THE RESEARCH TRIANGLE PARK

Master Plan • November 2011

Research Triangle Foundation of North Carolina

THE RESEARCH TRIANGLE PARK MASTER PLAN

RESEARCH TRIANGLE FOUNDATION OF NORTH CAROLINA • NOVEMBER 2011

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Table Of Contents

1. INTRODUCTION 1

2. THE RESEARCH TRIANGLE PARK TODAY

Economic and Market Trends 3

The Physical Setting 7

3. GOALS, OBJECTIVES, AND PLANNING PRINCIPLES

Goals 15

Development Objectives 17

Planning Principles 19

4. THE MASTER PLAN

Land Use and Density 21

Park-Wide Elements 23

Guided Development Areas 29

5. REALIZING THE PLAN

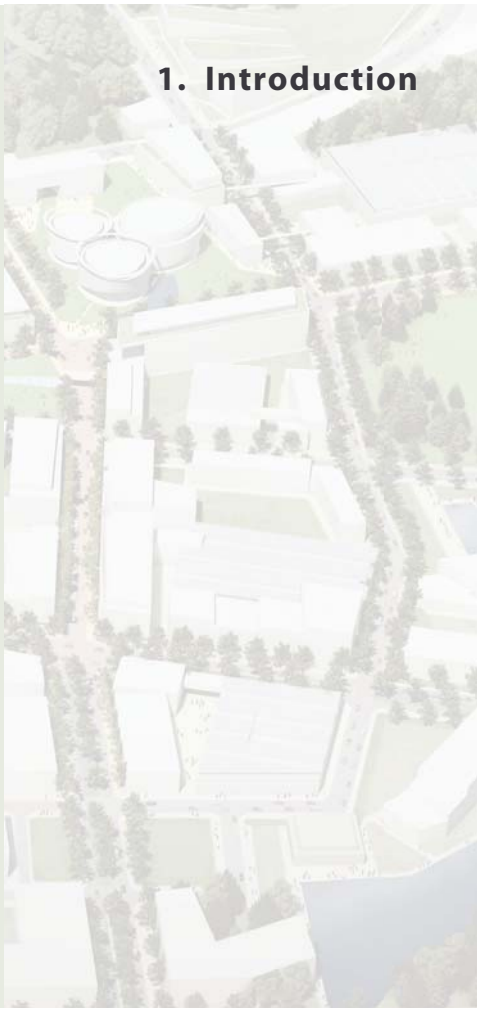
Implementation and Phasing Considerations 41

Land Use and Regulatory Framework 42

Sustainability Framework 45

6. CONCLUSION 49

1. Introduction



Introduction

THE FOUNDING VISION REALIZED

Over fifty years ago, leaders in business, government and academia together framed an ambitious plan to transform thousands of acres of woods and farmland into one of the world's first science parks. The fruit of this vision, the Research Triangle Park (RTP), has been a resounding success, leading the way in creating a more diverse, knowledge-based economy and generating considerable prosperity in the region and in the State of North Carolina as a whole. The Park symbolizes a dynamic and innovative spirit, and has come to be known world-wide as a center of ground-breaking research and technological discovery. Over time, the surrounding Research Triangle Area has grown and benefited from its association with RTP - the vibrant core of the regional economy.

EVOLVING TO MEET NEW CHALLENGES

Today, however, the Research Triangle Park faces a turning point. Its original development model must change to meet new challenges in the marketplace and inside the Park itself. Research-based companies must be flexible and nimble to respond quickly to the demands of national and global competition. Their facilities must adapt to fulfill evolving, diverse requirements in the workplace. Many of today's knowledge workers expect amenities and opportunities to connect and share ideas in a socially dynamic setting. The independent campuses at RTP, mostly hidden behind trees, do not reflect this trend. There is no central, defining place that represents the heart of the Park – that nurtures and reveals the dynamic, world-class research community made up of RTP's over 170 companies and entrepreneurs. Moreover, the remaining vacant sites at the Park are not sufficient to serve the next 50 years of need. Fortunately, RTP's 7,000 acres can yield ample additional development capacity, given the current very low intensity of development in the Park. The challenge and the opportunity is in discovering how and where this significant potential can be unlocked in an appropriate way.

RENEWING THE VISION

RTP needs a renewed vision to guide development to meet these challenges for the next 50 years. The Research Triangle Foundation, the steward of the Park, commissioned this Master Plan for this purpose. A core goal of the Plan is to meet the evolving needs of existing companies while adapting to attract a range of new companies and start-ups. The Plan aims to provide a diverse development framework that is dynamic, flexible, and responsive to the wide range of RTP company needs and market factors. The Plan also aims to frame the Park as an integral and integrated part of the larger region, by responding to regional planning initiatives and to larger natural systems through sustainable planning. In these ways, the RTP Master Plan represents a once-in-a-generation opportunity to re-envision the concept of the Park as a center of innovation for the 21st Century.

Aerial view of RTP at Cornwallis Drive and Route 147

FRAMING A NEW RTP MASTER PLAN

The Master Plan looks at the Park as it exists today in its market context and its physical setting to identify major trends, opportunities and constraints for long-term development. Drawing upon insights and work of earlier Foundation strategic planning efforts and extensive market research, the Plan then outlines goals, objectives and planning principles to guide the undertaking. The Master Plan itself is comprised of both park-wide elements and more focused, transformative projects in select areas. The Plan addresses regional connectivity, access, transit, land use, landscape, environmental considerations and the sustainable infrastructure needed to support projected future development. A broader mix of uses are proposed in select areas to support the Park's research mission, with higher development densities, enhanced landscape, innovative green infrastructure, and links to future transit. The Master Plan aims to increase connectivity throughout, and envisions a more seamless and purposeful relationship with nature.

A plan can only benefit a site if it is realized. The Master Plan includes implementation considerations and zoning land use policy recommendations that will yield more efficient land use and unlock development potential, using contemporary planning practices. The Plan includes a Sustainability Framework to guide the development of buildings, infrastructure and open space, and to further enhance RTP's reputation as a leader in sustainable operations, building and research.

POSITIONING THE PARK AND REGION FOR FUTURE PROSPERITY

Just as the original vision for RTP was realized through commitment of a broad partnership of stakeholders, the new RTP Master Plan will require joint effort and resolve. Continuing to use the Park's original, mid-20th Century development model to guide its future is no longer tenable. Transformative change is needed to meet 21st Century challenges. The long-term benefits of the new RTP Master Plan to tenants, to the region and to the state of North Carolina, will be considerable. The Plan shows how RTP could accommodate dramatically more development and employment over the next 50 years, in a sustainable and transformative way. The Plan will be a catalyst to create the new environments that attract talented scientists, knowledge workers, and world-class companies. In doing so, the Master Plan will re-energize the Research Triangle Park so it continues to serve as an engine of prosperity at the core of the Research Triangle region and State of North Carolina for decades to come.

RTP and the region

2. The Research Triangle Park Today

ECONOMIC AND MARKET TRENDS

Competitive Pressures

Enduring Strengths of The Research Triangle Park

Real Estate Challenges and Opportunities

THE PHYSICAL SETTING

The Region

Access And Transportation

Land Use

Landscape Character And Ecology

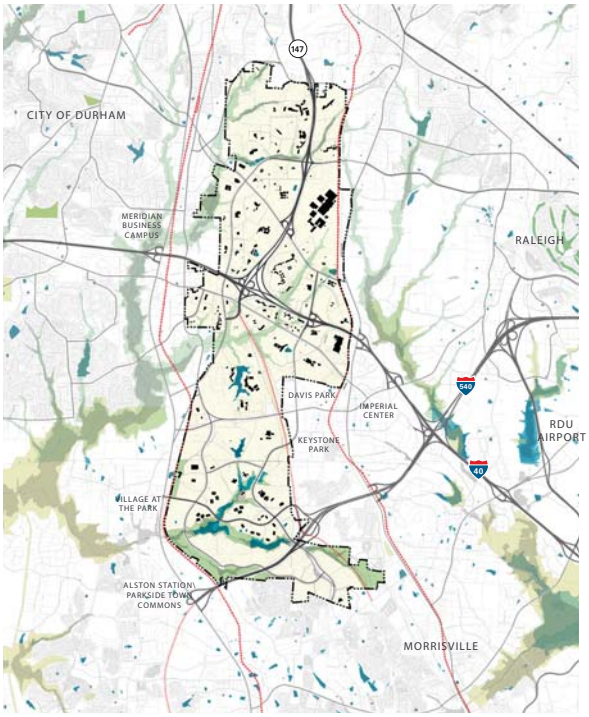
Utility Infrastructure

The Research Triangle Park Today

Today the Research Triangle Park faces challenges that could not be foreseen over fifty years ago when it was founded. The rapid pace of change within the research and technology global market, as well as the limited number of remaining vacant sites, make it critical that the Park plan comprehensively for the next fifty years in order to remain a dynamic engine of growth and prosperity for the region and the state. Understanding the Park's current condition is an important foundation for this effort.

When the Research Triangle Park's founders created the Park, it was at the cutting edge of the era's best planning principles, allowing easy automobile access while preserving the Park's natural setting. The Park's development model worked exceptionally well over the decades, as large research and technology companies bought parcels within the Park and established independent research and office estates. The proximity to three strong research universities - Duke University in Durham, North Carolina State University in Raleigh, and the University of North Carolina at Chapel Hill - and population centers provided those working in the Park with ready access to a modern work environment surrounded by the natural beauty of the North Carolina countryside. Many of the nation's top technology and research companies such as IBM and GlaxoSmithKline now employ thousands of North Carolina's most capable and innovative workers, with a multibillion dollar effect on the state's economy.

In today's world, however, many of the qualities that made the Park so successful in earlier decades run counter to trends in innovation industries and land stewardship. Whereas earlier generations of American workers fled urban areas for newly built, suburban and car-accessible employment centers, today's innovation workers seek the greater connectivity, convenient amenities and vitality that comes from a denser mix of uses, as well as a firmer commitment to sustainability.



The Research Triangle Park Existing Conditions 2010

COMPETITIVE PRESSURES

The Research Triangle Park faces competition due to a number of factors, including international growth, the strength of larger technology regions, the changing character and needs of companies in the American innovation economy, and the establishment of newer research parks that are more aligned with today's business needs and worker preferences. The Research Triangle Park must cater to a broader range of companies today than in previous decades, when growth was strongest among established companies that wanted to own their own campuses.

International Competition

Globalization trends, expanding international market access and lower overseas costs will continue to increase international competition in research and technology fields. Since RTP's founding, hundreds of new research parks have been established across over seventy countries and six continents.

Competing American Technology Clusters

Technology clusters in Boston, Silicon Valley, Seattle and San Diego, among others, currently have a commanding position in the American economy, have reached a critical mass that drives continued exponential growth, and are closer to venture capital funding sources.

Shifts Within Innovation Economy

Expansion within research parks today requires the nurturing of start-ups through their stages of growth, not just the attraction of established companies. During the past few years, Research Triangle universities have been particularly successful in commercializing new technology. From 2006 to 2008, Duke, NC State, and UNC Chapel Hill and produced more start-ups, licenses, patents and options than many competitor clusters/regions. However, the Park has only been able to attract a small number of these start-ups.

Moreover, established companies within the Park and elsewhere are increasingly interested in renting properties in order to maintain the flexibility to respond quickly to shifting global market and technological needs. The traditional model of development within the Park -- large campuses developed and owned by a single company -- no longer represents the greatest need in the market.

Development of Newer Research Parks

More recent research parks are built with today's business preferences in mind and offer newer facilities and infrastructure. Many are built with a density that enables an active pedestrian life and integrate residential and retail uses.

ENDURING STRENGTHS OF THE RESEARCH TRIANGLE PARK

Park tenants and owners continue to be drawn by a number of regional and Park strengths, including its high-quality and low-cost workforce, its lower operating costs, and the pastoral environment that the Park has been able to preserve over fifty years of development.

Strong Work Force

The population of the Research Triangle region is highly-educated due to the strength of the region's institutions of higher education, including Duke, NC State, and UNC Chapel Hill, other regional universities, and community colleges. A substantial portion of students at these three universities pursue studies in science and technology-related fields, leaving them well prepared for the technology and research-based employment opportunities at the Park. At the same time, labor costs are significantly lower in the region than in higher-cost technology regions on the East and West Coasts, a factor related to the high quality of life and low cost of living in the Research Triangle region.

Pastoral Environment

With its strict rules relating to the preservation of natural areas, the Park has avoided the fate of many suburban areas, where haphazard development has led to the creation of an unattractive built environment. Workers are particularly appreciative of the natural areas that surround their offices.

Legacy and Momentum

Even with no changes to the Park's business strategy, the decades-long presence of major research and technology employers and the significant investments they have made in the Park will ensure that the Park remains a significant economic player well into the future. However, future growth will likely require new strategies to attract the next generation of research companies.

