



THE UNIVERSITY *of* NORTH CAROLINA
GREENSBORO



CAMPUS BICYCLE MASTER PLAN

May.2008

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Executive Summary

This Executive Summary provides a brief review of all of the sections contained in the UNCG Bicycle Master Plan (the “Plan”). The Plan was begun in January 2008 and completed in May 2008. The Plan is the first of its kind for the University and will serve as a guiding document for the development of campus bicycle facilities, programs, and policies to encourage cycling.

Section 1. Introduction

While previous University plans and surveys have addressed bicycle ridership, the Campus Bicycle Master Plan (“Plan”) is the first comprehensive bicycle study developed for the University of North Carolina at Greensboro (UNCG). The purpose of the Plan is to promote bicycling as a sustainable travel mode on campus, while also enhancing the bicycling environment through identification of ancillary improvements such as additional bicycle parking and safety-education programming. The inherent benefits of this Plan and its implementation include increased options for sustainable transportation on campus, better air quality, improved health and wellness of students and staff, and a decreased environmental footprint for the University.

Throughout the planning process, a Steering Committee of University students, faculty and staff provided guidance and input to create a Plan that will serve the entire campus community. The Plan focuses on creating a safe biking environment and providing more convenient bicycle opportunities for University commuters and recreational riders alike. The following goals and objectives were created by the Steering Committee as tools to help focus the Plan on UNCG’s needs.

- **Safety.** To have safe bicycle routes and facilities where bicyclists of varying skill levels feel comfortable riding their bikes. In this atmosphere, bicyclists are aware of the “rules of the road,” bicycle lanes are kept clear of parked cars, and bicyclists enjoy high visibility as viable users of area roadways.
- **Connectivity.** To create an inter-connected network of bicycle facilities including marked bike lanes and off-road trails that allow for access to all destinations on campus, as well as links to key destinations off-campus, such as student and staff housing, shopping and retail districts and downtown so that the students, faculty and staff can travel by bicycle to work, school, and shopping destinations.
- **Incentives & Amenities.** To develop bicyclist-friendly amenities that will make bicycling an easy and convenient mode choice and incentivize bicycling in small ways to promote cycling as a viable commuter choice.
- **Education & Encouragement.** To educate bicyclists and motorists alike about the benefits of safe bicycling by distributing informational pamphlets, engaging staff and students in campus-wide bicycle safety programs and hosting University-sponsored bicycling activities (e.g. “Bike to Work Week” event).
- **Aesthetics.** To maintain the visual appeal and appearance of the campus, while also providing effective bicycling facilities.

Section 2. Evaluating Current Conditions

This section provides the physical and demographic context for the UNCG Bicycle Master Plan and its recommendations by providing a review of current demographics and expansion plans, existing physical conditions, a crash analysis, and the results of the Plan’s public involvement process. The results of this section indicate that while 2% of current campus trips are by bike, University students and staff have a great interest in cycling. Many non-cyclists who participated in a campus-wide

survey indicated that they would like to bicycle commute, given better facilities and more incentives for cycling. Many participants of the survey and March 19, 2008 Open House also indicated that bicycle safety-education and enforcement of bicycle laws are needed on campus, for both cyclists and motorists. As can be seen from the inventory of UNCG's existing facilities and the City of Greensboro's planned and existing bicycle facilities, there are many opportunities for bicycle connections between the University campus and major off-campus destinations, including campus-area neighborhoods, shopping centers, parks and downtown Greensboro.

This section also reviewed and provided recommendations on existing plans that may relate to the UNCG Bicycle Master Plan. The existing plans that were reviewed are as follows:

- *Campus Transportation Plan* (2006)
- *UNCG Campus Master Plan Update* (2007)
- *Campus Sustainability Report* (2002)
- *Greensboro Urban Area Bicycle, Pedestrian, & Greenway Plan* (2006)
- *Greensboro Urban Area Long Range Transportation Plan*

Section 3. Bicycle Circulation Plan

The Bicycle Circulation Plan provides on-road and off-road project recommendations and general cost estimates for bicycle improvements at or near UNCG. This section identifies planned campus-area bicycle improvements included in the Greensboro Urban Area Bicycle, Pedestrian and Greenway Master Plan ("*BiPed Plan*"), as well as new or expanded recommendations for on-campus and off-campus roadway and trail facilities not included in the *BiPed Plan*. The section thoroughly reviews treatment types and also highlights special focus areas for bicycle improvements, such as railroad crossings and intersection improvements.

Section 4. Facility Design Guidelines

The Facility Design section provides a summary of best-practices for the construction and installation of on-road and off-road bicycle facilities. The purpose of the section is to supplement, not replace, the accepted roadway and cycling standards available at national and state levels. Items that are reviewed include:

- Street cross-sections
- Signage and pavement markings
- Intersection standards
- Bicycle bridge and tunnel design
- Off-road bicycle facility design

Section 5. Bicycle Parking Plan

Bicycle parking is a key component of any successful campus bicycle program. Section 5 outlines facility design standards for bicycle parking at UNCG, as well as recommendations for new and retrofitted bicycle parking locations. The top 25 bicycle parking recommendations were prioritized in Section 5 based on input from the campus population through the Bicycle Master Plan survey. Additionally, this section outlines recommendations for bicycle and moped parking policies that will ensure appropriate quantities and placement of parking facilities in the future, as well as recommendations for new moped and motorcycle parking locations on campus.

The top 25 bicycle parking priorities for campus, in order of importance, are:

1. Elliott University Center

2. Jackson Library
3. Student Recreation Center
4. Moore Humanities & Research Building
5. Curry Building
6. Sullivan Science Building
7. Dining Halls
8. Bryan Building
9. HHP Building
10. Graham Building
11. Mossman Building
12. Music Building
13. Petty Building
14. McIver Building
15. Stone Building
16. Gatewood Studio Arts Building
17. Eberhart Building
18. 1100 W Market St (University Offices)
19. Weatherspoon Art Museum
20. Moore Building (Nursing)
21. Ferguson Building
22. Foust Building
23. Brown Building
24. Aycock Auditorium
25. Admissions & Visitor Center

Section 6. Programs & Policy Recommendations

Bicycle and pedestrian planners often refer to the “five E’s” of bicycle-friendliness: Engineering, Education, Encouragement, Enforcement and Evaluation. This section targets the non-engineering improvements for campus that will enhance bicycle safety and awareness through education, encouragement and enforcement programming. Key recommendations are for:

Education:

- Bicycle Program Website
- Bicycle Safety Brochures
- Bicycle Safety Classes

Encouragement:

- Campus Bike Map
- Promotional Giveaways for Cyclists
- Campus Bike Commuter Event
- Emergency Ride Home Services
- Bike Buddy Program
- Campus Bicycle Loan Program

Enforcement:

- Targeted Enforcement Campaign
- Online Bicycle Registration

Public Outreach & Staffing:

- Full-time TDM Manager to help with promotion, public outreach and evaluation of bicycle efforts on campus

Section 7. Implementation

The implementation plan covers financing and partnership opportunities that are available to the University for planning, design, and construction of various types of bicycle projects and programs contained in this Plan. Sources of funding that are discussed include internal funding sources, in addition to the following state and federal sources:

NCDOT Funding

Congestion Mitigation and Air Quality Improvement Program
Transportation Enhancement Program
Small Urban Funds
Hazard Elimination Program
Spot Improvement Program
Governor's Highway Safety Program
Statewide Discretionary Funding
State Transportation Improvement Program
Share the Road License Plate Program

Other Funding:

Economic Development Grants and Funding
Parks and Recreation Related Funding
Grants from Non-Profits and Advocacy Groups

This section also identifies potential partners for implementation of the projects and programs in the Plan and revisits the vision and goals of the plan in the conclusion section, which describes the benefits of a more bicycle-friendly campus.

Section 1. Introduction

While previous University plans and surveys have addressed bicycle ridership, the Campus Bicycle Master Plan (“Plan”) is the first comprehensive bicycle study developed for the University of North Carolina at Greensboro (UNCG). The purpose of the Plan is to promote bicycling as a travel mode on campus, while also enhancing the bicycling environment through identification of ancillary improvements such as additional bicycle parking and safety-education programming. This chapter presents an overview of bicycling on campus and in Greensboro and also provides the vision, mission, goals, and objectives of the Bicycle Plan.

1.1 Overview

The University of North Carolina at Greensboro is a scenic campus situated in the heart of the state, less than two miles west of downtown Greensboro. The current campus is less than one-third square mile, surrounded by historic residential neighborhoods and established retail districts. Student life at UNCG offers many opportunities for off-campus recreation, shopping, housing, and on-campus destinations that are all within comfortable biking distance. However, according to the 2005 Campus Transportation Plan, around 90% of the approximately 16,500 UNCG students and 2,510 employees¹ travel to campus by automobile.

With anticipated campus development of more than 1.5 million square feet and future campus enrollment numbers of nearly 22,500 full-time students by 2025, it is important for the University to focus on opportunities to increase bicycling and other sustainable transportation options to and around campus.² The Campus Bicycle Master Plan aims to evaluate current bicycling conditions at UNCG and recommend projects, programs and policies to improve bicycle-friendliness.

There are many potential benefits of this Plan. Private and public universities around the country have found that the creation of comprehensive Transportation Demand Management (TDM) programs – including bicycling programs – greatly reduce parking demand and traffic congestion on campus. Bicycling, specifically, offers a fuel-free transportation option to students, faculty and staff, and bicycle commuters contribute greatly to clean air and environmental sustainability. Bicycling also provides health and recreational options to the campus community and may contribute to economic benefits such as reduced insurance costs and community development benefits throughout Greensboro.

1.2 Existing Bicycle Use & TDM Programs

According to the Campus Transportation Plan, as of February 2005, only 2% of all people travelling to campus commute by bike. The same survey revealed that less than 1% travel by transit and approximately 7% walk to campus. Compared to citywide bicycle and pedestrian commutes in Greensboro, UNCG has high bicycle and pedestrian mode splits (see Table 1.1). However, a number of models exist of colleges around the country that have exceptionally high levels of bicycle and/or pedestrian trips to and from campus. Some of these “high-achievers” are listed in Table 1.2, which compares their mode split data to UNC Greensboro. The campus examples in Table 1.2 are all quite different in context and character from each other and from UNCG. Though these schools may not be equal in size

or function to UNCG, they do provide inspiration for higher mode-share for the University, and their commute numbers directly reflect the benefits of their investments in transportation demand management (TDM) and bicycle-specific programming. Based on the successes of these and other university programs nationwide, it is anticipated that UNCG could increase bicycle ridership greatly through expansion of campus TDM and bicycle encouragement programs.

Travel Mode	UNCG Mode Split ³	Greensboro Mode Split ⁴
Drive Alone	80%	79%
Carpool	7%	13%
Transit	<1%	1.7%
Motorcycle	Not available	0.08%
Bicycle	2%	0.3%
Pedestrian	7%	2.4%
Telecommute	Not available	2.7%
Other	3%	0.8%

Table 1.1. UNCG and City of Greensboro travel mode splits

University Name & Location	Total Campus Population	Bicycle Commute Trips	Pedestrian Commute Trips	Total Bike/Ped Trips
University of North Carolina - Greensboro	19,010	2%	7%	9%
University of California – Berkeley ⁵	45,000	9.5%	30.5%	40%
University of Colorado – Boulder ⁶	30,983*	31%	19%	50%
University of California – Davis ⁷	35,206	38.3%	3.1%	41.4%

Table 1.2. UNCG and other University travel mode splits

* Undergraduate & Graduate student population only (no faculty/staff)

Currently at UNCG, motor vehicle parking is readily available, and all students are allowed to bring their cars to campus if they so wish. While UNCG's Department of Auxiliary Services has invested in a part-time Transportation Demand Management (TDM) Coordinator, the University would likely see significant increases in mode split with the investment of additional resources in the promotion of transportation alternatives. The University might consider setting a goal for alternative transportation use on campus and invest a proportionate amount of funding to TDM functions.

1.3 Moped and Motorcycle Use

Though no specific travel data exists on moped or motorcycle use at UNCG, it is considered an important and similar mode to bicycling. Currently, a number of students, faculty and staff use mopeds and motorcycles to commute to campus. These vehicles are considered by the University administration to be a preferred mode for commuting to campus, as they take less space to park, help alleviate traffic problems and use less gas to operate than cars or trucks. The University would thereby like to continue to encourage students, faculty and staff to use mopeds and motorcycles to commute to campus, while addressing potential conflicts with bicycles and pedestrians through better design of moped and motorcycle parking areas and other strategies. The Bicycle Master Plan will therefore address moped

and motorcycle parking strategies to resolve current conflicts, promote further moped and motorcycle use, and recommend specific parking locations and techniques for permitting, signing and marking moped and motorcycle parking stalls.

1.4 Goals & Objectives

Throughout the planning process, several goals have been repeatedly articulated by UNCG faculty, staff, students and members of the Bicycle Master Plan steering committee. These goals and related objectives will remain major focal points of the entire Plan. In turn, the Plan will provide policies and guidelines to meet these goals, outline steps to encourage bicycling, establish design standards that allow these goals to remain achievable into the future and create an implementation plan for construction of an effective, environmentally-friendly, and economical bicycle network.

* **Safety.** To have safe bicycle routes and facilities where bicyclists of varying skill levels feel comfortable riding their bikes. In this atmosphere, bicyclists are aware of the “rules of the road,” bicycle lanes are kept clear of parked cars, and bicyclists enjoy high visibility as viable users of area roadways.

- Reduce conflicts between bicyclists, pedestrians and motorists
- Inform motorists, cyclists and pedestrians of traffic laws and safety tips pertaining to their mode(s)
- Improve physical barriers to cycling (i.e. railroad crossings)

* **Connectivity.** To create an inter-connected network of bicycle facilities including marked bike lanes and off-road trails that allow for access to all destinations on campus, as well as links to key destinations off-campus, such as student and staff housing, shopping and retail districts and downtown so that the students, faculty and staff can travel by bicycle to work, school, and shopping destinations.

- Connectivity to work, school, shopping
- Coordination with City and other campuses for improved off-campus connectivity
- Bike racks on buses for multi-modal connections

* **Incentives & Amenities.** To develop bicyclist-friendly amenities that will make bicycling an easy and convenient mode choice and incentivize bicycling in small ways to promote cycling as a viable commuter choice.

- Additional bicycle parking facilities throughout campus that are visible, accessible and preferable to users
- Secure, covered and long-term bicycle parking options
- Shower and locker room facilities throughout campus
- Bicycle air stations and repair tools on campus
- Bicycle maps and wayfinding signage
- Identify motorcycle and moped parking areas away from bicycle racks for better delineation

* **Education & Encouragement.** To educate bicyclists and motorists alike about the benefits of safe bicycling by distributing informational pamphlets, engaging staff and students in campus-wide bicycle safety programs and hosting University-sponsored bicycling activities (e.g. “Bike to Work Week” event).

- Pamphlets and brochures

- Educational and promotional campus bike events
- Incentives for bicycle commuters
- Identify moped and motorcycle conflicts with bicyclists and educate all on best parking practices for campus

* **Aesthetics.** To maintain the visual appeal and appearance of the campus, while also providing effective bicycling facilities.

- Screening of bicycle parking facilities, as appropriate
- Bicycle parking and design standards
- Maintain clutter-free campus look

¹ UNCG Institutional Research Department

² UNCG Campus Master Plan (<http://www.uncg.edu/fpl/CampusMasterPlan.html>)

³ 2006 UNCG Transportation Master Plan (http://parking.uncg.edu/UNCGFINAL_web.pdf)

⁴ 2000 US Census, Means of Transportation to Work for Workers 16+ Years (<http://factfinder.census.gov>)

⁵ "Transportation Alternatives at UCB," December 2005.

http://pt.berkeley.edu/PDFs/Alternatives_at_UCB_fall05.pdf

⁶ Source: "Modal Shift in the Boulder Valley", National Research Center, 2001

(<http://www.facilities.ufl.edu/cp/pdf/TransportationDemandManagement.pdf>)

⁷ Source: Shaheen, et al., 2003 (<http://www.taps.ucdavis.edu/>)

Section 2. Evaluating Current Conditions

2.1 General Overview

As an urban campus, UNCG is surrounded by several established neighborhoods and shopping districts, as well as local parks, trails and cultural attractions. The University is within biking distance (i.e. 1-5 miles) of downtown Greensboro and several other major universities in the Greensboro area. Thanks to the age of the campus and surrounding neighborhoods, UNCG sits within a traditional, gridded street system with many parallel local streets. These neighborhood streets are relatively bike-friendly and comfortable for bicyclists of varying skill levels and generally provide cyclists with many alternative parallel routes to busier roadways. Due to its urban setting and proximity to downtown, the University is also bordered and intersected by a rail line and several major roads, each carrying a significant amount of average daily traffic (ADT) significantly greater than that on the interior of campus, posing a real and perceived barrier to cycling.

Campus Area Neighborhoods

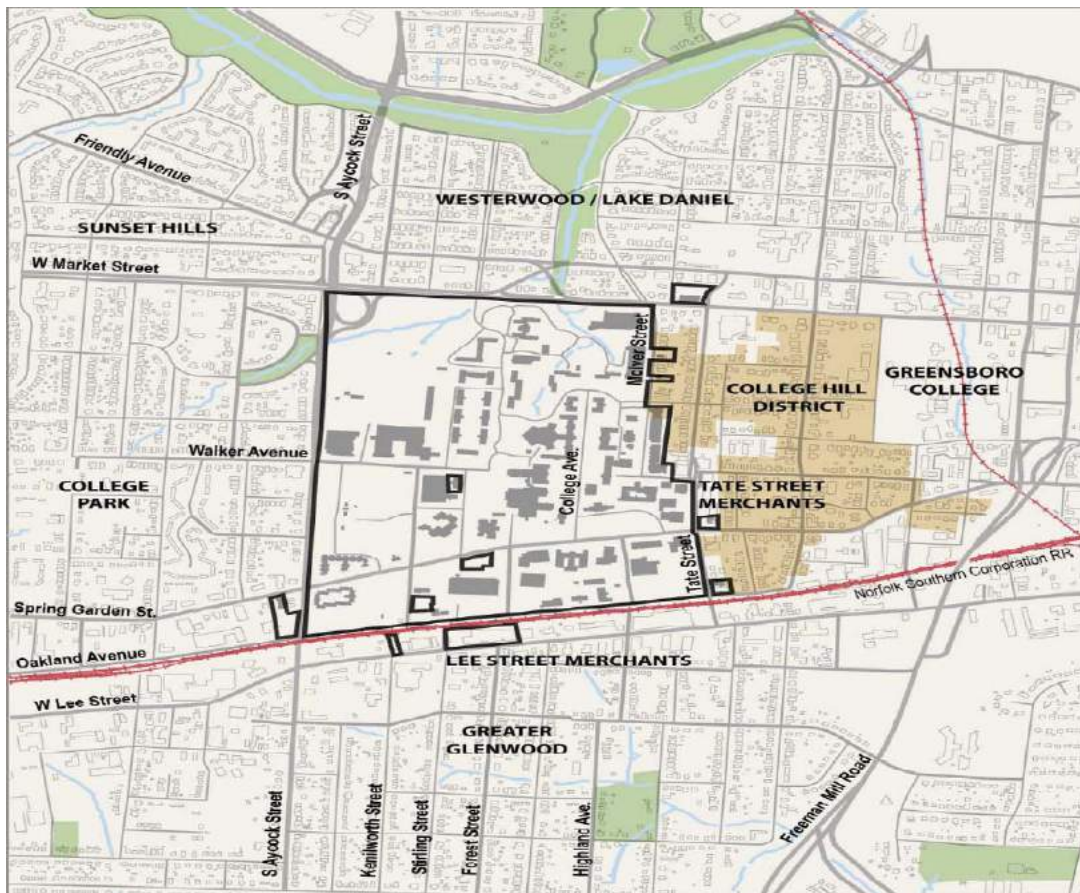


Figure 2.1. Campus-area neighborhoods.

Source: UNCG Campus Master Plan, <http://projects.sasaki.com/uncgreensboro>

The campus is bordered by four crucial local roadways – Lee Street to the south, Aycock Street to the west, Market Street to the north and Tate Street to the east. While these major

thoroughfares and connector streets provide the University with essential connections to and from local, off-campus destinations, attention should be paid to the bicycle level of service on such roadways and some bicycling improvements made to ensure bikeability to and from the campus area. Experienced cyclists will likely feel comfortable “taking the lane” on major roadways, but less experienced cyclists may perceive busy, multi-lane roads as a barrier to cycling.

The southern-most portion of campus houses academic buildings, operational facilities and a large amount of on-campus parking. Running east-west through the southern edge of campus, Spring Garden Street is an important major thoroughfare that connects the campus with housing, parks, retail, Guilford College to the west, and downtown Greensboro to the east. Spring Garden Street carries approximately 76,000 cars, 130 bicyclists¹, numerous pedestrians and many buses through campus on a daily basis, and is the busiest on-campus street. While Spring Garden Street has been a focus for on-campus streetscaping and intersection improvements, it will remain an important roadway for bicyclists, pedestrians and motor vehicles and should be monitored regularly for speed, volume and crash related issues. Additionally, the east-west Norfolk-Southern rail line on the south end of campus (parallel to Lee Street) provides another interesting obstacle for cyclists. North-south street crossings into campus are only available through rail underpasses at Aycock Street and Tate Street, both of which are unlit and narrow, and could act as barriers to inexperienced cyclists. The University and City have plans to improve the Aycock Street and Tate Street underpasses for better access; future consideration should be given to a bicycle and pedestrian bridge or underpass at Forest Avenue for improved access.

The central and northern sections of the campus are less oriented toward car traffic, with central campus devoted mostly to academic and student services uses and the northern-most portion of campus primarily devoted to student housing and sports/recreation fields. The University has closed College Avenue to car traffic (excepting University service vehicles), creating a pedestrian concourse area in the heart of campus that provides enough space and division for comfortable shared-use by cyclists and pedestrians. The access roads in the north campus area are open to motor vehicle traffic, though these roads are low-volume by nature on a typical weekday. Though this area has a hilly topography, it is generally bicycle-friendly. Sidewalk and trail connections in the north campus area provide bike access east from Gray Drive to the McIver Street concourse. Potential vehicular conflicts may arise in areas with extensive parallel parking, particularly along Gray Drive and/or West Drive. Educational awareness campaigns could help address these bicycle-motor vehicle conflicts and/or potential pedestrian-bicycle conflicts in campus pedestrian zones.

Existing Campus Building Uses

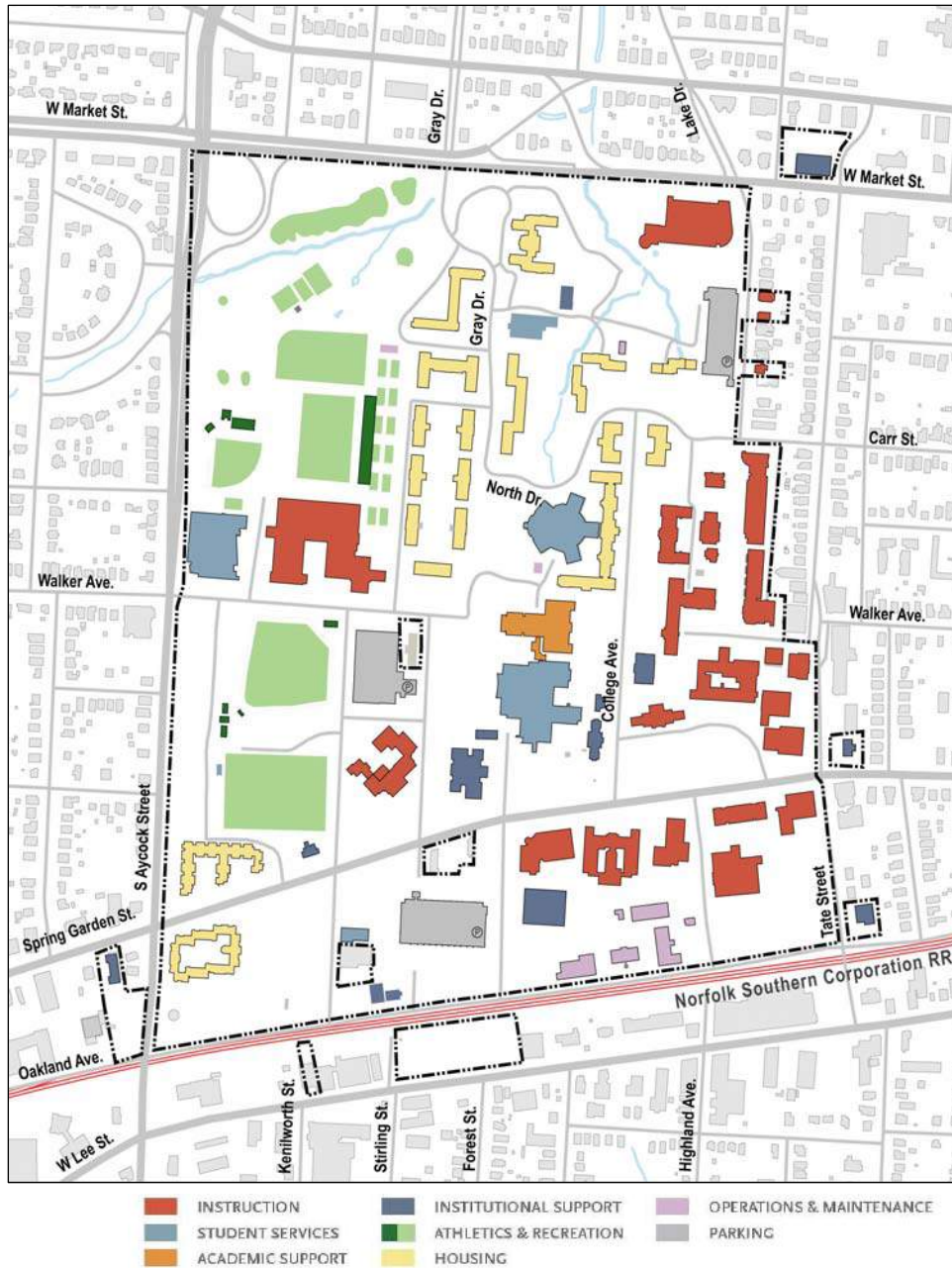


Figure 2.2. Existing Campus Building Use.
 Source: UNCG Campus Master Plan, <http://projects.sasaki.com/uncgreensboro>

2.2 Existing Plans & Policies

Existing local policies and plans help shape the University and City-wide bicycling environment and offer information as to how bicycle facilities and programs have been managed thus far. Plans and policies also provide local perspective and a vision for the future of the physical campus, as well as projected future population, enrollment numbers, proposed City-wide roadway, bicycle and greenway networks and other helpful information.

2.2.1 Existing Plans

The existing plans that affect bicycling at UNCG include:

- *Campus Transportation Plan* (2006)
- *UNCG Campus Master Plan Update* (2007)
- *Campus Sustainability Report* (2002)
- *Greensboro Urban Area Bicycle, Pedestrian, & Greenway Plan* (2006)
- *Greensboro Urban Area Long Range Transportation Plan*

The following summaries capture the key points of these plans as they relate to cycling.

- Campus Transportation Plan (2006)
The *UNCG Campus Transportation Plan* addresses opportunities for the University to manage parking demand and provide a wider range of transportation alternatives to students and staff. The *Campus Transportation Plan* focuses on transit service expansion as the primary means of reducing future parking demand but, also recommends bicycle parking improvements and collaboration with City staff for on-road bicycle improvements to increase bicycling mode share at UNCG. The *Campus Transportation Plan* also recommends Transportation Demand Management (TDM) programs that would directly complement recommendations of the Bicycle Master Plan. These complementary measures include the proposed Guaranteed Ride Home Program, Car-Sharing Program, Flex Parking and Commuter Incentives Program to encourage bicycling and other transportation alternatives to driving alone. Many of these program recommendations are suggested as part of the Bicycle Master Plan, as well.
- UNCG Campus Master Plan Update (2007)
The *UNCG Campus Master Plan* is intended to guide the University through enrollment growth and physical expansion through the year 2025. The Plan identifies future building sites for UNCG and addresses landscaping, circulation and access on campus. The Plan also indicates that many surface parking lots will be sacrificed to campus development in the future, making multi-modal access more important as car parking becomes increasingly limited. Specific recommendations to improve bicycling conditions include:
 - Bicycle lanes on major campus streets, including Tate St & Walker Ave
 - Work with the City to replace or improve railroad crossings at Tate Street and Aycock Street
 - Shared access on walkways and roadways for bikes
 - Additional bicycle parking, including bicycle stations at parking decks with air pumps & showers
- Campus Sustainability Report (2002)
The *Campus Sustainability Report* was compiled by the Office of Waste Reduction and Recycling in 2002. The report highlights the University's environmental accomplishments at that time and suggests further improvements in campus operations and policy for increased sustainability. In the report, sustainability is defined as "the challenge of meeting current needs without compromising the ability of future generations to meet their needs," and a comprehensive review is made of a number of campus practices for their environmental, economic and social impacts. At

the time this plan was written, the University was undertaking several green space and pedestrian improvement projects, including the conversion of the Elliott University Center gravel parking lot to green space and the dedication of College Avenue as a pedestrian corridor. Though this report does not directly address bicycling issues, it does illustrate the University's commitment to environmentally-conscious practices and transportation policies.

- Greensboro Urban Area Bicycle, Pedestrian & Greenway Plan (2006)
The *Greensboro Urban Area Bicycle, Pedestrian & Greenway Plan*, referred to as the *BiPed Plan*, provides a full review of the City and the Greensboro Urban Area Metropolitan Planning Organization (GUAMPO) plans for improved bicycle, pedestrian and greenway accommodations throughout the urban area. The *BiPed Plan* covers the entire county and makes specific recommendations for roadway and greenway improvements for bicyclists on or near UNCG. Specifically, the *BiPed Plan* calls for bicycling improvements to:
 - Spring Garden St (bike lane – completed)
 - Washington St (bike lane)
 - McGee St (bike lane)
 - Kenilworth St (bike lane)
 - Stirling St (bike lane)
 - Market St (further study needed)
 - Walker Ave (bicycle boulevard)
 - Friendly Ave (further study needed)
 - Lee St (further study needed)
 - Aycock St (further study needed)

It is important for the UNCG Bicycle Master Plan to consider these recommendations so that the University can work with the City to make improvements on off-campus roads that are major bike connectors to/from campus. For a full summary of the *BiPed Plan* recommendations around UNCG, see Sections 2.4.1 and 2.4.2.

- 2035 Long Range Transportation Plan
The *Long Range Transportation Plan* (LRTP) is a planning document of the Greensboro Urban Area Metropolitan Planning Organization (MPO). The LRTP is a federally-mandated plan that identifies transportation needs for the MPO area with a 30 year outlook. At the time of this analysis, the MPO is updating their 2030 LRTP and has set the vision for the 2035 *Greensboro Urban Area LRTP*. The 2035 vision is “*To develop and maintain a safe, efficient, and environmentally compatible transportation system that provides convenient choices for accessing destinations throughout the Greensboro Metropolitan Area and the Triad, including well-integrated, connected public transportation, pedestrian, and bicycle networks.*” The LRTP makes several policy statements that impact bicyclists, as well as project recommendations for bicycle facility construction or improvement. At the time of this analysis, the new 2035 LRTP recommendations are currently unavailable.

Available policy statements from the 2035 LRTP recommend increased multi-modal connections. The 2030 LRTP Bicycle & Pedestrian Element seeks to incorporate bicycle and pedestrian facilities as routine, baseline accommodations in all roadway projects. The 2030 LRTP recommends that on-road bicycle improvements are

included as “incidental projects” of all roadway construction and also recommends \$114.5 million in sidewalk and trail construction in the next 30 years. This plan recommends a bicycle study be completed to formally identify bike projects, which resulted in the *BiPed Plan*. The specific recommendations of the *BiPed Plan* are expected to be incorporated into the *2035 LRTP*.

2.2.2 Existing Policy

The City of Greensboro has a variety of sources for policy guidance relating to cycling, including the City’s *Unified Development Ordinance (UDO)*, *City of Greensboro Street Design Standards* and the *Greensboro Urban Area BiPed Plan*, as well as state and national policy and design documents. These policy documents all affect construction and design of bicycle facilities in City jurisdiction, including bicycle lanes, wide outside shoulders, greenways, and bicycle parking. The *UNCG Design & Construction Guidelines* and *UNCG Design Manual* give guidance on bicycle facility design on campus, specifically related to bicycle parking and signage, and updates should be made to this manual to incorporate new design standards recommended in the Bicycle Master Plan (see Section 4). Bicycle facility maintenance in the campus area is under several jurisdictions, namely the Facilities Operations (Physical Plant) and Parking and Campus Access Management departments.

- On-road Bicycle Facilities

On-road bicycle facilities, such as bicycle lanes, wide outside lanes and shoulders, are constructed in a number of ways. For campus roadways, these facilities would be designed by UNCG’s Facilities Design & Construction and constructed by Facilities Operations departments. For off-campus roadways, these facilities would be constructed by the City of Greensboro or NCDOT (depending upon roadway ownership) or by developers during new development. Bicycle facilities should always be designed and constructed using NCDOT’s *North Carolina Bicycle Facilities Planning and Design Guidelines* as a minimum standard. The City’s *Street Design Standards Manual* sets minimum standards for City streets and specifically addresses appropriate bicycle lane widths for residential and non-residential collector streets, neighborhood streets, and major and minor thoroughfares. The Manual also includes discussion of required curb and gutter, sidewalk width and location, roadway design and posted speeds, curb radii, block length, on-street parking width and other design elements that affect bicyclists. The Manual’s Section D, on “Definitions,” describes the following bicycle-related treatments for City streets.

- Bicycle Lane - A portion of a roadway that has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.
- Bicycle Path - A bikeway physically separated from motorized vehicular traffic and either within the highway right-of-way or with an independent right-of-way.
- Bicycle Route - A segment of a system of bikeways designated by the jurisdiction having authority with appropriate direction and information marker, with or without a specific bicycle route number.
- Bikeway - A thoroughfare suitable for bicycles; may either exist within the right-of-way of other modes of transportation, such as highways, or along a separate and independent corridor.

The University should consider adding definitions of these facilities and the definitions of other bike-related accommodations in the *UNCG Design & Construction Guidelines* document.

- Off-road Bicycle Facilities

Off-road bicycle facilities on campus – specifically, the UNCG Irwin Recreational Trails - are the jurisdiction of the Student Recreation Center and Facilities Operations.

- Bicycle Parking Racks & Other Ancillary Facilities

The University's 2005 *Design & Construction Guidelines* briefly address bicycle parking requirements in Section 09002, only indicating the required color (Benjamin Moore Black Walnut #13361) of bicycle racks on campus. These design standards should incorporate requirements for the style of rack (in conformance with the Association of Pedestrian and Bicycle Professionals *Bicycle Parking Guidelines*) and number of bicycle parking spaces required by use for new construction projects, in addition to the color and other specifications. The Bicycle Master Plan will recommend a set of standards for bicycle parking to incorporate into the University's design guidelines.

Additionally, the University's signage program should include a section on bicycle- and pedestrian-related signage, particularly design standards for bicycle parking signage, bicycle and pedestrian wayfinding signage, bicycle pavement markings, and moped/motorcycle signage and pavement markings.

- Bicycle Facility Maintenance

UNCG campus area roadways are a combination of City, State and University-owned streets. Figure 2.3 (page 15) lists ownership of each roadway in or near campus. It can be assumed that City streets are maintained by the City's Public Works Division, State-owned roads are maintained by NCDOT and University-operated streets are maintained by the UNCG Facilities Operation department. As for off-road facilities, the City of Greensboro's Parks and Recreation Department is responsible for maintenance of City greenways under their jurisdiction. Campus recreational trails are maintained by the UNCG Facilities Operations department.

- Bicycle Use Guidance

Bicycle usage at UNCG is guided by North Carolina State Law and the City of Greensboro's Code of Ordinances. The North Carolina Department of Transportation's *A Guide to North Carolina Bicycle and Pedestrian Laws* provides a summary of laws pertaining to bicycling in North Carolina. North Carolina law considers a bicycle a form of vehicle, which means a bicyclist has the same rights and responsibilities on the road as a driver of any vehicle. As do many towns and cities in North Carolina, the City of Greensboro Code of Ordinances restricts the use of bicycles on sidewalks in the Central Business District (i.e. downtown area).

- Mopeds & Motorcycles

Currently, moped use is not monitored or permitted at UNCG, but motorcycles must have an "M" parking permit to park their vehicle on campus. Signed motorcycle parking areas are located throughout the campus but typically have neither marked parking stalls nor do they officially allow for moped parking. Generally, mopeds are permitted to park

at bicycle parking racks, though the campus administration has noted existing and potential conflicts that may arise between mopeds, bicyclists and pedestrians using the same space. By state law, mopeds with engines under 50 cubic centimeters are not required to be registered with the Department of Motor Vehicles and therefore do not have license plates. This makes mopeds more difficult than motorcycles to monitor, permit and ticket on campus.

2.3 Existing Programs

Currently, the University's bicycle-related programming is focused primarily on safety-education and theft prevention. The UNCG Department of Public Safety (DPS) has a bicycle registration program for campus and carries out targeted outreach at the beginning of each academic year to encourage new students to register their bicycles. DPS officers attend freshman orientation events to register bikes and hand out bicycle safety pamphlets. DPS also provides bicycle safety lectures to students at University residence halls by request. The department keeps bicycle and pedestrian safety materials on-hand at their office on Tate Street and also has some safety tips listed on their website at http://police.uncg.edu/Programs_Information/PedestrianSafety/index.asp.

In addition to educational outreach, the Department of Public Safety has six certified Bicycle Patrol Officers who patrol campus by bike in the spring and summer seasons. These officers focus on a wide range of public safety issues but do occasionally distribute bike and pedestrian safety brochures during their regular campus patrols. DPS also regularly assigns officers in marked cars to traffic speed enforcement duties, especially at busy campus intersections during peak travel times.

The University has focused more attention on campus-wide TDM programming since the completion of its Transportation Master Plan in 2006. The University has hired a part-time TDM Manager who staffs the Transportation Subcommittee of the UNCG Sustainability Committee. The Transportation Subcommittee is focused on identifying long-term and short-term bicycle and pedestrian initiatives and a multi-modal menu of commuter alternatives, among other duties. As part of this recent paradigm shift, the University changed the name of its Parking Services department to "Parking Operations & Campus Access Management" and collaborated with the City of Greensboro and area colleges to improve transit service to/from campus through the addition of the Higher Education Area Transit ("HEAT") bus system. Additional measures could be considered to expand TDM and bicycle-specific programming to encourage safer cycling practices and higher cycling rates. Section 6 of the Bicycle Master Plan includes further recommendations.

2.4 Existing Facilities

According to state law, every road in North Carolina is considered a bicycle facility, excepting those roads specifically identified as closed or controlled access. Thus, in Greensboro and specifically on the UNCG campus, cyclists should be expected on nearly every roadway; however, some roads are more suitable for cyclists than others. In order to identify which roads are most suitable for cycling, it is first important to understand roadway conditions. A road's classification generally indicates the volume of traffic on the road, the roadway cross-section, the agency responsible for its maintenance, and its general purpose.

The higher the traffic volume on a road, the less comfortable cyclists become using that facility. The following roads with high traffic volumes – major thoroughfares - may be less suitable for cycling by those with low or moderate experience maneuvering a bicycle in heavy traffic.

Classification	Definition	Campus-area Roads
Major Thoroughfares	Streets that serve medium to long distance travel and connect minor thoroughfares and collector streets to freeway and other higher type roadway facilities.	<ul style="list-style-type: none"> • Aycock Street (City) • Spring Garden Street (City) • Market Street (City) • Lee Street (City/State)
Minor Thoroughfares and Connector Streets	Roads that primarily serve a local travel purpose and often connect to other minor thoroughfares as well as major thoroughfares.	<ul style="list-style-type: none"> • Tate Street (City) • Oakland Avenue (City) • Walker Avenue (City) • Gray Drive (Campus) • North Drive (Campus) • Kenilworth Street (City) • Forest Street (City) • Highland Avenue (City) • McIver Street (City) • West Drive (Campus) • Carr Street (City) • Theta Street (City) • Stirling Street (City)

Table 2.1. Roadway classification and ownership of campus area streets.

2.4.1 On-Road Bicycle Facilities

The City of Greensboro has been proactive in improving on-road cycling conditions over the years. Many on-road bicycle facilities are in place, several of which are in the UNCG campus area. Additionally, the *2006 Greensboro Urban Area Bicycle, Pedestrian and Greenway Plan* (“*BiPed Plan*”) calls for improvements in urban Greensboro, many on or near the UNCG campus. Bicycle facilities in the *BiPed Plan* are categorized as follows:

Bicycle Lane	A 4- to 5-ft section of roadway that has been designated by striped pavement markings, signage and pavement symbols for the preferential or exclusive use of bicyclists.
Paved Shoulder	A 4-ft minimum paved shoulder is recommended on roads with Average Daily Traffic (ADT) of over 3,000 vehicles and 2-ft minimum for roads with ADT between 1,000 and 3,000.
Other On-Road Bicycle Facility	Wide outside lanes, typically designed to be 14 feet wide. This width allows more separation between bicyclists and motor vehicles than typical 10- to 12-ft wide travel lanes. Wide outside lanes are not marked or striped to indicate exclusive use for bicyclists.
Connector	Shared roadways that connect bicycle facilities; connectors should

	maintain low traffic speeds and volumes so as not to require special treatments to be bicycle-friendly.
Side Path	A 10-ft or wider multi-use path constructed in the roadway corridor right-of-way, which runs adjacent to a portion or full length of the road.
Further Study Required	High-speed, high-volume roadways that currently have poor conditions for bicycling but may provide important bicycle connections. Straightforward opportunities to stripe narrower lanes, remove lanes, add shoulders, or make other physical improvements do not currently exist due to right-of-way constraints and traffic volumes. The <i>BiPed Plan</i> indicates that further study is needed to identify the appropriate type of future bicycle accommodation.

Table 2.2. Bicycle facility categories, per the Greensboro BiPed Plan definitions.

Table 2.3 and Table 2.4, respectively, describe existing and planned City-constructed bicycle facilities in the UNCG campus area. It is important to note these existing and planned City projects in order for the UNCG Bicycle Master Plan to both reinforce these projects and recommend on-campus bicycling improvements that complement City facilities and enhance connectivity to off-campus destinations.

Corridor	Facility Type	End Points	
Spring Garden Street	Bike Lane	Collier Dr	Greene St
Florida Street	Bike Lane	Holden Rd	E. Lee St

Table 2.3. Existing on-road bicycle facilities in the campus area.

Corridor	Proposed Facility Type	End Points	
Spring Garden Street	Bike Lane	Holden Rd	Elm St
Washington Street	Bike Lane	Spring St	Greene St
McGee Street	Bike Lane	Spring St	Elm St
Kenilworth Street	Bike Lane	Spring Garden St	Walker Ave
Stirling Street	Bike Lane	Spring Garden St	Walker Ave
Market Street	Further Study Needed	?	Dudley St
Friendly Avenue	Further Study Needed	?	Dudley St
Lee Street	Further Study Needed	S Murrow Blvd	Patterson St
Aycock Street	Further Study Needed	Freeman Mill Rd	Benjamin Pkwy
Walker Ave	Connector	Market St	Forest Dr

Table 2.4. Proposed campus area on-road bicycle facilities in the Greensboro BiPed Plan.



Figure 2.3. Map of the locations for the planned bicycle facilities in the 2006 Greensboro BiPed Plan.

2.4.2 Off-Road Bicycle Facilities

Greenways are paved or unpaved multi-use paths, highly popular with cyclists because of their separation from traffic and often scenic quality. In the past, greenways have been used primarily as recreational facilities, but have increasingly become major transportation routes for bicycle commuters. As of October 2006 (the completion date of the *BiPed Plan*), the City of Greensboro has a fairly extensive system of paved and unpaved greenway trails, including the Lake Daniel Trail system just north of campus. The *2006 BiPed Plan* proposes the following locations as priority areas for campus area greenways (in order of highest to lowest priority):

- **Downtown Loop Trail** (Project #19, *BiPed Plan*) – this approximately four mile greenway trail recommended in the Greensboro *BiPed Plan* is an ongoing effort in the City of Greensboro and should connect to campus through a spur from downtown west on Lee St and north along Tate St.
- **Lake Daniel Greenway UNCG Spur** (Project #43, *BiPed Plan*) – this short 0.4-mile greenway connects the Lake Daniel Greenway southward to the UNCG campus along Lake Daniel complex parkland, parallel to East Lake Drive. A signalized crossing exists at Market Street, but a safer crossing would need to be provided across Friendly Avenue.

To the extent that these facilities may not provide appropriate width for bicyclist accommodation, a separate and parallel bicycle accommodation should be provided. Greensboro's system of signed bicycle routes will help cyclists navigate parallel routes from existing and future greenways to the campus (see Section 3 for a map of campus area bicycle routes).

Figure 2.4 shows a map of existing greenway facilities in the University area, as well as the general location of the two planned greenways described above.



Figure 2.4. Map of Existing & Proposed Greensboro Trails & Greenways from the 2006 *Greensboro BiPed Plan*.

2.4.3 Bicycle-Automobile Crash Analysis

In addition to reviewing existing bicycle-related plans, policies and facilities, performing a bicycle crash analysis is useful in assessing the overall bicycle-friendliness of a community. A bicycle crash analysis can provide information on key locations or educational outreach areas where improvements could be made to enhance bicycle safety, indicate popular routes for cycling, and illustrate conflict areas between pedestrians and cyclists. Only one on-campus bicycle crash was reported to police in 2007, and that crash occurred at the intersection of Spring Garden Street and Stirling Street (note that the majority of bicycle crashes go unreported). According to the police report, the bicyclist was riding on the sidewalk and was hit by a right-turning motorist. The cyclist sustained only minor injuries. This crash reinforces the notion that sidewalk riding can be dangerous due to the multiple conflict points at intersections and driveways, as well as due to the unpredictability of cyclist and motorist behavior at these conflict points. Additionally, many survey respondents and members of the Steering Committee identified intersections along Spring Garden Street as safety concerns. This crash indicates that campus intersections may need to be a focal point for programmatic and project recommendations made in Sections 3 and 6 of the Plan.

In addition to this on-campus crash, several bicycle crashes were reported in the near campus area, which could point to the need for enhancements around campus to improve bicycle safety. Figure 2.5 provides a summary of crashes in the near campus area in 2007.

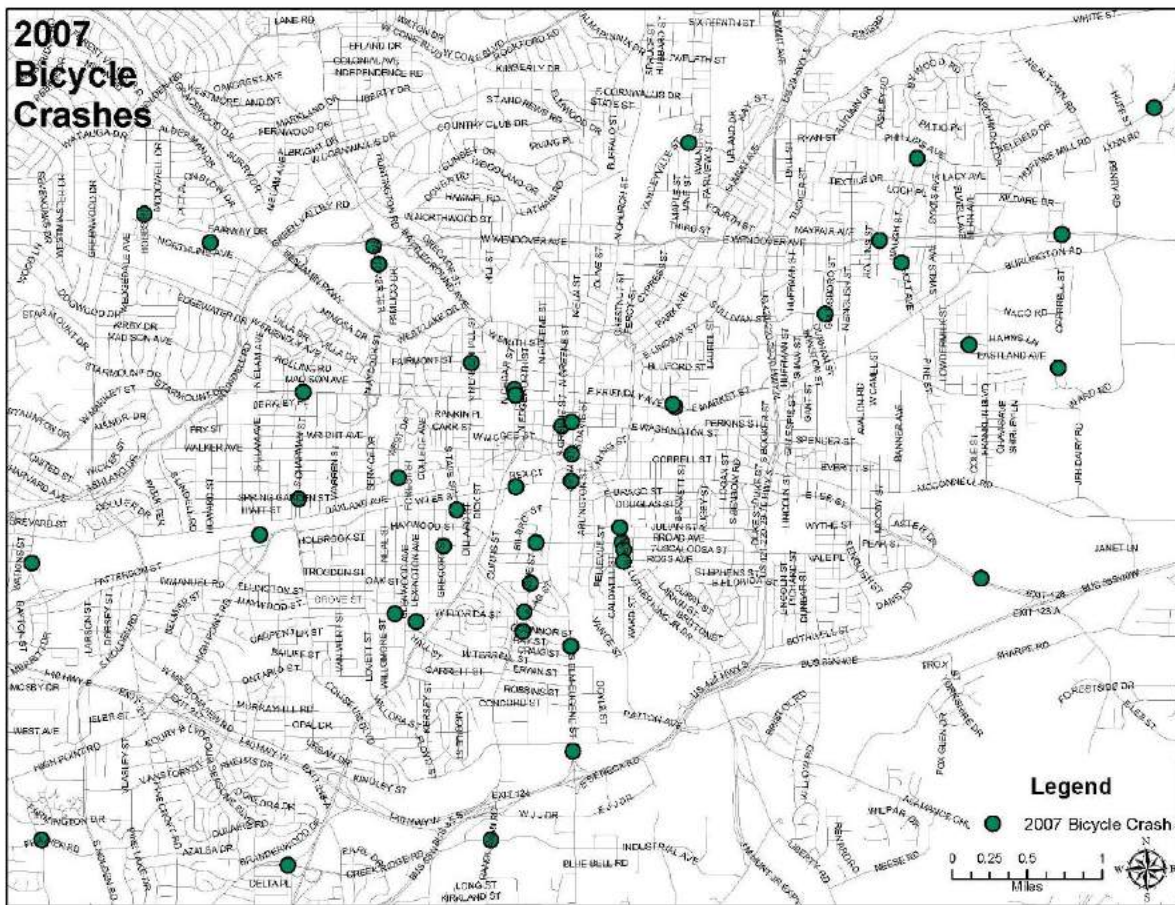





Figure 2.5. 2007 City of Greensboro Bicycle Crash Map. Source: City of Greensboro Bicycle & Pedestrian Coordinator.

2.4.4 Moped and Motorcycle Facilities

The University’s Parking Operations & Campus Access Management department manages motorcycle and moped parking. While mopeds are not required to purchase a campus parking permit, motorcycle drivers must display a valid “M” permit to use designated motorcycle parking spaces at UNCG. The cost of an “M” permit is \$145/year.

As of March 2008, the University had six designated motorcycle parking areas at various locations throughout campus that require “M” permits. Motorcycle parking stalls are signed, but individual stalls are not delineated in the following existing parking areas.

