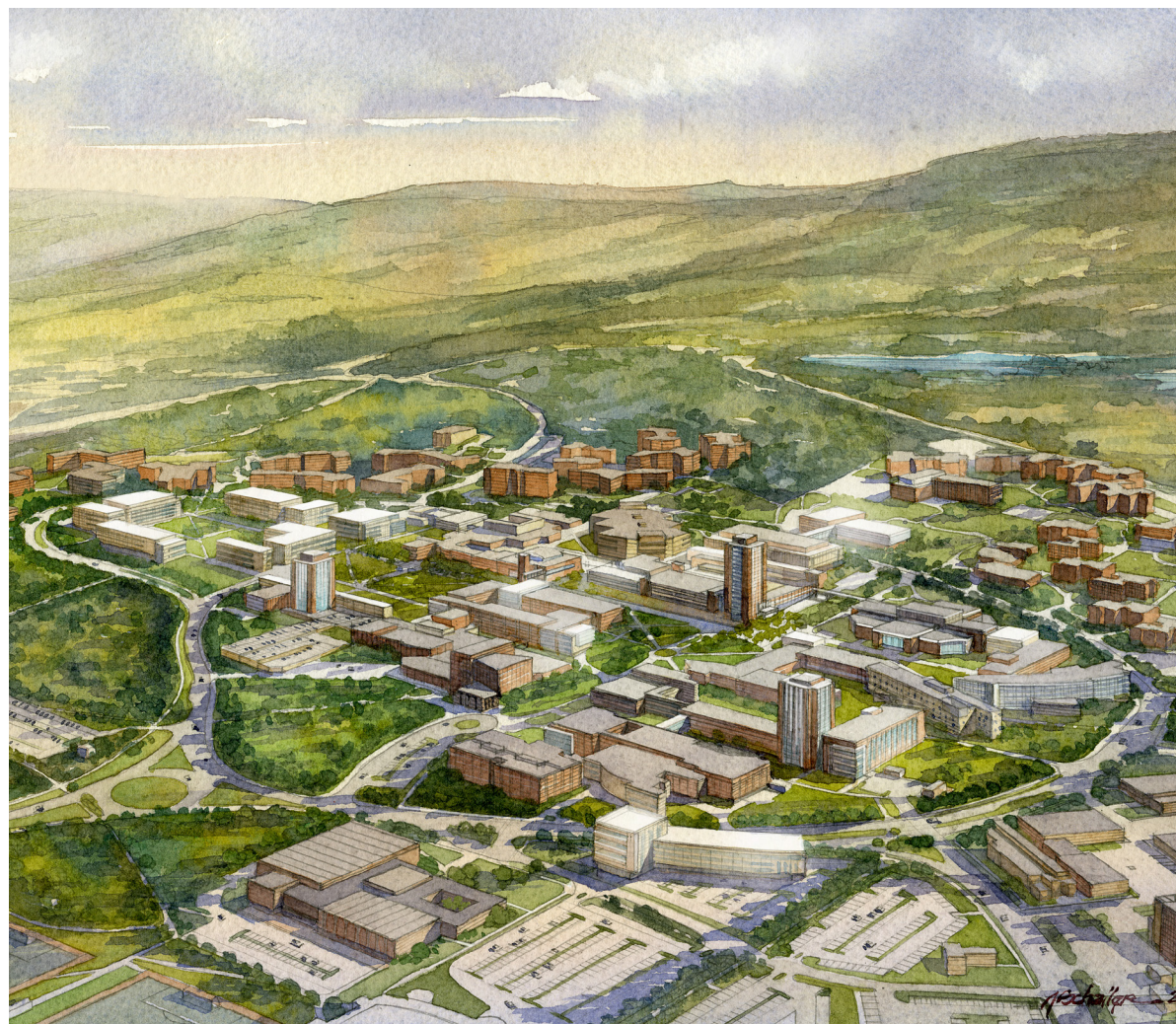


MARCH 2011

PHASE 5: FINAL RECOMMENDATION



FACILITIES MASTER PLAN

CAPITAL PLAN YEARS 2013 TO 2023
STATE UNIVERSITY CONSTRUCTION FUND & BINGHAMTON UNIVERSITY
SUCF PROJECT NUMBER 07839

PERKINS
+ WILL

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5.0 Introduction

Binghamton University is a public research University Center in the State University of New York (SUNY) system. The University includes six schools and offers comprehensive undergraduate and graduate programs in over 130 areas of study.

The University's 619-acre campus is located in Vestal, NY, in the Southern Tier region of Upstate New York. The University also includes a new downtown campus, as well as a number of smaller support facilities in the Southern Tier region.

The State University Construction Fund (SUCF) engaged Perkins+Will to conduct a Facilities Master Plan (FMP) report for the University. The intent of the FMP is to qualify and evaluate the University's existing facilities, and provide a plan for future capital projects to support the University's mission.

The study was initiated in January of 2010, and consists of five phases: Campus Profile, Assessment of Conditions, Analysis of Space Needs, Concept Alternatives, and Final Recommendations.

This report, Final Recommendation, is the fifth phase of five comprising the Facilities Master Plan for Binghamton University. The document presents the final concept for future development of the University over the course of the two capital funding cycles 2013 to 2018 and 2018 to 2023, and outlines future projects for enrollment growth beyond 2023.

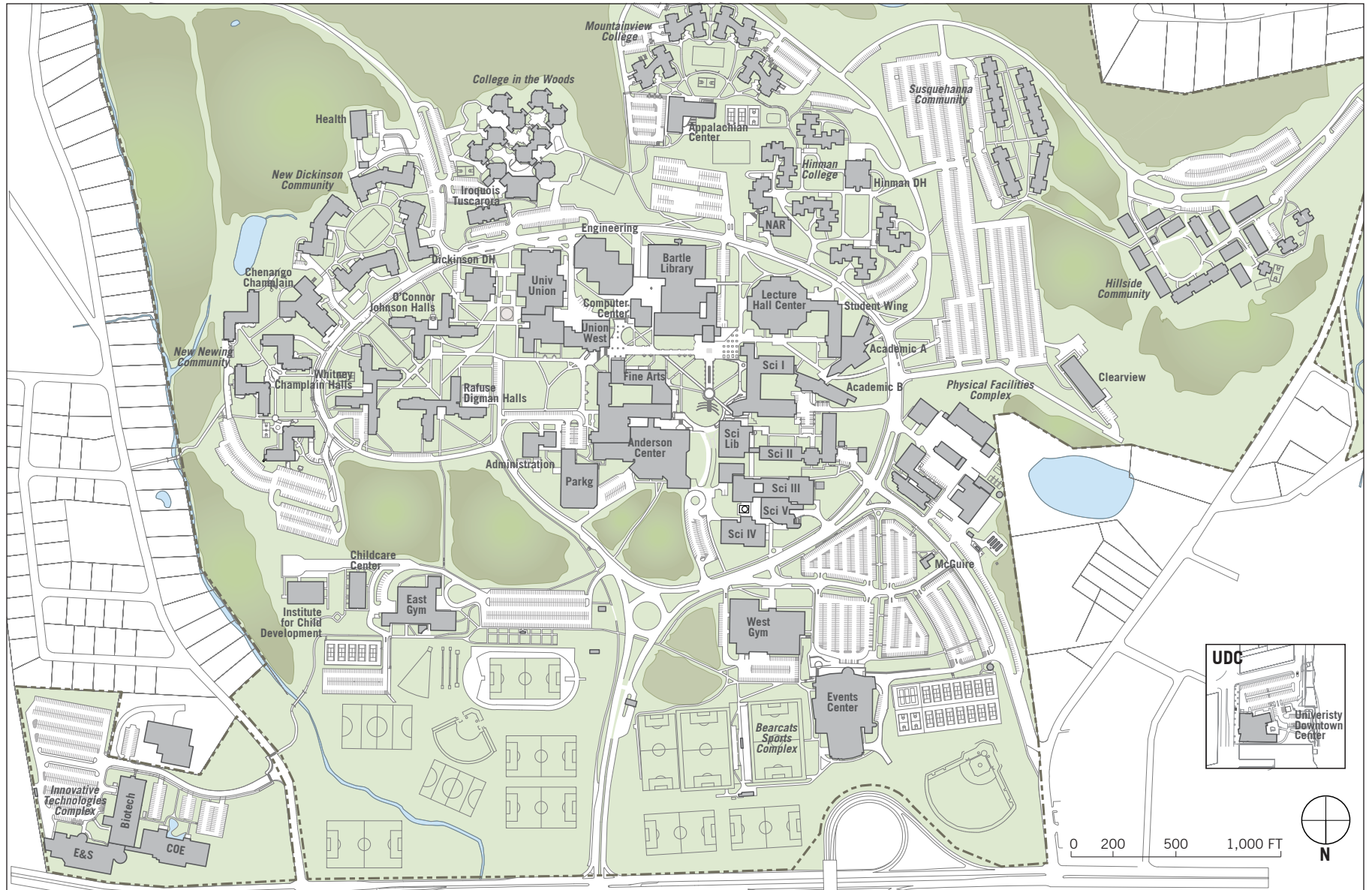


FIGURE 5.0A Binghamton University Existing Campus

5.1 Summary Findings

5.1.1 ACADEMIC MISSION AND STRATEGIC PLAN

ACADEMIC MISSION

Binghamton University defines itself as a premier public university. As such, the University's mission is to enrich the lives of people in the region, nation, and world, through discovery, education, and engagement.

The University identifies its academic mission as follows:

"Our mission is to provide an affordable, world-class education to high-caliber students from culturally and economically diverse backgrounds. Our focus is always on the student. Our internationally renowned faculty members produce amazing scholarship and art, and bring their spirit of inquiry and discovery into the classroom."

As a part of its academic mission, the University identifies three key components:

- 1. World Wise.** Binghamton University believes that a 21st century college education requires a deep engagement with the world. It strives to provide students with a distinctly global experience and foster international perspective in all aspects of college life.
- 2. Innovative.** The University values curiosity and exploration in art and culture; in science and engineering; about people, families, communities, and nations. It continually invests in learning and discovery on multiple platforms to meet the needs of every student. It is committed to providing members of the campus community with high-caliber facilities. Additionally, the University engages in industry partnerships, building a reputation as a nationally recognized research institution.
- 3. Engaged.** The University is committed to providing students with an exciting, fulfilling, and rewarding college experience. It offers a wide array of programming in clubs and organizations, recreational and athletic activities, and at residential-colleges to support the complete BU student.

STRATEGIC PLAN

In 2010, Binghamton University issued an update to its strategic plan, following a number of shifts in its planning environment. During the year, the University underwent a series of leadership changes. In addition, an international fiscal downturn greatly constrained the resources available to the University.

The University's strategic plan identifies a commitment to sustain excellence during the period of transition, blending traditional and innovative approaches to create effective actions. Its vision is as follows:

"Binghamton will distinguish itself as a stellar institution of higher education, one that combines an international reputation for graduate education, research, scholarship and creative endeavor with the best undergraduate programs available at any public university."

To achieve its goals, the University strives to be educationally excellent, innovative, collaborative, global, resourceful, and technological.

EDUCATIONALLY EXEMPLARY

- + Increase the number of tenure/tenure-track faculty who will advance the mission of discovery and learning in both established and emerging programs.
- + Grow and strengthen graduate education.
- + Ensure that Binghamton's undergraduate programs are world-class and visionary.
- + Enhance Binghamton's transfer initiatives.
- + Use research findings and campus assessments to improve student learning.
- + Enhance the role the Division of Student Affairs plays in undergraduate education for students both on and off campus.

INNOVATIVE

- + Provide a "state-of-the-art" environment for research and scholarly activities.
- + Expand University leadership as a "green" campus.

COLLABORATIVE

- + Foster a campus culture of respect.
- + Foster collaborative management principles.
- + Make professional development a University-wide priority.
- + Foster engagement with our communities of interest.
- + Promote the use of research and scholarship in our external communities.

GLOBAL

- + Foster research opportunities with institutions abroad.
- + Enhance students' preparation for a global society.
- + Increase students' exposure to global research and scholarship.
- + Create a synergistic global network of our international students and alumni abroad.

RESOURCEFUL

- + Increase and further diversify educational opportunities.
- + Seek revenue flexibility.
- + Encourage faculty and staff to seek sponsored program funds that advance their particular intellectual interests.
- + Provide competitive doctoral stipends.
- + Develop multiple sources of support for undergraduate students.
- + Successfully meet the goals of the comprehensive gifts campaign.
- + Promote effective deployment of resources.
- + Enhance the University's planning and evaluation processes.
- + Develop a new adaptive master plan for facilities and grounds.

TECHNOLOGICAL

- + Enrich instructional methodologies employed by faculty.
- + Capitalize on the digitization of information.
- + Leverage technology to provide excellent services.
- + Enhance delivery of computing services.

5.1.2 CAMPUS OVERVIEW

Binghamton University consists of a number of State-owned and Binghamton University Foundation-owned properties. In all, the University property comprises 33 parcels for a total of 1,505 acres. Additionally, the Binghamton Foundation established University Plaza LLC as a subsidiary, not-for-profit student housing corporation to develop University Plaza Apartments on Vestal Parkway. University Plaza LLC owns the project for 30 years on land leased from Newman Development. The University maintains no direct link to the private student housing development, which is managed by Ambling Management Co.

SUMMARY OF PROPERTY LOCATIONS

Owned

1. The main BU Campus comprises seven State-owned parcels (619 acres), four NYS Housing Finance Agency-owned parcels (4.2 acres), and 16 Foundation-owned parcels (317.4 acres).
2. The University Downtown Center comprises two State-owned parcels in downtown Binghamton (1.7 acres).
3. 426-428 Commerce Road comprises two Foundation-owned parcels in Vestal (1.63 acres).
4. The Glendale Property comprises one Foundation-owned forested parcel in Union (562.7 acres).

Leased

5. Library Annex at Conklin (Leased facility).
6. Art Factory in downtown Binghamton, housing the Small Business Development Center (Leased facility).
7. Center for Advanced Microelectronics Manufacturing (CAMM) at Endicott Technologies, Inc. (Use agreement).

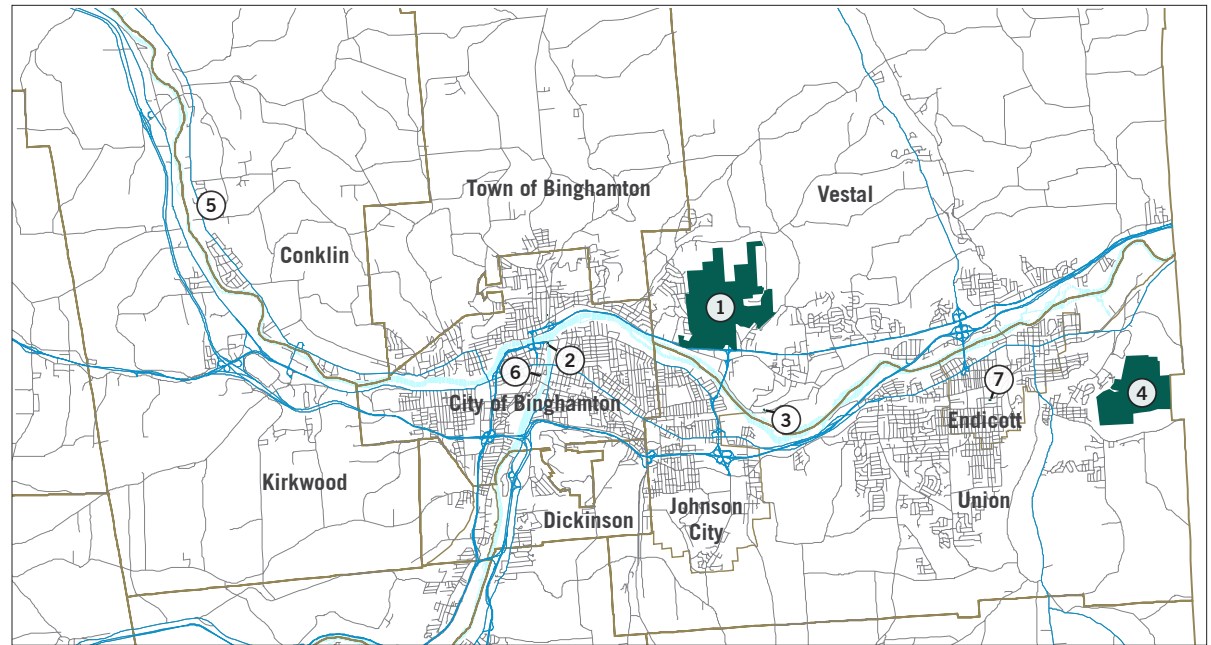


FIGURE 5.1.2A Existing Property Location Map

5.1.3 ASSESSMENT OF CONDITIONS

SUCF and Binghamton University jointly conducted a campus-wide Building Conditions Assessment Survey (BCAS) in 2007. The Assessment evaluates the condition of state-owned facilities based on four major categories: Building Exterior, Building Interior, Mechanical and Plumbing, and Building Electrical. Components of each major category are evaluated for condition on a four-point scale of poor, fair, good, and excellent.

Phase 2 Assessment of Conditions of the FMP confirmed and updated the conditions data reported in the BCAS. Updates are informed by field observations, capital projects, and interviews conducted with facilities management and operations personnel. The figure at the right presents a summary of conditions assessment findings. A composite conditions score of either satisfactory or unsatisfactory is presented for each building based on a weighted averaging of component scores.