REAL ESTATE CHALLENGES AND OPPORTUNITIES

The Research Triangle Park currently contains an aging building stock used for research and office uses, with small amounts of additional hotel and retail uses. Space is largely owned by users, with a smaller amount of rental space. Preparing the Park for the next fifty years of growth will require a broader and more creative real estate strategy that will tap into regional trends and market opportunities in order to create a more vibrant, attractive and flexible work environment.

Solid Commercial Market Despite Aging Building Stock

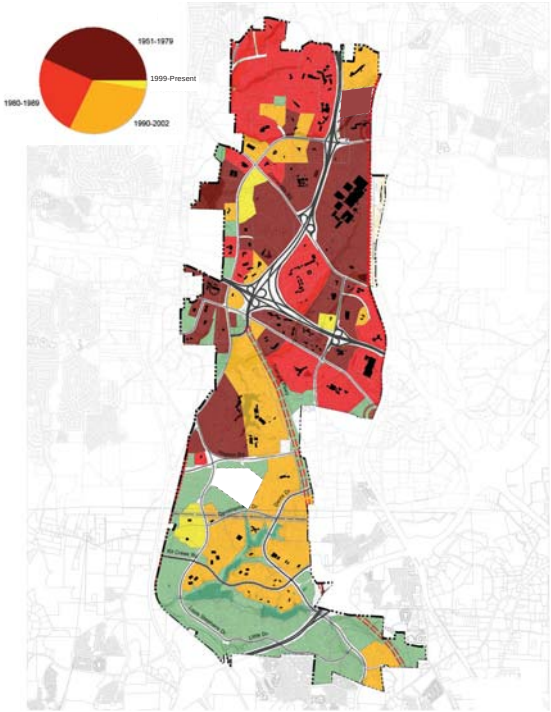
The Research Triangle Park contains over 22 million gross square feet of commercial space, including office, research, laboratory, industrial, and flex space. Because of the Park's relative age, a significant portion of the Park's building stock was constructed decades ago, resulting in a number of properties that are in need of modernization in order to meet the needs of today's companies.

Despite the aging of the Park's building stock, it is in some ways a healthier real estate market than the surrounding region, with a vacancy rate of 11.9%, compared to the Research Triangle region's office vacancy rate of 13%. After factoring out a vacant building owned by GlaxoSmithKline that is set for demolition, the Park's vacancy rate falls to 10.6%. Rental rates, which fell by 17% after the tech bust in the early 2000s, have since recovered and have been relatively unaffected by the 2008-2011 economic downturn.

The Park's lower vacancy rate and steady rental market suggest that there may be a market opportunity for additional rental spaces. These properties could cater to the smaller, less established and more entrepreneurial firms, including spin-off firms resulting from research at area universities that increasingly dominate innovation industries.

Residential Market Opportunities, Limited By Development Restrictions

The Research Triangle region is a particularly attractive region for multifamily development due to its young, highly educated and rapidly



Building age (dated to first construction on parcel)

growing population. Due in part to the many research and technology companies located in and around the Park, the Research Triangle region has a larger share of young workers and a faster rate of population growth than the rest of the state. The region is also a relatively affluent region, with a workforce weighted toward better paid and more knowledge-intensive industries. Since 2000, an average of 25% of new units built in the Research Triangle region have been in multifamily developments, a share that rose to 40% in 2008. Despite the recession, the residential rental market is increasingly healthy, with vacancy falling from a high of over 9% in 2009 to 6% in 2010.

While residential development is not currently permitted at the Research Triangle Park, permitting a modest amount of residential development could help create the more vital, 24- hour environment many young workers increasingly prefer, while providing an important amenity for the Park's companies. The most attractive residential developments would likely integrate retail amenities such as restaurants and neighborhood stores. Mixed use residential developments such as these have been successful in the area, particularly in Raleigh, Durham and Chapel Hill.

New multifamily residential development within the Park could be attractive to young college graduates and international hires who seek proximity to their new jobs and are not ready to purchase or maintain a new single family home. Living close to work is particularly appealing to a younger generation of educated workers that is seeking a less car-dependent lifestyle. Over the near term, rentals and townhouses are likely to be the most viable forms of residential development, as these housing types were less affected by the recession than condominiums. Over the long term, a wider range of housing options should be viable, including condominiums.

Need For Retail Within Vibrant Environment

Retail can serve as an important amenity for Park workers, who currently lack sufficient places to eat lunch outside the workplace and meet informally with co-workers and clients. Interviews with employers within the Park revealed a particular desire from workers for additional food and beverage options.

Currently, Park workers have access to minimal retail in and around the Park, including a small amount of retail space at Park Center, strip malls near the Park with little connectivity to Park companies and potentially additional retail that will be part of Parkside Commons, a mixed-use development that is planned on the southwest edge of the Park.

Demand from area workers and residents could support a significant amount of additional retail space in the Park. However the success of retail in the Park is likely to depend upon the creation of a more attractive shopping and dining destination for the Park's workers than is currently available at Park Center. New retail development would also be supported by the introduction of residential use into the Park as well as increases in the permitted density of office and research space.

Potential For New Hotel Over Time

Although it currently contains only one hotel, the Research Triangle Park is located at the center of the Raleigh-Durham area's principal hotel market. Most area hotels are clustered around Interstate 40 interchanges that are adjacent to the Park or the Raleigh-Durham International Airport.

With the Park's proximity to the Raleigh-Durham International Airport as well as the significant demand generated by Park businesses, the Park should support additional hotel development over the long term, especially a higher-end hotel catering to business travelers. However new hotel development likely will need to wait for recovery from the slow economy, which has significantly weakened by the regional hotel market.

Adapting to Changing Times

While the Park remains a major economic force in the region, future growth will depend on the ability of the Park to cater to new kinds of companies and employees while retaining existing firms. A new real estate strategy that caters to changing worker and company preferences as well as new economic conditions can help ensure the Park's continuing role as a major contributor to the local, regional and state economy over the next fifty years.

The Physical Setting

The Research Triangle Park, at 7,000 acres and 7 miles in length, is the largest and oldest operating science park in North America. Its original plan provided a flexible framework for transforming a rural wooded and farmland setting into what would become a pre-eminent international research park. The current conditions – for access, land use, landscape and infrastructure - present both challenges and opportunities as the Park embarks on a new Master Plan.

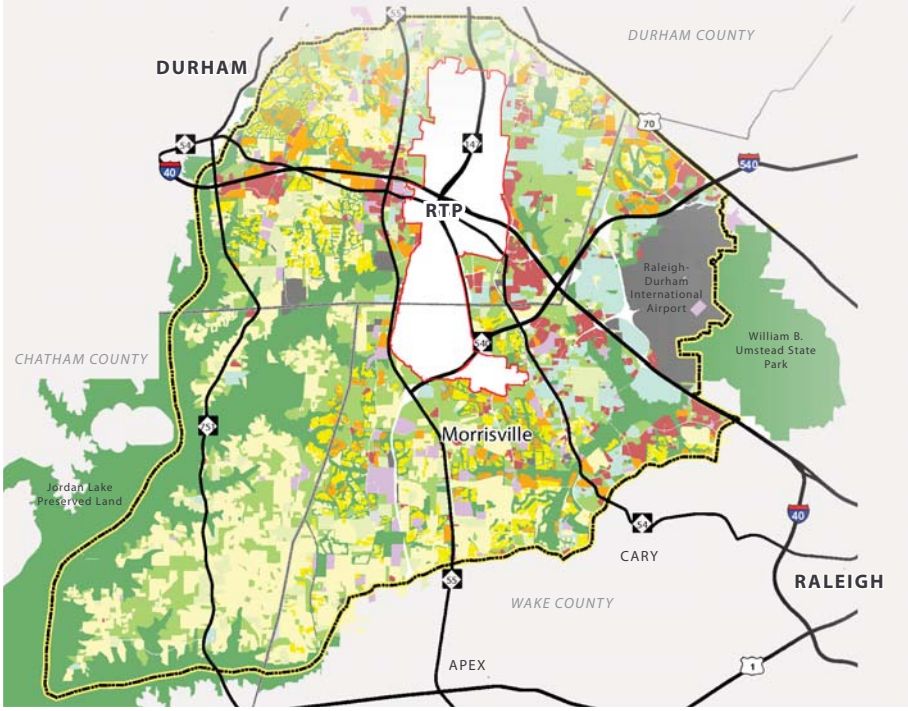
THE REGION

RTP must be understood first and foremost as part of the larger area. The genesis of the Park sprang from the desire to tap into the intellectual capital being created at the three surrounding universities (Duke University, North Carolina State University, and the University of North Carolina at Chapel Hill) and thereby strengthen the regional economy by proactively inducing larger state-wide trends.

Regional development was remote from the Park boundaries in the early years. Since then, the Research Triangle region has experienced enormous population growth, and development has reached and surrounded the Park's perimeter. RTP's success has generated much of this growth. Early development near the Park perimeter was largely ad hoc strip mall or flex office developments. Planned larger developments, including Imperial Center, followed. More recent development, such the proposed Parkside Commons, reflect best-practices for mixed-use planning, and have been done in close coordination with regional government planning officials.

The RTP Master Plan aims to respond to opportunities outside the Park in the larger Research Triangle region for integrated planning solutions with adjacent areas, and to capitalize on regional opportunities for improved access and transit.

Regional development has reached the perimeter of the Park



Land use patternswithin the CORE region

ACCESS AND TRANSPORTATION

The Research Triangle Park in general benefits from excellent transportation access. For national and international travelers, the recently expanded Raleigh Durham Airport will continue to be an asset for the Park.

For commuters, RTP is well connected to regional arteries and interstate highways. The significant population growth in the Triangle and resulting traffic congestion at peak times strongly indicates, however, that additional regional transportation alternatives are needed in the long term. Interstate 40 is the major east-west route, but one which slows to a crawl at most morning and evening rush hours. The extension of Triangle Parkway to the south will somewhat reduce congestion by providing an alternate route. Land inside RTP was set aside for the I-40 and Triangle Parkway right-of-ways in the original Master Plan. The new Master Plan requires similar long-tern transportation planning.

Roads inside RTP are mostly owned by the Counties and represent one of the most significant infrastructure investments in the Park. They create a pattern of development parcels that is generally medium to large scale. Park roads generally have sufficient capacity for current peak travel demand. TW Alexander Drive is being widened from one to two lanes in each direction.

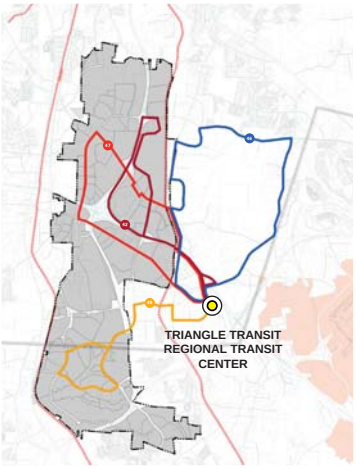
The predominant majority of trips to and from the Park are by single occupancy vehicle. Less than 2% of trips are by Triangle Transit buses. Currently bus service is linked to the regional transit center at Imperial Center (formerly in RTP at Park Center). The limited use of transit and scarcity of transit options speaks to the low-density character of the region and convenience of driving. It also reflects, at RTP itself, the "last mile problem", where bus stops currently are located on Park road frontages, several hundred yards from traveler's ultimate destination of building entries, reducing the attractiveness and viability of transit.

In order to support and guide sustainable growth at the Research Triangle Park for the coming decades, the Master Plan must support viable regional transportation alternatives.

