

Carolina

The UNIVERSITY of NORTH CAROLINA at CHAPEL HILL



2007 CAROLINA NORTH PLAN

Plan Approved September 26, 2007

Submitted on June 13, 2008

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TABLE OF CONTENTS

Executive Summary	3
Vision and Need	6
Planning Process	8
Project Background and Existing Conditions	10
Developing the 2007 Plan	17
The 2007 Plan	21
Conclusion	33



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Executive Summary

Carolina North will serve the mission of the University of North Carolina at Chapel Hill by creating a world-class research and learning campus in the heart of Chapel Hill. This new campus will be a vibrant, sustainable development that will attract and create exciting new opportunities for research and innovation in North Carolina. The implementation of this campus is a timely response to the surge in main campus development in the last decade. The need for this campus also reflects a trend toward public-private partnerships and economic development related to research efforts and innovations generated by the University. The Carolina North campus will provide a place for the University to grow and develop new models for research and education.

At their May 2006 meeting, the Board of Trustees passed a resolution directing the University's administration to submit zoning and land development applications for Carolina North to the applicable local government. University staff worked with the community and various technical consultants during the subsequent year and a half to prepare a draft plan for review by the Board of Trustees in July 2007. The draft plan was further refined and was approved by the Board of Trustees in September 2007. This plan identifies a two-hundred and fifty acre footprint for University growth and development over the next fifty years. The plan has been guided by numerous public conversations as well as three consistent themes. Carolina North will:

- support the mission of the University,
- be a compact, mixed-use academic community, and
- be a sustainable, high-performance campus.

During development of the plan, the Leadership Advisory Committee was a significant public input to the planning process. Chancellor James Moeser formed the Leadership Advisory Committee for Carolina North and charged the members to develop guiding principles for the plan. The Committee met from March 2006 through January 2007 and issued a final report on January 19, 2007. Key topics from the Leadership Advisory Committee Report are: general and development management, fiscal equity, environmental stewardship, open space, natural areas, parks and recreation, housing, schools, commercial and other uses, and transportation. The principles in the Leadership Advisory Committee Report were used during the plan development to maintain consistency between that committee's findings and the final plan.

In early 2007, an ecological assessment of the property was completed and shared with the community. That assessment and a series of subsequent infrastructure workshops formed the basis for the planning efforts that led to the first set of concept plans for a public dialogue held in March 2007. Monthly public sessions between March and September dealt with broad issues and the input from those sessions helped develop and refine the concepts. As a result, a single draft concept emerged in June and a final plan was developed in September 2007. Designs reflect and integrate that analysis, workshops, and public meeting input.

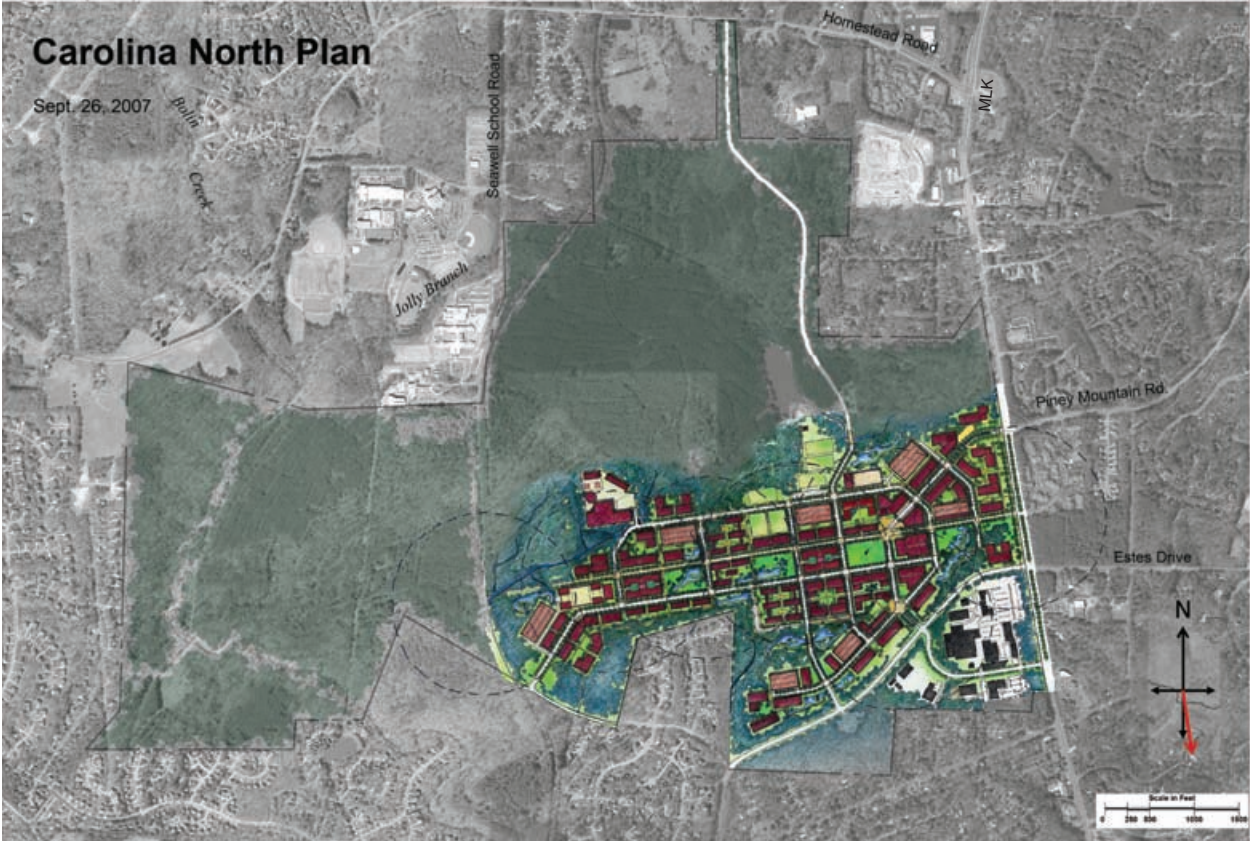
During these community sessions, different strategies were considered for land use, open space and ecology, circulation, transportation, parking, energy, and utilities infrastructure. The Chancellor's vision for Carolina North as a model of a sustainable community has been a foundation for these planning efforts. As the planning concepts were tested internally and with the community, several enduring themes emerged as defining characteristics of the plan:

- respect the ecology of the site,
- create a sense of identity and place,
- support transit-oriented development,
- provide appropriate local connections for bike, pedestrian, transit, and roadways,
- design for efficient land use with appropriate density,
- provide flexibility to allow for innovation and changes in technology,
- maximize stormwater management,
- maximize energy conservation and carbon reduction, and
- consider building typology.

The projected program for the first fifteen years of development is based on the best knowledge available today. The academic and research components in this program reflect estimates that helped guide planning for a first phase of development. The program will continue to evolve but it served as an important test to ensure that the building areas at Carolina North could accommodate the type and size of programs in appropriate locations on the plan.

This comprehensive process of community input and committee recommendations helped guide the final plan for Carolina North by focusing on the broad issues that informed the final plan design.





Vision and Need

In 2006, Chancellor Moeser expressed a vision that Carolina North be developed as “a place of amazing discovery and innovation, and a new model of sustainable community.” He additionally asked that participants in the planning process visualize Carolina North as a proud and integral part of the community.

Carolina North will be first and foremost a campus conceived to meet the academic mission and ideals of the University of North Carolina at Chapel Hill. As a flagship public research university charged with helping to lead a transformation in the state’s economy, the University must compete with national peers for the talent and resources that drive innovation. Today, that competition demands a new kind of setting — one that enables public-private partnerships, public engagement, and flexible new spaces for research and education.

Rapid changes in education, research, and engagement mean that the University must pursue new opportunities in new ways. Carolina North will provide an ideal setting for collaborative research that advances new knowledge and attracts the talented researchers and students who enrich the intellectual life of the University and the community.



The University's recently adopted curriculum places strong emphasis on interdisciplinary studies, undergraduate research, and entrepreneurship. To accommodate expected increases in enrollment and research activity, the University will develop clusters of closely related activities at Carolina North, making room on main campus for additional students, faculty members, and staff. Carolina North will offer a meaningful research experience to students and will provide a setting where entrepreneurial endeavors can carry innovations into the marketplace.

The University has embraced the imperative that its teaching and research programs are connected to the economic well-being of the region and of the state. Carolina North will support the creation of new research-based businesses by providing facilities, shared resources, support services, a collaborative environment, and opportunities to partner with existing businesses.

The interaction between the University and the private sector is a growing source of research funding, collaboration, and partnerships. With the development of Carolina North, the University will be able to attract new funding sources, stimulate economic growth, and create jobs for North Carolina by providing a setting to encourage the public-private partnerships that spur innovation and economic growth. The University developed an initial program for a first phase of growth at Carolina North. (See page 30) This program was based on current knowledge but recognized the inevitable need for flexibility in long-term institutional program and capital planning. The University program will evolve along with the mission-based needs of the institution.

