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Chapter 1 Introduction

New Mexico State University (NMSU) has the potential to be considered one of the premier institutions in the southwestern United States in terms of recreational opportunities. Like many universities in the west, NMSU lies in a valley of glorious mountains (specifically the Organs, Dona Ana’s, and Roblado’s). NMSU also lies in a state, which receives over 300 days of sunshine every year, and winter days are often in the 60’s.

However, NMSU is not a campus designed to take advantage of the beautiful natural geography, sunny days, and mild weather. By many standards the NMSU campus is designed to accommodate automobiles versus bicyclists and pedestrians. The layout of the campus aside, NMSU is a campus that is relatively heavily traveled by bicyclists and pedestrians.

Thus the combination of ideal physical and climatic conditions and a desire to employ alternative modes of travel through bicycling and walking begs the questions, “Why is the campus not more bicycle and pedestrian friendly?” and “What can be done to turn NMSU into such a place?”

The purpose of the NMSU Bicycle Plan is to make the campus a more bicycle-friendly place where bicycling is a transportation mode that is safe, attractive, easy, and convenient. Bicycles could be used commuting and recreation for people of all ages in the university community whether they are students, faculty, or staff. The plan provides the university with a set of actions to begin this endeavor. The plan includes goals, policies suggestions, and recommendations for bikeways, bicycle parking, promotion programs, and safety education programs. NMSU will not become a model campus for bicycling overnight, but this plan is a first step toward getting there.

Bicycling is one mode among many, which share the roadways on campus. Frequently, roadway facility and funding decisions are made with little consideration for bicycling as a serious transportation mode. A goal of this plan is to provide bicyclists with an equal chance to travel and circulate safely and conveniently in, through, and around the campus.

At the same time, the needs of bicyclists must be integrated with the needs of the many other roadway users, including pedestrians, the disabled, emergency service and maintenance providers, transit and automobiles. There is already a circulation map for automobiles and the Roadrunner bus routes for campus. The Bicycle Plan will allow more comprehensive transportation planning in the city by complementing these other planning efforts.
Chapter 2 Background

The NMSU campus has great potential to be a bicycling place. A journey through campus on any given day will show a relatively large number of people of all ages and stations on campus biking for reasons from basic commuting to recreation.

Despite this relatively high level of usage, conditions can and should be improved. The NMSU campus over time has slowly become an auto-dominated place. The campus has one dedicated bicycle path that is completely separated from automobiles. However, this is an issue, which could be rectified with some retrofitting of selected areas of campus.

Because of the campus’ auto-dominated nature, most bicyclists have the same origins and destinations as motorists. Most bicyclists at some point during their trips are forced to share the road with automobiles and/or pedestrians, thus producing mode conflicts and increasing the chances for accidents. Consequently, the greatest opportunity for near-term improvements lies in repaving, re-stripping, and modifying many streets on campus to accommodate bicyclists to a greater degree and reduce modal conflict.
Why Promote Bicycling at NMSU?

Bicycling is the most efficient form of transportation in terms of energy expended per mile traveled. However, few bicyclists consciously ride for this reason. Bicyclists ride, in fact, for many reasons and the benefits are accrued by both the individual as well as society. Bicyclists have door-to-door mobility at the exact time they need it without wasting time locating parking.

Many bicyclists have access to either an individual or shared private automobile, however, they choose to ride a bike for environmental reasons. The environmental reasons range from the obvious one of air pollution to the more subtle, but just as real, problems of noise pollution, water pollution from roadway run-off, excessive paving resulting in reduced area for water drainage and loss of habitat, dependence on foreign oil, and so on.

Many bicyclists ride for the social and health benefits produced to include the environmental reasons mentioned above. Additional benefits include reduced stress, time saved by using a bike commute for daily exercise, and in some cases belonging to a club. Additionally these folks participate in a proactive method for reducing traffic congestion and freeing-up auto parking spaces every time they choose to bike it instead of drive it.

Bicycling can also be a time and cost saving method of commuting. From a public policy perspective; it is a worthy effort to provide safe and convenient personal mobility to those without cars. People without cars need access to not only the educational experience at NMSU, but also the employment opportunities, which can be found on campus. Additionally, students without automobiles would have at the minimum, a safe way to get from campus to the entertainment and shopping options beyond the confines of the campus. This purpose obviously would require a degree of cooperation with the City of Las Cruces; it is a worthy pursuit.

Project History

Dr. Robert J. Czerniak, Professor of Geography and Urban Planning at New Mexico State University, conceived the concept for this plan. Dr. Czerniak has felt this to be an important effort for some time now, and posed the bicycle plan project as an option to his Planning 475: Transportation Planning class at the outset of the Fall Semester of the 2001.