The conditions assessment indicates a significant need for renovation at Binghamton University's legacy facilities. Approximately half of today's campus was in existence by 1969. Legacy buildings are characterized by heavy concrete and masonry facades, double-loaded corridors, large lecture halls, and narrow classroom depths. Many remain in operation today, and while they have been well-maintained and are in sound condition, structurally, they require extensive mechanical upgrades and reprogramming to meet contemporary pedagogy needs.

Buildings of primary concern are the Bartle Library, the Computer Center, the Fine Arts Building, and Sciences Complex. Buildings that were constructed or have undergone major renovation more recently are in satisfactory condition.



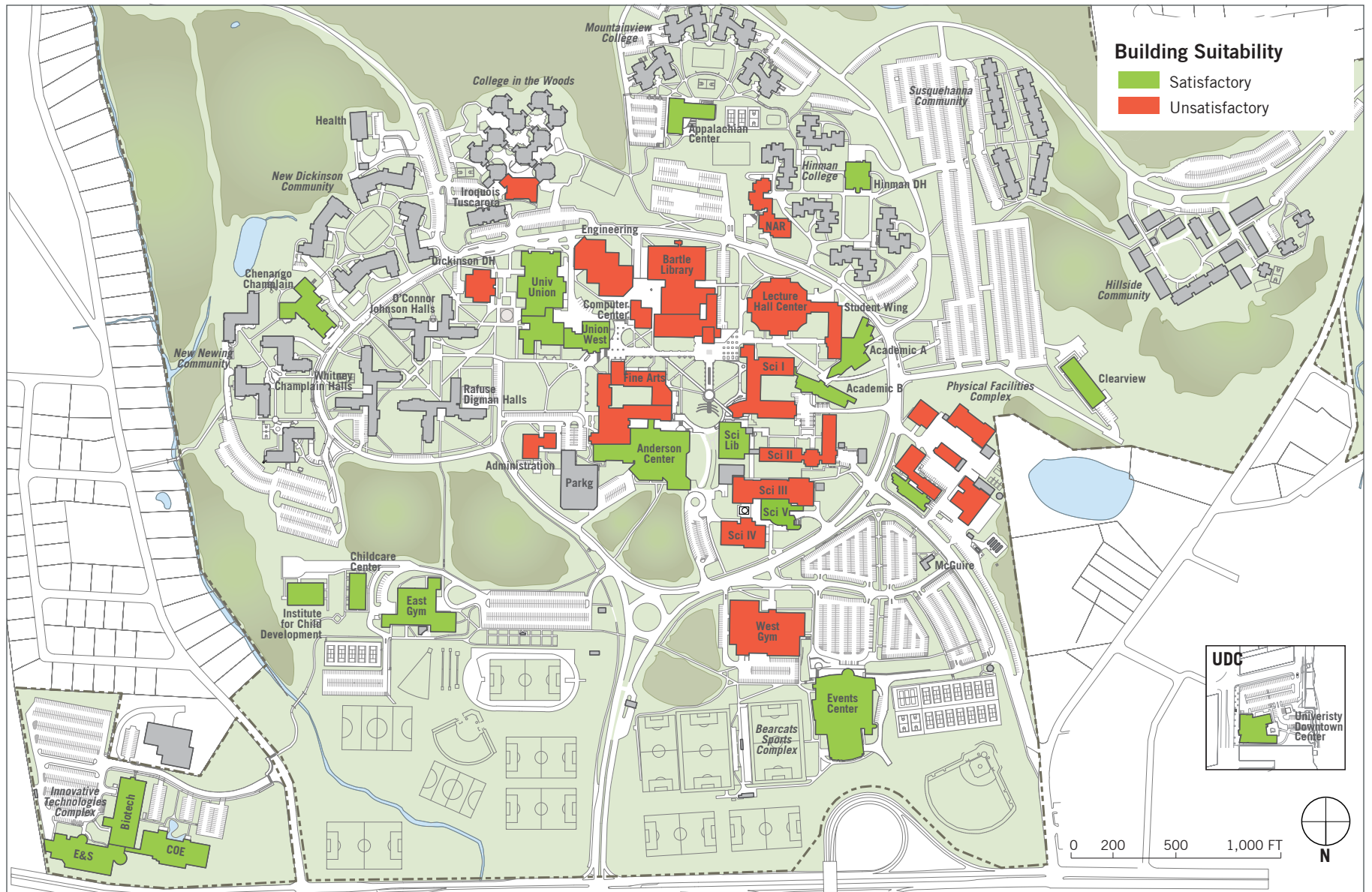


FIGURE 5.1.3A Summary of Building Condition Assessment Survey, updated 2010

5.1.4 ENROLLMENT PROJECTIONS

As a part of the FMP process, Binghamton University's Enrollment Management Group conducted enrollment analysis and issued a projections that reflect its vision for expansion through 2023.

CAMPUS ENROLLMENT PROJECTIONS

The campus projects an overall enrollment growth of 54 percent, or approximately 8,000 FTEs, through 2023. The campus anticipates continual growth throughout the planning period of 2013 to 2023.

The campus projects undergraduate enrollment to grow by 47 percent and graduate level enrollment to increase by a substantive 89 percent. Given these figures, the campus projects that undergraduate enrollment will account for about 78 percent of its total enrollment growth, with graduate enrollment accounting for the remaining 22 percent. This will shift the University's balance of undergraduate to graduate students slightly from its current ratio of 82:18 to a ratio of 78:22.

YEAR	UNDERGRAD	GRAD	TOTAL
2009 (Actual)	12,135	2,590	14,725
2013	13,205	2,823	16,028
2018	14,933	4,280	19,213
2023	17,829	4,902	22,731

FIGURE 5.1.4A Binghamton Enrollment Projections (FTE), Source: Enrollment Management Group Enrollment Projections

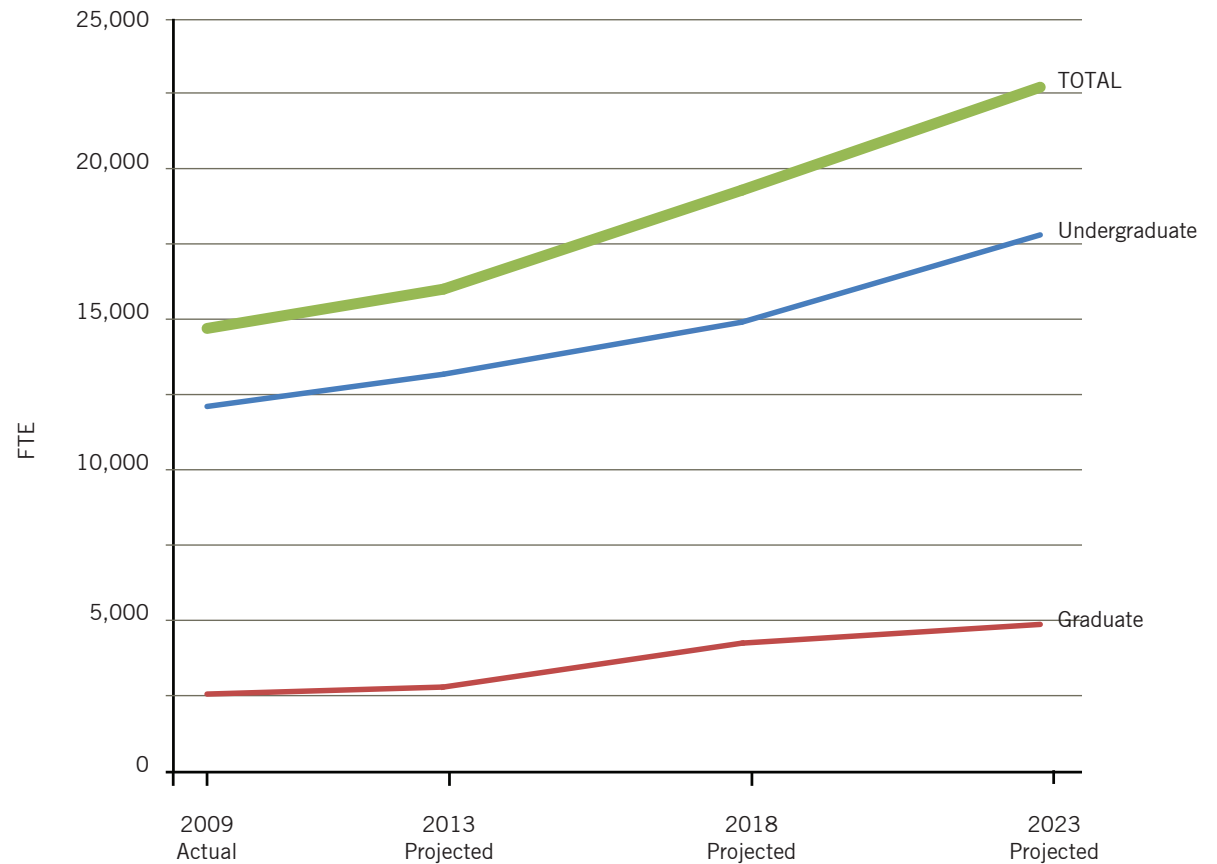


FIGURE 5.1.4B Binghamton Enrollment Projections (FTE), Source: Enrollment Management Group Enrollment Projections

5.1.5 SPACE NEEDS

At a macro-level, Binghamton University operates at a level of assignable square footage per student FTE significantly less than other SUNY institutions, particularly among the University Centers. As reported in section 3.4.2 Benchmarking of Existing Space, in 2009 BU reported a total of 133 ASF per student AAFTE campus-wide, compared with an average of 180 ASF per AAFTE among the other three University Centers. This indicates that BU functions at a highly efficient level, occupying approximately 25 percent less space per student FTE than its system peers.

Further analysis demonstrates that Binghamton University's main campus operates with even greater facilities efficiency. The main campus in Vestal is the location of nearly 95 percent of total facilities, and operates at 121 ASF per student FTE. Due to limited academic programming, the University's secondary location at the University Downtown Center reports 66 ASF per student FTE.

MAGNITUDE OF SPACE NEEDS AT BU

The space needs assessments for Binghamton University for the planning dates of 2009, 2013, 2018, and 2023 are summarized in the chart to the right. The University faces a significant magnitude of need through the planning period. The SUNY assessment indicates a campus-wide need of 2.1 million ASF in 2013 and 2.6 million ASF in 2023. The alternate assessment indicates a more substantive need of 2.5 million ASF in 2013 and 2.9 million ASF in 2023.

ACADEMIC VERSUS SUPPORT SPACE

A facilities inventory for an institution of higher education is comprised of two main components: academic space and support space. Academic space includes all classrooms and labs where instruction occurs, departmental office facilities, and research facilities. Support space includes shared auxiliary facilities required on a campus to support the daily lives of the campus community, such as libraries, student and faculty activity space, student services, administrative services, athletic and recreation space, campus services, and building services.

Binghamton University's 2009 inventory reports a ratio of 40 percent academic to 60 percent support space, an expected proportion for a residential university of its size and type.

The space needs assessment projects this ratio to shift toward the academic side for 45 percent academic space and 55 percent support space. As the University's population grows, a more linear increase in academic space will be required to support the campus population. Assuming the continued concentration of programming at the main campus, efficiency will be gained on the support space side.

PLANNING HORIZONS

Due to the magnitude of enrollment growth and associated space needs, it is important for the FMP to prioritize overall need when sequencing the capital projects in Phases 4 and 5. This will ensure that the correct types of facilities are provided early in the plan, facilities growth in University-identified strategic programs and catalyzing future cycles of renovation.

To aid in prioritization, space needs are separated into two planning horizons: a near-term Building Capacity Period followed by a long-term Sustained Growth Period.

The Building Capacity Period achieves the two-fold purpose of redressing existing facilities capacity and condition issues while also aligning overall facilities provision with the University's revised academic and strategic mission.

The Sustained Growth Period builds on the foundation of the Building Capacity Period, achieving additional facilities capacity to support the University's enrollment growth over the planning horizon, through 2023.

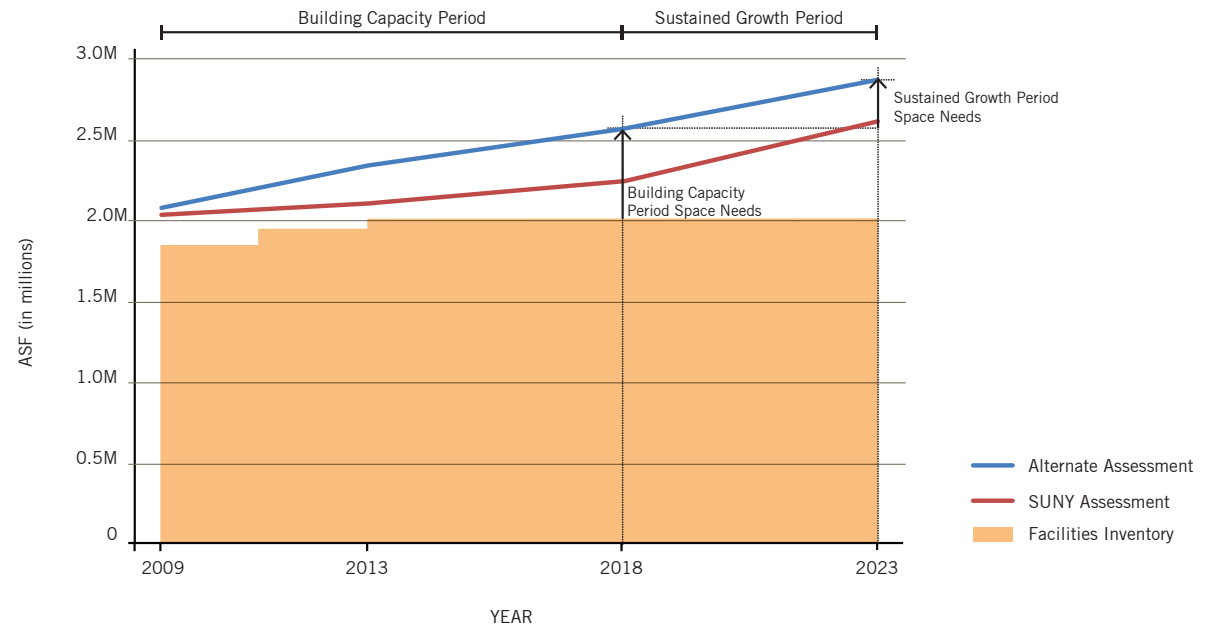


FIGURE 5.1.5A BU Space Needs 2009-2023

5.2 Planning Principles

5.2.1 OVERVIEW AND APPROACH

The Planning Principles for the facilities master plan represent the translation of Binghamton University's academic mission and strategic vision into planning criteria.

The Principles result from the synthesis of two primary data sets, University Drivers and Resource Drivers, which are presented in sections 4.2.1 and 4.2.2. The University Drivers reflect the University's strategic plan document, and indicate how the FMP addresses and makes manifest elements of the plan. The Resource Drivers reflect best practice approaches toward program relocation, renovation, and new construction.

The Planning Principles address four key components of University development: Growth of Binghamton University, Academic Facilities, Support Facilities, and Open Space and Circulation. The Principles serve as the drivers of development for the plan.

5.2.2 UNIVERSITY DRIVERS

EDUCATIONALLY EXEMPLARY

Binghamton University strives to foster a comprehensive learning environment characterized by thought curricula, challenging courses, meaningful interactions with faculty and professional staff, and extensive opportunities for personal growth. The FMP addresses this goal through the following drivers:

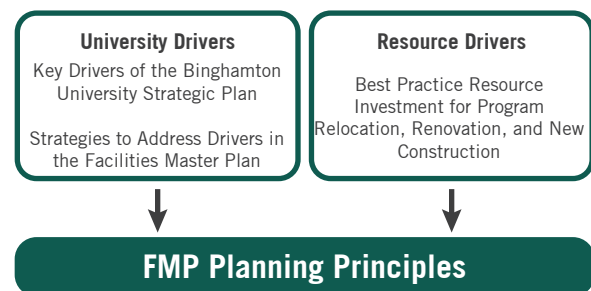


FIGURE 5.2.1A Diagram of Planning Principles Process

- + Provides classrooms, computer labs, class laboratories with the physical environment to support BU's pursuits in innovative teaching and learning.
- + Creates informal learning environments throughout campus for members of the University community to gather, interact, and collaborate.
- + Identifies opportunities for collocation of academic or research units and for provision of new facilities.

INNOVATIVE AND ADAPTIVE

Binghamton University recognizes that innovation flourishes when diverse perspectives are shared, discussed and debated in an environment of respect, and remains committed to the advancement of new ideas, methods, and approaches. The FMP addresses this goal through the following drivers:

- + Identifies the facilities requirements of the University's innovative efforts, particularly spaces that are absent from the University's current portfolio.
- + Creates spaces that are capable of multitasking to accommodate different users and functions.
- + Develops a master plan that is nimble in its response to the different future scenarios that may unfold.

COLLABORATIVE

Binghamton University fosters a collaborate community, with members that engage one another within the campus and also engage with those beyond the campus. The FMP addresses this goal through the following drivers:

- + Provides spaces throughout campus for formal and informal collaboration to occur among students and faculty.
- + Provides touch-down spaces to support interdisciplinary research among multiple departments.
- + Increases access to BU by fostering institutional identity at all sites and potential future "opportunity sites."

GLOBAL

Binghamton University seeks to increase faculty, staff, student and alumni engagement with counterparts in other nations, and bring knowledge and insights from work conducted around

the world and incorporate advancements into the work done on campus. The FMP addresses this goal through the following drivers:

- + Use technology to overcome the physical limitations of space and connect students with worldwide opportunities and link BU's multiple locations.
- + Provide facilities that are comparable to or superior to those found elsewhere to attract and retain world-renowned faculty and students.
- + Develop the main campus and other locations in a sustainable manner.

