission and sustainability. Very well structured.

This Master Plan addresses the essential elements of the campus and their relationship to regional, physical, social, economic, and political factors. It establishes a broad physical framework for land use, development intensity, open space, circulation, and linkages to the surrounding community. The plan offers a degree of flexibility while providing an overall structure for the efficient, effective, and high-quality development.
http://www.ormp.ucdavis.edu/environreview/LRDP.html
Synopsis: UC Davis land use plan that will guide physical development on campus to accommodate projected enrollment increases and expanded and new program initiatives through the 2015-16 academic year.

This report outlines and addresses the planning principles that describe the desired character of future growth and development on the UC Davis campus: flexibility, longevity, dynamic teaching environment, accessible research environment, and interactive and welcoming public service environment.

Synopsis: The proposed plan outlines ways to strengthen the University's current transportation programs and continue to promote alternatives to single occupancy vehicle trips.

This plan outlines transportation demand management goals and objectives like adding additional on-campus housing, pursuing new land use patterns, and managing parking demand through parking restrictions and parking fees, in order to reduce vehicle commuters and traffic congestion on the Stanford campus.

4. USA – West Coast

4.1 Other Universities and Cities

Synopsis: Official guidelines for “skinny” streets in the whole Portland area, covering 1-3 million people.

Synopsis: Transportation technologies for the new age. Campus grows, but vehicular traffic does not!

The purpose of this website is to provide information about unconventional (therefore innovative) transportation technologies. Some of these technologies are operational, some are under development and some are still conceptual.

Synopsis: This University of Colorado at Boulder Campus Master Plan is the guide for future physical development of the campus.

This Master Plan addresses both a backlog of needs, and projections of future needs. This plan is a guide for the University of Colorado at Boulders capital investment and other physical changes on the campus. Objectives of this plan include: identifying institutional goals of pertinent campus planning, analyzing facility needs, to set forth the comprehensive framework plan for buildings, outdoor areas, environmental management, and transportation, and to address community relations.

Synopsis: Guides the future development on the University of Washington at Seattle campus.

The new plan determines how the Seattle campus can grow over the next decade and beyond in response to increasing student enrollment and research demands, while preserving the beauty of its physical environment and minimizing any impacts on its neighbors.
5. Rest of North America

5.1 General

I5.1.1 Rivard, Nicole. “No Parking: Savvy schools are discovering that building a parking lot is not necessarily the best way – or indeed the only ways – to solve campus parking problems.” Article from University Business. June 2002.

Synopsis: More parking is not always the answer. University of Rhode Island.


Study that provides costs values in a format designed to easily calculate and compare the full costs/benefits of transport policy and planning alternatives. Provides extensive reference information.


Contains a 36-point checklist of campus transportation planning principles. The primary purpose of this handbook is to provide practicing professionals and other interested parties with a basic day-to-day source of reference on the proven techniques of the practice.

5.2 Other Universities and Cities


Synopsis: Campus Growth at Stanford and University of Washington without increasing vehicular traffic. W. Toor is a leader in sustainable access to campuses and at the same time the Mayor of Boulder, Colorado.

Article outlining techniques used by Stanford University and University of Washington to help their campuses grow without increasing traffic.

Stanford University decreased traffic by paying employees not to drive, vastly increasing alternate modes of transportation, increasing on-campus student and faculty housing, and began renting cars to students.

University of Washington decreased traffic by creating the U-PASS program. This program improved transit, provided more bicycle facilities, and increased parking costs. The additional revenue goes towards alternate modes of transportation.


Synopsis: Important to provide access to the Campus without destroying the quality of the Campus as an educational community.

This report discusses various transportation modes. It discusses the growing dilemma associated with parking and includes and estimates on how much parking really costs. It also discusses numerous transportation demand strategies including a transit pass program, the bicycle and creating a pedestrian friendly campus, carpools, parking management, and creating more options. For each strategy, various universities are used as examples. There is also a discussion of joint planning projects which are taking place at various universities.

V5.2.3 Balsas, Carlos J.L. “Sustainable Transportation Planning on College Campuses.” Article in Press of the Transport Policy. Department of Landscape Architecture and Regional Planning, University of Massachusetts. 1 June 2002.

Synopsis: Excellent comparison of campuses Cornell, UW Madison, UC Boulder, UC Santa Barbara, Stanford, UC Davis, UO Eugene, UW Seattle.