The class began work on the plan in early September 2001 and completed the plan in mid December 2001.
Chapter 3 Existing Facilities and Programs

On-street bicycle facilities

NMSU has a limited amount of bicycle lanes available within the campus core. Of the limited number, safety is a concern for the bicycle user as well as the non-bicycle user. The streets with bicycle lanes include:

- University Avenue presently accommodates a bicycle lane running East and West. The lane begins at South Main and abruptly ends before the on-ramp of I-25 past Triviz Street. The bicycle lane as a whole is a safety concern especially in the vicinity of the Triviz Street and University Avenue intersection. High volumes of traffic and limited signage add to safety concerns for this bicycle lane.

- Espina Street is confusing to the bicycle user. At one point Espina accommodated a bicycle lane but has since been “blacked” over. At some areas on this road the black paint material has faded and the issue of whether this is a bicycle lane or not is quite confusing. {Obviously, safety is a concern upon this high volume road for the user.}

- Wells Street contains partial bicycle lanes

- Payne Street, beginning at intersection of Stewart and Payne Street and ending at the intersection of Payne and Wells Street.

Off-Street Bicycle Facilities

In addition to the existing on-street bicycle lanes NMSU also presents bicycle users with a limited number of bicycle paths. Within the campus core the majority of pedestrian walkways are shared with bicycles. These spaces serve as the main throughways for bicycle users as well as pedestrian access. This can prove to be unsafe and inefficient for bicyclists and pedestrians. Pathways solely intended for bicycle usage include:

- A bicycle path running from the Educational Services building to Corbett Center

- A bicycle path running parallel on the west side of Union Avenue, beginning at the intersection of University Avenue and ending at the intersection of Main Street.

Bicycle Parking

A factor affecting bicycle use is the availability of secure convenient bicycle storage. Bicycle racks, instruments to safely lock bicycle while attending business, are distributed
unevenly throughout the campus. These racks are mainly located in close proximity to all buildings within the campus.

Traffic- High Volume Roads

With any transportation-planning project, safety is the main concern of the planners. With this bicycle plan the impact of high volume roads within or in direct proximity of the campus should be considered. They are as follows:

- University Avenue
- Triviz Street
- Espina Street
- Union Avenue
- Stewart Street
- Jordan Street

These roadways have been planned for using the utmost caution to ensure the safety of the bicyclists.

Bicycle Education Programs on Campus

Bicycle educational programs at NMSU are non-existent. Limited literature upon proper and legal bicycle use can be found at the NMSU Police Department within the same booklet of legal motor vehicle operations.
Chapter 4 The Campus Bicycle Use Survey

The primary concern of the NMSU Bicycle Plan is to provide students and faculty with the opportunity to bicycle safely and conveniently. The bicycle plan for NMSU should improve upon an existing network that is considered to be unbalanced. This plan focuses upon adapting the existing bicycle routes, consisting of disconnected bicycle lanes and paths, and implementing the new plan to create a safe and efficient bicycle network.

A campus survey instrument was distributed to 127 students to form a better understanding of bicycle use and needs at NMSU. The actual survey can be reviewed by turning to Appendix B: NMSU Bicycle Plan Campus Survey. A treatment of the survey can however, be viewed below. Having ridership and public input creates a base to develop informed recommendations for the NMSU campus in terms of bicycle use and needs.

Again, with safety being a primary concern, of all surveyed 58% of those surveyed have been involved in an accident or a near miss. It is important that NMSU work to reduce these occurrences.

A majority of those surveyed feel that NMSU is in need of more bike paths and routes (72%) to better serve the bicycle riders at NMSU. In fact, the lack of bicycle paths and routes was found to be the biggest bicycle problem on campus (41%). Of those surveyed, 78% feel that there should be a portion of campus designated to bicycle and pedestrian use only. The idea of a Campus Transportation Zone (CTZ) strategy was formulated with this in mind. The CTZ will be discussed later in the report.

Bicycle parking facilities are also considered to be lacking on the NMSU campus. 35% of those surveyed feel that bicycle-parking facilities are inadequate. When asked what is needed, 83.5% prefer additional racks being installed at individual buildings. Several buildings were mentioned when asked where additional bike rack should be installed including, Hardman Hall, Walden Hall, Corbett Center, Zuhl Library, Breland Hall, Frenger Food Court, Milton Hall, Business Complex, Astronomy Building, Science Hall, Biology Annex and Gerald Thomas. Immediate need is apparent at Hardman Hall, Walden Hall, Frenger Food Court and Zuhl Library. Currently, there are no bike racks present at Frenger Food Court, and those at Hardman Hall are almost always at capacity. Additional bike racks at Corbett Center and Breland Hall will eventually be needed.