RESOURCEFUL

Binghamton University aims to maintain the commitment to making available the resources required to achieve the institution's mission of discovery, learning, and engagement, and deploying all resources thoughtfully and effectively. The FMP addresses this goal through the following drivers:

- + Maximize the value of existing facilities and infrastructure investments in and around the Brain.
- + Enhance the utilization of existing campus facilities, considering program redistribution, qualitative condition improvements and new construction.
- + Identify opportunities to collocate academic or research units that utilize similar facilities.

TECHNOLOGICAL

Binghamton University strives to enrich the instructional methodologies employed by faculty, with particular emphasis on capitalizing on the digitization of information and leverage technology to provide excellent services. The FMP addresses this goal through the following drivers:

- + Incorporate technology into learning environments to support pedagogy.
- + Identify opportunities for technology to increase access to the University's unique collections (books, scientific specimens, special collections, etc.), while reducing facilities requirements.
- + Adapt interactive service technologies to supplement and enhance what today are face-to-face encounters.

5.2.3 RESOURCE DRIVERS

Binghamton University is committed to developing a plan that makes the best use of its resources while realizing its strategic goals. Resources are considered to include capital expenditures, facilities, time, and labor. The FMP addresses resource goals through the following drivers:

PROGRAM RELOCATION

- + Consider the desired long-term location of program and move program only once to its desired long-term location.
- + Co-locate complimentary program functions.
- + Align building capabilities with program needs.
- + Vacate space with highest and best use toward meeting strategic objectives.

RENOVATION

- + Renovate large, contiguous zones of space for maximum impact.
- + Renovate to build beautiful, permanent program space.
- + Consider the cost-effectiveness of renovation projects.
- + Achieve minimal campus disruption.
- + Provide swing space that will serve multiple future renovations.
- + Invest minimal capital in swing space.

NEW CONSTRUCTION

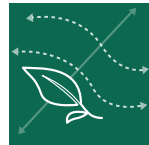
- + Add program space that cannot be achieved effectively through renovation of existing facilities.
- + Use new construction to catalyze cycles of substantive renovation.
- + Use new construction to enhance the connectivity between existing facilities.

5.2.4 PLANNING PRINCIPLES



GROWTH OF BU

- + Retain existing primary facilities locations at the Brain, the Innovative Technology Center (ITC) and the University Downtown Center (UDC), with the Brain serving as the academic core.
- + To maximize utilization of existing and future facilities, pursue development in and around the Brain.
- + Pursue strategic development at the ITC and the UDC.
- + Remain open to development at other opportunity sites in the community, with emphasis on sites that strengthen University partnerships.



OPEN SPACE AND CIRCULATION

- + Clarify campus organization by reinforcing primary circulation axes and featuring the locations where they intersect.
- + Maintain the Lois B. DeFleur Walkway, the Central Campus Commons and the Peace Quad as open spaces, anchored by the axes intersections.
- + Increase connectivity between campus facilities to create a more walkable campus.
- + Lessen pedestrian/vehicular conflicts around East Drive and West Drive.
- + Project the spirit of BU at all campus entrances, highlighting Vestal Parkway as the main entrance.



ACADEMIC FACILITIES

- + Establish the facilities relationships between undergraduate teaching and graduate faculty research space.
- + Align classroom and teaching lab inventory with pedagogy.
- + Consolidate physical collections and storage, while distributing access and displaying unique resources.
- + Due to specialized facilities, maintain existing precincts of Science and Fine Arts.



SUPPORT FACILITIES

- + Complement centralized student life spaces in the University Union with distributed spaces, integrated throughout all campus facilities.
- + Align facilities with the University's goal to support student engagement in physical activities.
- + Co-locate student support services for efficiency and improved student service.
- + Enhance and clarify the visitor's experience, considering arrival, parking, wayfinding, and facilities to welcome guests and project the spirit of BU.
- + Maintain primary administration functions in the Couper Administration Building.
- + Develop campus infrastructure around a model of sustainability.

5.3 Land & Building Use

5.3.1 OVERVIEW AND APPROACH

A facilities master plan is a long-term physical plan that synthesizes an institution’s academic goals and programmatic needs with physical conditions, implementation logistics, and cycles of funding sources. The intent of the plan document is to serve as an effective planning tool for the coming years.

This section of the plan presents the final recommendation for future development at Binghamton University. The recommendation is derived from key data sets compiled in Phases 1, 2, and 3 of the FMP, including elements of the University’s profile such as strategic and academic plans, building conditions assessments, quantitative space needs assessments, and qualitative assessments such as interviews, committee meetings, roundtable discussions, etc.

PLANNING HORIZONS

The FMP address facilities needs over two capital funding cycles from 2013-2018 and 2018-2023. The plan also considers the years leading up to 2013, in effort to set up for major projects over the two cycles.

As summarized in Phases 2 and 3 of the FMP, Binghamton University will experience significant facilities needs through 2023 given the age of existing facilities and projected enrollment growth. Due to the overall magnitude of growth, it is important that the FMP prioritizes need. This will ensure that the right type of space is executed early in the plan, allowing for targeted growth in strategic programs and catalyzing future cycles of renovation.

To aid in prioritization, the final recommendation separates total facilities needs for Binghamton University into two planning horizons: a near-term period of Building Capacity followed by a longer-term period of Sustained Growth.

Building Capacity Period. The building capacity period achieves the purposes of redressing existing facilities capacity and conditions issues, aligning facilities with the University’s revised academic and strategic missions, and addressing space needs associated with 2018 enrollment growth. Given

project schedules, implementation of building capacity period projects extend from 2013 to 2023, outlined in section 5.8 Implementation.

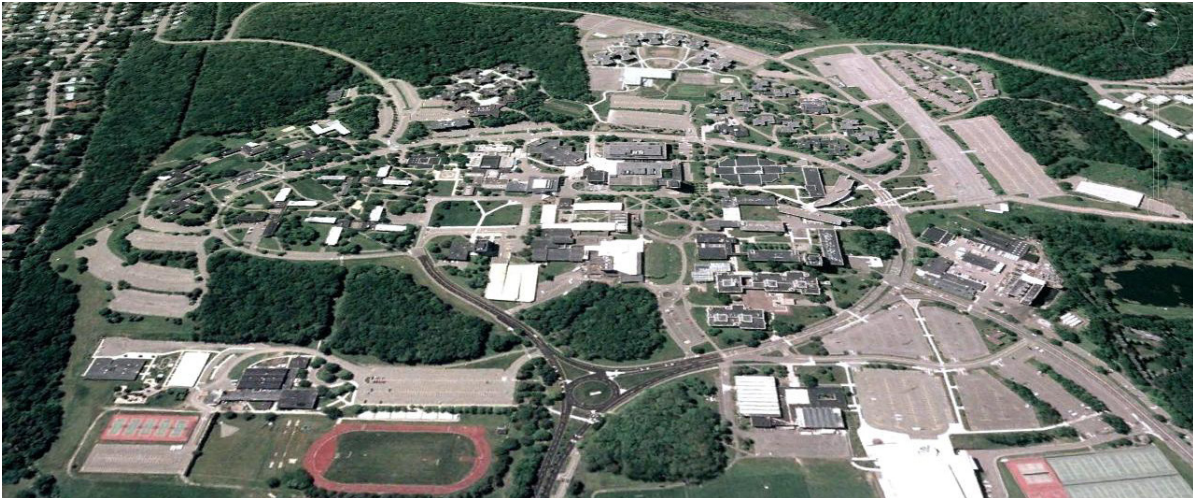
Sustained Growth Period. The sustained growth period builds on the foundation of the building capacity period, achieving additional facilities capacity to support the University’s full 2023 enrollment growth. Implementation of sustained growth period projects extend into the period beyond 2023, outlined in section 5.8 Implementation.

PROGRAM FAMILIES

To support plan clarity, the final recommendation organizes the University into manageable planning units consisting of clusters of departments or programs. Through these program families, linkages and potential adjacencies between components emerge. The recommendation contains a section for each program family, describing primary goals and strategies for redevelopment. To further communicate prioritization, a phasing graphic accompanies each program family section, placing the proposed strategies into one of three phases: near-term, intermediate-term, or long-term.

RECOMMENDATION METRICS	GSF
Renovation	1,310,000
New Construction	1,425,000
Building Capacity Period	835,000
Sustained Growth Period	590,000

FIGURE 5.3.1A Overview of the Final Recommendation



Program Families	Departments and Programs
Harpur Fine Arts, Humanities, Social Sciences, Math	Africana Studies, Art History, Art Studio, Asian & Asian-American Studies, Cinema, Classical & Near Eastern Studies, Comparative Literature, Economics, English, General Literature & Rhetoric, Geography, German & Russian Studies, History, Judaic Studies, Latin American & Caribbean Studies, Mathematics, Medieval Studies, Music, Philosophy, Political Science, Romance Languages & Literature, Sociology, Theater, Women's Studies
Harpur Sciences & Anthropology	Anthropology, Biology, Chemistry, Geological Sciences & Environmental Studies, Lab Animal Resources, Physics, Applied Physics & Astronomy, Psychology
Watson Engineering	Bioengineering, Computer Science, Electrical Engineering, Engineering Design, Mechanical Engineering, Systems & Industrial Engineering
Professional Programs	Clinical Campus, College of Community and Public Affairs, School of Education, School of Management, School of Nursing
Classrooms & Computer Labs	General Classrooms, Lecture Halls, Seminar Rooms, Computer Labs and PODs
Centers, Institutes & Grant Funded Programs	All Centers and Institutes*, Organized Research Program Development, Public Archaeology Facility, Research & Sponsored Programs, Sponsored Program Development, Start Up Suite
Libraries	University Library
Student Activities, Student Services, Administration, ITS	Student Activities & Student Service**, Administration***, Computer Services, Computer Services Operations, Educational Communications, Enginet,
Athletics, Recreation, Health & Wellness Studies	Athletics, Director's Office HPE, Physical Education (Health & Wellness Studies), Recreation
Campus Services & Building Services	Custodial Services, Environmental Health & Safety, Physical Facilities, University Police

List of departments is not comprehensive of all campus departments.

*Centers and Institutes: New York State Center of Excellence at BU: Small Scale Systems Integrated Packaging (S3IP), consisting of Center for Advanced Microelectronics Manufacturing (CAMM), Center for Autonomous Solar Power (CASP), Integrated Electronics Engineering Center. Organized Research Centers: Center for Advanced Information Technologies (CAIT), Center for Advanced Sensors and Environmental Systems (CASE), Center for Applied Community Research and Development (CACRD), Center for Cognitive and Psycholinguistic Sciences (CaPS), Center for Development and Behavioral Neuroscience (CDBN), Center for the Historic Study of Women & Gender (CHSWG), Center for Integrated Watershed Studies (CIWS), Center for Interdisciplinary Studies in Philosophy, Interpretation, and Culture (CPIC), Center for Leadership Studies (CLS), Center for Medieval and Renaissance Studies (CEMERS), Center for Science, Mathematics, and Technology Education (CSMTE), Center for the Teaching of American History (CTAH), Center for Writers (CW), Clinical Science and Engineering Research (CSERC), Institute for Materials Research (IMR), Institute of Biomedical Technology (IBT), Linux Technology Center (LTC), Public Archaeology Facility (PAF), Roger L. Kresge Center for Nursing Research (KCNr). Institute of Advanced Studies: Fernand Braudel Center for the Study of Economies, Historical Systems, and Civilizations (FBC), Institute for Advanced Studies in Humanities (IASH), Institute for Asia and Asian Diasporas (IAAD), Center for Korean Studies (CKS), Institute for Evolutionary Studies (Evos), Institute of Global Cultural Studies (IGCS), Institute for Intergenerational Studies, Watson Institute for Systems Excellence (WISE). Other Centers and Institutes: Center for Computing Technologies, Center for Research in Translation, Center on Democratic Performance, Confucius Center, Global Publications, Handbook of the World, Institute for Child Development, Medieval & Early Renaissance Center, Primary & Preventative Health.

**Student Activities & Student Services: Academic Advising, Admissions, Binghamton Scholars, Campus Life, Career Development Center, Center for Civic Engagement, Child Care, Dean of Students, English as a Second Language, Educational Opportunity Program, Financial Aid, Hillel National Organization, International Student and Scholar Services, Languages Across the Curriculum, Office of International Programs, Services for Students with Disabilities, Student Health Services, Student Organizations, TRIO & Veteran's Programs, University Counseling Center, University Registrar, University Union, Writing Center

***Administration: Accounts Payable, Alumni & Parent Relations, Auxiliary Services, Auxiliary Services Corporation, Binghamton Foundation, Budgeting Office, Business Affairs, Central Duplicating & Printing, Chief Administrative Office, Compliance & Risk Management, Continuing Education and Outreach, Creative Services, Employee Assistance Program, Dean of CCPA, Dean of Harpur College, Dean of the School of Education, Dean of the School of Management, Dean of the School of Nursing, Enrollment Management, Faculty Senate, Graduate School Provost, Harpur's Ferry, Human Resources, International Affairs, Institutional Studies, Internal Controls, Off Campus College, Purchasing, Sodexo, Strategic Partnership for Industrial Resurgence, Student Affairs Assessment, Student Conduct Office, Telecommunications, Translation Program, Union Offices, University Communications, University Copy Center, VP for Academic Affairs, VP for External Affairs, VP for Finance & Management, VP for Research, VP for Student Affairs

FIGURE 5.3.1B FMP Program Families and Constituent Departments and Programs

5.3.2 SITE DEVELOPMENT STRATEGY

Binghamton University currently occupies two main campus sites, one in Vestal and one in downtown Binghamton. The two main sites are supplemented by additional specialized off-campus locations. As the University continues to grow, it will build upon the critical mass of academic programming and facilities located at its main campus in Vestal and maintain its downtown campus, while also remaining open to development at opportunity sites in the broader region.

MAIN CAMPUS

The University's main campus in Vestal serves as the primary hub for academic programming and student life and contains over 90 percent of the institution's total facilities. The campus includes academic and research buildings, student activities and student services, administrative offices, athletics and recreation facilities, and student housing.

In the future, the University plans to maintain the main campus as its primary location, retaining existing academic and student life programs. As a result, projected 2023 enrollment growth disproportionately affects the main campus, yielding substantive facilities needs. New academic facilities will support growth in the liberal arts, sciences, and professional programs, while support facilities will provide additional student life space to support a growing population. Additionally, new facilities will serve a critical role in facilitating extensive cycles of renovation in legacy buildings.

UNIVERSITY DOWNTOWN CENTER

The University Downtown Center (UDC) in downtown Binghamton accommodates the College of Community and Public Affairs and supporting program. Due to the program's close affiliation with community organizations, the location downtown in close proximity to the community functions well for CCPA. The facility also contains BU's center for outreach.

In the future, the University intends to maintain the UDC as the primary location for CCPA. With future enrollment increases and associated demands for space, the program may be required to make use of facilities at the main campus to supplement existing facilities downtown.

OFF-CAMPUS LOCATIONS

The University maintains a number of off-campus locations that are either State-owned, Foundation-owned, or leased. In most instances, off-campus locations support a specific institutional focus, such as library material storages at the Library Annex or vehicle parking and physical facilities storage at the Commerce Road facility. Off-campus locations include the following: 426-428 Commerce Road (Foundation-owned), Glendale Property forested parcel (Foundation-owned), Library Annex at Conklin (leased), Art Factory Small Business Development Center (leased), and the Center for Advanced Microelectronics Manufacturing at Endicott Interconnect (use agreement).

OPPORTUNITY SITES

As a vibrant University Center in the SUNY system, Binghamton University is an integral part of its surrounding region. In the future, opportunities for development of University facilities may arise at sites outside of the main campus or the UDC. To remain nimble to such opportunities, the FMP carries key program elements as distinct, separate entities that may be placed at the most opportune location at the time of project realization. For example, the plan approaches the Law School in this manner.