I-40 peak hour congestion

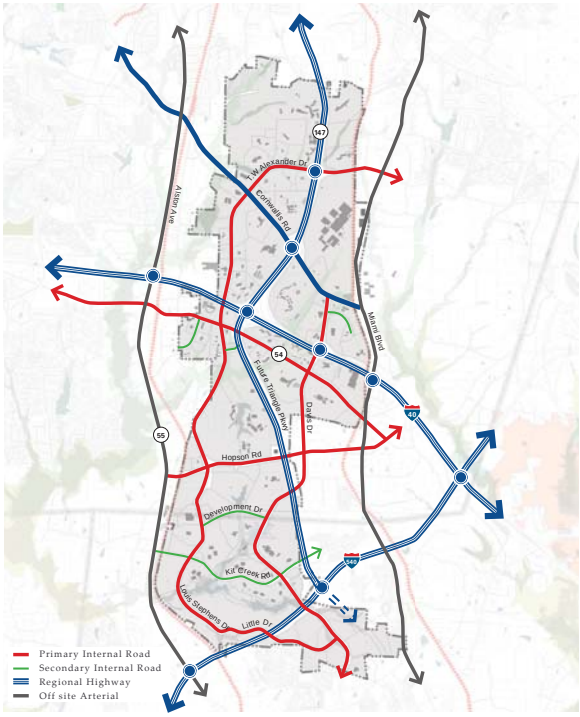
Davis Drive

Louis Stephens Drive



Existing bus service at RTP

RTP bus stop



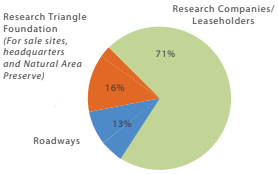
RTP existing road network

LAND USE

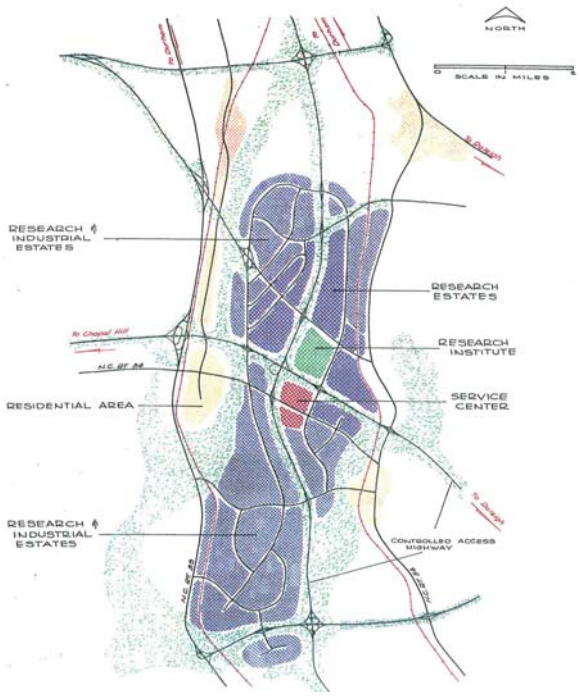
The original RTP Master Plan, shown opposite, served to guide land use well for many years. It provided a flexible framework with substantial development opportunities for large research companies and others to build facilities to suit their specific research needs in a verdant, spacious setting. The predominant land use envisioned is characterized as "research estates" – autonomous parcels for individual companies. The Plan also indicated near and long-term road infrastructure reflecting a low-density, dispersed approach to land use, in keeping with its founding vision of a park-like setting to foster innovative companies. The Park's 22 million gross square feet is comprised of over 170 companies.

While large companies will continue to occupy significant sites at RTP, and develop or redevelop new ones, relying predominantly on the old land use model of research estates is no longer sustainable. On the supply side, vacant land is running out; remaining undeveloped sites represent only 9% of the Park area as of 2010, as shown in the map on the next page. On the demand side, many research companies are looking for a more vibrant, collegial setting rather than independent campuses. A more diverse approach to land use is required to unlock the significant untapped development potential at RTP. This must be done while continuing and strengthening the legacy of harmony with the natural setting.

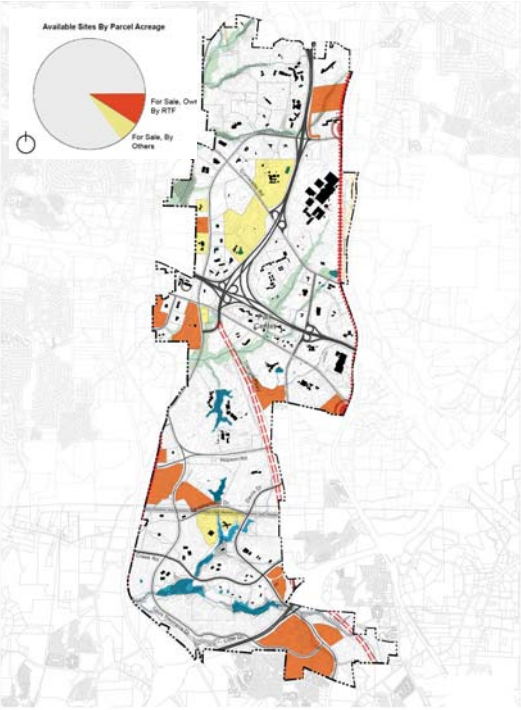
Development density at RTP is controlled primarily by county zoning. The northern 75% of the Park is in Durham County; the southern 25% in Wake County. Zoning requirements originally were identical in each county, but have transformed over time to have variations. In both counties, yard and coverage requirements have the most significant effect controlling



Existing RTP land use



Original RTP Master Plan



Available sites at RTP, 2010

development density. Large setbacks from roads and from side and rear property boundaries result in substantial portions of each site being off-limits to development in the service of screening properties from adjacent areas with landscaped buffers. Clustering development with adjoining sites, to support a pedestrian environment, is not permitted. To realize a new vision for land use at the Park, zoning changes will be required to enable and encourage thoughtful development that clusters facilities in proximity to planned transit service, and incorporates natural areas as an integral part of daily experiences.

The last five decades of development at RTP have resulted in a typical pattern of ownership with large-scale parcels. Enabling denser cluster development will require new parcelization agreements among adjacent property owners, and will depend on owners who are willing to participate in real estate transactions to implement this. And a more concentrated approach to land use in key areas will also require new roads and infrastructure, as when RTP was first developed.

Research is the predominant type of land use at RTP, regulated by zoning and by the covenants of the Research Triangle Foundation. Today, zoning limits retail and hotel uses to Park Center, the "service center" mapped in the original master plan. Only limited residential (25 units) is not allowed. To maintain a vibrant and competitive research environment in the 21st Century, however, a more robust mix of supporting, complimentary uses will need to be added in select, concentrated areas. Creating opportunities for dining, convenience shopping, recreation, study, meeting and living will strengthen the Park's core mission of supporting innovation and research by fostering a vital knowledge-based community.

LANDSCAPE CHARACTER AND ECOLOGY

The concept of research in a park-like setting is at the core of The Research Triangle Park's DNA. The power of this original vision of a research park resonates in the many science parks that followed around the world. From the outset, preserving substantial amounts of the wooded setting at RTP was a given high priority and embedded in the Park's development regulations. This respect for nature will continue and remain a character-defining trait of RTP's brand.

As we enter the 21st Century, our understanding of natural environment has deepened. Rather than the natural setting being the residual undeveloped edges of lots, it is possible to have natural systems such as streams and wetland areas serve as frameworks to guide development that is more responsibly integrated with nature. The Master Plan should create open spaces that create opportunities to unify and strengthen this research community and create a sense of place.

While wooded road frontages provide a park-like setting, they also conceal much of the enterprise at RTP from public view. It is possible to pass through the Park and have little idea of the range of vibrant companies within its boundaries if not for signs at entry drives. The relatively uniform landscape along roadways also makes wayfinding challenging, since few landmarks exist to orient visitors. Recent signage improvements have helped to the extent possible. Along roadways, the edges of the Park are often not clearly defined. This not only creates confusion but also misses an opportunity to strengthen the Park's identity. Gateways must be better defined, so visitors can know when they have arrived at RTP.

RTP has a range of open space amenities, including recreation fields and trails, to support its companies. The Park lacks, however, any defining common open spaces where people can gather, socialize, and recreate in the sense of a town park, green, or square.

In the southern portion of RTP, the lakes, and the Natural Area Preserve zoning provision (in which shared open spaces allow denser development of individual parcels) are good examples of this approach. Preserving wooded areas can not only screen development but also preserve valuable habitat if planned in an integrated manner. Maintaining the quality of stormwater runoff will be important as well as the Park develops as it is part of the Jordan Lake watershed.

Typical wooded road frontage in the Park

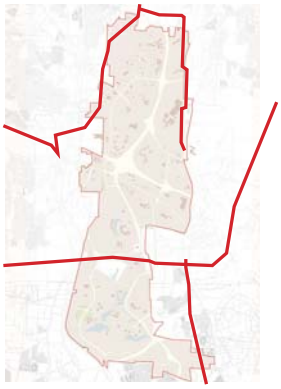
Lakes in the southern portion of RTP

UTILITY INFRASTRUCTURE

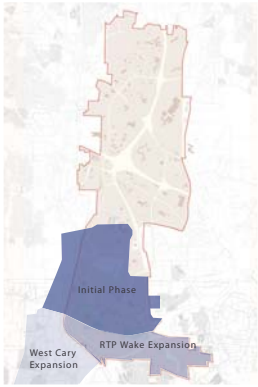
The Park is served at most roadways with a robust utility network, for water, sewer and natural gas, sized to anticipate substantial capacity needs for research (and some industrial) uses. Most road rights-of-ways also include multiple telecommunications / fiber optic lines. Two major power easements serve RTP – one north-south at Miami north of Cornwallis Drive, and a second east-west along Hopson- connected to multiple feeds throughout the Park.

The reliability of the water supply in drought conditions is a key concern, especially for RTP companies with mission critical facilities that depend on an uninterrupted supply of water for data center cooling, or other essential operations. Regional efforts are underway to address water consumption and Durham and Wake Counties are collaborating on a Water Reuse Project that will serve much of the south end of RTP below I-40. It will pipe treated wastewater ('graywater') for use in cooling plants and irrigation.

For water, energy, and waste, the RTP Master Plan aims to identify sustainability strategies that can be implemented in steps to reduce consumption, lower operating costs, and decrease environmental risks.



RTP main power transmission lines



Jordan Lake Water Reclamation and Reuse Project, partial Map

3. Goals, Objectives, and Planning Principles

GOALS

Economic and Employment

Innovation

Sustainability

DEVELOPMENT OBJECTIVES

More Density and Nature

21st Century Amenities

Product Type Diversification

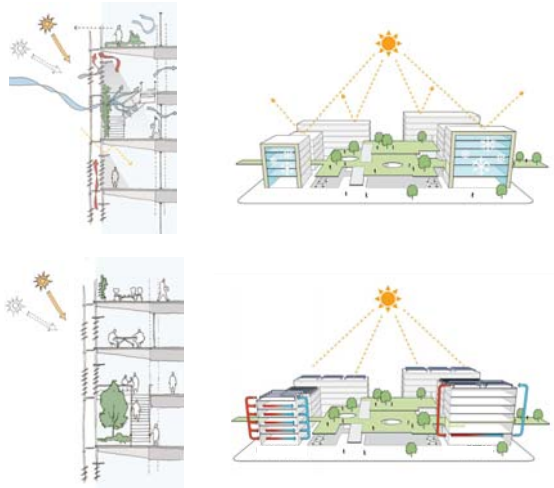
Business Support Services

New Partnership Models

PLANNING PRINCIPLES

Goals

In order to maintain RTP's legacy as a driver of the regional and state economy in the 21st century, it must update its development strategy to meet the changing needs of today's companies. This section describes goals for employment, innovation and sustainability to support this renewal of RTP, as well as more specific objectives and physical planning principles to guide development in coming decades.



ECONOMIC AND EMPLOYMENT GOALS

The Foundation's primary goal for undertaking a Master Plan is to create an environment that will allow the Park to continue to be an economic driver for the innovation economy in the region and the state for the next 50 years. This goal will be achieved by maintaining the Park's attractiveness to existing tenants and owners, facilitating opportunities for existing companies to expand on site, and broadening the Park's appeal to additional types of companies, including those not historically found at RTP.

Retain Existing Firms

The Research Triangle Park currently houses 38,000 workers and 170 companies, including some of the top researchers and most successful technology firms in the world. As the Park seeks to expand its tenant base by adapting to changing user requirements in select locations, it must work to retain the character of the Park for those existing high-quality tenants and owners who were first attracted to the 'office in the park' environment. It must also continue working to meet the needs of existing firms, including allowing expansion in place where feasible.

Continue to Draw Large Companies

Major, internationally-recognized firms have constituted a core market for the Park since its founding, often operating out of self-contained research campuses. The presence of these world-class firms not only helps to drive regional and state employment and economic growth, but also brands the Park as a world-class research destination. The Park must remain attractive to large firms by continuing to provide opportunities to establish independent campuses while also providing opportunities for denser, mixed-use development models.

Attract a Broader Range of Tenants

The Research Triangle Park attracts a wide range of research and technology firms, but key interventions will make the Park more attractive to smaller, entrepreneurial firms that play a growing role in the innovation economy. Establishing more incubator space and additional rental opportunities for start-ups, for example, could help the Park capture a larger percentage of technology spin-offs originating in regional universities.

INNOVATION GOALS

Innovation has been integral to the RTP brand since the Park's founding. To continue this legacy, the Park must foster the pursuit of discovery and support commercialization of this knowledge for larger benefit. This can occur in several areas:

Create and retain more start-ups
The Park should continue to provide opportunities in leased laboratory and office space for companies ranging from the newest start-ups to medium-sized companies looking for room to grow.

Support Corporate Research
The Park should continue to provide a supportive setting for the largest corporations to conduct research, including swing space to address changing facility needs to respond to research and development opportunities.