Although bicycle registration exists at NMSU, many students are unaware of it. Of all respondents only 50% stated that they do not know about bicycle registration at NMSU. In addition, 68% of non-bike riders surveyed would consider riding a bicycle to campus if there were a 20% reduction in activities fees as an incentive.

See Appendix A for survey statistics.
Chapter 5 Campus Transition Zones (CTZ)

The defining of the CTZ (as described below) implies traffic calming techniques, which can easily be implemented in-line with the planning principles, and goals and objectives discussed in chapter 6 of this plan.

CTZ Concept

The concept for CTZ arose during the planning process out of the need primarily to aide in defining the study area. During this process it was recognized that zones should be defined at various stages of campus to determine how best to plan for a balanced transportation system (pedestrian, bicycles, and auto-mobiles) throughout campus and so that the weakest modes be protected in a logical manner. In addition these zones help to determine where the University and the City of Las Cruces need to begin collaborating with one another to achieve the most optimal planning solutions for both entities and so that neither one steps on the others toes.

Campus Transportation Zones

The concept mentioned above is reflected in the descriptions of the three zones below.

A. Zone 1 (Red)
   1. Bicycle/Pedestrian Dominant (Heavily Populated)
   2. Higher Density with Reduced Parking Facilities & Increased Bike Racks
   3. Automobiles Will Be Eliminated From This Area Over Time
   4. Center of Campus Activities

B. Zone 2 (Orange)
   1. Transition Zone (Moves People from Zones 1-3)
   2. Automobile Becomes Increasingly Dominant
   3. Housing & Recreational Facilities with Parking Facilities & Bike Racks

C. Zone 3 (Yellow)
   1. Auto Dominant
   2. Low Density Land Use
   3. Larger Parking Facilities

Further Zonal Descriptions and Purposes

Zone 1:

Zone 1 should be thought of as the core of campus and the activity epicenter of NMSU. Persons on foot or aboard a bicycle will dominate this zone. This zone is designed to ultimately rid the core of campus of automobile traffic, increase the safety and
convenience of pedestrians and bicyclists, and make this area an enjoyable place for people to not only move from one location to another, but to also gather and interact with each other.

Zone 2:

This zone is meant to be an area with a lessened focus on the pedestrian and bicyclists while still providing them with maximum safety. This zone will see a reintroduction of automobiles, but they will still be somewhat minimized in order to provide a safe environment for those moving into zone 1.

This zone encompasses campus housing, recreational, and entertainment facilities such as the Vista del Monte apartments, the Campus Activity Center, the Pan American Center, and Aggie Memorial Stadium.

This zone also signals a progressive transition into the auto-dominated ring around campus where the University and the City of Las Cruces should begin collaborative planning efforts.

Zone 3:

This zone is intended to service automobiles primarily. However, bicyclists and pedestrians cannot be ignored. Sufficient facilities should be provided in order to provide safe access to the roadways for more advanced bicycle riders.

Zone 3 is where the University and the City of Las Cruces should focus collaborative efforts. In comparison to the other two zones, this zone is characterized by low-density land uses.
Chapter 6 Implementation

This plan has been presented to members of the campus staff including representatives of the physical plant and key members of the University Leadership. Adoption of this plan is left solely to this group and campus advisory committees.

The NMSU Bicycle Plan is designed in such a manner that it is possible to update any or all of the chapters at any given time with more, better, and current data. The plan also allows for the addition of new chapters as Dr. Czerniak, future classes, and/or University Staff deem it to be necessary or prudent.

The successful implementation of the plan requires the following steps to make it useful and beneficial for the campus community at large:

1. Carry out the objectives of the 5 goals outlined in chapter 2 by implementing the immediate, short-term, and long-term action items; and
2. Open a dialogue between all members of campus to determine if other suggestions made in this plan are feasible, reasonable, and agreeable.

If the University chooses to adopt the plan as it stands or with additions, they must then implement it. Many of the specific actions described in this Plan require further public review and input, detailed evaluation, identification of funding sources, and further approvals by the University and possibly the City of Las Cruces if joint efforts are decided upon.

The immediate steps following adoption of the NMSU Bicycle Plan are:

1. Set priorities for the proposed bicycle projects and programs.
2. Develop more detailed bicycle design plans with input from the community; and
3. Define the staff needed to implement the Plan and identify the resources for that staffing level.

One of the University's major challenges in implementing the Bicycle Plan will be finding the funding for capital projects.

Principals, Goals, Objectives, and Recommendations

Planning Principles

1. Define the study area of the plan and transition zones between the City of Las Cruces planning area and that of the campus, and identify transportation strengths and weaknesses to integrate the NMSU Bicycle Plan with the City of Las Cruces and the Las Cruces Metropolitan Planning Organization (MPO) Bicycle Facility Plan.
2. Reform areas with mode conflicts and provide buffers between modes.
3. Embrace the concept that the core of campus is a bicycling and pedestrian environment while taking into account those persons with mobility, hearing, and or vision impairments.