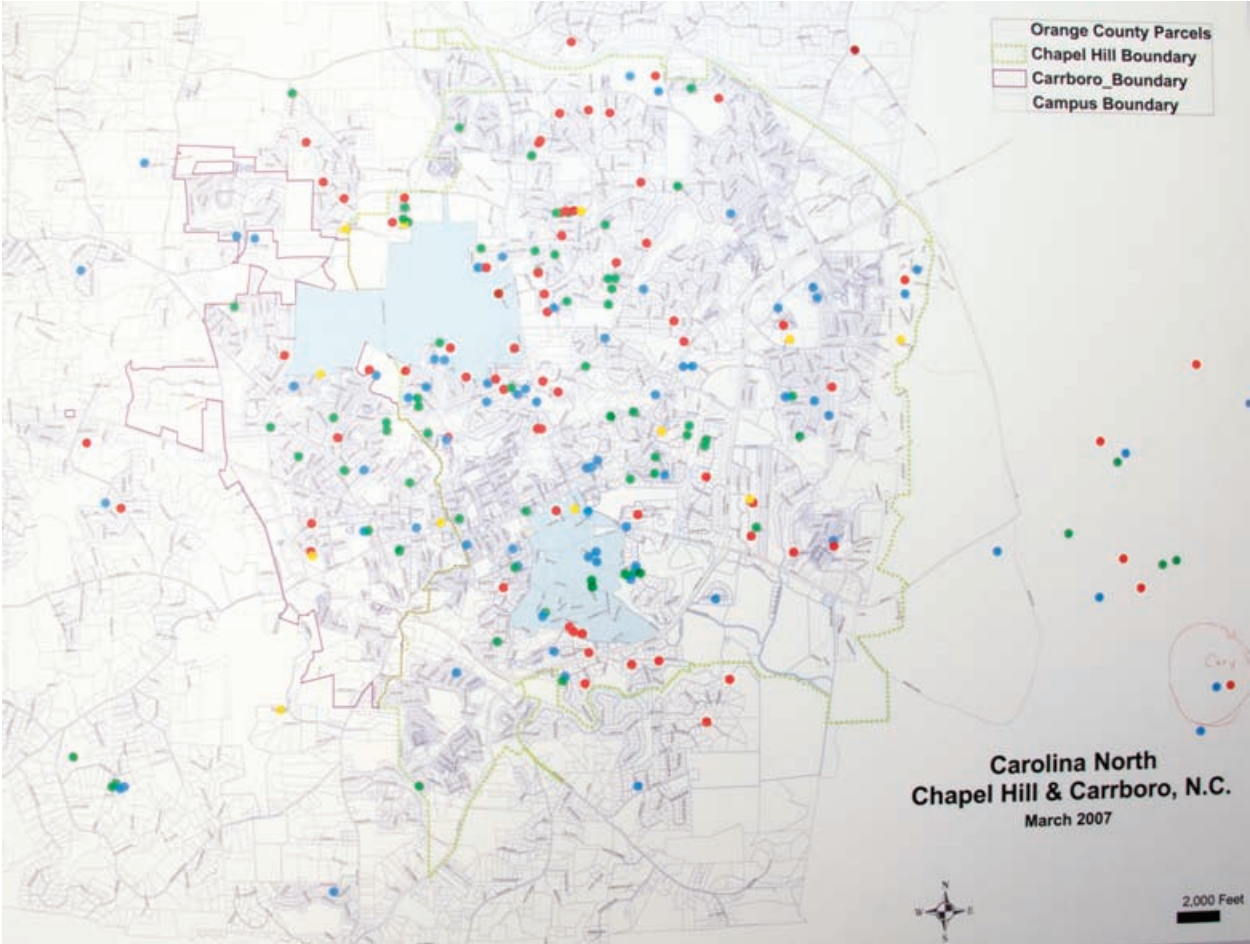


Planning Process

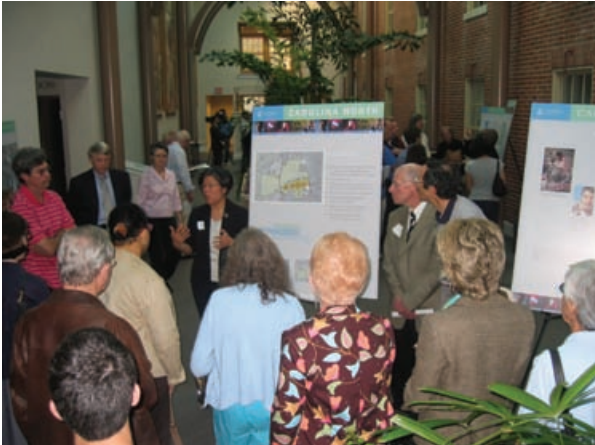
A number of past planning efforts have informed this plan. The 1998 Outlying Parcels Land Use Plans established key elements of the planning and transportation systems for the development of the Carolina North property. Subsequently, the 2000 Horace Williams Master Plan provided a strategic vision for the near term (10–20 years) and long term (100 years) and helped establish more specific design concepts for a mixed-use research campus. The Horace Williams Citizen Committee, a town appointed committee, responded to the Plan’s general principles, also with a focus on sustainability at Carolina North.

In response to the commitment to develop Carolina North as a model of sustainable community, a planning process was organized in 2006, to address concepts related to ecological principles, infrastructure, high-performance buildings, and integrated sustainable design. In March 2006, the University created a Leadership Advisory Committee (LAC) to provide input and broad discussion regarding the planning of Carolina North. The LAC, consisting of representatives of the University, three local governments and the local community, discussed critical aspects of the project. In January 2007, the committee generated a final report documenting areas of agreement and disagreement on major issues for Carolina North. This report informed the subsequent planning process and community meetings.

Between November 2006 and January 2007, input was gathered from a variety of stakeholders and experts to help shape effective plans for Carolina North. These workshops, concentrating on infrastructure and ecological assessment, helped gather and assess technical information fundamental to the project planning, and allowed the University to develop information needed for a meaningful exchange in subsequent public forums. The monthly public forums that started in March 2007 and followed the technical workshops were open to the entire community and offered opportunities to further refine ideas. Each session was well attended, with participants from the Town, the community, the University, and a variety of interest groups. Over the course of these workshops and public sessions, multiple development strategies, a conceptual site diagram, and a preferred 50-year plan were developed.



Map from public forum showing locations of attendees' residences



Public forum



Public forum

Project Background and Existing Conditions

History and Use

The Carolina North site consists of approximately 1,000 acres of land on the west side of Martin Luther King Jr. Boulevard, about two miles north of the main campus. The site is in Orange County and straddles the boundary between the Towns of Chapel Hill and Carrboro. Two streams, Bolin Creek and Crow Branch Creek, cross the western and northern portions of the site respectively.

In 1940, the property was devised, in part, to the University of North Carolina at Chapel Hill by Henry Horace Williams, Professor of Philosophy at the University from 1890 to 1940 and Chairman of the department from 1890 to 1935. Other parcels comprising the remainder of Carolina North were acquired at later times. Subsequent to University acquisition, the property served a variety of support functions for the Town of Chapel Hill and the University. These activities were concentrated on the southeast corner of the site near the Martin Luther King Jr. Boulevard frontage at Municipal Drive.

The primary use of part of the Carolina North property today is Horace Williams Airport. The airport dates from the 1920's. The University plans to relocate its MedAir operations to the Raleigh-Durham International Airport. The University also uses a portion of the site for storage parking and grounds maintenance and support activities such as lay-down areas, construction storage, mulching, and materials supply.

A portion of the site was used by the Town of Chapel Hill as a municipal landfill. Although that operation ceased in 1973, the approximately 40-acre landfill is still a significant site feature today. From 1973 to 1979, a one-quarter acre portion of the site was used to dispose of hazardous waste from the University's research activities. That source material is being removed in 2008, and on-going groundwater remediation will continue near Crow Branch Creek.

The remainder of the property retains its natural landscape, forest, streams, and wildlife making it one of the few expansive green spaces in Chapel Hill, North Carolina. The Carolina North Forest, as it is now called, is actively managed by the University.



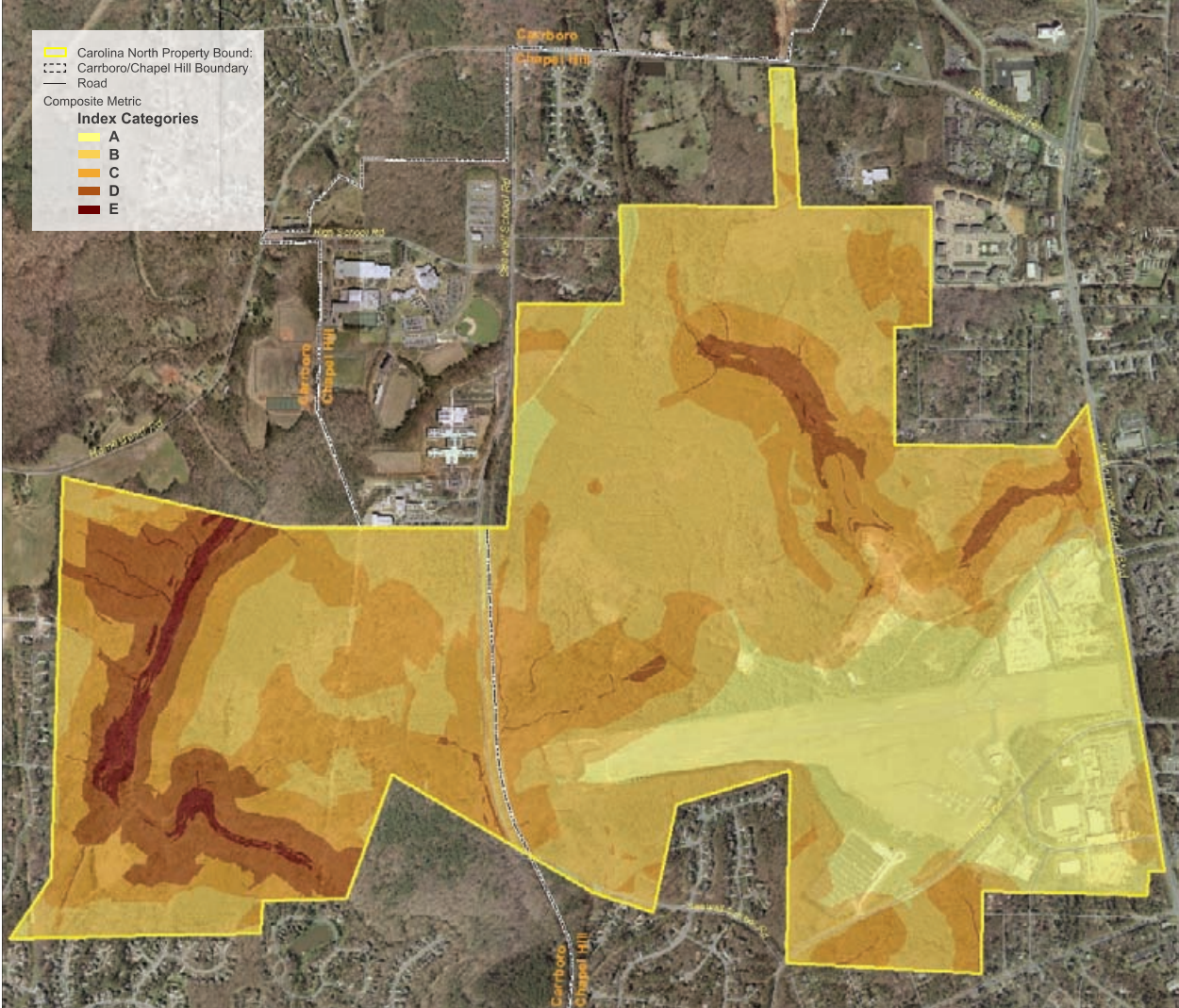
Aerial photo of existing site

Ecological Assessment

In July 2006, an ecological assessment of the Carolina North property was conducted by a third-party independent consulting firm to determine the suitability of the site to support development without compromising ecological stability and integrity. This assessment was based on the ecological, cultural, historic, and recreational characteristics of the site.