Strengthen inter-company and university connections

The Park must provide opportunities for collaboration among companies and with the region's universities. Inter-company connections can be strengthened by creating the types of shared spaces and amenities that encourage interaction – cafes and other retail uses, active open space, shared business support services and shared conference facilities. These amenities will also make the Park more attractive to University affiliates. University connections can be further strengthened by supporting the creation and expansion of joint research centers and continuing education programs such as North Carolina State University's MBA @ RTP.

SUSTAINABILITY GOALS

The original vision for the Research Triangle Park was for development in a park-like setting that preserved a substantial portion of the natural environment. In this respect, RTP was ahead of its time. In many ways, this legacy continues. A number of companies have built LEED-rated facilities, with the Foundation's LEED Silver Headquarters being an outstanding example. The owner and tenant committee Environment@RTP actively promotes sustainable practices.

RTP should continue to strengthen this legacy in order to cultivate a reputation as a model of sustainability. Green initiatives can be pursued in transportation, resource use, stewardship of the natural environment and quality of the built environment, both for Foundation-led infrastructure projects and private development by site owners. Establishing a reputation as a global leader in sustainability will distinguish the RTP brand and be attractive to current and prospective workers and companies.

Development in the southern portion of the Park has exploited new land use techniques to create shared open space systems that better manage environmental impacts.

Development Objectives

Going forward, a number of initiatives can help the Park retain existing firms and remain attractive to new users, including allowing new density and a mix of uses; preserving key natural areas and creating additional active open spaces; providing 21st century amenities to Park workers; attracting a wider range of firms; promoting new partnership models; and providing additional services to support Park businesses.

University Avenue in Downtown Palo Alto: A pedestrian-friendly central district and retail environment minutes from the Stanford Research Park.

MORE DENSITY AND NATURE

In order to provide a competitive product for new companies and expand job creation opportunities within the Park, the Research Triangle Park will need to permit and even encourage increased density in certain locations to create new opportunities for growth and enable more urban models of development. However, this densification must not damage the Park's reputation as an attractive, forested environment, pre-zoned to cater to R&D activities. The Park's natural setting is one of its primary draws. Even as more development occurs, the Park should retain and strengthen its emphasis on sustainability by maintaining natural space that contributes to the environmental stewardship of the Park; creating new open spaces that can be used by workers and residents; broadening transportation options to include transit; and encouraging development patterns that are less land intensive.

21ST CENTURY AMENITIES

Employees increasingly want to work in exciting, active locations that offer a range of amenities. Amenities that will help attract and retain workers include:

- Improved Park visibility within the region and clear entryways
- Creation of a vibrant central district
- Active retail, focused on food and beverage
- High quality, attractive multifamily housing at key nodes
- More integral and defining university presence
- Space for business support services

PRODUCT TYPE DIVERSIFICATION

The Research Triangle Park can expand and strengthen its tenant base by providing diverse real estate products that meet the needs of a broader array of firms, most of which today are represented in the Park to varying degrees:

- R&D Firms with large footprints, similar to the larger current Park firms
- Spin-offs, start-ups and other new companies
- "Graduate" companies from nearby incubators and campuses
- Under-recognized or under-served growth businesses, such as contract research organizations (CROs) and contract manufacturing organizations (CMOs)
- Government offices

BUSINESS SUPPORT SERVICES

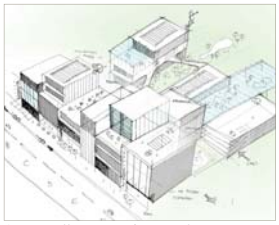
The Research Triangle Foundation can assist both large and small firms in a number of ways that will strengthen company competitiveness and growth opportunities in the Research Triangle:

- Reuse outmoded existing facilities for incubation space
- Provide commercialization support through incubators, a venture capital center, or other scale-up support.
- Create a one-stop shop for basic business needs for small and start-up companies. This could provide a data center, legal services, regulatory assistance, and/ or access to financing
- Continue to support linkages with local universities
- Form linkages with other research centers internationally
- Establish a center for vendor relationships and CRO visibility

NEW PARTNERSHIP MODELS

Creation of new land use development patterns and real estate products in the Park will require strong partnerships between the Research Triangle Foundation, Park companies, real estate developers and governments. The Foundation can play a range of critical roles in these partnerships:

- Encourage and empower Park companies, the owners of the majority of the land within the Park, to build more densely on their properties and to join with other landowners to create new development parcels;
- Engage developers as partners in order to construct one or more mixed-use centers
- Work with local and state governments to update land use regulations that support the creation of new infrastructure.



Concept illustration for mixed-use development

Green development precedent: Nike Headquarters, Nelson Byrd Woltz

Planning Principles

The following planning principles emerged from discussions with a broad range of stakeholders during the course of the project. These principles will be a starting point to frame discussion with Park companies. Once refined, they will serve to guide the physical development in support of the Plan's goals and objectives.

- Favor **clustered, connected, development** to unlock development potential, promote sustainability and to leverage and support a range of future transit initiatives.
- Support development of **diverse types of research facilities**, ranging from multi-tenant buildings in clustered settings to single-use campuses.
- Reposition RTP as a **model of sustainability**.
- Preserve and restore significant **natural systems** with the intent to reinforce habitat corridors and increase biodiversity.
- Enhance the overall setting, better define **key gateways** into the Park, and create attractive **shared open space** to strengthen RTP's identity and visibility.

- Provide a distinctive, vibrant, **mixed-use nexus for research** in one or more areas of the park to foster innovation, promote social interaction, and create signature destinations at the RTP.

- Create **additional development opportunity** on typical "estate properties" by carefully considered amendments to land use regulations, consistent with promoting a park-like, attractive and sustainable setting.

- Plan in concert with surrounding government entities to **enhance connectivity, coordinate development initiatives and support regional natural systems**.

4. The Master Plan

LAND USE AND DENSITY

Long-Term Development Capacity

General Development

Guided Development

PARK-WIDE ELEMENTS

Access And Transportation

Landscape And Natural Systems

Utilities And Infrastructure

GUIDED DEVELOPMENT AREAS

Triangle Commons

Park Center

Kit Creek Center

Land Use And Density

The Master Plan for the Research Triangle Park represents a vision to catalyze and guide development over the next fifty years. The Plan is a blend of Park-wide elements to be realized over time and more concentrated interventions to transform select areas in a way that can benefit RTP as a whole. The Plan is the first step of a process, as the Research Triangle Foundation engages with stakeholders in the Park, in government, and in the development community to create an executable implementation strategy for the Park's future. The Master Plan is framed in a strategic way that provides the flexibility necessary to respond to opportunities and accommodate adjustments that will be necessary as vision is translated into reality.

Amendments to Park land use regulations are needed to unlock development potential and to reposition RTP as a 21st century hub for research and innovation. The Master Plan recommends tiered density controls and a broader range of permitted land uses within the Park in order to introduce more compact, research-based development with a diverse range of product types in select areas. In this tiered model, RTP would have two basic types of development: General Development and Guided Development are suggested. Guided Development areas occur in three locations :

- In the north at a mixed-use development cluster adjacent to the rail right-of-way that runs along the east side of the Park at a location where a new station would be located for a commuter rail service proposed by Triangle Transit.
- At the location of the current Park Center parcel, south of I-40 between Davis Drive and the Triangle Commons Parkway extension.
- In the south where Kit Creek forms a series of linked lakes.

GENERAL DEVELOPMENT

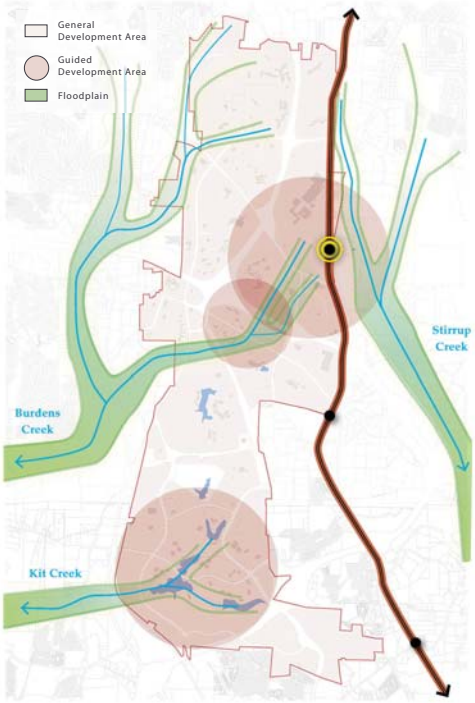
Within General Development parcels, the Plan recommends incremental adjustment to coverage requirements to provide more consistency and development flexibility while preserving significant, unpaved open space to enhance the on-site management of storm water. The Master Plan recommends new setback regulations, both to foster consistency within the Park, and to provide more flexibility to existing companies as they expand their operations. Parcels will be consistent with and reflect the intent of the Jordan Lake watershed overlay districts already mapped in the Park. Permitted uses - research and related functions - will remain unchanged in this tier.

GUIDED DEVELOPMENT

In these areas, the Master Plan recommends broader changes to land use regulations, to foster clustered development and shared management of open space resources. The Plan envisions that detailed master plans will be prepared in each of these areas, with the concurrence and participation of the underlying land owners and consistent with land use policy goals. Uses remain predominantly research-based, but with a greater mix of permitted uses to support and benefit companies and their employees. Each of the guided development areas is described in more detail in the following sections.

LONG-TERM DEVELOPMENT CAPACITY

Preliminary studies indicate that changes in land use regulations in the three guided development areas could permit significant additional development capacity to supplement the additional capacity on remaining vacant sites. Redevelopment and/or expansion on General Development sites would allow even more long-term capacity. Rather than running out of land, RTP has substantial future reserves of development capacity if thoughtful planning and regulatory policies are implemented.



General and guided development areas

Park-Wide Elements

ACCESS AND TRANSPORTATION

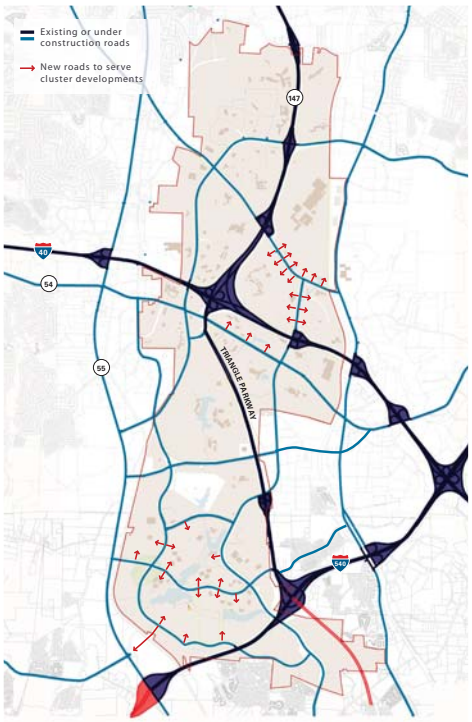
Most people will continue to drive to and from RTP in the near term, but planning for transit alternatives is essential as part of a sustainable vision for the future. The RTP Master Plan reflects a flexible approach to supporting a range of possible transit initiatives, integrated with select new roads where needed to support new development clusters in key areas.

The Road Network

The existing RTP road network has considerable capacity to support the level of additional future development envisioned in the Master Plan. The near-term completion of Triangle Parkway, connecting NC 147 to I-540, will provide a major new highway connection for regional traffic and should relieve congestion at peak times near the NC 147 / I-40 merge and along Park roads used now to attempt to bypass this traffic.

The Master Plan proposes new and modified roads in select guided development areas to create a more diverse range of parcels sizes in these areas as part of the redevelopment. Modifications to some existing roads are also needed in guided development areas to support the Master Plan goals by creating a more pedestrian-friendly road frontage in locations with compact development and transit.

Structured parking would be encouraged to conserve open space. In guided development areas structured parking will be relied on to a greater extent to realize the vision of a compact, walkable, mixed-use development.



Existing and proposed road network

Moving Towards Future Transit

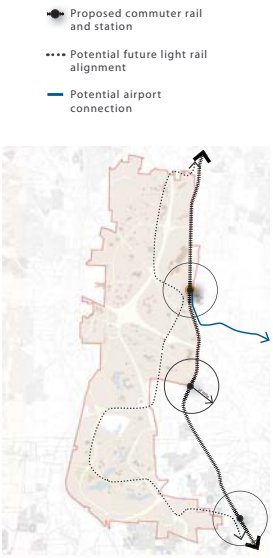
An important part of the Plan is integrating transit planning to identify more sustainable ways of assessing the Park. The current regional transit initiative, led by Triangle Transit, is considering commuter rail and light rail transit (LRT) alternatives. The commuter rail initiative has a strong potential to benefit RTP in the near term. LRT alternatives may be on a longer horizon, but could also benefit the Park with enhanced connectivity.