Building/ Lot Name	Moped/ Motorcycle	Description	Picture
Dining Hall	Motorcycle Only	north side of Dining Hall, west side North Spencer	
Gatewood Studio Arts (Lot 7)	Motorcycle Only	east side of Gatewood Studio Arts; also serves Graham & Weatherspoon Bldgs	
Hinshaw Residence Hall	Motorcycle Only	west side of Hinshaw; also serves HHP and other area dorms	
Cotten Residence Hall	Motorcycle Only	east side of Cotten; also serves Coit and other area dorms	
Stirling Street (Bryan Bldg)	Motorcycle Only	west side of street, in front of Bryan Building	


Stirling Street	Motorcycle Only	east side of street, across from Bryan Bldg	
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Table 2.5. Existing motorcycle parking locations at UNCG, as of March 2008.

Moped parking is unregulated and currently interspersed between existing motorcycle parking areas and bicycle parking racks on campus. It is recommended that the University expand upon the existing motorcycle parking protocol to include mopeds, possibly by creating an “MP” permit (at a lower annual cost than the “M” permit) and designating all motorcycle parking areas as open to mopeds, as well. New motorcycle/moped parking areas should be installed throughout campus (see Appendix 6 for detailed recommendations), and all mopeds and motorcycles should be expressly prohibited from parking at bicycle rack locations due to their frequent placement near or on pedestrian walkways and concourses, inappropriate for motorized travel.



Figure 2.6. Mopeds parking in front of the Science Building.

2.5 Campus Concerns, Needs & Priorities

The Bicycle Master Plan used an extensive public involvement process to engage the campus community in a needs-assessment and prioritization process. Public involvement was a two-pronged process. First, a Steering Committee was created to serve a guiding role and provide input throughout the planning process. Members of the Steering Committee are as follows:

Name	Affiliation
Mike Byers	Business Affairs
Terri Cartner	Auxiliary Services
Howard Doyle	Facilities Design & Construction
Bruce Griffin	Office of Public Safety
Peggy Holland	City of Greensboro DOT/MPO
Beverly Levine	UNCG Faculty
Scott Milman	Parking Operations & Campus Access Management
Fred Patrick	Facilities Design & Construction
Kyla Purtell	UNCG Undergraduate Student
David Reeves	Facilities Design & Construction
Guy Sanders	UNCG Housing & Resident Life
Angie Schrock	Auxiliary Services
Mark Shultz	UNCG Faculty

Table 2.6. UNCG Bicycle Master Plan Steering Committee Members.

Second, a public outreach effort was developed that included an Open House held on March 19, 2008 and a campus-wide survey early in the planning process to gather public input on campus bicycling conditions. The survey was also available online during the months of January and February 2008 and could be accessed via the project website at <http://uncgbikeplan.pbwiki.com> and via the direct link at <http://www.keysurvey.com/survey/174892/1148/> (note: this link is no longer active).

Section 2.5.1 Public Input on General Campus Needs

At the Steering Committee meeting on February 4, 2008, stakeholders were given the opportunity to provide input on cycling conditions on and around the UNCG campus. Specifically, Steering Committee members specified areas where they would like to see bicycle route improvements for cyclists (both on-campus and off-campus), as well as new or improved bicycle parking amenities. Steering Committee members also highlighted major conflict zones for bicyclists and pedestrians on campus and at area intersections. In general, Steering Committee members would like to see better bicycle access to off-campus locations (especially neighborhoods west and east of the University), improvements to railroad crossing barriers south of campus and increased bike parking throughout campus. Spring Garden Street was highlighted as a corridor with potential motorist/bicyclist/pedestrian conflict at peak periods, especially at intersections. Steering Committee members also highlighted the McIver pedestrian concourse as a potential conflict zone. Figure 2.6 shows roadways and areas that stakeholders identified as needing improvement, in addition to high conflict zones and recommended parking locations identified by the Steering Committee.

In addition to the input of the Bicycle Master Plan Steering Committee, an Open House was held on March 19, 2008 at the UNCG Dining Hall. The Open House was advertised in advance through flyers, the project website, email listservs to campus faculty and staff, and in the *Campus Weekly* newspaper. Student and staff passers-by were also asked to stop by and make comments on the Bicycle Master Plan “Working Paper Draft” and proposed project maps. Over 30 comment cards were received, and many new project ideas were shared, which have been added to the recommendations in Sections 3-6 of the Bicycle Master Plan. Comments from the Open House include the following:

“Tate Street should be a number one priority for bike lanes, though sharrow may be a good alternative.”

“Consider a yellow bike [community bike] program for campus.”

“Looking forward to more scooter (moped) parking. Please do not lump us with bicycles.”

“Need better bicycle access from north of campus [for faculty and staff commuters], especially within a 2-mile radius of campus; improving the Lake Daniel Spur Trail and Downtown Loop Trail should be top priorities.”

“The University should remove the ‘no bikes’ signage from the Irwin Recreational Trails.”

“The University needs more convenient bike parking at all campus buildings, especially in front of the Dining Hall at the main entrance. Also, the intersection of Tate Street and Carr Street needs safety improvements.”

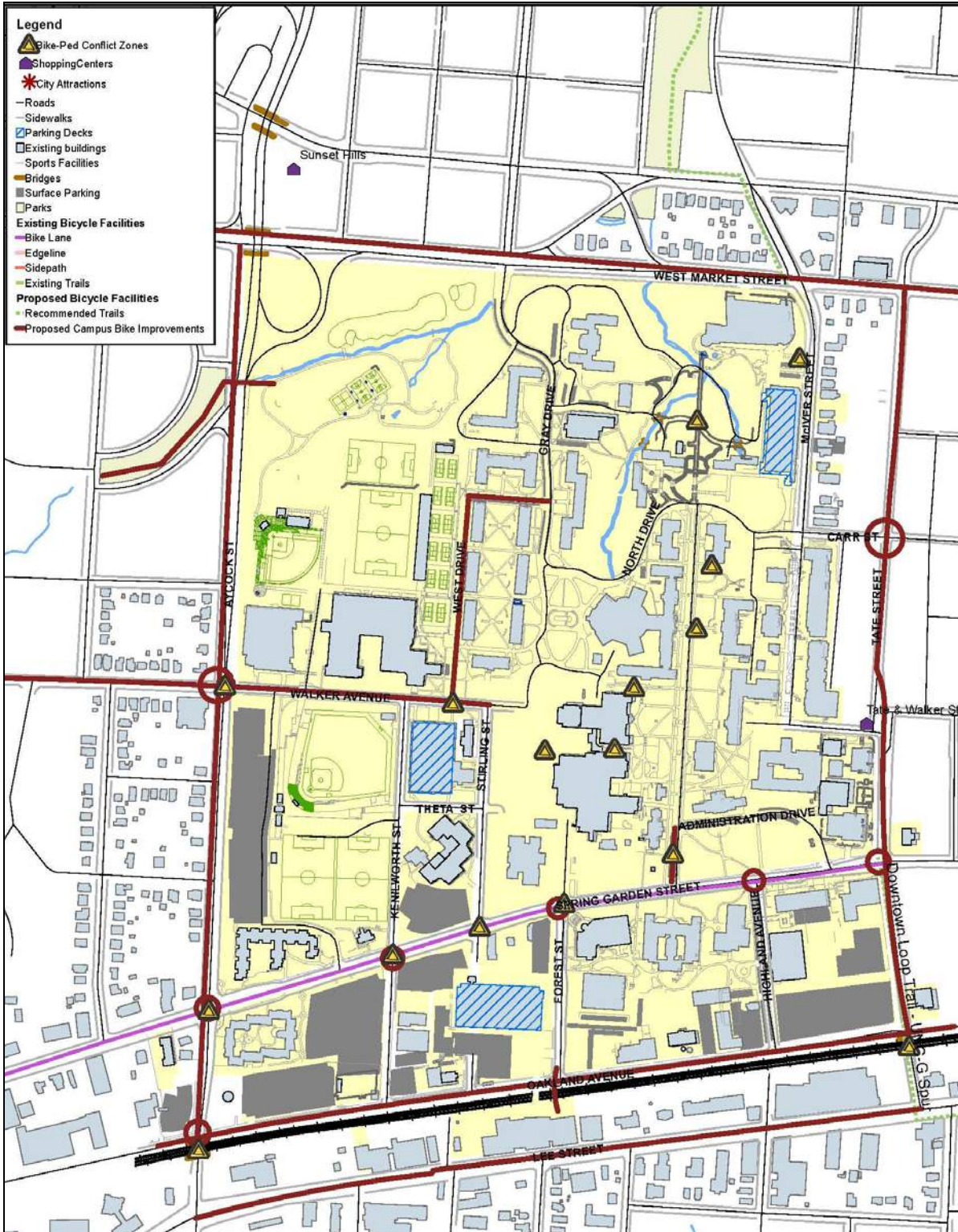
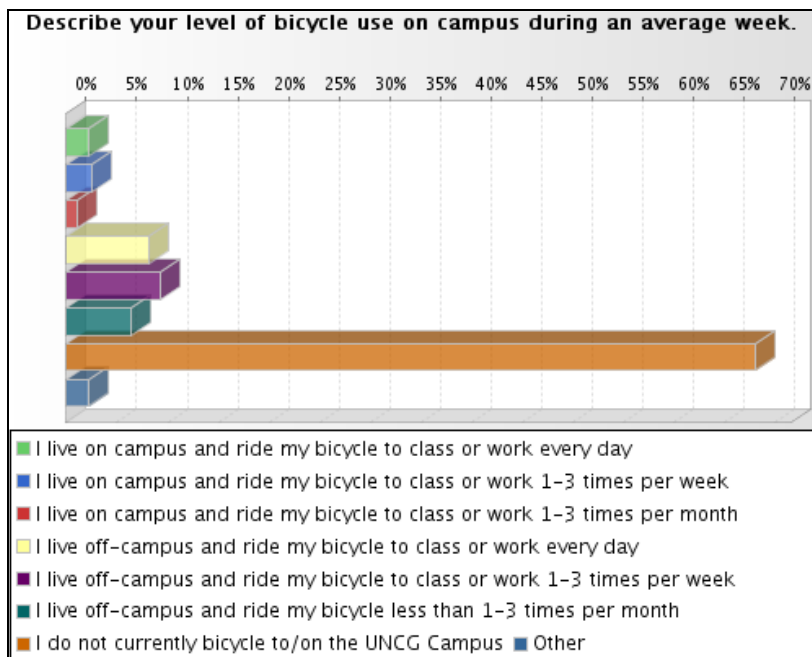


Figure 2.7. Map of Steering Committee comments – identification of potential bicycle parking locations and pedestrian-bicycle conflict zones.

Section 2.5.2 Survey Results

The UNCG Bicycle Master Plan survey was conducted as one part of the public outreach effort for the Plan. It was established to provide a convenient, straightforward venue for the campus population to give input on University area cycling conditions and their hopes for future improvements. The survey was circulated online and in paper format at the February 6, 2008 “Commuter Deli” at Elliott University Center, an event for UNCG commuter students to get more information on campus resources. The online version of the survey was accessible through a direct link, emailed to the entire faculty/staff population (2,510) and nearly half of the student population (7,660). Additionally, the survey was available as a link on the UNCG Bicycle Master Plan’s website, created specifically for the campus bicycle planning effort. The survey period began on January 22, 2008 and closed on February 20, 2008; 941 survey responses were received.

The majority of survey respondents were students (48%), though many staff (30%) and faculty (19%) also responded. Most survey respondents indicated that they did not bike to/on campus (643, or 68%), but of the respondents that are cyclists, 232 (25%) indicated that they biked frequently from UNCG to other area colleges or off-campus locations. The graph below illustrates the respondents’ average bicycle use to/on campus.



Respondents indicated that they would like to see more greenways and bicycle lane connections to/from/around campus, as well as on-campus bicycle facilities, better incentives for cycling and transit improvements (e.g. bike racks on buses). Additionally, respondents indicated that they would like to see the University invest in other bicycle amenities such as (in order of preference) outdoor covered parking, bicycle pumps and paper bicycle maps.

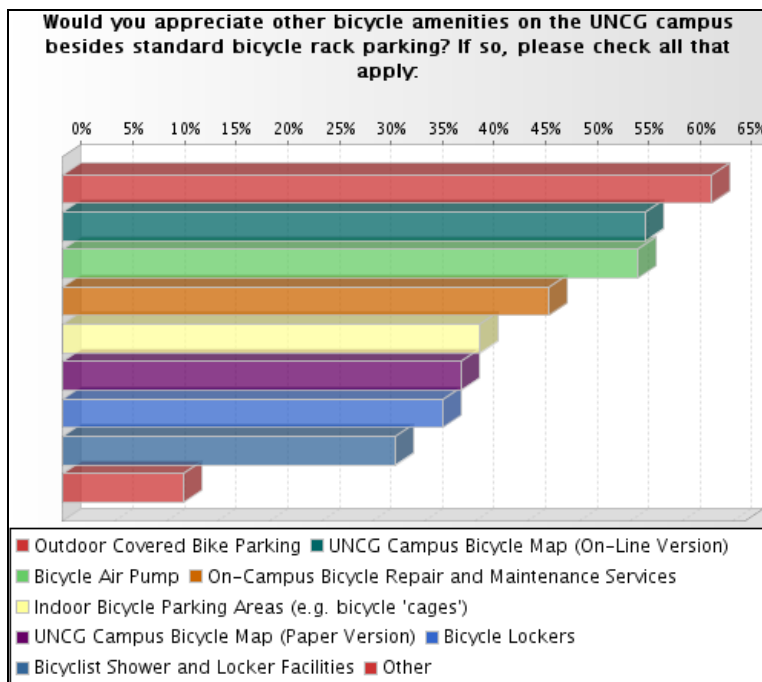
Almost one-third of the survey respondents wrote in comments at the end of the survey, many of which indicate that a lot of students and staff who do not currently bicycle to campus would like to be able to bike commute, given better facilities and access:

"I live 4 miles from campus and would bike to work if I could shower in the summer especially."

"It isn't feasible for me to bike TO work, 'cos I live too far away. However, I might bike around campus if my bike could be stored somewhere safe and dry and there were showers."

"Provide enough bike lanes so that cyclists don't run over pedestrians walking on the campus."

"[Need] racks on the buses for when it's cold or raining out! Thanks!"



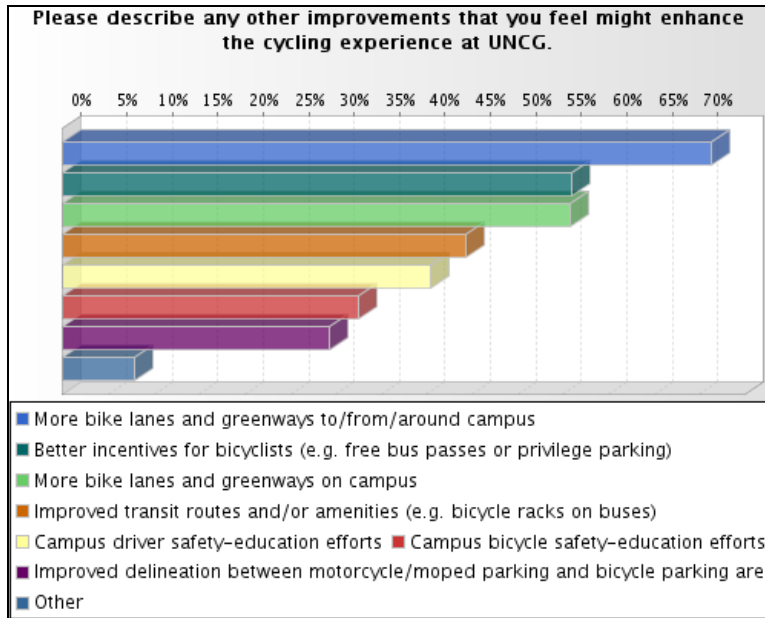
In addition to comments and feedback on physical improvements for bicycle-friendliness on and around campus, many survey respondents emphasized the need for better education of bicyclists, pedestrians and motorists. These comments suggest concerns over safety issues, as well as a need for education on cycling etiquette and courtesy of motorists, in addition to better enforcement of bicycle and pedestrian laws and campus rules for all roadway users.

"We badly need cyclist education -- the new bike lanes and racks are great, but I see cyclists doing lots of dangerous things on Spring Garden St."

"I would like a list of the bike rules and regulations posted in a single webpage, including off-limit areas and traffic rules on campus."

"The bike lanes on Spring Garden are dangerous, because drivers pass stopped vehicles on the righthand side. Police should give tickets to people who drive their cars in the bike lane. Somebody is going to get hurt!"

“My concern is the lack of helmet use by the students. Very rarely do you see a bicyclist with a helmet on the UNCG campus, but with the Greensboro driving habits, the risk of injury is high.”



In addition to these comments, survey respondents ranked their top three preferences for new or additional bicycle parking locations. All of this information was used to identify and prioritize projects and programs for the Bicycle Master Plan.

For a complete copy of the survey and survey results, please see Appendix 1.

¹ City of Greensboro 2007 Bicycle Crash Data. Average number for counts on October 13, 16, 18 and 19, 2007 at Spring Garden intersections with Tate St and Aycock St.

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Section 3. Bicycle Circulation Plan

Based on evaluation of current bicycling conditions at UNCG and in the surrounding area, as well as feedback and input from the public involvement process, the Bicycle Master Plan recommends a series of on-campus and off-campus bicycling improvements. These improvements follow state and national guidance for bicycle facility design, as outlined in Section 4, and complement recommendations of other recent UNCG and City of Greensboro planning documents.

3.1 Off-campus Bicycle Facilities – Project Recommendations

In October 2006, the Transportation Advisory Committee (TAC) of the Greensboro Urban Area Metropolitan Planning Organization (MPO) adopted the *Greensboro Urban Area Bicycle, Pedestrian, and Greenway Master Plan* (“*BiPed Plan*”). The Greensboro *BiPed Plan* outlines recommendations for off-road (greenway) and on-road bicycle facilities in the areas surrounding UNCG. The follow recommendations of the UNCG Bicycle Master Plan take into account the existing recommendations of the *BiPed Plan* and in highlighted cases expand upon these recommendations to improve bicycle connections between campus and surrounding housing, shopping and other destinations.

Section 3.1.1 Off-road Greenway Facilities

Greenway trails are shared-use paths that accommodate bicyclists, pedestrians, skaters and sometimes other recreational and transportation users. Generally, greenway trails are located through a linear park, stream buffer or other existing green space. Often, these trails are preferred by bicycle commuters if they offer a direct route, as they are a pleasant and scenic alternative to biking with traffic.



Figure 3.1. Greenway trail.
Source: www.pedbikeimages.org

Connections from UNCG to Greensboro’s existing and future network of greenway trails will serve the campus community well by connecting the University to surround parks and neighborhoods, and offering an alternative to busier local roadways. The following trail segments are recommended as connector routes to/from the University:

- **Downtown Loop Trail** (Project #19, *BiPed Plan*) – this approximately four mile greenway trail recommended in the Greensboro *BiPed Plan* is an ongoing effort in the City of Greensboro and should connect to campus through a spur from downtown west on Lee Street and north along Tate Street.
- **Lake Daniel Greenway UNCG Spur** (Project #43, *BiPed Plan*) – this short (0.4-mile) greenway connects the Lake Daniel Greenway southward to the UNCG campus along Lake Daniel complex parkland, parallel to East Lake Drive. A signalized crossing exists at Market Street, but a safer crossing would need to be provided across Friendly Avenue.

To the extent that these facilities may not provide appropriate width for bicyclist accommodation, a separate and parallel bicycle accommodation should be provided.

Greensboro’s system of signed bicycle routes will help cyclists navigate parallel routes from existing and future greenways to the campus. In addition to the planned greenways recommended in the *BiPed Plan*, it is recommended that the University and City of Greensboro work together on several new greenway links to connect surrounding neighborhoods to the campus, including the proposed trail below.

- **College Park Greenway** – a short trail connection from College Park (west of campus) to the Irwin Recreational Trails in the northwest quadrant of campus. This trail was suggested by a UNCG staff member during the March 19, 2008 Open House because it would allow bicycle commuters from the College Park neighborhood and farther west to access campus by bike but avoid the busy intersection of Walker Avenue and Aycock Street. The trail would run through Greensboro’s College Park (west of campus) and provide an underground bikeway beneath Aycock Street by way of the existing stream culvert to connect to UNCG’s Irwin Recreational Trails in the northwest quadrant of campus.

In addition to the construction of these trail connections, it is recommended that the University invest in better pedestrian scale lighting for existing campus trails, such as those surrounding the north campus residence halls, in order to improve safety and encourage use of these networks as viable transportation routes. Other amenities, such as water fountains, benches and trash cans can also complement and enhance greenway and trail facilities.

Section 3.1.2 On-road Bicycle Facilities

A number of campus area roadways offer important connector routes for commuters accessing the University from surrounding neighborhoods and downtown. These routes also allow students living on-campus to easily find off-campus destinations by bike, such as retail shopping centers, cultural attractions, parks and the central business district in downtown Greensboro. In order to encourage bicycle use and make these connections to/from campus more bicycle-friendly, the University should coordinate with the City of Greensboro to implement recommended projects on City streets. A number of bicycle treatments can be used to improve bikeability and enhance bicycle safety. These treatments are discussed further in Section 4 of this Plan and include sharrows (shared lane markings), “Share the Road” and bicycle route signage, bicycle lane markings, wayfinding signs, traffic calming and other improvements.

Bicycle lanes are designated bicycle travel lanes on a roadway, specifically marked by striping, signage and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are usually 4-6 ft wide. The following campus area roadways are recommended for bicycle lane treatments:



Figure 3.2. Friendly Avenue north of campus could be more bike-friendly if bicycle lanes and/or other improvements were made.



Figure 3.3. Bicycle Lane.
Source: www.pedbikeimages.org

- Market Street & Friendly Avenue (one-way pair)
- Aycock Street
- Lee St (Tate Street to Aycock Street)

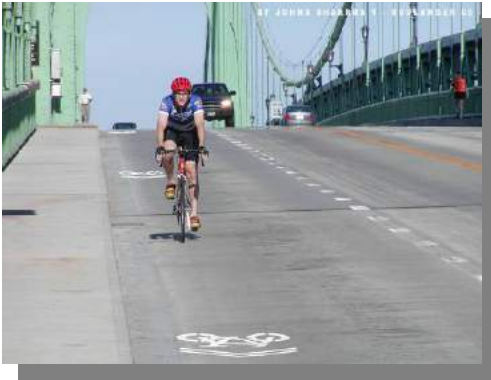


Figure 3.4. Sharrow.

Source: www.pedbikeimages.org

Shared-lane treatments are often used for roadways without quite enough width or opportunity to mark bicycle lanes. Wide outside lanes (WOLs) are one example of a shared-lane; WOLs are typically unmarked wide curb lanes, generally 14-16ft wide. Sharrows are shared-lane markings, which can be painted or stenciled onto WOLs or typical travel lanes. Sharrows are intended to raise motorist awareness of bicycle use on a marked roadway and also indicate to cyclists where to ride in the travel lane. Though sharrows have not been adopted in the national Manual for Uniform Traffic Control Devices (MUTCD), they are under study by the National Committee on

Uniform Traffic Control Devices (NCUTCD) and are expected to be included in the next update of the MUTCD. The following campus area roadways are recommended for sharrow treatments:

- Lee Street (wide outside lane on Lee, west of Aycock Street and east of Tate Street)
- Tate Street

A **bicycle boulevard** is a shared roadway that has been optimized for bicycle traffic, using traffic calming elements to achieve a safer bicycling environment and discourage cut-through motor-vehicle traffic. The purpose of a bicycle boulevard is to improve bicycle safety and circulation by having or creating low traffic volumes (using bike lanes where traffic volumes are moderate). A bicycle boulevard attempts to create free-flow travel for bikes by assigning the right-of-way to the bicycle boulevard at intersections wherever possible and using preferential traffic controls for bicycles at major intersections. Further, bicycle boulevards have a distinctive appearance such that cyclists become aware of the existence of the bike boulevard and motorists are alerted that the roadway is a priority route for bicyclists. The following campus area roadways are recommended for improvement through a number of bicycle boulevard treatments. Once these facilities are in place, these roads should be formally marked and signed as bicycle boulevards:

- McIver Street
- Oakland Avenue

Traffic Calming is the practice of reducing traffic speeds and/or volume on a particular roadway through a number of engineering measures that include speed humps, neckdowns or curb extensions, median islands, chicanes, raised speed tables and raised crosswalks. Traffic calming is suggested to reduce speeds on the following streets



Figure 3.5. Curb Extension.

Source: www.pedbikeimages.org

and thereby improve bikeability, especially for inexperienced or beginner cyclists:

- Carr Street
- Mendenhall Street

These recommendations are summarized in Table 3.1, below.

Off-Road Facility	Suggested Treatment
Downtown Loop Trail	Project #19, <i>Greensboro BiPed Plan</i> – provides a campus connection to downtown through a greenway spur from downtown west on Lee St and north along Tate St to UNCG.
Lake Daniel Greenway – UNCG Spur	Project #43, <i>Greensboro BiPed Plan</i> – a short (0.4-mile) greenway connector from the Lake Daniel Greenway southward to UNCG.
College Park Greenway	Create a greenway connection to College Park from the Irwin Recreational Trails by widening the stream culvert under Aycock St.
On-Road Facility	Suggested Treatment
Aycock St	Bike Lanes
Carr St	Signage
Chapman/Coliseum Blvd	Signage and/or sharrows
Elm St	Bike Lanes
Friendly Ave	Bike Lanes
Lee St	Bike Lanes (Tate to Aycock) Wide Outside Lanes with Sharrows (west of Aycock St, east of Tate St)
Market St	Bike Lanes
McIver St/Garland Dr	Bicycle boulevard
Mendenhall St	Traffic calming, signage
Oakland Ave	Sharrows and signage to create bicycle boulevard.
Tate St	Sharrows and signage
Walker Ave	Sharrows, signage and/or bike lanes to create bicycle boulevard
Westover Ave	Bike Lanes

Table 3.1. Proposed off-road and on-road bicycle facilities.

Signed Bicycle Route Networks are a system of bicycle-friendly routes, marked by typical “Bike Route” signs (see Figure 3.6) that help cyclists navigate safely through a community. Signed bicycle routes are often low-volume, local streets with low traffic speeds that provide safe and comfortable biking alternatives to busier thoroughfares. The City of Greensboro has a system of signed routes, which are included in the City’s published bike map and should be updated as needed to help UNCG bicycle commuters navigate the campus and surrounding neighborhoods. Currently, two Greensboro bicycle routes run through campus: Route 6 and Route 9. Figure 3.7 illustrates the City’s bicycle routes in and around the UNCG campus area.



Figure 3.6. Typical Bike Route sign.
Source: MUTCD.



Figure 3.7. Map of signed bicycle routes in the City of Greensboro, surrounding the UNCG campus area.

3.2 On-campus Bicycle Facilities – Project Recommendations

In addition to working with the City of Greensboro to improve off-campus connections for bicycle commuters, the University should also focus on several on-campus projects to help improve the bicycle-friendliness of the UNCG campus itself. Since the University has more flexibility on campus-owned and operated streets, bicycle improvements on these roadways could and should be top priorities. The recommendations below for on-campus facilities include a variety of potential treatments, most of which are described in Section 3.1 above, but all of which are detailed in Section 4: *Facility Design Guidelines* of the Bicycle Master Plan.

The recommended on-campus improvements captured in the table below and in Figure 3.8 were identified by campus cyclists, students, faculty and staff during the January – February 2008 survey, at the February 4, 2008 Steering Committee Meeting and March 19, 2008 Open House and further developed by consultants with The Louis Berger Group, Inc.

Campus Street	Suggested Treatment
Administration Drive	Add “two-way for bikes” option for the short segment of Administration Drive that connects the College Avenue bicycle/pedestrian concourse with Spring Garden Street. This will allow quick and easy access for bicyclists but may require removal of parallel parking on the west side of the street and/or installation of a 10-14ft wide sidewalk.
Norfolk-Southern Rail Line	Construct a bicycle and pedestrian bridge over the railroad or tunnel under the railroad at Forest Street in order to provide an additional north-south connection to campus and a dedicated bicycle/pedestrian way across the railroad, a perceived barrier along the southern edge of campus.
Oakland Avenue	Enhance the bikeability of this east-west alternative to Spring Garden Street by creating a “bicycle boulevard” through signage, pavement markings and preferential treatments for bicycles.
Spring Garden Street	Improve bicycle safety at all campus intersections of Spring Garden Street through the restriction of right turn movements (i.e. “No Turn on Red” signage) and additional bicycle lane pavement markings indicating to cyclists the direction of travel. Additional measures such as bicycle loop detectors and related pavement markings, bicycle boxes, signage and experimental pavement markings (e.g. colored bike lanes) may be considered. Bollards or other form of physical barrier could be installed to prevent motorists from using bike lanes as right turn lanes at intersections.
Tate Street	Enhance motorist awareness of bicyclists on this narrow throughway by adding “sharrow” pavement markings and “Share the Road” signage. Bicycle lanes may be considered; removal of some on-street parking would be necessary.
Walker Avenue	Create a “bicycle boulevard” on this important connector from UNCG to off-campus housing and commercial areas.

	Add sharrows, signage and/or bike lanes for bicycle boulevard effect. Curb extensions and a bicycle box may be considered for the intersection of Walker Avenue and Aycock Street; right turning movements should be restricted at this signalized intersection. If pavement markings (e.g. bike lanes, centerline) are added to Walker Avenue, on-street parking should be more clearly delineated.
West Drive	Though it may not be feasible, a suggestion has been made to close West Drive off to auto traffic in order to ease bicycle travel. An alternative to closing the street would be to remove metered parking and replace it with less transitional faculty/staff parking or at least extend the time on the meters. Further study will be needed to assess options for West Drive.

Table 3.2. Recommendations for on-campus bicycle improvements, based on feedback from the Steering Committee and the March 19 Open House.

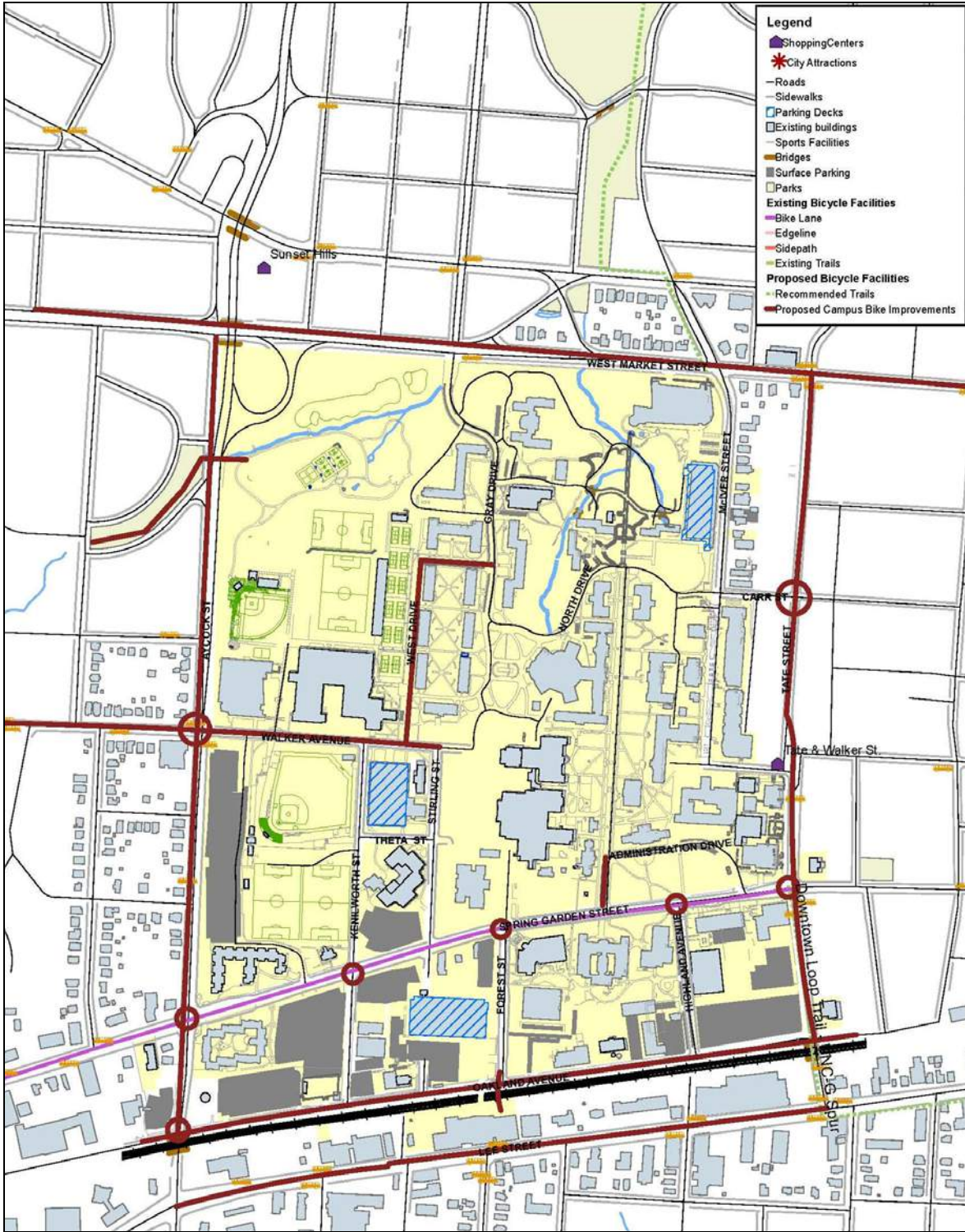


Figure 3.8. Map of recommended on-campus and off-campus bicycle improvements, identified during the February 4, 2008 Steering Committee meeting and March 19, 2008 Open House.

3.3 Special Focus Areas & Key Projects

There are several areas of campus which pose unique challenges for UNCG bicyclists; these include key area intersections and the current railroad underpasses at Aycock Street and Tate Street. In order to improve overall bikeability in the campus area, these “hot spots” or focus areas should be addressed. Additionally, the University might consider a variety of ancillary facilities to enhance the biking environment on campus.

- Intersection Improvements** – Based on feedback from the Steering Committee and campus cyclists, intersections in the campus area are exceptionally difficult for cyclists to traverse and are perceived as barriers to bike commuting by less experienced bicyclists. All intersections in the campus area should be monitored for safety and appropriate treatments made to reduce turning conflicts. It is recommended that turning movements be restricted at most, if not all, campus intersections with the introduction of “No Turn on Red” signage (for right turning traffic) and “Yield to Pedestrians” signage (for left and right turning traffic). Additionally, enforcement and engineering treatments should be considered to prevent motor vehicles from using the Spring Garden St. bicycle lane as a right turn lane and/or passing lane at intersections. In addition to all the on-campus Spring Garden Street intersections, the intersection of Walker Avenue and Aycock Street, Oakland Avenue and Aycock Street, and Carr and Tate Streets were also identified as problem locations. Bike boxes should be considered for problem intersections, in order to draw cyclists to the front of the intersection (beyond motorist stop bar) and raise visibility and awareness of cyclists at major conflict points (see Appendix 2 for details).



Figure 3.9. Regulatory signage for motorists to raise awareness of bicyclists and pedestrians at intersections. Source: <http://mutcd.fhwa.dot.gov>

- Railroad Crossings** – The Norfolk-Southern rail line on the southern edge of campus poses a challenge to bicyclists, especially because the existing rail underpasses at Aycock Street and Tate Street are narrow, poorly lit and viewed as barriers or choke points for less experienced bicyclists who do not feel comfortable “taking the lane” to traverse these crossings. It is recommended that the existing two rail underpasses in the campus area be improved with better lighting and “Share the Road” signage to raise motorist awareness of bicyclists in the area. In addition,



Figure 3.10. Tate Street underpass

plans for a Forest Street bicycle and pedestrian bridge or tunnel are strongly supported and encouraged. This designated bicycle/pedestrian crossing over the tracks will provide a valuable link to residential and commercial uses on Lee Street and south of campus, and will also help reduce the perceived barrier of the rail line as the campus expands south.

- Ancillary Facilities** – There are a number of bicyclist “perks” that can be low cost and quick to install that would greatly enhance the cycling environment and perception of bicycling at UNCG. These “ancillary facilities” include bicyclist amenities such as showers, lockers and changing rooms for bicycle commuters, air pumps, bicycle racks on campus and community buses, directional way-finding signage for cyclists and pedestrians and bicycle parking amenities. These amenities can encourage bicycling by increasing the convenience of bicycle commuting for students, faculty and staff. It is recommended that the University incorporate shower/locker facilities into new campus construction (as recommended in the LEED Green Building Rating System) by creating a guideline or requirement in the Construction Guidelines of the UNCG Facilities Design & Construction department. It is also recommended that the University install one air pump at the Elliott University Center with the possibility of adding another in the north campus area for the residence halls. It is further recommended that the University consider bicycle-specific wayfinding signage to increase accessibility and navigational ease of the campus to bicyclists and pedestrians, as well as enforce etiquette and guidelines for campus; specific recommendations for signage are addressed further in Section 4. Finally, bicycle parking is necessary to creating a “bicycle-friendly” setting at any business or institution. The University is very interested in providing additional bicycle parking facilities and improving the siting of bicycle racks. Section 5 of the Bicycle Master Plan includes detailed information and recommendations for bicycle parking at UNCG.

A list of these project recommendations can be found in the table below.

Project Area	Suggested Treatment
Tate and Aycock Street Railroad Underpasses	Lighting Improvements
Norfolk-Southern Rail Crossing	Construct a bicycle/pedestrian bridge over the Norfolk-Southern rail line or a tunnel underpass beneath the rail line to improve crossing safety and reduce the “obstacle” effect of the railroad between the campus and southern neighborhoods.
Campus-wide Intersection Improvements	Post “No Turn on Red” and “Yield to Pedestrians” signage at all signalized intersections to restrict turning movements and raise motorist awareness of bicyclists and pedestrians at busy campus intersections. Other MUTCD signs should be considered, such as the “Begin Right Turn Lane, Yield to Bikes” sign in Figure 3.7. Also consider “bike boxes” at intersections to increase visibility of cyclists (see Appendix 2 for details).
Bicycle Parking Facilities	Install covered and uncovered bicycle racks throughout campus, as appropriate (see Section 5). The University should also consider the installation of bicycle lockers, available for rent, for longer-term covered parking opportunities. Bicycle storage rooms should be considered for all new residence halls. A bicycle map should be printed and distributed that identifies the locations of all campus parking and other “ancillary facilities.”
Bicycle Wayfinding	Consider the installation of directional “wayfinding” signs for cyclists,

Signage	which identifies major campus destinations and bicycle facilities (e.g. the Irwin Recreational Trails). Wayfinding signage can include mileage information for distances to destinations, and should be human-scale and visually-interesting to appeal to pedestrians as well. See Appendix 2 for further detail.
Bike/Bus Facilities	Install bike racks on all buses serving campus. Bus racks should have 2-bike minimum capacity; buses serving popular routes may be considered for new 3-bike racks.
Other Bicycle Amenities	Install an air compressor with calibrated air pump for bicyclists at the Elliott University Center and/or north campus residence hall area. Shower/locker room facilities should be considered in all new campus construction and installed in new buildings and building renovations whenever possible. The Construction Guidelines of the UNCG Facilities Design & Construction department should incorporate standards for such amenities. Finally, as discussed more thoroughly in Section 5, a campus “bicycle station” should be considered. A bicycle station is a bicycle community center, which includes a repair shop that also sells helmets and other bicycle gear, and serves as a “go-to” spot for campus cycling information.

Table 3.3. Recommendations for specialized or “focus area” projects in the campus area.

3.4 General Bicycle Facility Costs

Project scheduling must address several elements of a project including cost, constructability, and priority. Project constructability is a function of both the basic costs of a project and also the ease with which the project can be constructed. Some projects may be relatively short and require very little materials but have high constructability costs due to the need to purchase right-of-way or the removal of obstructions.

Further study of the proposed bicycle improvements will be necessary to develop detailed project costs, but Table 3.4 provides a general estimate of the basic costs for the proposed projects. Please note that all cost estimates may increase or decrease depending on the cost of raw materials, labor, and inflation. Cost estimates do not take into account purchase of Right-of-Way or structure construction.

Itemized cost assumptions are shown in Table 3.4 as follows:

Item	Cost
Restriping & Signage Projects:	
On-pavement symbol	\$120 each
Bicycle Route sign	\$200 each
Striping	\$0.85 per linear foot
New Trail Construction:	\$400,000 per mile
New Road Construction:	\$2.5M per mile

Table 3.4. Basic Bicycle Project Costs.

Restriping and Signage Projects: Pricing estimates for restriping and signage projects are based on 2005 NCDOT Bid Averages for NCDOT Division 4. It was assumed that a sign and symbol would be placed every 1/2 mile for all restriping and signage projects. Also, it is assumed that any restriping and signage project would not require resurfacing or additional pavement width and curb and gutter. This would add additional cost to the project.

New Trail Construction: Estimate assumes a 10 foot wide, multi-purpose trail with minor earthwork and minimal type structures to cross drainage features.

New Road Construction: Estimate assumes two lane, rural highway with minor earthwork and minimal type structures.

Section 4. Facility Design Guidelines

This section of the UNCG Bicycle Master Plan is based on current state and national guidelines including the North Carolina Bicycle Facilities Planning and Design Guidelines (NCDOT Office of Bicycle and Pedestrian Transportation, January 1994) and the AASHTO Guidelines for the Development of Bicycle Facilities (AASHTO, 1999). The UNCG guidelines use these documents as a baseline for minimum conditions, and are intended to provide design solutions for a wide range of bicycle facility types. It is recognized that on facilities maintained by NCDOT, the State’s design guidelines will apply, and that the City of Greensboro and the University have the potential to exceed these minimum guidelines where conditions warrant on facilities within their jurisdiction.

4.1 Key Bicycle Design Principles

The following are key principles for these guidelines:

1. Continuous Bicycle Networks

UNCG will work with the City of Greensboro, NCDOT and other necessary agencies to complete a network of greenways, trails and on-street bicycling facilities that allow bicycle access between the University campus and surrounding neighborhoods, shopping areas and other destinations.

2. Biking with Traffic is Legal

Per North Carolina state law, bicycles are defined as vehicles whose drivers have the same rights and responsibilities on the road as the drivers of motor vehicles. Therefore, it is legal to bicycle on all roads in Greensboro, except those roads designated as limited access arterials or freeway facilities, which prohibit bicyclists. In addition, bicyclists are not permitted to ride on sidewalks in the Central Business District (CBD) and it is generally not recommended outside of the CBD except for young children. This means that most streets are bicycle facilities and should be planned, designed and maintained accordingly.

3. Design for All Cycling Skill Levels

Bicyclists have a range of skill levels from beginner, child and senior cyclists (“Type B/C”) to experienced, fast commuters (“Type A”) who are capable of biking with

The **Design Cyclist** is the person or group for whom one is considering when thinking of providing new or improved bicycling facilities. Different levels of cyclist may be used to or feel safer on different kinds of facilities or in different conditions.

Fast commuter (Type A Cyclist) - confident in most on-road situations and will use a route with significant traffic volumes if it is more direct than a quieter route;

Other utility cyclist (Type A Cyclist) - may seek some segregation at busy junctions and on links carrying high-speed traffic;

Inexperienced utility, commuter and leisure cyclist (Type B Cyclist) - may be willing to sacrifice directness in terms of both distance and time, for a route with less traffic and more places to stop and rest. May travel more slowly than regular cyclists;

Child (Type C Cyclist) - may require segregated, direct routes from residential areas to schools, even where an on-road solution is available. Design needs to take account of personal security issues. Child cyclists should be anticipated in all residential areas and on most leisure cycling routes;

Users of specialized equipment - includes disabled people using hand-cranked machines and users of trailers, trailer-cycles, tandems and tricycles. This group requires wide facilities free of sharp bends and an absence of pinch-points or any other features which force cyclists to dismount. (source: [UK Government, 2004, p.10](#))

Concept: Design Cyclist

traffic. Bicycle accommodations at UNCG should aim to serve all levels of the “design cyclist” and, at minimum, serve the “Type A” cyclist.

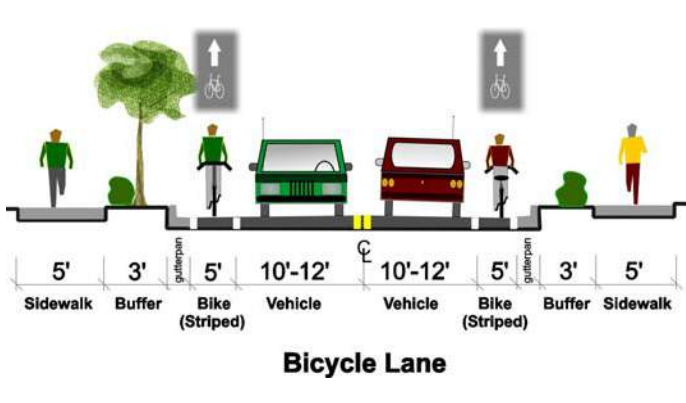


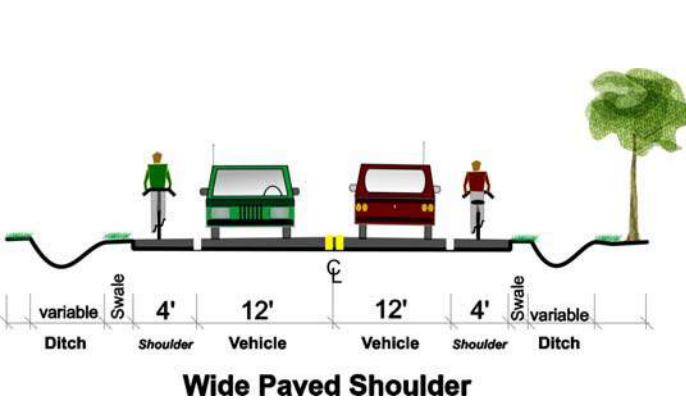
4. Safe, Complete, “Green” Streets

Campus area streets should be “designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and bus riders of all ages and abilities should be able to safely move along and across a ‘complete street.’”

5. Adaptability

These guidelines should be applied with professional judgment by project designers and engineers.

Table 1. Bicycle Facility Types

Facility Type	Example Image	Category	Treatment	Function	Example Cross-section
Bike Lane		<p>On-street Vehicle Speeds: <= 45 MPH Setting: Urban Curb and Gutter: Ok On-Street Parking: Ok Pavement Marking: Bicycle symbol</p>	<p>On-street striped and signed lane to NCDOT standards. Can be used on two or four lane roadways. Not recommended on roadways with center turn lane or frequent driveways.</p> <p>Width: 4' – 6' striped lane with pavement markings Position: Between gutter pan and travel lane, or parking lane and travel lane Surface: Same as road</p>	<p>Specifically delineates space on the road for bicyclists from which motor vehicles are prohibited. May also be used at intersections to guide cyclists and motor vehicles about appropriate positions on the road. Frequently used on urban roadways.</p>	 <p style="text-align: center;">Bicycle Lane</p>
Wide Paved Shoulder	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>With a pavement symbol</p>  </div> <div style="text-align: center;"> <p>Without a pavement symbol</p>  </div> </div>	<p>On-street Vehicle Speeds: <= 45 MPH Setting: Rural/countryside Curb and Gutter: No On-Street Parking: No Pavement Marking: Not necessary</p>	<p>Dual use paved shoulders that are wide enough to safely accommodate bicycle traffic; do not typically include painted icons. Can be used on two or four lane roadways. Not recommended on roadways with center turn lane or frequent driveways.</p> <p>Width: >= 3' striped lane Position: Shoulder Surface: Same as road</p>	<p>Provides space for bicyclists outside of travel lanes in areas without curb and gutter. Most frequently used on rural roadways.</p>	 <p style="text-align: center;">Wide Paved Shoulder</p>
Sharrows		<p>On-street Vehicle Speeds: <= 35 MPH Setting: Urban or rural Curb and Gutter: Ok On-Street Parking: Ok Pavement Marking: Sharrow</p>	<p>Painting of a "sharrow" or "shared lane marking" on outside lane. Lane should be minimum of 10 feet wide with sharrow pavement marking approximately 1.5 feet from outside line. Can be used on two or four lane roadways.</p> <p>Width: NA Position: In travel lane Surface: Same as road</p>	<p>Provides notice to drivers to the presence of bicyclists and helps position bicyclists within the travel lane. Frequently used on urban roadways with limited right-of-way. Should be positioned outside of "door zone".</p>	 <p style="text-align: center;">Sharrows</p> <p><small>(1) Note: Sharrow stencil is offset 1.5' from outside edge of door swing zone.</small></p>

<p>Wide Outside Lane</p>		<p>On-street Vehicle Speeds: <= 35 MPH Setting: Urban or rural Curb and Gutter: Ok On-Street Parking: Ok Pavement Marking: None</p>	<p>An unmarked roadway with wide (14') outside lanes and "Share the Road" signage. Can be used on two or four lane roadways with or without median. Width: Travel lane – 14' Position: NA Surface: Same as road</p>	<p>Used on roadways with adequate width for a bicycle lane but relatively low volume, in particular roads without striping.</p>	 <p style="text-align: center;">Wide Outside Lane</p>
<p>Shared Lane</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>With pavement markings</p>  </div> <div style="text-align: center;"> <p>Without pavement markings</p>  </div> </div>	<p>On-street Vehicle Speeds: <= 35 MPH Setting: Usually urban but can be rural Curb and Gutter: Ok On-Street Parking: Ok Pavement Marking: None</p>	<p>A striped or unstriped roadway with "Share the Road" signage. Traffic calming and other measures are recommended in conjunction to create a safe shared use environment. Width: Travel lane – 10 - 14' Position: NA Surface: Same as road</p>	<p>Used to notify motorists and other vehicles of the potential presence of bicyclists. Roadways may be striped or unstriped, two or four lane. May also indicate a route that cyclists are encouraged to take in comparison to other parallel routes. .</p>	 <p style="text-align: center;">Shared Lane</p>
<p>Shared-use path</p>		<p>Off-street Vehicle Speeds: NA Setting: Urban or rural Curb and Gutter: NA On-Street Parking: NA Pavement Marking: Sometimes centerline</p>	<p>Designed to NCDOT standards. Separated from roadway by planting strip or vertical curbing or built along railroads, rivers and streams, or open space. Width: 10' – 14' Position: NA Surface: Asphalt, concrete or other smooth surface</p>	<p>Provide off-street facilities for recreational cyclists, children and others; can offer connectivity between the on-street facilities and destination points.</p>	

4.2 Street Cross-Sections

This subsection covers basic street design elements and presents typical cross-sections for the roads encountered on and around the UNCG campus. Note that limited access, freeway, and interstate roadways are not shown; these roadways are not recommended for bicycle use and are illegal for cyclists to ride upon.