4. Employ and provide traffic calming techniques, appropriate and adequate facilities for all modes to aid the safety and convenience of pedestrians and bicycle access to all destinations within the campus core of a reasonable walking and bicycling distance.

5. Accommodate bicycles on arterials and make bicycling an equitable mode of transportation within the inner-campus zones.

6. Develop instruments to gauge public opinion concerning all user concerns of the NMSU Bicycle Plan.

7. Develop a method for coalition building to ensure ongoing dialogue concerning bicycling education and safety.

8. Move bicycle commuting to the top of the list for auto trip reduction.

GOALS, OBJECTIVES, and POLICIES

The goals and objectives of this plan are diverse and in some cases undoubtedly controversial. Full implementation is planned over a 10-year time frame. The action items discussed below will address the goals and objectives in three phases. Immediate actions will be take place within three (3) years of adopting the plan. Short-term actions will be accomplished in three to five (3-5) years, and Long-term actions will be accomplished within five to ten years (5-10).

Goal 1. Promote connectivity for bicycles on campus by creating a bicycle network.

Objective 1
Adopt and maintain a NMSU Bicycle Facility Plan through continuous and coordinated review, analysis and implementation.

Objective 2
Construct new bicycle facilities on campus, separating modes of transportation, wherever possible.

Objective 3
Provide for improvements to pedestrian facilities, street lighting, and landscaping with the implementation of any bicycle facility.

IMMEDIATE ACTION ITEMS

Construct a bike lane on Williams Street from Frenger mall to Sam Steel.

Construct a bike lane on Jordan Street connecting the existing University Avenue and the Women’s Residence Center (WRC) paths. This includes changing parking entrances from Jordan.
Eliminate on-street parking at fraternity houses along Wells Street. Construct a bike lane connecting the two sections of existing bike lanes on Wells Street. This provides a bike lane from east—west sides of campus.

Construct a bike path/lane connecting the University Avenue path to the International Mall across the east end of the Horseshoe.

**SHORT-TERM ACTION ITEMS**

Construct a bike lane (with appropriate dismount zones) on Locust Street from Corbett Center to Wells Street. This would require installing parallel parking on both sides of Locust Street north of Stewart Street and eliminating angle parking.

Construct a bike lane (with appropriate dismount zones) along Williams Street from Frenger Mall to Espina by Cole Village. This should be accomplished by striping bike lanes on either side of the road.

Construct a bike lane (with appropriate dismount zones) the entire length of Stewart Street. This should be accomplished by striping the road with bike lanes in either direction. This will require removal of the center left-turn lane on Stewart east of Williams Street and west of Locust Street.

![Present conditions on Stewart Street, east of Williams Street and west of Locust Street](image_url)

**Stewart St.**  
The turning lane in the center of Stewart should be eliminated. Stewart St. should accommodate two-way traffic without the center turning lane. The proposed bike lanes, both northbound and southbound, should be located near the edges of Stewart and each is 5’ wide to accommodate the bicycle lanes.  
Stewart should be equipped with left hand turn lanes for automobiles. The proposed bike lanes, both northbound and southbound, should be located near the edges of Stewart and each be 5’ wide to accommodate the bicycle lanes. Stewart should be equipped with left hand turn lanes for automobiles at the intersections.
Produced improvements to Stewart Street to better accommodate bicyclist

Construct a bike lane from the Eastern end of the Horseshoe heading south to eventually meet with the proposed lane on Stewart Street.

Present conditions at the Horseshoe and N. Wendell:

N. Horseshoe and N. Wendell
Currently, N. Wendell south of N. Horseshoe is 34’ wide accommodating two-way traffic and on-street parking. N. Wendell north of N. Horseshoe is 34’ wide, closed to traffic from the Horseshoe and the parking lot between Guthrie Hall and the Chemistry Building is used for motorcycle parking.
The southbound bike lane should intersect the existing bike path on University at N. Wendell travel south through the motorcycle parking and continue along N. Wendell to S. Horseshoe. To accommodate vehicle traffic in this area N. Wendell should be a one-way street southbound, still allowing on-street parking in front of Hadley Hall.
The northbound bike lane at S. Horseshoe and N. Wendell should follow the Horseshoe around the East side of Hadley Hall on the right side of Horseshoe Ave. and intersect N. Wendell. The bike lane should then continue through the motorcycle parking to the University bike path.
Barricades, such as parking curbs, should be placed to allow for the free travel of bicycles along the bike lanes, but prevent automobiles from entering.
Proposed improvements to Horseshoe

Relocate bike lane on University adjacent to roadway. Place the pedestrian walkway farthest from the road.