Inventory and analysis included water resources, geologic formations, soils groups, approximate tree stand age, land use/land cover, morphology, landscape ecology, regional landscape ecology, state and local government natural areas designation, and cultural and historic resources. Data was collected on-site, through literature searches, and in interviews and meetings. These components were evaluated by consultants and an academic peer-review group. The multiple layers of analysis were then compiled. The resulting assessment identifies the portions of the site that are relatively more suitable for conservation or development.

This ecological assessment was a critical foundation for the planning process. The assessment provided a physical basis against which the discussions on development patterns, transportation, open space, connections, site management, and utilities infrastructure could be evaluated.



Ecological Analysis, Composite Metric Suitability Analysis

Transportation Access

The site fronts only one road with four or more traffic lanes – Martin Luther King Jr. Boulevard – on its eastern side. Martin Luther King Jr. Boulevard is a five-lane arterial road connecting Carolina North to main campus and downtown Chapel Hill to the south. Martin Luther King Jr. Boulevard also provides a direct connection north to I-40, the primary highway serving the entire Research Triangle region as well as rapidly growing areas to the east and west. I-40 is a critical connection for most of the University community who live outside of the Chapel Hill/Carrboro area. There are no plans to widen or add capacity to Martin Luther King Jr. Boulevard at this time.

The southern edge of Carolina North is flanked by Estes Drive Extension, an important east-west connector for the community. While currently a two-lane road, the Town of Chapel Hill plans to upgrade it to a three-lane road with bike lanes. The Town of Carrboro has installed bicycle upgrades on the portion of Estes Drive Extension under its jurisdiction.

Seawell School Road divides the western part of the site between the Towns of Chapel Hill and Carrboro. Seawell School Road is a two-lane north–south road connecting Homestead Road and Estes Drive Extension. There are no plans for any significant improvements to this road.

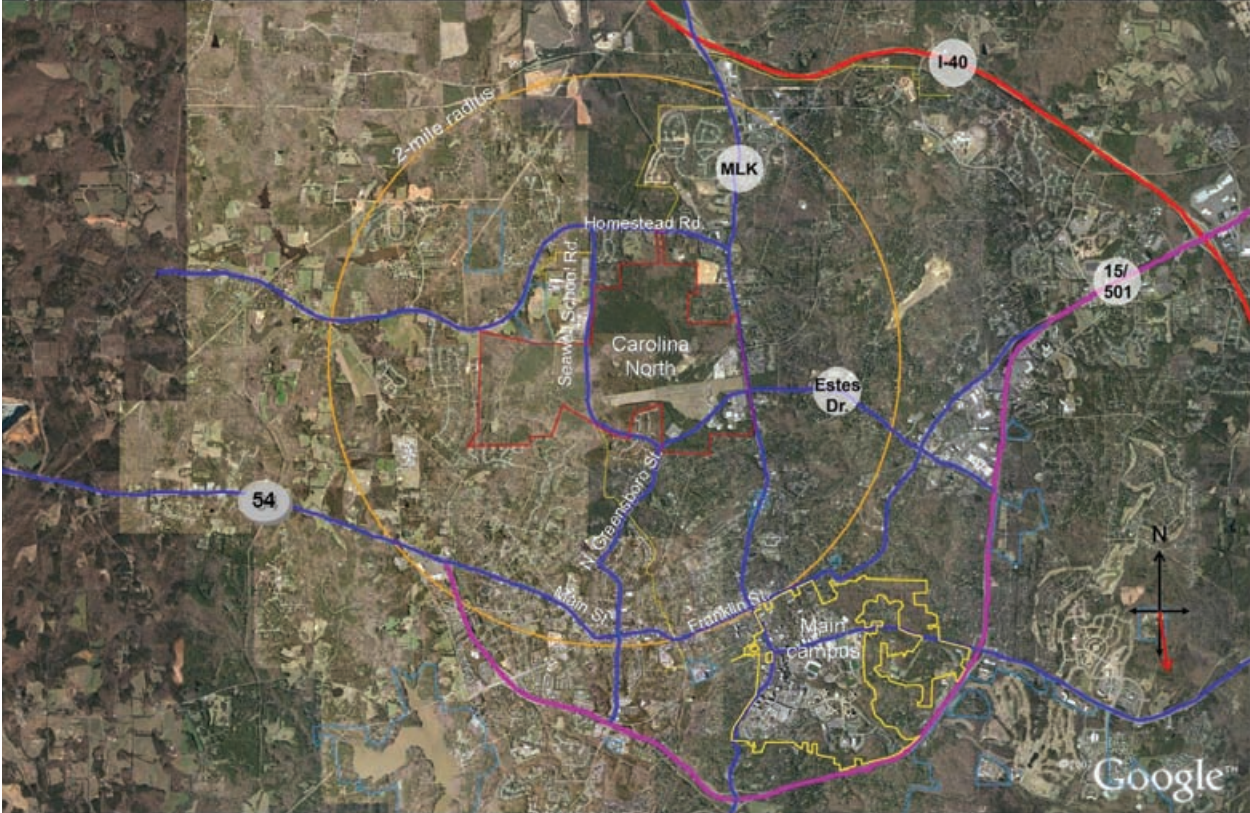
At the north, a narrow panhandle of property connects Carolina North to Homestead Road, now a two-lane road with plans for upgrades similar to Estes Drive Extension.

While transportation access to the site is a major challenge, there are opportunities to balance limited roadway system capacity with multiple types of transit. Within the 250 acres, the relatively flat topography offers excellent potential for all modes of circulation.

Transit Services

The towns of Chapel Hill and Carrboro are served by an excellent, fare-free local bus system. The University is a primary funder of this system which serves both towns including the main campus and the Carolina North site.

Regional transit service is limited. This is a major challenge since about 65% of existing University employees live outside of the Chapel Hill/Carrboro area, and the vast majority has no choice but to rely on automobiles to get to campus, including those who use park-and-ride. Currently there are only three regional bus routes, mostly operated by the Triangle Transit Authority (TTA), that serve Chapel Hill from the east, Durham, and Hillsborough.



Regional Transportation Network

Transit Planning Initiatives

The Research Triangle region's long-range transportation plans include improved transit services, focused on fixed guideway or rapid transit in several corridors. The official Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO) long-range transportation plan includes fixed guideway transit serving main campus and downtown Chapel Hill from Durham (the US 15-501 corridor) and from the east along I-40/NC 54.

Two separate studies that have run concurrent to this planning process are revisiting transit options for the Chapel Hill/Carrboro area and the region as a whole:

- The towns of Chapel Hill and Carrboro and the University undertook a study to identify transit improvements within the Chapel Hill transit service area that will result in a Long Range Transit Plan. The transit needs of Carolina North are being addressed by the study that examines travel within the towns as well as its connections to the region. A number of corridors are being assessed to identify the appropriate level of transit investment and determine priorities for investment. Corridors that are emerging as candidates for busways or other forms of transit are Martin Luther King Jr. Boulevard from I-40 to main campus and US 15-501 from Durham.
- Various entities in the Research Triangle region are participating in developing a regional transit vision plan. This effort is examining regional transit needs and priorities including services to the Chapel Hill/Carrboro area. While the local study described above is a separate initiative specific to the Chapel Hill/Carrboro area, many of the same corridors are being analyzed in both studies.

Greenways and Trails

The towns of Chapel Hill and Carrboro both encourage non-motorized forms of transportation, and have included a number of greenways and trails improvements in their transportation plans. The development of Carolina North affords the opportunity to link and supplement these resources.

Utilities Infrastructure

Existing utilities infrastructure on the site is limited and was developed ad hoc to serve a wide variety of historic uses. Several utility easements cross the site, including a high pressure natural gas main owned by PSNC Energy. Orange Water and Sewer Authority (OWASA) owns and operates water and sanitary sewer systems in the vicinity of the Carolina North site. Some smaller power and data lines serve various portions of the site.

Developing the 2007 Plan

Based on the site analysis, scenarios were formulated to demonstrate the variety of site development patterns. All of the strategies incorporated sustainable, high performance practices, a variety of open space types, hierarchy of streets and service zones, a variety of building heights, parking, and integrated transportation systems. Each of these strategies was in full support of the University's mission and vision that Carolina North be a vibrant, sustainable, compact, mixed-use academic community. Each scenario also included a variety of parking options and provisions to connect to greenways and bike trails that are proposed in the neighboring communities.