Bike Lanes: Marked bicycle lanes are one of the key elements of a bicycle system. They provide an additional level of perceived comfort for cyclists and raise driver awareness of the potential for cyclists on the road. A bicycle lane is typically 4-6 feet wide. Wider bicycle lanes are discouraged since they can be easily confused by motorists as parking or even



Figure 4.1 Marked Bike Lane
Source: www.pedbikeimages.com

through travel lanes. Marked bicycle lanes require proper maintenance and application. Their effectiveness can be reduced if blocked by on-street parking, interrupted by frequent intersections with right-turning bays and lanes (see Section 4.4), and/or filled with road debris. In some areas, these conditions have caused avid cyclists to oppose bicycle lanes. In spite of this, the benefits of bicycle lanes make them valuable tools for creating a bicycle-friendly community for riders of lesser skill and experience levels.

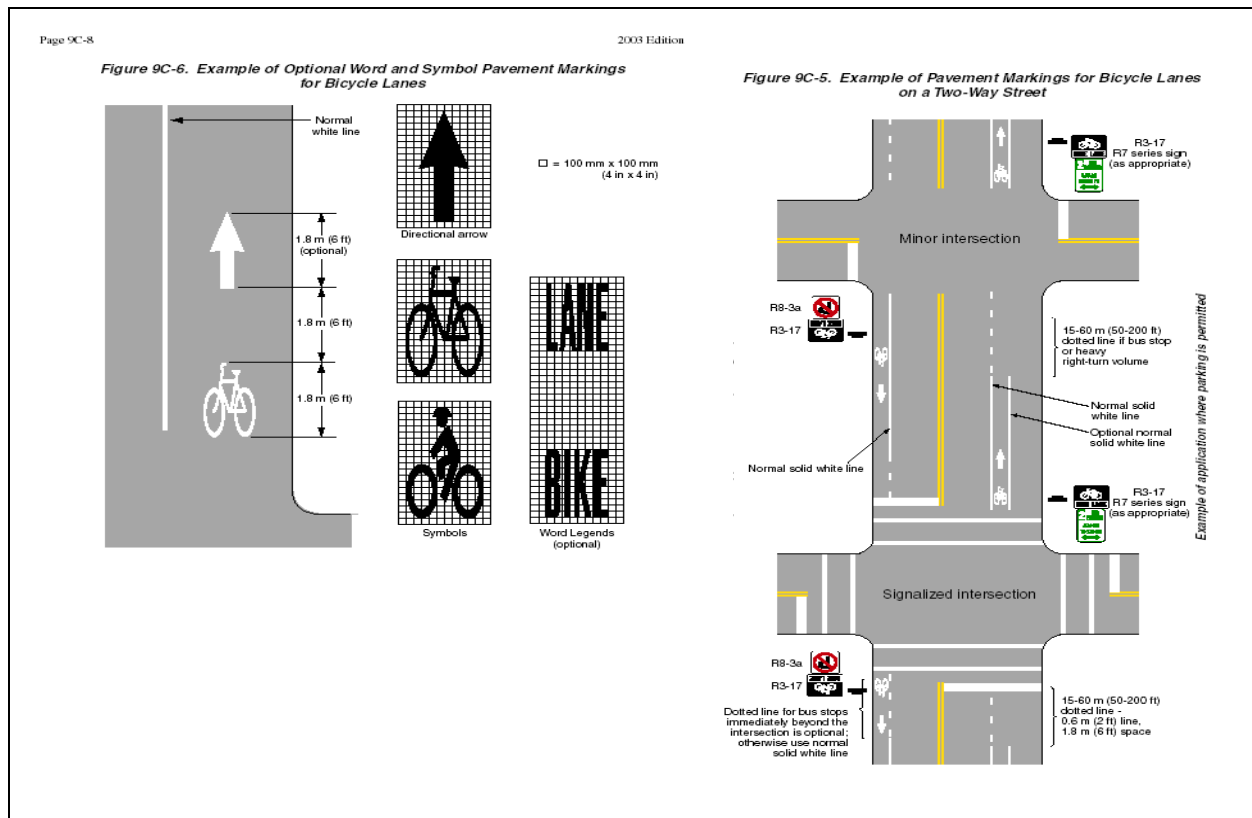
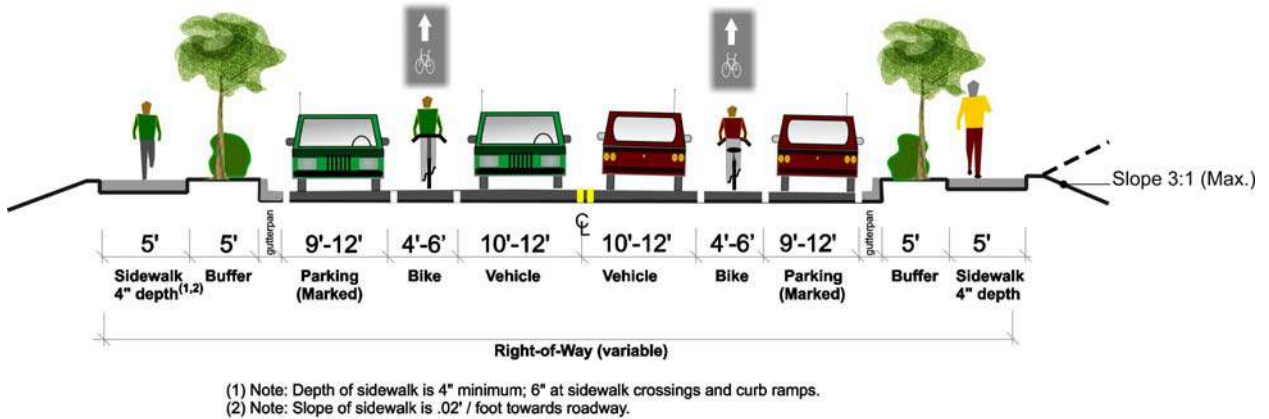


Figure 4.2 MUTCD guidance on bicycle lane markings and signage.

The following designs are examples of some recommended “best practice” approaches to marking bike lanes; however, specific engineering judgment may be required in many cases to ensure an optimal design given right-of-way, environmental, or other considerations.

Figure 4.3. Combined Parking and Bicycle Use*



Bicycle Lane, Parking on Both Sides

Figure 4.4. Separated (Marked) Parking on one side and Bicycle Lanes*

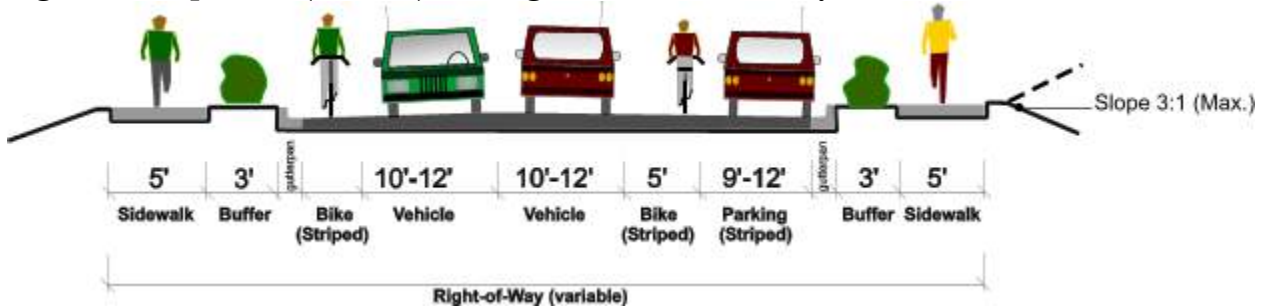
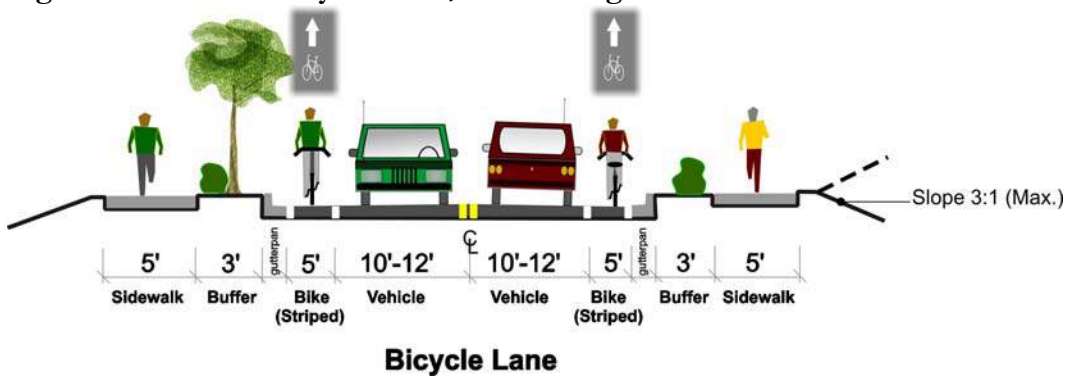


Figure 4.5. Marked Bicycle Lane, No Parking*



*Note: Marked bike lanes and parking lanes have 4" - 6" solid white painted (not thermoplastic) lines, as well as "BIKE LANE" text in the former.

4.3 Signage and Pavement Markings

Signage and pavement markings can complement engineered improvements to bicycle facilities, in addition to being used as stand-alone tools for awareness-building and education on campus. It is recommended that the University consider a combination of signage and pavement markings, as needed.

Section 4.3.1 Signage

The following regulatory and warning signs (Figures 4.6 and 4.7) offer guidance from the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) for bicycle-related signage. These signs are useful for educating and enforcing traffic laws and expectations for motorists, bicyclists and pedestrians who are sharing the road and/or multi-use trail facilities. Figure 4.8 illustrates MUTCD guide signs for bicycle facilities, which can provide directional information to cyclists. The University and City of Greensboro should consider all forms of signage as appropriate to address site-specific issues (such as wrong-way biking in the Spring Garden Street bicycle lanes) and enhance safety of existing and new bicycle facilities.

Figure 9B-2. Regulatory Signs for Bicycle Facilities

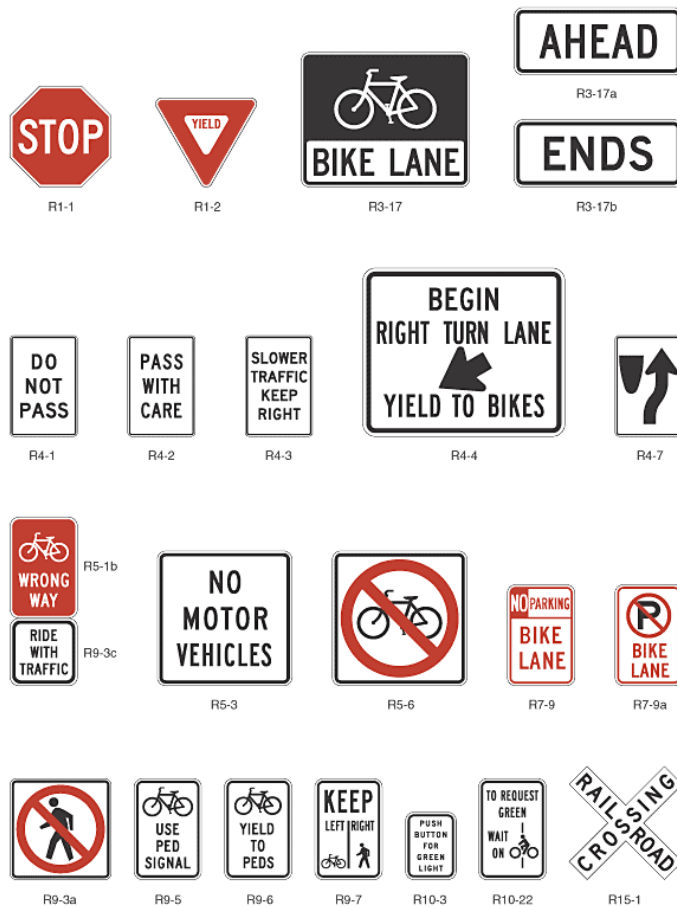


Figure 4.6. Regulatory signs for bicycle facilities. Source: Manual for Uniform Traffic Control Devices (MUTCD).

Figure 9B-3. Warning Signs for Bicycle Facilities (Sheet 2 of 2)

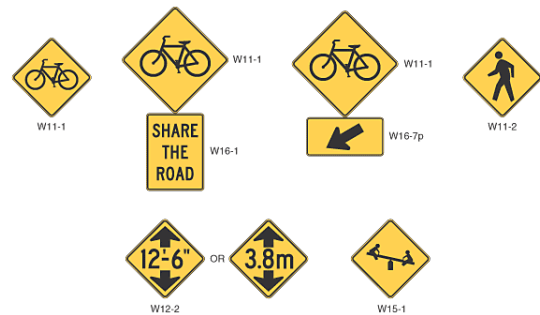


Figure 4.7. Warning signs for bicycle facilities. Source: Manual for Uniform Traffic Control Devices (MUTCD).

Figure 9B-4. Guide Signs for Bicycle Facilities

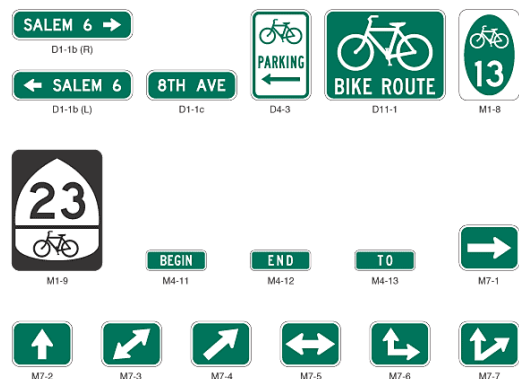


Figure 4.8. Guide signs for bicycle facilities. Source: Manual for Uniform Traffic Control Devices (MUTCD).



“Share the Road” signs: Signage on shared roadways can be beneficial to bicyclists by raising driver awareness of their presence on the road and by highlighting designated or “best” cycling routes for bicyclists. Bicycle signage on a route can encourage all users to “Share the Road.” Signage should always be used to signal the presence of bicycle lanes but can also be used independently to indicate that a road is a common bicycle route. “Share the Road” signs are approved by the NCDOT and included in the State of North Carolina’s traffic control manual.

Special Signage: In addition to standard MUTCD and State signage, the University might also consider developing signage specific to campus. Wayfinding signage could include UNCG-themed directional signs intended to help students, staff and visitors navigate the campus, as well as bicycle-themed directional signage with mileage markers and distance information. Additional considerations would be regulatory signs such as those indicating “walk zones” or “dismount zones” on campus, or other signs educating bicyclists on campus etiquette.

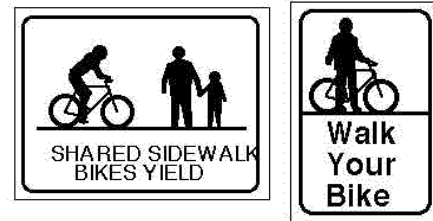


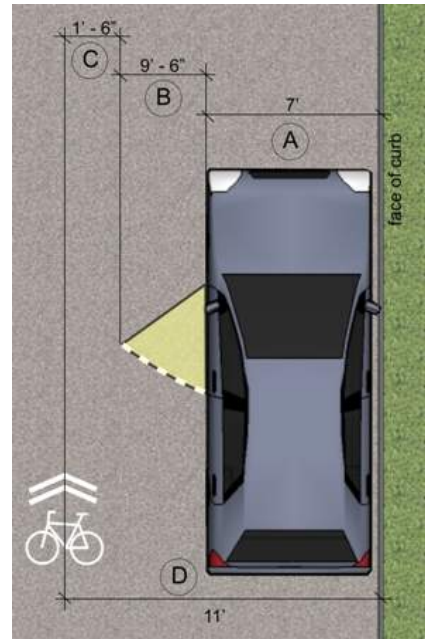
Figure 4.9. Campus signs from the University of Oregon. Source: University of Oregon Bicycle Plan.

Section 4.3.2 Pavement Markings and Related Treatments

Sharrows: A new bicycle shared lane arrow (or “sharrow”) stencil has been developed for use on on-road bikeways where the right-of-way is too narrow for designated bike lanes. The sharrow stencil can serve a number of purposes, such as making motorists aware of bicyclists in their lane, showing bicyclists the direction of travel, and, with proper placement, reminding bicyclists to bike farther from parked cars to prevent “dooring” collisions. Denver, San Francisco, Portland and other cities have effectively used these markings for several years, and this treatment is currently being considered for inclusion in the MUTCD. Sharrows can be used as an “experimental” treatment with approval from the NCDOT.



Figure 4.10. Newly-painted sharrow facility in Portland, OR. Source: Todd Boulanger, www.bikeportland.org



Sharrows Marking Design

- A=Distance from Driver Side Door to Face of Curb
- B=Door Swing Distance
- C=Distance from Open Door To Centerline of Sharrow Pavement Marking
- D=Distance from Face of Curb to Centerline of Sharrow Pavement Marking

Figure 4.11. Diagram of appropriate placement of “sharrow” pavement marking. Source: NCUCTD.

Bicycle Boulevard: A bicycle boulevard is a roadway that has been selected and treated with various traffic calming provisions specifically to allow for a continuous bicycle-friendly facility of varying traffic speeds and conditions. Bicycle boulevards are often signed as such and allow for convenient bicycle use while motor vehicle access may be somewhat limited in areas. See Appendix 2 for details on bicycle boulevard treatment options.



Figure 4.12.
Sample signage.

4.4 Intersection Standards

Providing for transitions at intersections for cyclists is a perennially difficult design issue, particularly so when dedicated right-turning lanes or bays will potentially require cyclists to weave with motorists moving over from a through lane into the turning lane. The typical weave area is marked with a standard 4 - 6 inch white striped line to denote the presence of a bicycle lane (see Figure 4.13).

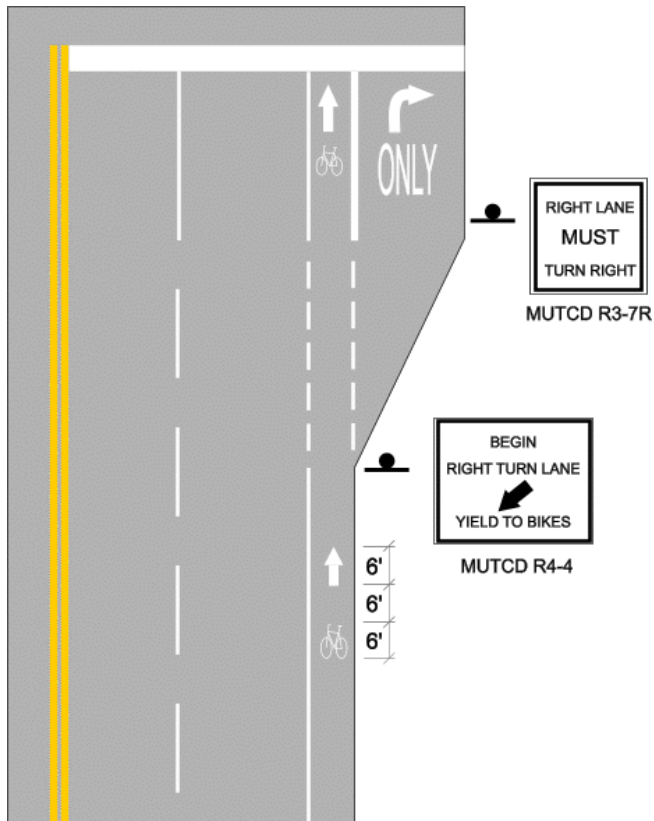


Figure 4.13. Bicycle Lane Treatment at Intersection w/Right Turn Lane¹

Bicyclist Activated Signals: Traffic signals can be made more bicycle-friendly by increasing the sensitivity of the internal “loop detector” for better detection of bicyclists at traffic lights. The loop detector is a device embedded in the asphalt of a travel lane, which senses the presence of traffic and directs traffic signals to change. The sensitivity of existing loop

detectors can often be increased to detect bicyclists, but sometimes new “bicycle loop detectors” are installed at intersections to create a bicycle-activated signal. Loop detectors at campus intersections should be checked for sensitivity and pavement markings placed in the travel lane to indicate where cyclists should be on the roadway to activate the signals.

Bike Box: A “bike box” is an innovative intersection treatment designed to raise awareness of cyclists at intersections. Though they are not in use in many U.S. cities, bike boxes have been credited with improving turning movements for bicyclists at signalized intersections without requiring cyclists to merge into traffic to reach the turn lane or use crosswalks as a pedestrian. The bike box is formed by locating the stop line for motor vehicles back from the intersection and adding an additional stop line for bicyclists immediately behind the crosswalk, thereby creating a box where bicyclists wait in front of motor vehicle traffic for the light to change. This gives cyclists greater visibility, as well as an opportunity to assume a more comfortable position to make a turn. The University and City might consider bicycle boxes for “problem” intersections on campus.

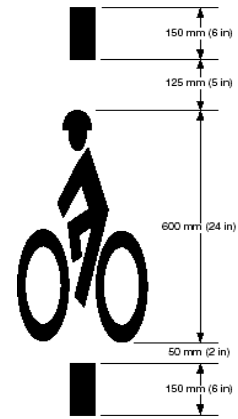


Figure 4.14. Bicycle Detector Pavement Marking.
Source: MUTCD.

4.5 Bicycle Bridges and Tunnels

The North Carolina Department of Transportation (NCDOT) has developed a policy that specifically supports on-road, non-separated bicycle facilities. In addition, this policy states that bridges, interchanges, viaducts, tunnels and other such structures must accommodate cyclists according to FHWA policy for federally funded roadway projects. The reality of state-funded roadway projects is that, while cycling accommodations are now fairly established where rights-of-way are adequate, constrained projects or areas where minimizing pavement due to environmental concerns may necessitate significant additional funds to be appropriated for the roadway project.

Design standards for railroad crossings and roadway bridges incorporating bicyclists (and pedestrians) are stated explicitly in the AASHTO *Standard Specifications for Highway Bridges* (esp. Figure 2.7.4A)². Bicycle- and pedestrian-specific bridges will follow design standards in the AASHTO *Guide for the Development of Bicycle Facilities* and North Carolina *Bicycle Facilities Planning and Design Guidelines*. All bicycle/pedestrian bridges (or tunnels) should adhere to basic trail design principles with a minimum (usable) width of 10ft and recommended width of at least 14ft. Bridge height must ensure clearance of 23ft from the bottom of the bridge to the railroad tracks. All bridges should maintain a 12:1 grade in the sidewalk or trail approach to the bridge, and level platforms of at least 5ft in width should be provided at every 30ft interval, as required by the Americans with Disabilities Act (ADA) and Access Board guidance. This standard may require “switchback” ramps for steep, short-distance approaches. Turning radii for switchbacks should be wide enough to accommodate bicycle riders unless the bridge is designed as a bicycle dismount zone. The width of intermittent platforms may be increased to 10ft to better accommodate bicyclists.

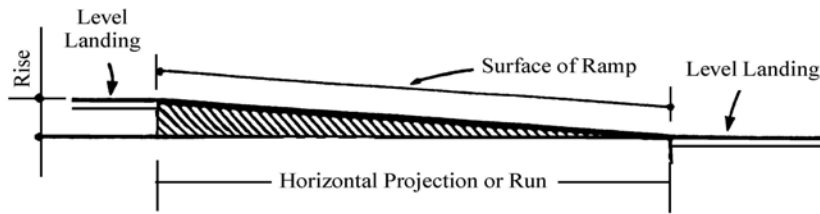
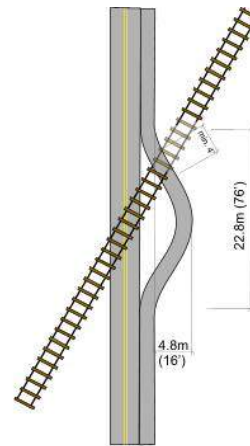


Figure 4.15. ADA design standard for level landing interval on sloped ramp. Source: FHWA *Trail Design for Access*, <http://www.fhwa.dot.gov/environment/bikeped/09-chap4.pdf>.

North Carolina standards require a maximum bicycle railing height of not less than 54" and railing spacing of not greater than 8" (note that pedestrian railing minimum heights are slightly lower). NCDOT does not recommend attempting to transition a bike lane into the travel lanes of a roadway bridge, if possible. All bridge transitions should have rubberized expansion joints placed at not greater than 45 degrees to the angle of travel to ensure a smooth ride from the roadway or sidewalk/trail surface to the bridge surface. In rare circumstances, bikeway facilities may be marked on one side of a roadway bridge. If so, the on-bridge facility should connect to a bicycle facility at both ends, physical separation should be provided from motoring traffic, and interference from on/off ramps at either end must be safely addressed. Generally, two-directional, on-road bicycle facilities are not recommended.



Bicycle Path Crossing RR at Acute Angle (>45°)
Source: AASHTO *Guide for the Development of Bicycle Facilities* (Figure 27)

Figure 4.16. AASHTO guidance for safe bicycle crossings at rail lines.

4.6 Off-Road Bicycle Facility Design

Sometimes the best option for a cyclist is a pathway that does not follow along or on a roadway. Greenway trails, multi-use trails and bicycle paths are some of the names for these types of facilities.

Design considerations for off-road bicycle paths include the following:

- Placing a multi-use pathway next to an adjacent roadway poses operational problems at intersections and driveways and is generally not recommended unless it is necessary to do so for short distances. When the path crosses a roadway, the crossing should be designed according to Figure 4.14³.

- The minimum recommended width of an off-road bicycle path is 10 feet. Lesser widths are not recommended since they will not accommodate two-way bicycle traffic and a single pedestrian moving side-by-side. Twelve feet is the recommended standard.
- Horizontal clearances should be maintained for at least 2-3ft from the edge of pavement of the bicycle path to ensure good visibility and minimize the potential harm from obstructions. If a minimum 2ft horizontal and 8ft vertical clearance cannot be maintained, then warning signs should be posted in advance. Note: in underground passages or tunnels, the vertical clearance should be increased to 10ft.
- Separating a walking path (min. 5ft) from a bicycle path by a white strip (6 inches) or with a grassy swale or berm (min. 3ft) is excellent practice. However, the bicycle path should still be a minimum of 10ft wide to ensure safe, two-way bicycle traffic.

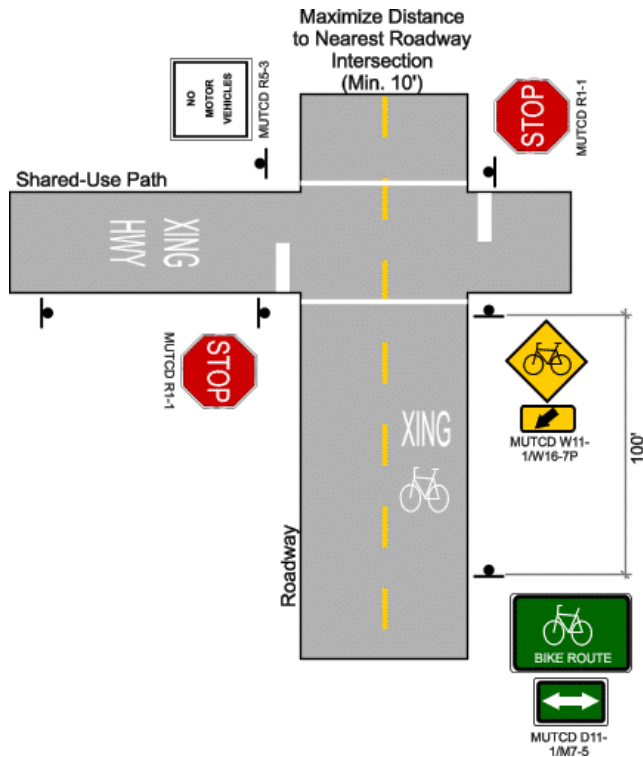


Figure 4.17. Multi-use Trail and Roadway Intersection Treatment³

In addition, the University may consider innovative treatments such as “stair channels” to accommodate bicycles on walkways and pathways with stairway access only at grade changes. Incorporating bicycle “stair channels” will allow bicyclists to dismount and walk bicycles up or downhill at these junctures, maintaining bicycle access throughout the campus area (see Figure 4.18). Stair channels can be created by carving a swale into existing concrete or granite walls lining stairways, or may require additional construction.



Figure 4.18. Stair channel (Brown Building photo).

4.7 Resources

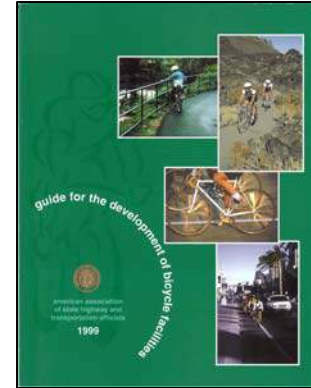
The following is a list of references and sources utilized to develop design guidelines for UNCG's Bicycle Master Plan. Many of these documents are available online and provide a wealth of information on bicycling standards and "best practices."

AASHTO Guide

Guide for the Development of Bicycle Facilities, 1999.

American Association of State Highway and Transportation Officials, Washington, DC.

www.transportation.org



AASHTO Green Book

Policy on Geometric Design of Streets and Highways, 2001.

American Association of State Highway and Transportation Officials, Washington, DC.

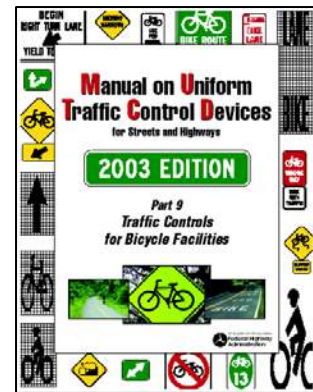
www.transportation.org

NCDOT

The North Carolina Bicycle Facilities Planning and Design Guidelines, 1994

NCDOT Division of Bicycle and Pedestrian Transportation

http://www.ncdot.org/transit/bicycle/projects/resources/projects_facilitydesign.html



MUTCD

Manual on Uniform Traffic Control Devices, 2003.

Federal Highway Administration, Washington, DC.

<http://mutcd.fhwa.dot.gov>

PBIC / APBP

Bicycle Facility Selection: A Comparison of Approaches

Michael King, for the Pedestrian and Bicycle Information Center

Highway Safety Research Center, University of North Carolina – Chapel Hill, August 2002

<http://www.bicyclinginfo.org/pdf/bikeguide.pdf>

Association of Pedestrian and Bicycle Professionals

Bicycle Parking Design Guidelines

<http://www.bicyclinginfo.org/pdf/bikepark.pdf>

¹Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition. Federal Highway Administration, 2003. From Figure 9C-3, Section 9C.06.

² Standard Specifications for Highway Bridges, American Association of State Highway and Transportation Officials, 2002. pp. 11-15.

³ Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition. Federal Highway Administration, 2003. From Figure 9C-3, Section 9C.06.

³ Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 Edition. Federal Highway Administration, 2003. From Figure 9B-7, Section 9B.20.

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Section 5. Bicycle Parking Plan

Just as motor vehicle parking is a key component of campus access management, the availability of safe and convenient bicycle parking facilities is a critical accommodation of bicyclists on campus. Quality bicycle parking is visible, accessible, convenient, secure and easy-to-use, in addition to being well-placed.

The 2006 UNCG Transportation Master Plan identified several key goals for increased bicycle use to/from and on campus, particularly the addition of new bicycle parking locations and covered bicycle parking facilities. These goals are reinforced by the Campus Master Plan update, and the University has made bicycle parking improvements a top priority. This section identifies existing and proposed bicycle parking locations, as well as standards and guidelines for installing effective, quality bicycle parking during future construction projects, renovations and retrofits.

5.1 Recommended Facilities & Standards

Bicycle racks need to be sited and installed properly in order to be well-used. All too often, bicycle parking is an afterthought and not considered as a project design element. It is most effective to incorporate bicycle parking into the design of all new building construction projects, including parking decks, transit hubs and sports/recreation facilities. Including bicycle parking in facility design will help ensure appropriate quantity, quality, aesthetics and type of parking facility. Providing short-term bicycle parking facilities at all significant campus buildings will also encourage and reward bicyclists who choose to commute to school or work. Providing long-term bicycle parking at residence halls and other appropriate sites will benefit cyclists who live on campus or store a bicycle on campus for other reasons. In fact, the increasingly popular *Leadership in Energy and Environmental Design (LEED)* green building rating system allocates a qualifying point toward accreditation for provision of bicycle storage and changing facilities in new construction and renovation projects, as it encourages multi-modal transportation alternatives to driving alone¹.

Section 5.1.1 Bicycle Rack Selection

All bicycle racks are not made alike. There are many types and styles of bicycle racks, all providing different parking capacity (i.e. number of bike parking spaces), some with much more capacity and better ease of use than others. An effective bike rack supports the bicycle frame in an upright position and enables the user to lock the frame and one or both wheels to the rack element.

Additionally, an effective bicycle rack allows for easy access to individually parked bicycles. Bicycle racks with multiple rack “elements” should allow for at least 30” between rack elements (in the case of a U-rack, each rack should be placed within at least 30” of an adjacent rack).



Figure 5.1. Inverted-U Style Bike Rack.
Source: APBP Bike Parking Guidelines

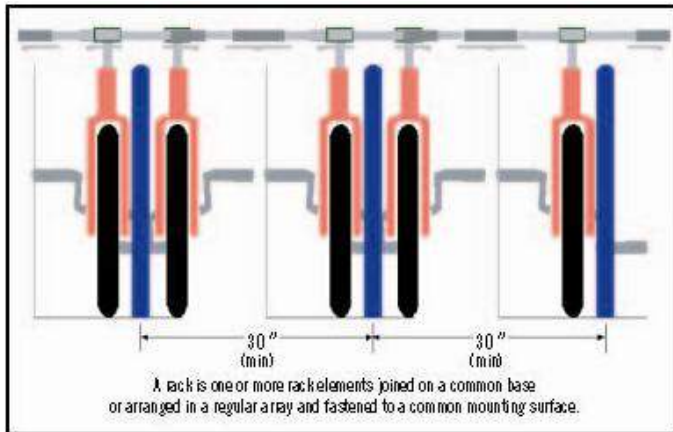


Figure 5.2. Bicycle rack placement illustration.
Source: APBP Bike Parking Guidelines

It is recommended that the University choose a consistent rack style for use across campus. The Steering Committee for the Bicycle Master Plan has chosen the “Inverted-U” rack (see Figure 5.1) and the “Stadium Rack” (see Figure 5.3) as the campus standards.



Figure 5.3. “Stadium Rack” by Saris.
Source: www.saris.com

Section 5.1.2 Bicycle Rack Site Selection


Retrofitted and new bicycle parking projects should consider building use to determine the appropriate quantity of bicycle parking spaces (see Section 5.2). Building aesthetics and landscaping features should be considered during rack placement. Rack placement should also take in to consideration visibility,

1. THE RACK ELEMENT

Definition: the rack element is the part of the bike rack that supports one bicycle.







The rack element should:

- Support the bicycle upright by its frame in two places
- Prevent the wheel of the bicycle from tipping over
- Enable the frame and one or both wheels to be secured
- Support bicycles without a diamond-shaped frame with a horizontal top tube (e.g. a mixte frame)
- Allow front-in parking: a U-lock should be able to lock the front wheel and the down tube of an upright bicycle
- Allow back-in parking: a U-lock should be able to lock the rear wheel and seat tube of the bicycle



Comb, toast, schoolyard, and other wheel-bending racks that provide no support for the bicycle frame are NOT recommended.

The rack element should resist being cut or detached using common hand tools, especially those that can be concealed in a backpack. Such tools include bolt cutters, pipe cutters, wrenches, and pry bars.

 INVERTED "U" (the rack element supports two bikes.)	 "A" (the rack element supports two bikes.)
 POST AND LOOP (the rack element supports two bikes.)	 COMB (the rack element is a vertical segment of the rack.)
 WAVE (the rack element is a vertical segment of the rack. (see additional discussion on page 2))	 TOAST (the rack element holds one wheel of a bike.)

Not recommended

Figure 5.4. APBP Bicycle Parking Guidelines.
Source: www.apbp.org

accessibility and convenience for the user and potential obstacles to use, such as being located above street level (up stairs) or in an unlit location.

Recommended site requirements for UNCG bicycle racks:

- Racks should not interfere with pedestrians or other street furniture – new bicycle racks should only be installed on a sidewalk or pedestrian way with five or more feet of clear sidewalk space remaining.
- Racks should be placed as near to the building entrance as possible, without causing conflicts with pedestrians – it is recommended that racks be placed within 50 ft of the entrance to the building that rack is intended to serve, preferably the main entrance.
- Racks installed near building entrances, retaining walls and other vertical structures should be placed at least 3ft from that structure to allow appropriate room for parking a bicycle freely without impediment.
- Racks should be installed in concrete footings with anchor bolts – anchoring racks to concrete pads is preferable; anchoring to asphalt or other surfaces should be avoided to deter theft and/or vandalism of the structure.
- In the case of multiple adjacent racks, racks should be installed to allow for at least 30” minimum spacing between racks, while 3 ft spacing is preferred.

Section 5.1.3 Covered Bicycle Parking

Covered bicycle parking is an amenity that encourages and rewards year-round bicycle commuters, offers sheltered parking for residential uses and protects bicycles from inclement weather. Covered bicycle parking can be achieved through a variety of means, whether taking advantage of existing building awnings and parking decks or through the more-expensive, but sometimes necessary, construction of stand-alone bicycle parking shelters. It is recommended that covered bicycle parking installed in parking decks be located near the parking attendant booth, if one exists, for added comfort of user and theft prevention.



Figure 5.5. Example of a modular, pre-fab bicycle shelter manufactured by DERO.



Figure 5.6. Covered parking opportunity at Phillips-Hawkins Residence Hall.

Covered bicycle parking should be provided where high-volume, long-term storage is needed, such as at campus residence halls, as well as at key destinations throughout campus. The same siting guidelines in Section 5.1.2 should also be used when installing covered bicycle parking facilities.

Recommendations for new and retrofitted covered bike parking locations at UNCG include:

- Oakland Avenue Parking Deck
- McIver Parking Deck
- Spring Garden Apartments Parking Deck
- North Spencer Residence Hall (at right)
- Suites at Tower Village
- Academic Classroom and Office Building (new)



Figure 5.7. Covered parking opportunity at North Spencer Residence Hall.

Section 5.1.4 Long-term Bicycle Storage

Like covered parking, long-term bicycle storage offers more protection from inclement weather plus the added amenity of additional theft-prevention. Long-term bicycle storage facilities include:

- Bicycle lockers (see Figure 5.8 and 5.9)
- Indoor bicycle storage rooms, sometimes referred to as “bike cages”
- Staffed bicycle stations

These facilities are more likely to be used by cyclists with expensive or high-end bicycles, by park-and-ride or transit users who commute to campus using public transportation then switch to a bicycle for day-time use, or by campus departments for storage of a “department bike” for employee use. In the case of bike storage rooms, these facilities would likely be used by campus residents or commuters who do not use their bicycles frequently but would like to keep them at a secure campus venue for occasional use. The key difference between a bike locker and bike storage room is individual vs. group access.



Figure 5.9. Bicycle Locker
Source: www.bikelink.org

Long-term bicycle storage facilities can be equipped with a variety of locking systems to allow for various formats of rental programs. Smart card technology is the most effective method for tracking use and access, but it is also the most expensive method for locker and bike room rentals. Traditional keying systems are also an option, along with coin-operated key dispenser systems. Revenue from locker and/or bike room rentals could help off-set the cost of installation or be utilized for bicycle-related programming elsewhere on campus.



Figure 5.8. Bicycle Locker
Source: www.bikelink.org

It is recommended that the University select a campus standard for vertical bike racks to use in indoor bike storage rooms, as well as a campus standard for bike lockers. The recommended vertical rack for the purpose of this Plan is the Saris “Stack Rack,” which saves space with its double-decker design, but uses a mechanized vertical assist to help cyclists lift bikes onto the top level. This vertical rack can be used in secure enclosed “cages” or rooms in parking decks, residence halls or other campus buildings to create an indoor bike parking area.



Figure 5.10. Saris Stack Rack.
Source: www.saris.com



Figure 5.11. ABSC Model #302 Bike Locker.
Source: www.ameribike.com

In addition to bike storage rooms, the University might consider using bike lockers outdoors to provide long-term covered parking. For the purposes of this Plan, the double-sided fiberglass composite bicycle locker Model #302 by American Bicycle Security Company has been recommended for proposed bike locker spaces on campus. The ABSC Model #302 is shipped in one piece and requires no assembly; it includes hardware for surface-mounting into concrete, and provides a durable, secure bicycle storage space for two bikes per locker.

Section 5.1.5 Bicycle Station

As a long-term vision, the University might consider including a staffed “bicycle station” in future campus expansion plans. Bicycle stations generally offer extensive cycling amenities such as centralized shower and changing facilities, a bike repair workshop and/or free access to bike tools, bicycle rentals, a bicycle air pump, coffee bar, helmet and lock sales and more, all in a “one-stop shop.” Such a service facility could serve all sustainable transportation users and would be a great addition to a future transit hub, student services center or recreational facility.

5.2 Existing & Proposed Bicycle Parking Locations

As of Spring 2008, the University had 249 bicycle racks at over 60 locations throughout campus, providing approximately 670 total bicycle parking spaces. Bicycle rack placement varies by location and little to no covered bicycle parking or long-term bicycle storage options exist outside of the residence halls. It is recommended that the University provide covered bicycle parking at key campus destinations (see Section 5.1.3) and all residence halls, and provide additional bike parking capacity at a number of existing building and parking lot locations throughout campus.

The “top 25” priority bicycle parking locations recommended in this Plan were identified based on feedback from the Steering Committee and the Bicycle Master Plan survey. Priority bicycle parking areas (outlined in Table 5.1, as well as in Appendix 4) should be installed as project funding becomes available. Installation of the “top 25” priority bike

parking areas will provide an additional 258 bicycle parking spaces at 97 bicycle racks and lockers throughout campus. An additional thirty-eight bicycle parking areas are proposed beyond the “top 25,” which would provide another 236 spaces at 71 bicycle racks and lockers throughout campus, plus three bike lockers. Installation costs for bike parking can vary depending on manufacturer, facility type and preparatory work needed prior to installation. The project cost estimates in Table 5.1 are based on the itemized estimates below². It should be noted that the University may be able to achieve cost savings on the bicycle racks through bulk orders placed with respective manufacturers.

- Cost to purchase one Saris U-rack, Model 15317 (bulk rate): \$139.99 each
- Cost to purchase Saris Stadium rack, Model 2136 (bulk rate): \$383.99 each
- Cost to purchase Saris Stadium rack, Model 2138 (bulk rate): \$464.99 each
- Cost to purchase and install bike lockers: \$1000 to \$4000 each (parks 2 bikes)
- Cost to install 6ft x 12ft concrete pad: \$240
- Cost to install 6ft x 15ft concrete pad: \$300

Additional bicycle parking recommendations and details are included in Appendices 4 and 5 for parking locations not included in the “top 25” but still identified as opportunities for retrofitted parking based on available space and observed need. In addition to installing these proposed retrofitted bike parking locations, Section 5.3 provides guidelines for future bike parking installations at all new campus construction and renovation sites.

Finally, it is suggested that the University post a bicycle rack request form online (possibly at the Parking Operations & Campus Access Management website – see Section 6.1) to allow for a well-coordinated and streamlined approach to managing new bike parking needs and public requests.

Priority	Proposed Rack Location	Description	Rack Type	Number of Racks	Parking Spaces to Provide	Total Cost
1	Elliott University Center	West entrance, expansion	U-rack	5	10	\$769.90
		North entrance, new	Stadium	1	8	\$778.98
		SW corner, new installation	Stadium	2	16	\$1437.96
2	Jackson Library	NW corner (sheltered)	U-rack	5	10	\$1,069.90
		NE corner (front entrance)	U-rack	4	8	\$855.92*
		SE corner (front entrance)	U-rack	4	8	\$855.92*
3	Student Recreation Center	East entrance	U-rack	2	4	\$307.96
4	Moore Humanities & Research Building	NW corner (near Spring Garden Street)	Stadium	3	18	\$1,193.94
5	Curry Building	NE corner (along sidewalk to Ferguson Bldg)	U-rack	4	8	\$855.92
6	Sullivan Science Building	North entrance (adjacent to Carr Street)	U-rack	5	10	\$1,069.90
7	Dining Hall	North entrance (covered)	Stadium	2	12	\$795.96

Priority	Proposed Rack Location	Description	Rack Type	Number of Racks	Parking Spaces to Provide	Total Cost
8	Bryan Building	SE corner, expansion	U-racks	4	8	\$799.96
9	HHP Building	East entrance at West Drive	U-rack	5	10	\$769.90
		East entrance, expansion	Locker	1	2	\$2,000.00
		West entrance, expansion	U-rack	4	8	\$615.92
10	Graham Building	North entrance, expansion	U-rack	3	6	\$461.94
		South entrance	Stadium	2	16	\$957.96
11	Mossman Building	South entrance	Stadium	11	8	\$478.98
		North entrance, bike locker	Locker		2	\$2,000.00
12	Music Building	South entrance (front)	U-rack	3	6	\$715.93
13	Petty Building	South entrance, new installation	Stadium	1	8	\$718.98
14	McIver Building	East entrance (rear)	Stadium	1	8	\$478.98
15	Stone Building	SW entrance, new installation	U-rack	5	10	\$1,069.90
16	Gatewood Studio Arts Building	East entrance, near Lot 7(sheltered if needed)	U-rack	4	8	\$615.92
17	Eberhart Building	West entrance, along McIver pedestrian concourse	U-rack	5	10	\$1,069.90
18	1100 W Market St (University Offices)	South entrance, near Market Street	U-rack	1	2	\$273.98
19	Weatherspoon Art Museum	West entrance (side); new installation	U-rack	7	14	\$1459.93
20	Moore Building (Nursing)	SW corner (rear), new installation	U-rack	4	8	\$855.92
21	Ferguson Building	South entrance (rear)	Stadium	1	6	\$637.98
22	Foust Building (Admin)	North side (rear)	U-rack	2	4	\$307.96
24	Aycock Auditorium	SW entrance (side)	Stadium	1	6	\$637.98
25	Admission & Visitors Center	SW corner (near parking lot)	U-rack	1	2	\$273.98

Table 5.1. Top 25 priority bicycle parking locations for new and retrofitted installations. Detailed photographs and drawings of these parking locations are included in Appendix 4 and 5. For the purposes of this Plan, the U-rack (Saris Model 15317) and Stadium Rack (Saris Models 2136 or 2138) were used as standard bicycle rack units. The ABSC Model #302 was used as the standard bicycle locker unit. Prices include concrete pad (where necessary), bike rack/locker and hardware; prices do not include any demolition or landscaping costs, labor or overhead, shipping/handling (except on bike lockers) or taxes.

* Cost based on concrete pad for footing and does not include cost of decorative brick

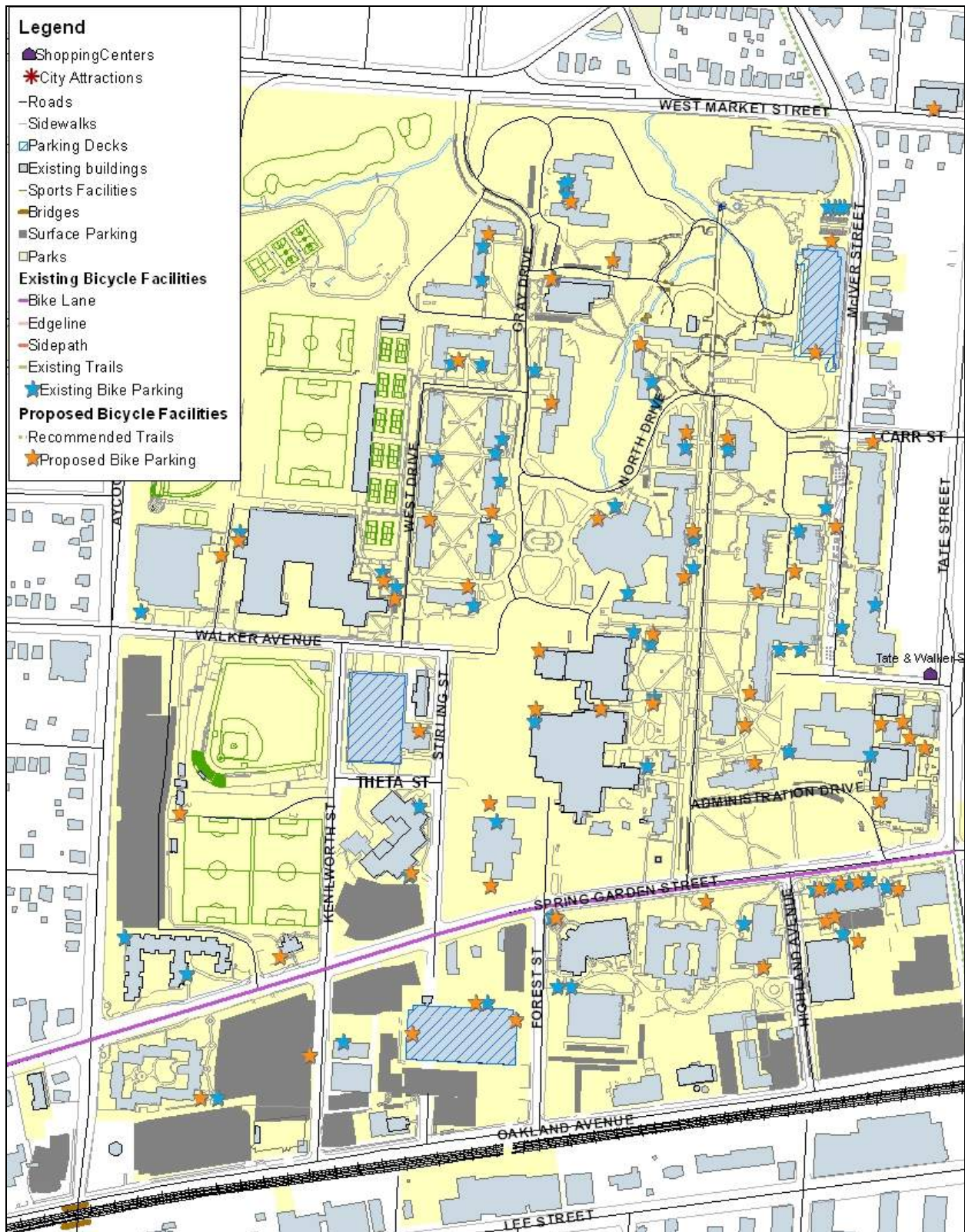


Figure 5.12. Existing and proposed bicycle parking.

5.3 *Bicycle Parking Policies*

In order to ensure the provision of well-integrated, effective parking facilities in future campus construction projects, the University should incorporate a bicycle parking policy into its Facility Design & Construction standards. The following matrix can be used as a guideline for future parking requirements during campus development and should be provided to departments, architects and design/engineering firms during the design phase of each project to ensure appropriate placement of parking facilities. This table provides a guideline for the quantity of bicycle parking spaces to be installed based on building use.