Add bicycle awareness signs throughout campus and the length of University Avenue.

Construct a connecting path from Garcia Hall to Alumni Avenue west of the duck pond.

Construct a bike path that connects the Locust Street bike path at Garcia to the bike lane south on Locust Street from Corbett Center. This path will go behind the cement stage (west).

**LONG-TERM ACTION ITEMS**

Construct a bike path that will run through the center of or the natural break between the intramural fields, which are located behind the Activity Center and Natatorium on Stewart Street. In effect this path would connect Stewart and Wells Streets (with a dismount zone at the north end).

Construct a bike path starting at the existing path near Jordan Street. It will run in front of Corbett Center and continue to Espina Street via Frenger Mall.
Construct a bike path that follows the sidewalk from the Pan American Center past Alumni Hall to the Locust Street bike path at the southeastern corner of Corbett Center.

Close Espina to cars (South end of the Horseshoe to Frenger Mall) with access for service and delivery vehicles.

Close Stewart St. to cars. Develop plan for a transit/bike way.

Construct a tunnel for bicyclist to cross Traviz under University Ave. This action must be integrated with the city plans and intersections and continue to review and improve network design of lanes and paths.

**Goal 2. Promote safety for bicycles on campus by reducing the number of accidents.**

**Objective 1**
Encourage the adoption of specific facility and system design criteria for bicycle facilities and the elimination of all hazards as part of transportation network improvements.

**Policies**
The American Association of State Highway and Transportation Officials’ “Guide for the Development of Bicycle Facilities”, as amended, should be used as a basis for developing bicycle facility design criteria, and used for planning and constructing bicycle facilities.

All facilities should be signed and striped according to the requirements of the Manual of Uniform Traffic Control Devices, as amended.

Drainage grate inlets and utility covers should be compatible to bicycle usage to provide for more bicycle friendly traveling surfaces, including transition to drainage grates.

Safety rails should be provided for bicycle facilities adjacent to steep grades or slopes.

**Objective 2**
Establish a bicycle awareness campaign and safety program that promote usage of bicycles as a mode of transportation including the production of maps showing existing and proposed bicycle facilities.

**Policies**
Provide all students attending orientation with information pertaining to bicycle registration and use on campus.

**Objective 3**
Decrease auto use within the core of campus.
Chapter 7 Current and Proposed Connectivity of the Campus Bicycle Network

Campus Bicycle Plan Connectivity With City of Las Cruces' Bicycle Facilities

A more efficient bicycle facility for both the University and the City of Las Cruces will result if connected routes and paths are established between both plans. The current status of the two plans does not establish connectivity.

- Triviz Street contains a bicycle path, but presents a lack of safety for the bicycle user. The user must cross Triviz Street before entering campus. This entails two crossings. Both crossing Triviz Street to access a safe crossing point and then crossing University Avenue, which is also considered dangerous for the bicyclist. Once University Avenue has been crossed, no bike path or lane is awaiting the user on campus.

- South Main Street has a city established bike facility. However, this facility posses dangerous obstacles for bicyclist’s crossing over and riding into the campus core.

- The Las Cruces MPO has planned future bicycle facilities adjacent to NMSU, but aside from the above-mentioned facilities none have been constructed.

Connectivity of the Current Facilities

While attempting to implement a bicycle plan, the most important concern is the safety of the pedestrians and the user. If this goal is met, connectivity is secondary significant goal. Currently, the connectivity of the bicycle routes is unbalanced and inefficient. Limited bike paths and lanes, along with dangerous crossings, limited signage and the plethora of private auto facilities impede the bicycle user. These variables result in a campus bicycle facility that has unbalanced and relatively poor connectivity. The poor connectivity of the existing system can be seen below.

The proposed bike land and path network for the New Mexico State University vastly improves the bicyclist’s ability to move across the network. Although overall circuitry (as represented by the Gamma indices) remained the same as the current, divided networks the important fact is represented by the Alpha indices. The Alpha index portrays the overall linkage of the nodes in the network to one another. The fact that the network moves from 0 (or no real linkage from one end of the network to the other) to 0.147 shows that the network has become much more linked than it was. The Beta indices are a general test of the connectivity of the network and show the increase in general connectivity with the proposed network. The significance of the abstraction can be seen best simply by looking at the visual improvement to the network. After the implementation of the proposed links, where once there were four networks with no links
between them, there is now a singular network, which allows a bicycle rider to move throughout the campus without leaving the network.
Appendix A:
NMSU Campus Bicycle Survey
Familiarity with bike ordinances (scale of 1 - 10)