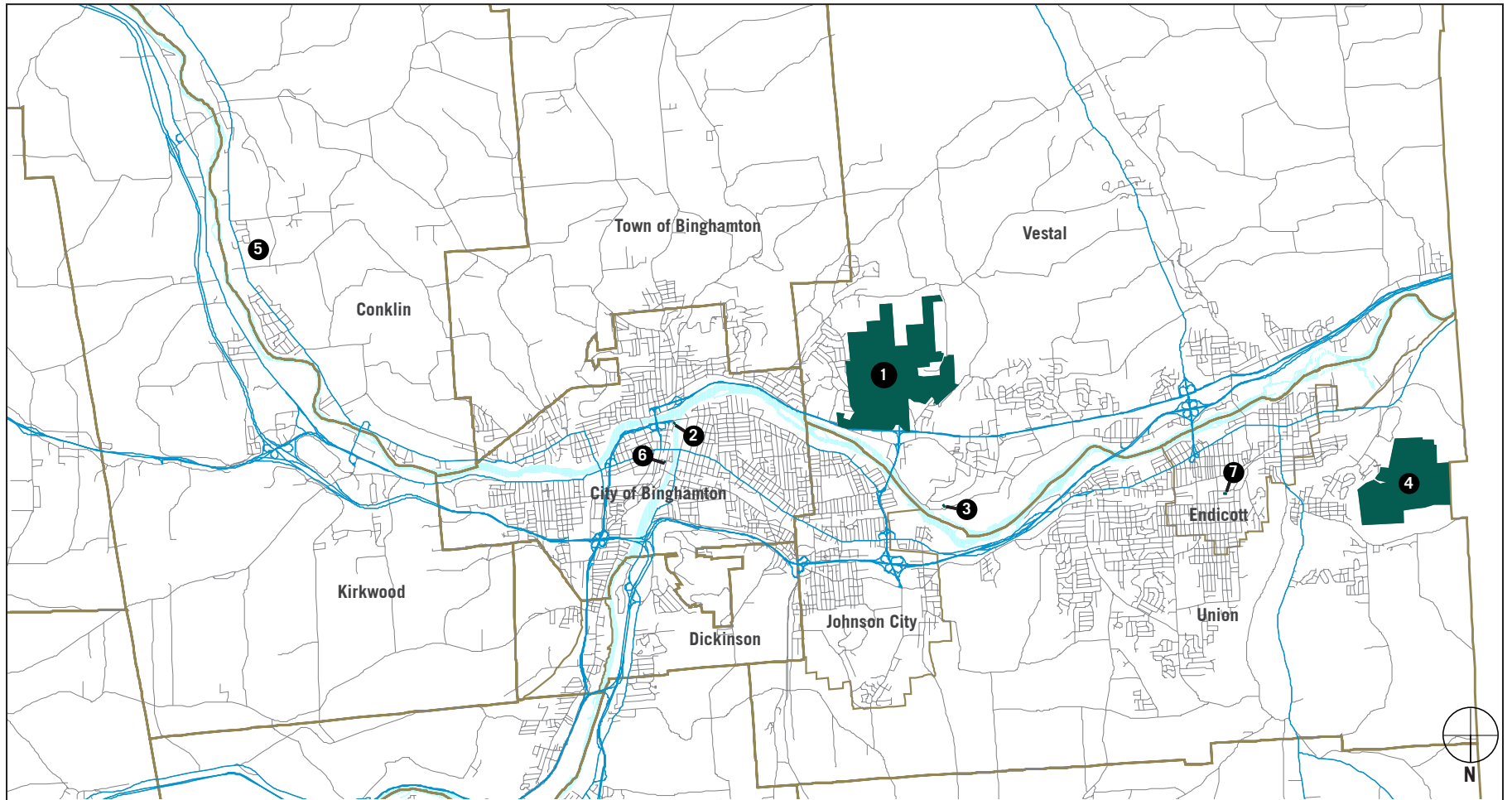


FIGURE 5.3.2A Existing Property Location Map

- | | |
|---|--|
| 1. Main Campus (State and Foundation Owned) | 5. Library Annex at Conklin (Leased) |
| 2. University Downtown Center (State Owned) | 6. Art Factory (Leased) |
| 3. 426-428 Commerce Road (Foundation Owned) | 7. CAMM at Endicott Interconnect (Use Agreement) |
| 4. Glendale Property Forested Parcel (Foundation Owned) | |

5.3.3 BUILDING CAPACITY PERIOD

The building capacity period includes renovation and new construction projects that redress existing facilities capacity and conditions issues, align facilities with the University's revised academic and strategic missions, and address space needs associated with 2018 enrollment growth.

Key project initiatives include the following:

- + New ITC Health & Natural Sciences at the ITC Campus
- + New Interdisciplinary Academic Center at Visitor's Lot
- + New Globalization Center at the East Campus
- + Harpur Center at the Computer Center
- + Major renovations at Bartle Library, the Fine Arts Building, and the Sciences Complex
- + New School of Law at an Off Campus Location

FACILITIES INVESTMENT

The diagram on the opposite page outlines the facilities investment associated with the building capacity period. The adjacent chart provides definitions for each investment category. Renovation investment is closely tied to building condition and suitability findings.

CATEGORY	DESCRIPTION
Minor to Moderate Renovation & Reprogramming	Buildings that require full or partial minor to moderate upgrades including relocation of interior partitions, upgrade of finishes, exterior facade work, etc. but whose internal systems are still viable. Similarly, buildings that will be reconfigured to house new functions but will only require minor architectural upgrades.
Major Renovation & Reprogramming	Buildings that are structurally sound but require significant overhaul of building systems and architectural modifications to conform with current life safety and accessibility standards. Given the extent of such building renovations, these are considered candidates for wholesale reprogramming.
New Construction	New construction serves the dual purpose of providing additional high-quality program space on campus to support the University population, as well as facilitating major renovation of existing facilities. New construction either takes the form of entirely new buildings or additions to existing facilities.
Not Considered	Residential hall-related projects not considered in the scope of the FMP.
Existing To Remain	Buildings of recent construction or renovation that significantly fulfill their purpose.
No New Investment	Buildings that are structurally deficient, would require excessive capital investment to meet anticipated campus needs, or where further capital investment exceeds building value.

FIGURE 5.3.3A Facilities Investment Summary Legend

BUILDING CAPACITY PERIOD

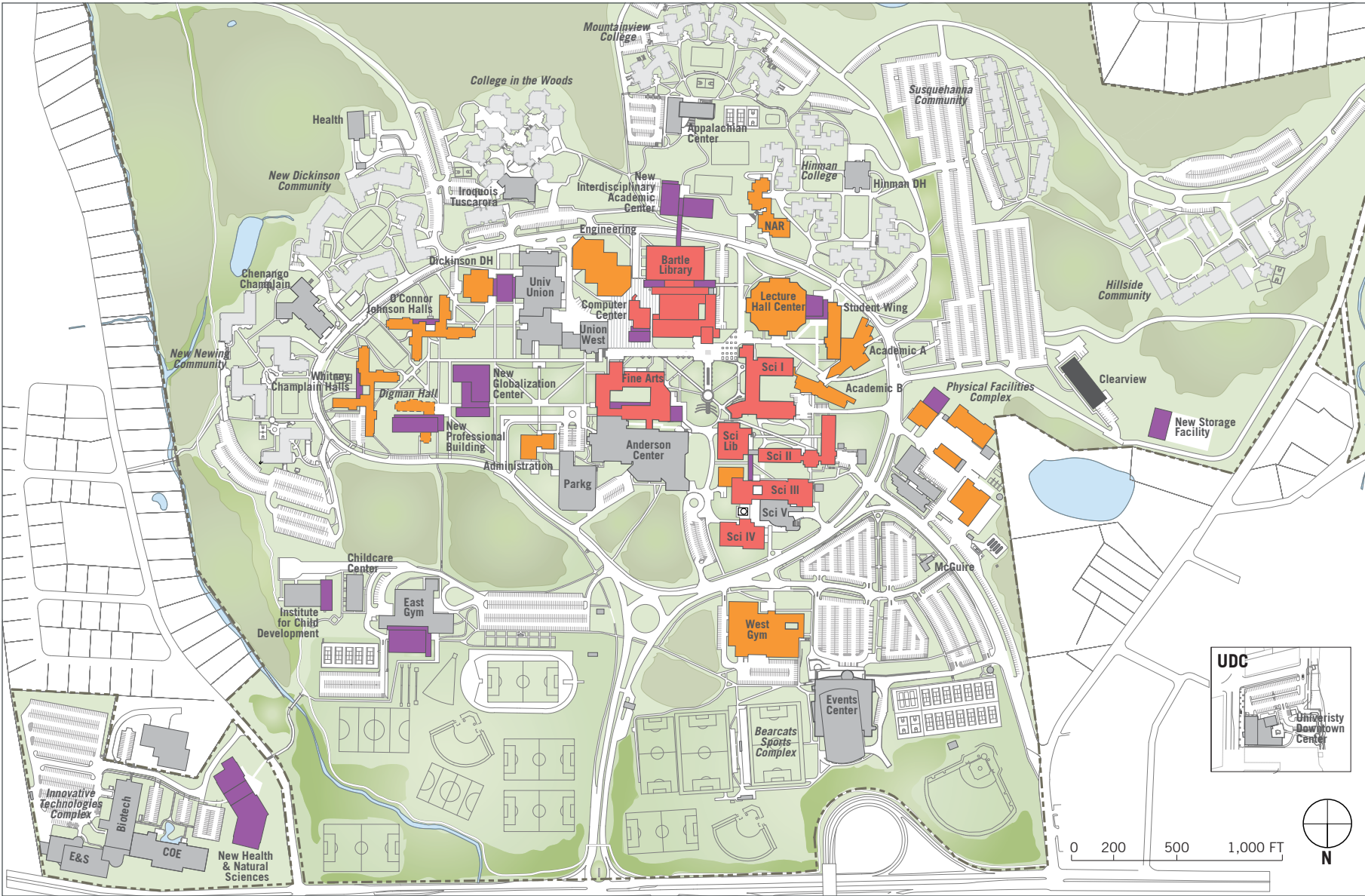


FIGURE 5.3.3B Facilities Investment Summary Map

PLAN OVERVIEW

RENOVATION

Major phased renovation projects occur at prominent legacy academic facilities, including Bartle Library, the Computer Center, Dickinson Dining Hall, the Engineering Building, the Fine Arts Building, the Lecture Hall Center and Student Wing, and the Sciences Complex. Local renovations for targeted reprogramming or program backfill occur at other campus buildings, and residence halls in the Original Dickinson Community at the East Campus are repurposed for academic and support programming.

NEW CONSTRUCTION

New construction occurs within the plan as additions to existing facilities and as major new free-standing buildings. Additions to legacy facilities within the Brain support renovation projects to modestly expand capacity, improve circulation issues, and provide local modern facilities that cannot be accommodated in legacy buildings. Additions also afford the opportunity to complement the heavy concrete and masonry aesthetic of legacy facilities with lighter facades that reveal the activities occurring within buildings and blur the boundaries between indoor and outdoor places.

Major new buildings showcase programs that are unique to Binghamton University, while also enhancing the institution's facilities inventory and catalyzing the renovation of legacy buildings. New buildings include:

- + **Health and Natural Sciences.** The new Health and Natural Sciences at the ITC Campus serves as a gateway to the ITC and provides the University with state-of-the-art research laboratories, test and measurement facilities, and research computing facilities to support growth in research in the natural sciences. The building adds the first undergraduate instructional classrooms and laboratories to the ITC Campus, facilitating use by undergraduate students.
- + **Interdisciplinary Academic Center.** The new Interdisciplinary Academic Center at the existing Visitor's Parking Lot accommodates key interdisciplinary programs, such as Philosophy, Politics, and Law (PPL), and academic programs that serve a large portion of BU's population. The facility also contains high-quality classroom and lecture hall facilities to support student population growth.
- + **Globalization Center.** The new Globalization Center at the east campus highlights the University's commitment to internationalization, featuring a complement of

PLAN COMPONENTS	PROGRAM
1. Academic A and B Program Backfill	Professional Program Expansion
2. Administration Building Program Backfill	Administration Program
3. Bartle Library Phased Renovation	Harpur Programs, Libraries
4. Computer Center Renovation and Addition	New Harpur Center
5. Dickinson DH Renovation and Addition	Student Services One-Stop and Admissions
6. East Gym Addition	Recreation Court Space
7. Engineering Building Renovation	Watson Program
8. Fine Arts Building Renovation and Addition	Fine Arts Programs (excluding Art History)
9. Institute for Child Development Addition	ICD Program Expansion
10. Lecture Hall Center Renovation and Addition	Lecture Halls
11. McGuire Building Renovation	SUCF Site Representatives
12. Nelson A. Rockefeller Renovation	Classrooms, Student Services
13. O'Connor Johnson Renovation	ITS, Geography, Alumni, Departmental Swing Space
14. Physical Facilities Complex Renovation	Physical Facilities Program
15. Sciences I-IV Renovation	Harpur Science Program
16. Science Library Renovation	Harpur Science Program, Classrooms, Libraries
17. Student Wing Renovation	Classrooms, Professional Program Expansion
18. University Union Program Backfill	Student Activities Program
19. West Gym Renovation	Student Athlete Center
20. Whitney Champlain Renovation	Departmental Swing Space
21. New ITC Health & Natural Sciences Building	Harpur Sciences, Engineering
22. New Interdisciplinary Academic Center	Classrooms, Harpur Program
23. New Globalization Center	Classrooms, Harpur Program, Student Services
24. New On-Site Storage Facility	Libraries
25. New Professional Building	Professional Programs
26. School of Law (Off Campus)	School of Law Program

FIGURE 5.3.3C Redevelopment Plan Summary Legend

- globally-focused academic programs and providing a new home for a range of student support services.
- + **School of Law.** A new School of Law to accommodate the University's future academic program is planned for construction at location off of the main campus.

BUILDING CAPACITY PERIOD

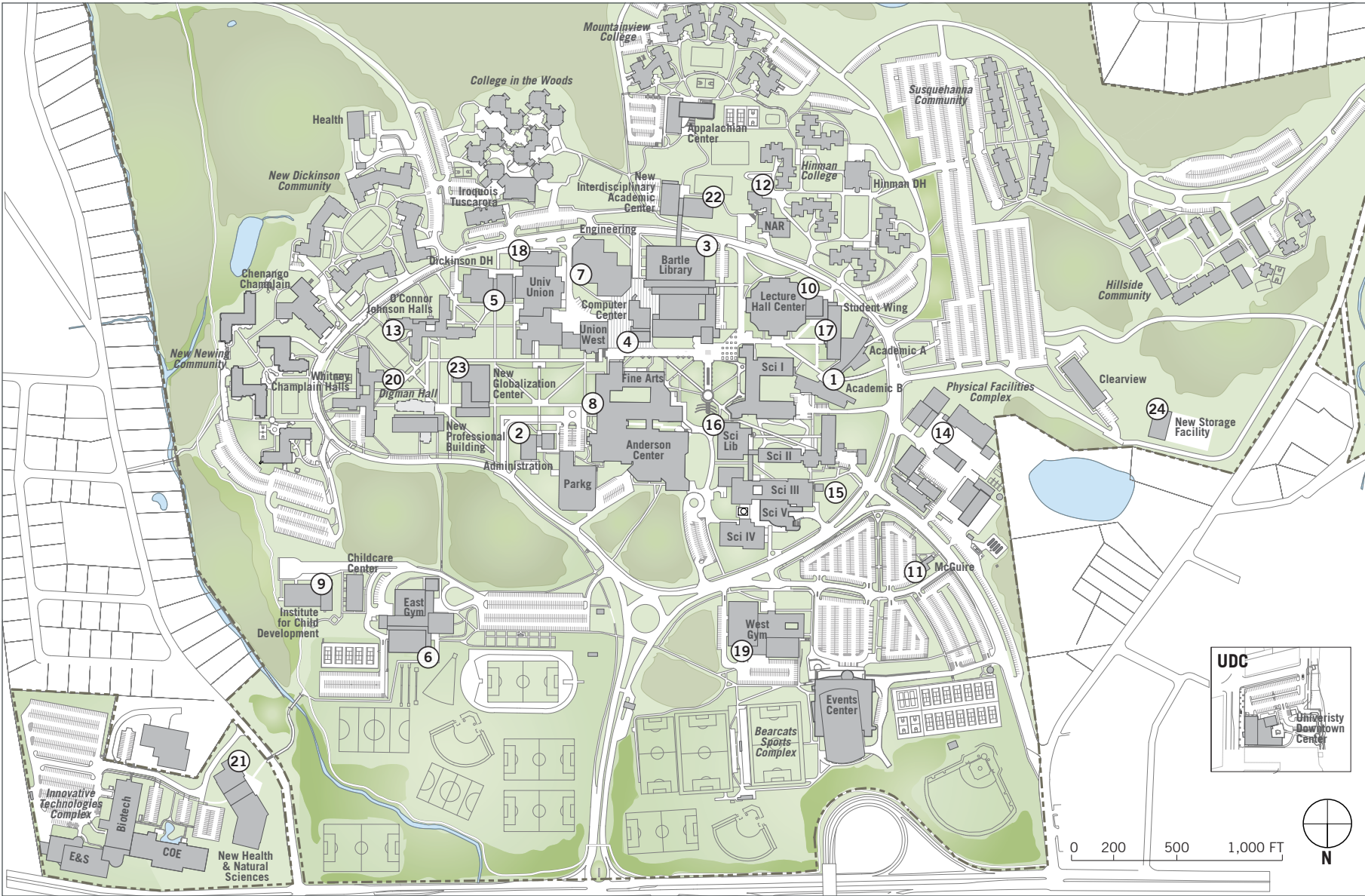


FIGURE 5.3.3D Redevelopment Plan Summary

5.3.3.1 HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

Binghamton University has a rich history in the liberal arts. The institution that is today a SUNY University Center was founded originally as Harpur College in 1946. In 1965, Harpur College became Binghamton University. Today Harpur College of Arts and Sciences continues to serve as the backbone of the University as its liberal arts and sciences college and largest academic unit.

The Harpur Fine Arts, Humanities, Social Sciences, and Mathematics program family of the FMP includes all academic departments in the Divisions of Fine Arts and Humanities, the Mathematical Sciences department in the Division of Sciences, and all departments except for the Anthropology department in the Division of Social Sciences.

Humanities and Social Sciences programs are located primarily at the Bartle Library, with some programs in other locations on campus, such as Geography in the Student Wing (relocating to Johnson Hall). Fine Arts programs are primarily located at the Fine Arts Building, with Cinema located at Student Wing. In some cases, ancillary departmental functions are located in buildings away from the main departmental location, such as the presence of English program in Tuscarora Hall.

Bartle Library and the Fine Arts building are both legacy facilities on campus that have undergone a series of additions since their original construction in the 1960s. The buildings carry a significant deferred maintenance backlog. Comprehensive renovation is required to align facilities with contemporary pedagogy and technology, clarify circulation routes, address building interior and MEP system upgrades, and meet current building regulations.

Other buildings on campus are available to be repurposed to support Harpur program, including buildings within the Original Dickinson Community which will function as departmental office swing space to facilitate major renovations.

Capacity expansion for Harpur programs will be provided at a new Interdisciplinary Academic Center and a new Globalization Center.