Building Use	Bicycle Capacity	Other Details	Physical Location
Residential	1 space per 4 units*	100% covered	Visible, well-lit area
Academic	1 space per 5 building occupants	Covered parking as possible	Visible area near main entrance
Sports/Recreation	1 space per 40-100 seats*	Covered parking as possible	Adjacent to restrooms/locker rooms, fields or other attraction
Operations	1 space per 5 building occupants	Covered parking as possible	Visible area near main entrance
Parking Deck	1 space per 20 auto spaces*	At least 70% covered	Well-lit area near parking attendant booth
Park & Ride Lots	1 space per 20 auto spaces*	All bike lockers	Well-lit area, protected from car traffic

Table 5.2. Bicycle Parking Guidelines for future UNCG construction and renovation projects. These standards were developed through a compilation of “best practice” ordinances for bicycle parking in communities and campuses throughout the U.S., and also incorporate the U.S. Green Building Council’s LEED standards for bicycle storage at institutional and commercial buildings. All of these standards meet or exceed the LEED SS Credit 4.2 requirement for Bicycle Storage; standards with an asterisk (*) exceed the LEED standard.

5.4 *Motorcycle & Moped Parking Recommendations*

Moped parking is currently unregulated and interspersed between existing motorcycle parking areas and bicycle parking racks on campus. As moped and motorcycle use increase on campus, it is important to reduce parking conflicts between bicycles, motorcycles and mopeds, as well as related moving conflicts with pedestrians. In order to do so, it is recommended that the University clearly delineate motorcycle and moped parking areas on campus, separate and away from bicycle parking and pedestrian zones. Motorcycle and moped parking areas should all be on or near the street and/or car parking areas. Mopeds and motorcycles should be expressly prohibited from parking at bicycle rack locations due to their frequent placement near or on pedestrian walkways and concourses, inappropriate for motorized travel. Moped parking may be allowed further into the campus center than motorcycle parking on a case-by-case basis but should always be designed to avoid conflict with lower-speed travelers, particularly bicyclists and pedestrians. More specifically, access to motorcycle or moped parking areas should not require the driver to ride on a sidewalk.



Motorcycle and moped parking areas should be signed and parking stalls should be clearly marked on the pavement with paint or thermoplastic, as illustrated in Figure 5.10 (also available in Appendix 7). Though “moped only” parking areas may be allowed in more central campus areas, it is recommended that all motorcycle parking areas be open to moped parking, as well, and thereby signed as such. New motorcycle/moped parking areas should be installed throughout campus for







greater accessibility and options. Covered motorcycle/moped parking is proposed for each of UNCG’s three major parking decks. The University should work with equipment vendors to ensure that moped and motorcycle drivers have access into these lots through the gates used by other motor vehicles, in order to prevent conflicts with pedestrians at walk-in entrances. The University and its vendors may need to increase the sensitivity of gate arms in order to allow for detection of lighter vehicles, such as mopeds.





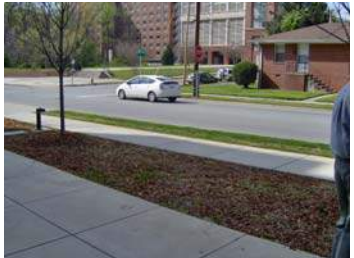

In order to more clearly define parking arrangements and enforce parking rules for mopeds and motorcycles, it is recommended that the University expand upon the existing motorcycle parking protocol by creating an “MP” permit at a lower annual cost than the “M” permit (\$145 per year as of March 2008). Motorcyclists and moped drivers should all be required to register for a campus parking permit, and a ticketing system should be developed so that motorcycles and mopeds parked at bicycle parking racks are first warned, then fined for parking illegally outside of their designated parking areas.




Figure 5.13. Proposed “moped only” parking area for UNCG. Located along Carr Street in front of the Sullivan Science Building.

Bldg/Lot Name	Moped/Motorcycle	Description	Picture
Administration Drive	Moped & Motorcycle	Stripe stalls on existing asphalt (west side of drive, prior to car parking area) and post appropriate signage.	
Gray Drive (Cotten Residence Hall)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area (east side of Cotten) and post appropriate signage. Serves residence halls and central campus.	

Bldg/Lot Name	Moped/Motorcycle	Description	Picture
Lot 1	Moped & Motorcycle	Install asphalt/concrete, as appropriate; add stalls and signage.	
Lot 7 (Gatewood Studio Arts Building)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area northeast of Gatewood Studio Arts. Serves Gatewood, Graham & Weatherspoon Bldgs.	
McIver Parking Deck	Moped & Motorcycle	Stripe stalls on existing asphalt and post appropriate signage.	
Moore (Nursing) Building	Moped & Motorcycle	Install appropriate signage and stripe stalls on extra pavement along curb of service drive west of the Moore Nursing Building.	
Music Building	Moped & Motorcycle	Remove grass between trees/planters and install 3 new concrete pads with rolled curbs (1 in each area between trees). Install 3 inverted-U bike racks on one pad; paint moped parking stalls on the remaining 2 concrete pads.	
North Drive (Dining Hall)	Moped & Motorcycle	Stripe stalls in existing motorcycle parking area (north side of Dining Hall, west side North Spencer). Serves residence halls and central campus.	

Bldg/Lot Name	Moped/Motorcycle	Description	Picture
Oakland Avenue Parking Deck	Moped & Motorcycle	Stripe stalls on existing asphalt and post appropriate signage.	
Petty Building (rear - service drive)	Motorcycle Only	Install sign and striping for 1 stall in available space.	
Stirling Street (at Theta Street)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area (east side of street), across from Bryan Bldg.	
Stirling Street (Bryan Bldg)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area (west side of street), in front of Bryan Building.	
Sullivan Science Building (Carr St)	Allow moped and motorcycle parking	Install new moped/motorcycle parking area on the north side of Sullivan Science Building. Install rolled curb and stripe stalls for moped parking only; add appropriate signage.	
Walker Avenue Parking Deck	Allow moped and motorcycle parking	Stripe stalls and install appropriate signage on Level 3, across from EUC.	

Bldg/Lot Name	Moped/Motorcycle	Description	Picture
West Drive (Hinshaw Residence Hall)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area on West Drive (west side of Hinshaw). Serves HHP, SRC and residence halls.	

Detailed moped recommendations are included in Appendix 6.

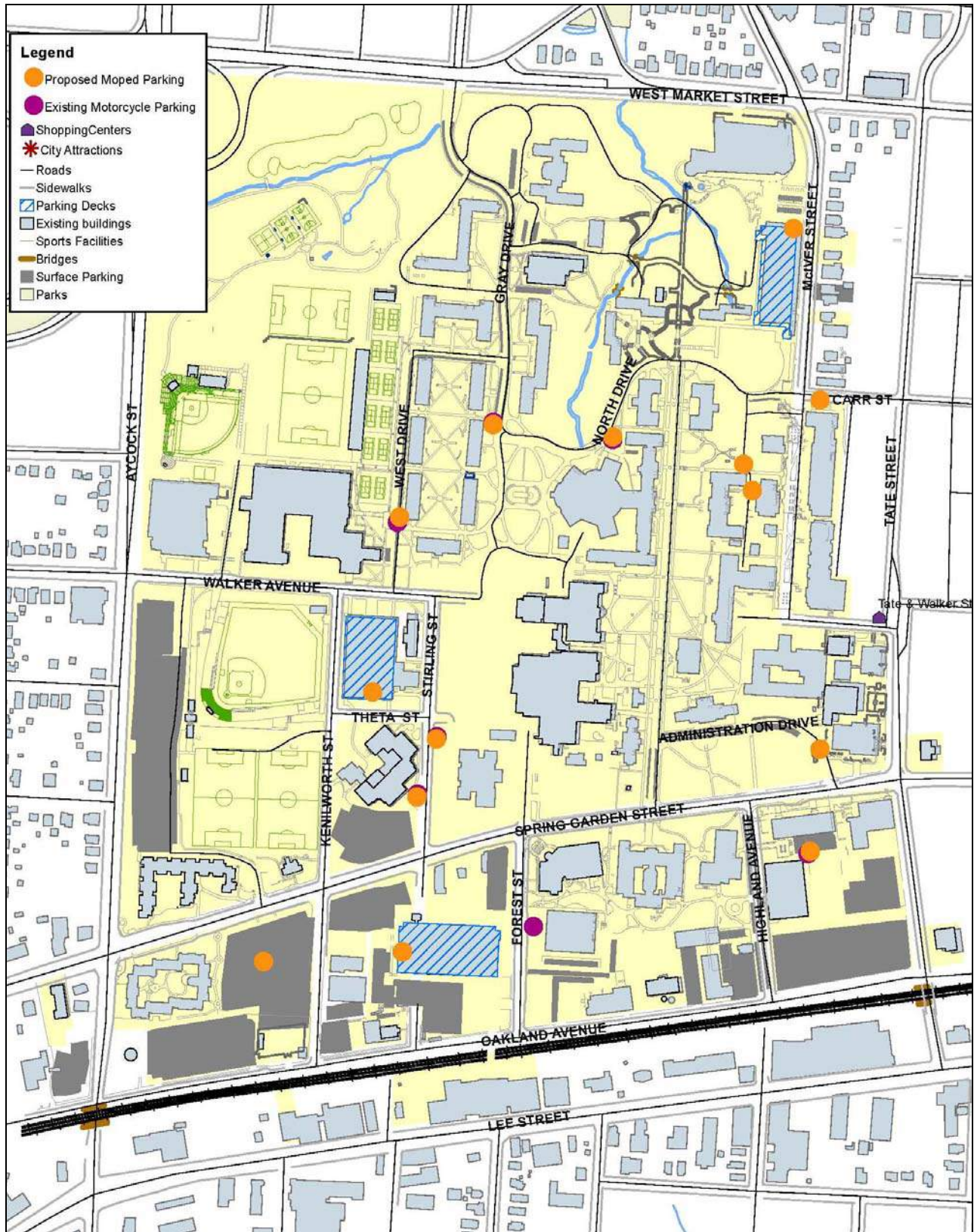


Figure 5.14. Existing and proposed moped and motorcycle parking areas on campus.

¹ USGBC Green Building Rating System, Version 2. <http://www.usgbc.org/ShowFile.aspx?DocumentID=913>

² Rack prices are for the *Bike Dock 2100 Series* model “U-rack” and *Stadium Rack 2138* model “Stadium Rack” by Saris Cycling Group, as quoted by Bob Fortune. www.saris.com

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Section 6. Programs & Policy Recommendations

Bicycle and pedestrian planners often refer to the “5 E’s” that lead to a bicycle or pedestrian friendly community: Education, Encouragement, Enforcement, Engineering and Evaluation. The physical improvements recommended in Sections 3-5 of the UNCG Bicycle Master Plan will greatly enhance the bikeability of UNCG’s campus; however, other “soft” improvements will need to be made to complement and reaffirm those engineering and design recommendations. In fact, the UNCG Bicycle Master Plan survey revealed that many campus employees and residents believe that better education and enforcement could greatly improve the bicycling environment for all campus users, including bicyclists, pedestrians and motorists. The survey and Open House, as well as the Steering Committee, helped to identify specific target areas for campus programming. Below are a number of recommendations for education, encouragement, enforcement and evaluation programs that build upon and enhance the University’s current practices. These recommendations are based on feedback from the campus population, as well as “best practices” and successful program models from campuses and communities across the country.

6.1 Education Programs

Currently, the UNCG Department of Public Safety & Police operates a bicycle registration program and performs bicycle safety outreach at the beginning of each academic year (see Section 2 for details). Though the University has focused more attention on bicycle safety-education than other program areas, there are many opportunities to expand educational outreach and “brand” a unique campus-wide bicycle educational program.

It is recommended that the University build off of existing outreach programs and establish a safety-education campaign that includes a TDM/Bicycle Program webpage (possibly under the Parking Operations & Campus Access Management website at <http://parking.uncg.edu>), University-produced bicycle safety brochures and bicycle safety classes for campus newcomers.

Program Recommendation	Description
Bicycle Program Website	Develop an online informational resource for campus cyclists that includes bike safety tips, an online bicycle registration option, a link to the City of Greensboro bicycle map and additional resources such as a bicycle rack request form and visual “how-to” guide on loading a bicycle onto a bus rack.
Bicycle Safety Brochures	Develop a campus-wide “brand” or logo for the University TDM and/or Bicycle Program and subsequently create UNCG-specific bicycle safety brochures that highlight local and state bicycle laws, bike safety tips and information specific to campus. This brochure could include details on how/where to correctly park a bicycle at UNCG and information on campus area dismount zones or inappropriate bicycling behavior.
Bicycle Safety Classes	Host bicycle safety classes at the beginning of each semester, marketed as campus tours for new students and staff. These 1.5 hour classes could begin with a brief review of the bike’s

	working parts (see the “ABC Quick Check” in Appendix 5) and a review of basic bike laws and safety tips, followed by an on-bike tour through campus to teach participants how to ride safely in traffic. This class should be taught by an experienced cyclist, preferably a League of American Bicyclists certified “BikeEd” instructor.
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Table 6.1. Recommended Bicycle Education Programs for UNCG.

6.2 Encouragement Programs

UNCG has started planning for future Transportation Demand Management (TDM) options and recently created a part-time TDM Coordinator position to jumpstart the program. However, there is still low-visibility of the TDM program on campus and the majority of the campus population drives to school or work at UNCG. It is recommended that the University “brand” the campus-wide TDM program and begin extensive outreach to encourage increased bicycle commuting and transit use, as well as create incentives for those who choose travel alternatives to driving alone. Such outreach could include a campus bike map to promote bicycling through education, emergency ride home services, promotional giveaways and a campus bike event to reward and incentivize bicycle commuting.

Encouragement Program Recommendation	Description
Campus Bike Map	Create a campus bike map to inform current and potential cyclists of bicycle travel options to campus, available bike lanes and parking locations, local bike shops and related amenities. This map could be posted online as a downloadable PDF and/or distributed in print format as a stand-alone document or part of a bicycle safety brochure (recommended above). Map should also include safety information and identify parking areas for mopeds and motorcycles.
Promotional Giveaways for Cyclists	Create an incentive program for campus bike commuters. UNCG already gives free bus access to students on PART and HEAT buses; the University could also provide free or discounted bus passes on other GTA transit routes, occasional car parking (flex parking), and/or bicycling accessories (such as light sets, helmets, reflective vests or ankle bands). One or more of these items could be made available to every bicyclist who registers his/her bike with DPS, which could also encourage better participation in the bicycle registration program.
Campus Bike Commuter Event	Host a Campus Bike Commuter Event to encourage non-cyclists to try bicycle commuting for a day or a week and/or to reward current bicycle commuters with an event that highlights their effort and provides some incentive (through promotional give-away, raffles, free food or coffee and/or event t-shirts). This event could be a stand-alone activity,

	such as the nationally-celebrated “Bike to Work Week” in May of each year, or added to an existing campus event, such as the regular UNCG “Commuter Deli.”
Emergency Ride Home Services	Create an Emergency Ride Home (ERH) Service available to alternative transportation users, especially bicyclists, which allows a free ride home via taxi or shuttle if an emergency situation arises. Emergencies might include personal/family illness or crisis, including a sick child, unscheduled overtime or other household emergency (e.g. fire or flood). ERH services can be limited to registered participants and include an annual limit, such as two per calendar year.
Bike Buddy Program	Develop an online “rideshare” type of program for cyclists where experienced bike commuters can sign up to act as a short-term mentor to a new or inexperienced bike commuter. The program can match cyclists by origin (i.e. neighborhood) and destination (i.e. campus area) for convenience. This program allows potential bike commuters an opportunity to get comfortable biking in traffic.
Campus Bicycle Loan Program	Create a campus bicycle loan program that provides low-cost bicycles to the campus population for use on a daily basis. This program could use a number of different check-out system models, utilizing campus identification cards and/or a smartcard system for day-to-day check-out of bikes, or the program could provide loaner or low-cost bikes on an annual basis to students who choose not to bring a car to campus. Bicycles for the program could be new or renovated.

Table 6.2. Recommended Bicycle Encouragement Programs for UNCG.

6.3 Enforcement Programs

The UNCG Department of Public Safety & Police has many officers who are well-educated in bicycle and pedestrian safety. There are six trained bicycle officers who patrol campus by bike, and the department performs regular traffic speed enforcement on major campus area streets, as well as various bicycle/pedestrian safety awareness activities. The Department could build upon these existing safety awareness programs to help reduce bicycle/pedestrian/motorist conflicts on campus, as well as to encourage increased obedience of traffic laws by all roadway users in the campus area.

Program Recommendations	Description
Targeted Enforcement Campaign	Develop targeted enforcement campaign of bicycle and pedestrian laws to be carried out each semester, especially on busy campus-area streets, such as Spring Garden Street and Tate Street. Motorists, bicyclists and pedestrians alike should be stopped during this weeklong outreach for discourteous, illegal and unsafe behavior, such as speeding, running traffic lights and stop signs, and not yielding right of way at

	crosswalks and intersections. Violators should be given warning tickets and/or safety brochures; serious or repeat offenders should be ticketed. The primary purpose of this exercise will be to educate and raise awareness of campus safety issues.
Online Bicycle Registration	Develop an online campus bicycle registration option for students and staff, and work with the TDM Coordinator to post information on the Parking Operations and Campus Access Management website. This will help to promote the program and encourage higher participation by the computer savvy campus population.

Table 6.3. Recommended Bicycle Enforcement Programs for UNCG.

6.4 Evaluation, Public Outreach & Staffing Recommendations

Over the years, there have been various efforts to engage the campus community in alternative transportation issues at UNCG. Prior to completion of the UNCG *Transportation Master Plan*, the Campus Transit Exploratory Committee (CTEC) was created to help guide the future of transit and transportation and steer the vision of that Plan. Shortly after, in the Fall of 2006, faculty senate president Anna Marshall-Baker, Provost Uprichard, and Vice Chancellor of Business Affairs Reade Taylor initiated the creation of the standing University Committee on Sustainability. The CTEC was disbanded, and interested members of student, faculty and staff signed up for the sustainability committee, whose purpose is to provide a unified, cross-campus collaboration on sustainability issues. The UNCG sustainability committee has several subcommittees, one of which is focused on transportation issues. The transportation committee is chaired by the UNCG TDM Coordinator with seven additional representatives of the student body, faculty and staff. The Transportation Subcommittee has identified their focus and plans to promote TDM efforts and implement various improvements of the UNCG Transportation Master Plan over the next few years. The Transportation Subcommittee should continue to evaluate bicycle and pedestrian needs as part of their focus on sustainable transportation for the University and work to help ensure the priority elements of the Bicycle Master Plan are implemented. The UNCG Sustainability Committee and all of its subcommittees can play an important leadership role in the implementation of the Bicycle Master Plan and its program, policy and project recommendations.

In addition to these campus committee efforts, the University has illustrated its commitment to alternative transportation and campus-wide sustainability initiatives through the addition of a full-time Environmental & Sustainability Manager and part-time Transportation Demand Management (TDM) Coordinator to its staff in 2004 and 2006, respectively. These positions help create awareness of transportation alternatives and promote opportunities for multi-modalism at UNCG. It is recommended



Figure 6.1. UNCG Bulletin Board. An empty bulletin board in the Dining Hall provides a perfect opportunity for promoting bicycling and TDM efforts to UNCG students and staff.

that the University consider increasing the part-time TDM Coordinator position to a full-time TDM Manager position. In the future, as demand rises, the University may even consider hiring a Bicycle & Pedestrian Coordinator position under the TDM Manager and/or a student intern(s) to help coordinate bicycle safety outreach and education campaigns on campus, as well as follow-up with evaluation of bicycle ridership and safety. These key University staff members should coordinate closely with City, MPO and other agency staff through regular meetings to facilitate partnerships and coordinate on funding and implementation strategies for the UNCG Bicycle Master Plan.

Finally, the various departments responsible for specific bicycle and pedestrian programs and projects should build upon the current University support for bicycling and help promote safe bicycle transportation to/from and on campus. Parking Operations & Campus Access Management should dedicate a webpage to bicycle commuting, for instance, and work to establish an annual campus bike commuter event to promote biking. The Department of Public Safety should promote online bicycle registration and continue to distribute bicycle safety-education materials. Residence halls at the University should distribute bicycle safety information and maps, as well as advertise campus bicycle parking facilities, especially “bike rooms” at dormitories. The UNCG Student Stores should sell bicycle helmets and locks to help promote bicycling safety and convenience on campus. All of these departments could work together to post bicycle safety information at a main kiosk or bulletin board at the UNCG Dining Halls or other campus locations to raise awareness of bicycling issues. There are many ways to make bicycle commuting a larger and more accepted part of the University culture, creating a safer and healthier campus environment for everyone. It is recommended that all departments strive toward promoting and integrating cycling awareness as much as possible.

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Section 7. Moving Forward: Implementing the Plan

In conclusion, this section discusses the benefits of implementing the Bicycle Master Plan, as well as partnership opportunities that may be available to UNCG for planning, design and construction of bicycle projects and for programmatic recommendations contained in this Plan.

7.1. Implementation Overview

Though the University has a number of internal funding sources for implementation of the Bicycle Parking Plan (see Section 5), UNCG will need to work in tandem with the City of Greensboro and other local agencies for many of the on-road and off-road bicycle project recommendations of the Bicycle Master Plan. Some of these projects may be jointly or solely funded by the City and/or University, as well as the State of North Carolina Department of Transportation (NCDOT) and Greensboro Urban Area Metropolitan Planning Organization (GUAMPO). As resources of any one of these given entities may be limited in terms of new funding for capital-intensive projects in a year, partnerships will be valuable in creating positive change that advances the goals of the Bicycle Master Plan.

It is recommended that the University seek partnership opportunities with the City of Greensboro for projects through “sponsorship” by the local government for one or more of the external funding sources listed in Section 7.1.1. As many of these federal and state funding sources require a local match (e.g. 20% local funding “match” for 80% federal or state funding), it is recommended that the University consider participation in matching funds to help leverage federal and/or state funding for project implementation. The City of Greensboro is a member of GUAMPO and Piedmont-Triad Council of Government (COG), both of which can also provide technical assistance such as planning and grant writing for various projects.

Section 7.1.1 North Carolina Department of Transportation Funding Sources

- **Transportation Enhancement Program** - Transportation enhancements are transportation-related activities that are designed to strengthen the cultural, aesthetic, and environmental aspects of transportation systems. The Transportation Enhancements program is administered by NCDOT and provides for the implementation of non-roadway capacity improvement projects, including bike and pedestrian facilities, landscaping, and similar aesthetic improvements. Various forms of bicycle paths, on-road improvements, safety actions, educational programs, and bicycle parking are eligible for funding.
- **Congestion Mitigation and Air Quality Improvement (CMAQ) Program** - CMAQ is a federal funding source for projects focused on investment in air quality improvements and provides funds to expand or initiate transportation services with air quality benefits. CMAQ funding is allocated based on a competitive grant application process, whereby funding applications are prioritized by the MPO and funding for selected projects is allocated through NCDOT. Projects eligible for CMAQ funding include transit improvements, rideshare services, demand management strategies, pedestrian and bicycle programs and traffic flow improvements.

- **Small Urban Funds** - Each NCDOT Highway Division has \$2 million of small urban funds available annually. Local requests for small bike and pedestrian projects can be directed to the NCDOT Highway Division 7 office for funding through this source. A written request should be submitted to the Division Engineer providing technical information such as location, improvements being requested, timing, etc. for thorough review. There is a \$250,000 maximum amount per request per fiscal year for local projects within two miles of Greensboro’s city limits.
- **Hazard Elimination Program** - Bicycle and pedestrian projects are eligible for this program. This program focuses on projects intended for locations that should have a documented history of previous crashes. Generally, NCDOT Highway Divisions receive approximately \$100,000 annually for hazard elimination and another \$200,000 is allocated to the Division of Bicycle and Pedestrian Transportation for statewide projects such as training workshops, pedestrian safety and research projects.
- **Spot Improvement Program** - The NCDOT Bicycle and Pedestrian Transportation Division budgets \$500,000/year for “spot” safety improvements throughout the State. These improvements might include signing, grate replacement, bike rack installations, hazard remediation at skewed RR crossings, and other small-scale improvements. Proposals should be submitted directly to the Bicycle & Pedestrian Transportation Division.
- **Governor’s Highway Safety Program (GHSP)** - Substantial progress in reducing crashes, injuries and fatalities is required as a condition of receiving funding through the annual GHSP program. All funding is considered to be “seed money” to get programs started – the grantee is expected to provide a portion of the project costs and to continue the program after GHSP funding ends. Projects are only approved for one full or partial federal fiscal year at a time; however, projects may be funded for up to three consecutive years. Amounts of GHSP funds vary from year to year, according to the specific amounts requested.
- **Statewide Discretionary Funding** - The Statewide Discretionary Fund consists of \$10 million and is administered by the Secretary of the Department of Transportation. This fund can be used on any project at any location within the State. Primary, urban, secondary, industrial access, and spot safety projects are eligible for this funding. To request funding, an agency must submit a written request to the NCDOT Highway Division 7 office (or Board of Transportation representative representing Greensboro), providing a clear description of project and project justification.
- **State Transportation Improvement Program** - Bicycle and pedestrian projects are broadly eligible for funding from most of the major federal-aid transportation sources. One of the most cost-effective ways of accommodating bicycle and pedestrian accommodations on major roadways is to incorporate them as part of larger reconstruction, new construction and some repaving projects. Generally, the same source of funding can be used for such bicycle and pedestrian accommodation as is used for the larger highway improvement if the bike/ped accommodation is “incidental” in scope and cost to the overall project. Overall, most on-road bicycle and pedestrian

accommodations within the state are made as incidental improvements. The other type of specific bicycle project is termed “independent” for the simple reason that it is not connected to a specific roadway improvement funded by NCDOT, which sets aside \$6 million annually through the Bicycle & Pedestrian Transportation Division for the construction of bicycle improvements across the State. Eighty percent of these funds are from STP-Enhancement funds, while state funds provide the remaining 20%. Greensboro, by providing the local 20% match, can make its projects more attractive relative to competing applications.

- **Share the Road License Plate Program** - When finalized, this program places money from purchases of the Share the Road License Plate towards bicycle safety and educational programs sponsored by NCDOT.

Section 7.1.2 Other Funding Sources

Proposed programs may draw from University-specific funding or other funding sources, including general matching grants from NCDOT for specific local initiatives and non-transportation related funding sources. Other potential funding sources include:

- **Economic Development Grants and Funding** for activities that may serve to attract new residents and visitors
- **Parks and Recreation Related Funding** for improvements which may be applicable to greenway construction or recreational activity
- **Grants from Non-Profits and Advocacy Groups** interested in promoting bicycle and pedestrian activities, recreation, or physical activity

7.2. Partnerships

A partnership is often the basic building block for creating a new program or infrastructure improvement in a community. Working partnerships between campus departments will be key to the success of many of the program and project recommendations in the UNCG Bicycle Master Plan, especially related to bicycle education, encouragement, enforcement and bicycle parking. Additionally, partnerships between the University and City of Greensboro will be crucial in helping move forward with improvements to City and State owned roadways in the campus area. Finally, partnerships with off-campus nonprofit agencies, institutions, private sector agents and foundations might also enhance the bicycle-friendliness of campus, as well as the bicycling culture in the campus area and throughout Greensboro. Tables 7.1 and 7.2 below provide ideas for partnering agencies both on-campus and off.

On-Campus Organization	Relationship and Interests
Academic Departments and Research Centers	Academic departments at UNCG could be unexpected partners in bicycle programs, providing low-cost options for assistance with program implementation. For instance, the Art Department could help with program logo design or the University’s Center for Geographic Information,

On-Campus Organization	Relationship and Interests
	Science and Health could help create and update campus bicycle maps.
Facilities Operations	The University's Physical Plant and Operations staff will help maintain a beautiful campus and safe biking environment through the installation of bicycle parking racks and maintenance of on-road and off-road campus bicycle facilities.
Facilities Design & Construction	The University's campus architects and design professionals help structure and maintain the campus aesthetic at UNCG, and will help ensure that bicycle facilities are included in all new campus construction and renovation projects.
Parking Operations & Campus Access Management	As the department that houses the University's Transportation Services and TDM staff, POCAM will be the main campus department in charge of implementing bicycle education, encouragement and evaluation programs recommended in the Plan. POCAM will also be in charge of developing and enforcing moped parking policies and projects for UNCG.
Department of Public Safety and University Police	DPS will offer many valuable services for campus, including bicycle safety-education and enforcement of bicycle laws. Campus police, especially trained bicycle officers, should be called upon for assistance with bicycle-related events and services.
Student Clubs & Campus Organizations	Student clubs and organizations will be great resources in spreading the word about University bicycle programs and engaging attendance in campus bike events.
Student Housing & Residence Life	Housing & Residence Life can help with bicycle education of on-campus residents, as well as to ensure that appropriate bicycle parking facilities are provided at all campus residence halls.
Student Recreation Center	The Student Recreation Center should act as a clearinghouse for bicycle safety materials and programmatic information for students and staff.
UNCG Sustainability Committee	The Sustainability Committee will offer valuable assistance in prioritizing, promoting and evaluating UNCG's bicycle programs and policies.
University News	The University's news outlets can help increase awareness of bicycling issues, promote bicycling safety and advertise bike commuter events to the campus community.

Table 7.1. Potential on-campus partners for implementing the Bicycle Master Plan.

Off-Campus Organization	Relationship and Interests
Bicycling In Greensboro (BIG)	BIG is a nonprofit organization whose mission is to help transform the greater Greensboro area into a more bicycle friendly community. BIG seeks to accomplish this mission through education, advocacy, alliances, events and service.
Bike Me! Collective	This off-campus nonprofit is working to establish a community bicycle program which could eventually service the campus, if partnerships are developed and maintained.
Chamber of Commerce	The Greensboro Chamber may offer a convenient one-stop source of potential volunteer resources and donations.
City of Greensboro Department of Transportation	The Greensboro DOT will provide a valuable off-campus resource for project and program implementation, especially on off-campus roads. The City's Bicycle/Pedestrian Coordinator will be an important contact.
Greensboro Velo Club	GVC is a membership-based cycling club that organizes bicycle rides and events throughout Guilford County.
Greensboro Transit Authority	GTA operates fourteen daytime bus routes in the Greensboro area, as well seven "HEAT" (Higher Education Area Transit) routes to/from local University campuses, including UNCG. GTA will be an important partner in ensuring multi-modal transit options to campus.
Local Bicycle Shops	Local bicycle shops, such as Recycles and Cycles D'Oro may provide assistance with promotion and services for campus bicycle events and education programs.
Moses Cone Health System	Hospitals and healthcare professionals can be valuable resources in promoting health-based education programs and bicycle safety messages.
Moses Cone – Wesley Long Community Health Foundation	This community foundation offers grants to organizations and programs that address health and wellness, and may be a good funding source for innovative bicycle programs at UNCG.
Other Area Colleges and Campuses	There are a number of other public and private colleges in the Greensboro area which could be great partners for the University in implementing projects and programs.

Table 7.2. Potential off-campus partners for implementing the UNCG Bicycle Master Plan.

7.3 Conclusion

The UNCG Bicycle Master Plan is intended to improve bicycle conditions on campus, promote bicycling at UNCG, and increase bicycle safety. It serves as a guide to the future of bicycling at the University and is intended to provide guidelines for enhancing the bicycle-friendliness of the campus area and encourage more students, faculty and staff to commute by bike.

The contents of the Plan review the existing demographic, physical, and institutional conditions at UNCG that may impact bicycling and the University's bicycle-friendliness. The Plan then provides a series of recommendations for changes to existing policies and plans, as and new projects and programs. To supplement these recommendations, the Plan also provides recommended funding sources and partnership opportunities for implementation. A section on standards and guidelines is provided to assist with project design and construction.

The benefits of the UNCG Bicycle Master Plan will be many. Not only will implementation of this Plan improve bicycle-friendliness in the campus area, it will also make it safer and more pleasant for cyclists and all campus denizens. In addition, by promoting bicycling, recommended programs of the Plan will increase bicycle activity, subsequently improving the environmental quality of the campus area and health of the University population. The increase in bicycle commuting will help the University balance its parking needs and reduce the reliance upon costly parking decks as the campus expands. Additionally, the projects and programs of the Plan will provide students, faculty and staff with transportation alternatives to driving alone and enhance the quality of life in the campus area.

Finally, a reputation of bicycle-friendliness is often an attractor to prospective students, faculty and staff considering a University for new academic or employment pursuits. Newcomers will be attracted to the campus for its beauty, history, outdoor activities and quality of life. The University might even consider working with the City and surrounding neighborhoods to create a major event and marketing effort to generate local and statewide attention to bicycle commuting and the accomplishments of UNCG itself in creating a bicycle-friendly culture.

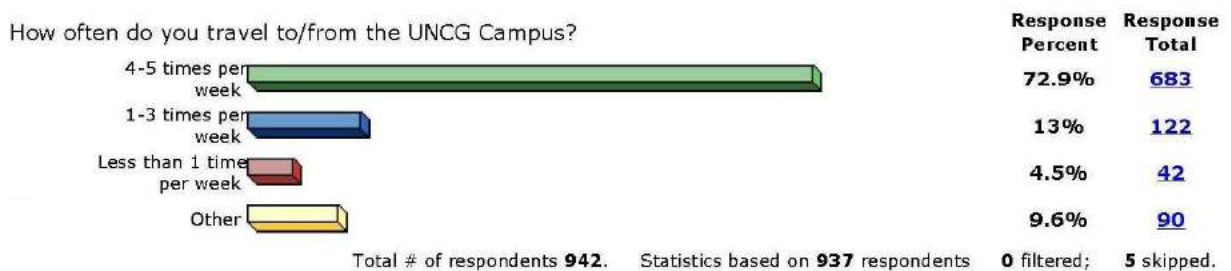
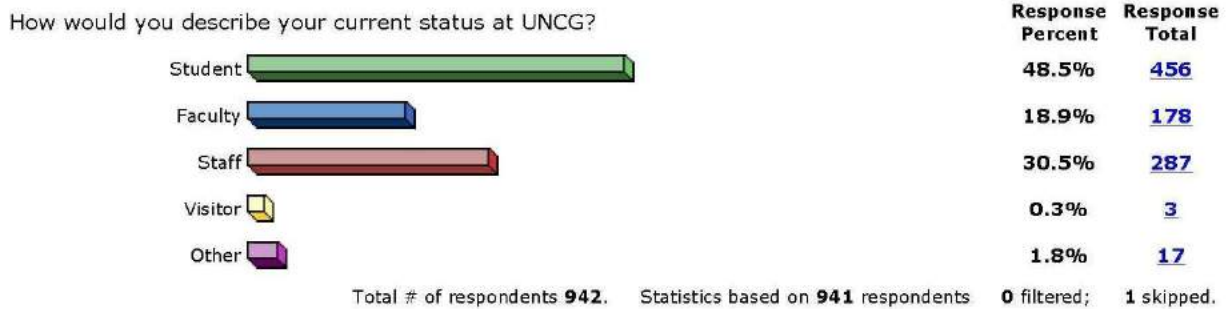
From here, the University, its leaders, students and staff can use this Plan as a set of guidelines for the next steps in meeting the University's goals of increased bicycle access, education, safety and convenience while maintaining a valued and valuable campus aesthetic. By following the recommendations within this document, UNCG will find the tools, in the form of recommended policies and programs, and the building blocks, in the form of recommended projects, to create the University's vision of a safe, bicycle-friendly campus community.

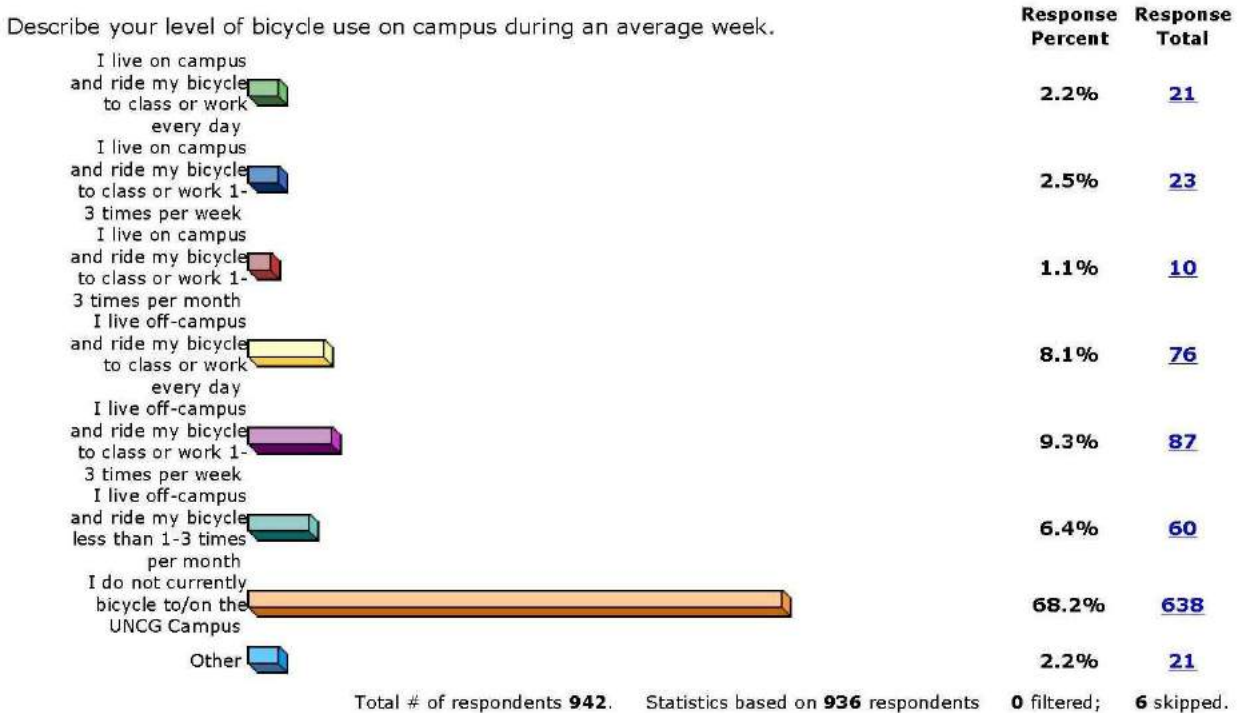
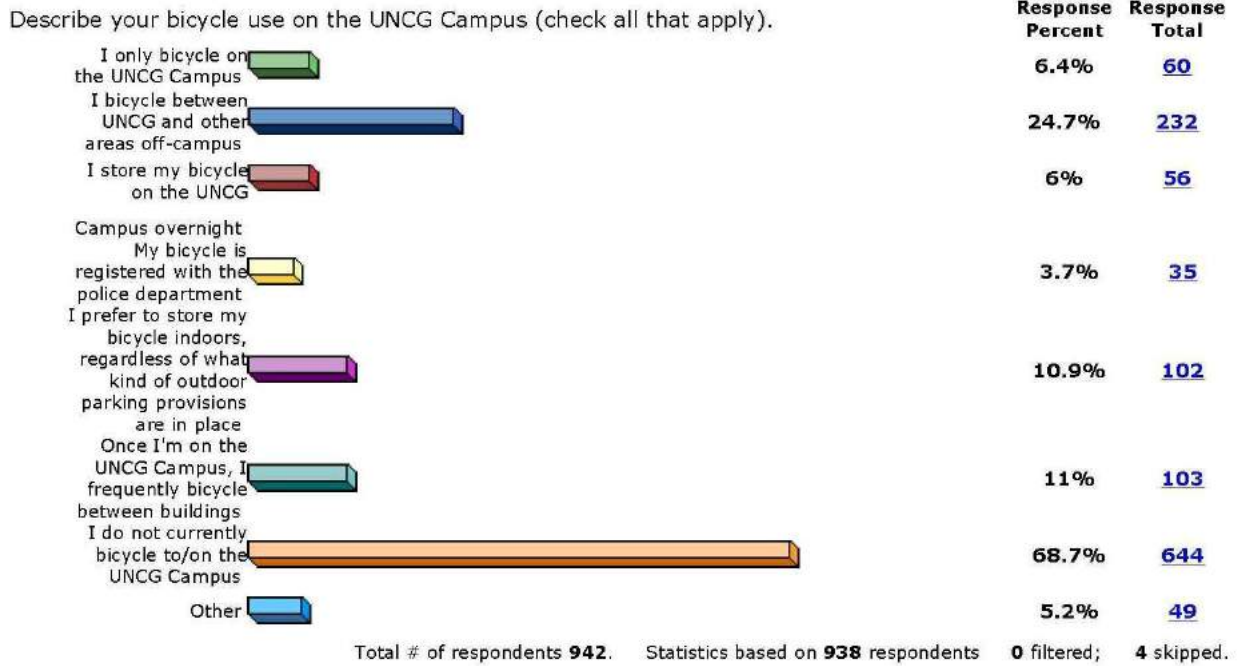
Appendix 1: Survey Results

The UNCG Bicycle Master Plan survey was distributed by the University's Institutional Research staff via email to all 2,510 UNCG faculty and staff, as well as approximately half of the 16,500 students enrolled in the 2008 Spring semester for a total of 7,660 students polled. In addition to a direct link emailed twice to this subset of the campus population on January 23, 2008 and February 20, 2008, the survey was also available through the UNCG Bicycle Master Plan website at <http://uncgbikeplan.pbwiki.com>.

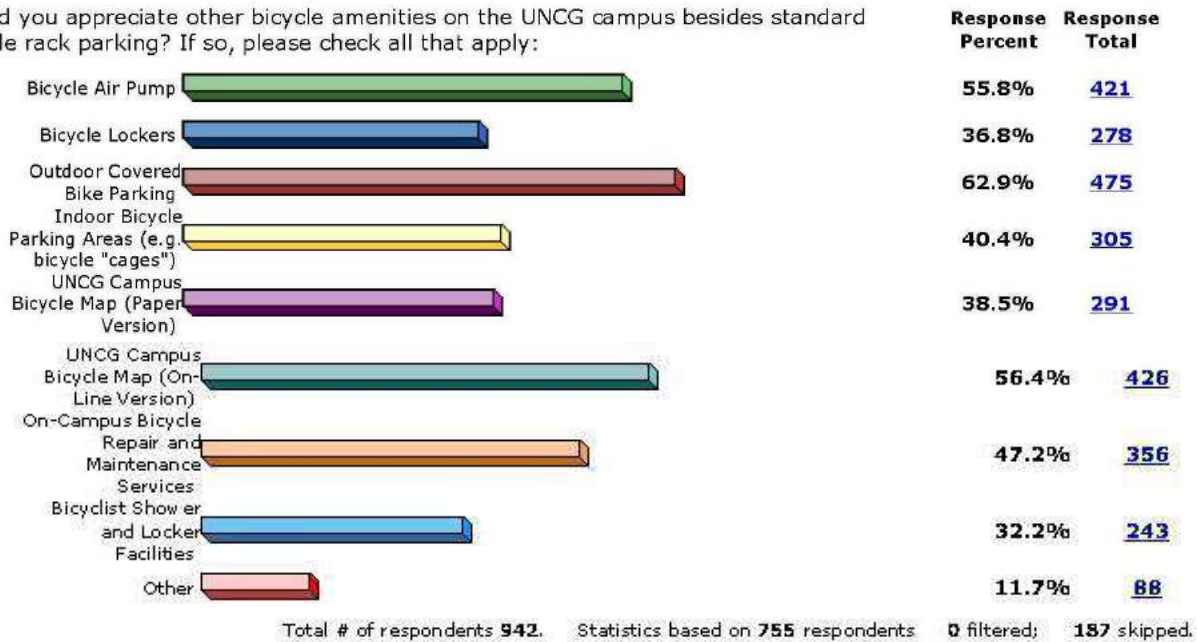
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How would you describe your current status at UNCG?	
How often do you travel to/from the UNCG Campus?	
Describe your bicycle use on the UNCG Campus (check all that apply).	
Describe your level of bicycle use on campus during an average week.	
Would you appreciate other bicycle amenities on the UNCG campus besides standard bicycle rack parking? If so, please check all that apply:	
Please rank the top three buildings where you would most like to see better or improved bicycle parking.	
Please describe any other improvements that you feel might enhance the cycling experience at UNCG.	
Please tell us any other things you wish for us to know as we are developing a bicycle master plan for UNCG.	





Would you appreciate other bicycle amenities on the UNCG campus besides standard bicycle rack parking? If so, please check all that apply:



Please rank the top three buildings where you would most like to see better or improved bicycle parking.



Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Bailey Hall	0% (0)	100% (1)	0% (0)		1
Baseball Stadium	16.7% (1)	66.7% (4)	16.7% (1)		6
Brown Building	47.4% (9)	31.6% (6)	21.1% (4)		19
Bryan Building (Bryan School of Business & Economics)	48.7% (37)	32.9% (25)	18.4% (14)		76
Campus Supply Store	25% (2)	50% (4)	25% (2)		8

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Carmichael Building	28.6% (2)	42.9% (3)	28.6% (2)		7
Carter Child Care Center	0% (0)	100% (2)	0% (0)		2
Coit Hall	20% (1)	40% (2)	40% (2)		5
Cone Hall	40% (2)	40% (2)	20% (1)		5
Cotten Hall	0% (0)	100% (1)	0% (0)		1

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Curry Building (School of Education)	49% (48)	28.6% (28)	22.4% (22)		98
Dining Halls	31.2% (24)	35.1% (27)	33.8% (26)		77
Eberhart Building	50% (16)	28.1% (9)	21.9% (7)		32
Elliott University Center	38.5% (116)	35.5% (107)	25.9% (78)		301
Faculty Center	60% (3)	20% (1)	20% (1)		5

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Family Research Center	0% (0)	75% (3)	25% (1)		4
Ferguson Building	25% (5)	30% (6)	45% (9)		20
Field Turf Maintenance Building	0% (0)	0% (0)	0% (0)		0
Financial Aid	14.3% (1)	42.9% (3)	42.9% (3)		7
Forney Building	44.4% (4)	22.2% (2)	33.3% (3)		9

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Foust Building (College of Arts & Sciences)	31.6% (6)	21.1% (4)	47.4% (9)		19
Gatewood Studio Arts Center	51.4% (19)	24.3% (9)	24.3% (9)		37
Genetic Counseling	0% (0)	50% (1)	50% (1)		2
Gove Student Health Center	12.5% (2)	31.2% (5)	56.2% (9)		16
Graham Building	36.5% (23)	38.1% (24)	25.4% (16)		63

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Gray Hall	50% (2)	0% (0)	50% (2)		4
Gray Home Management House	0% (0)	100% (1)	0% (0)		1
Grogan Hall	20% (1)	20% (1)	60% (3)		5
Guilford Hall	0% (0)	66.7% (2)	33.3% (1)		3
HHP Building (School of Health & Human Performance)	48.5% (32)	28.8% (19)	22.7% (15)		66

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Hinshaw Hall	0% (0)	100% (3)	0% (0)		3
International Programs Center	50% (2)	25% (1)	25% (1)		4
Jackson Library	28.6% (44)	38.3% (59)	33.1% (51)		154
Jamison Hall	0% (0)	0% (0)	100% (1)		1
Mary Foust Hall	50% (6)	33.3% (4)	16.7% (2)		12

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
McIver Building	30.6% (11)	30.6% (11)	38.9% (14)		36
McIver St. Parking Deck	27.3% (3)	18.2% (2)	54.5% (6)		11
McNutt Building	44.4% (4)	33.3% (3)	22.2% (2)		9
Mendenhall Hall	0% (0)	33.3% (1)	66.7% (2)		3
Moore Building (School of Nursing)	36.4% (8)	40.9% (9)	22.7% (5)		22

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Moore Humanities & Research Administration	52.3% (56)	26.2% (28)	21.5% (23)		107
Moore-Strong Hall	75% (3)	0% (0)	25% (1)		4
Mossman Building (University Administration)	25.6% (11)	41.9% (18)	32.6% (14)		43
Music Building (School of Music)	59.5% (25)	21.4% (9)	19% (8)		42
North Drive Child Care Center	0% (0)	50% (1)	50% (1)		2

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
North Spencer Hall	33.3% (1)	66.7% (2)	0% (0)		3
Nursing Annex Building	33.3% (1)	33.3% (1)	33.3% (1)		3
Mossman Building (University Administration)	25.6% (11)	41.9% (18)	32.6% (14)		43
Music Building (School of Music)	59.5% (25)	21.4% (9)	19% (8)		42
North Drive Child Care Center	0% (0)	50% (1)	50% (1)		2

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
North Spencer Hall	33.3% (1)	66.7% (2)	0% (0)		3
Nursing Annex Building	33.3% (1)	33.3% (1)	33.3% (1)		3
Science Building	31.2% (24)	37.7% (29)	31.2% (24)		77
Shaw Hall	0% (0)	50% (1)	50% (1)		2
Sink Building (800 Oakland Ave)	20% (1)	40% (2)	40% (2)		5

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Smith Campus Ministries Building	100% (1)	0% (0)	0% (0)		1
Soccer Stadium	0% (0)	25% (1)	75% (3)		4
Softball Stadium	0% (0)	0% (0)	100% (1)		1
South Spencer Hall	42.9% (3)	14.3% (1)	42.9% (3)		7
Spring Garden Apartments	54.5% (6)	27.3% (3)	18.2% (2)		11

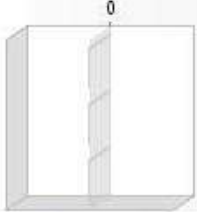
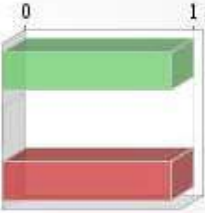
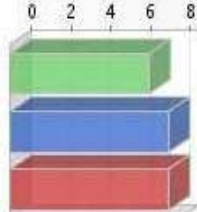
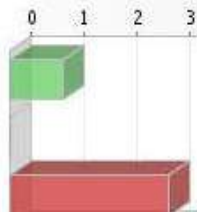
Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Steam Plant Building	0% (0)	100% (1)	0% (0)		1
Stone Building (School of Human Environmental Sciences)	45.9% (17)	24.3% (9)	29.7% (11)		37
Student Recreation Center	25.8% (32)	35.5% (44)	38.7% (48)		124
Taylor Building	50% (6)	25% (3)	25% (3)		12
Tower Village	11.1% (1)	33.3% (3)	55.6% (5)		9

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

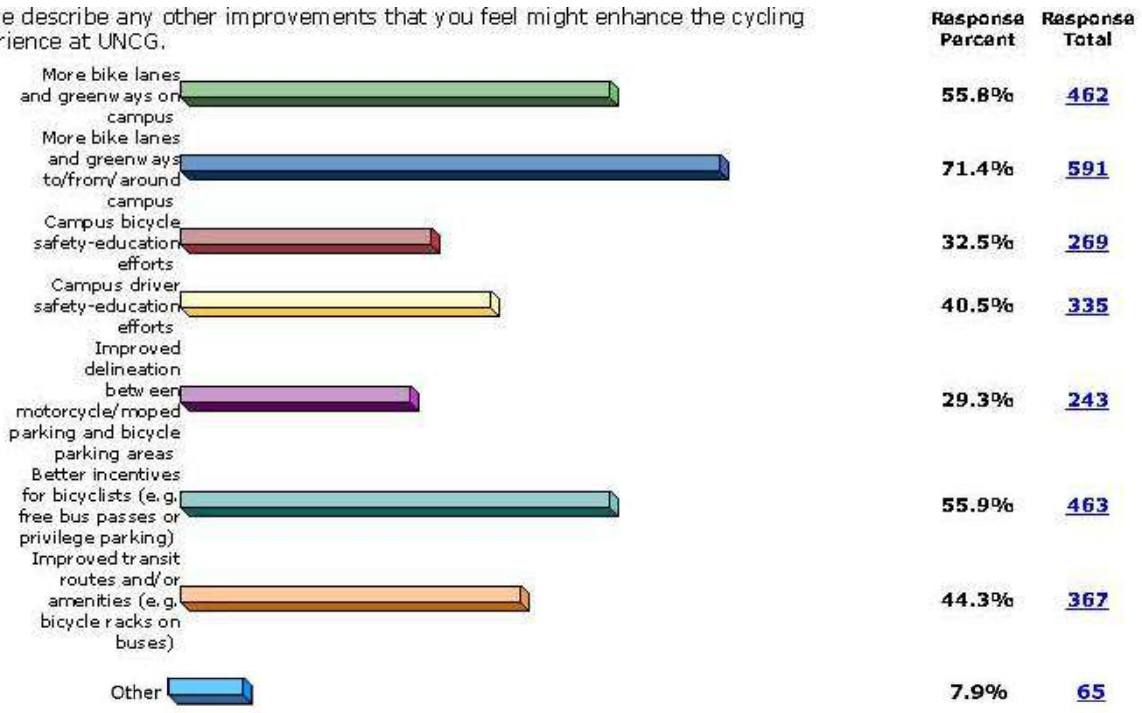
	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
University Graphics & Printing	0% (0)	33.3% (1)	66.7% (2)		3
University Police Station	0% (0)	25% (1)	75% (3)		4
Walker Ave. Parking Deck	14.3% (4)	25% (7)	60.7% (17)		28
Weatherspoon Art Museum (Cone Building)	20% (5)	20% (5)	60% (15)		25
Weil Hall	0% (0)	0% (0)	100% (1)		1

Please rank the top three buildings where you would most like to see better or improved bicycle parking.