Definition of Terms

Working Landscapes

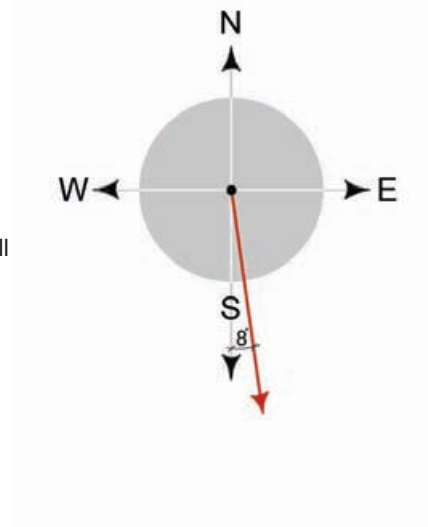
Many of the larger natural areas internal to the site and along its edges are characterized as working landscapes. They provide multiple functions beyond the aesthetic and social benefits of open space and landscaping. These functions may include stormwater management and wastewater treatment, low impact recreational opportunities, shallow groundwater recharge, native plant nurseries, native habitat for targeted species, and ecological research and learning opportunities.

Solar South

Solar south is different from magnetic south, which can be determined with a compass. It is instead dictated by the geographic location and latitude of a site. The solar south angle takes into consideration the sun's path from sunrise to sunset and is the alignment that allows the full potential of the sun's energy and position to be used. At Carolina North, solar south is 8 degrees east of magnetic south.

High Performance Buildings

A high-performance building is defined by the US Department of Energy as a building with energy, economic, and environmental performance that is substantially better than standard practice. Because it is energy efficient, it saves money and natural resources. It is a healthy place for its occupants to live and work and has a relatively low impact on the environment.



North-South Scenarios

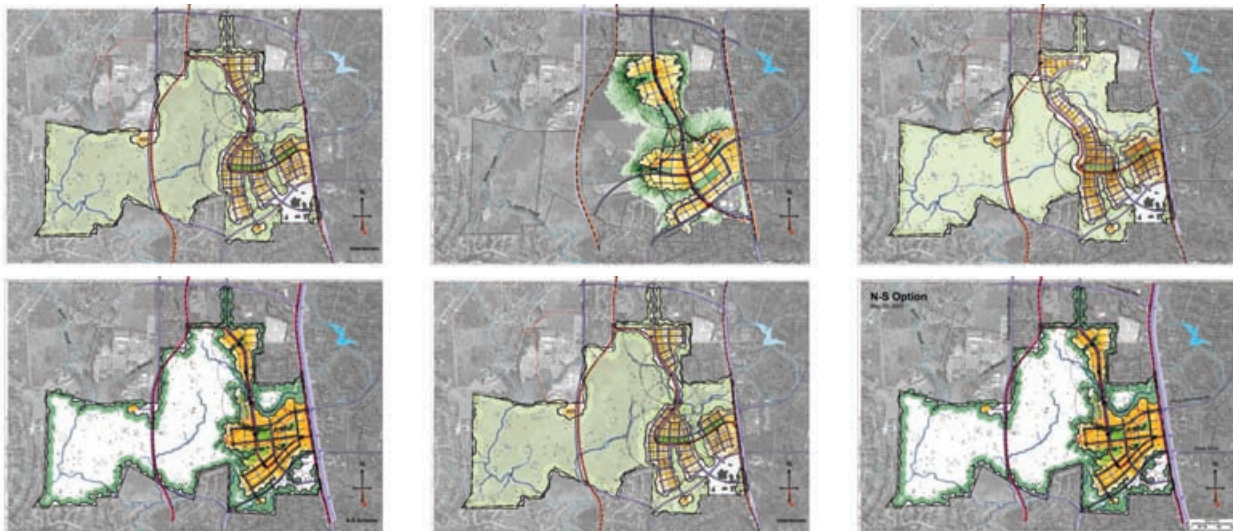
The scenarios that concentrated the development along a north-south spine aimed to keep the development footprint close to the existing Martin Luther King Jr. Boulevard corridor while preserving larger, contiguous forest areas. These designs incorporated a new road stemming south through the site from Homestead Road and a connection through to Estes Drive Extension. They contained an overall grid-pattern of development that still allowed the natural landscape to weave into the developed core. All of these designs showed the majority of development within the previously disturbed land along Martin Luther King Jr. Boulevard near Estes Drive Extension and a pocket of development to the north with a connection to Homestead Road. Pros and cons of the North-South strategy are as follows:

Pros:

- Development concentrated within the Crow Branch Creek watershed
- Integrated restoration strategy for Crow Branch Creek
- Compact development, integrated with large natural areas
- Integrated on-street transit corridor
- Block organization allows a modular implementation strategy
- Development areas are divided by habitat areas - each with a mix of land uses
- More development is situated closer to I-40
- Opportunities to divert the rail corridor through the site and serve large portions of the development if used for fixed guideway transit

Cons:

- Does not optimize already disturbed footprint
- Some development outside of walking distance to transit (more than 1,000 feet)
- Development adjacent to communities to the north
- No roadway connection to the west
- Long-term connections to the rail corridor would be inefficient
- Development spreads further north from connections to Chapel Hill and Carrboro greenways and trails
- Development is more spread out, increasing distances for pedestrian and bike travel



North-South Scenario Options

East-West Scenarios

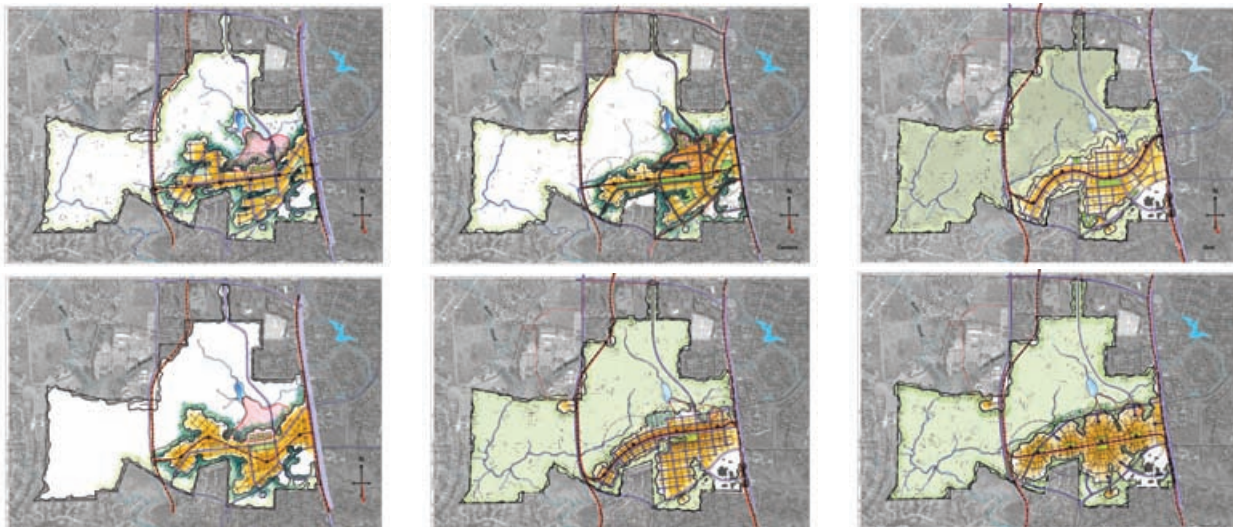
These scenarios focus the development in an east-west pattern, generally aligning with the existing airport runway. This orientation keeps the majority of the development within the previously disturbed land and integrates solar south orientation (see definition, page 17) with the physical plan. The regular pattern of central open spaces acts as an organizing element and brings more working and natural landscape into the core. The integrated transit system stops at regular intervals and the east-west organization allows for nearly all of the development to be located within walking distance of transit. Pros and cons of this strategy are as follows:

Pros:

- Majority of development is located on already disturbed land
- Retains a large amount of existing forest patch
- Compact development integrated with large natural areas
- Integrates a transit corridor as a central spine
- Evenly distributed access points for transit
- Majority of development within walking distance of transit (1,000 feet)
- Solar south orientation optimized
- Greater balance between pedestrian zones and access/serviceability
- Multiple east-west corridors allow for transit line in separate corridor
- Allows for direct roadway connection to west
- Compact development allows easier pedestrian and bike travel

Cons:

- Some development is located within both the Crow Branch and Bolin Creek watersheds
- Grid layout perceived as visually less interesting than curvilinear patterns in North-South schemes
- Proposed north-south road still ultimately needed even without development to the north



