CONCLUSION

The Twentieth Century has been a period of great growth and maturation for Rutgers-New Brunswick. In its land area, student population, courses of study, and reputation, the university barely resembles the small liberal arts college it was at the last century's turn. With the goal of moving to the vanguard of American public universities, Rutgers seems poised for even greater achievements in the century to come. It must not, however, ignore the issues of land use, transportation, and technology in its pursuit of academic excellence. More than just the sum of its grants and scholarly achievements, a university is a physical entity, a collection of places, people, and facilities that must work together as an organic whole. To attain and maintain ranking among top American research and teaching institutions, the university must be an attractive, modern, efficient, easily traversable place. State-of-the-art facilities, communications, and design will not in and of themselves make a university great. These elements can, however, help retain and attract the first-rate faculty, students, and administrators that propel scholarship forward. More importantly, these elements of physical space can help forge the communities that are essential for collaboration and innovation.

Rutgers-New Brunswick has a wealth of land and facilities, but our analysis of history shows that development at the university is more the result of circumstance and opportunity than of long-range master planning. Far-reaching development plans have rarely been drafted and even more rarely followed. The university has been able to expand its land and mission greatly in the last 100 years. Facilities, however, are geographically, functionally, and stylistically diverse. Distances between campuses, land uses, and academic disciplines pose transportation problems, fragment the university community, and hinder collaboration. The lack of consistent design vocabulary also undermines the image of a unified institution and gives many parts of the campuses an unattractive, uninviting appearance.

Our research shows that many universities are actively engaged in comprehensive master planning efforts that address issues in physical planning, transportation, and aesthetics. We believe Rutgers now has the opportunity to create a physical plan that complements the academic, fiscal, and organizational goals of the Strategic Plan.

Issues arising from the research presented here can form the framework for a Rutgers-New Brunswick master plan. The land-use maps and descriptions catalog the important elements on each campus, showing heavily used nodes and corridors, and the distribution of uses. Site visits led to suggestions of places that work well and those that do not. The analysis showed that, in general, the campuses are not always walkable; that gaps, unattractive spaces, and the lack of gateways detract from a sense of place; and that the campuses are often poorly integrated with the surrounding community.

Our transportation analysis underscores the size and complexity of the transportation system, and points to problem areas in the transportation network such as bus and roadway congestion, high auto use, ubiquitous parking, and
dissatisfaction with the system. The analysis also pointed to potential sources for these problems such as distances between uses, the scheduling and distribution of classes, parking policies, the road network, and lack of provision for alternative transportation modes.

The technology group cataloged the breadth of initiatives in communications, computing, and instructional technology at Rutgers. The consequences of these innovations on building requirements, land use, transportation, and the organization of the university were also explored. Our research shows that it is difficult to predict the direction, timing, and effect of technological change in the long term. All we spoke to agreed, however, that technology available today has the potential to alter the processes of teaching and learning, and that the opportunities and challenges presented by this change require careful, thoughtful planning by the university.

Some of the most valuable ideas that can form the basis for master planning come from the focus groups. In general the groups expressed interest in a combination of all three broad models of development, nodal, central, and linear. Participants would like to see the university keep the existing campus nodes intact, building upon the unique strengths and characteristics inherent in each. They also indicated, however, that in addition to expanding social spaces on the individual campuses, they would like to see a central social/cultural/entertainment facility that could become a common gathering spot for all members of the university community. Tying the nodes and a common central space together with improvements to the George Street corridor was also a popular proposal in focus group discussions. Focus groups anticipated that innovations in instructional and library technology would allow for increased communication and a reduced need for trips during peak hours. Participants stressed however that advances in technology would never eliminate the need for classes or travel between campuses and would, in fact, increase the need for social interaction and face-to-face collaboration in more flexible classroom spaces. Above all, focus group participants indicated that improvement in transportation was the most priority for future campus development.

The recurring themes emerging from our research can be summarized as one central vision: a unified university that respects the unique identities of its individual campuses, and strives to be a part of the community. To achieve this vision we recommend several areas for further study and action. The recommendations, discussed in detail in the land use, technology, and transportation sections above, are synthesized and summarized here.