	1 First Priority	2 Second Priority	3 Third Priority	1 First Priority ■ 2 Second Priority ■ 3 Third Priority ■	Response Total
Winfield Hall	0% (0)	0% (0)	0% (0)		0
500 Forest St. (University Relations)	50% (1)	0% (0)	50% (1)		2
1100 West Market St. (University Offices)	30.4% (7)	34.8% (8)	34.8% (8)		23
Chemical Safety Facility	25% (1)	0% (0)	75% (3)		4

Total # of respondents **942**. Statistics based on **680** respondents **0** filtered; **262** skipped.

Please describe any other improvements that you feel might enhance the cycling experience at UNCG.



Total # of respondents **942**. Statistics based on **828** respondents **0** filtered; **114** skipped.

Please tell us any other things you wish for us to know as we are developing a bicycle master plan for UNCG.

Response Total
296

Total # of respondents **942**. Statistics based on **296** respondents **0** filtered; **646** skipped.

Appendix 2: Bicycle Boulevard Treatment Design Matrix

The UNCG Bicycle Master Plan recommends a number treatments inherent to “bicycle boulevards” for campus area roads. A bicycle boulevard is an innovative new design technique that combines bicycle enhancements and traffic calming on a shared roadway to improve bicycling safety and quality. Appendix 2 is a matrix of available treatments for the design of bicycle boulevards, published by the Bicycle Transportation Alliance of Portland, Oregon.

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PROJECT GOAL #4

BOULEVARD SIGNAGE & MARKINGS

Where am I? Where am I going? How much farther is it? Answer all these questions and more with bike boulevard signage and pavement markings. Smaller markings on the ground tell cyclists where to go while larger markings indicate to drivers that they are on a bike boulevard and should slow down. Signs tell cyclists where they are headed and how much further they have to go to reach their destination. The tools in this section offer a few examples of ways to show folks how to get from here to there.

BICYCLE TRANSPORTATION ALLIANCE
OPENING MINDS AND ROADS TO BICYCLING



TOOLS	STREET TYPE PERMITTED ON	PHOTO	SPEED REDUCTION	LESS TRAFFIC	EMERGENCY DELAY	COST	DESCRIPTION	EXAMPLES IN PORTLAND, OR
BLUE BIKE LANES	Dangerous Bike/Car Intersection		No	No	No	Varies due to size, \$2.17/sq. ft.	Gives cyclists clear priority at high conflict areas	SE 7th and Morrison SE Hawthorne at MLK NE Broadway at east side bridgehead
SHARROWS	Bikeways where a bike lane is preferred but not possible due to ROW constraints		Maybe	No	No	\$150-\$300 each	"Share the Road" arrow. Indicates that cyclist can use the whole lane. Marking designed so if you ride down the center of the arrows, you will be outside the "dooring" zone	NW 18th and 19th
BIKE BOXES	Busy Streets		No	No	No	\$200 for striping	Brings cyclists to front of the line at traffic lights, priority crossing/turning, reduces right-hook conflict, fill in box with color paint to increase visibility	SE Clinton at 39th
DINNER PLATE BIKES	Bike Routes		No	No	No	\$100 each	Indicates that you are on a bikeway, follow arrows	Bikeways: NE Tillamook SE Clinton NW Johnson
WAYFINDINGS	All Streets		No	No	No	\$150 each	Indicates distance to certain districts, gives direction and travel time	Multiple locations
BIKE LOOPS	All Streets at Signalized Intersections		No	No	No	\$150-\$300	Cyclist can trigger traffic lights by placing tires over bike symbol. Used with Scramble Signal.	NE Skidmore at MLK NE 12th at Lloyd
ARTISTIC TOUCHES	All Streets		No	No	No	Varies, depending on artist and design	Experiment with art, street furniture and sculptures	SE 33rd and SE Yamhill

Appendix 3: APBP Bicycle Parking Guidelines

The Association of Pedestrian and Bicycle Professionals (APBP) is a trade organization for planners, engineers, landscape architects, nonprofit directors and others in the bicycle and pedestrian design field. APBP is a well-respected source of bicycle and pedestrian expertise, which has published a number of design guidance documents including the Bicycle Parking Guidelines - the most-used bicycle parking publication in the field.

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BICYCLE PARKING



GUIDELINES

A set of recommendations from the Association of Pedestrian and Bicycle Professionals [apbp]



“I would ride to work if there was a safe place to lock my bike.”

INTRODUCTION

The lack of a secure parking space keeps many people from using their bikes for basic transportation. Leaving a bicycle unattended, even for short periods, can easily result in damage or theft. Finding a bike rack that doesn't work or isn't conveniently located makes for a frustrating experience.

The purpose of this document is to assist with the selection and placement of appropriate bicycle racks for short-term parking. Four major components will be discussed.

1. The rack element. This device supports the bicycle.
2. The rack. It is important to understand how bikes interact with each other when rack elements are assembled together.
3. Combining of multiple racks into a bicycle parking lot.
4. Locating the rack, and the relationship of the rack to the building entrance it serves and the cyclists' approach to that entrance.

The discussion will focus on outdoor installations. The racks are intended to accommodate conventional, upright, single-rider bicycles. It is assumed the cyclist will use a solid, U-shaped lock, or a cable lock, or a combination of the two.

The apbp Task Force that developed this guide is also developing recommendations for other important bicycle parking-related issues including:



- a. Assessing the appropriate number of bicycle parking spaces for different buildings and land uses, including the use of bicycle parking ordinances.
- b. Long-term bicycle storage facilities such as lockers and bicycle parking garages.
- c. Indoor bicycle parking and the carriage of bicycles in transit vehicles.

1. THE RACK ELEMENT

Definition: the rack element is the part of the bike rack that supports one bicycle.

The rack element should:

- Support the bicycle upright by its frame in two places
- Prevent the wheel of the bicycle from tipping over
- Enable the frame and one or both wheels to be secured
- Support bicycles without a diamond-shaped frame with a horizontal top tube (e.g. a mixte frame)
- Allow front-in parking: a U-lock should be able to lock the front wheel and the down tube of an upright bicycle
- Allow back-in parking: a U-lock should be able to lock the rear wheel and seat tube of the bicycle



Comb, toast, school-yard, and other wheel-bending racks that provide no support for the bicycle frame are NOT recommended.

The rack element should resist being cut or detached using common hand tools, especially those that can be concealed in a backpack. Such tools include bolt cutters, pipe cutters, wrenches, and pry bars.



INVERTED "U"

One rack element supports two bikes.



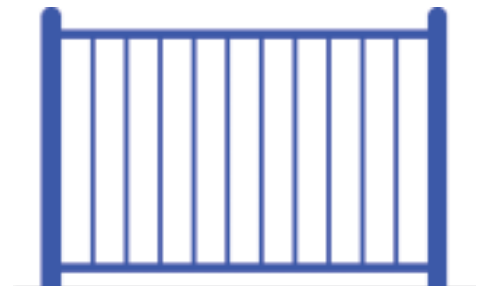
"A"

One rack element supports two bikes.



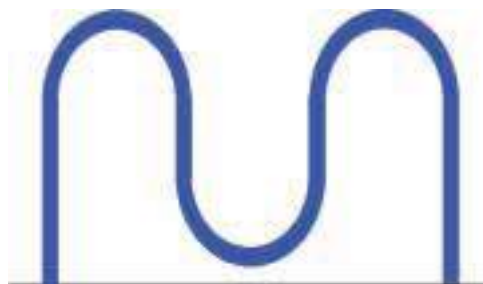
POST AND LOOP

One rack element supports two bikes.



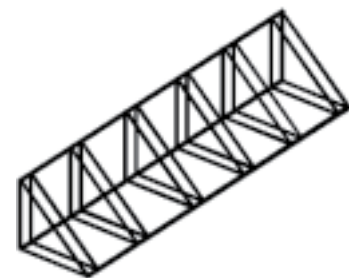
COMB

One rack element is a vertical segment of the rack.



WAVE

One rack element is a vertical segment of the rack.



TOAST

One rack element holds one wheel of a bike.

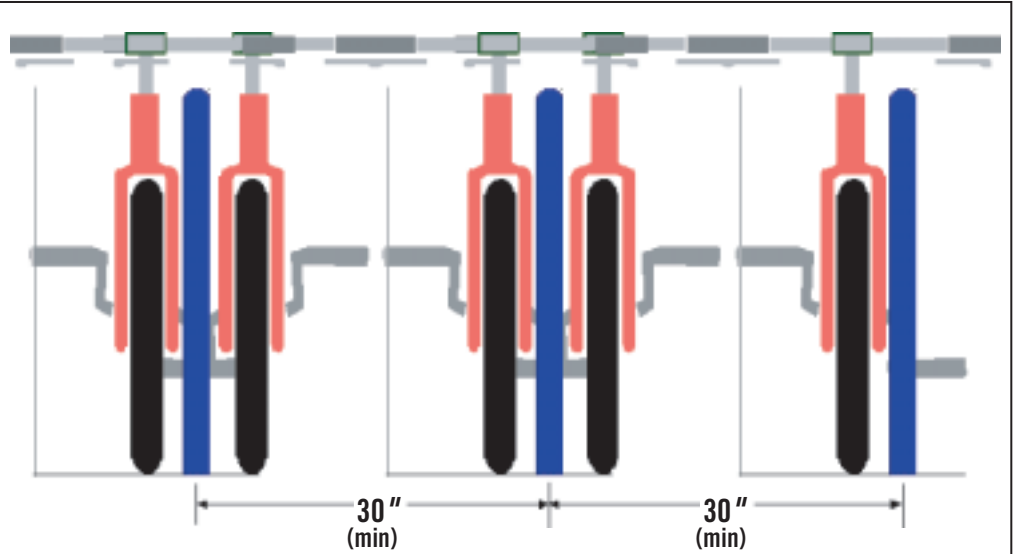
2. THE RACK

Definition: a rack is one or more rack elements joined on any common base or arranged in a regular array and fastened to a common mounting surface.

The rack should consist of a grouping of rack element. The rack elements may be attached to a single frame or remain single elements mounted within close proximity to each other. The rack elements should not be easily detachable from the rack frame or easily removed from the mounting surface. The rack should be anchored so that it cannot be stolen with the bikes attached—vandal-resistant fasteners can

be used to anchor a rack in the ground. An exception is a rack that is so large and heavy that it cannot be easily moved or lifted with the bicycles attached.

The rack should provide easy, independent bike access. Inverted “U” rack elements mounted in a row should be placed on 30” centers. This allows enough room for two bicycles to be secured to each rack element. Normally, the handlebar and seat heights will allow two bicycles to line up side-by-side if one of them is reversed. When there is a conflict, the bikes can be placed slightly offset from one another as shown. If the elements are placed too close together, it becomes difficult to attach two bikes to the same element.



A rack is one or more rack elements joined on a common base or arranged in a regular array and fastened to a common mounting surface.

If it is too inconvenient and time consuming to squeeze the bikes into the space and attach a lock, cyclists will look for an alternative place to park or use one rack element per bike and reduce the projected parking capacity by 50 percent.

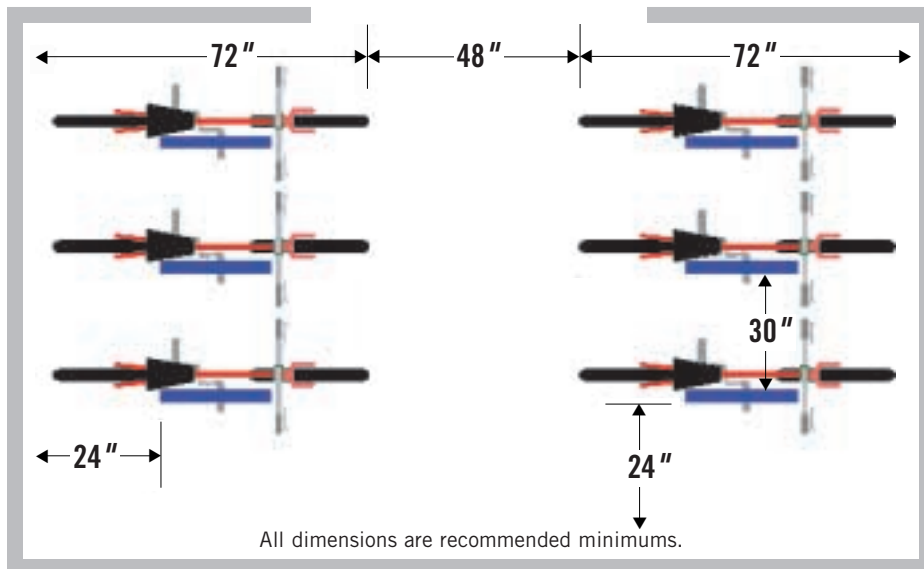
Wave style racks are not recommended. Bicyclists commonly use a “wave” rack as if it were a single inverted “U.” This limits the actual capacity of the rack to two bikes regardless of the potential or stated capacity. Bicycles parked perpendicular to a wave rack (as intended by the manufacturer) are not supported in two places and are more likely to fall over in the rack. The advertised capacity of a wave rack is usually much higher than the practical capacity.

An empty rack should not create a tripping hazard for visually impaired individuals.



3. THE RACK AREA

Definition: the rack area is a bicycle parking lot where racks are separated by aisles.



A rack area or “bicycle parking lot” is an area where more than one rack is installed. Aisles separate the racks. The aisle is measured from tip to tip of bike tires across the space between racks. The minimum separation between aisles should be 48 inches. This provides enough space for one person to walk one bike. In high traffic areas where many users park or retrieve bikes at the same time, such as a college classroom, the recommended minimum aisle width is 72 inches.

The rack area is a bicycle parking lot where racks are separated by aisles.

72 inches (six feet) of depth should be allowed for each row of parked bicycles. Conventional upright bicycles are just less than 72 inches long and can easily be accommodated in that space. Some rack types will allow the racks to be mounted closer to the wall. This will not change the space required by the bicycles or the aisles.

Large rack areas with a high turnover rate should have more than one entrance. This will help facilitate the arriving and departing of cyclists and pedestrians.

If possible, the rack area should be protected from the elements. Racks along building walls can be sheltered by an awning. Even though cyclists are exposed to sun, rain, and snow while en route, covering the rack area keeps the cyclist more comfortable while parking, locking the bike, and loading or unloading cargo. An awning will also help keep the bicycle dry, especially the saddle.

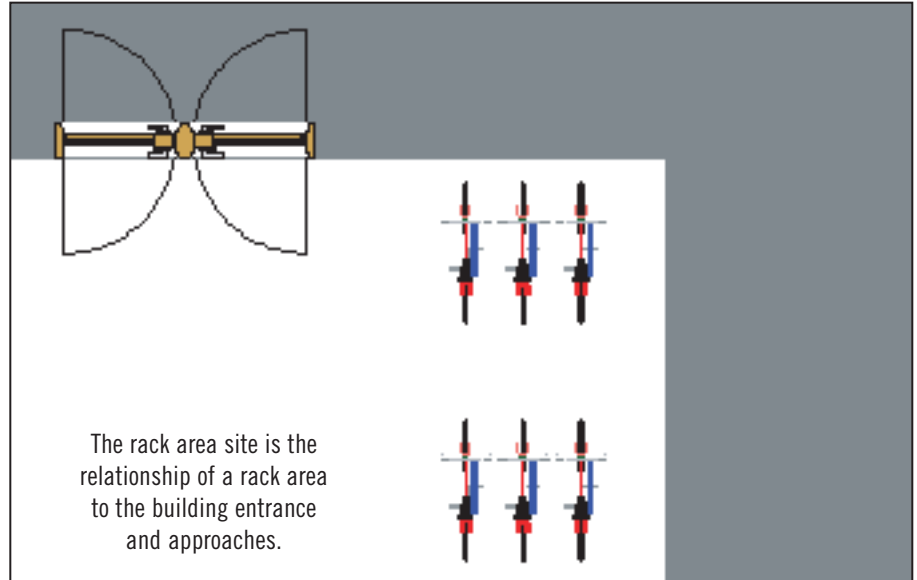


4. THE RACK AREA SITE

Definition: the rack area site is the relationship of the rack area to a building entrance and approach.

The location of a rack area in relationship to the building it serves is very important. The best location for a rack area is immediately adjacent to the entrance it serves. Racks should not be placed so that they block the entrance or inhibit pedestrian flow in or out of the building. Racks that are far from the entrance, hard to find, or perceived to be vulnerable to vandalism will not be used by most cyclists.

It is important to understand the transition a cyclist makes from vehicle to pedestrian. The cyclist approaches the building mounted on the bicycle. At some point, the cyclist stops, dismounts, and walks the bike to a rack.



The bicycle is attached to the rack and any cargo is removed. The cyclist now walks into the building carrying the cargo. Adequate space must be provided to allow for this transition.

The rack area should be located along a major building approach line and clearly visible from the approach. The rack area should be no more than a 30-second walk (120 feet) from the entrance it serves and should preferably be within 50 feet.

A rack area should be as close or closer than the nearest car parking space. A rack area should be clearly visible from the entrance it serves. A rack area should be provided near each actively used entrance. In general, multiple buildings should not be served with a combined, distant rack area. It is preferred to place smaller rack areas in locations that are more convenient.

5. CREATIVE DESIGNS



The recommended practices above are not intended to stifle creativity. There are many creative, three-dimensional bicycle parking racks that work very well. Whether the rack is a type of “hanger”, “helix” or another

configuration, the critical issue is that the rack element supports the bike in two places and allows the bicycle to be securely locked.

Creative designs should carefully balance form with function. For example, the distinctive “croquet

set” rack shown here likely has a smaller effective capacity than might be immediately apparent because one or more of the rack elements is not accessible. Similarly, the “hanger” racks shown below must be carefully manufactured and maintained to prevent weaknesses at the joints of the hanger and rack—such weakness might compromise the security of bicycles locked to the rack. In addition, the “coat hanger” elements should be spaced at least 30” apart.



CONCLUSION

More information about bicycle parking is available from a wide variety of sources. Visit www.bicyclinginfo.org to access many of those sources, and to find a list of bicycle parking manufacturers.

More information about the Association of Pedestrian and Bicycle Professionals is available at www.apbp.org.



BICYCLE PARKING GUIDELINES

Adopted by the Association of Pedestrian and Bicycle Professionals
Spring 2002

ACKNOWLEDGMENTS

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ASSOCIATION OF PEDESTRIAN
AND BICYCLE PROFESSIONALS

Appendix 4: Proposed UNCG Bike Parking Locations

This appendix includes a detailed spreadsheet listing proposed new and retrofitted bicycle parking locations at existing campus buildings, parking decks and surface lots. Highlighted rows (in orange) illustrate the “priority” projects, selected through public input by the UNCG campus community.

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Building	Rack Type	# Racks	Model	# Spaces	Description	Image
Admission & Visitor Center	U-rack	1	Saris 15317	2	Remove grass; install new concrete pad at SW corner of building, adjacent to parking lot and install 1 flange-mounted u-rack	
Aycock Auditorium	Stadium rack	1	Saris 2136	6	Install 1 flange-mounted Stadium rack, just north of west side entrance in mulch bed. Pour concrete and install U-racks for more permanent installation.	
Baseball Stadium	U-rack	4	Saris 15317	8	Remove grass and install 6'x12' concrete pad south of gated entrance. Install 4 U-racks west of field.	
Brown Building	U-racks	2	Saris 15317	4	Rear (west) side of building; existing concrete pad; install individual U-racks for permanent installation	
Brown Building	Bike Locker	1	ABSC #302	2	Install double-sided bike locker (doors facing east-west) on existing concrete pad for long-term, covered storage	
Bryan Building -recommended for inclusion in Academic Bldg site plan	U-rack	4	Saris 15317	8	SE bldg entrance; expand existing concrete pad along sidewalk; add u-racks; add shelter if desired for covered parking.	
Cotten Residence Hall	Stadium rack	1	Saris 2136	6	SE corner of bldg; side entrance; existing pad	
Curry Building	U-rack	4	Saris 15317	8	Remove grass, grade as necessary. Install 6'x12' concrete pad and 4 U-racks next to existing sidewalk between Ferguson and Curry (NE of Curry's front entrance).	
Dining Hall (side)	Stadium rack	2	Saris 2136	12	NW corner; covered - install Stadium Racks under existing awning (see diagram)	






Building	Rack Type	# Racks	Model	# Spaces	Description	Image
Eberhart Building	U-rack	5	Saris 15317	10	Remove grass, install concrete pad and U-racks in "nook" of retaining wall on northern side of Melver pedestrian concourse (between Science Bldg and Nursing).	
Elliott University Center	U-rack	5	Saris 15317	10	Install next to existing U-racks on existing concrete pad; curve NE to side of building.	picture not available
Elliott University Center	Stadium rack	1	Saris 2138	8	Install 1 Stadium Rack at north side of building, near ped overpass to serve EUC and Jackson Library. Install concrete pad and U-racks for permanent installation. May consider bike shelter.	
Elliott University Center	Stadium rack	2	Saris 2136	12	Remove landscaping and install 6'x 24' concrete pad and 2 Stadium racks at south side of building. Install landscaped screenings for aesthetics. Consider U-racks for permanent installation. May consider bike shelter.	
Ferguson Bldg	Stadium rack	1	Saris 2136	6	Remove grass; install new concrete pad and flange-mounted Stadium rack on south side of building; just east of rear entrance	
Forming Building (under construction)	Stadium rack	2	Saris 2138	16	Building is currently under construction. Install 1 Stadium rack at east (front) entrance and 1 Stadium rack at west (rear) entrance, both near the sidewalk approach to building. Diagram sent to FDC staff.	no picture available
Foust Building (Administration)	U-rack	2	Saris 15317	4	Use existing concrete pad; install 2 U-racks (parallel to building) on north side (rear) of building (near building wall). May consider 1-2 bike lockers in this area for longer-term, covered bike parking in the central campus area.	
Gatewood Studio Arts Building	U-rack	4	Saris 15317	8	Use existing concrete pad in Lot 7, near main entrance to Gatewood (NE corner of building). Install 4 flange-mounted u-racks oriented N-S. Add bike shelter for covered parking.	
Gove Student Health Center	Bike Shelter with U-racks	4	Aero Shelter (DERO); Saris 15317	8	Remove existing 2 u-racks and rotate 90 degrees; use existing concrete pad to reinstall 2 existing u-racks and 2 additional u-racks for a total of 8 parking spaces. Racks should be flange-mounted.	

Building	Rack Type	# Racks	Model	# Spaces	Description	Image
Graham Building	Stadium rack	1	Saris 2138	8	Install 1 Stadium Rack on existing concrete, south side of building at rear entrance (SW corner).	
Graham Building	Stadium rack	1	Saris 2138	8	Install 1 Stadium Rack on existing concrete, south side of building at rear entrance (SE corner).	
Graham Building	U-rack	6	Saris 15317	12	If additional parking is needed, install 3 U-racks per concrete pad "nook" on north side of building (near main entrance). This is an expansion of existing bike parking area.	
Gray Home	U-rack	1	Saris 15317	2	Install u-rack on existing concrete pad, next to west side (rear) building entrance. Orient rack to parallel building.	
Guilford Residence Hall	Stadium rack	2	Saris 2136	12	Install 2 Stadium Racks at east (front) entrance on existing concrete pad, just north of front entrance	
HHP	U-rack	5	Saris 15317	10	Install 5 U-racks on existing concrete pad, between street trees and adjacent to West Drive	
HHP	Bike Locker	1	ABSC #302	2	Install 1 dbl-sided bike locker next to existing u-rack installation on east side of HHP (align doors facing north-south); provides long-term, covered storage option. Alternatively, install 3 u-racks for additional uncovered parking.	
HHP	U-rack	4	Saris 15317	8	Remove shoe brushes, use existing concrete pad and install up to 4 U-racks. This is an expansion of existing bike parking area on west side of building to serve HHP and SRF.	

Building	Rack Type	# Racks	Model	# Spaces	Description	Image
Hinshaw Residence Hall	Stadium rack	1	Saris 2138	8	Install Stadium rack at NE corner, to serve side entrance of Hinshaw dorm; install bike shelter as desired for covered parking	
Jackson Library (NW)	Bike Shelter with U-racks	5	DERO Aero Shelter; Saris 15317	10	Remove grass at rear of building, near Walker Ave cul-de-sac; install concrete pad and 5 flange-mounted U-racks; add bike shelter for covered bicycle parking near transit hub. A second option would be to install concrete pad and 2 dbl-sided bike lockers for long-term storage.	
Jackson Library (NE)	U-rack	4	Saris 15317	8	Remove existing rack and mulch; install 6'x12' brick pad and 4 flange-mounted U-racks. Brick pad should be expanded as necessary to meet adjacent brick walkway.	
Jackson Library (SE)	U-rack	4	Saris 15317	8	Remove existing rack and mulch; install 6'x12' brick pad and 4 flange-mounted U-racks. Brick pad should be expanded as necessary to meet adjacent brick walkway.	
Mary Foust Residence Hall	Stadium rack	1	Saris 2138	8	Use existing brick pad on second level of tiered walkway; install Stadium Rack in available "nook" at east (rear) building entrance.	
McIver Building (also serves Carmichael, Taylor & Brown Bldgs)	Stadium rack	1	Saris 2138	8	Use existing concrete pad at south side of deck, next to convenience store. Move trash cans and picnic bench away from wall, install Stadium Rack adjacent to wall.	
McIver Street Parking Deck	U-rack	10	Saris 15317	20	Remove shrubbery; install concrete pad and 10 U-racks along vertical brick wall. Install bike shelter, if desired, for covered bike parking.	
Moore (Nursing) Building	U-rack	4	Saris 15317	8	Remove grass behind existing concrete "nook" at SW corner of building (between fire equipment and wheelchair ramp); install new 6'x12' concrete pad (adjacent to sidewalk). Install 4 flange-mounted U-racks.	
Moore Humanities Bldg	Stadium rack	3	Saris 2136	18	Remove existing racks at NW corner of building (along wall) and replace with 3 Stadium racks, oriented to match curve of the adjacent retaining wall.	

Building	Rack Type	# Racks	Model	# Spaces	Description	Image
Moore-Strong Residence Hall	Stadium rack	2	Saris 2136	12	Remove shrubbery to holly, extend existing concrete pad and install 2 adjacent Stadium Racks; may consider U-racks for more permanent parking installation	
Mossman Building	Bike Locker	1	ABSC #302	2	Install dbl-sided bike locker in alcove next to vertical brick wall, directly north of Mossman Building; provides long-term covered bike storage.	
Mossman Building	Stadium rack	1	Saris 2138	8	Install Stadium Rack at south entrance, on existing brick pad	
Music Building	U-rack	3	Saris 15317	6	Install 4 new 9'x9' concrete pads between trees adjacent to McIver Parking Deck, just north of the garage (south of the Music Building). Install 3 U-racks (if necessary) on one concrete pad (NW corner); the remaining pads will have rolled curbs and marked stalls for moped parking.	
North Spencer Residence Hall	U-rack	5	Saris 15317	10	Install 5 flange-mounted u-racks in existing brick pad, adjacent to current bike parking installation	
North Spencer Residence Hall (covered)	Stadium rack	2	Saris 2136	12	Install 2 Stadium Racks under existing covered porch area at Spencer Residence Hall	
Oakland Ave Parking Deck	Stadium rack	1	Saris 2138	8	Install 1 Stadium Rack on existing concrete, inside parking deck, near emergency phone and parking attendant (leave room for moped/MC parking)	
Oakland Ave Parking Deck	Stadium rack	1	Saris 2138	8	Install 1 Stadium rack on 2nd level, NE corner, of the Oakland Ave Parking Deck (behind cashier box, near wall).	
Oakland Ave Parking Deck (bike lockers)	Bike Locker	3	ABSC #302	6	Use existing concrete pad; install 3 bike lockers adjacent to existing U-racks on north side of parking deck to provide long-term, covered bike storage.	

Building	Rack Type	# Racks	Model	# Spaces	Description	Image
Petty Building	Stadium rack	1	Saris 2138	8	Remove shrubbery on south side of building; install new concrete pad east of door for 1 Stadium Rack. May consider U-racks for more permanent installation. May also consider bicycle ramp for stairwell south of building.	
Phillip-Hawkins Residence Hall (covered)	Stadium rack	1	Saris 2138	8	Install 1 flange-mounted Stadium Rack against wall, under existing awning south of front entrance (west side of building)	
Ragsdale-Mendenhall Residence Hall	U-rack	5	Saris 15317	10	Remove shrubbery; install concrete pad. Install 2 adjacent Stadium Racks at west side entrance, NW of front door	
Reynolds Residence Hall (covered)	U-rack	5	Saris 15317	10	Install flange-mounted u-racks into existing concrete/brick pad, under awning at NE corner of building	
Shaw Residence Hall	U-rack	4	Saris 15317	8	Install 6'x12' concrete pad and 4 flange-mounted U-racks at rear of building, adjacent to existing walkway at NE corner.	
Stone Building	U-rack	5	Saris 15317	10	Remove mulch and shrubbery at SW corner of Stone building, install 6'x15' concrete pad adjacent to building. Mount 5 U-racks to concrete pad.	no picture available
Student Recreation Center	U-rack	2	Saris 15317	4	Install 2 flange-mounted u-racks on existing concrete pad at NE corner of SRC, below loading dock (adjacent to brick wall)	
Sullivan Science Building	U-rack	3	Saris 15317	6	Install new concrete pad between trees in existing mulch area at NE corner of building. Install 3 U-racks. Close to this location (opposite middle tree) will be a similar concrete pad with marked moped parking stalls.	
Taylor Building (also serves Brown, Carmichael and McIver)	U-rack	8	Saris 15317	16	Remove grass, install concrete pad between brick inlay on either side; install 8 flange-mounted U-racks. Install bike shelter as desired for covered parking.	

Building	Rack Type	# Racks	Model	# Spaces	Description	Image
The Suites @ Tower Village	U-rack	4	Saris 15317	8	Remove lilies at SE corner of building; install new concrete pad adjacent to sidewalk at NE corner of building. Mount U-racks; install bike shelter for covered parking. May consider adding a bike storage room inside of this residence hall if space is available.	
Walker Avenue Parking Deck (Parking Operations & Campus Access Management)	Stadium rack	1	Saris 2136	6	Use existing concrete pad on east side of building (3rd level); install 1 Stadium Rack	
Weatherspoon Art Museum	U-rack	7	Saris 15317	14	Remove grass and termite testers; install new concrete pad and 5 flange-mounted u-racks west of building entrance	
Weil-Winfield Residence Halls	Stadium rack	2	Saris 2138	16	Move existing rack (at Winfield) west to make room for additional racks. Add 2 Stadium racks on existing brick pad adjacent to existing rack to serve dorm residents.	
1100 W Market Street (University Offices)	U-rack	1	Saris 15317	2	Remove grass and install new 6'x6' concrete pad and install flange-mounted U-rack.	no picture available
Lot 1 Park & Ride (bus stop)	Bike Locker	1	ABSC #302	2	Remove car parking spot west of bus stop; install concrete/asphalt pad and 1 double-sided bike locker (doors facing north-south) to provide long-term, covered bike parking option to park & ride and/or bus commuters.	

Appendix 5: Proposed UNCG Bike Parking Locations

This appendix includes detailed diagrams of each priority bicycle parking project for the University; highlighted in Section 5 (pages 56-57) of the Plan. A digital AutoCAD version of each drawing is being submitted with this Plan to the UNCG Facilities Design & Construction department.

The first five pages of Appendix 5 are detailed specifications for each of the three bike racks (Saris models #15317, 2136 and 2138) and bike locker (American Bicycle Security Company models #302) used as standards in this document. Equivalent models for the “inverted-U” and “stadium rack” standard can be used to replace these brand-specific models. Approved alternatives include:

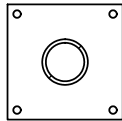
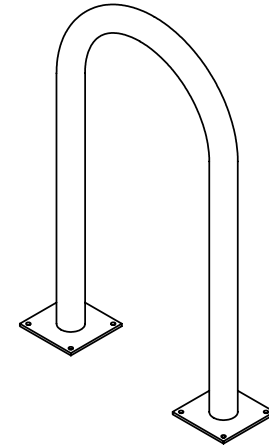
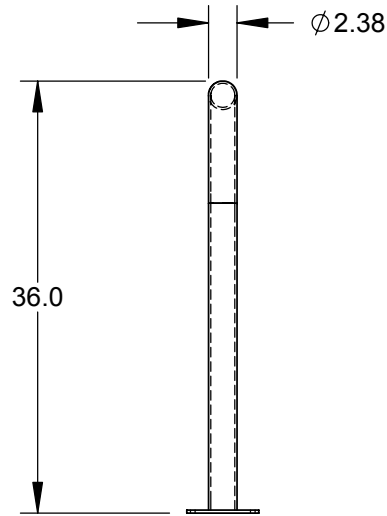
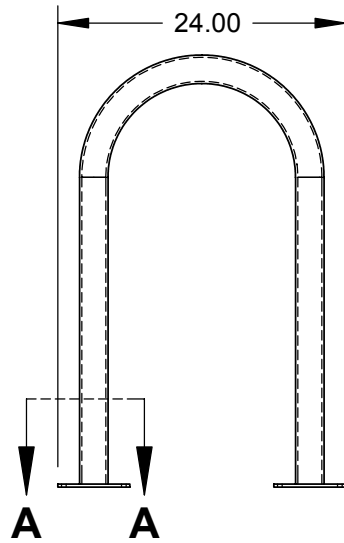
Single “Inverted-U” Rack

- Huntco RR Series Bike Rack (single rack, surface-mounted, 2-bike capacity):
http://huntco.com/mercantool/mtool.pl?command=productpage_show&product=6
- DERO Hoop Rack (single rack, surface-mounted, 2-bike capacity):
http://www.dero.com/brochures/hoop_rack.pdf
- Saris Custom Bike Dock Series (Model #15317):
<http://www.saris.com>

Multiple Inverted-U or “Stadium” Rack

- Huntco RR Series Bike Rack (single unit, surface mounted, 3+ bike capacity):
http://huntco.com/mercantool/mtool.pl?command=productpage_show&product=6
- DERO Hoop Rack (single unit, surface mounted, 3+ bike capacity):
http://www.dero.com/brochures/hoop_rack.pdf
- Saris Stadium Rack (Model # 2136/2138)
<http://www.saris.com/p-319-stadium-rack.aspx?skinid=3>

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2X 6" X 6" X .25" SQUARE
FLANGE MOUNTING PLATE
WITH 4 Ø5/8" MOUNTING HOLES

NOTE:

1. DO NOT SCALE DRAWING.
2. INTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.



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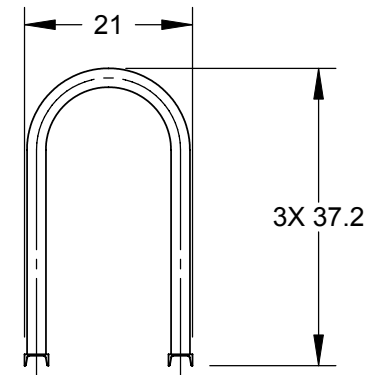
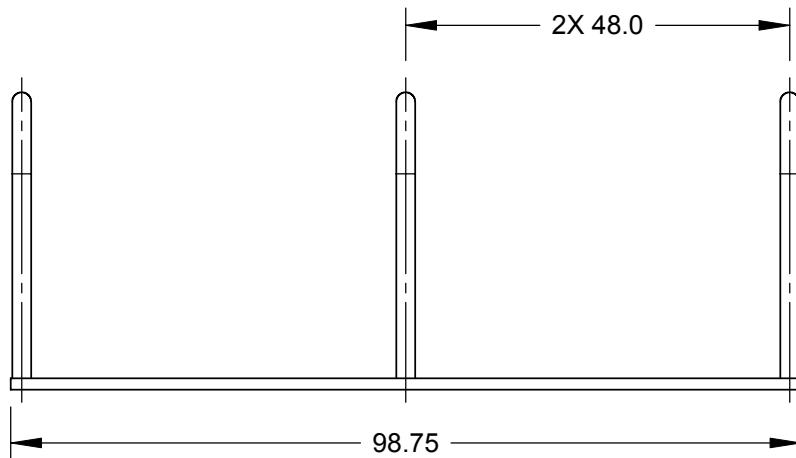
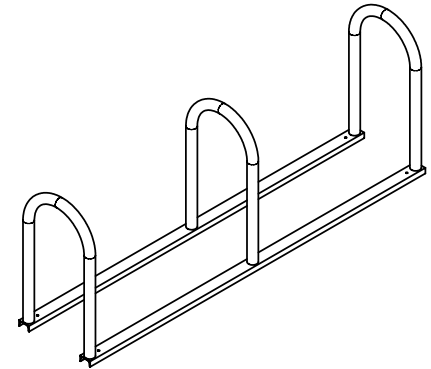
SARIS CYCLING GROUP

5253 VERONA RD., MADISON WI. 53711
1-800-783-7257 / 1-608-274-1702
WWW.SARISPARKING.COM

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TITLE:

15317 - 2 BIKE FM BIKE DOCK



NOTE:

1. DO NOT SCALE DRAWING.
2. INTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. TOTAL WEIGHT: 154 LBS.



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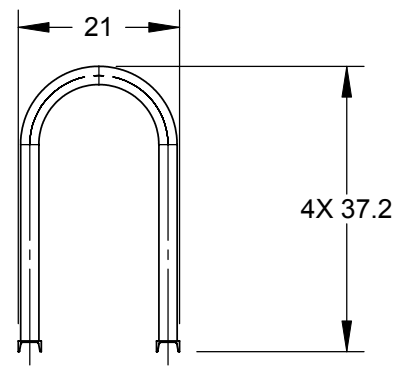
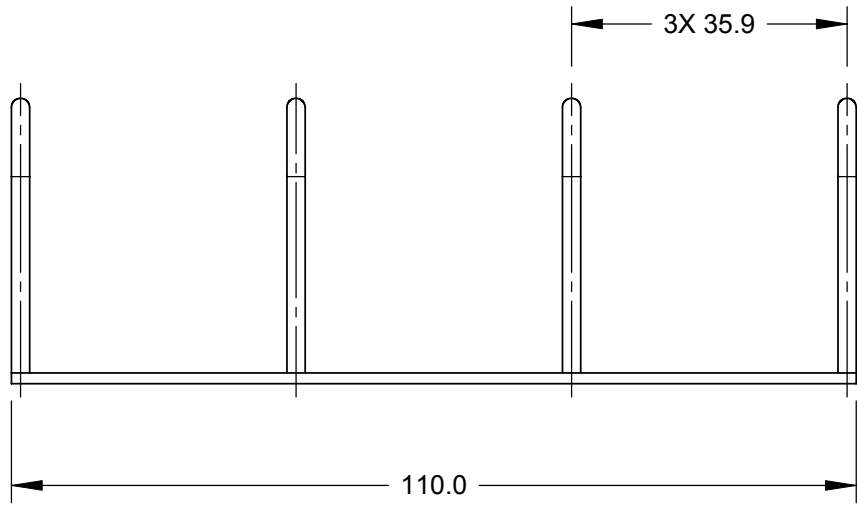
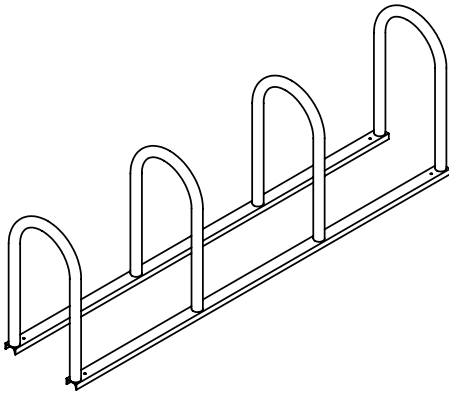
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TITLE:

6 BIKE STADIUM U-RACK



NOTE:

1. DO NOT SCALE DRAWING.
2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
3. TOTAL WEIGHT: 190 LBS.



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TITLE:

8 BIKE STADIUM U-RACK

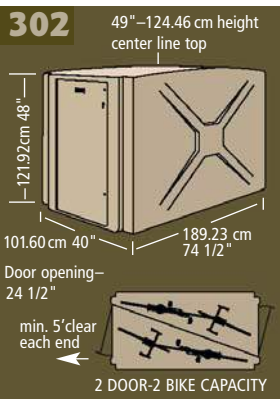
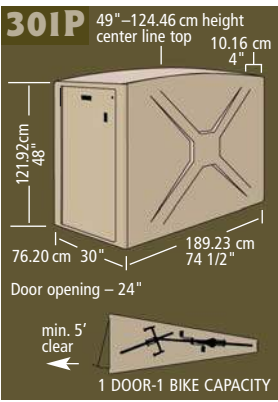
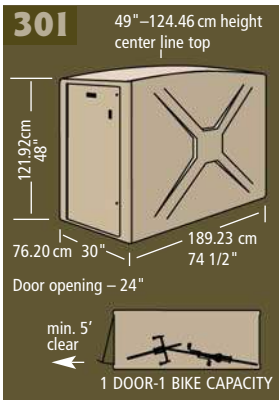
Models 301-301P-302



Specify the 300 Series lockers for the highest customer satisfaction from the no-assembly ready-to-use delivery through years of trouble free operation.

Architects, designers and government agencies specify the 300 Series due to the high quality unitized manufacturing which means virtually no installation costs!

- NEW design, one piece FRP Composite bike locker– NO ASSEMBLY required.
- The 300 series is the first one piece locker available that is not molded of soft and flammable HDPE plastic material.
- Designed after our very popular 350 series of lockers and available in 6 styles providing flexibility for site locations.
- All lockers are shipped assembled and can be stand alone or grouped– NO COMMON WALLS. Lockers easily relocated.
- The construction of fiberglass reinforced plastic is highly resistant to impact, stains and will not corrode.
- High security with standard key locks recessed in door face and internal locking bar system.
- For those wanting more storage or room for 2-3 bikes in one locker we offer the **MODEL #301W**, same width as our two door versions but has door on one end only.
- Ride a recumbent or need more room for storage than our **#301W Locker**, then our **MODEL #301WL** is the answer, at 40" wide and 102" long it is the biggest bike locker available.



Specifications:

Structure and finish

Locker shall be manufactured of molded fiberglass reinforced plastic composite with a solid color stipple texture finish. Material shall be E-glass and polyester resin at 35% ratio. Tensile Strength, 18,000 psi. Locker shall be one piece with no external or internal frame and no seams or joints on tops or side walls. Material shall withstand over 300 lb/sqft on roof and 200 lb/sqft on walls/doors. No on site assembly shall be required. Roof shall be crowned for water run off and all corners shall have a smooth radiused finish. Finish of UV stabilized gelcoat does not need painting, allows solvent removal of graffiti and is resistant to impact and U.V. damage. Two standard colors, Tan & Medium Gray. Custom colors matched to your color sample. Interior divider wall on model 302 shall be

sealed OSB exterior board and bottom edge shall be a minimum of 1" above ground level.

Locks and hardware

Fort Lock 7 pin tumbler Pop Out "T" handle locks with three keys and removable lock cylinders. Internal locking hardware consists of three plated hardened steel cams controlling an extruded aluminum locking bar which engages the door frame over three foot span. High quality custom continuous door hinge will not rust. All fasteners on locking system shall be zinc plated or better.

Locker shall anchor in all four corners through base flanges using expansion anchors.

Standard colors or let us match your color

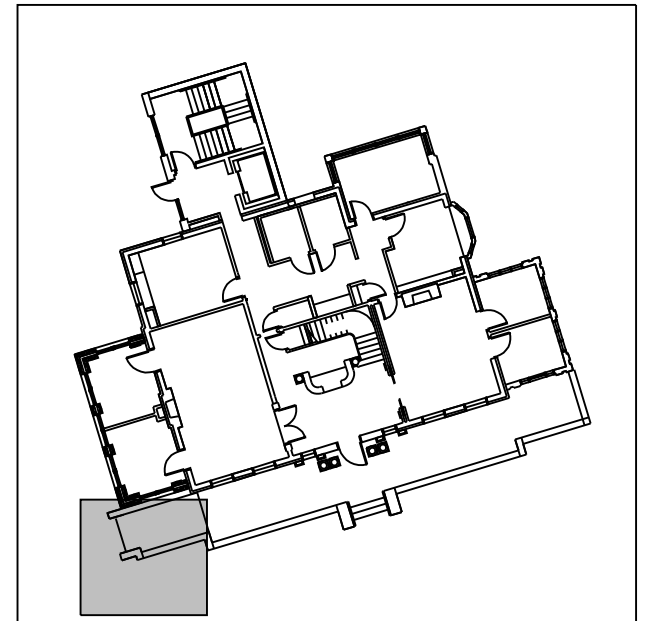
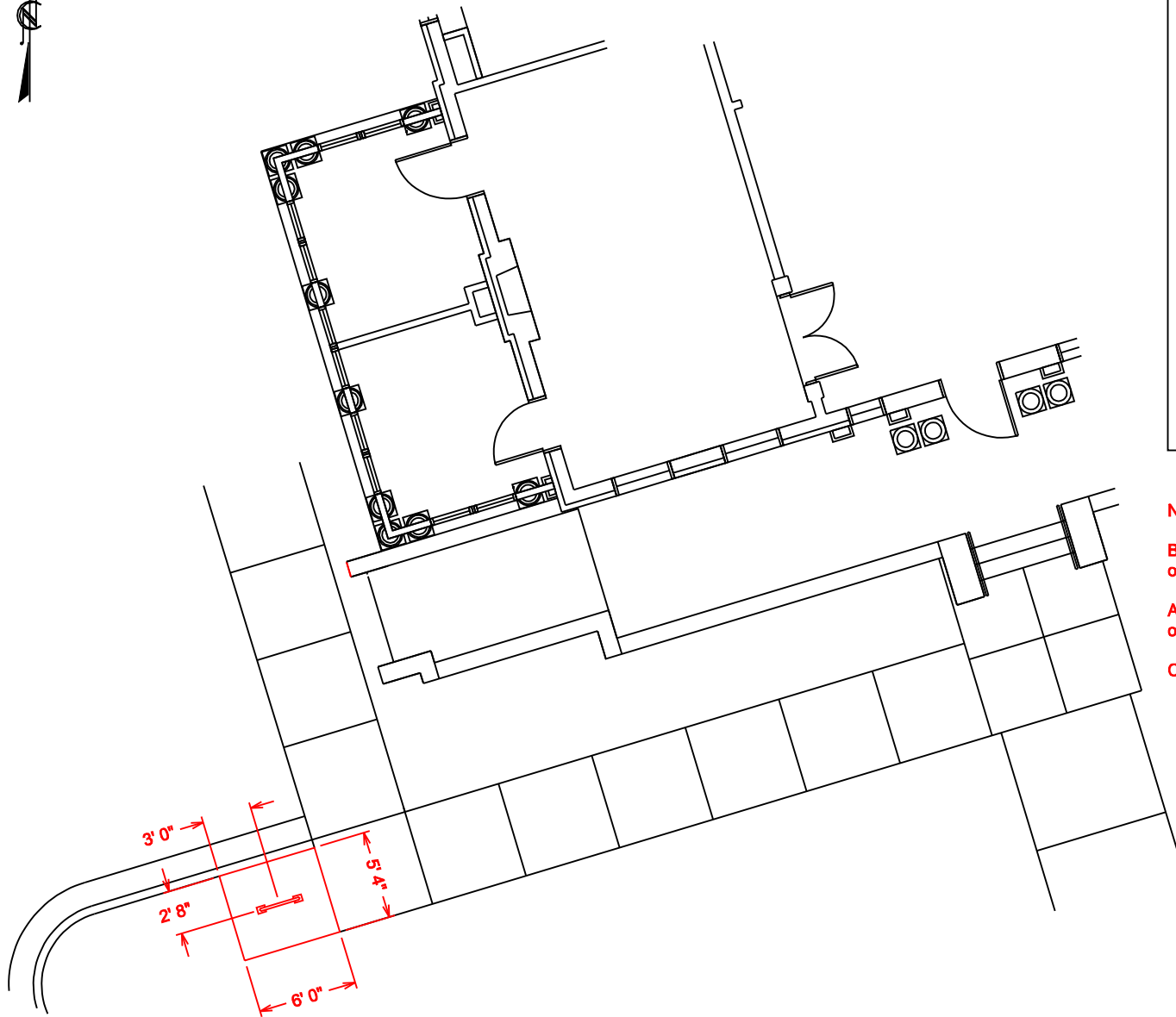


Optional features:

- **Fiberglass composite floors** are ideal for storage lockers or if lockers cannot be anchored.
- Electronic locking systems. iButton® or card reader.
- Heavy duty stainless steel pad lock handle will accommodate high security pad locks.
- Coin and Token operated locks for collection or money return.
- MEDECO™ stainless steel locks with T-Handle.
- Ventilation System, stainless steel vents on doors for dissipation of heat and dampness.
- Safety-View™ windows and walls to check contents of lockers. Acrylic or expanded metal.