East-West Scenario Options

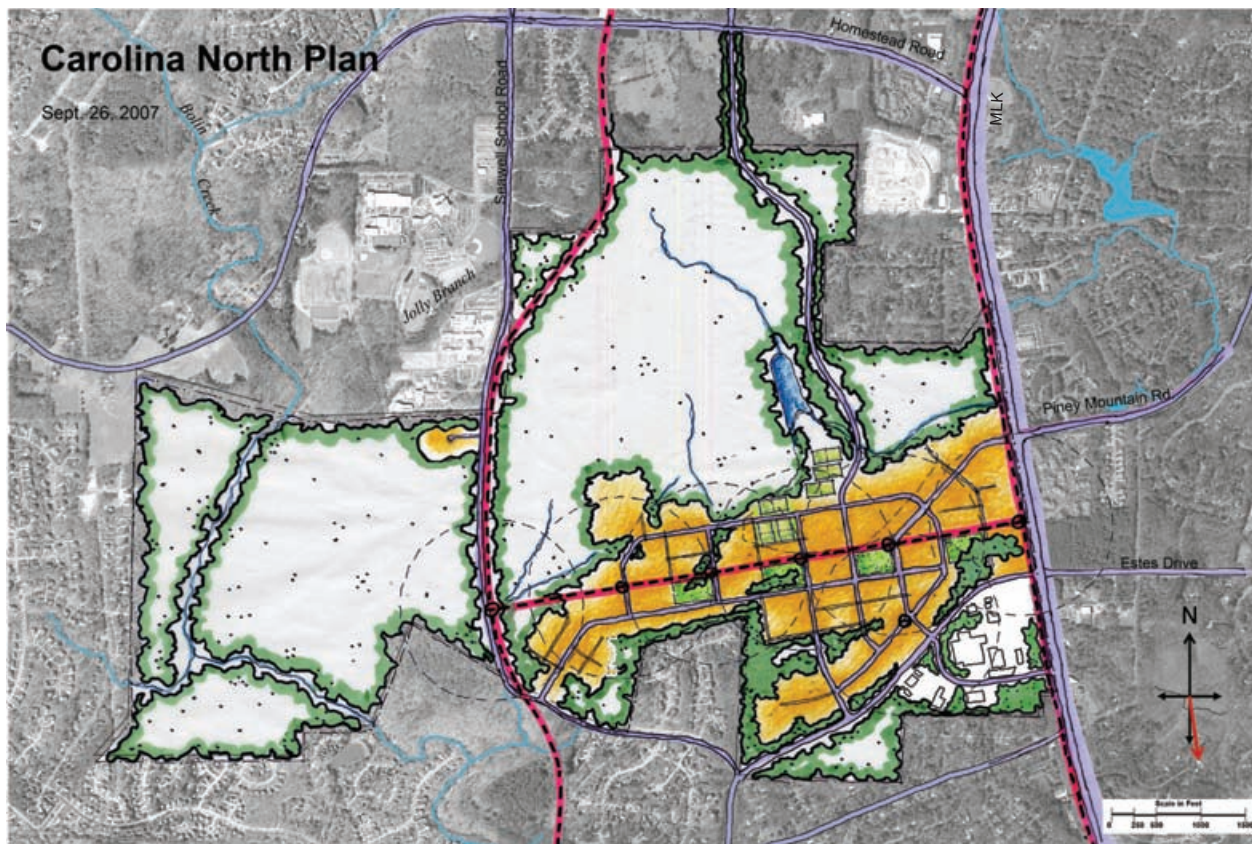


The 2007 Plan

The initial scenarios were discussed and evaluated in the community sessions and refined until a single concept diagram emerged in June 2007 that incorporated the most promising development features. This concept continued to be evaluated and refined until a final plan emerged in September 2007.

Concept Diagram

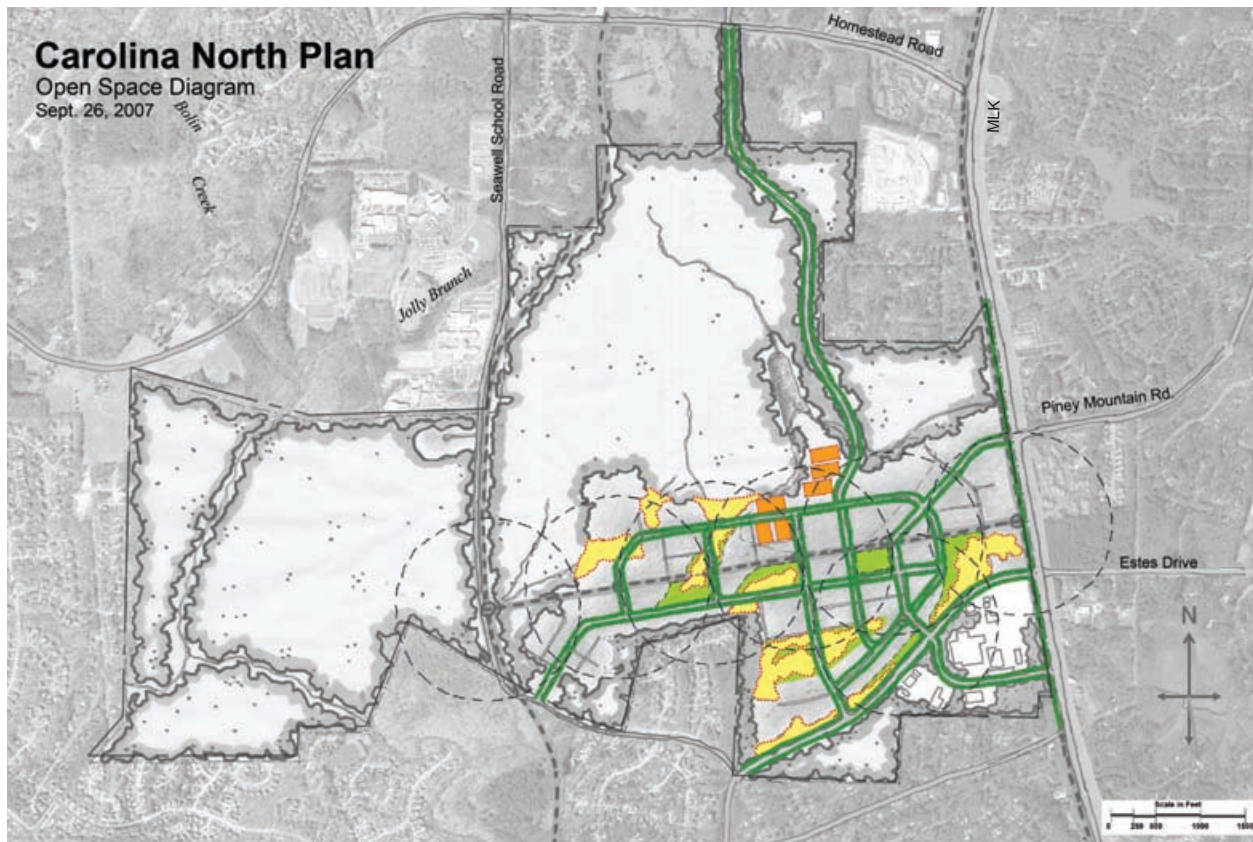
The Concept Diagram illustrates the location and disposition of development on the site at the land planning scale without the specificity of individual building footprints. The majority of the development is located on land that has been previously disturbed by the existing airport, historic runways, former Chapel Hill municipal yard, and landfill, thereby preserving a large section of contiguous forest and habitat. This distribution of development focused future development in areas that were identified in the ecological assessment as less suitable for conservation. The plan is oriented east-west and integrates blocks that face solar south to optimize future solar gain in buildings. This pattern will allow the incorporation of new technologies as the buildings are designed.



The yellow shaded areas in the concept diagram signify the relative density of development - the deeper the shade, the more dense the development. The diagram shows that the most dense development areas are located at the center of the development along the transit corridors.

Open Space

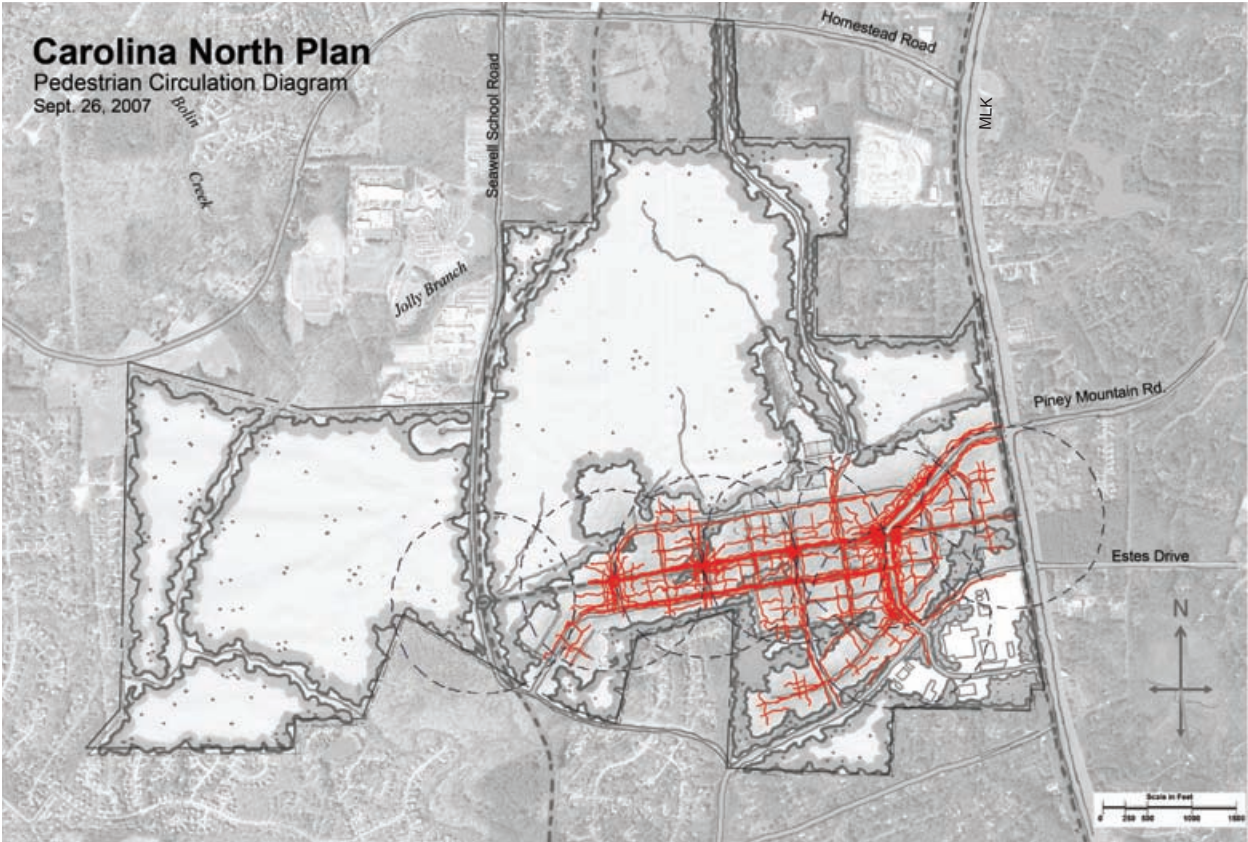
The network of open space is a key feature of the plan. Regular intervals of open space through the center of the development act as organizing elements along the transit corridor and encourage interaction with the landscape. The open space not only provides areas for working landscape to absorb stormwater run-off, but also connects the development back to the beauty of the site. The areas of working landscape (see definition, page 17) may include constructed wetlands, geothermal well fields, preserved habitat, and best stormwater management practices, allowing development to flow seamlessly into the natural landscape. Providing regular access to open areas in the most dense areas of development provides an appropriate land-use balance between opportunities for density and livability for the anticipated residents and occupants.