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<td>2</td>
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<td>3</td>
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<td>4</td>
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<td>9</td>
<td>1.57%</td>
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<tr>
<td>10</td>
<td>1.57%</td>
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Do you obey ordinances? (if above answer was below 5 'NO' answer was input)

a) yes 23.62%
b) no 76.38%

Ride bike to campus for 20% activity fee reduction?

a) yes 82.68%
b) no 17.32%

Bike parking on campus adequate?

a) yes 65.35%
b) no 34.65%

If parking is inadequate what is needed?

a) more racks in current locations 23.62%
b) different kind of rack 9.45%
c) racks in new locations 12.60%
d) n/a (don’t know or answered no to above) 54.33%

Which would you prefer?

a) centralized parking facilities 15.75%
b) racks at individual buildings 84.25%

Opinion of current NMSU bike registration

a) oppose 7.87%
b) favor 14.96%
c) neutral 25.20%
d) don’t know about it 51.97%

What is the biggest bike problem on campus?

a) no problem 14.96%
b) lack of path / routes 41.73%
c) lack of parking facilities 3.94%
d) safety 19.69%
e) security of bike 13.39%
f) other 6.30%
If NMSU campus was designated bike / pedestrian would you ride a bike to campus?

<table>
<thead>
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<td>b) no</td>
<td>16.54%</td>
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<td>c) maybe</td>
<td>30.71%</td>
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<tr>
<td>d) already ride</td>
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<td>c) 35-45</td>
<td>3.94%</td>
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<td>d) &gt;45</td>
<td>0.79%</td>
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<th>Bicycle type</th>
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<td>a) mountain bike</td>
<td>44.88%</td>
</tr>
<tr>
<td>b) 10-speed</td>
<td>4.72%</td>
</tr>
<tr>
<td>c) BMX bike</td>
<td>12.60%</td>
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<td>d) no bike</td>
<td>37.80%</td>
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## Bicycle Use Survey Statistics (Bike Respondents)

All statistics based on 57 responses:

### Travel Distance to the University (in miles)

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<th>Percentage</th>
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<td>&gt;1-5</td>
<td>38.60%</td>
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<td>&gt;5-10</td>
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</tr>
<tr>
<td>&gt;10</td>
<td>0.00%</td>
<td>1</td>
</tr>
</tbody>
</table>

### How safe is campus (scale of 1 - 10)?

<table>
<thead>
<tr>
<th>Safety Level</th>
<th>Percentage</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.02%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.00%</td>
<td>6.245614</td>
</tr>
<tr>
<td>3</td>
<td>5.26%</td>
<td>Median</td>
</tr>
<tr>
<td>4</td>
<td>5.26%</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>26.32%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8.77%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>17.54%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8.77%</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>7.02%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>14.04%</td>
<td></td>
</tr>
</tbody>
</table>

### Have you ever been involved in an accident or near miss?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) yes</td>
<td>64.91%</td>
</tr>
<tr>
<td>b) no</td>
<td>35.09%</td>
</tr>
</tbody>
</table>

### Should some parts of campus be bike and pedestrian only?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) yes</td>
<td>80.70%</td>
</tr>
<tr>
<td>b) no</td>
<td>19.30%</td>
</tr>
</tbody>
</table>

### Should NMSU create more bike paths / routes?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) yes</td>
<td>77.19%</td>
</tr>
<tr>
<td>b) no</td>
<td>22.81%</td>
</tr>
</tbody>
</table>

### Familiarity with bike ordinances (scale of 1 - 10)

<table>
<thead>
<tr>
<th>Ordinance Level</th>
<th>Percentage</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>31.58%</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>14.04%</td>
<td>3.385965</td>
</tr>
<tr>
<td>3</td>
<td>10.53%</td>
<td>Median</td>
</tr>
<tr>
<td>4</td>
<td>5.26%</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>28.07%</td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1.75%</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3.51%</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1.75%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3.51%</td>
<td></td>
</tr>
</tbody>
</table>

Do you obey ordinances? (if above answer was below 5 'NO' answer was input)
- **a)** yes 33.33%
- **b)** no 66.67%

Ride bike to campus for 20% activity fee reduction?
- **a)** yes 100.00%
- **b)** no 0.00%

Bike parking on campus adequate?
- **a)** yes 61.40%
- **b)** no 38.60%

If parking is inadequate what is needed?
- **a)** more racks in current locations 29.82%
- **b)** different kind of rack 12.28%
- **c)** racks in new locations 12.28%
- **d)** n/a (don't know or answered no to above) 45.61%

Which would you prefer?
- **a)** centralized parking facilities 10.53%
- **b)** racks at individual buildings 89.47%

Opinion of current NMSU bike registration
- **a)** oppose 5.26%
- **b)** favor 19.30%
- **c)** neutral 35.09%
- **d)** don't know about it 40.35%