The commuter rail proposal would connect downtown Durham to southeast Raleigh/Garner by adding a commuter rail track to North Carolina Railroad's (NCRR) existing freight and regional passenger line, currently running along the Park's eastern edge. Triangle Transit has studied proposed commuter station locations and the ability of current and projected adjacent development to support these stations. Two stations are planned at the edge of RTP. The RTP North Station, proximate to the intersection of Cornwallis and Miami, is the location of one of the proposed cluster development districts. This station will be a significant endorsement for this proposed transit-oriented guided development area. The second station, at Triangle Metro Center, is located at the edge of the Park. Here there is less proximate development potential inside the Park, compared to Triangle Commons, but additional existing and potential development abutting the Park will support ridership.

Creating a multi-model center at the RTP North commuter rail station will benefit the Park and the region. Components of this transit center could include a relocation of the Triangle Transit regional bus Transit Center from Imperial Center to this location with access to Miami Boulevard and Cornwallis Drive. A connector to RDU airport, if realized, could also link to this location, perhaps near term by dedicated bus-way, and long term by the elevated Automated People Mover (APM) envisioned by the airport authority. The route past the planned relocated rental car facility could approach RTP via Chin Page Road.

The current LRT alternatives proposed by Triangle Transit reflect two separate systems – one linking Chapel Hill and Durham and a second serving the greater Raleigh area. In current plans, neither LRT alternative extends to the Research Triangle Park. While the timeline for realizing light rail at the Park is unknown, it is prudent to plan for potential LRT In the context of a 50-year RTP Master Plan. This is especially important given the significant population growth projected for the region. Just as the original RTP Master Plan had the foresight to set aside land for transportation infrastructure that is only now being realized 50 years later (Triangle Parkway), this Master Plan identifies how LRT along existing road right-of-ways could one day serve the Park and catalyze additional transit-oriented, compact development. Any LRT should link to the multi-modal center at the RTP North commuter rail station. The route at the north and south ends of the Park should connect to LRT lines running parallel to the NCRR tracks to Durham and Raleigh.

Ideally, many future RTP commuters could walk to work from new rail stations in or next to the Park. For those companies remote from transit stations, shuttle buses could be an alternative for linking rail to final destinations.



LANDSCAPE AND NATURAL SYSTEMS

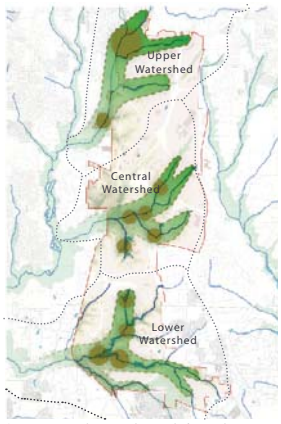
The Master Plan envisions park-wide landscape enhancements in both developed areas and natural areas. Additional landscape projects to frame and enhance proposed new guided development clusters are described in their respective sections of this report.

Natural framework

The existing (mostly wooded) stream corridors provide the most compelling natural framework for RTP's 7,000 acres, despite their disturbed and occasionally eroded conditions. 98% of the Park's total acreage flows in a series of three sub-watersheds into the Burden's Creek and Jordan Lake Watershed to the west and south of the Park's boundaries. These sub-watersheds (roughly equivalent in size and distributed in north, central and south portions), in combination with their corresponding stream corridors and partially intact forested areas provide a reasonable armature for guiding future sustainability oriented development. At first appearance, RTP gives the impression of a relatively homogenous landscape of suburban development interspersed with preserved patches and scrims of existing Piedmont forest. Yet closer scrutiny of the character of the existing cultural and natural landscape suggests that some distinctions might be made between the three watershed precincts within RTP. An over-arching goal is preserving and enhancing the natural stream corridors (with their associated wildlife habitats) to promote an even greater biodiversity within RTP and continue to give the Park a strong sense of continuity and identity. It will also be useful to acknowledge and subtly differentiate the three geographies. These distinguishing characteristics will provide a natural framework for future landscape development in each of these precincts.

Gateways

RTP is entered, primarily by car, in more than a dozen places. Existing signage, both new and old, assists in marking your arrival to RTP, but these thresholds could be made more distinctive in character by the addition of selective planting. The Master Plan recommends identifying and prioritizing a series of landscape gateways as a means to further promote the presence of RTP within its larger context. These gateways can help give RTP a greater identifying physical presence. The focus for gateway enhancements should be at the busiest intersections within RTP where people first arrive from the primary arterial roads. Suggested first priority landscape gateways are the two adjacent Davis Drive intersections at I-40 and NC 54 and at the Cornwallis Drive intersection with NC 147. The Cornwallis Drive intersection with NC 147 is already well-planted with a combination of shade trees, evergreens and a few shrubs and small flowering trees. However, it might benefit from a more consistent and extensive ground plane planting (perhaps of native grasses and wildflowers) and a more uniform grove-like planting of one particular flowering or understory tree. The two Davis Drive intersections at I-40 and NC-54 are also well planted, but could benefit from a more distinctively planted entry thresholds. These entry areas could also use a more consistent ground treatment (other than lawn) with perhaps a consistent regularized planting of one major tree type and one understory flower tree that works to further differentiate the interchange from others along the interstate. The proposed character of all of these threshold landscapes may vary somewhat from one gateway to the next, but in general they should have a scale, simplicity and strength of planting

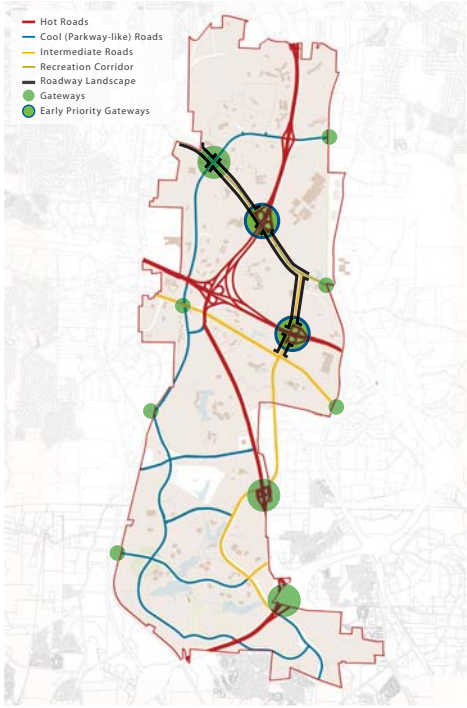


Stream corridors in the Park form three watersheds

expression that both distinguishes them from their immediate surroundings and reinforces the RTP message of research, and sustainability. They should emphasize an ecologically appropriate set of native plants – ones that would be drought tolerant, relatively long-lived, maintenance -free and seasonally expressive. The recent planting palette utilized at the RTF headquarters provides an excellent template for sustainable native planting.

Road Landscape Character

The road corridors that traverse RTP are the primary public landscapes - owned by the counties, with landscape maintained by the Research Triangle Foundation. These roadways provide opportunities to further define the identity and character of the Park. While some of the road verges have been landscaped with a variety of native and ornamental (exotic) plant species, in general many of these road segments—especially the newer ones—could be further differentiated from the road conditions that connect from outside the Park. Use of consistent ground treatment (other than lawn) and more consistent regularized planting of one major tree type and one understory flower tree as employed in the gateways would also work to differentiate these segments. While State of North Carolina highway regulations and existing utility corridors may restrict what might be possible, the Plan recommends that overtime these linear landscape along Park roads be enhanced to reflect a distinctive Park character and sense of identity by employing such consistent planting plans. Existing road corridors could be categorized and designed as either "hot" or "cool" roads. Cool roads, such as Kit's Creek or TW Alexander, would be more parkway-like, usually 2-lane (versus 4-lane), more shaded and more natural in character. Hot roads, such as NC 147 or I-40, would have landscapes designed to reflect their wider (4-lane), faster, more open and sunnier character. To reinforce the RTP brand identity the newer plantings would take cues from the plant palette suggested for the Gateway landscapes -that is, planting to accentuate sustainability and innovation. These more extended linear plantings would also have a strong sense of continuity, simplicity, power and beauty. Early priorities for enhanced roadway landscaping would be extensions of the gateways along Davis and Cornwallis Drives.



Priority gateways and road landscape improvements

UTILITY AND INFRASTRUCTURE

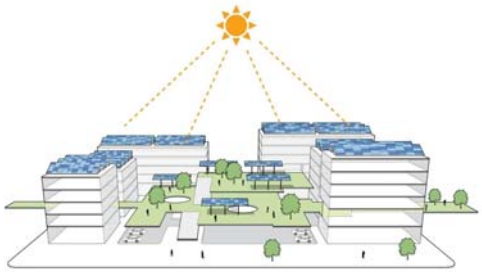
Realizing the additional development in RTP Master Plan will depend on sufficient and sustainable infrastructure. The Park is generally well served by energy, power and water networks. In the long term, however, the water supply might be subject to potential risk of periodic disruption from seasonal drought. Managing water use in a sustainable way is therefore important. This section summarizes utility and infrastructure considerations for the Master Plan. The Sustainability Framework in the following chapter summarizes the range of possible green initiatives for water and other resources that together can provide sufficient, reliable and efficient utility support for the Park in coming decades.

Power

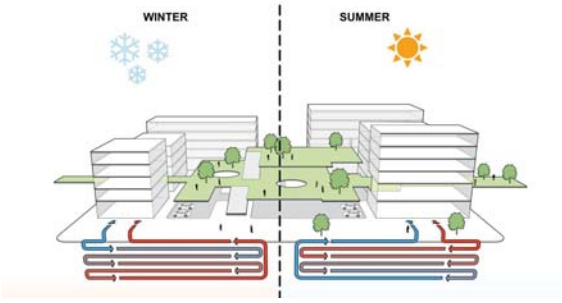
RTP has a number of primary substations within the its boundary and directly adjacent as well as good coverage of above ground MV distribution lines. It is assumed that there may be some spare capacity within the existing power network based upon the projected mix of the development. However it is recommended that further investigation is undertaken with the Power providers, Duke Energy, to determine current spare capacity and impact of development proposals over the project lifetime.

Transmission lines will be extended as needed to serve new development sites. Providing below-grade service would be desirable in cluster development areas to avoid overhead transmission lines in new pedestrian precincts.

The Plan encourages use of renewable energy strategies. Some RTP owners, including the Environmental Protection Agency and GlaskoSmithKline, have already installed photovoltaic panels on rooftops. In the future, roofs of parking garages can be fitted with Photovoltaic panels to produce on-site energy, utilizing available incentives from Duke Energy and other sources.



PV cells to reduce electricity consumption could be located on roofs and used as shading devices in open spaces.



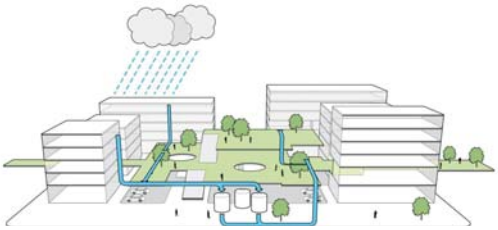
Leveraging the ground as a thermal reservoir and other techniques could be employed.

Telecommunications
The Plan will require private telecommunication service providers to extend fiber and other networks to serve new development in defined right-of-way. As the initial phases of the plan are developed special attention will be required to ensure adequate flexibility and space for upgrades to meet rapidly changing technology needs.

Water
Water lines will be extended to new building sites in guided development areas. To ensure adequate supply for the Park and the region, given periodic drought risks, the Master Plan recommends a wide range of water efficiency measures, including low-flow fixtures, use of native plant species to minimize irrigation needs, and robust water-re-use measures. Development south of I-40 would be planned to link to the proposed Durham / Wake Water Re-Use project. For sites that are not served by this project, measures have been studied for decentralized water re-use on individual sites. These include the use of treatment wetlands to purify waste water for irrigation and cooling tower use. This strategy would reduce water consumption on existing sites by up to 30% . In newly developed areas of the Plan, each new building can be directly linked to nearby treatment wetlands to yield even greater water savings – up to 80%. Sewer systems would still need to link to new development with decentralized waste water treatment as a backup measure required by current codes.

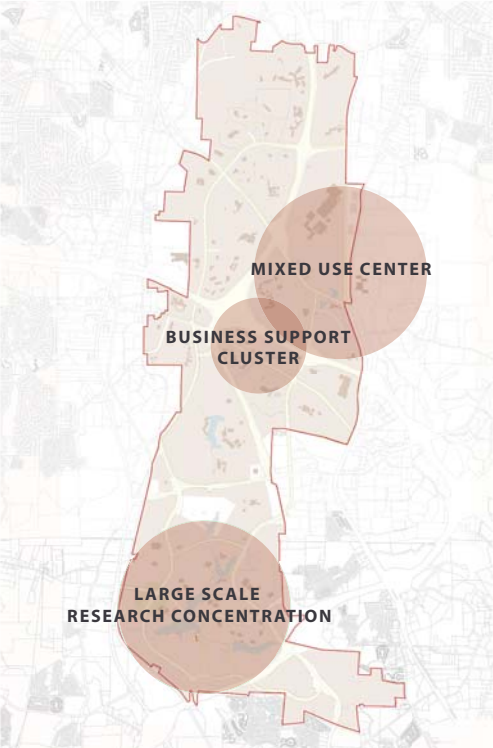
Waste
Solid waste is currently either trucked to landfills or recycled. The Plan has studied the opportunity of a Waste Recovery Facility to serve the entire Park and to significantly increase the rate of recycling, reduce landfill amounts and serve as a model of leading edge environmental stewardship. These and other potential sustainability initiatives are summarized in the Sustainability Framework in the following chapter.