The following section outlines objectives, strategy, and projects associated with the Harpur Fine Arts, Humanities, Social Sciences, and Mathematics track.

OBJECTIVES

Right-size departmental facilities to meet expanded or contracted space needs.

The rich history of Harpur College at Binghamton University emphasizes a liberal arts education experience for all students, reflected in the University's core educational requirements. As a result, a large demand is placed on the Harpur departments in the Fine Arts, Humanities, and Social Sciences. The Mathematics department also experiences substantive demand as a result of general education requirements, majors, and pre-requisite programming for Watson Engineering and the School of Management. The plan right-sizes departmental facilities to address existing surpluses and deficits and prepare departments for the effects of future growth.

Renovate Bartle Library North and the Fine Arts Building for improved condition and utility of facilities.

Bartle Library and the Fine Arts Building are two legacy campus facilities that were constructed with the founding of the campus and added on to multiple times to facilitate expansion as the University grew. Facilities in both buildings reflect dated pedagogic approaches, have major circulation and wayfinding issues, and require upgrade of building systems and interior finishes. The plan conducts comprehensive renovation of the two buildings to clarify building organization and upgrade mechanical systems and finishes. Departmental facilities are modeled to provide unique identify for each entity, while supporting inter-departmental collaboration and sharing of support facilities.

Support the University's interdisciplinary focus with a new Interdisciplinary Academic Center for key Harpur programs.

Interdisciplinary inquiry and discovery is a focus at Binghamton University across all programs. A new Interdisciplinary Academic Center co-locates programs in the Humanities and Social Sciences divisions that engage in interdisciplinary work and serve a foundational role in the liberal arts experience. The building also provides facilities for supporting center and institute research programs and state-of-the-art classrooms.

Showcase the University's commitment to internationalization at a new Globalization Center that houses key globally-focused Harpur academic programs.

Binghamton University emphasizes internationalization on various levels. One key component of the commitment is the provision of numerous globally-minded academic programs and supporting research centers and institutes. A new Globalization Center co-locates academic departments with a global-focus to showcase the University's distinctive programming.

Upgrade technology to create spaces that meet the technological demands of contemporary pedagogy.

Technology is driving dramatic change in higher education pedagogy as well as the expectations and learning styles of today's students. To support learning across campus, in both formal and informal learning environments, the plan upgrades departmental facilities to respond to technological requirements across scales.

STRATEGY

The chart below and following narrative outlines project initiatives in the Harpur Fine Arts, Humanities, Social Sciences, and Mathematics program family. Projects are presented in detail on subsequent pages.

NEAR-TERM

In the near-term, under the 2008 to 2013 capital plan cycle, Johnson Hall is repurposed from a residence hall to serve as an academic and support facility. Upon completion, the Geography department is relocated from the Student Wing to Johnson Hall. ITS functions are also relocated to Johnson Hall from the Computer Center.

INTERMEDIATE-TERM

Major intermediate-term renovation projects occur at the Original Dickinson Community, the Bartle Library, and the Fine Arts Building. A new Interdisciplinary Academic Center is constructed for capacity expansion.

Buildings within the Original Dickinson Community are repurposed to create a BU Alumni Center and departmental office swing space to facilitate major renovations at legacy facilities across campus.

A process of phased renovation is begun at the north portion of Bartle Library. The primary program element in the north building is departmental office facilities for Harpur liberal arts programs. The first phase renovation occurs at the northeast portion of the building on the first and second levels for Art History, the Counseling Center, and additional Harpur departmental facilities.

Following completion of the first phase of the Bartle Library North renovation and relocation of the Art History department, a phased renovation of the Fine Arts Building is begun. Phase 1 of the project renovates the north wing to receive the Cinema and Art Studio departments.

A new Interdisciplinary Academic Center is constructed in the intermediate-term to provide expanded capacity and conditions improvement in departmental facilities. The building features classrooms and lecture halls, the English and Math departments, which support a large population, the Philosophy and Political Science departments, part of the Philosophy, Politics and Law program, and key student support facilities.

LONG-TERM

In the long term, major phased renovation projects are continued at Bartle Library North and the Fine Arts Building.

A new Globalization Center is constructed to showcase Binghamton University's commitment to internationalization. The building contains key academic departments and supporting research entities that focus on the international experience, as well as student support programs related to internationalization.



HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

RE-PURPOSE ORIGINAL DICKINSON HALLS

Due to the magnitude of renovation requirements at Binghamton University's main campus and the limited availability of swing space, O'Connor Johnson Halls and Whitney Champlain Halls at the Original Dickinson Community are repurposed for programmatic needs and departmental office swing space.

The Original Dickinson Community is located at the main campus, within the eastern portion of the Brain, an opportune location given adjacency to existing academic buildings and the new East Campus Housing residential facilities. The Community consists of three main buildings, each with two L-shaped wings of residence halls that are joined by common space.

As legacy residential facilities, a number of architectural constraints limit the range of program that the buildings may accommodate. Within the L-shaped wings, the buildings have a compressed column grid and low floor-to-floor heights, inhibiting the creation of additional large, open spaces. Therefore, the facilities are best suited for repurposing as administrative or departmental offices. A modest amount of gathering space to support office facilities is available at the common rooms on the first level of each hall.

Although these buildings may remain in the campus portfolio for an extended period, the intent is to treat them as temporary swing space to fill gaps in the overall space shortfall. As a general principle, attempts should be made to minimize investment in these legacy structures, putting them to use for the things they can do well as they are while modifying them to the least degree necessary. While in the context of a specific project this may not seem to be the best long-term use of funding, when looked at across the extent of the overall campus it is more advisable to direct renovation dollars elsewhere into buildings that will remain core components of Binghamton's inventory for the long-term. The investment approach proposed is also preferable to the more costly alternative, locating programs that would otherwise go into these buildings into modular or temporary buildings.

BUILDING EXTERIOR AND INTERIOR

In keeping with the overall strategy of minimizing long-term investment in these buildings and treating them as the best of the campus' swing-space options improvements to their exterior and interior architectural elements should be minimized.

Windows will likely require replacement to minimize energy use, comply with NY State Energy code and support occupant comfort. Aside from other repairs to secure the exterior envelope and enclosure, no significant investments should be made to manipulate the exterior façade and character of the buildings. Similarly, as interior space layouts are developed, opportunities should be considered to conserve interior demising walls as well as the building's existing double-loaded corridor, while locating programs around the existing structural column grid.

MEP SYSTEMS

A similar approach should be taken with respect to the building's engineering infrastructure. While through-wall packaged terminal air conditioners and unitized rooftop equipment may result in an increased maintenance and operations burden, the intent is for these improvements to allow the buildings to assist the campus in filling a space shortfall until appropriate new construction can be provided in the out-years of this master plan. New lighting fixtures and fire alarm systems should be installed to comply with current codes.



ADDITIONAL CONSIDERATIONS

To facilitate accessibility to upper levels of the Dickinson Halls, elevators must be added to the buildings.

PROJECT	GSF	DESCRIPTION	KEY PROGRAM ELEMENTS (ASF)	
Johnson Hall	Renovation	Renovate legacy residence hall for administrative offices and departmental office facilities.	Geography	11,300
	Addition		ITS	11,300
	10,200	Construct addition to provide elevator for accessibility. Upgrade for building interior, MEP, and data systems as required.	Custodial Services	1,000
			TOTAL	23,600
O'Connor Hall	Renovation	Renovate legacy residence hall for an Alumni Center at the main level and departmental office facilities on upper levels.	Alumni & Foundation	8,400
	34,900		Asian & Confucius	3,500
		Upgrade for building interior, MEP, and data systems as required.	Dept Office Swing	12,500
			Custodial Services	1,000
			TOTAL	25,400
Whitney Champlain Halls	Renovation	Renovate legacy residence hall for departmental office swing space facilities.	Harpur Departments	49,700
	69,800		Custodial Services	2,000
	Addition	Construct addition to provide elevator for accessibility. Upgrade for building interior, MEP, and data systems as required.	TOTAL	51,700
	10,200			

FIGURE 5.3.3.1A Project Details, Re-Purpose Original Dickinson Halls

PHASED RENOVATION OF BARTLE LIBRARY NORTH

The Bartle Library was constructed in three segments. A portion of the building was constructed in 1960 with the original Harpur College campus. The tower and north building expansion were constructed in 1966. The south building and connector addition were constructed in 1973.

Bartle Library primarily contains Harpur and University Library program, with Harpur program at the north side and University Library program at the south side. The building also contains support functions such as a cafe and the Counseling Center, centers and institutes, as well as ancillary and surge facilities for other department functions.

Due to the age of the building, coupled with a loss of building organization clarity following multiple additions, Bartle Library requires comprehensive renovation for pedagogy alignment, circulation clarification, building exterior, interior, and MEP system upgrades, and asbestos abatement.

This section outlines a process and requirements for phased renovation at the north portion of Bartle Library. For phased renovation of the south portion, refer to section 5.3.3.7 Libraries.

BUILDING EXTERIOR AND INTERIOR

Portions of Bartle Library contain asbestos material and require abatement with renovation projects. Renovation that occurs in asbestos-containing zones must begin with a major abatement phase that will require removal of utilities added beneath the ceiling, such as the fire alarm and data systems. Renovations should also include removal and replacement of all HVAC equipment and piping, except for main ducts or pipe that is determined to have a serviceable life.

MEP SYSTEMS

The north portion of Bartle Library has two mechanical rooms: one at the basement of the original northwest L-shaped building section, and another at the penthouse level of the north building addition. Each mechanical room services its respective segment of the building.

Mechanical room and related distribution systems throughout the north building of Bartle Library require comprehensive upgrade for conditions and provision of contemporary systems. Renovations within the building must upgrade air handling units

at mechanical rooms, chilled and hot water coil distribution systems, humidifiers, outdoor air mixing boxes, and fans with variable frequency control drives.

Due to the phased nature of renovation, implementation of mechanical upgrades must be considered. First phase projects associated with each of the two building segments should include mechanical room upgrades. Upgrades must provide new air handling units and heat exchangers to support new distribution systems that are installed in the renovated spaces. However, during the course of the cycle of phased renovation legacy mechanical equipment must be retained to support unrenovated spaces. Final phase renovations associated with each building segment may remove all legacy equipment in mechanical rooms, as all spaces will be supported by the new equipment.

The main ducts within the building may be reused, however require cleaning. The existing chillers and tower are in good condition.

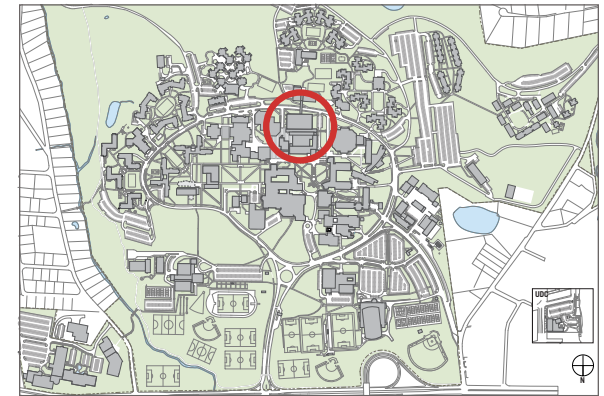
A host of other MEP system issues must be addressed in building renovation. Where recent renovation and abatement projects have occurred, significant infrastructure changes will not be required. In all other areas the following must occur:

Mechanical Systems:

- + Removal of the HTHW / steam exchanger and all steam perimeter heating, replacement with hydronic heating,
- + Addition of humidification to all AHUs,
- + Replacement of the 750-ton chiller in the central penthouse, which uses R22 refrigerant that will become obsolete,
- + Addition of central cooling at the Tower and removal of all window air conditioning units,
- + Upgrade of the dedicated DX cooling system for the rare-books collection will be required by 2023.

Electrical Systems:

- + Addition of significantly more emergency power capacity, with consideration of a new diesel generator in each section of the building to support equipment critical to maintaining environmental systems,



- + Replacement of primary substations, transformers, and switchgear to upgrade the electrical distribution system,
- + Provision of a new fire alarm system that initially employs existing fire alarm panels and eventually converts to new panels with renovation phase completion.

Plumbing Systems:

- + Addition of a sprinkler system to the unprotected majority of the building.

ADDITIONAL CONSIDERATIONS

The building should be rewired with data rooms and data drops to accommodate the shift in media to digital both at library and academic programming.

Rainwater harvesting may be added to the roof drainage system for reuse in the building as cooling tower make-up water, water for humidifiers, and water for toilet flushing.

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

PHASED RENOVATION OF BARTLE LIBRARY NORTH

Due to the size of Bartle Library and the fact that it was constructed as three projects over the course of more than a decade, the building today contains a wide array of program elements and lacks consistent and clear circulation patterns.

Comprehensive renovation over the course of the planning period represents an opportunity to clarify circulation routes and program zones, allowing for improved user wayfinding and effectiveness and usability of program spaces.

The diagrams on the opposite page outline the target building circulation and program organization. Each phase of renovation must consider this macro view and design toward its realization.

BUILDING CIRCULATION

- + Define the connector between the north and south buildings as a major building landmark and the location for heavy circulation, high connectivity, and soft program spaces.
- + Strengthen the major circulation spine at the first level that extends from the north and south building connector to the north entrance to the Lois B. DeFleur walkway.
- + Add a major circulation spine at the second level at the same location of the spine at the first level, extending from the north and south building connector addition to the north stairwell.
- + Create major circulation routes at the ground level to connect the extreme north and south edges of the building, through the north and south building connector.
- + Allow the column grid to dictate secondary circulation routes for efficiency.

BUILDING PROGRAM

- + Define Harpur Fine Arts, Humanities, and Social Sciences departments as the primary occupants of the north building. Additionally provide for ancillary shared and support functions such as the Cafe, the Counseling Center, and University Library Special Collections.
- + Define the University Library as the primary occupant of the south building. Consolidate a significant amount of library program out of the north building, using the storage facility.
- + Provide high-activity informal seating and study space at primary building entrances and main circulation zones to support contemporary informal student learning.

Circulation Organization

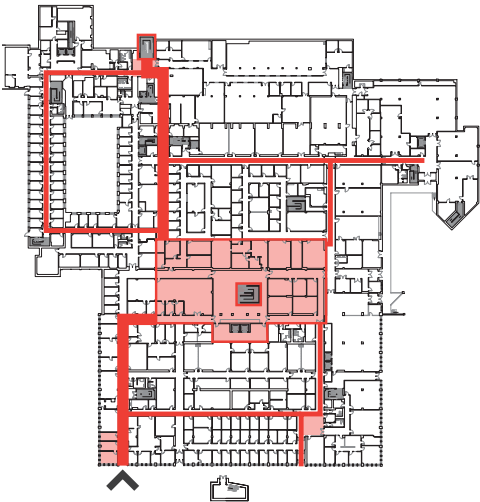
- Building Entrance >
- Major Circulation Route
- Minor Circulation Route
- Major Building Public Space
- Stairway or Elevator

Program Organization

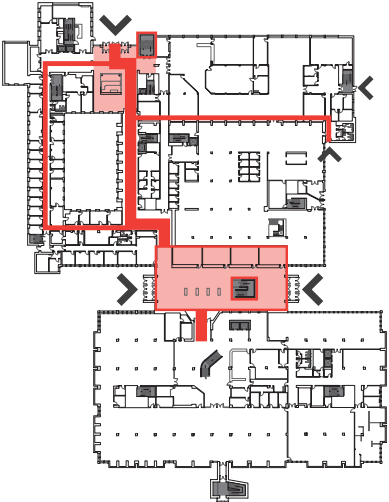
- Harpur Departments
- Classrooms & Computer Labs
- University Libraries
- Student Services and Administration
- Building Services and Circulation

FIGURE 5.3.3.1B Target Building Organization, Bartle Library North

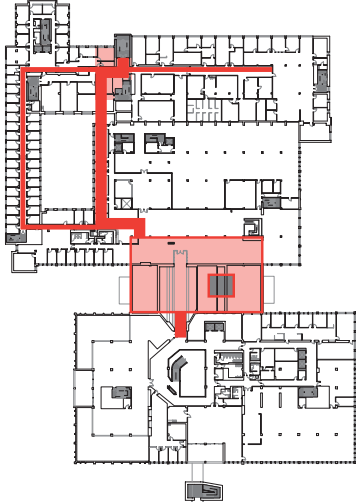
BUILDING CAPACITY PERIOD



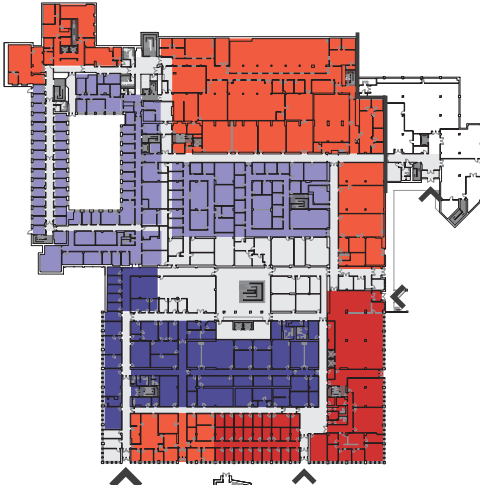
Ground Floor



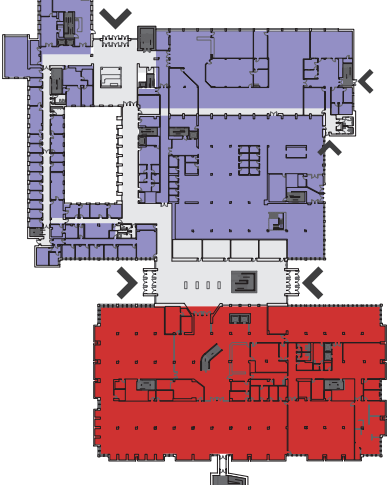
First Floor



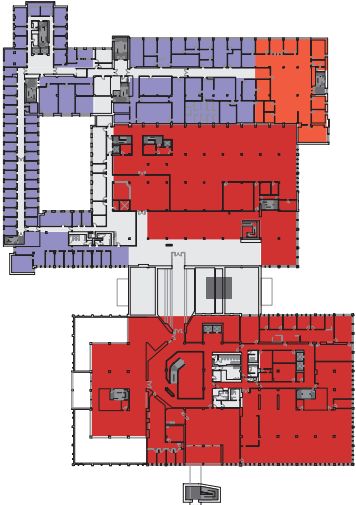
Second Floor



Ground Floor



First Floor



Second Floor

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

PHASED RENOVATION OF BARTLE LIBRARY NORTH

PROJECTS AND PHASING

The north building of Bartle Library is renovated in five phases, defined with consideration of the following factors:

- + Characteristics of building construction, structure, and mechanical systems,
- + The requirement for asbestos abatement,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation in Bartle Library or at another campus facility.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Detail for the Phase 1 project is provided on the opposite page. Phasing diagrams on the following pages outline boundaries associated with each phase project.