See price sheet for more options.

(Material strength comparison available on request)



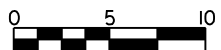
AREA OF DETAIL

Notes

Bike Dock proposed - Saris Model 2113 Flange Mount or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Concrete quantity for 6' X 5'-4" concrete pad = 0.4 CY



HORIZONTAL SCALE

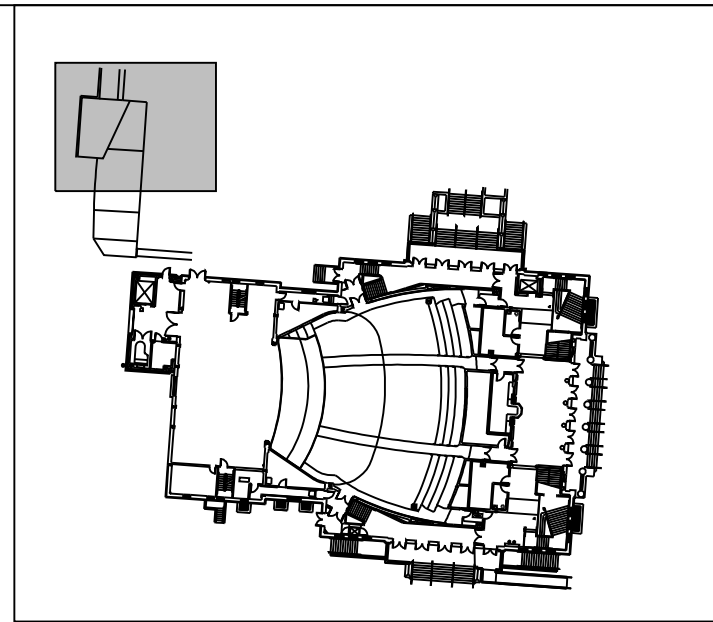
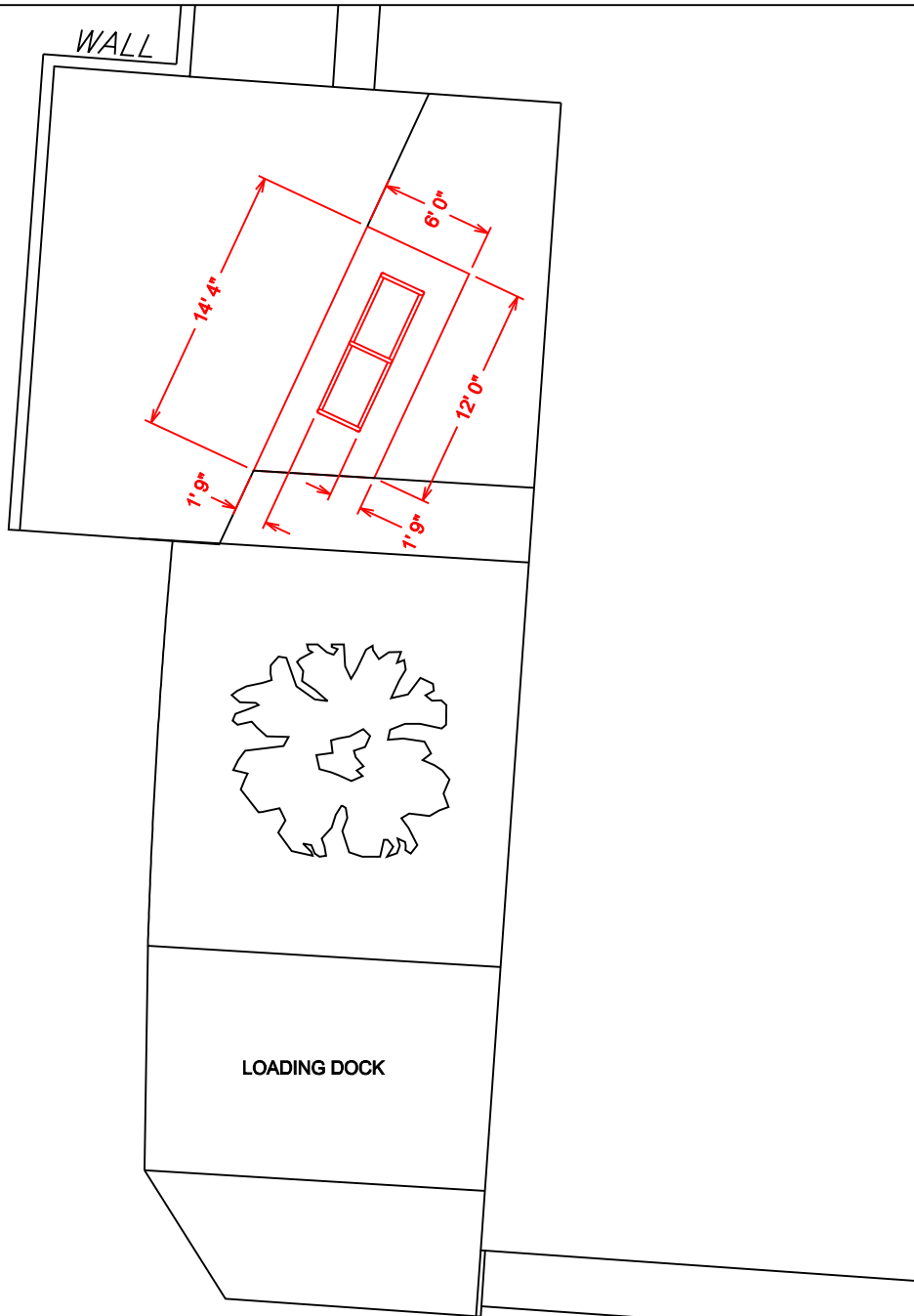


**2-BIKE FLANGE
MOUNT U-RACK
MODEL: SARIS 2113**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Admissions and Visitor Center



AREA OF DETAIL

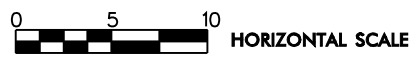
Notes

Install new 6' x 12' concrete pad and 1 Stadium rack, just north of west side entrance in mulch bed. Pour concrete and install U-racks for more permanent installation.

Bike rack proposed - Saris Stadium Rack Model 2136 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

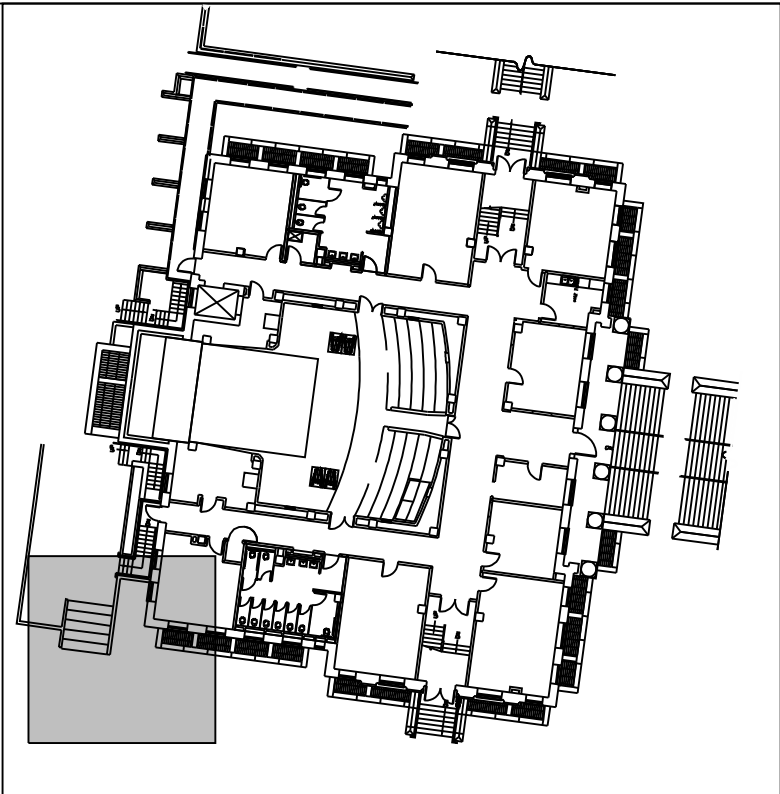
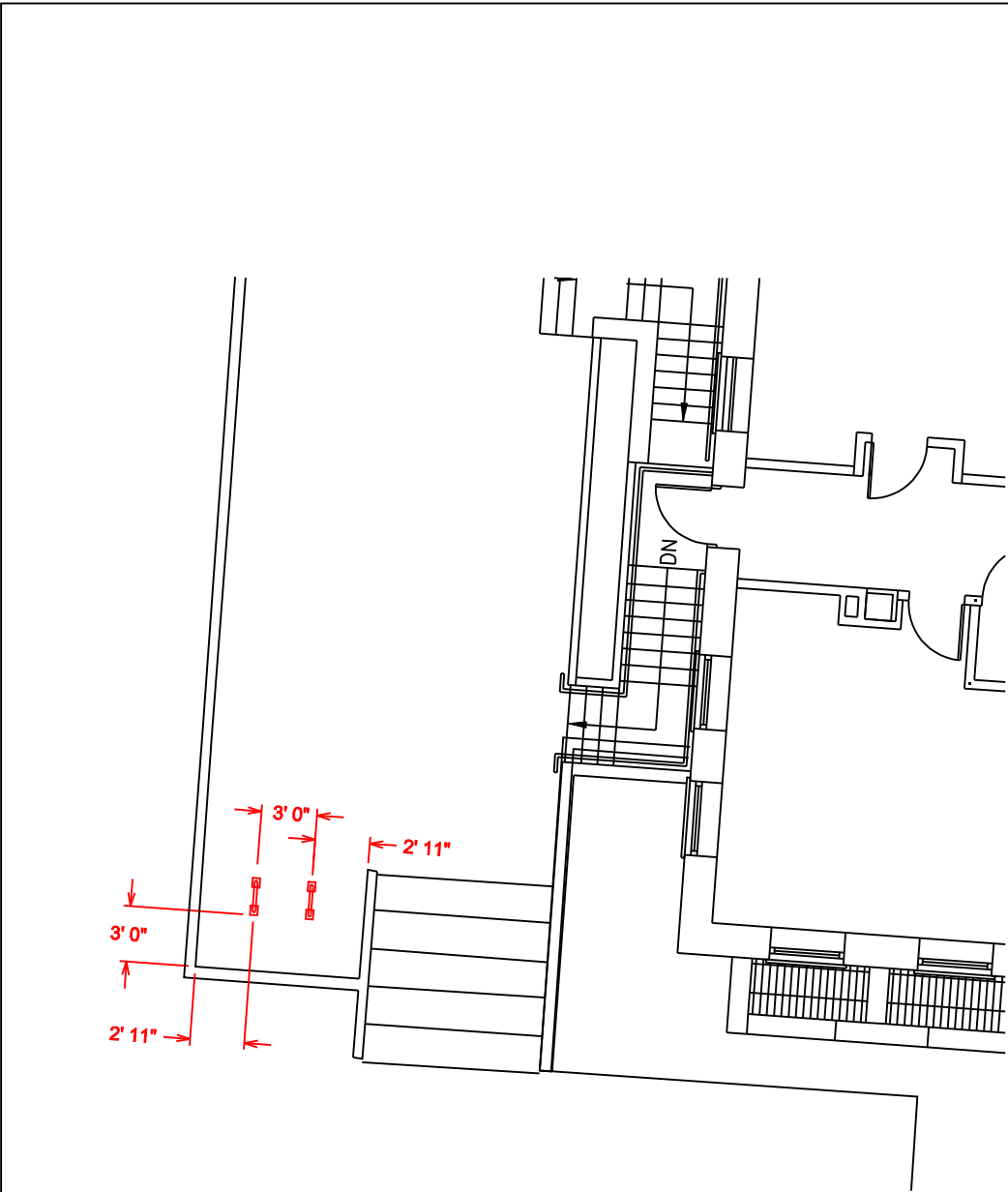
Concrete quantity for 14' 4" x 12' x 6' pad = 1.0 CY



**6-BIKE
STADIUM RACK
MODEL: SARIS 2136**

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Raleigh, North Carolina 27605

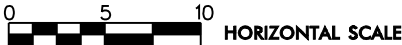
UNCG Bicycle Master Plan
Aycocock Auditorium




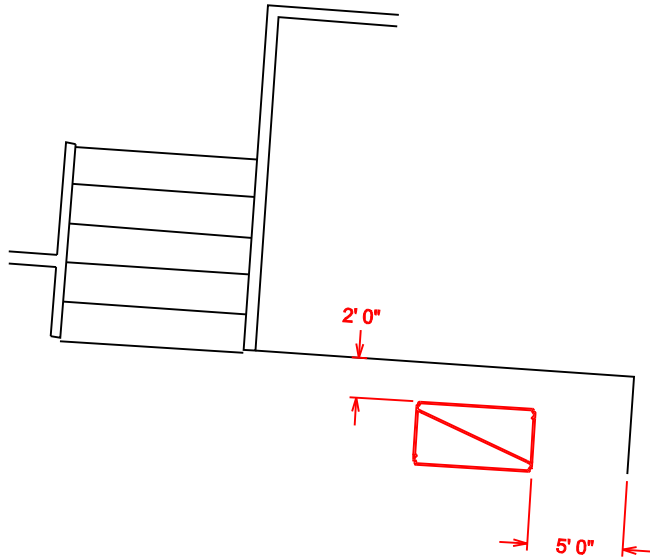
AREA OF DETAIL

Notes

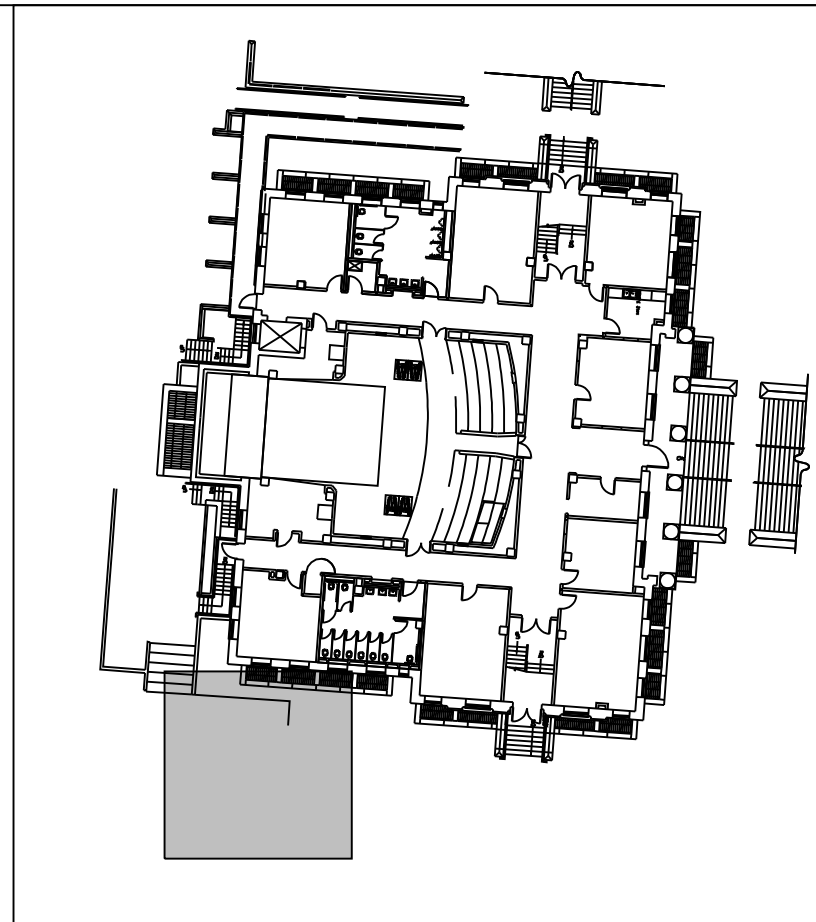
- Rear (west) side of building; existing concrete pad; install Stadium rack (may install individual U-racks for permanent installation)
- Bike Dock proposed - Saris Model 15317 flange fount bike dock or equivalent
- Anchor units required for installation - Saris Part Number 6260.



	<p>THE LOUIS BERGER GROUP, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605</p>
<p>2-BIKE FLANGE MOUNT BIKE DOCK MODEL: SARIS 15317</p>	<p>UNCG Bicycle Master Plan Brown Building</p>



0 5 10 HORIZONTAL SCALE



AREA OF DETAIL

Notes

Install double-sided bike locker (doors facing east-west) on existing concrete pad for long-term, covered storage

Bike locker proposed - American Bicycle Security Company Model 352 or approved equal

Installation Anchors and hardware included with bike locker



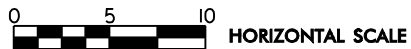
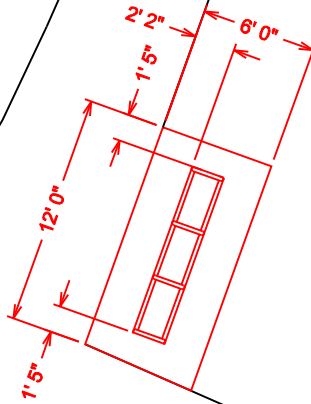
**DBL. SIDED BIKE LOCKER
AMERICAN BICYCLE
SECURITY CO
MODEL 352**



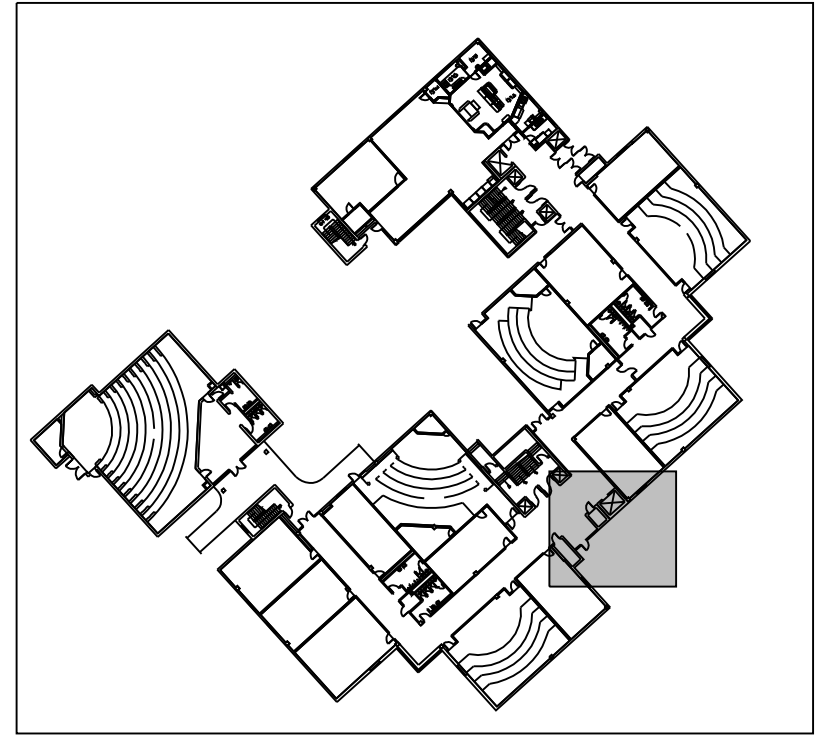
THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan

Brown Building



HORIZONTAL SCALE



AREA OF DETAIL

Notes

SE building entrance; install 6' X 12' concrete pad along sidewalk and install stadium rack; add shelter if desired for covered parking.

Bike rack proposed - Saris Stadium Rack Model 2138 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

Concrete quantity for 6' x 12' pad = 1.0 CY



**8-BIKE
STADIUM RACK
MODEL: SARIS 2138**

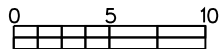
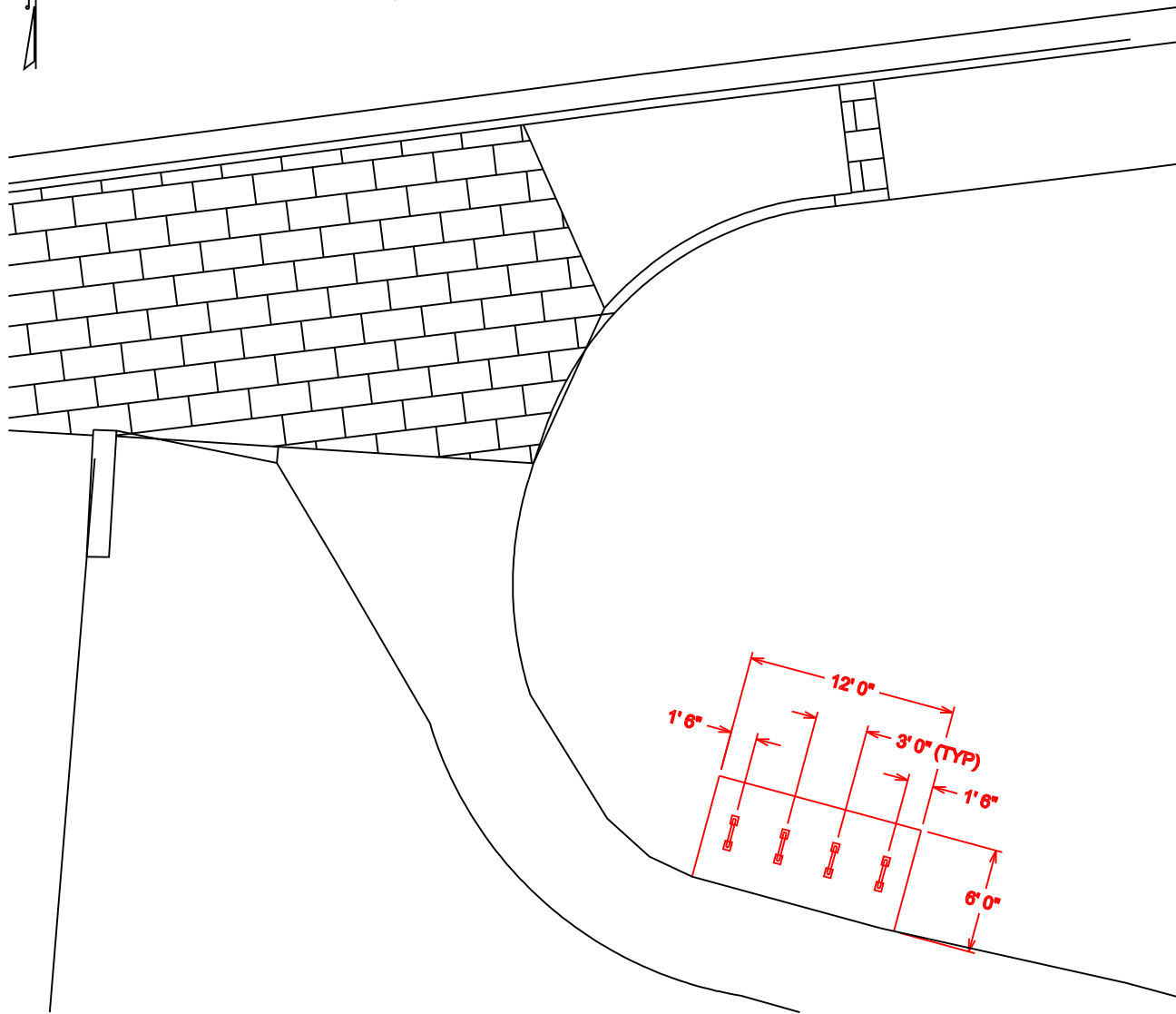


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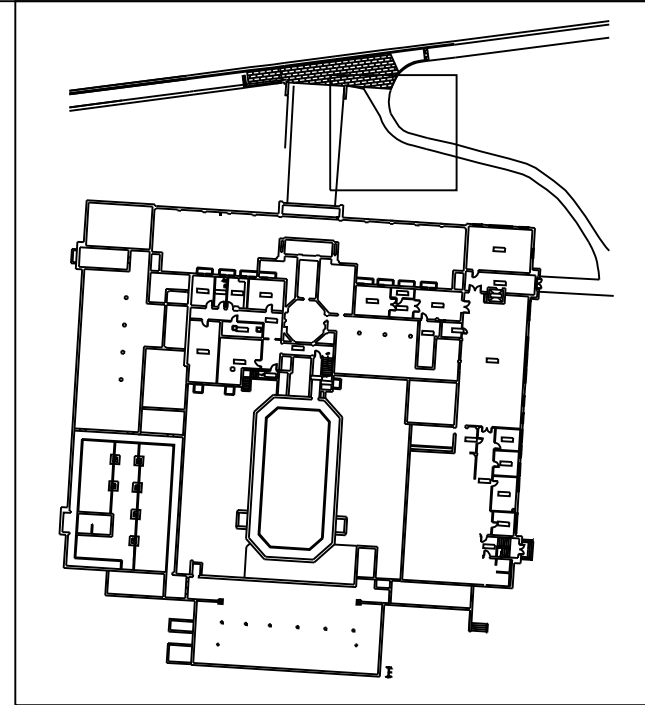
UNCG Bicycle Master Plan
Bryan Building



SPRING GARDEN ST.



HORIZONTAL SCALE



AREA OF DETAIL

Notes

Remove grass, grade as necessary. Install 6'x12' concrete pad and 4 flange mount bike docks next to existing sidewalk between Ferguson and Curry (NE of Curry's front entrance).

Bike Dock proposed - Saris Model 15317 flange four bike dock or equivalent

Anchor units required for installation - Saris Part Number 6260.

Concrete quantity for 6' x 12' pad = 1.0 CY

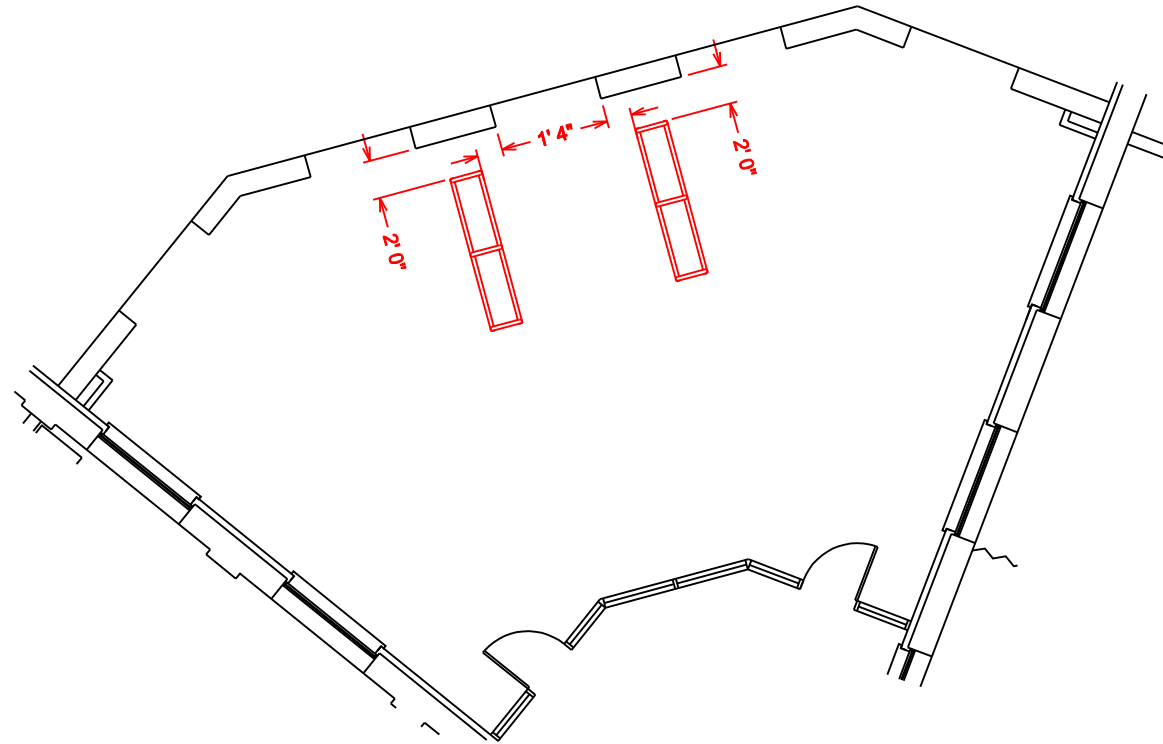


**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**

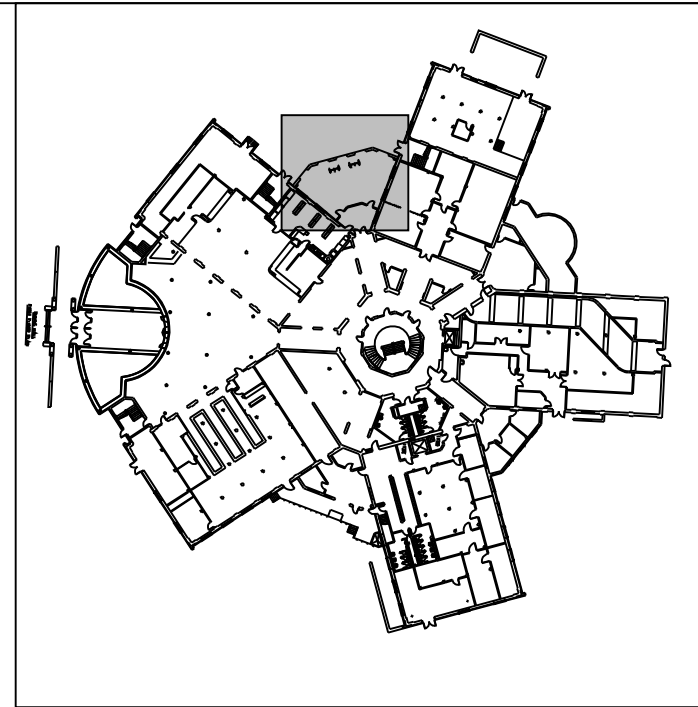


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Curry Building



0 5 10 HORIZONTAL SCALE



AREA OF DETAIL

Notes

NW corner; covered - install 2 - 3 bike stadium racks under existing awning (see diagram)

Bike rack proposed - Saris Stadium Rack Model 2136 - accomodates 6 bikes

Permanent installation in existing concrete: Saris Part Number 6260

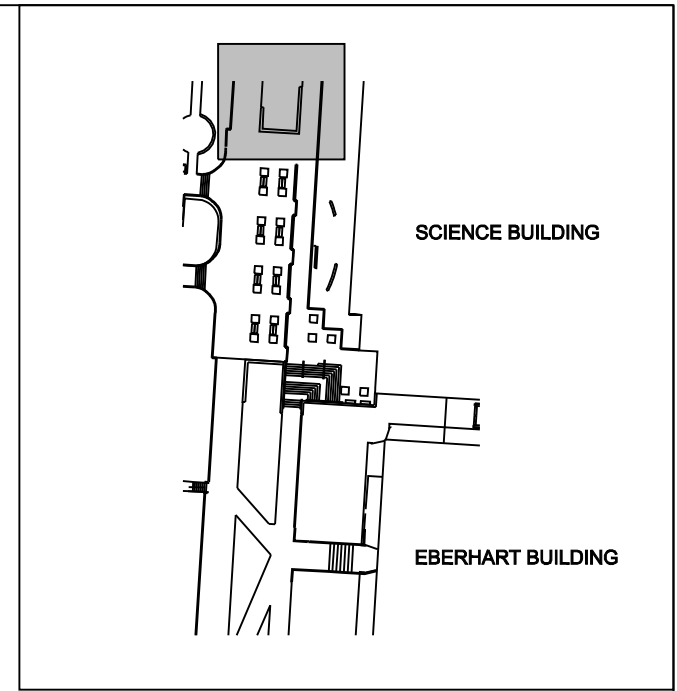
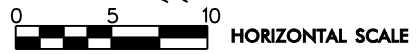
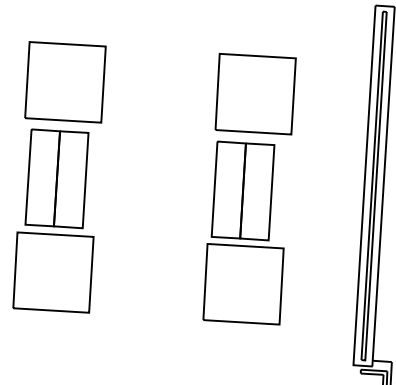
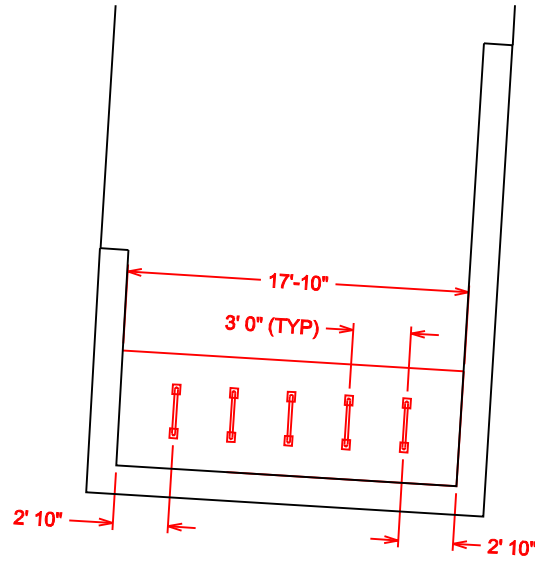
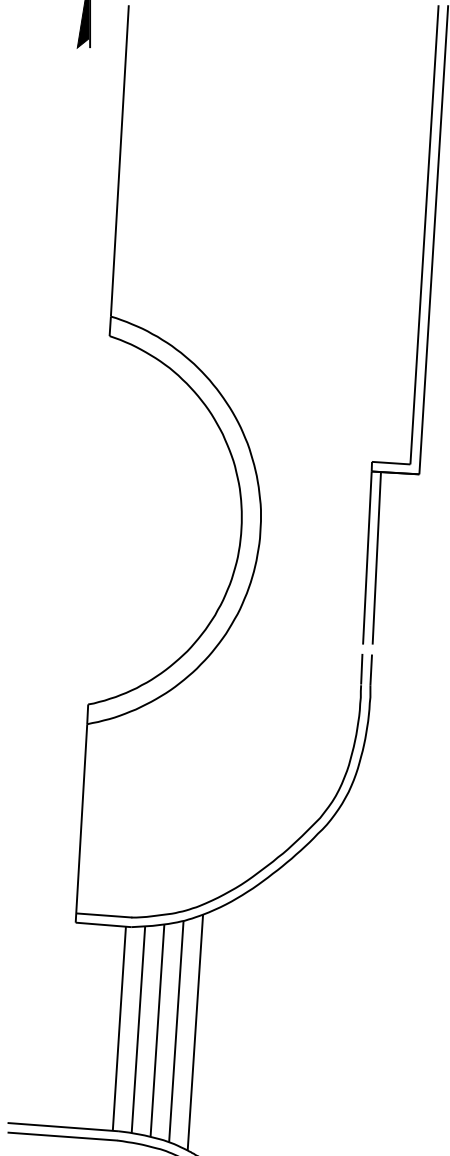


6-BIKE
STADIUM RACK
MODEL: SARIS 2136



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Dining Hall



AREA OF DETAIL


Notes

Remove grass; install new 6' x 18' concrete pad at SW corner of building, adjacent to parking lot and install 5 flange-mounted U-racks.


Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Concrete quantity for 6' x 18' pad = 1.4 CY

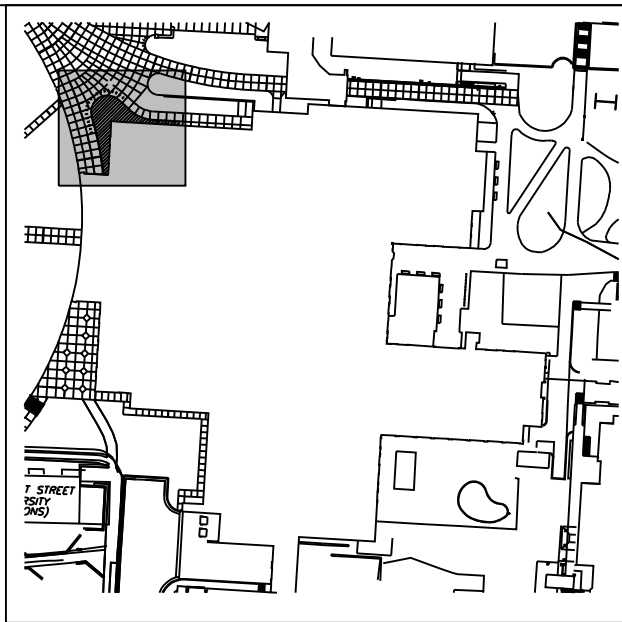
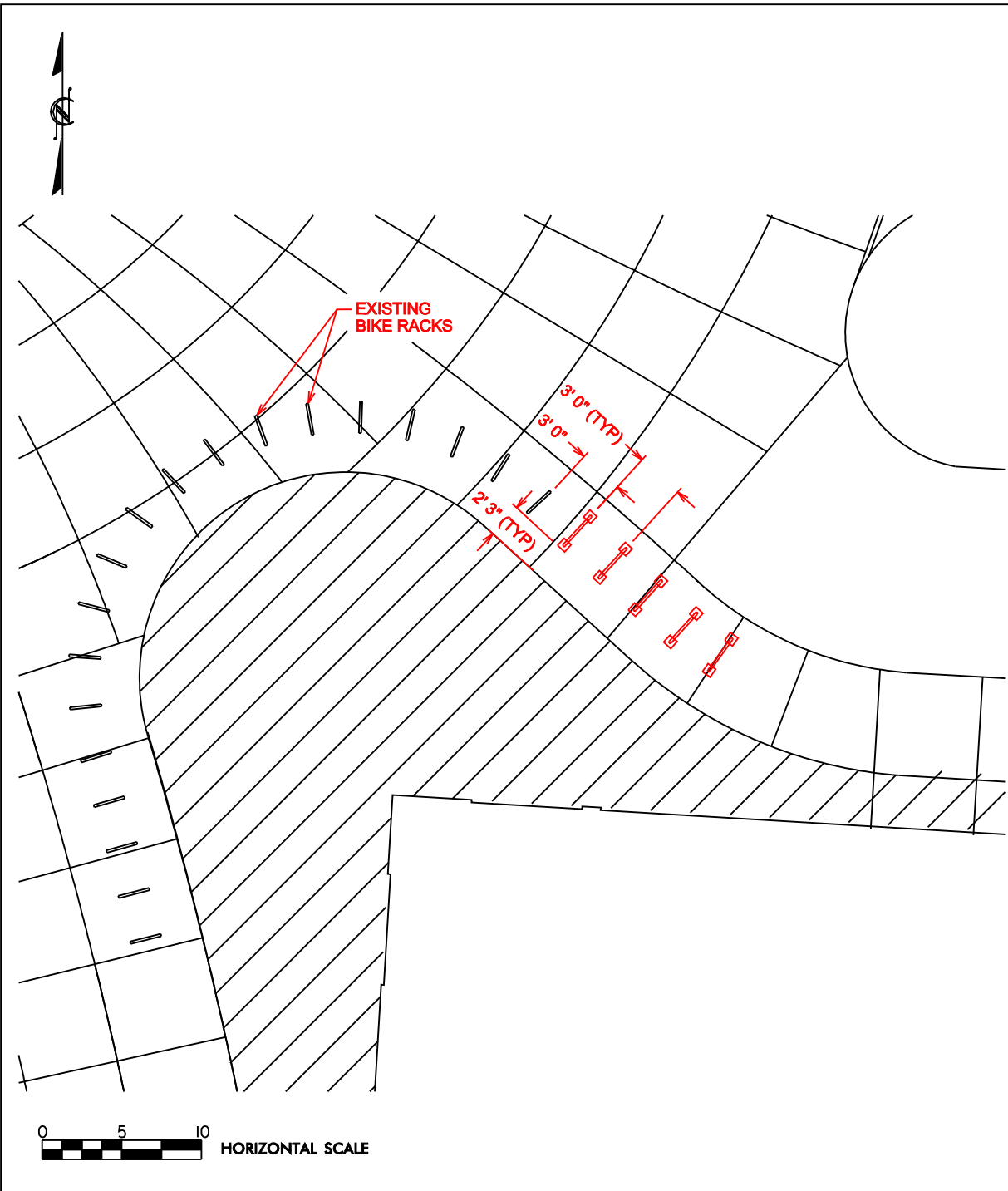


**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Eberhart Building





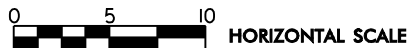
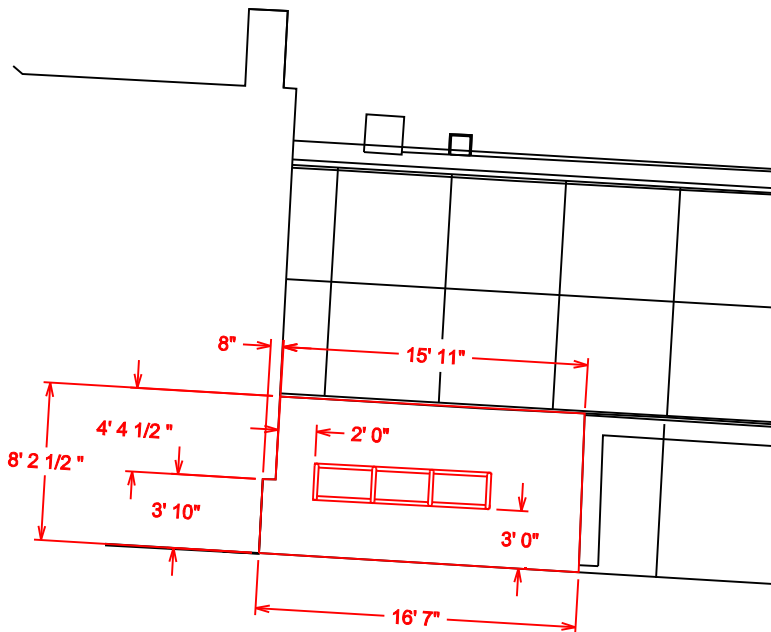
Notes

Install 5 U-racks next to existing U-racks on existing concrete pad; curve NE to side of building.

Bike Dock proposed - Saris Model 2113 Flange Mount or approved equal

Anchor units required for installation - Saris Part Number 6260

 2-BIKE FLANGE MOUNT U-RACK MODEL: SARIS 2113	 THE LOUIS BERGER GROUP, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605
	UNCG Bicycle Master Plan Elliott University Center



AREA OF DETAIL

Notes

Install 1 Stadium Rack at north side of building, near pedestrian overpass to serve EUC and Jackson Library. Install concrete pad and U-racks for permanent installation. May consider bike shelter.

Bike rack proposed - Saris Stadium Rack Model 2138 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

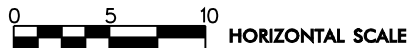
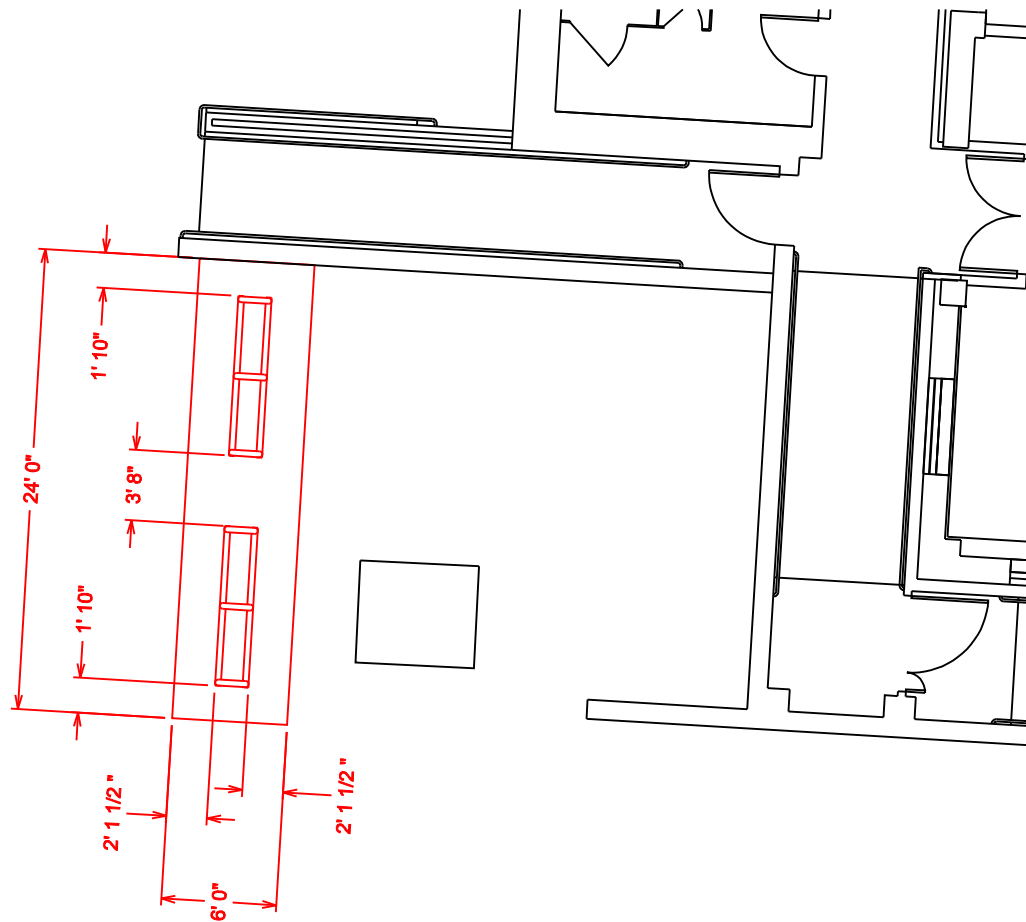


8-BIKE
STADIUM RACK
MODEL: SARIS 2138

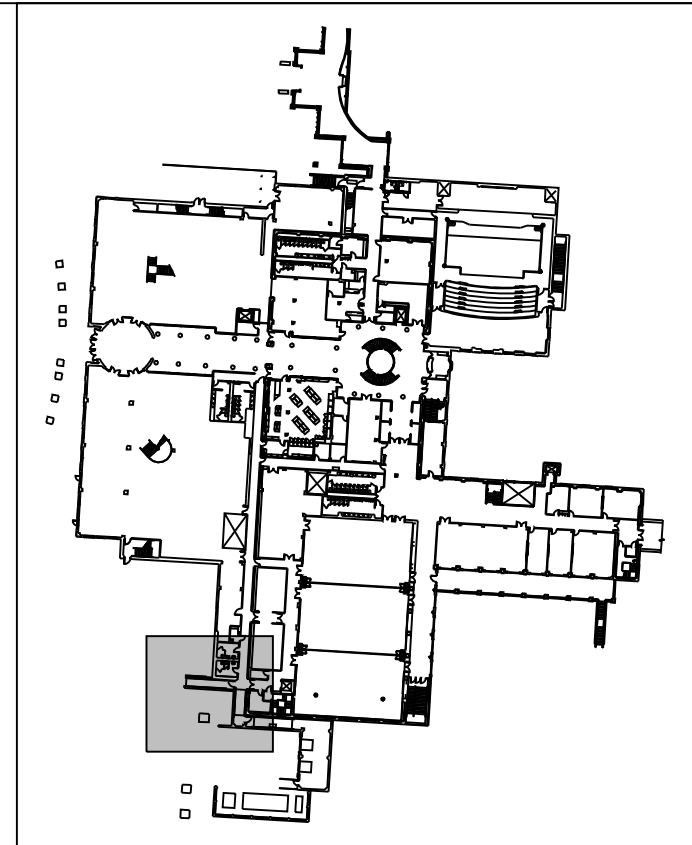


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Elliott University Center



HORIZONTAL SCALE



AREA OF DETAIL

Notes

Remove landscaping and install 6' x 24' concrete pad and 2 Stadium racks at south side of building. Install landscaped screenings for aesthetics. Consider Uracks for permanent installation. May consider bike shelter.