Constructed wetlands used to purify water.

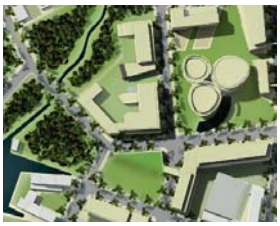

The terraced landscape between the buildings can filter water for use in grey water systems while excess run off is stored in at-grade tanks for future use.

Guided Development Areas

The three areas of guided development in the RTP Master Plan reflect a vision for how key districts within the Park can be regenerated over the coming decades. These changes to the land use framework will provide the Park with a more diverse range of product types. The illustrations in this Plan are aspirational concepts – not literal proposals. The final designs for each area will emerge as a result of detailed master plans, undertaken with the consent and engagement of underlying landowners, in partnership with the Foundation. What is ultimately built will no doubt look quite different. Yet the concept for each area reflects a distinct development aspiration. The goal is that each part of the Park will enrich the whole, and that the new development clusters will attract the next generation of research businesses.



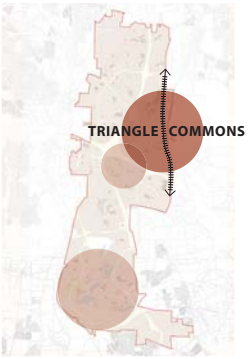
Mixed Use Center: Triangle Commons
This cluster provides the greatest range of amenities and uses to support research and creates a new sense of a heart for the Park. The working title for this area is Triangle Commons.



Business Support Cluster: Park Center
This development, at Park Center, reflects a goal of leveraging the prime location of this site near major regional arterials to create an office / commercial hub in support of Park companies, providing businesses the opportunities to more quickly grow and evolve as needs change.

Large Scale Research Concentration: Kit Creek Center
This development in Wake County, clustered around the Kit Creek Lakes, reflects a goal of creating a critical mass of research businesses sufficient to foster development of transit and amenities around a natural core, with access to a planned mixed-use center and residential cluster adjacent to the Park in Cary.

TRIANGLE COMMONS
A central element of the Master Plan is a new mixed-use center to create an innovative knowledge community at RTP to attract the next generation of knowledge workers. The working title for this cluster is Triangle Commons. This development aims to be a destination at RTP, and to serve as the new heart of the Park. It will merge the social needs of a leading-edge research center with the functional needs of a vibrant mixed use center. Development will be woven together with natural systems to create a lively and sustainable research community. Triangle Commons is envisioned as a transit-oriented development, proximate to the RTP North commuter rail station, planned by Triangle Transit, in an area with nearly 15,000 employees currently within walking distance.



Program Elements
The Master Plan tests a preliminary program vision for Triangle Commons, grounded in research, but enriched by a variety of amenities to make it a vibrant place well beyond normal business hours - an ideal place for its research community to live, work and play. While the actual type and size of development program in first and later phases will emerge in later detailed planning, the total could be in the range of 7 million additional gross square feet, and include a diverse range of uses.

Research Space
Research-based office space will be the primary program element, with a significant amount of incubator space. Tenants would range from major corporations, leasing swing space, to mid-size research companies to small start-ups.

Retail
Ground-level retail space is important for creating a socially engaging setting and pedestrian-friendly environment, and to extend the duration of activity at the Park beyond regular working hours. Retail would include dining and convenience shopping served by both the working population and residents.

Conference Center / Hotel
A Forum / Conference Center will provide an important shared space for Park businesses, the universities and the community. While the Park currently has the seeds of one in the Foundation's Headquarters, the envisioned conference center will support symposia, programs, events, films, concerts and other activities to create a social, cultural and intellectual heart to the Commons. It could be developed jointly with a new hotel, providing one or two hotels in Triangle Commons is consistent with the vision of the Commons as an amenity serving the entire Park.

Residential
To create a more vibrant setting and offer an alternative to commuting younger workers at the Park, the Plan recommends introducing multi-family residential at the Commons, perhaps up to 1,400 units. Residential areas would be within walking distance of the center of Triangle Commons and integrated with parks and stream corridors. A variant on this could be short-stay residential for employees visiting their company's RTP facility for a project assignment.

Science and Technology High School
To leverage the brand identity of the Park and build on the success of regional STEM (Science, Technology, Engineering, and Math) education, the RTP Master Plan includes a program for a new Science and Technology High School. A new facility at the edge of Triangle Commons will add to the diversity of the Commons life.

Opportunities for Higher Education
Triangle Commons could also provide the surrounding universities with program space for continuing education, shared research, and conferences.

Access, Circulation, Parking
As Triangle Commons grows, so should options for its access. The Triangle Commons area will be highly connected, and highly multi-modal, served by regional highways, commuter rail, light rail, regional and local bus routes, and a connection to RDU. Internal circulation will be filtered through a pedestrian-scale street grid, complete with bike lanes, greenways and a potential light rail system. The Plan anticipates that structured parking will be integrated into development and used for most parking in the long term. At the outset, surface parking areas would be planned in such a way that future development accompanied by garage construction can build upon the established street grid and embrace the transit circulation of the Commons.

Open Space and Natural Systems
The open space system in Triangle Commons includes both neighborhood scale open spaces and restored and landscaped stream corridors. The Plan recommends erosion protection measures to restore degraded streams to their natural state and make them part of a larger open space network. Additional storm water retention areas will be needed to enable cluster development. New water bodies will be created and connected to these restored riparian corridors, providing the cluster with recreational areas and distinctive gateways along the cluster's entry roads.

In addition to the restored natural areas, each residential district and research cluster will have neighborhood-scale open spaces. These open spaces will be connected to one another by greenways and streets, complete with swales and landscape setbacks to reinforce natural drainage patterns. The largest of these neighborhood open spaces will be adjacent to the cultural center and school, at the heart of the cluster. This recreation area will potentially have ball fields and open space related to the school, as well as open spaces serving the Triangle Common's research, resident community, and the Park as a whole.

Architectural Character
The architectural character of Triangle Commons should convey that this new heart of Research Triangle Park is a center of innovation and technology, and the nexus of a unique, knowledge-based community. The renderings here represent a vision of what this character could be. They are illustrations of potential concepts and possibilities – of a vibrant mix of activities in a walkable, transit-oriented development integrated with nature. The buildings, whatever their eventual expression, should speak to the unique character of this place and RTP's international standing.

Triangle Common's architecture will be an extension of its planning principles. Buildings of all uses and scales will incorporate technologies and forms that exploit their relationship to nature, reduce internal energy consumption, and focus on water and waste conservation. To reinforce the Park's brand as a leader in technological innovation, buildings in the Commons should demonstrate the highest standards in sustainable design, with high-performance façade systems, water harvesting, and solar hot water.

The illustrated aerial view (preceding page) shows how these strategies can inform the shape and feel of the Triangle Commons community. It shows how multi-family housing fronting a restored stream corridor can use vegetated roofs and interstitial green spaces within the blocks to pull green elements up, over, and through the buildings to connect with a Main Street.

A second view illustrates the concept of this Main Street (opposite page), framed by denser mixed-use buildings, clad in a high-performance facade systems, with internal spaces designed to easily adapt to different users and configurations. This illustration also shows light rail running down the center of the multi-modal main street, with vehicle and bike lanes on either side and PV panels in the roadbed.

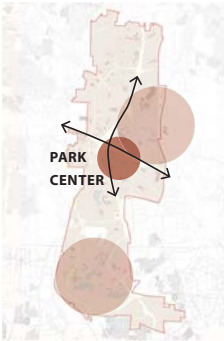
The third view and accompanying diagram illustrates a conceptual vision for a cultural and community center for Triangle Commons, a "Mediatech". This could serve as the community's central gathering space, complete with business, educational and conference facilities, as reflected in its form. The Mediatech would be capable of hosting large scale symposia, reinforcing the Triangle Commons as a place for members of the global innovation community to meet and exchange ideas.

Illustrative concept for a cultural, community, and conference center

Illustrative concept of multi-modal shopping street in Triangle Commons framed by mixed-use buildings clad in high-performance facades.

PARK CENTER

Designated in the original RTP Master Plan as a service center, Park Center was intended to support the Park with retail amenities, office space and hotel accommodations from this central location. Today, Park Center faces significant challenges. Much of its office and retail space is vacant and in aging building stock. Significant improvements are needed to regenerate this visible and important property at the heart of the Park.



Park Center appears ideally suited to become a high density, business-support center, integrated with an enhanced natural setting, given its excellent regional access from I-40 and Triangle Parkway. The existence of ground leases for the existing properties complicates finding short-term, easy solutions. In this future vision, Park Center would be less focused on retail, as Triangle Commons will serve this role in a transit-oriented, mixed-use center in the area. The Master Plan proposes that Park Center be redeveloped to replace obsolete facilities over time and create a more pedestrian-friendly setting, organized around a shared open space along a restored stream corridor. Park Center could include retail amenities targeted to serve the employees of surrounding businesses.

Program Considerations

Park Center currently has approximately 970,000 GSF of facilities on the 5 parcels that comprise the site. This includes office / research (788,000 GSF), hotel (150,000 GSF / 200 keys), and retail (32,000 GSF). The Master Plan vision for Park Center illustrated opposite shows how the site could be redeveloped over time with new and replacement buildings to provide as much as 2 million gross square feet of total floor area for office / research use in support of RTP's mission..

Access, Circulation, Parking

Park Center will continue to have its primary access off of NC 54. While this regeneration of Park Center would require some structured parking to achieve a compact, pedestrian-friendly environment, selected existing surface parking could remain. The enhanced road network within Park Center would reflect the Master Plan goals of providing a finer grid of streets, bike lanes and pedestrian connections.

Park Center aerial, existing conditions

Transit

In the long term, a potential light rail alignment through the Park could provide access to Park Center, either along Davis Drive on the east side of the area, or through a new alignment that would go over I-40. A mile distant from Triangle Metro Center at the intersection of NC 54 and Miami Drive, Park Center is effectively not within walking distance of this planned commuter rail station, but an LRT alignment could be devised to link to the commuter rail to the north at Triangle Commons.

Open Space and Natural Systems

Park Center contains some of the most compromised and disturbed natural systems in RTP. The Burden's Creek corridor from the edge of I-40 to the edge of NC 54 provides an excellent and very visible opportunity for restoration and stormwater improvements. These initiatives should be fully coordinated with future densification of Park Center and should be a primary focus of an interconnected open space system of neighborhood-scale urban parks and paths. Stream restorations and the creation of new trails should be designed in concert with similar initiatives proposed to the north in Triangle Commons. Planting strategies should acknowledge the more urban and visible character of this precinct.

The degraded condition of Burdens Creek today

Initial stream corridor improvements (above) could evolve into an integrated open space network serving Park Center (at right)

Illustrative concept on an active and integrated open space in a redeveloped Park Center.

KIT CREEK CENTER

The concept for Kit Creek Center is a large scale concentration of research facilities focused on a natural core comprised of existing lakes and waterways in the southern, Wake County portion of the Park. The concept encompasses approximately 850 acres and envisions a mix of new development on vacant sites, retention of existing facilities, and the addition of new buildings on sites to create a more compact, pedestrian-friendly setting. In contrast to Triangle Commons, which plans to have a broad mix of program uses, the Kit Creek Center would be primarily a research-focused development. Preliminary study indicates that as much as 5.5 million gross square feet of development is possible in this area, in addition to the existing 3.3 million gross square feet which would remain. Kit Creek Center could include a small core of amenity retail and dining next to a transit stop and existing lakes reinforcing the green character of the cluster.

Parkside Commons, a mixed-use development with retail and residential, is planned immediately adjacent to the southwest corner of the Park by a developer in coordination with the Town of Cary. These amenities can serve Kit Creek Center. Road, bicycle and pedestrian linkages to Parkside Commons will connect a range of amenities and housing opportunities with Kit Creek Center's research facilities. For this reason; a broader range of uses is not required here, as at Triangle Commons. As a result, the program goal for Kit Creek Center is a large scale research concentration.