PROJECT	GSF	DESCRIPTION
Phase 1 Renovation	35,600	<p>Renovate a portion of the first floor and second floor of the original L-shaped portion of the building. Locate the Art History department at the first level, and the Counseling Center and additional Harpur program space at the second level.</p> <p>Conduct first phase upgrades to the basement level mechanical room to support new distribution equipment, while maintaining legacy equipment for unrenovated space.</p> <p>Upgrade program spaces for building exterior, interior, MEP, and data condition requirements.</p>
Phase 2 Renovation	53,200	<p>Renovate a portion of the ground level for academic and support program.</p> <p>Conduct first phase upgrades to the penthouse mechanical room to support new distribution equipment, while maintaining legacy equipment for unrenovated space.</p> <p>Upgrade program spaces for building interior, MEP, and data condition requirements. Asbestos abatement required at the ground level.</p>
Phase 3 Renovation	44,400	<p>Renovate the first floor and second floor for Harpur program and University Library special collections.</p> <p>Upgrade for building exterior, interior, MEP, and data condition requirements. Following upgrade, take legacy equipment in penthouse mechanical room off-line.</p>
Phase 4 Renovation	38,100	<p>Renovate the ground floor, first floor, and second floor for Harpur program.</p> <p>Upgrade for building exterior, interior, MEP and data condition requirements.</p>
Tower Renovation	49,400	<p>Renovate the Tower for Harpur program.</p> <p>Upgrade for building exterior, interior, MEP and data condition requirements. Following renovation, take legacy equipment in basement mechanical room off-line.</p>

FIGURE 5.3.3.1C Project Details, Phased Renovation of Bartle Library North

PHASE 1 RENOVATION DETAIL

Phase 1 at Bartle Library north renovates the northeast portion of the original L-shaped building on the first and second floors for Art History, the Counseling Center, and other Harpur Program, to be determined.

The diagrams to the right outline the renovation zone and target departmental organization. The renovation locates Art History at the first floor, with prominent visibility from the main entrance off the Lois B. DeFleur Walkway and direct access to the other Fine Arts departments at the Fine Arts Building.

The Counseling Center is located at the second floor adjacent to the east stairwell, moved from its location at the first floor of the building. By maintaining the Center in Bartle Library, it is easily and directly accessible by members of the campus community, and its second floor location provides additional privacy. The location adjacent to the east stairwell allows for a second means of exit from the Center that leads directly outside for additional patient privacy. The suite also meets the Counseling Center's full space needs to co-locate all components of the department and eliminate miscellaneous office requirements in other locations.

The Phase 1 renovation must also upgrade the mechanical room in the basement of the original northwest L-shaped building section, per the outlined MEP system upgrade requirements.

The following moves facilitate implementation of the Phase 1 renovation project:

- + Relocation of the EOP tutoring suite from the second floor and to the University Union Phase 2 north project,
- + Relocation of the Harpur Dean's office and Writing Center from the second floor to the Harpur Center at the renovated Computer Center,
- + Consolidation of University Library collections at the first floor to the On-Site Storage Facility,
- + Consolidation of graduate student organizations from the second floor to the University Union,
- + Relocation of the continuing education unit from the first floor to swing space at O'Connor Hall or Whitney Champlain Halls,
- + Consolidation of the English and Math departmental space at the second floor or provision of temporary swing space at O'Connor Hall or Whitney Champlain Halls.

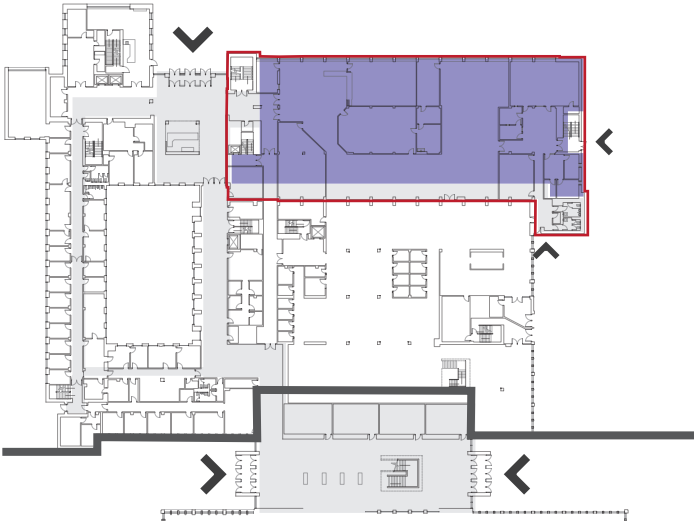
Second Floor

Counseling Center	4,000 ASF
Harpur Department	6,800 ASF
Custodial Services	800 ASF
<i>Subtotal</i>	<i>11,600 ASF</i>

First Floor

Art History	7,800 ASF
Custodial Services	800 ASF
<i>Subtotal</i>	<i>11,600 ASF</i>

TOTAL ASF **23,200 ASF**



Legend

- Harpur Art History, Other Departments [Blue Box]
- Counseling Center [Red Box]
- Building Services and Circulation [Grey Box]

FIGURE 5.3.3.1D Phase 1 Renovation Detail, Bartle Library North

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

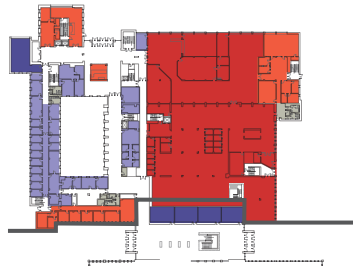
PHASED RENOVATION OF BARTLE LIBRARY NORTH

Existing Condition

Second Floor



First Floor



Ground Floor

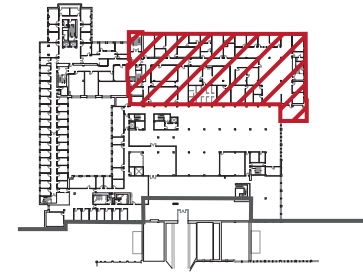


- Harpur Humanities, Social Sciences, Math
- Watson Engineering
- Classrooms & Computer Labs
- University Libraries
- Student Services & Administration
- Building Services

Phase 1 Renovation

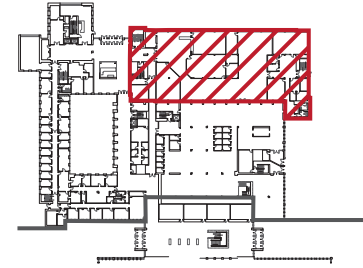
Second Floor

Subtotal 17,800 GSF

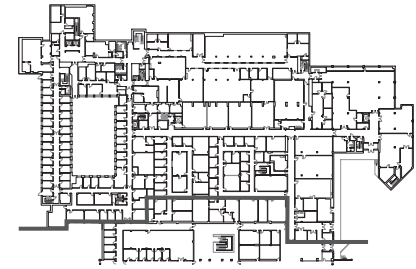


First Floor

Subtotal 17,800 GSF



Ground Floor



TOTAL GSF 35,600 GSF

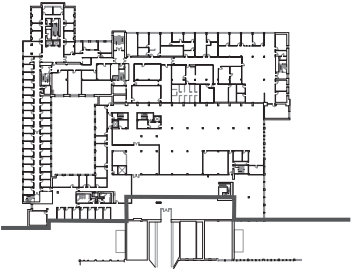
Additional renovation to occur at the basement mechanical room to initiate building system upgrades for the northwest L-shaped portion of the building.

FIGURE 5.3.3.1E Renovation Phases, Bartle Library North

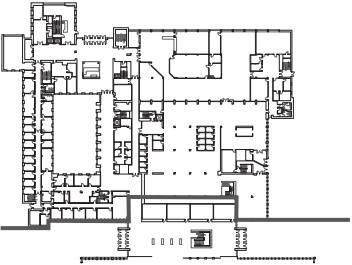
BUILDING CAPACITY PERIOD

Phase 2 Renovation

Second Floor

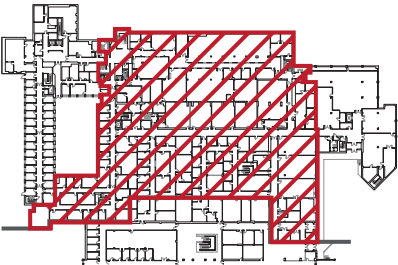


First Floor



Ground Floor

Subtotal 53,200 GSF



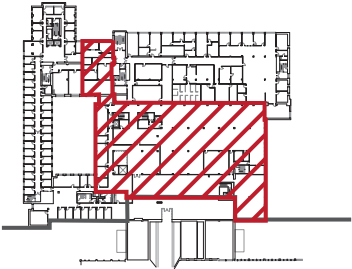
TOTAL GSF 53,200 GSF

Additional renovation to occur at the penthouse mechanical room to initiate building system upgrades for the north addition of the building.

Phase 3 Renovation

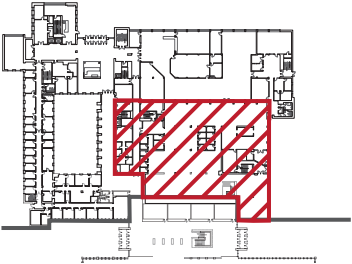
Second Floor

Subtotal 24,900 GSF

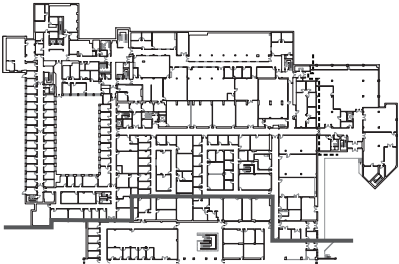


First Floor

Subtotal 19,500 GSF



Ground Floor



TOTAL GSF 44,400 GSF

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

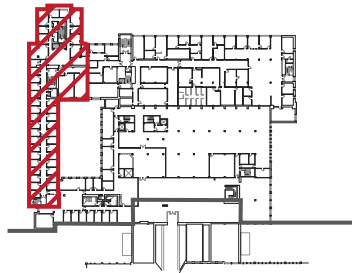
PHASED RENOVATION OF BARTLE LIBRARY NORTH

Phase 4 Renovation

Second Floor

Subtotal

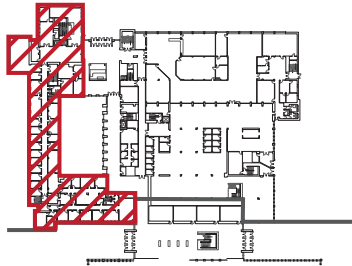
10,100 GSF



First Floor

Subtotal

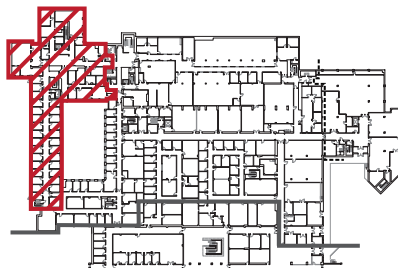
15,500 GSF



Ground Floor

Subtotal

12,500 GSF



TOTAL GSF

38,100 GSF

Phase 5 Renovation

Tower 3-15

Subtotal

3,800 GSF/Floor



TOTAL GSF

49,400 GSF

PHASED RENOVATION OF THE FINE ARTS BUILDING

Like Bartle Library, the Fine Arts Building was constructed in two segments. An L-shaped portion of the building was constructed in 1960 with the original Harpur College campus. This was added on to in 1966 to complete what is now the Memorial Courtyard. In 1985 the Anderson Center was constructed as an addition to the north and west of the Fine Arts Building.

The Fine Arts Building contains four departments within the Harpur Division of Fine Arts: Art History, Art Studies, Music, and Theater. The remaining division, Cinema, is now located in the Student Wing. The building also contains classrooms and lecture halls, a cafe, the Art Museum, and offices and ancillary facilities for the Anderson Center for Performing Arts.

The Fine Arts Building carries a significant backlog of maintenance requirements due to the age of the facility and to clarify building organization. Comprehensive renovation must address circulation and wayfinding as well as building exterior, interior, and MEP system upgrades.

Renovation must also address the alignment of facilities with contemporary pedagogy for the fine arts. Additionally, with renovation the Cinema department will be moved to the Fine Arts Building for co-location with other departments for improved interdisciplinary collaboration.

This section outlines a process and requirements for phased renovation of the Fine Arts Building.

BUILDING EXTERIOR AND INTERIOR

Due to age, all windows in the Fine Arts Building require replacement to reduce infiltration, heat loss, and summer heat gain. Asbestos abatement will be required for piping in crawl spaces and cavities.

MEP SYSTEMS

The four original wings of the Fine Arts Building require replacement of most MEP infrastructure.

Mechanical Systems:

- + Replace old air handling units and ducts, except for the main trunk ducts. Install new AHUs with variable air volume terminals and variable frequency drives on fan

motors. Move HC3 from the crawl space or create a room for it.

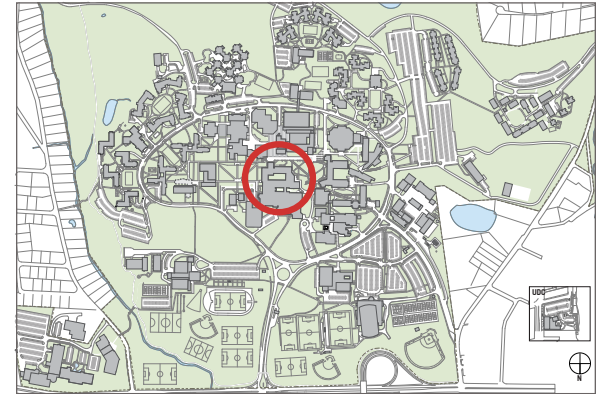
- + Install new electronic controls to replace existing pneumatic system. Retain new air compressor and use pneumatic control only for operation of main valves and large dampers.
- + Replace all exhaust fans, combining exhaust with makeup air through energy recovery ventilators.
- + Upgrade exhaust system in the art studio shop to replace air handling units and energy recovery ventilator. Add shutoff valves on exhaust systems to hoods and variable frequency drives on fans to maintain adequate exhaust flows at hoods in use.
- + Consider adding new natural gas-fired steam generator for humidification to AHUs. Remove existing steam HTHW-to-steam system as a part of overall HTHW loop temperature reductions.

Electrical Systems:

- + Replace distribution switch gear as a part of a major project to upgrade the electrical system.
- + Replace all power distribution panels, wiring, devices, and fixtures with renovation.
- + Provide a new fire alarm system.

Plumbing Systems:

- + Replace all plumbing fixtures and supply piping. Rearrange toilet rooms meet ADA regulations.
- + Replace all hot water heating from the new heat exchangers out to the distribution equipment, including pumps, piping, and heating equipment.
- + Replace chilled water piping throughout from the new chiller / cooling tower and pumps (to be installed in 2012) to the rest of the building.
- + Add sprinklers to most spaces within the Fine Arts Building that are currently unprotected (Anderson Center and the Art Museum contain alternate fire protection systems).
- + Consider rainwater harvesting for gray water to toilets, cooling towers, and humidifiers.



Renovation of the Art Gallery at the Fine Arts Building to Create a Transparent Volume

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

PHASED RENOVATION OF THE FINE ARTS BUILDING

BUILDING ORGANIZATION

The Fine Arts Building was constructed at a time when the University's academic core was relatively contained to the south and west portions of the Brain. As such, the building's main entrances and primary circulation routes favor these directions.

Expansion over past decades has extended the academic core to the north. Future expansion will continue to expand program to the east. As a result, the Fine Arts Building, once along an edge of the academic zone, will now be centrally located on campus. With phased renovation, the opportunity exists to reconfigure program and reorient major circulation routes through the building for improved wayfinding and the ability to showcase student work for a greater campus audience.

The diagrams to the right outline target building circulation and program organization. Each phase of the renovation should consider this macro view and design toward its realization.

Circulation Objectives:

- + Define a major circulation spine at the north wing of the building on the first and second levels that connects between the University Commons (northwest entrance) and the Peace Quad (east entrance).
- + Create nodes of informal student lounge, study, and pin-up space at each entrance.
- + Construct a circulation addition along the Memorial Courtyard to activate the facade and take advantage of views out.
- + Add vertical circulation within the Art Museum to allow circulating between levels without leaving the space.
- + Allow the column grid to dictate secondary circulation routes for plan efficiency.