Pedestrian Circulation

The plan is designed to be pedestrian friendly. One thousand feet is approximately equal to a ten-minute walk and is considered a generally acceptable walking distance in a transit-oriented development. The plan includes transit stops at 1,000 foot intervals and wide sidewalks with full canopy street trees.

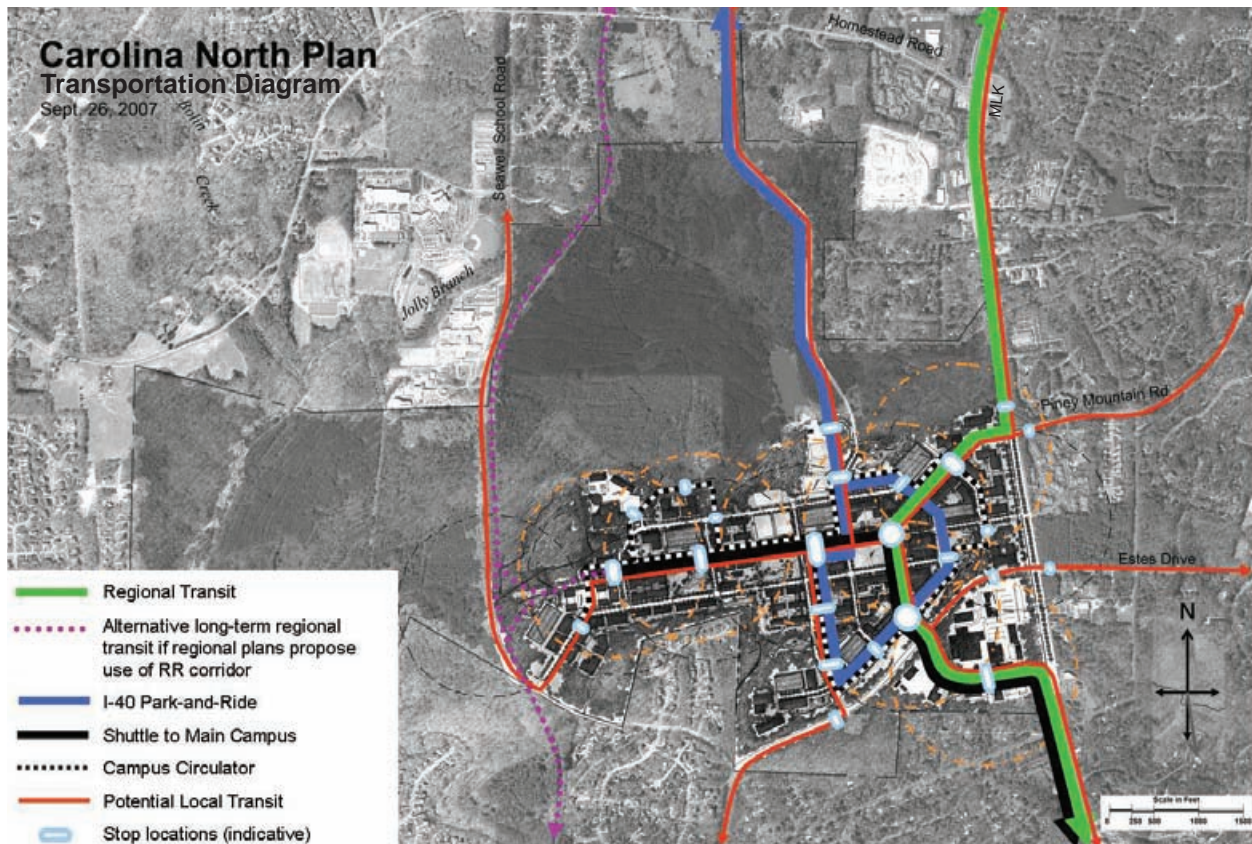
Pedestrian activity is concentrated along the main entrance road off Martin Luther King Jr. Boulevard and the nodes along the transit corridor. The entrance road is envisioned to have active ground-floor uses including retail businesses and cafes that would attract graduate students, researchers, and employees and serve the residents and visitors at Carolina North. Also acting as a main loop for regional transit, the entrance road will be a natural zone of pedestrian activity.



Transportation

The plan includes an extensive transportation network to achieve connections between local and regional transit. There are provisions for multiple types of transit and flexibility for future improvements and connections. Transit and transportation improvements will necessarily evolve over time, with appropriate commitments phased in as certain densities are achieved. The overall vision includes multiple connections to existing services as well as new services such as an internal campus shuttle that ties into transfer points and moves people through and around the site, reducing the need to drive and park multiple times throughout the day. As the campus grows, additional service to the main campus will reduce the need for car trips between the two locations and help eliminate additional traffic on Martin Luther King Jr. Boulevard.

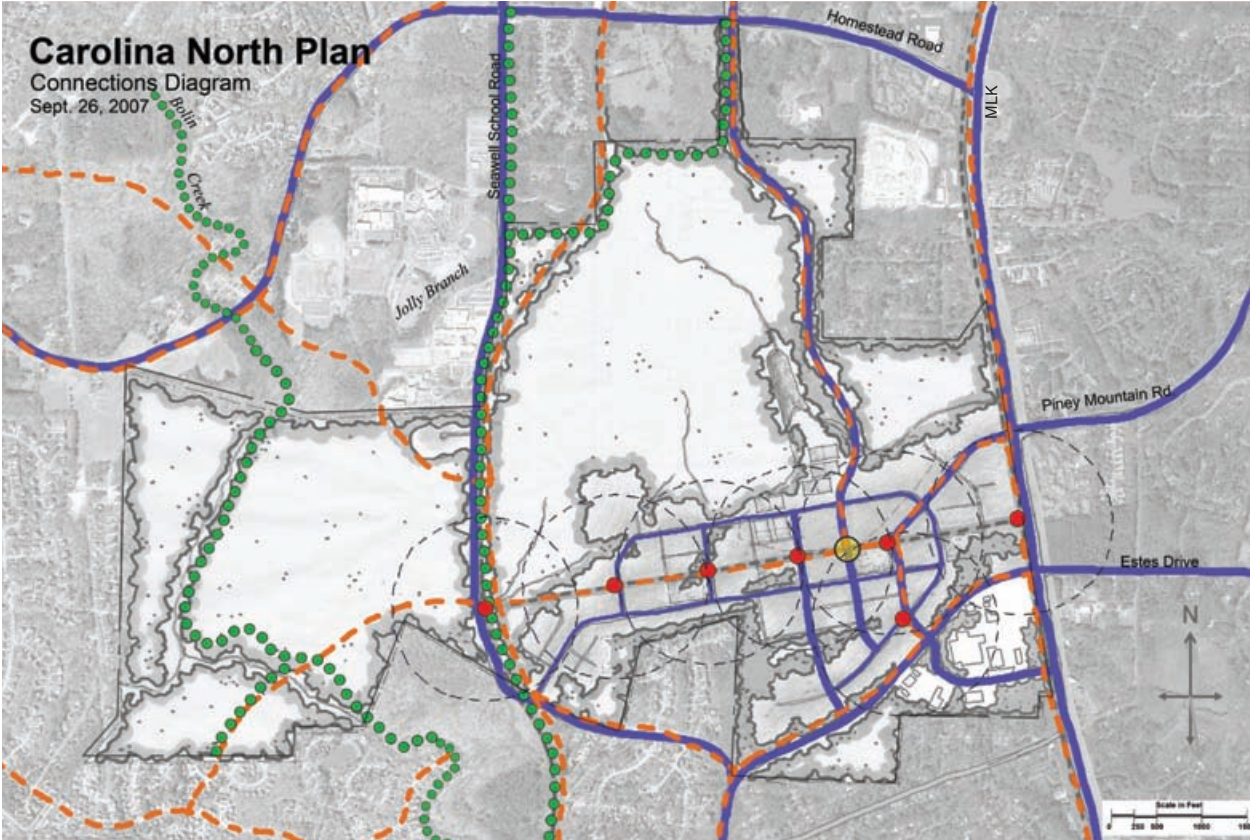
Flexibility to respond to growth and changing technologies is essential in transportation planning. While there are many ways to design transit routes, the following diagram shows one example of how they could be incorporated at Carolina North. The street network and setbacks in the plan allow for changes in transit systems and technologies. The plan anticipates opportunities for the campus to respond to a variety of parking strategies that will evolve as the campus grows.