What is the biggest bike problem on campus?
- **a)** no problem 15.79%
- **b)** lack of path / routes 50.88%
- **c)** lack of parking facilities 5.26%
- **d)** safety 8.77%
- **e)** security of bike 15.79%
- **f)** other 3.51%

If NMSU campus was designated bike / pedestrian would you ride a bike to campus?
- **a)** yes 40.35%
- **b)** no 1.75%
- **c)** maybe 15.79%
- **d)** already ride 42.11%
<table>
<thead>
<tr>
<th>Sex</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>m) male</td>
<td>66.67%</td>
</tr>
<tr>
<td>f) female</td>
<td>33.33%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 18-25</td>
<td>77.19%</td>
</tr>
<tr>
<td>b) 25-35</td>
<td>21.05%</td>
</tr>
<tr>
<td>c) 35-45</td>
<td>1.75%</td>
</tr>
<tr>
<td>d) &gt;45</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bicycle type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) mountain bike</td>
<td>71.93%</td>
</tr>
<tr>
<td>b) 10-speed</td>
<td>8.77%</td>
</tr>
<tr>
<td>c) BMX bike</td>
<td>17.54%</td>
</tr>
<tr>
<td>d) no bike</td>
<td>1.75%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zone</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.02%</td>
</tr>
<tr>
<td>2</td>
<td>8.77%</td>
</tr>
<tr>
<td>3</td>
<td>36.84%</td>
</tr>
<tr>
<td>4</td>
<td>33.33%</td>
</tr>
<tr>
<td>5</td>
<td>14.04%</td>
</tr>
</tbody>
</table>
Bicycle Use Survey Statistics (Non-Bike Respondents)

All statistics based on 70 responses.

Primary Mode of Transportation
b) car 65.71%
c) walk 30.00%
d) other 4.29%

Travel Distance to the University (in miles)
a) 0-1 37.14% Mean
b) >1-5 45.71% 4.723571
  Median
  2

c) >5-10 11.43%
d) >10 5.71%

How safe is campus (scale of 1 - 10)?
1 8.57% Mean
2 1.43% 5.582857
3 11.43% Median
4 7.14%
5 30.00%
6 4.29%
7 10.00%
8 14.29%
9 2.86%
10 8.57%

Have you ever been involved in an accident or near miss?
a) yes 52.86%
b) no 47.14%

Should some parts of campus be bike and pedestrian only?
a) yes 75.71%
b) no 24.29%

Should NMSU create more bike paths / routes?
a) yes 68.57%
b) no 31.43%

Familiarity with bike ordinances (scale of 1 - 10)
1 60.00% Mean
2 11.43% 2.342857
3 5.71% Median
4 2.86% 1
5 8.57%
6 2.86%
7 7.14%
8 0.00%
9 1.43%
10 0.00%

Do you obey ordinances? (if above answer was below 5 'NO' answer was input)
a) yes 15.71%
b) no 84.29%

Ride bike to campus for 20% activity fee reduction?
a) yes 68.57%
b) no 31.43%

Bike parking on campus adequate?
a) yes 68.57%
b) no 31.43%

If parking is inadequate what is needed?
a) more racks in current locations 18.57%
b) different kind of rack 7.14%
c) racks in new locations 12.86%
d) n/a (don't know or answered no to above) 61.43%

Which would you prefer?
a) centralized parking facilities 20.00%
b) racks at individual buildings 80.00%

Opinion of current NMSU bike registration
a) oppose 10.00%
b) favor 11.43%
c) neutral 17.14%
d) don't know about it 61.43%

What is the biggest bike problem on campus?
a) no problem 14.29%
b) lack of path / routes 34.29%
c) lack of parking facilities 2.86%
d) safety 28.57%
e) security of bike 11.43%
f) other 8.57%

If NMSU campus was designated bike / pedestrian would you ride a bike to campus?
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) yes</td>
<td>27.14%</td>
<td></td>
</tr>
<tr>
<td>b) no</td>
<td>28.57%</td>
<td></td>
</tr>
<tr>
<td>c) maybe</td>
<td>42.86%</td>
<td></td>
</tr>
<tr>
<td>d) already ride</td>
<td>1.43%</td>
<td></td>
</tr>
</tbody>
</table>

Sex
- m) male | 51.43% |
- f) female | 48.57% |

Age
- a) 18-25 | 84.29% |
- b) 25-35 | 8.57% |
- c) 35-45 | 5.71% |
- d) >45 | 1.43% |

Bicycle type
- a) mountain bike | 22.86% |
- b) 10-speed | 1.43% |
- c) BMX bike | 8.57% |
- d) no bike | 67.14% |

Zone
- 1 | 8.57% |
- 2 | 20.00% |
- 3 | 27.14% |
- 4 | 27.14% |
- 5 | 17.14% |
Appendix B: Current and Proposed Bike Lane/Path Network
Current and Proposed Bike Lane/Path Network