Program Objectives:

- + Relocate the Cinema department to the building for co-location with other Harpur Fine Arts departments. To accommodate Cinema, relocate the Art History department to Bartle Library for co-location with other humanities departments.
- + Relocate the Art Studies studios to north-facing space

in the north wing of the building to provide conditions improvements within studio spaces.

- + Construct a new facade on the Art Museum that employs glass and light-weight materials to juxtapose against the brick facade of the building, showcasing the space.
- + Retain program spaces for Music, Theater, and classrooms within the building.

Circulation Organization

- Building Entrance >
- Major Circulation Route 
- Minor Circulation Route 
- Major Building Public Space 
- Stairway or Elevator 

Program Organization





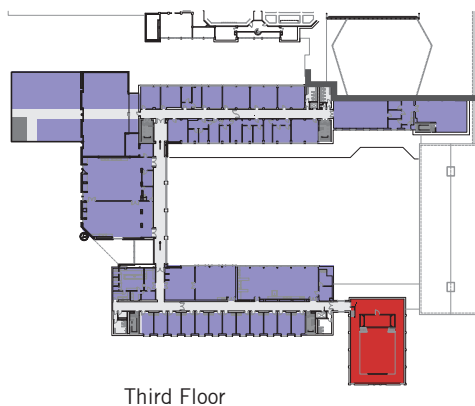
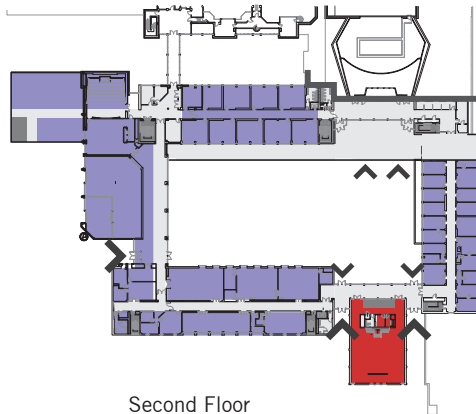
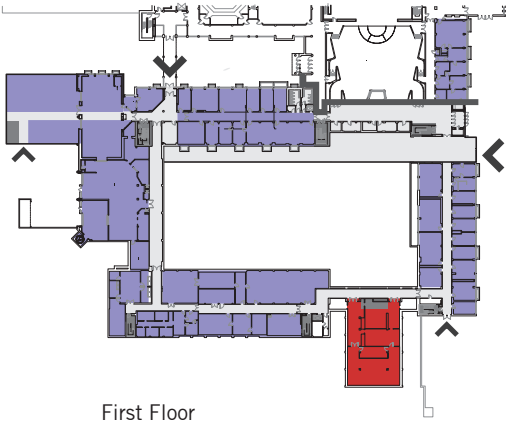
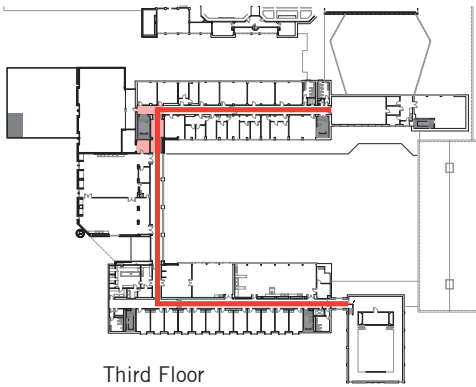
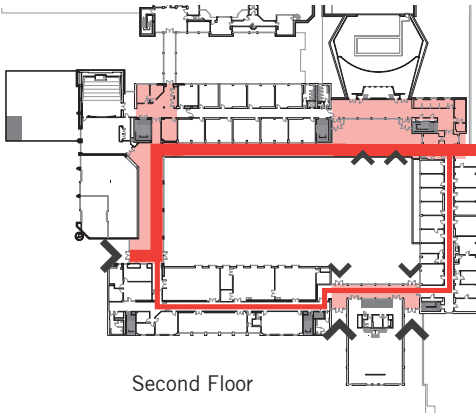
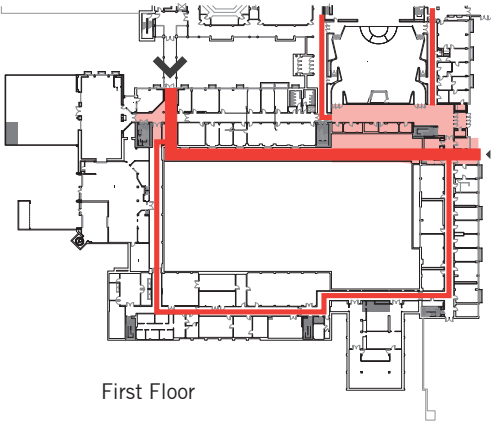
- Harpur Fine Arts Departments 
- Classrooms & Computer Labs 
- Art Museum 
- Building Services and Circulation 

FIGURE 5.3.3.1F Building Organization, Fine Arts Building

BUILDING CAPACITY PERIOD



HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

PHASED RENOVATION OF THE FINE ARTS BUILDING

PROJECTS AND PHASING

The Fine Arts Building is renovated in three phases, defined with consideration of the following factors:

- + Characteristics of building construction, structure, and mechanical systems,
- + The requirement for asbestos abatement,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation in Bartle Library or at another campus facility.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Detail for the Phase 1 project is provided on the opposite page. Phasing diagrams on the following pages outline boundaries associated with each phase project.

PROJECT	GSF	DESCRIPTION
Phase 1 Renovation and Addition	Renovation: 64,000 Addition: 22,200	Renovate the first, second, and third levels at the north wing and construct additions to extend north-facing program space within the bar and to provide circulation along the Memorial Courtyard. Renovate for Art Studio and Cinema departments, as well as supporting classroom and lecture hall facilities. Maintain existing shop facilities. With the Memorial Courtyard addition, create a public circulation route through the building and ground and first levels, activated by student lounge space. Upgrade facilities for building exterior, interior, MEP, and data condition requirements.
Phase 2 Renovation	45,300	Renovate the first, second, and third levels at the south wing of the building for departmental facilities for Music and Theater as well as general classroom facilities. Renovate and re-clad the Art Museum for condition improvements and architectural and circulation clarity. Upgrade facilities for building exterior, interior, MEP, and data condition requirements.
Phase 3 Renovation	14,400	Renovate the first and second levels at the east wing for departmental facilities for Music and Theater as well as general classroom facilities. Upgrade facilities for building exterior, interior, MEP, and data condition requirements.
Phase 4 Renovation	35,700	Renovate the first and second levels at the north wing of the original building for departmental facilities and labs for Music and Theater, as well as other support spaces. Upgrade facilities for building exterior, interior, MEP, and data conditions requirements. Implementation must consider phasing closely to allow for renovation of lab facilities by taking them off-line.

FIGURE 5.3.3.1G Project Details, Fine Arts Building Phased Renovation

BUILDING CAPACITY PERIOD

PHASE 1 RENOVATION AND ADDITION DETAIL

The Fine Arts Building Phase 1 renovation impacts the north and west wings of the building on all levels, and constructs two additions to provide expanded program space and clarify building circulation. Phase 1 is renovated for the Art Studio and Cinema departments as well as classroom facilities.

The diagrams to the right outline the renovation zone and target departmental organization. The renovation locates the Cinema department at the first and second levels of the building. A lecture hall and screening room for Cinema is provided on the second level in space created by enclosing the second level of the shops below.

Art Studio is located on the first, second, and third levels. The shops remain in the west wing at the first level. Studio space for the department is provided in north-facing space at the north wing, which is extended to the west to meet full program needs. Studios for BFA students, an addition to the University's inventory, are provided at the third level.

A second addition is provided at the first and second levels to create a public direct circulation path through the building from the University Commons to the Peace Quad. The circulation addition runs along the Memorial Courtyard and is activated along its length by informal student lounge and study space.

The following moves facilitate implementation of the Phase 1 renovation project:

- + Relocation of the Judaic Studies department to the Bartle Library Tower (under the 2008 to 2013 cycle),
- + Relocation of the Art History department to Bartle Library North in space created in the Phase 1 renovation,
- + Provision of additional classrooms at the Student Wing and Lecture Hall Center, which allow classrooms to be temporarily taken off-line during renovation at the Fine Arts Building,
- + Relocation of Music and Theater department offices to those vacated by Art History in other wings of the Fine Arts Building,
- + Consolidation of Music and Theater rehearsal rooms and/or the provision of temporary facilities within spaces vacated by Art History or at another location,
- + A targeted renovation-in-place and consolidation at the Art Studio shops.

Third Floor

Art Studio	14,500 ASF
Custodial Services	100 ASF
<i>Subtotal</i>	<i>14,600 ASF</i>

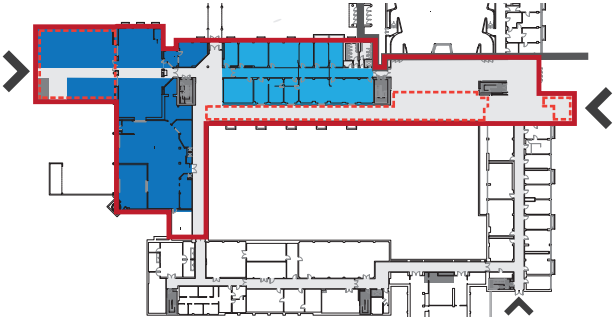
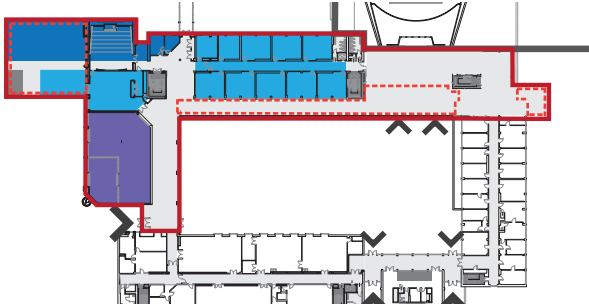
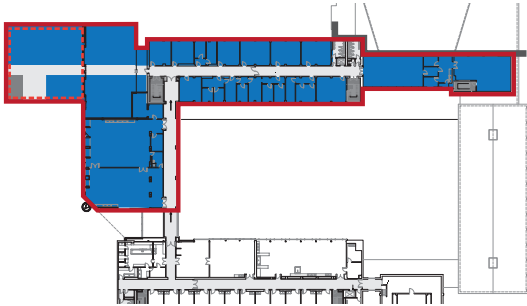
Second Floor

Art Studio	3,000 ASF
Cinema	6,400 ASF
Classroom	3,000 ASF
Informal Lounge	900 ASF
Custodial Services	100 ASF
<i>Subtotal</i>	<i>13,400 ASF</i>

First Floor

Art Studio	9,800 ASF
Cinema	4,200 ASF
Informal Lounge	900 ASF
Custodial Services	100 ASF
<i>Subtotal</i>	<i>15,000 ASF</i>

TOTAL ASF **43,000 ASF**



Legend

- Art Studio (Blue)
- Cinema (Light Blue)
- Classroom (Purple)
- Circulation, Integrated Informal Lounge (Grey)

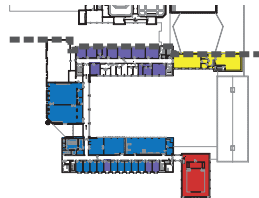
FIGURE 5.3.3.1H Phase 1 Details, Fine Arts Building

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

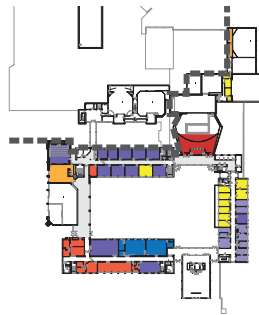
PHASED RENOVATION OF THE FINE ARTS BUILDING

Existing Condition

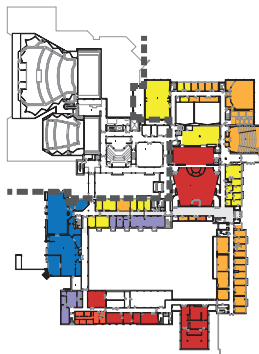
Third Level



Second Level



First Level



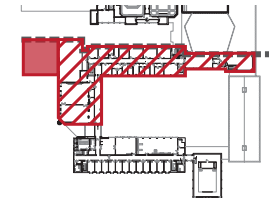
- Art History
- Art Studio
- Music
- Theater
- Classrooms & Computer Labs
- Art Museum
- Student Services & Administration
- Building Services

Phase 1 Renovation and Addition

Third Level

Subtotal Renovation 20,100 GSF

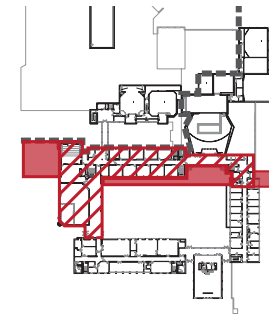
Subtotal Addition 4,100 GSF



Second Level

Subtotal Renovation 21,300 GSF

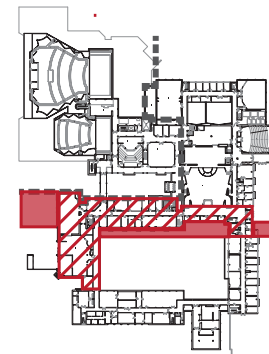
Subtotal Addition 9,200 GSF



First Level

Subtotal Renovation 22,600 GSF

Subtotal Addition 8,900 GSF



Renovation GSF 64,000 GSF

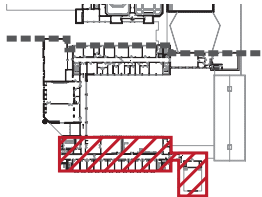
Addition GSF 22,200 GSF

FIGURE 5.3.3.11 Renovation Phases, Fine Arts Building

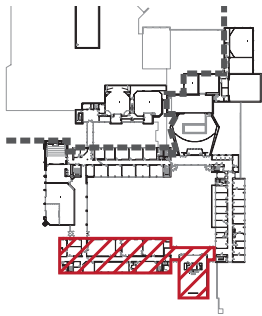
BUILDING CAPACITY PERIOD

Phase 2 Renovation

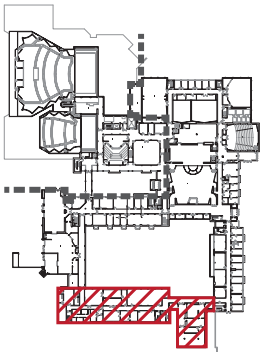
Third Level
Subtotal 14,600 GSF



Second Level
Subtotal 15,600 GSF



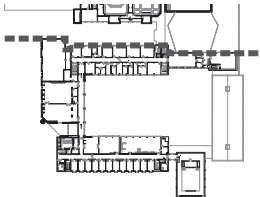
First Level
Subtotal 15,100 GSF



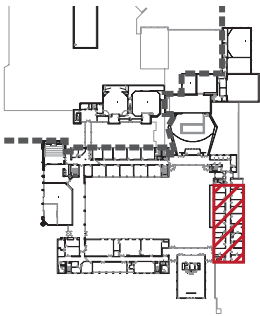
TOTAL GSF 45,300 GSF

Phase 3 Renovation

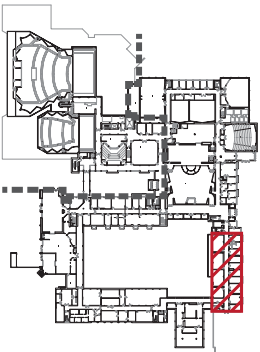
Third Level



Second Level
Subtotal 7,000 GSF



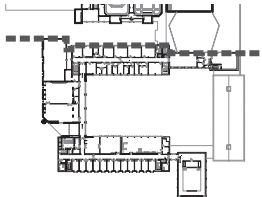
First Level
Subtotal 7,000 GSF



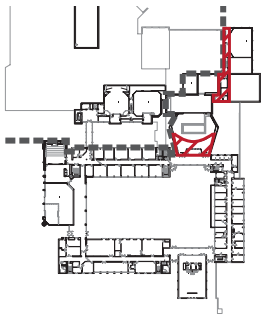
TOTAL GSF 14,000 GSF

Phase 4 Renovation

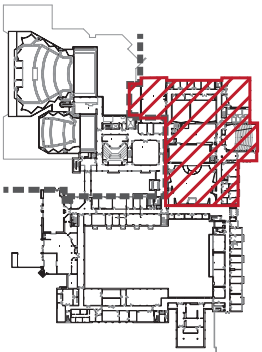
Third Level



Second Level
Subtotal 2,100 GSF



First Level
Subtotal 33,600 GSF



TOTAL GSF 35,700 GSF

HARPUR FINE ARTS, HUMANITIES, SOCIAL SCIENCES, MATHEMATICS

CONSTRUCT NEW ACADEMIC BUILDINGS

Binghamton University is significantly under-built with respect to academic facilities compared to its University Center peers. To support existing enrollment as well as future enrollment growth, the University requires the construction of new academic facilities.

In addition to expanding overall capacity, new buildings add high-quality, contemporary instruction and support spaces to the University's inventory, which largely dates to the 1960s and 1970s. In particular, spaces and functions that cannot be achieved through renovation of existing buildings are provided with new construction, such as technology-rich functions and large-section lecture halls.

Due to a lack of swing space and the magnitude of renovation requirements at the University's main campus, new buildings are also instrumental in facilitating major cycles of renovation at legacy facilities.

The building capacity period of the FMP calls for two new academic buildings. Each building contains a cluster of Harpur academic departments that, together, showcase unique Binghamton University programs and initiatives. Academic departments are complemented with a range of state-of-the-art classroom facilities, group meeting spaces, informal student lounge and study spaces, and media-portals that allow for remote access to library resources.