**Transportation Improvements.** The university should investigate improvements in the transportation system by focusing on three areas:

- Advanced Transit Systems (e.g. Light Rail, Automated Guideway)
- Transportation Demand Management
- Bicycle and Pedestrian Improvements
By applying an appropriate mixture of new transit technologies with demand management and bicycle/pedestrian improvements the university could significantly reduce auto traffic within and between the campuses. This strategy involves push and pull elements. The push element is made up of policies to discourage the use of the automobile for travel on campus including a limit on the number of parking spaces, relocation of parking to peripheral areas, and an increase in parking fees and fines. The pull element is a set of incentives to encourage alternatives to automobile use. Incentives can include improved transit service (free of charge or with discounts for frequent use), improvements in the non-auto circulation network to make walking and biking easier, safer, and more convenient. An important way to improve the transit system would be the implementation of new technology such light rail or automated guideway systems. By improving the speed, capacity, and reliability of the system, the university could increase ridership and decrease congestion on roadways.

Enhanced Social Spaces. Participants in all focus groups noted the need for increased social space at the university, especially given trends in technology that will allow for remote interaction and self study. Participants recommended:

- New University-Wide Social Center
- Improvements to Existing Campus Social Centers

Individual campus centers will always be necessary as nodes that anchor each campus neighborhood. Each should offer a wide range of opportunities and services within walking distance of residences and classes. Amenities and services should be similar at all campuses, but the scale should be appropriate for the anticipated number of users. Although individual campus centers are an important way to strengthen campus identity and community, the students we spoke to also expressed a desire for a campus-wide social facility in a central downtown location. This would be a place for the entire university community to gather. With food, entertainment, a large bookstore, and possibly other major retail, the facility could serve to unite the university, providing a counterpoint to the fragmenting forces of technology, increasing specialization, and geographic distance.

Human Scale/Pedestrian Design. Encouraging walking within each campus not only helps reduce congestion on transit and roadways, but helps to build community, and academic collaboration. We recommend further investigation into:

- Increased Densification
- Mixed Use Development
- Pedestrian Improvements
- Campus Safety and Security Improvements

Denser development patterns and more mixed use development will shorten the distances people must travel between classes, offices, residences, and social
spaces. The university should also consider the proximity of academic departments and disciplines that could benefit from greater interaction. Improving pedestrian pathways and open spaces by making them safer, more attractive, and more direct will also encourage walking. Changing the scale and pattern of development can help students, faculty, and staff feel more comfortable with their surroundings.

Integration with the Community. Improvement of the George Street corridor between the campuses, and better integration with the community at the edges of the university will improve the quality of life for everyone in the New Brunswick area. We recommend:

- Cooperation on a Plan for the Revitalization of George Street
- Joint Public/Private Ventures for Areas Adjacent to the University
- Incentives to encourage faculty to live around university edges.

Joint ventures with local government, such as the successful Civic Square Building project, could provide a way for the university to enhance its facilities and for the city to achieve its economic development goals.

Flexible Spaces. Trends in technology and education suggest that in the future the university will require spaces that are more flexible. We recommend:

- Flexible building design
- Adaptive Reuse
- Mixed Uses

New buildings at the university should be built with flexibility in mind. As study becomes more asynchronous and self-paced in nature students and faculty will need flexible rooms that can integrate group collaboration, individual work, and access to the network and multimedia. Because technology changes so rapidly, buildings should be constructed in such a way that implementation of new technologies (e.g. new wiring, new interfaces) is facilitated. Older buildings can also be retrofitted with these issues in mind thus updating the university while preserving its heritage. As discussed previously, mixing uses can help consolidate the campuses, reducing distances traveled, and increasing the sense of community and campus activity.

Technological Innovation. Focus group participants agreed that Rutgers’ future as a premier research university depends upon its ability to keep up with technological innovation. We recommend:

- Use of technology to fulfill and expand the university mission
- Use of technology to unify campus operations (transportation and communication)
• An organizational response to facilitate evaluation and implementation of new technologies

There is no question that innovations in instructional technology and information delivery will change the process of teaching and learning. That technological advances will also enable new forms of communication that will mitigate campus distances is also not in question. Our research shows, however, that implementation of specific technologies can be complex and costly. The university should, therefore, set up a mechanism to evaluate and implement new technologies on a university-wide basis. Part of the evaluation process should include implications for land use and transportation at the university.

Master Planning. An overarching theme of our project findings is that land use, transportation, and technology at the university are closely intertwined. In making investments for the future, the university is likely to devote considerable resources to all three areas. In the past, these types of investment decisions have been made independent of one another. To get the most for its money, however, we recommend that the university engage in a visioning and master planning effort that allows for consideration of academic goals, and land use, transportation, and technology needs, in tandem. By examining possibilities for synergy, Rutgers-New Brunswick can finally take its place as one of the nation's great academic centers.