Bike and Greenway Connections

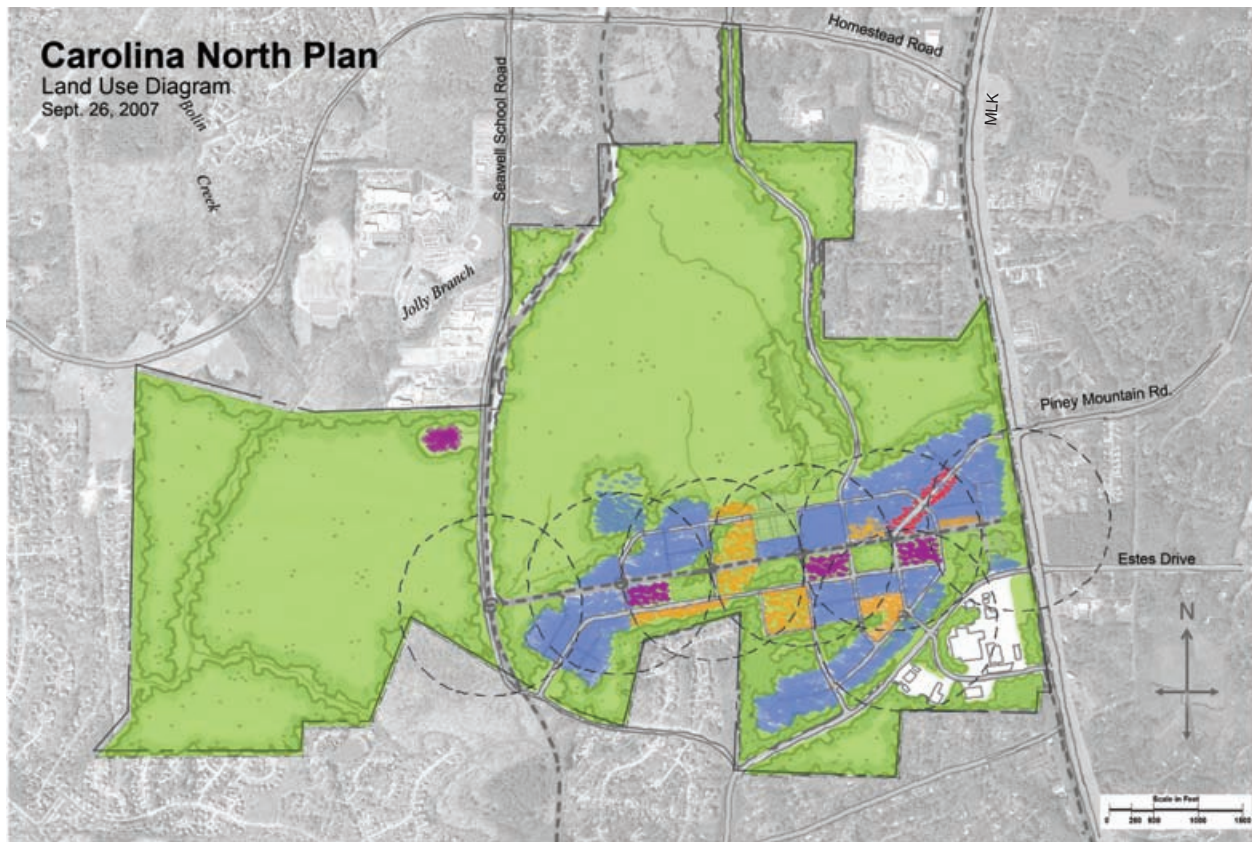
The plan provides opportunities to connect to proposed greenways and bike trails in both the towns of Carrboro and Chapel Hill. These trails will need to be field-located to avoid interrupting the existing forest patches and natural features as much as possible. Amenities such as a centralized bike service and storage facility and strategically placed showers and storage areas in buildings could also be considered as the campus grows.

Appropriate and well-designed connections to Carolina North will complement the transportation system, providing additional flexibility in access for occupants and users.



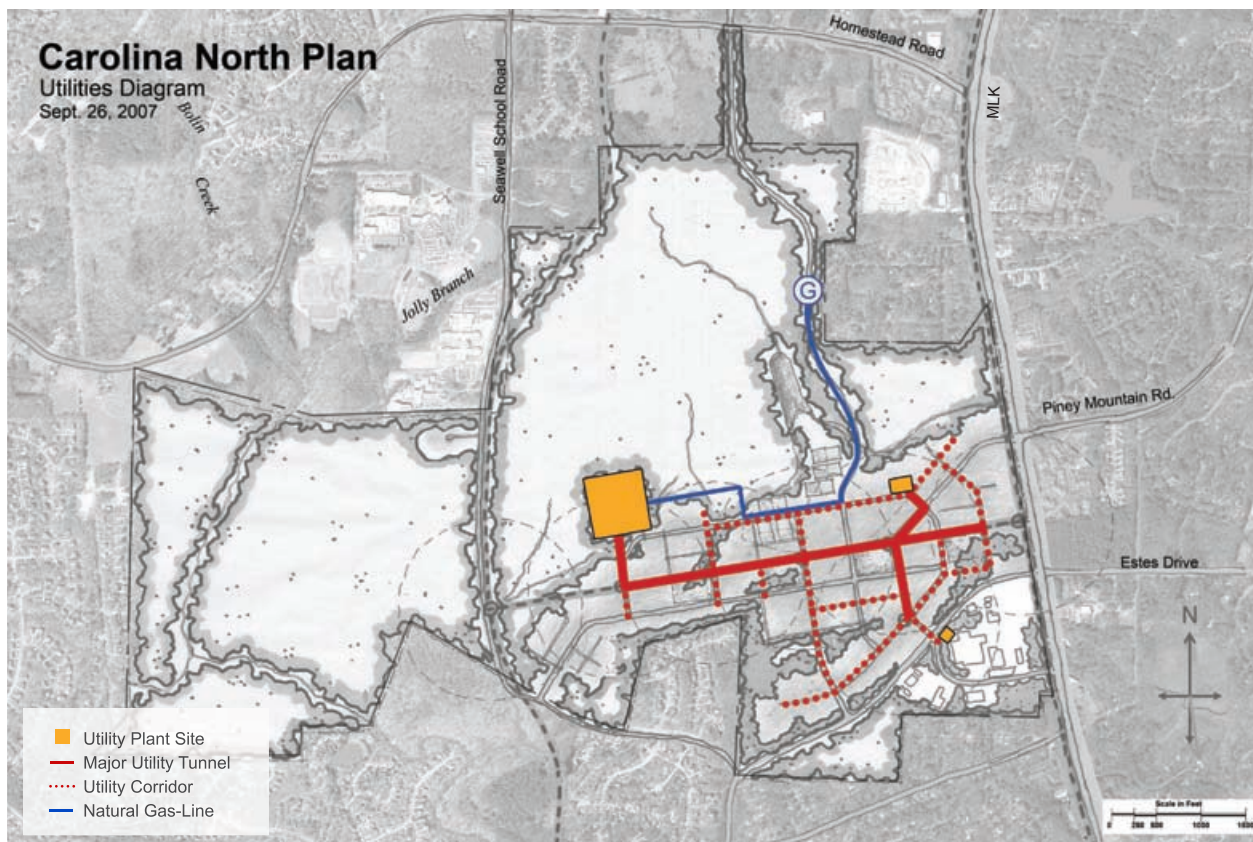
Land Use

Carolina North is envisioned as a transit-oriented, mixed-use academic campus. Multiple uses across the development allow for a more dynamic environment. On-site residents will help reduce traffic trips and provide 24-hour activity. Housing for graduate students, researchers, and faculty will be located throughout the development, serving as a buffer to established neighborhoods as well as adding an active evening use to the dense core. Ground floor retail to support the development is located along the entrance road and at transit nodes, concentrating these services near the majority of daytime users and within walking distance of residential areas of campus. The majority of space is dedicated to the research and institutional components of the program, but areas for civic functions are also included.



Utilities Infrastructure

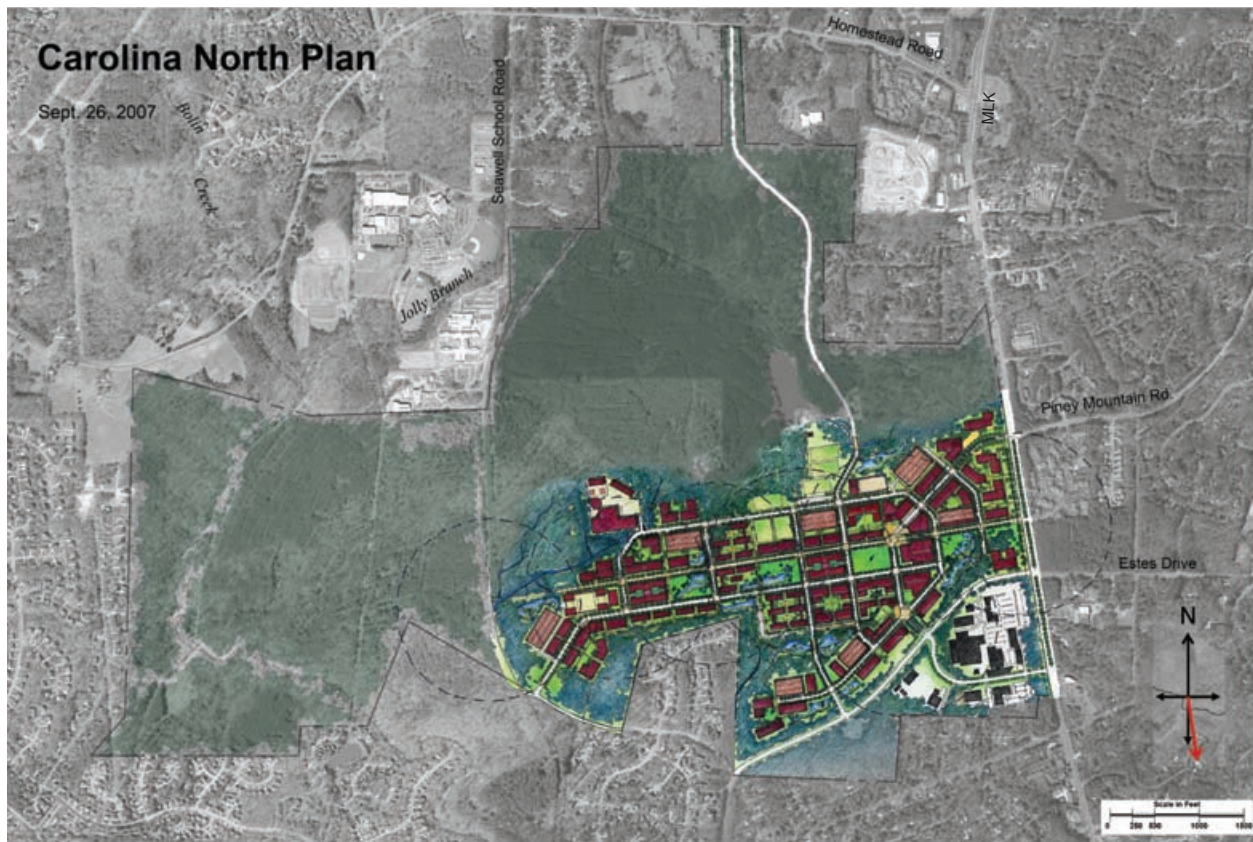
A well designed utility infrastructure is essential to achieving a sustainable development. Integration of the project's goals for land use, land pattern development, transportation, and energy efficiency were thoroughly considered. Central energy production and reclaimed water facilities were considered critical to building Carolina North as a sustainable development. Centralized utility facilities can reduce potable water consumption and carbon footprint compared to distributed production at individual buildings. The plan anticipates integrated facilities to support all programs with a framework of infrastructure that can mature with the campus. This holistic approach enables the campus to operate efficiently from the outset. The plan locates a major utility corridor under the transit spine within an accessible tunnel. The tunnel will contain many of the main runs of the required utility systems. Smaller, direct-buried utility lines and piping are located under many of the streets to serve all buildings and loop back to the tunnel. Implementation phasing and actual building system needs will play a large role in the timing and placement of this infrastructure.