Open Space and Natural Systems

Kit Creek Center would be defined by its integration with the nature. This part of the Park possesses the most intact and distinctive natural systems within RTP. New development would preserve and frame these lakes and waterways, which provide excellent opportunities for a rich diversity of open spaces and wildlife habitat. A concept for a proposed boardwalk and nature trail along the lake is shown below. Kit Creek's drainage areas should continue to be developed with a healthy balance of preservation, restoration, and recreational access. Similar to the open space strategy described for Park Center, this stream corridor should be seen as the centerpiece of the park system. Future articulation of the pedestrian network at Kit Creek Center could evolve as a distinct natural- to- urban gradation of paths, trails, lakeside promenades, urban greens and parks. This network of greenways could connect the core to surrounding research clusters and nearby Parkside Commons.

Transit

The potential light rail alignment could follow existing right of ways and have stations in several locations in Kit Creek Center, providing regional commuters direct access to their employers and the cluster's core amenities. This light rail could also make connections to one or more of the nearby commuter rail stations.

Access, Circulation, Parking

In the near-term access to the Kit Creek Center will be primarily from its edge roads, including Davis Drive, Louis Stephens, Development Drive, and I-540. Circulation to and from the research clusters will largely rely on existing park roads, with some new roads and a new pedestrian and bike network. These new circulation routes will also make direct connections to nearby Parkside Commons. A mix of surface parking at the periphery and garages in the core would support this new development.

Architectural Character

The Master Plan renderings of Kit Creek Center, like those for Triangle Commons, are illustrations of potential concepts and possibilities. In this case, the vision is a mix of research facilities, lakefront esplanades, and central amenities composed in a walkable, compact development integrated with nature. The architecture character of this lakefront cluster with its amenities reflects the focus of this cluster as nature, to differentiate this place as a unique community of knowledge workers. The form and materials of what is built will evolve from this vision. The eventual character of the place should strive to reflect RTP's distinction as a world-class center of research and technology.

Illustrative concept of new boardwalk and nature trail

Illustrative concept of waterfront amenities at Kit Creek Center

5. Realizing The Plan

IMPLEMENTATION AND PHASING CONSIDERATIONS

LAND USE AND REGULATORY FRAMEWORK

Zoning Context

Zoning Recommendations

General Development Areas

Guided Development Areas

SUSTAINABILITY FRAMEWORK

Water

Energy

Waste

Transportation

Urban Form

Landscape

Buildings

Implementation And Phasing Considerations

While the RTP Master Plan, like the original vision for the Park, aims to guide development for decades to come, action is needed in the near term in order to maintain the Park as a vital element of the region's economy.

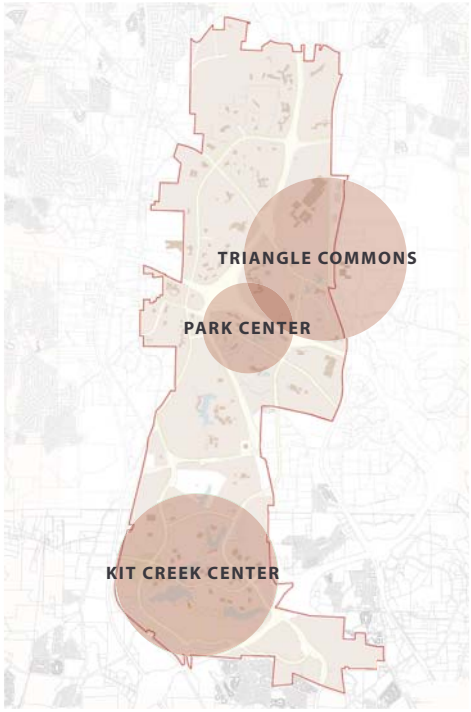
The Master Plan is organized into multiple projects so the vision can be refined and implemented in phases over time in a flexible manner. Priority transformative projects, including Triangle Commons, will themselves entail multiple phases given their scale and ambition and serve as economic catalysts for tapping the development potential of the Park for years to come.

The timeframe to implement the Master Plan will depend on many factors, including market conditions, financing, approvals, and regional transit initiatives.

The Research Triangle Foundation (RTF) will also need to take on new roles and responsibilities. For its first 50 years, RTF primarily sold land and managed Park operations. For the regeneration envisioned in the Master Plan, RTF will need to engage closely with regional planning officials to propose how land use regulations that apply to the Park could be amended for the benefit of RTP and the region. Zoning and other regulatory actions will be necessary to implement many proposed Master Plan elements and enable the physical change required to reposition the RTP in the future to be competitive compared to other science parks, nationally and internationally.

The Master Plan is a first step in RTF engaging with Park owners and tenants to discuss how changes can benefit all and to encourage participation in the development of the Plan. The Foundation, while owning a small number of remaining vacant sites, will nevertheless play a key leadership role to facilitate improvements park-wide – as they have been in commissioning the Master Plan. The participation of site owners will be needed to achieve the vision of the Plan and to develop the full potential of the Park.

Finally, identifying suitable "horizontal" and "vertical" development partners to implement the plan will be essential to translate vision into reality, especially in the guided development areas.



Land Use And Regulatory Framework

A key next step to realizing the Plan is to engage with regional planning authorities to map out the range of approvals that may be required. These primarily will entail zoning changes, regulated by Durham and Wake Counties. Preliminary discussions with the Center of the Region Enterprise (CORE) group of local planning officials have been constructive throughout the planning process. The introduction of multi-family residential and retail at Triangle Commons would not only entail zoning change for permitted uses, but also an amendment to the Foundation's covenants and existing legislation. Approvals may also include local and federal permits for restoration of watersheds, creation of ponds, and development near and enhancements to wetland areas. The extent and nature of these watershed approvals will require detailed planning to confirm the scope of proposed projects. The design and construction of new public roads will need to be approved by NCDOT.

ZONING CONTEXT

Most of the Park in Durham County is designated as Science Research Park (SRP), which permits primarily research activity and excludes most other uses. RTP falls in the suburban tier of density in the Durham Unified Development Ordinance. Current SRP zoning density regulations require large street yards, scaled to the size of each lot, to promote a park-like setting. Side and rear yards requirements are substantial, to buffer and separate adjacent research facilities from one another and mitigate impacts on adjacent properties. Building coverage (including structured parking) is limited to 15%, with no limitation on total impervious coverage (for buildings plus all paved areas). While height is capped at 120 feet or 145 feet with a waiver, this does not appear to be a practical constraint on previous development, which is typically no higher than 5 stories, and well below this limit.

The corresponding zone in Wake County is Research Applications (RA), with similar permitted uses, along with allowances for accessory, non-residential uses. The street yard requirement is based on rights-of-way width (rather than lot size) but also yields large, park-like setbacks. Impervious coverage is regulated in Wake County, limited to 30% of total lot area, while building coverage is not.. As part of an overall strategy for land use in the south of RTP, land that cannot be developed for environmental reasons (primarily lakes and wetlands) has been designated as Natural Area Preserve (NAP). Property owners can effectively purchase NAP acreage to increase the amount of impervious area they can build on their development sites.

At the southwest portion of the Park in both Durham and Wake Counties, watershed overlay districts apply in order to protect the Jordan Lake water supply. The impervious surface limits in Wake County reflect the fact that most of the Wake County portion of the Park falls within the watershed overlay.

Park Center is zoned as Commercial Center, a planned district in Durham County. This permits a range of uses, including office, retail and hotel. Development approval depends on adherence to a filed development plan. The development plan is typically approved as part of the rezoning process; however no approved plan currently exists for Park Center.

ZONING RECOMMENDATIONS

The RTP Master Plan recommends select changes to Durham and Wake County zoning to support the goals for regenerating the Park in a sustainable manner. These recommendations set overall goals for intensity of development, with the greatest intensity in the master-planned Guided Development Areas and lower intensity development in the balance of the Park.

GENERAL DEVELOPMENT AREAS

These areas, as shown on the map opposite, today comprise SRP and RA zones. Permitted uses would remain unchanged as research and directly related support functions. The Master Plan recommends amendments to yard requirements to regularize the current setback distance park-wide, while ensuring sufficient buffers to maintain an attractive, natural setting throughout the Park. Likewise, the Plan recommends incremental adjustment to coverage requirements to provide more development flexibility while preserving significant, unpaved open space to manage stormwater in a sustainable fashion. The goal is to bring SRP and RA back into alignment (as was originally the case) without adverse effect on existing owners. Specifically, an impervious coverage limit would be introduced in Durham's SRP zone in place of the building coverage limit. The goal will be for yard requirements to be the same in both counties.

GUIDED DEVELOPMENT AREAS

The uses and intensity in these areas would change in each guided development area as follows.

Triangle Commons

The area envisioned as Triangle Commons would have significantly greater intensity and mix of uses permitted to support the concept of a compact, walkable and vibrant development at the heart of RTP. The Master Plan recommends changing permitted uses to allow convenience retail, dining, hotel / conference, school facilities, and limited multi-family residential. The core of Triangle Commons would have the highest level of intensity and a rich mix of permitted uses. This would be differentiated as "Tier 1". To achieve a compact, transit-oriented development in Tier 1, yards would be limited, and selective use of "build-to" lines would create a more urban character. Coverage limits would be significantly increased, in keeping with this denser concentration of development. The balance of Triangle Commons would be developed at more moderate intensity levels, to transition to adjacent general development, and would be designated "Tier 2". Logistically, Triangle Commons could be considered as a new zone, SRP-2, with two tiers. SRP could become SRP-1 in the general development areas.

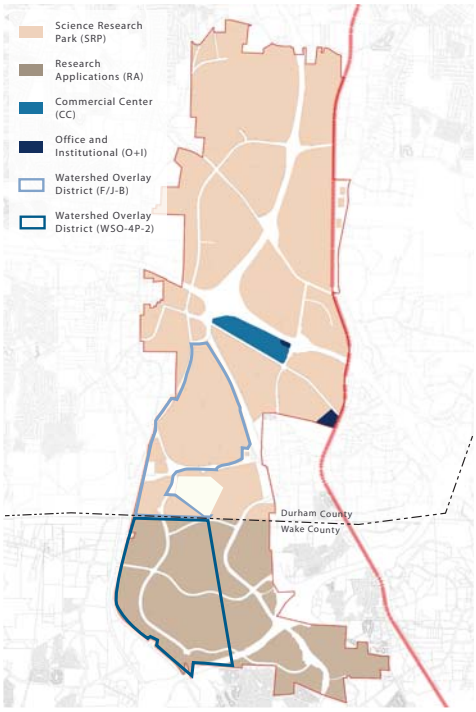
To ensure that the desired character of the Plan is realized, Triangle Commons is envisioned as a planned development area, requiring submittal of a detailed master plan. In this way, the overall scale and character of the cluster can be guided to meet the Park's goals.

Park Center

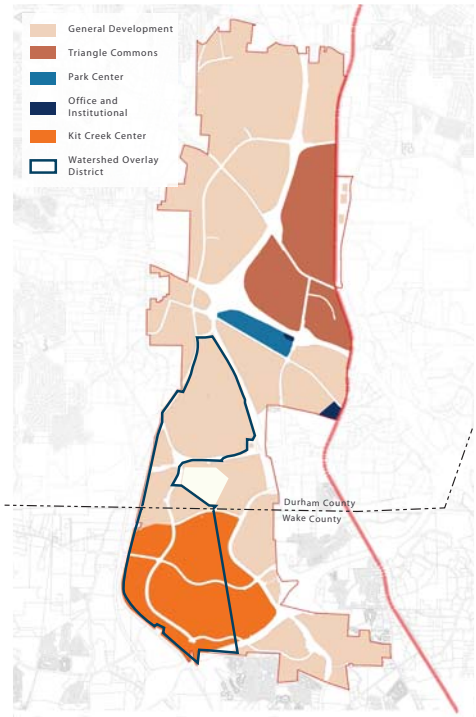
The current Commercial Center (CC) designation supports the uses and scale of density envisioned in the RTP Master Plan, without the need for comprehensive zoning changes. Consistent with the general approach in current zoning, a detailed master plan, prepared in conjunction with the Foundation and land owners, will be needed to guide development.

Kit Creek Center

The area envisioned as Kit Creek Center would also have greater density than typical Park areas. Permitted uses will remain research-focused, but with some dining and convenience retail allowed to serve the area. No residential is planned. Parkside Commons, a planned nearby mixed-use development, will provide a broad range of proximate amenities and mix of uses. To support the concept of a compact, walkable and vibrant development at the heart of Kit Creek Center, yards would, like Triangle Commons, be limited, and build-to lines employed selectively to create a pedestrian supportive environment. Coverage limits would be increased to support this denser concentration, while still following watershed standards. Logistically, Kit Creek Center could be considered as a new zone, RA-2, with the balance of the RA zoning in the Wake County portion of the Park becoming RA-1.