Bike rack proposed - Saris Stadium Rack Model 2136 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

Concrete quantity for 6' X 24' pad = 1.8 CY

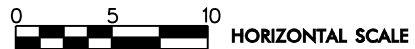
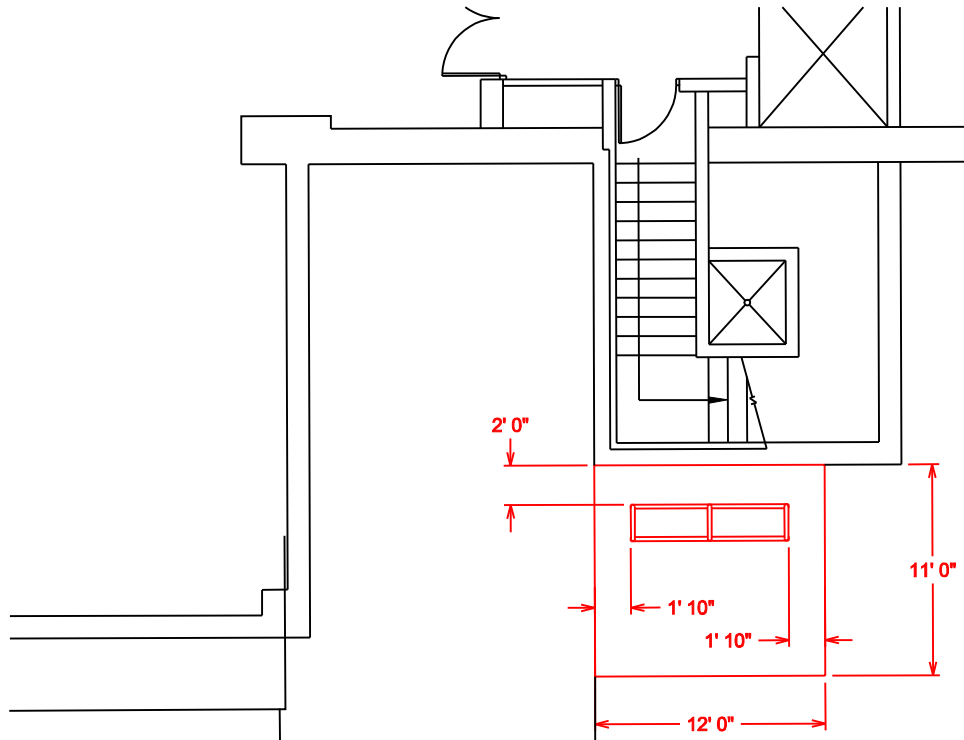


6 BIKE
STADIUM RACK
MODEL: SARIS 2136

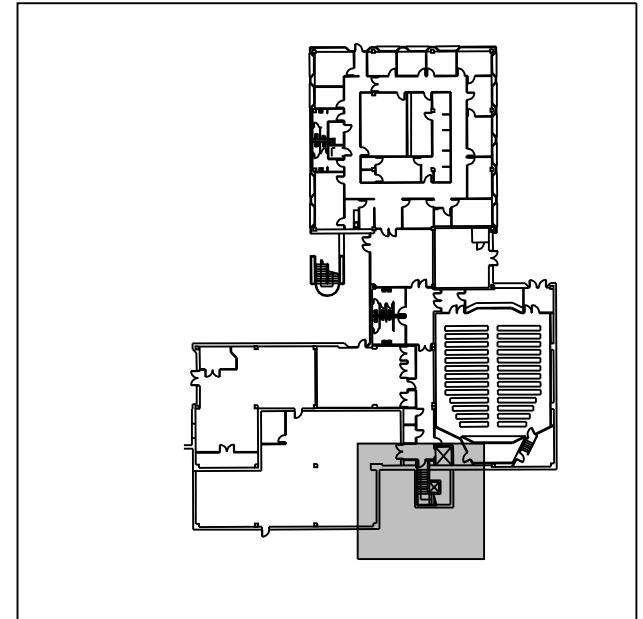


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Elliott University Center



HORIZONTAL SCALE



AREA OF DETAIL

Notes

Remove grass; install new concrete pad and 1-Stadium rack on south side of building; just east of rear entrance

Bike rack proposed - Saris Stadium Rack Model 2136 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

Concrete quantity for 11' x 12' slab = 1.7 CY



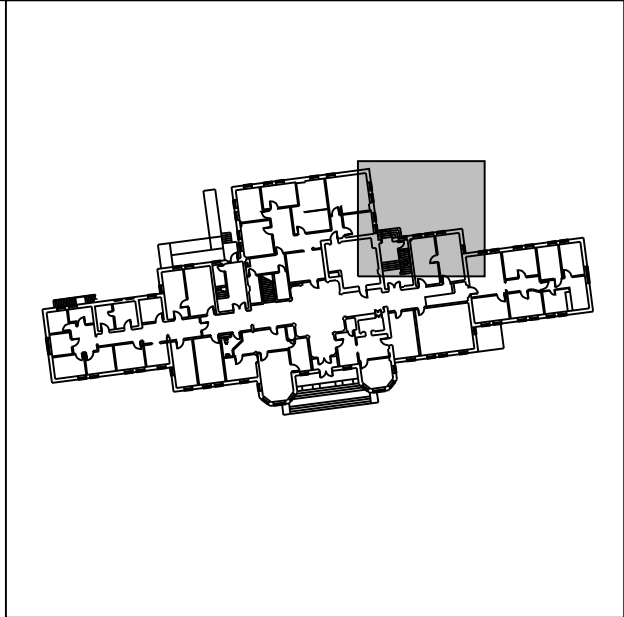
**6 BIKE
STADIUM RACK
MODEL: SARIS 2136**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan

Ferguson Building



AREA OF DETAIL

Notes

Use existing concrete pad; install 2 U-racks (parallel to building) on north side (rear) of building (near building wall). May consider 1-2 bike lockers in this area for longer term, covered bike parking in the central campus area.

Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal



HORIZONTAL SCALE



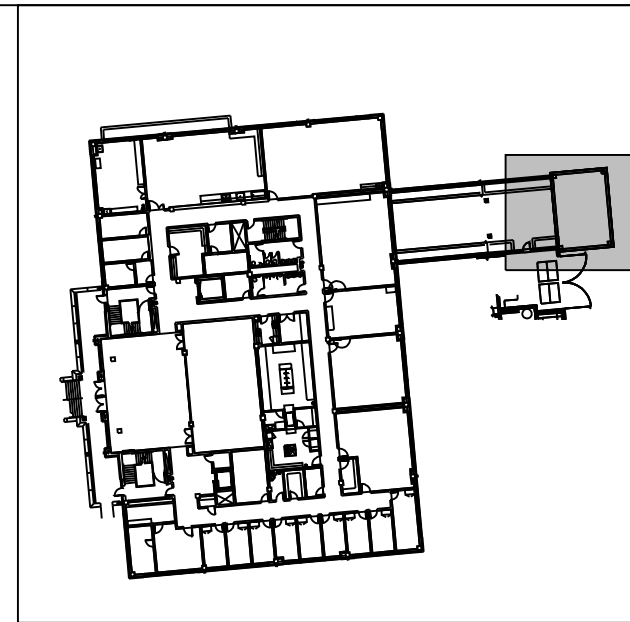
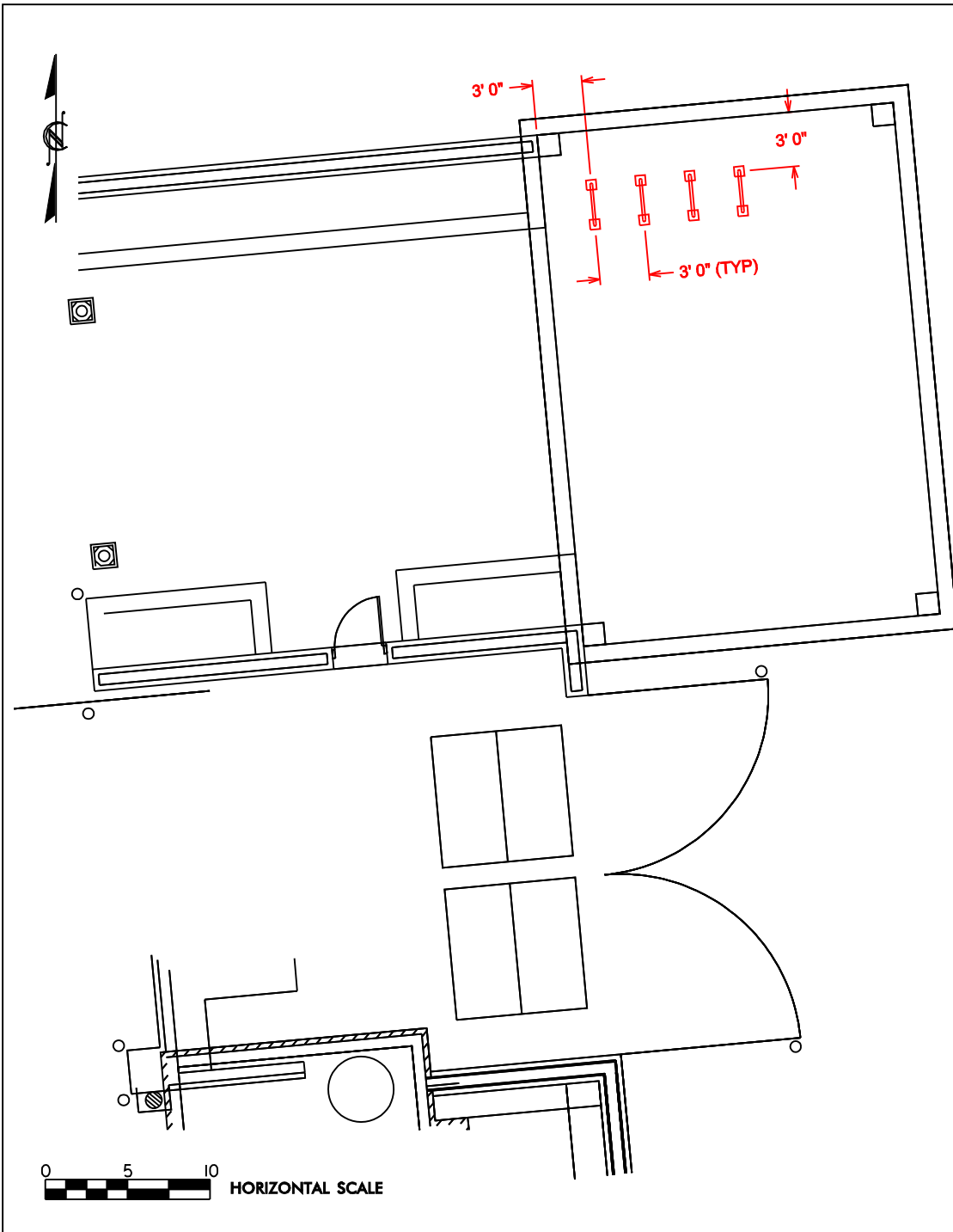
**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan

Foust Building




AREA OF DETAIL

Notes


Use existing concrete pad in Lot 7, near main entrance to Gatewood Building (NE corner of building). Install 4 flange-mounted U-racks oriented N-S. Add bike shelter for covered parking.

Bike Dock proposed - Saris Model 2113 Flange Mount or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

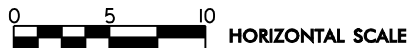
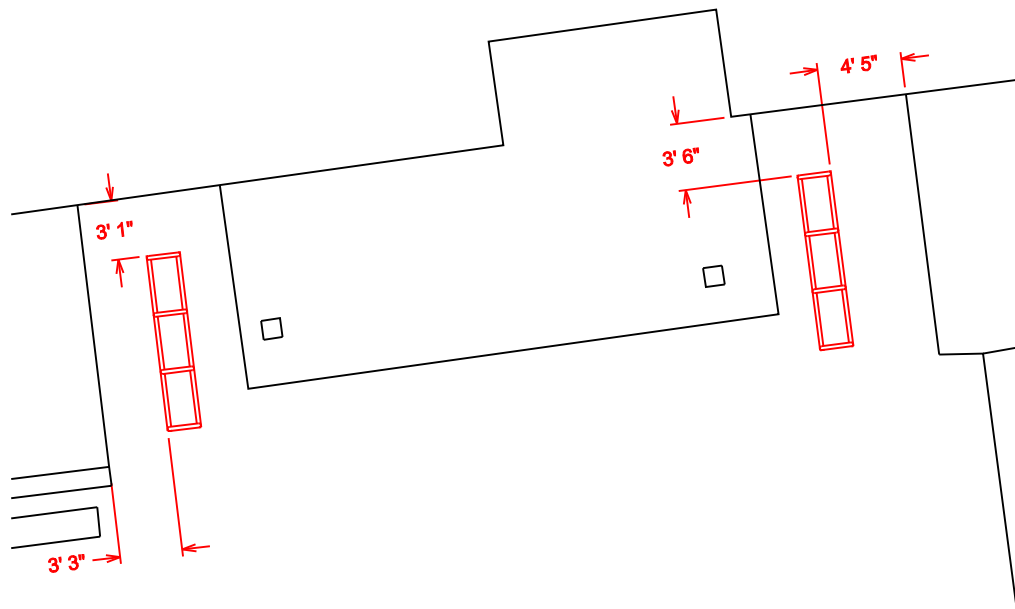


**2-BIKE FLANGE MOUNT U-RACK
MODEL: SARIS 2113**

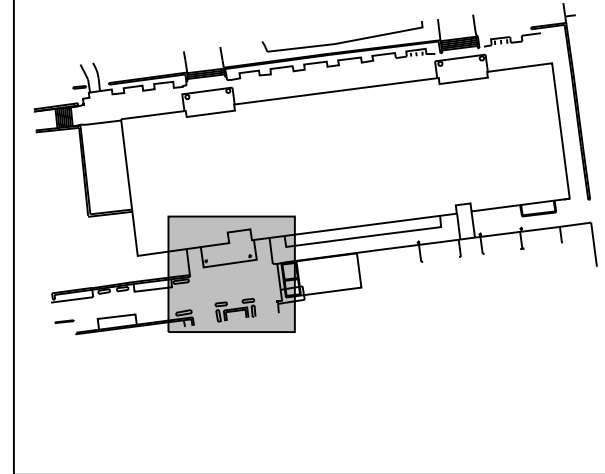


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Gatewood Studio Art Building



HORIZONTAL SCALE



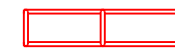
AREA OF DETAIL

Notes

Install 1 Stadium Rack on existing concrete, south side of building at rear entrance (SW corner).and 1 Stadium Rack on existing concrete, south side of building at rear entrance (SE corner).

Bike rack proposed - Saris Stadium Rack Model 2138 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

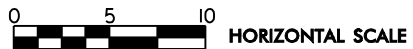
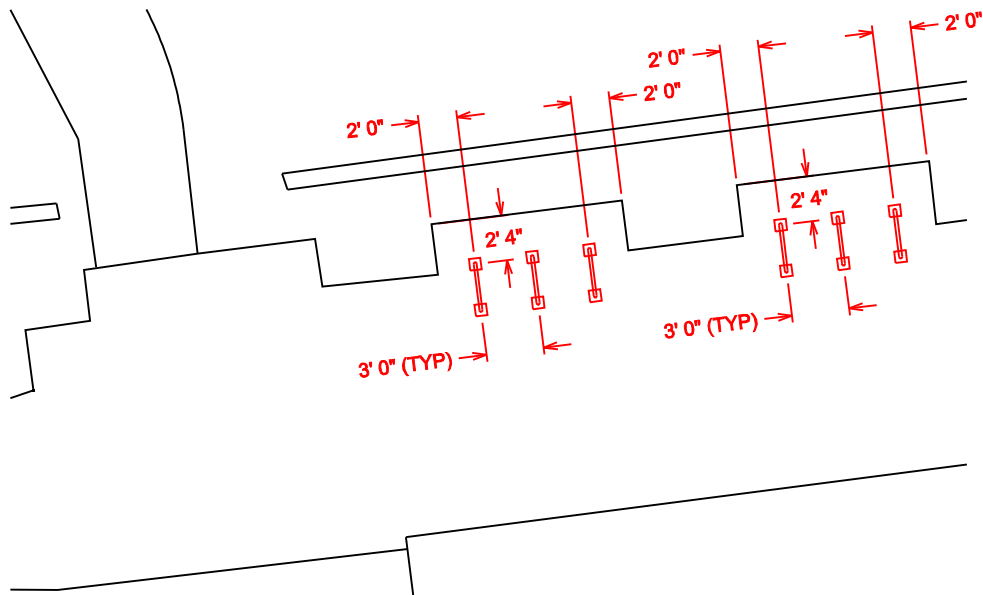


**6-BIKE
STADIUM RACK
MODEL: SARIS 2136**

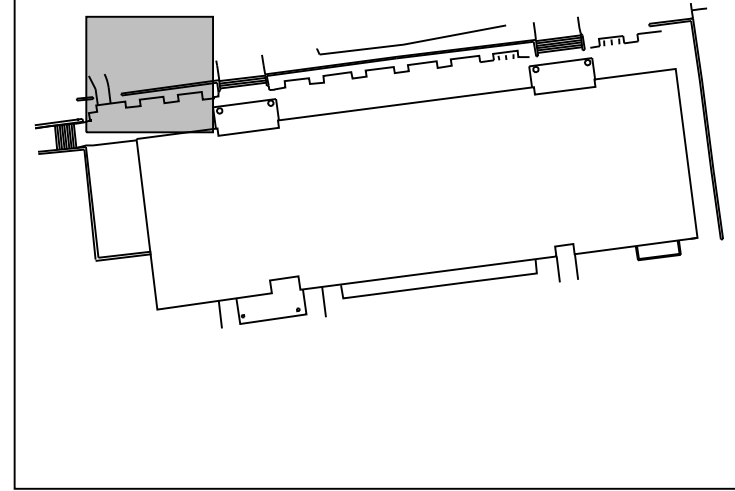


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Graham Building



HORIZONTAL SCALE



AREA OF DETAIL

Notes

If additional parking is needed, install 3 U-racks per concrete pad "hook" on north side of building (near main entrance). This is an expansion of existing bike parking area.

Bike Dock proposed - Saris Model 2113 Flange Mount or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

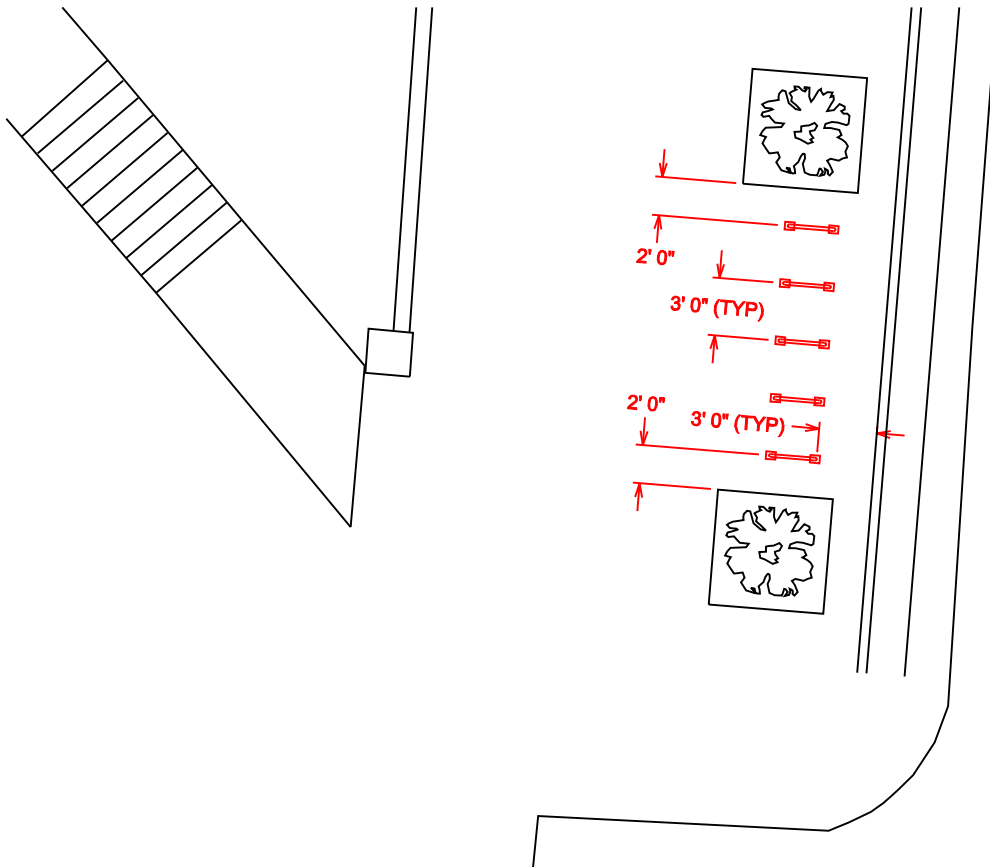


**2-BIKE FLANGE
MOUNT U-RACK
MODEL: SARIS 2113**

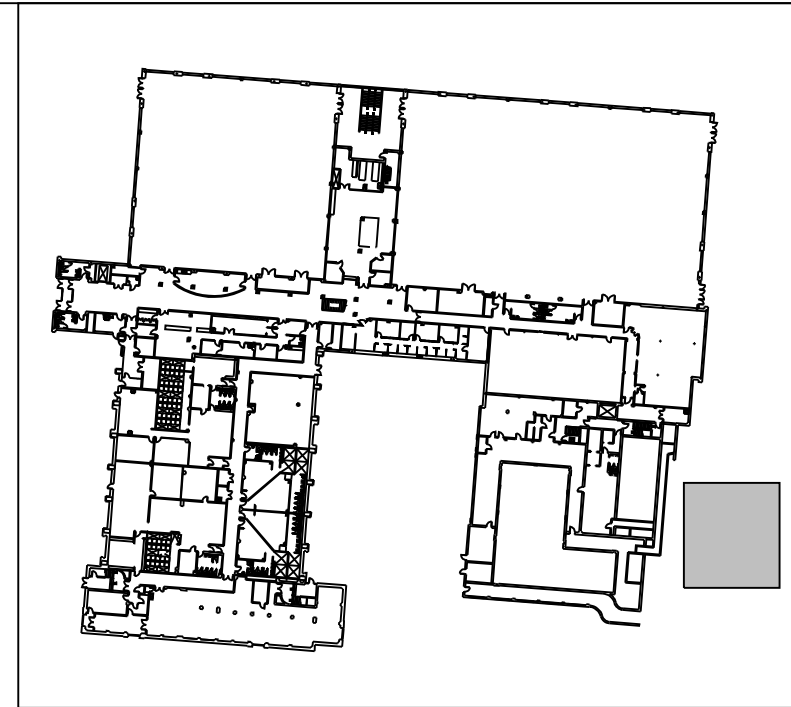


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Graham Building



0 5 10 HORIZONTAL SCALE



AREA OF DETAIL

Notes

Install 5 U-racks on existing concrete pad, between street trees and adjacent to West Drive

Bike Dock proposed - Saris Model 2113 Flange Mount or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

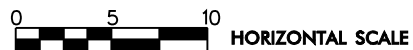
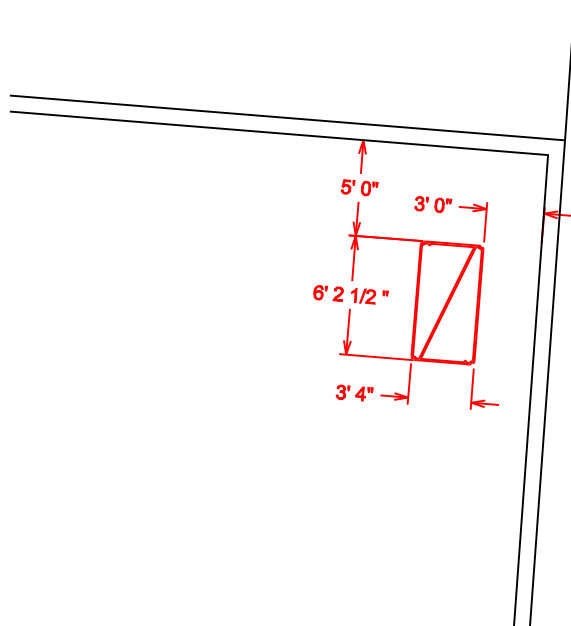


**2-BIKE FLANGE
MOUNT U-RACK
MODEL: SARIS 2113**

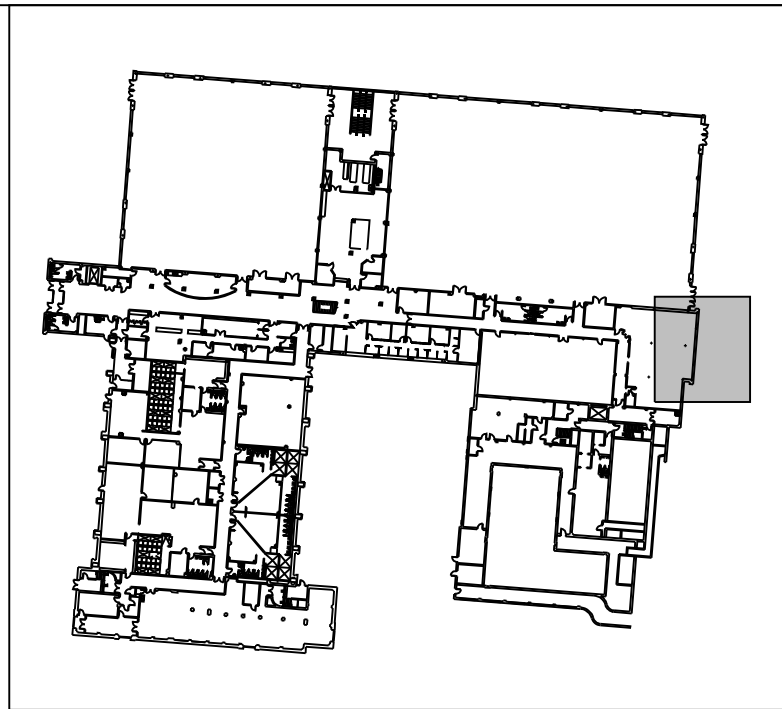


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Health and Human Performance Building



HORIZONTAL SCALE



AREA OF DETAIL

Notes

Install 1 dbl-sided bike locker next to existing u-rack installation on east side of HHP (align doors facing north-south); provides long-term, covered storage option.

Bike locker proposed - American Bicycle Security Company Model 352 or approved equal

Installation Anchors and hardware included with bike locker

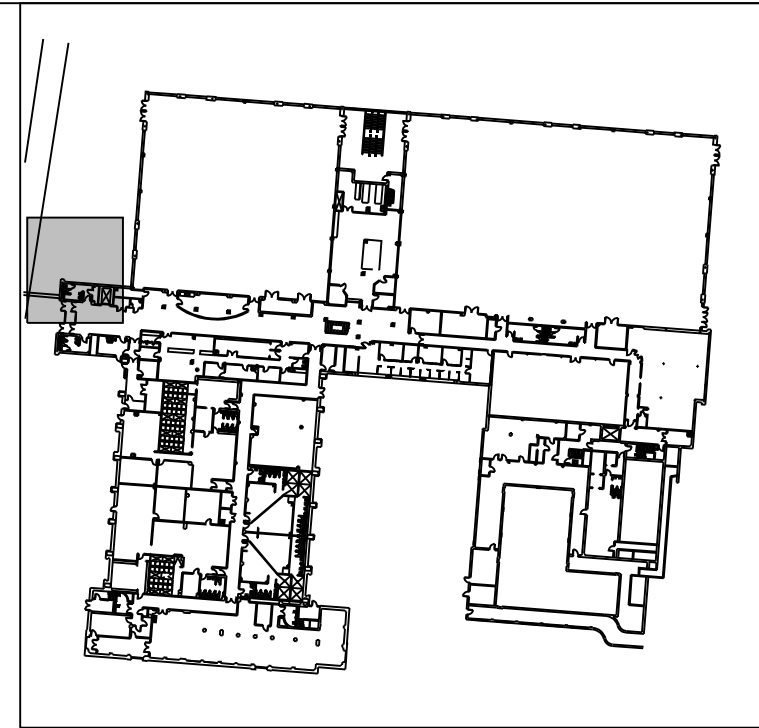
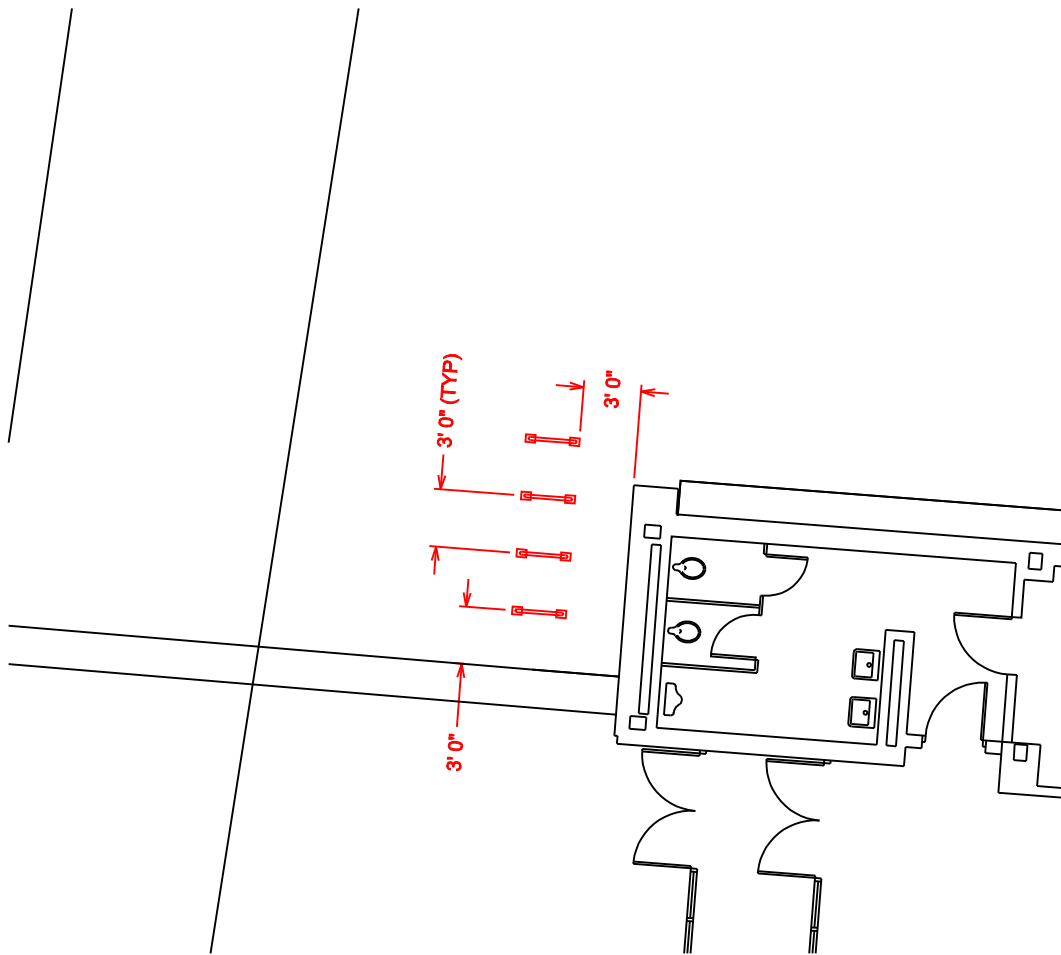


**DBL. SIDED BIKE LOCKER
AMERICAN BICYCLE
SECURITY CO
MODEL 352**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Health and Human Performance Building



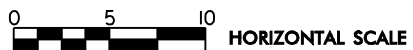
AREA OF DETAIL

Notes


Remove shoe brushes, use existing concrete pad and install up to 4 U-racks. This is an expansion of existing bike parking area on west side of building to serve HHP and SRF.

Bike Dock proposed - Saris Model 2113 Flange Mount U-rack or approved equal

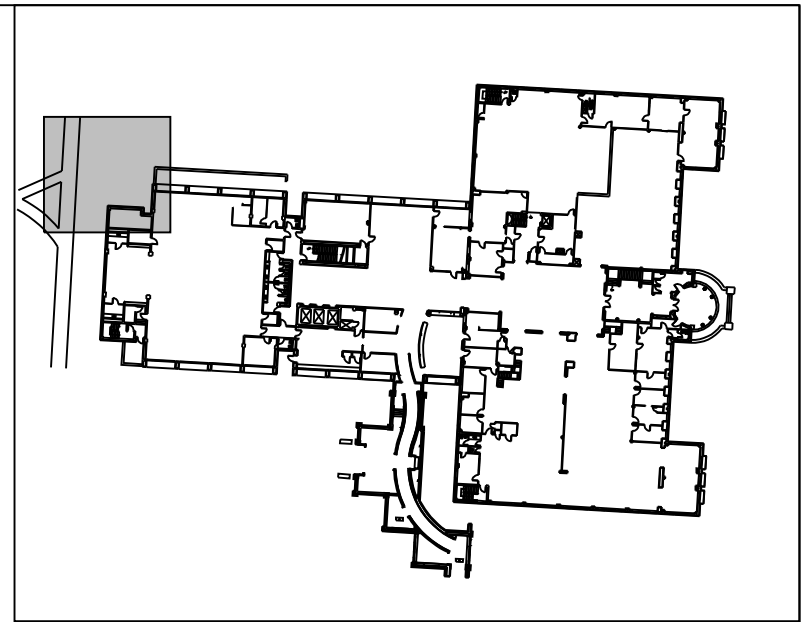
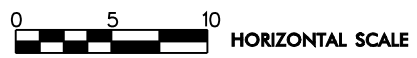
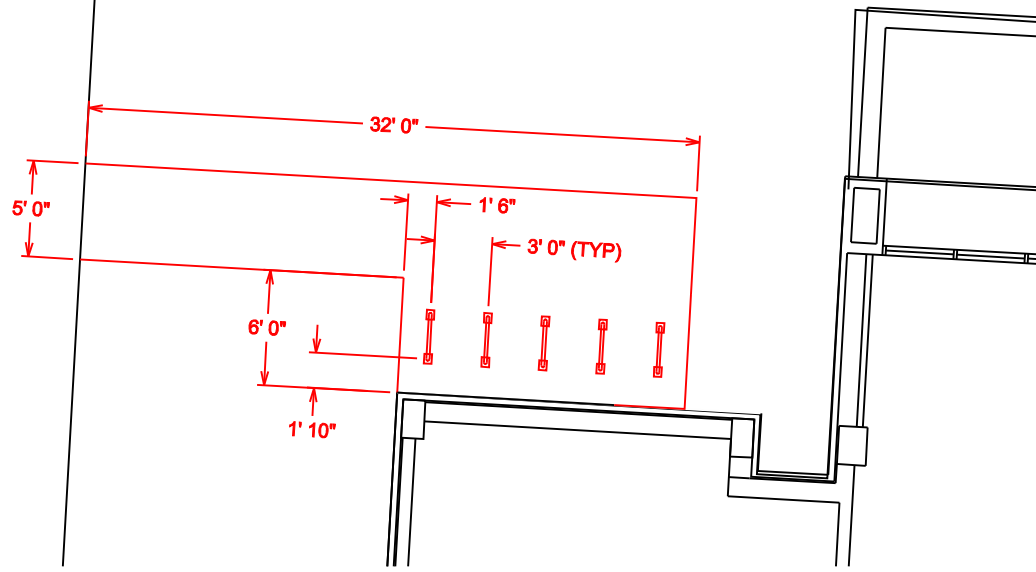
Anchor units required for installation - Saris Part Number 6260 or approved equal




**2-BIKE FLANGE
 MOUNT U-RACK
 MODEL: SARIS 2113**

 **THE LOUIS BERGER GROUP, Inc.**
 1001 Wade Avenue, Suite 400
 Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
 Health and Human Performance Building



AREA OF DETAIL

Notes

Remove grass at rear of building, near Walker Ave cul-de-sac; install concrete pad and 5 flange-mounted U-racks; add bike shelter for covered bicycle parking near transit hub. A second option would be to install concrete pad and 2 dbl-sided bike lockers for long-term storage.

Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Quantity of concrete for pad = 2.9 CY

**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**

THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Jackson Library (NW Corner)

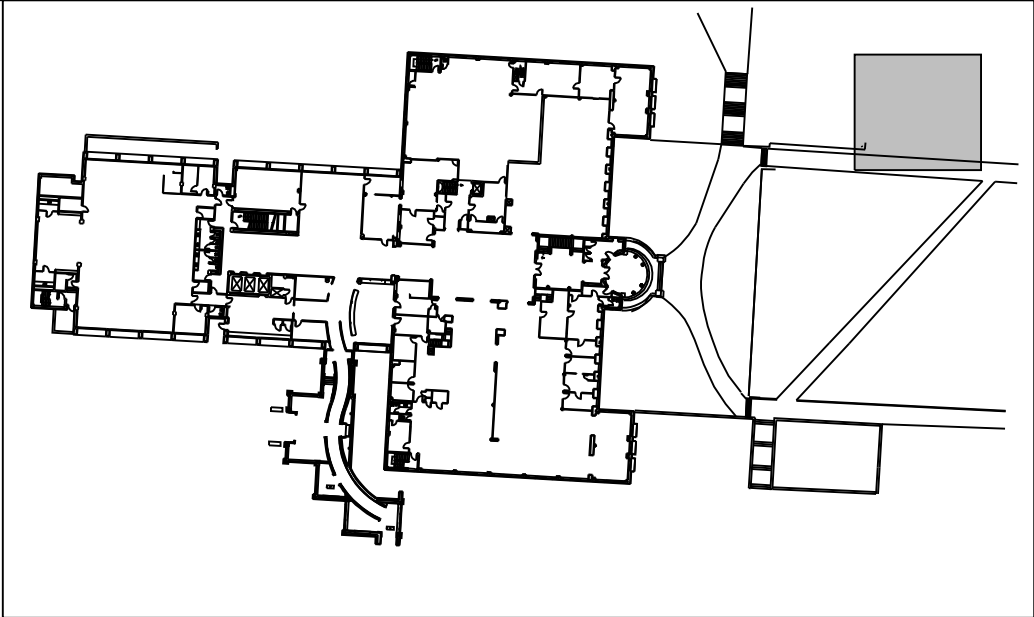
Notes

Remove existing rack and mulch; install 6'x12' brick pad and 4 flange-mounted Uracks. Brick pad should be expanded as necessary to meet adjacent brick walkway.

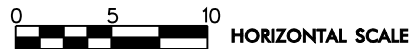
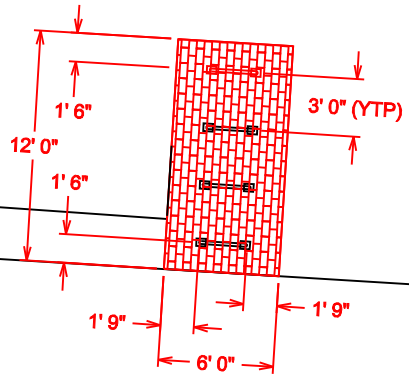
Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260

Required area of brick installed - 72 Sq Ft



AREA OF DETAIL

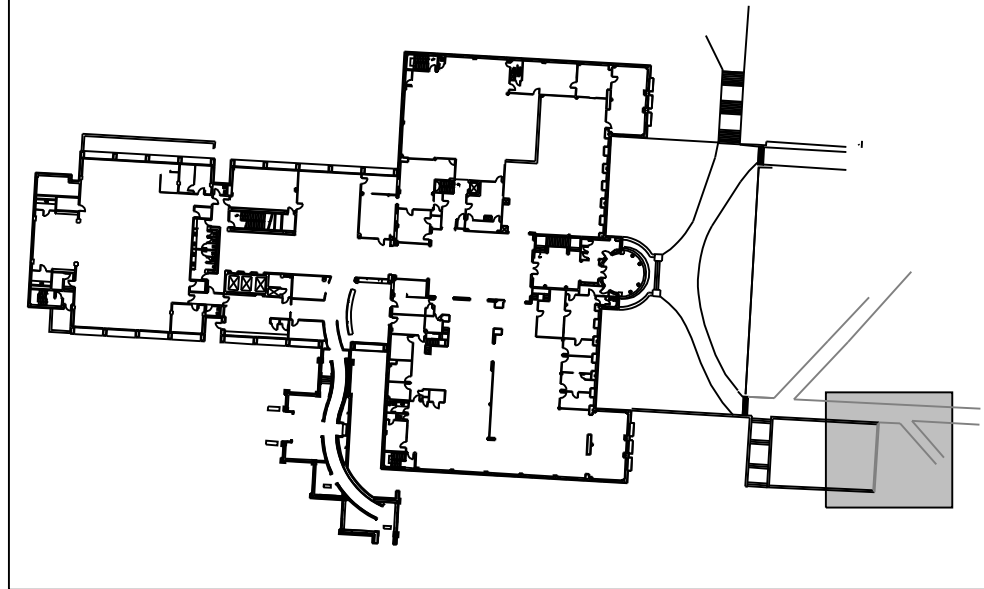


**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**

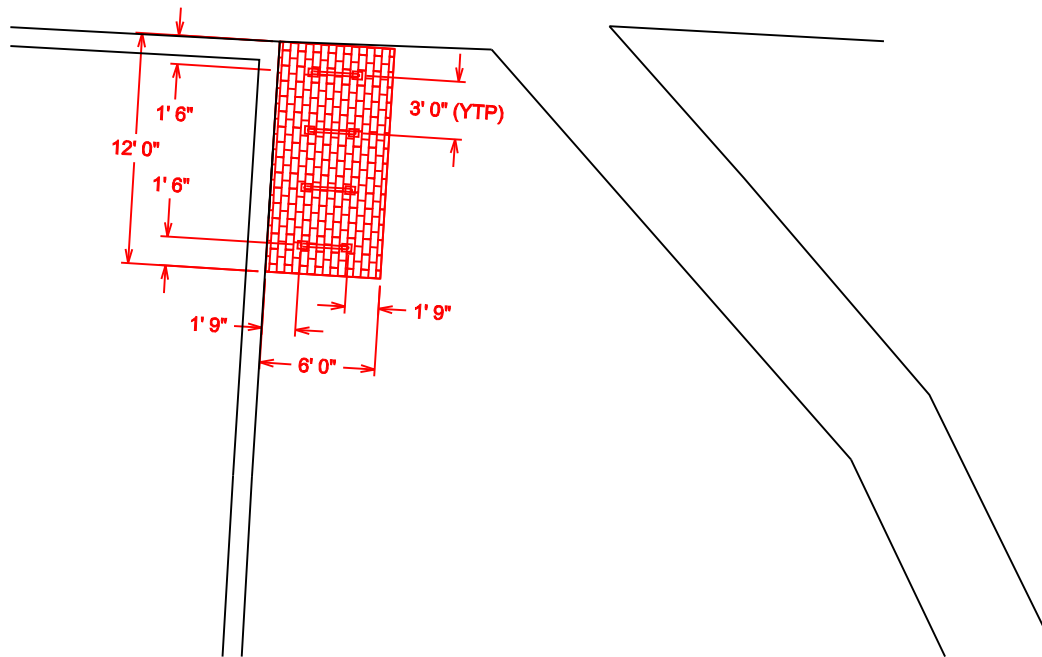


THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Jackson Library (NE Corner)



AREA OF DETAIL



Notes

Remove existing rack and mulch; install 6'x12' brick pad and 4 flange-mounted U-racks. Brick pad should be expanded as necessary to meet adjacent brick walkway.

Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Approximate area of brick pad = 88 Sq. Ft.



HORIZONTAL SCALE



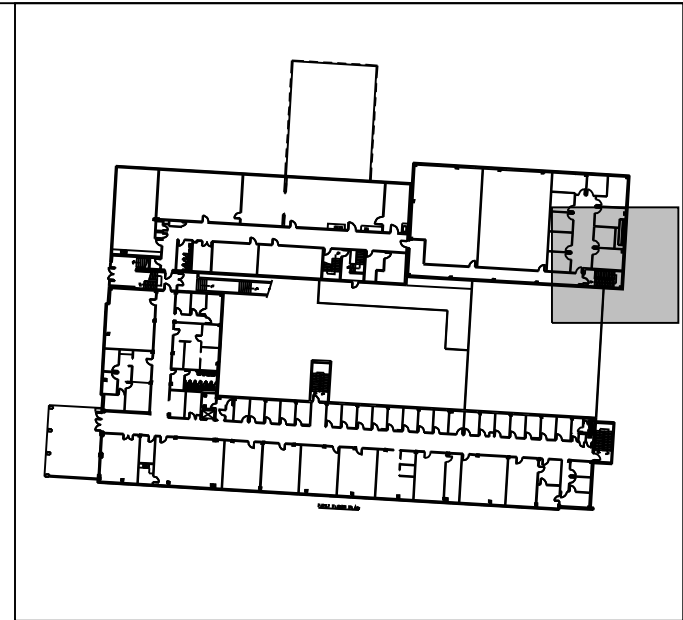
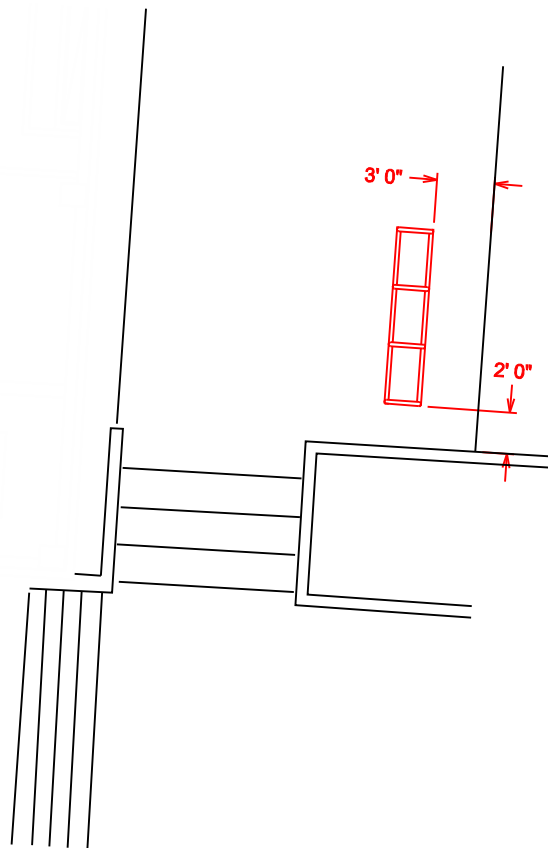
**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan

Jackson Library (SE Corner)



AREA OF DETAIL

Notes

Use existing brick pad on first level of tiered walkway;
install Stadium Rack in available "hook" at east (rear) building
entrance.

Bike rack proposed - Saris Stadium Rack Model 2138 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260
or approved equal



HORIZONTAL SCALE

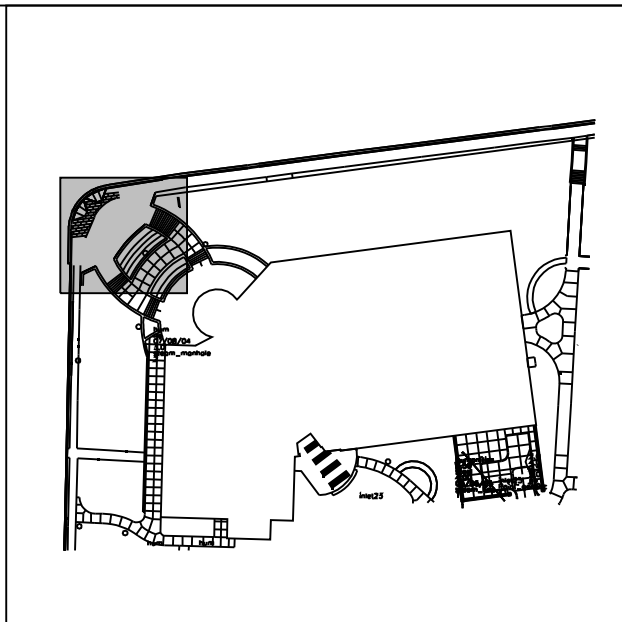
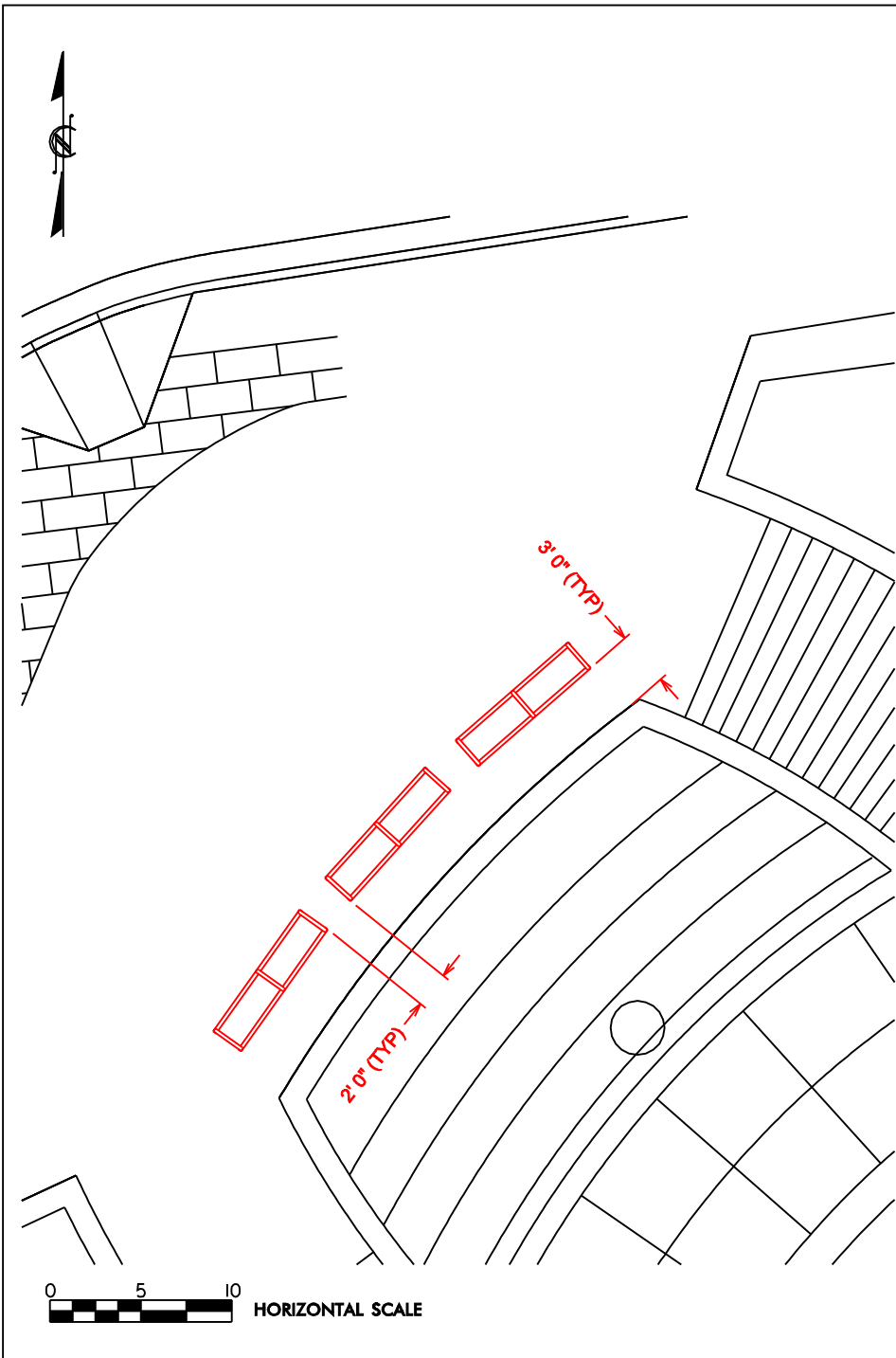


**8-BIKE
STADIUM RACK
MODEL: SARIS 2138**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
McIver Building



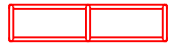

AREA OF DETAIL

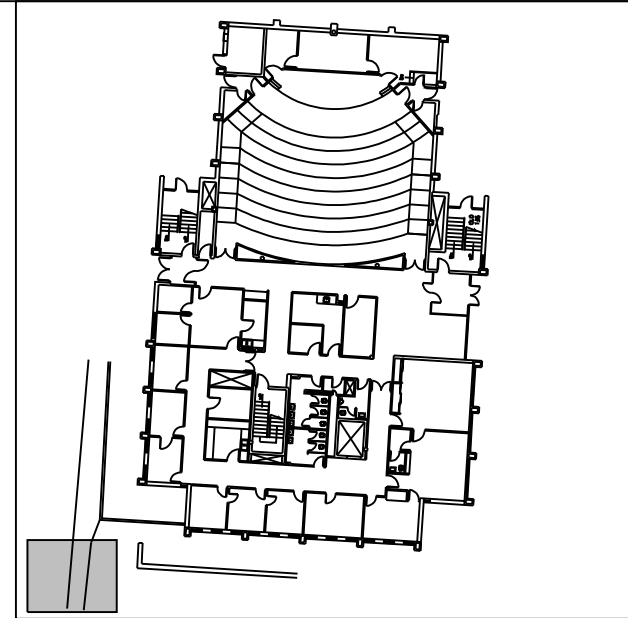
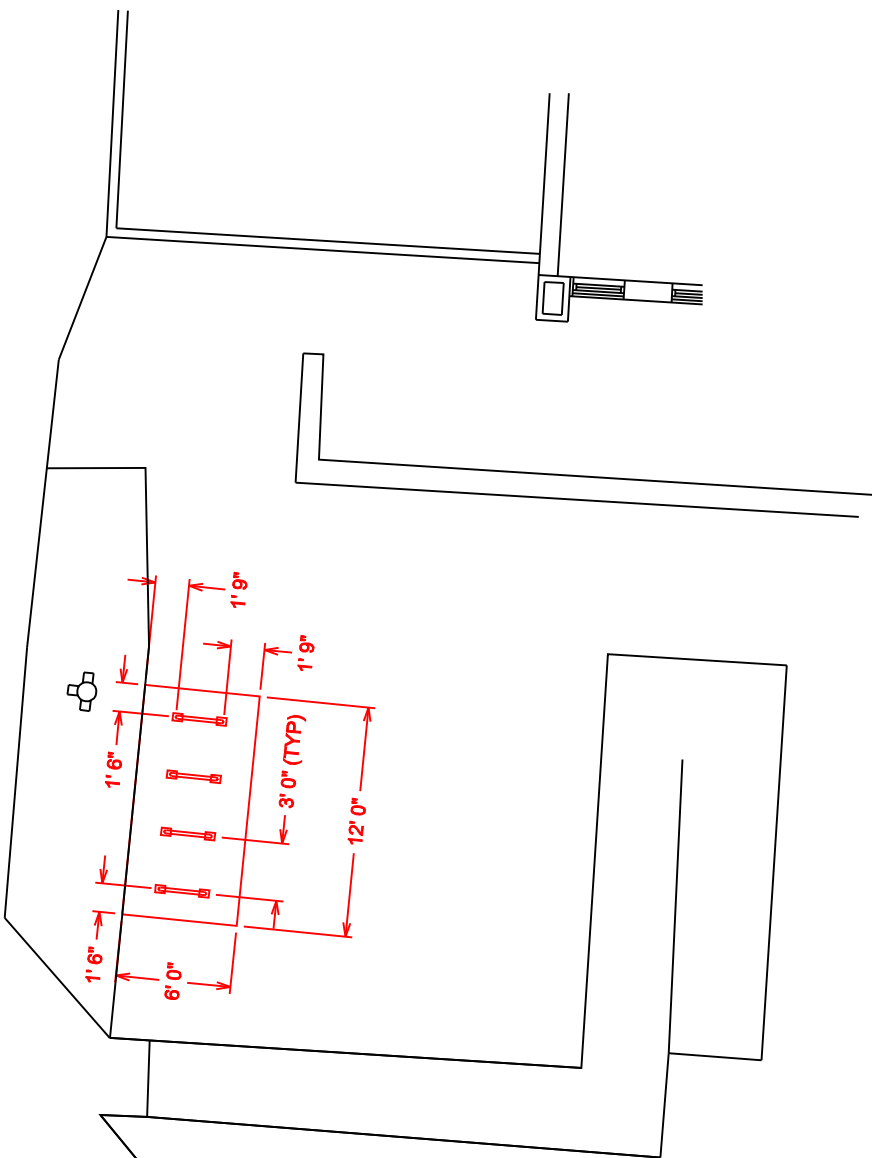
Notes

Remove existing racks at NW corner of building (along wall) and replace with 3 Stadium racks, centered and oriented to match curve of the adjacent retaining wall.