- Current Nodes
- Proposed Nodes
- Current Links
- Proposed Links
Index Analysis of Current and Proposed Bike Lanes and Paths at NMSU

Current System – 4 Networks

Network 1

Edges (e): 5

Vertices (v): 6

Alpha Index: \((5-6+1)/(12-5) = 0/7 = 0\)

Beta Index: \(5/6 = 0.833\)

Gamma Index: \(5/3(6-2) = 5/12 = 0.417\) Spinal

Network 2

Edges (e): 4

Vertices (v): 5

Alpha Index: \((4-5+1)/(10-5) = 0/5 = 0\)

Beta Index: \(4/5 = 0.8\)

Gamma Index: \(4/3(5-2) = 4/9 = 0.444\) Spinal

Networks 3 and 4
Edges (e): 3
Vertices (v): 4

Alpha Index: \(\frac{(3-4+1)}{(8-5)} = \frac{0}{3} = 0\)
Beta Index: \(\frac{3}{4} = 0.75\)
Gamma Index: \(\frac{3}{3(4-2)} = \frac{3}{6} = 0.5\)  Spinal

**Proposed System – 1 Network**

Edges (e): 50
Vertices (v): 40

Alpha Index: \(\frac{(50-40+1)}{(80-5)} = \frac{11}{75} = 0.147\)  Spinal
Beta Index: \(\frac{50}{40} = 1.25\)
Gamma Index: \(\frac{50}{3(40-2)} = \frac{50}{114} = 0.438\)  Spinal
New Mexico State University
Current and Proposed Bicycle Paths and Lanes

New Mexico State University
Current and Proposed Bicycle Racks

New Mexico State University
Current Bicycle Racks
by Type and Capacity

Source: Facilities & Operations Utilities. 2001
Campus Transportation Zones (CT'Z)

Campus Transportation Zones
- Zone 1 - Bicycle/Pedestrian Dominant
- Zone 2 - Transition
- Zone 3 - Auto Dominant

Source: Facilities & Operations Utilities, 2001
Accident: any event causing injury or material damage, to or by a bicyclist.

Alpha index: a basic ratio for evaluating the relative connectivity of and entire network. The equation for the alpha index is:
\[
\text{alpha} = \frac{\text{edges} - \text{vertices} + \text{circuits}}{(2 \times \text{vertices})-5}
\]

Arterial: part of the roadway system that serves as a principle road for through traffic. The routes that connect principle areas of traffic generation and/or major land uses.

Beta index: simple ratio of edges to vertices. The equation of the beta index is:
\[
\text{beta} = \frac{\text{edges}}{\text{vertices}}
\]

Bicycle: a vehicle with two wheels tandem, a steering handle, a saddle seat, and pedals by which it is propelled.

Bicycle Lane: a bikeway designated by signs and pavement markings.

Bike Locker: an enclosed storage cubicle for bicycles that can be locked.

Bicycle Path: a bikeway completely separate from motor vehicle traffic and that is contained within an independent right-of-way.

Bicycle Parking Device: a stable structure for the purpose of providing a safe place to store a bicycle.

Bike Rack: a bicycle parking device made of a metal beam or rod, curved in a way that does not allow personal bicycle locks to be removed by ordinary means.

Bikeway: a thoroughfare for bicycles.

Capacity: maximum number of vehicles per unit of time that can travel a given street. Also called maximum flow rate.

Collector: the roadways that distribute and collect traffic between major roadways (arterials) and local roadways.

Connectivity: degree to which all pairs of nodes are interconnected.

Flow rate: the number of vehicles per unit of time that pass a given point.

Edge (arcs): a line segment in a geographic network.

Gamma Index: a basic ratio for evaluating the relative connectivity of an entire network. The ratio between the actual numbers of edges to the maximum possible number of edges. The equation for the gamma index is:
\[
\text{gamma} = \frac{\text{edges}}{3(\text{vertices}-2)}
\]

Intersection: a place where a street, sidewalk, or bikeway intersects one, or more than one, street, sidewalk, or bikeway.

Local Street: roadway used primarily for direct access to residential, commercial, industrial, or other property.
Near Miss: occurs when any mode is in danger of causing or being involved in a conflict such as a collision with another mode and one or more modes is forced to come to a stop in order to avoid the conflict.

Pedestrian: of, related to, or designed for walking.

Sidewalk: a paved walk at the side of a street.

Speed: rate of motion. Calculated by dividing distance by the time it took to travel that distance.

Street: a public thoroughfare, usually paved, and larger than an alley or lane.

Travel Distance: the distance traveled from one's home to NMSU campus.

Vertices (nodes): points in a geographic network.