Existing Zoning



Proposed Regulatory Framework

Sustainability Framework

The RTP Master Plan integrates sustainability through each of the plan elements, from park-wide systems to proposals for "green" infrastructure at new developments. Together, the goals and corresponding initiatives for water, energy, waste, transportation, urban form, landscape and buildings constitute the Master Plan's sustainability framework.

The Park has already distinguished itself in sustainability - in how companies build and operate their facilities and in the new technologies invented at RTP or supported by Park companies. All recent buildings at RTP have been LEED certified, and Environment@ RTP is an active Owners and Tenants committee. Organizations including GlaxoSmithKline and the Environmental Protection Agency have implemented significant renewable energy projects on their RTP properties, with the installation of large photovoltaic panel arrays. A key breakthrough in the refinement of the light-emitting diode (LED) light, that resulted in efficiency four times higher than an incandescent bulb happened in 2003 at Cree, Inc., a Park company.

The RTP Master Plan aims to raise the bar for even higher, and move toward a goal of RTP being known globally as leader in sustainability. Implementing this framework will require the Research Triangle Foundation and RTP companies to embrace in this vision. The Foundation will provide leadership, encouragement, and facilitation to Park companies to understand opportunities and benefits as the Plan is implemented. The goal and initiatives described below provide further details to the concepts introduced throughout this planning document.

URBAN FORM

Goals

- In guided development areas, cluster buildings to minimize site disturbance and enhance walkability.
- Locate clusters to maximize opportunities for Transit-Oriented-Development near planned transit stops.

Master Plan Initiatives:

- Three guided development areas: Triangle Commons (located near RTP North station), Park Center, and Kit Creek Center (both with potential to be served by LRT)
- Linkage from Kit Creek Center to the planned adjacent Parkside Commons mixed use center

TRANSPORTATION

Goals

- Plan for a range of possible transit futures at RTP, as alternatives to the single-occupancy vehicle.
- Locate transit routes in the park to serve existing and projected development concentrations.
- Coordinate transportation alternatives to provide the most effective overall system.

Light rail transit

Master Plan Initiatives

- Triangle Commons is located to link to Triangle Transit's planned RTP North commuter rail station, with most development within a half-mile walk.
- A light rail transit (LRT) alignment is proposed in the Master Plan that will serve and connect development clusters in the Park to the surrounding region.
- Master Plan recommendation for a multi-modal node at RTP North Station, with a LRT link, a relocated Regional Transit Center (buses) and a future RDU Connector (bus or Personal Rapid Transit).
- Potential for enhanced bus service within the Park to link to commuter rail.
- Plan new and reconfigured rights-of-way to accommodate bike routes

Commuter rail

LANDSCAPE

Goals

- Create shared open spaces in guided development areas to support pedestrian activity, to link to surrounding development and to provide a natural focus to vibrant, knowledge communities.
- Identify open space to be set aside as wildlife habitat and plan to link to off-site natural corridors to promote bio-diversity.
- Use native plant species whenever possible to reduce irrigation and maintenance needs, and create a more sustainable environment.

Master Plan Initiatives

- Providing green open spaces as integral areas of the development clusters at Triangle Commons, Park Center and Kit Creek Center.
- Restore watersheds in the Triangle Commons and Park Center areas.
- Identify habitat areas to remain as part of the Master Plan comprehensive approach to land use.
- Manage and coordinate impervious coverage requirements park-wide.

BUILDINGS

Goals

- Make advances in sustainable building design and technology a visible symbol of RTP's continuing role as an innovative knowledge community.
- Encourage LEED certification of new construction
- Encourage adaptive reuse of existing buildings where feasible

Master Plan Initiatives

- Promote innovative, sustainable architecture in guided development areas, in concert with development partners.
- In Triangle Commons, promote mixed-use buildings to create a live-work-learn-play environment.
- Consider LEED Gold recommendation for all new construction.
- Integrate viable existing buildings into the master plans proposed in each guided development area.

WATER

Goals

- Minimize water consumption and maximize opportunities for waste water treatment and reuse.
- Encourage building owners to optimize water efficiency technologies.
- Manage stormwater effectively by using "Best Management Practices" to preserve and restore existing watersheds and improve water quality.

Waste water treatment wetland

Master Plan Initiatives

- Coordinate closely with the Jordan Lake Water Reclamation and Reuse Project in implementing the RTP Master Plan to decrease potable water demand, extend the service life of existing infrastructure, reduce nutrient loads to Jordan Lake, provide a new water resource that provides an alternative water supply for non-potable uses, and reduce the need to place restrictions of use of water.
- For areas not served by this project, encourage decentralized waste water re-use projects using natural systems such as treatment wetlands, for irrigation and cooling tower use.
- For new construction, encourage low-flow fixtures and "purple" pipe systems to allow re-use of water for appropriate, non-potable uses.
- Integrate storm water management features, including rain gardens and bio-swales, into open space design to manage the quantity and quality of storm water run -off.

ENERGY

Goals

- Promote energy efficiency measures in new development and in upgrades to existing facilities.
- Encourage renewable energy measures at RTP.

Master Plan Initiatives

- At Triangle Commons, and other locations where more compact development is planned, construct a either a Combined Cooling, Heating, and Power Plant (CCHP) or Local Energy Centers to optimize energy efficiency and reduce carbon emissions. (CCHP provides trigeneration - the simultaneous production of power, converted to electricity via a mechanical process, heat and cooling from a single source such as a gas turbine. The "waste heat" by-product is harnessed, to increase the overall efficiency of the system. Local Energy Centers, owned, operated and maintained by building owners, would provide local heating and cooling to a cluster of adjacent properties, using natural gas and high efficiency equipment.)
- Conduct outreach with Duke Energy to assess opportunities for renewable energy project financing for solar power installations at RTP
- Identify suitable opportunities for the utility to install photovoltaic arrays on garages, parking lots, or buildings.
- Utilize ground-source heat pumps (geothermal) to reduce energy used for cooling and heating.

WASTE

Goal

- Reduce waste to landfill by improving recycling rates

Master Plan Initiatives

- Build a Material Recovery Facility at RTP, similar to one in Raleigh and one planned in Durham. Either partner with an existing operator, or create an entity to maintain the MRF and collect solid waste.
- Continue to provide leadership and encouragement to owners and tenants on recycling initiatives.

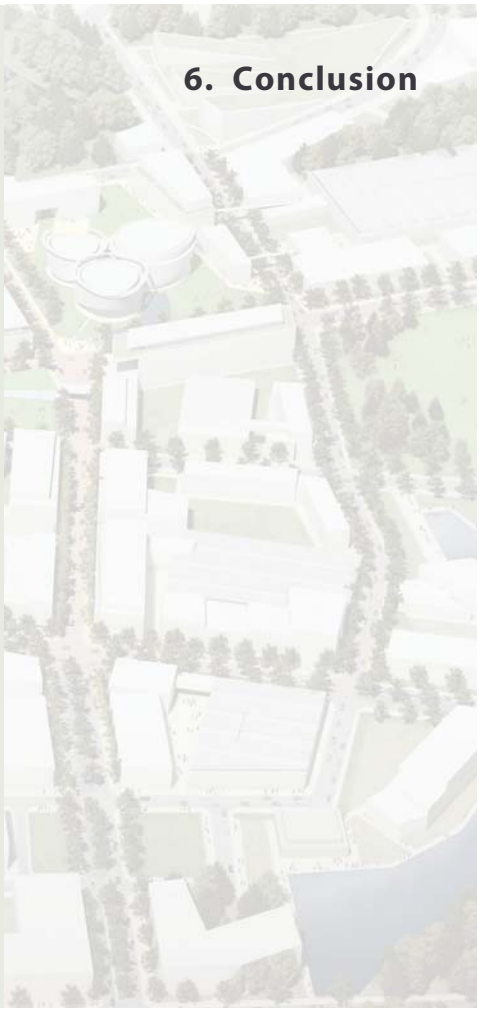
Green roof with solar panel array

Combined cooling, heating and power plant

Parking structure with solar panel array

Material recovery center

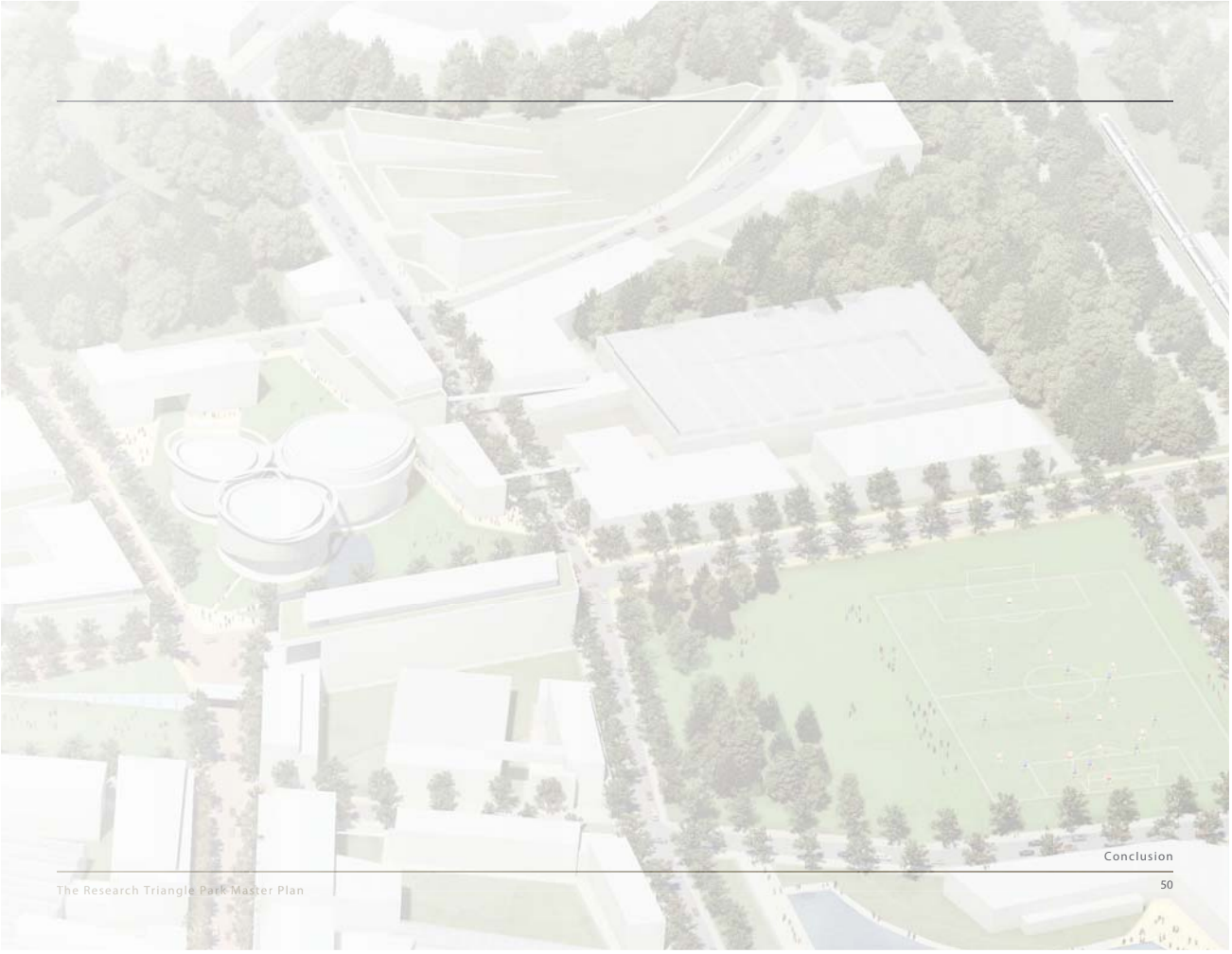
6. Conclusion



Conclusion

The Research Triangle Park is renowned world-wide as a cradle of innovation. To ensure the Park remains at the forefront of technology and applied science, it must reposition itself to respond to new realities – in the global marketplace, in the region, and in the workforce itself. Maintaining the status quo at the Park is not strategically sustainable. The dwindling number of remaining vacant sites and the need for a more vibrant, mixed-use heart where none exists now are but two indicators of the need for change. Just as the original plan for RTP was visionary for the mid 20th Century and a roadmap for significant, positive change, the RTP Master Plan represents a vision for the next 50 years. This vision will enable the Park to re-invent itself to meet the demands of the 21st Century in a way that is responsive to companies looking for a world-class location to conduct research, both existing in the Park and those to come. The Plan is transformative and achievable, tempering vision with pragmatism.

The publication of this report on the Plan is the beginning of a process. The Foundation looks forward to collaborating with stakeholders in RTP, the region and the State to refine the Plan elements and implement them over time. In this way, The Research Triangle Park, as the defining nucleus of the Triangle Area, can help its companies thrive and, in the process, remain an engine of prosperity for the region for decades to come.



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