Bike rack proposed - Saris Stadium Rack Model 2136 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

 <p>6-BIKE STADIUM RACK MODEL: SARIS 2136</p>	 <p>THE LOUIS BERGER GROUP, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605</p> <hr/> <p>UNCG Bicycle Master Plan Moore Humanities Building</p>
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AREA OF DETAIL

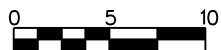
Notes

Remove grass behind existing concrete "nook" at SW corner of building (between fire equipment and wheelchair ramp); install new 6'x12' concrete pad (adjacent to sidewalk). Install 4 flange-mounted U-racks.

Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Concrete quantity for 6' x 12' pad = 1.0 CY



HORIZONTAL SCALE



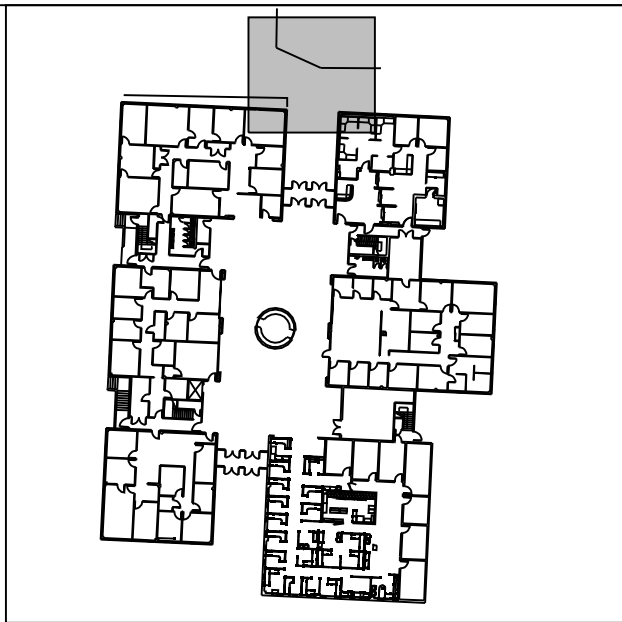
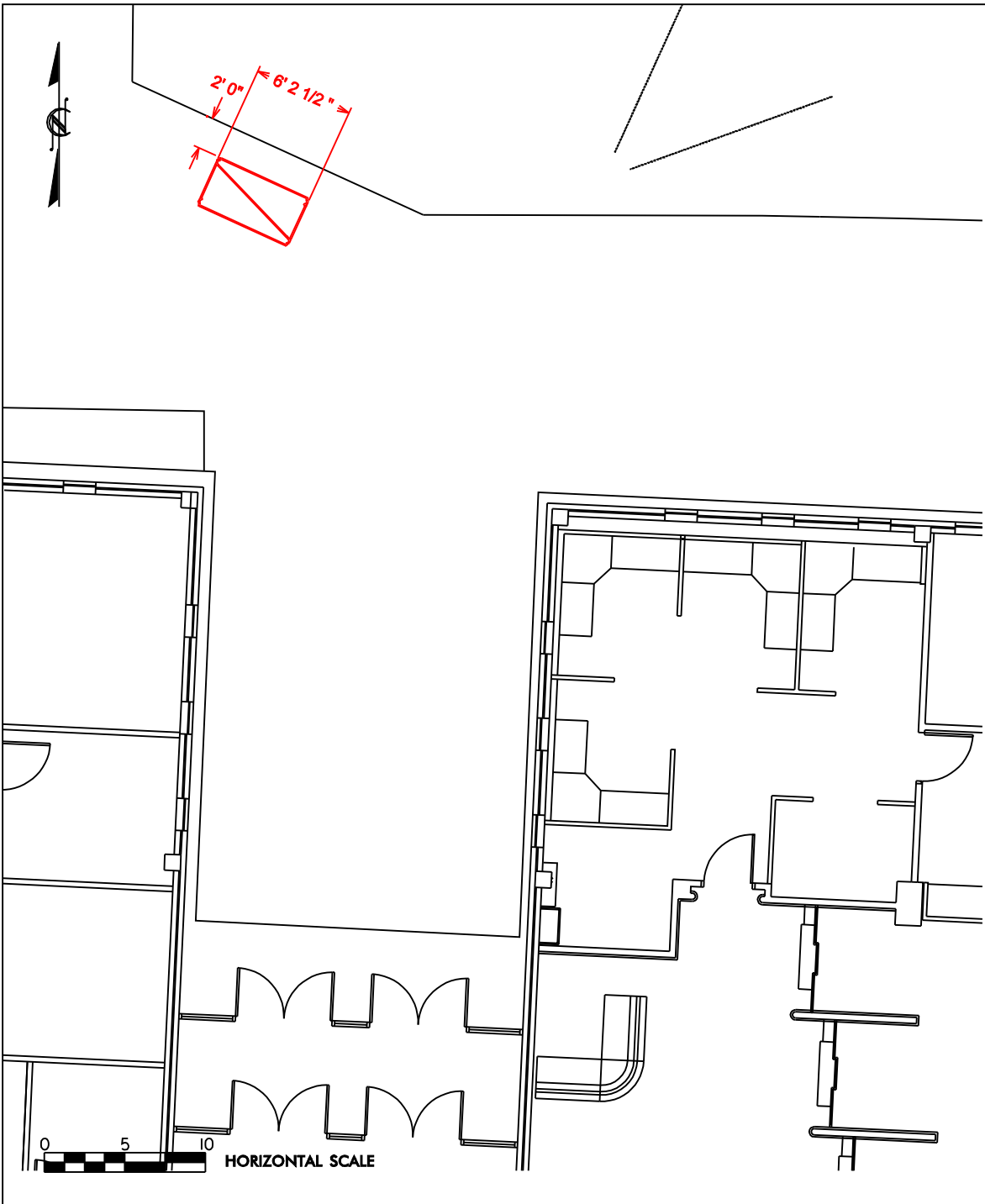
2-BIKE FLANGE MOUNT BIKE DOCK
MODEL: SARIS 15317



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan

Moore Building





AREA OF DETAIL

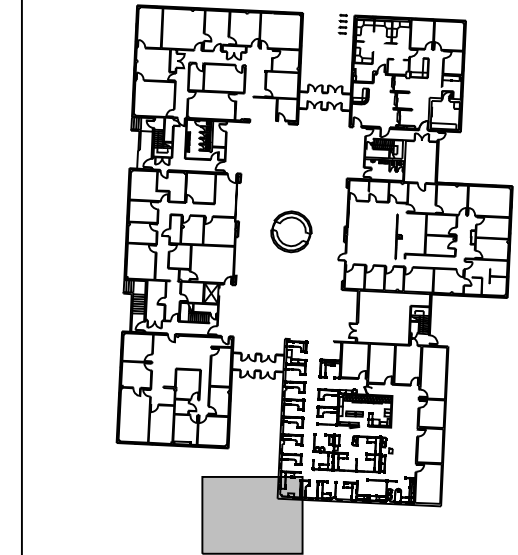
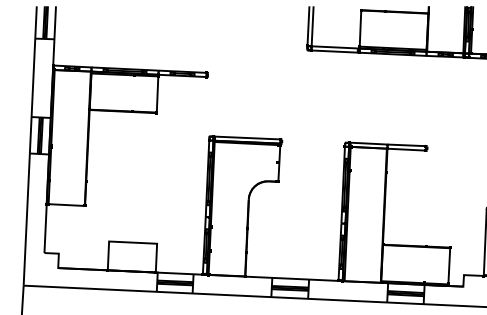
Notes

Install double-sided bike locker in alcove next to vertical brick wall, directly north of Mossman Building; provides long-term covered bike storage.

Bike locker proposed - American Bicycle Security Company Model 352 or approved equal

Installation Anchors and hardware included with bike locker

 <p>DBL. SIDED BIKE LOCKER AMERICAN BICYCLE SECURITY CO MODEL 352</p>	 <p>THE LOUIS BERGER GROUP, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605</p> <p>UNCG Bicycle Master Plan Mossman Building</p>
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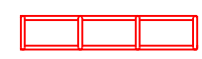
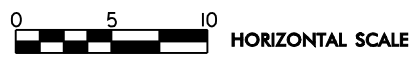
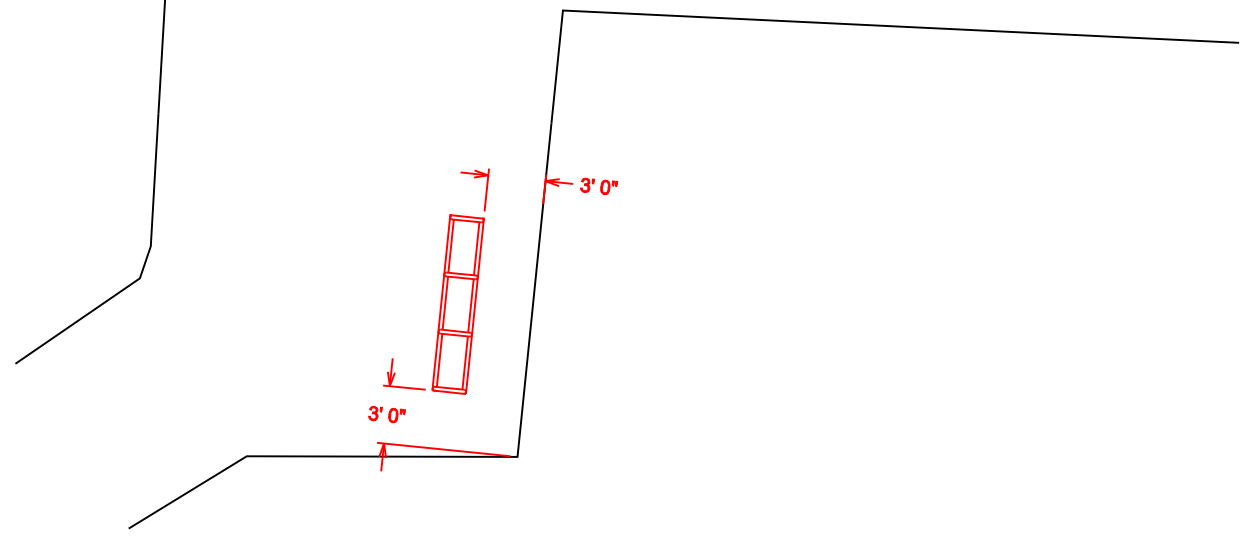
AREA OF DETAIL

Notes

Install 8 bike Stadium Rack at south entrance, on existing brick pad

Bike rack proposed - Saris Stadium Rack Model 2138 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal



**8-BIKE
STADIUM RACK
MODEL: SARIS 2138**



THE LOUIS BERGER GROUP, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Mossman Building



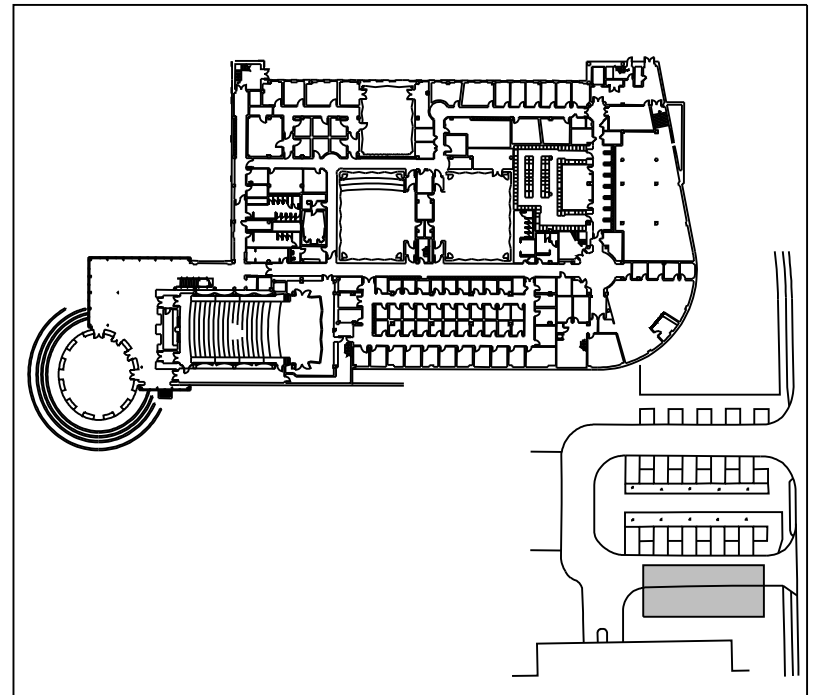
Notes

Install 4 new 9'x9' concrete pads between trees adjacent to McIver Parking Deck, just north of the garage (south of the Music Building). Install 3 U-racks (if necessary) on one concrete pad (NW corner); the remaining pads will have rolled curbs and marked stalls for moped parking.

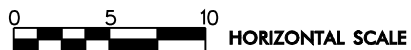
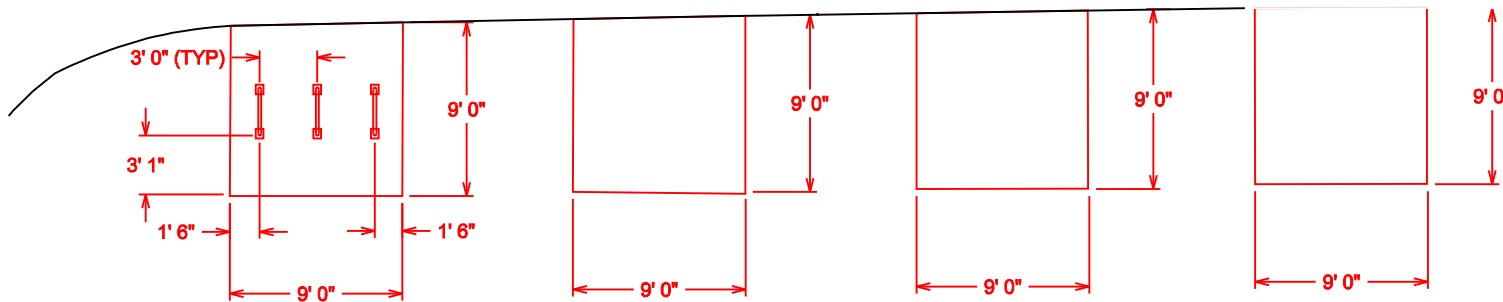
Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Concrete quantity for 4 - 9 x 9 concrete pads = 4.0 CY



AREA OF DETAIL



HORIZONTAL SCALE

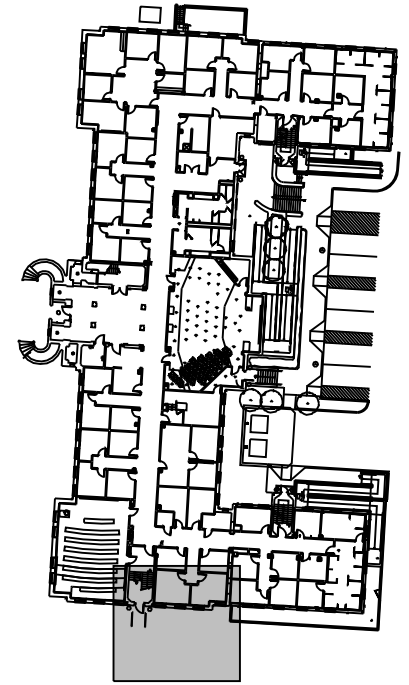
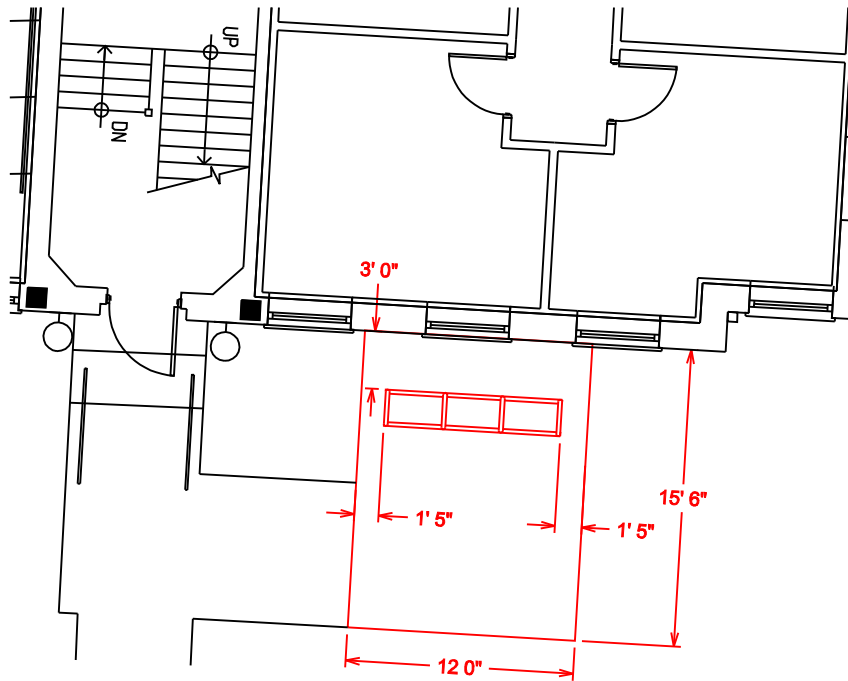


**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**



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1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
Music Building



AREA OF DETAIL

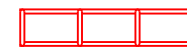
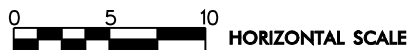
Notes

Remove shrubbery on south side of building; install new 6' X 12' concrete pad east of entrance door for 1 Stadium Rack. May consider U-racks for more permanent installation. May also consider bicycle ramp for stairwell south of building.

Bike rack proposed - Saris Stadium Rack Model 2138 or approved equal

Permanent installation in existing concrete: Saris Part Number 6260 or approved equal

Concrete quantity of 12' x 15.5' pad = 2.3 CY



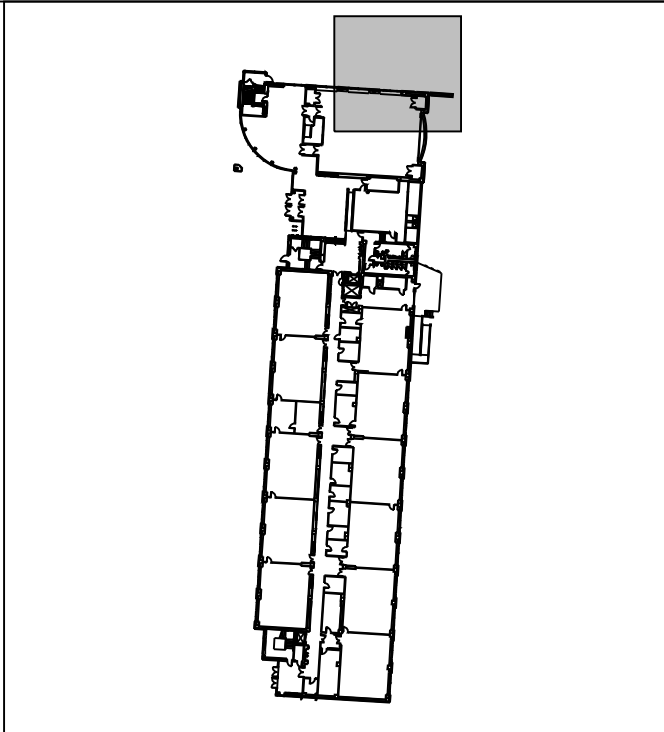
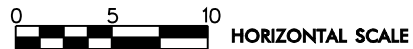
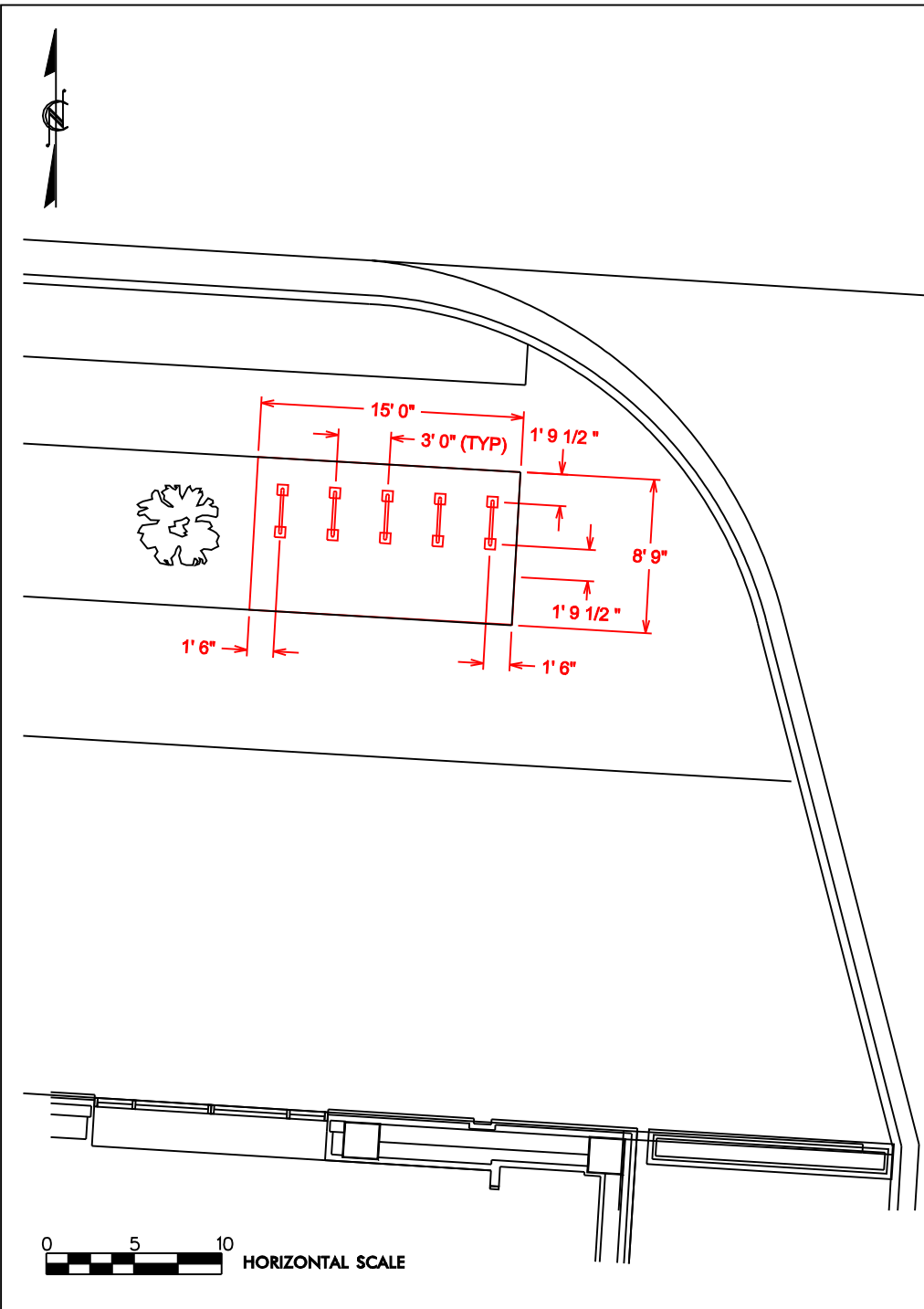
**8-BIKE
STADIUM RACK
MODEL: SARIS 2138**



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UNCG Bicycle Master Plan

Petty Building



AREA OF DETAIL

Notes

Install new 6'x15' concrete pad between trees in existing mulch area at NE corner of building. Install 5 U-racks. Close to this location (opposite middle tree) will be a similar concrete pad with marked moped parking stalls.

Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

Concrete quantity for 8' 9" x 15' pad = 1.7 CY

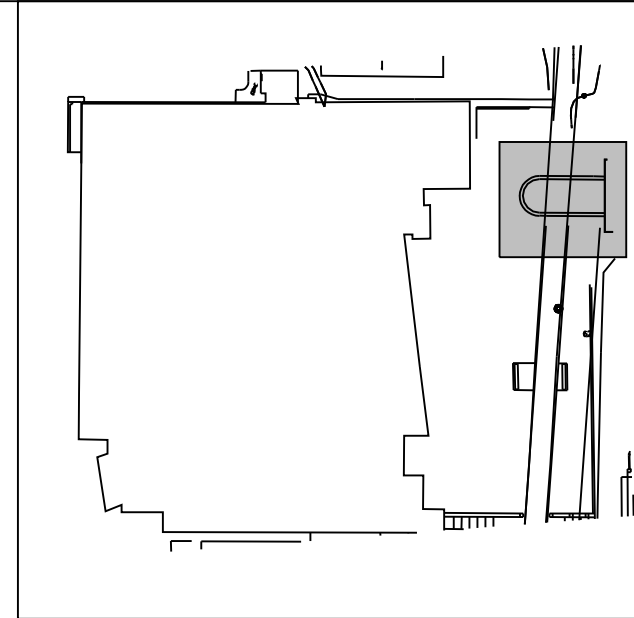
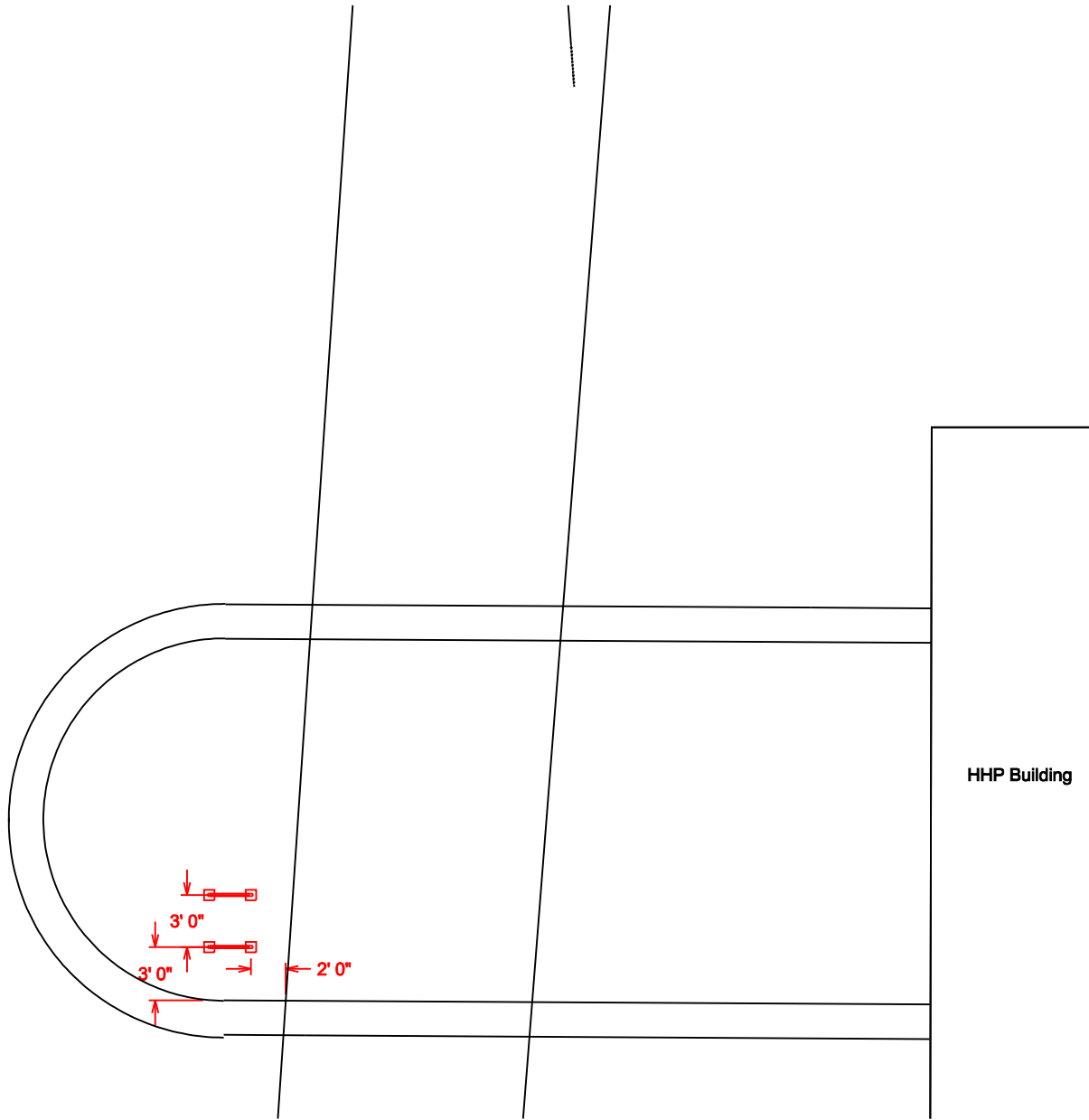


**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**



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1001 Wade Avenue, Suite 400
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UNCG Bicycle Master Plan
Science Building



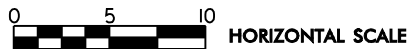
AREA OF DETAIL

Notes

Install 2 flange-mounted u-racks in existing concrete pad at NE corner of SRC, below loading dock (adjacent to brick wall)

Bike Dock proposed - Saris Model 2113 Flange Mount or approved equal

Anchor units required for installation - Saris Part Number 6260 or approved equal

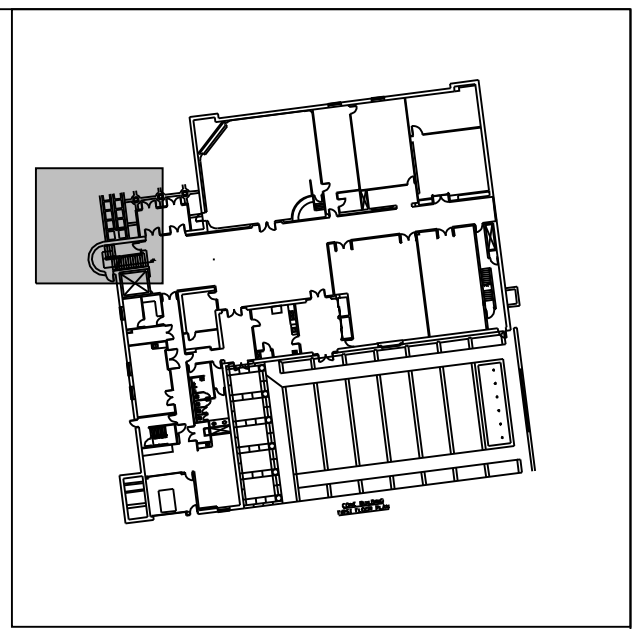
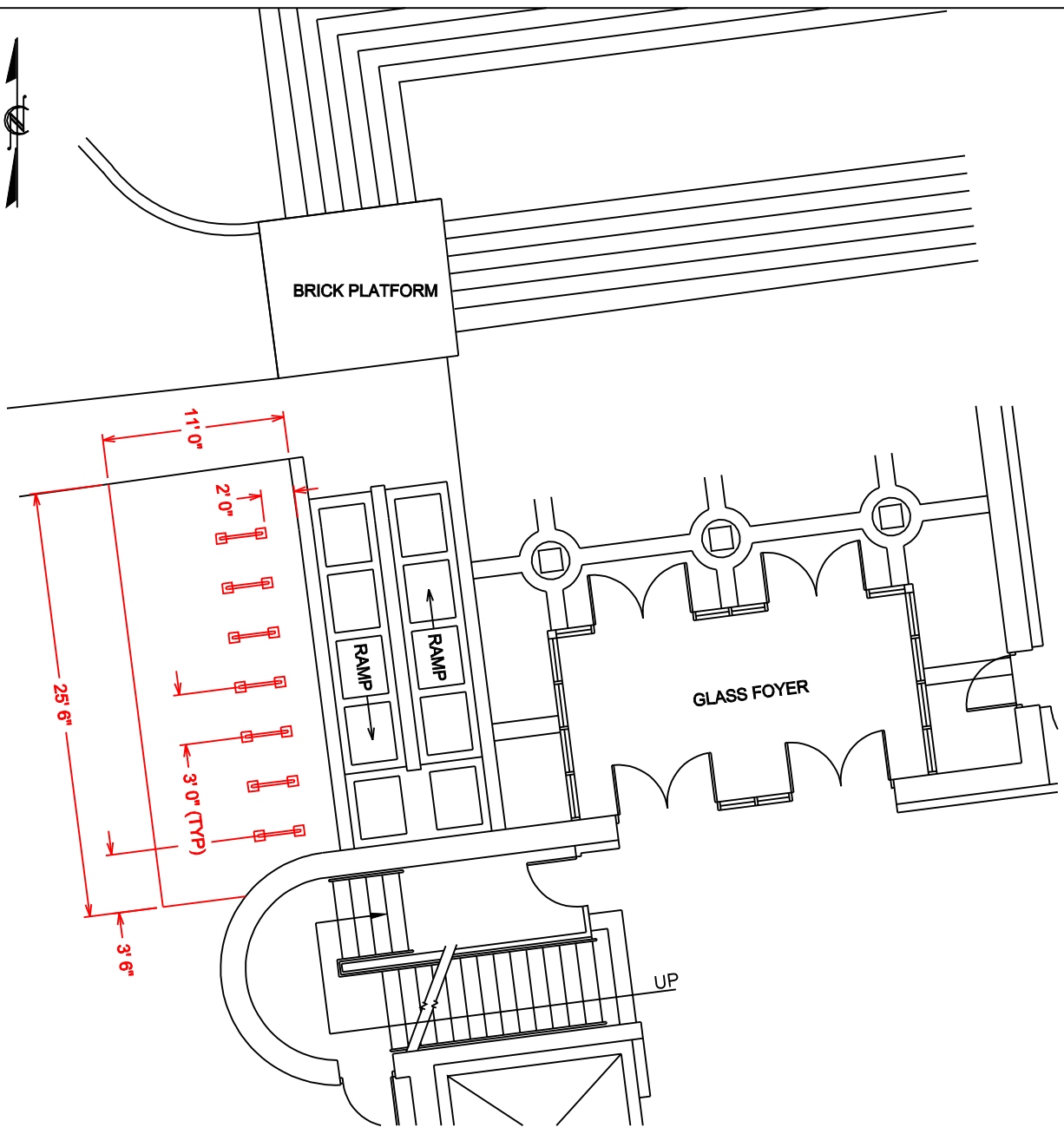


**2-BIKE FLANGE
MOUNT U-RACK
MODEL: SARIS 2113**



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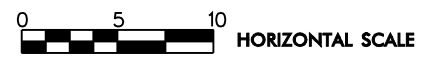
UNCG Bicycle Master Plan
Student Recreation Center





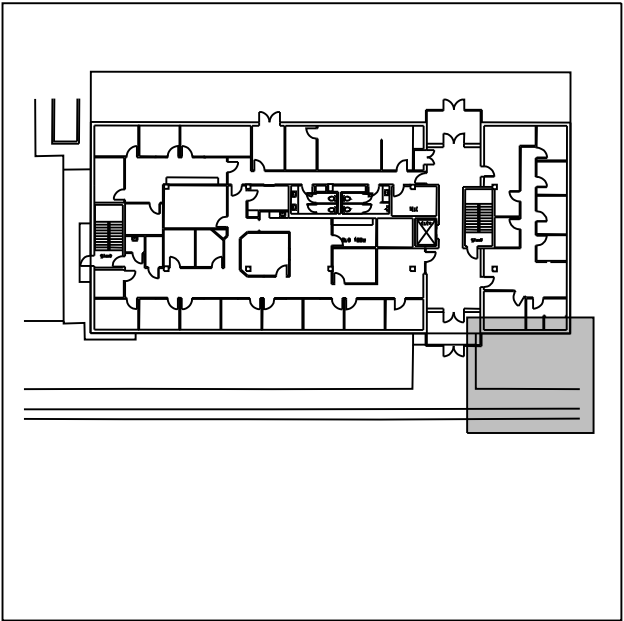
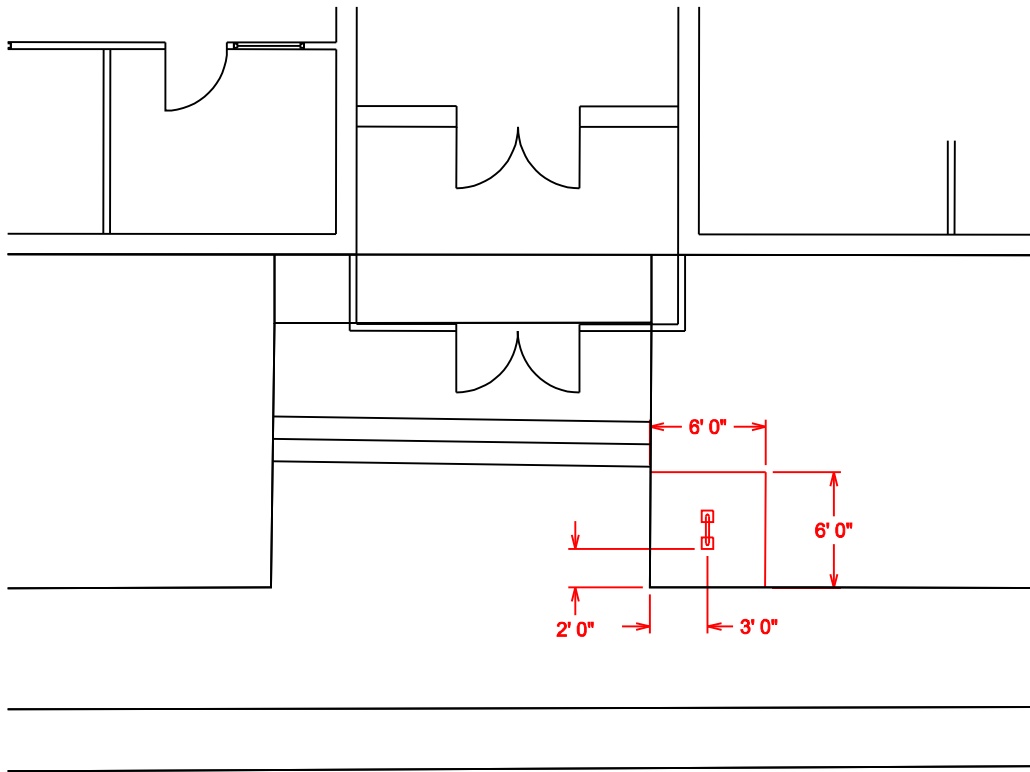
AREA OF DETAIL

Notes

- Remove grass and termite testers; install new concrete pad and 5 flange-mounted U-racks west of building entrance
- Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal
- Anchor units required for installation - Saris Part Number 6260 or approved equal
- Concrete quantity for approx. 11' x 25' 6" pad = 3.5 CY



 2-BIKE FLANGE MOUNT BIKE DOCK MODEL: SARIS 15317	 <p>THE LOUIS BERGER GROUP, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605</p>
	<p>UNCG Bicycle Master Plan Weatherspoon Art Museum</p>



AREA OF DETAIL

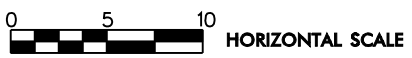
Notes

Remove grass; install new 6' x 6' concrete pad at SE corner of building, adjacent to front entrance and install 1 flange-mounted bike dock.

Bike Dock proposed - Saris Model 15317 Flange Mount bike dock or approved equal

Anchor units required for installation - Saris Part Number 6260

Concrete quantity for 6' X 6' pad = 0.5 CY



HORIZONTAL SCALE



**2-BIKE FLANGE
MOUNT BIKE DOCK
MODEL: SARIS 15317**








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Raleigh, North Carolina 27605

UNCG Bicycle Master Plan
1100 W. Market Street
University Offices




Appendix 6: Proposed UNCG Moped Parking Locations

This appendix includes a detailed spreadsheet listing proposed new and retrofitted moped parking locations at campus buildings, parking decks and surface lots.

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Bldg/Lot Name	Moped/Motorcycle	Description	Picture
Administration Drive	Moped & Motorcycle	Stripe stalls on existing asphalt (west side of drive, prior to car parking area) and post appropriate signage.	
Gray Drive (Cotten Residence Hall)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area (east side of Cotten) and post appropriate signage. Serves residence halls and central campus.	
Lot 1	Moped & Motorcycle	Install asphalt/concrete, as appropriate; add stalls and signage.	
Lot 7 (Gatewood Studio Arts Building)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area northeast of Gatewood Studio Arts. Serves Gatewood, Graham & Weatherspoon Bldgs.	
McIver Parking Deck	Moped & Motorcycle	Stripe stalls on existing asphalt and post appropriate signage.	
Moore (Nursing) Building	Moped & Motorcycle	Install appropriate signage and stripe stalls on extra pavement along curb of service drive west of the Moore Nursing Building.	

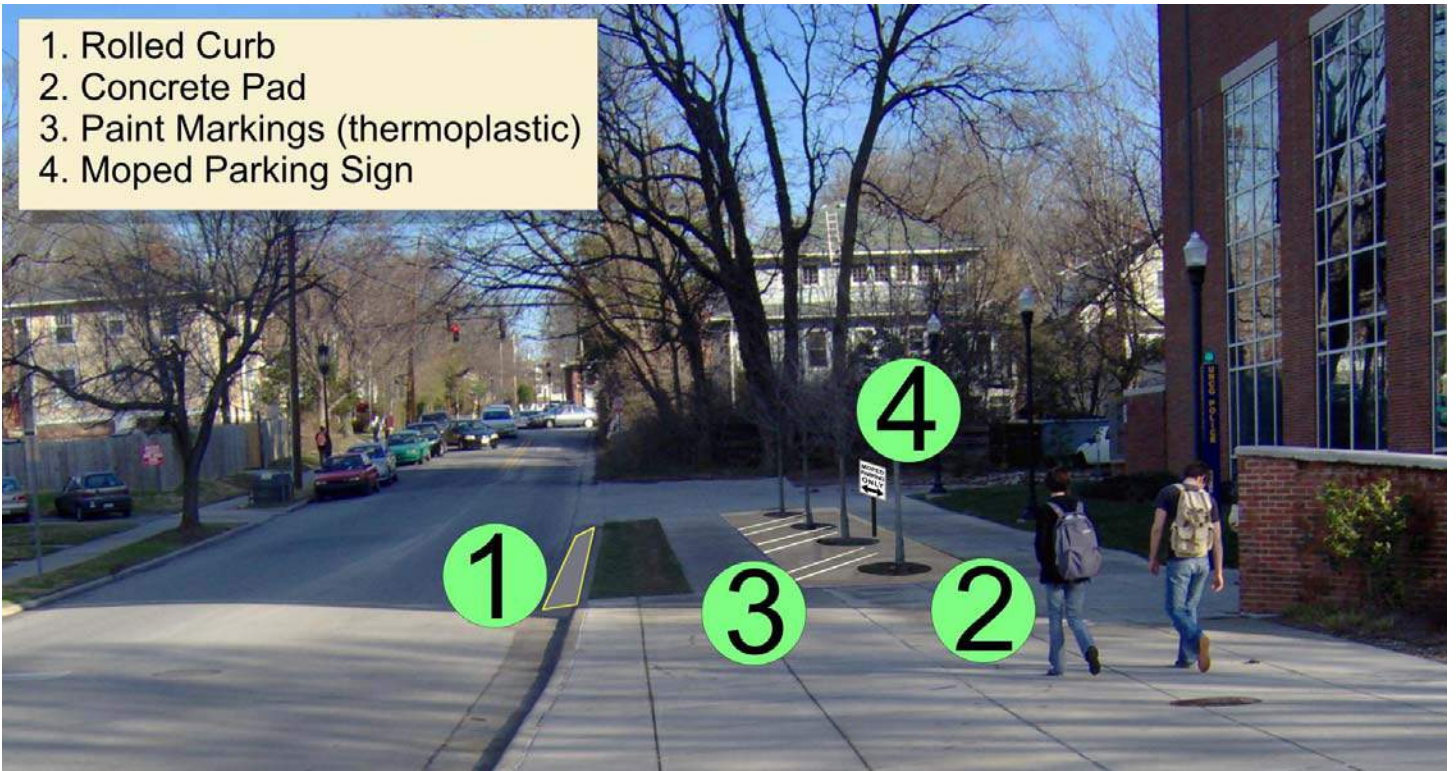
Bldg/Lot Name	Moped/Motorcycle	Description	Picture
Music Building	Moped & Motorcycle	Remove grass between trees/planters and install 3 new concrete pads with rolled curbs (1 in each area between trees). Install 3 inverted-U bike racks on one pad; paint moped parking stalls on the remaining 2 concrete pads.	
North Drive (Dining Hall)	Moped & Motorcycle	Stripe stalls in existing motorcycle parking area (north side of Dining Hall, west side North Spencer). Serves residence halls and central campus.	
Oakland Avenue Parking Deck	Moped & Motorcycle	Stripe stalls on existing asphalt and post appropriate signage.	
Petty Building (rear - service drive)	Motorcycle Only	Install sign and striping for 1 stall in available space.	
Stirling Street (at Theta Street)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area (east side of street), across from Bryan Bldg.	
Stirling Street (Bryan Building)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area (west side of street), in front of Bryan Building.	

Bldg/Lot Name	Moped/Motorcycle	Description	Picture
Sullivan Science Building (Carr St)	Allow moped and motorcycle parking	Install new moped/motorcycle parking area on the north side of Sullivan Science Building. Install rolled curb and stripe stalls for moped parking only; add appropriate signage.	
Walker Avenue Parking Deck	Allow moped and motorcycle parking	Stripe stalls and install appropriate signage on Level 3, across from EUC.	
West Drive (Hinshaw Residence Hall)	Allow moped and motorcycle parking	Stripe stalls in existing motorcycle parking area on West Drive (west side of Hinshaw). Serves HHP, SRC and residence halls.	

Appendix 7: Sample Moped Parking Detail

This appendix includes a digitally-altered visualization of a proposed new moped parking location along Carr Street at Science Hall. In order to provide convenient moped parking facilities, separate from bicycle parking and pedestrian walkways, it is recommended that the University utilize existing peripheral campus spaces for moped parking. This image illustrates the potential for installing a rolled curb and angled moped parking on a wide sidewalk, adjacent to the roadway, to provide moped parking while leaving ample space for pedestrians.

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Appendix 8: “ABC Quick Check” Bicycle Inspection

The “ABC Quick Check” can be used in education and encouragement programs to help cyclists understand the importance of a well-tuned and well-maintained bicycle.

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ABC Quick Check Bicycle Inspection

A is for Air (in bike tires)

- check everything to do with tires
- ensure that the tires are fully inflated
- ensure that wheels are straight
- ensure that tire tread is in place



B is for Brakes

- when squeezed, the brake levers should stop at least 2 inches from the handlebars
- check to make sure that the brake pads are in the proper position (not rubbing the rim), and that there is at least ¼ inch of rubber pad remaining

C is for Chain or Cranks

- check that the chain is on the gears and well-lubricated
- lift bike and click through gears to ensure the chain does not jump
- ensure that the pedals spin freely

Quick is for Quick Release

- check that the quick release levers (on tires and seat) are tightened
- ensure that any quick release levers are flush against the bike and not protruding

Check is for Final Check Over

- drop the bike and listen for loose parts (lift the bike a few inches off the ground, drop it and listen for loose parts)
- check the headset for looseness (apply the front brake, rock the bike back and forth)
- check the handlebars for looseness (hold the front wheel between your knees and try to twist the handlebars from side to side, up and down)



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