2007 Carolina North Plan

The Carolina North Plan depicts a potential development build out. Red boxes diagrammatically represent possible building footprints and their setbacks. These images illustrate how the campus could evolve, but the plan allows for long-term flexibility in implementation phasing.

The development is focused in an east-west orientation aligning with the existing airport runway. This keeps the majority of the development within the previously disturbed land and integrates solar south orientation. The regular pattern of central open spaces acts as an organizing element and brings more working and natural landscape into the developed core. The integrated transit system and the east-west organization allow for nearly all of the development to be located within walking distance to the transit nodes. The development is compact, making pedestrian and bicycle travel easy, and retains a large amount of existing forest habitat.



Implementation Phasing

The program for the first fifteen years of development is based on the best knowledge available today. The academic and research components in this program reflect estimates that helped guide planning for a first phase of development. The program will continue to fluctuate but it is an important test for developing appropriately sized and located building areas at Carolina North. In addition to the initial program, goals of the 15-year plan included:

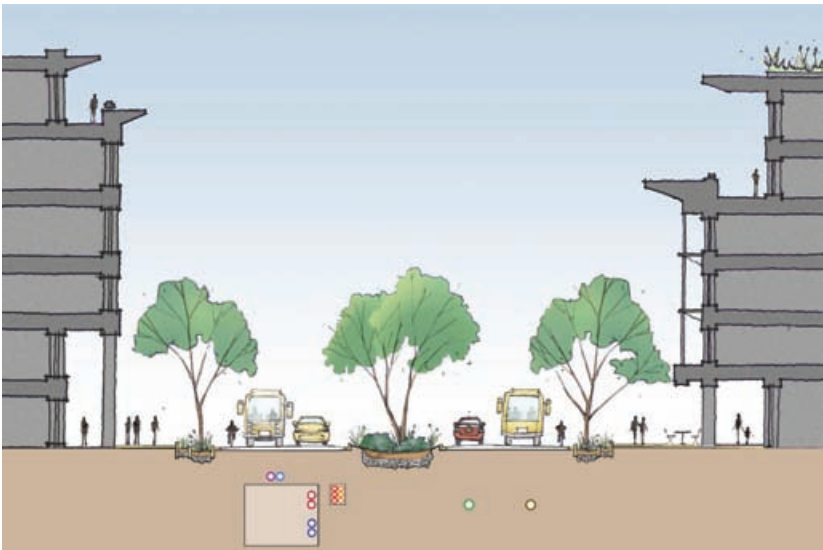
- respect the ecology of the site,
- focus on transit-oriented development,
- create a sense of identity and place,
- provide appropriate local connections for bike, pedestrians, transit, and roadways, and
- design for efficient land use with appropriate density.



2007 Carolina North Program Estimates for Years 1-15		
<i>Possible Program</i>	<i>Type</i>	<i>Estimated GSF</i>
University Programs		
Centers and Institutes I	Research	122,000
Centers and Institutes II	Research	93,000
Centers and Institutes III	Academic/Research	100,000
Innovation Center	Private Sector	85,000
Interdisciplinary Research Center	Research	150,000
Research		170,000
School of Law	Academic	200,000
School of Public Health	Research	155,000
UNC Health Care System	Patient Care/Offices	200,000
University Facilities Services	Support	75,000
Corporate Partners	Private Sector	525,000
Housing	Residential	500,000
Services (Retail, commercial, service, civic, etc.)		100,000
Total Possible Program Space:		2,475,000 GSF
Other Uses: Recreation Fields, Parking		

Street Sections

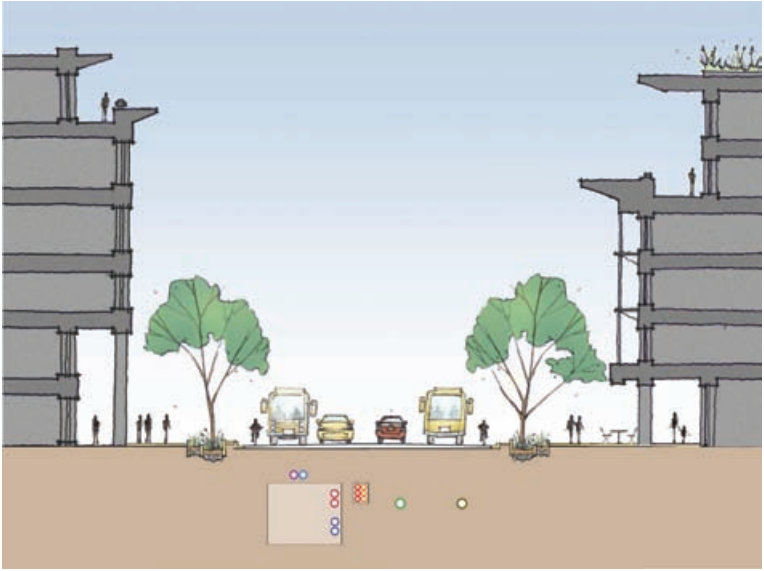
The cross-sections illustrate typical streets with transportation, landscape, stormwater, and utilities infrastructure systems. Each cross-section represents a general section for a particular area of the development. Buildings, open space, transit, parking, stormwater management, utility infrastructure, and energy technologies were integrated at a conceptual level. These sections show the interconnection of elements that form a sustainable development.



Entrance Road Cross-Sections

4-Lane Divided Street with median:

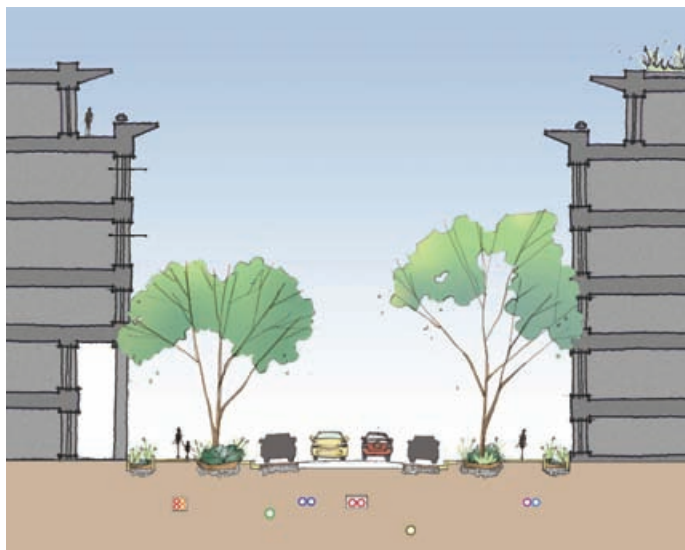
- 110' right-of-way
- +12' median
- 11' travel lanes
- 4' bike lanes
- 15' - 20' sidewalk and planted buffer



Entrance Road Cross Section:

4-Lane Divided Street:

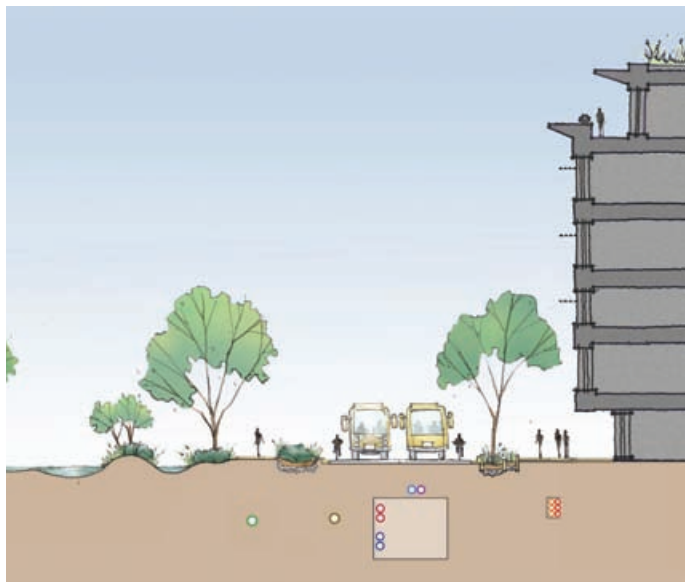
- 96' right-of-way
- 11' travel lanes
- 4' bike lanes
- 15' - 20' sidewalk and planted buffer



Local Road Cross-Sections

2-Lane Street with On-Street Parking:

- 90' right-of-way
- 11' travel lanes
- 10' – 15' sidewalk and planted buffer



Cross-Section for the Transit Corridor

2-Lane Transit Corridor with Bike Lanes:

- 75' right-of-way
- 11' travel lanes
- 4' bike lanes
- 15' – 20' sidewalk and planted buffer

Conclusion

This 2007 Carolina North Plan is driven by the mission of the University and is based on integrated sustainability principles; it reflects a significant spectrum of input, participation, and new information. The Plan evaluates and considers the major themes outlined in this report in a synchronized manner thereby establishing the groundwork for future efforts that will be necessary to guide and direct growth at Carolina North.



2007 Carolina North Plan

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