Where applicable, student services or other student support functions are co-located with academic programming to strengthen the student experience and allow for inter-departmental collaboration.

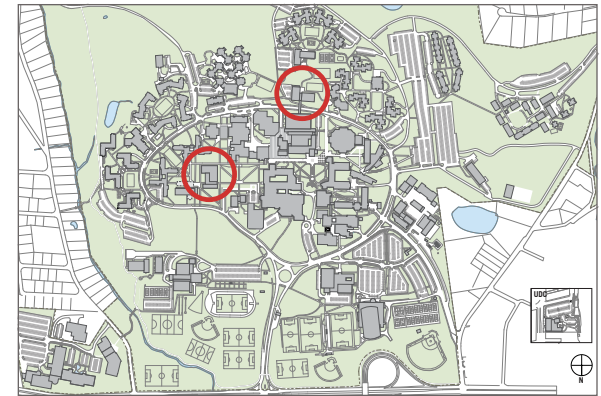
INTERDISCIPLINARY ACADEMIC CENTER

This building features Harpur academic departments that work in an interdisciplinary manner toward curriculum delivery. Most notable among them are departments that contribute to the Philosophy, Politics, and Law degree program, one of the University's largest majors. The Academic Center also contains departments that serve large portions of the University's population as core curriculum requirements including English and Mathematics.

The Interdisciplinary Academic Center is to be constructed south of Bartle Library in what is today the Visitor's Parking Lot. Due to site topography, the building will be situated above

the plane of the library such that a connecting walkway may be constructed to bridge over West Drive and connect the new building with the Library. This will also facilitate pedestrian traffic to and from campus from the residential communities up the hill.

Construction of the Academic Center should consider provision of parking at the sub-grade level to reduce impact on the overall quantity of campus parking.



Proposed Interdisciplinary Academic Center at the Visitor's Parking Lot, Connecting between the Brain and the Appalachian Center

BUILDING CAPACITY PERIOD

INTERDISCIPLINARY ACADEMIC CENTER	PROPOSED ASF
General Classrooms and Computer Labs	8,400
General Classrooms	7,600
Computer POD	800
Harpur Departments	52,800
English	20,200
Mathematics, including Math Lab	15,800
Philosophy	8,800
Political Science	8,000
Centers and Institutes	2,200
Support Spaces	6,600
Satellite Library Portal	800
Informal Lounge and Study Space	4,600
ITS	200
Building Services / Custodial	1,000
TOTAL ASF	70,000
<i>Available ASF</i>	<i>70,000</i>
<i>TOTAL GSF</i>	<i>125,000</i>

FIGURE 5.3.3.1J Building Program, New Interdisciplinary Academic Center

CONSTRUCT NEW ACADEMIC BUILDINGS

GLOBALIZATION CENTER

Binghamton University emphasizes internationalization through on-campus academic programs, study abroad programs, research initiatives, and support services for its large population of international students and faculty members. The Globalization Center features the University's distinctive internationally-focused programming by co-locating them in a new facility.

The Globalization Center is to be constructed as the first building of a future new academic quadrangle at the east campus. It will be sited on the western edge of the east campus along the Peace Quad.

Construction of the Globalization Center will require demolition of Rafuse Hall, a building within the Original Dickinson Community. Following the completion of the East Campus Housing project, the Original Dickinson Community will come off-line. However, due to inventory constraints, Rafuse Hall is to be employed as swing space for either residential or academic use until immediately prior to construction of the Globalization Center.



Proposed Globalization Center at the East Campus

GLOBALIZATION CENTER	PROPOSED ASF
General Classrooms and Computer Labs	17,800
General Classrooms	16,800
Computer POD	1,000
Harpur Departments	16,600
Africana Studies	2,100
Asian & Asian-American Studies	5,500
Classical & Near Eastern Studies	2,400
German & Russian Studies	2,500
Romance Languages and Literature	4,100
Harpur Interdisciplinary & Non-Divisional Programs	3,100
Latin American & Caribbean Studies Program	1,000
English as a Second Language	2,100
Centers and Institutes	2,900
Student Services*	7,200
Support Spaces	22,400
Satellite Library Portal	1,800
Informal Lounge and Study Space, Group Study Rooms	12,600
Cafe	2,800
ITS	4,200
Building Services / Custodial	1,000
TOTAL ASF	70,000
<i>Available ASF</i>	<i>70,000</i>
<i>TOTAL GSF</i>	<i>125,000</i>

*Student Services include International Student & Scholar Services (ISSS), Office of International Programs (OIP), including Dual-Diploma, Global Studies Minor, Languages Across the Curriculum.

FIGURE 5.3.3.1K Building Program, New Globalization Center

5.3.3.2 HARPUR SCIENCES AND ANTHROPOLOGY

Binghamton University features strong programs in the sciences that deliver instruction at the undergraduate level and conduct a breadth of graduate and faculty research. The Harpur Sciences and Anthropology program family of the FMP includes the Biology, Chemistry, Physics, and Psychology departments from the Division of Sciences and the Anthropology department from the Division of Social Sciences.

The sciences programs are primarily located at the Sciences Complex at the University's main campus. The Complex consists of six buildings: Sciences I-IV, legacy science instruction and research buildings; Science V, a new facility that supports lab animal research; and the Science Library, the location of science-related collections and a suite of classrooms. Additional Clinical Psychology program that requires public access is located at Clearview Hall.

Sciences I-IV were constructed prior to 1975 and all carry a significant deferred maintenance backlog. The Science Library has similar maintenance requirements; however they are less exposed as current program places fewer demands on the facilities. Comprehensive renovation is required to align facilities with contemporary pedagogy and technology, address building exterior, interior, and MEP system upgrades, and meet current building regulations. Due to its construction typology as a temporary structure, no new investment is recommended for Clearview Hall.

As a part of the FMP, legacy buildings at the Sciences will undergo comprehensive renovation in a phased manner. Capacity expansion will be provided through the new ITC Natural Sciences at the ITC Campus.

The following section outlines objectives, strategy, and projects associated with the Harpur Sciences and Anthropology track.

OBJECTIVES

Renovate Sciences I-IV to align facilities with contemporary curriculum delivery and technological requirements.

Sciences I-IV were constructed and occupied prior to 1975. Since that time, scientific practice and pedagogy has undergone significant change, and facilities at the University have been unable to keep up. There is a serious need to renovate legacy buildings in the Sciences Complex so that they may support contemporary curriculum delivery and technological requirements, as well as for improved mechanical systems and clarity of building circulation routes. These upgrades are essential for health and safety, and for faculty and researcher recruitment and retention.

Maximize facilities at the Sciences Complex by right-sizing departments whose space needs differ from that which they occupy and consolidating departmental storage requirements.

Many department's facilities needs have shifted since the construction of buildings within the Sciences Complex due to pedagogical and technological changes as well as shifting emphasis within the Division. As a result, some departments require right-sizing to meet an expanded or contracted need.

To aid in right-sizing departments in the context of limited facilities resources, space that is currently utilized as storage space is evaluated for re-purposing. The plan seeks strategies to consolidate storage facilities while engaging technology to expand access to archived resources.

Construct a new Health and Natural Sciences building at the ITC Campus to provide high-technology research facilities as well as expanded capacity for sciences departments.

Due to facilities age, it is difficult to provide high-precision space for contemporary technology-supported research in legacy buildings at the Sciences Complex. The new Health and Natural Sciences at the ITC Campus serves as a gateway to the ITC and provides the University with state-of-the-art research laboratories, test and measurement facilities, and research computing facilities to support growth in research in the natural sciences. In addition, the Health and Natural Sciences building adds the first undergraduate instructional classrooms and laboratories to the ITC Campus, facilitating use of by undergraduate students.

STRATEGY

Given the quantity of renovation required at the Sciences Complex, Binghamton University is presented with a unique opportunity to improve the alignment between facilities and its strategic vision for the sciences.

The University has identified the goal of increasing involvement in interdisciplinary activity, both in research initiatives as well as the delivery of instruction. Interdisciplinary activity presents many opportunities within the sciences. Many of today's most pressing questions - such as those involving human genomics, materials science, cell biology, bioengineering, and biomedicine - require the expertise of faculty from several disciplines. Additionally, an interdisciplinary approach to instruction engages students in a process of synthesis that enriches their overall educational experience and equips them with the skills that are essential for lifelong learning in the contemporary world.

The FMP defines the facilities upgrades and reconfiguration required to create the physical environment for Binghamton University to achieve its desired interdisciplinary activity and associated scholarly success.

Due to the magnitude of renovation required at legacy science facilities and a limited quantity of swing space, renovation phasing at the Sciences Complex and the provision of new facilities for the sciences is approached strategically. The FMP approaches alignment from two key angles, considering drivers from both the facilities-side as well as the program-side. The blending of the two yields a plan that is both functional and implementable.

The following consultant methodology was employed to identify and sequence projects within the Harpur Sciences and Anthropology program band.

BUILDING COMPONENTS

Building components are defined for legacy science facilities including Sciences I-IV and the Science Library by dividing the buildings into zones for phased renovation. Consideration of building construction, such as circulation and shafts, and renovation requirements drive the development of building components.

New facilities at the Health and Natural Sciences building offer

additional components that are critical in facilitating cycles of renovation and providing state-of-the-art space for the sciences.

Once established, each building component is evaluated for the programmatic capabilities the space is able to support (i.e. wet lab, dry lab, departmental offices, etc.). Components are renovated to create high-quality, permanent space for a designated cluster of program, consisting of a blend of facility space types, including instructional labs, research labs, departmental office facilities, and support facilities.

With consideration for building capabilities, the FMP identifies four categories of building components:

- + Science I and the Science Library
- + Science II
- + Sciences III and IV
- + New Health and Natural Sciences at the ITC Campus

PROGRAM CLUSTERS

Program clusters are established around key research and teaching thrusts, considering both the University's existing and identified future research focuses as well as national trends driving research and instruction within the sciences. Program clusters are conceived of as interdisciplinary units that engage key faculty members across multiple departments.

ALIGNMENT CRITERIA

A series of alignment criteria align the capabilities of building components with the space requirements of program clusters and serve to locate program within the buildings.

- + **Science I and the Science Library.** Science I is located adjacent to Science II, but is not connected. The building accommodates dry labs for instruction and research as well as less-demanding wet lab programming. Program clusters in around geology and ecology should be preferred candidates for location in Science I. The Science Library is located within the Science Complex with a direct connection to Science II and adjacency to both Science I and III. The building was constructed for Library program, however the lower two levels may be converted to less demanding wet lab facilities. Program clusters around anthropology, including archeology, sociocultural, and linguistics, should be preferred candidates for location in the Science Library.

- + **Science II.** Science II is located adjacent to Science III. The buildings are not currently physically connected, however the opportunity exists to connect them via a bridge. Science II contains specialized ventilation systems to support Chemistry program, including instructional and research labs. Program clusters that require such systems should be preferred candidates for location in Science II.
- + **Sciences III and IV.** Science III and IV adjoin with the new LAR facilities at Science V. Building construction and MEP systems allow the facilities to accommodate instructional and research wet lab facilities. Program clusters that employ the LAR and require wet labs should be preferred candidates for location in these buildings.
- + **Health and Natural Sciences.** The new Health and Natural Sciences building is located at the University's Innovative Technology Complex, which brings together partners from government, industry, and academia to advance high-technology research. Program clusters around interdisciplinary engagement of the sciences, technology, and engineering should be preferred candidates for location at the Health and Natural Sciences building.

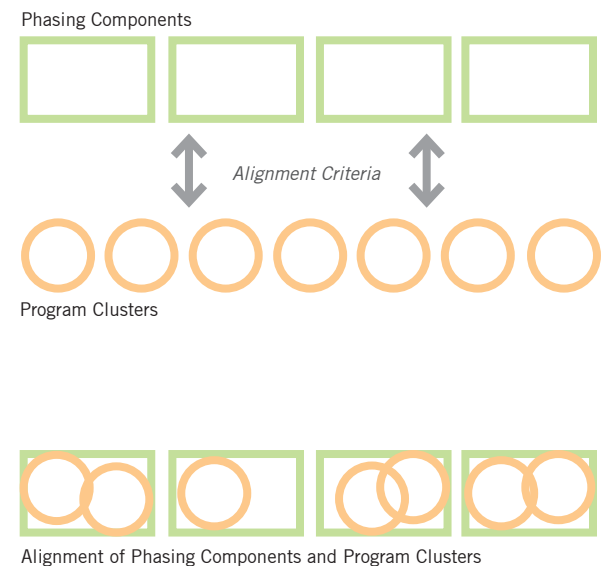


FIGURE 5.3.3.2A Strategic Approach of Aligning Building Phasing Components and Program Clusters

HARPUR SCIENCES

BUILDING COMPONENTS

The FMP identifies four categories of building components and defines phased projects within each category. Projects are summarized below and outlined in greater detail in the following section.

PROGRAM STUDY

Due the strategic approach to align facilities with program clusters, a detailed sciences program study must be conducted to develop an ideal distribution of program clusters for Binghamton University before they may be assigned to building components. The summary below identifies programmatic opportunities for the first phase project at the Complex, the Sciences IV Phase 1 renovation. Analysis of program clusters on the opposite page identifies opportunities for further program clusters and outlines requirements for further study.

SCIENCE III AND IV

Near-Term. In the near-term, the new Science V building is completed for lab animal research and Psychology Neuroscience research program. Designated program in Sciences IV and the

III/IV core are relocated to Science V, vacating a critical mass of space in Science IV to begin a cycle of phased renovations.

Intermediate-Term. In the intermediate-term, Science IV is renovated in two phases for program clusters that engage the lab animal research facilities at Science V. The Phase 1 project at Science IV East is the first renovation component to occur within legacy facilities at the Sciences Complex. The component is renovated for a program cluster of Cognition and Behavior, complementing the Neuroscience program in Science V.

Long-Term. In the long-term, Science III is renovated in three phases for additional programs that engage the lab animal research facilities at Science V.

SCIENCE I AND SCIENCE LIBRARY

Intermediate-Term. In the intermediate-term, the limited quantity of available swing space within the Sciences Complex necessitates conversion of facilities at the Science Library to program spaces. The ground level of the Science Library is renovated for low-impact wet lab space. The project is facilitated by consolidation of libraries program, aided by the

new On-Site Storage Facility. Following the completion of the Science Library, the Phase 1 renovation at Science I is conducted.

Long-Term. In the long-term, the Phase 2 renovation of Science I is conducted, completing renovation of the building.

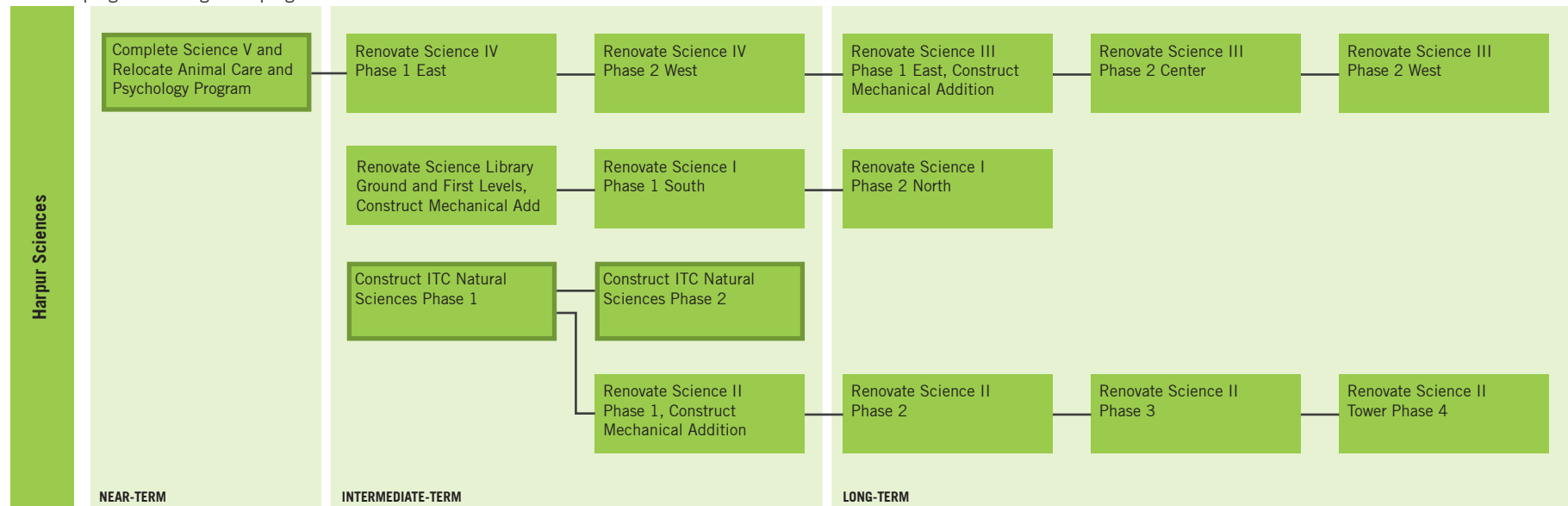
ITC HEALTH AND NATURAL SCIENCES

Intermediate-Term. The new ITC Natural Sciences is constructed in the intermediate-term to support capacity expansion and provide high-quality facilities for sciences programs. Due to the scale of the building, it is constructed in two phases so that a portion of the program space may be on-line for use sooner in the plan.

SCIENCE II

Intermediate-Term. In the intermediate-term, phased renovation of Science II is initiated with a Phase 1 renovation at the west wing.

Long-Term. Renovation is continued in the long term with three additional phases.



PROGRAM CLUSTERS

Program clusters are conceived of as interdisciplinary units that engage key faculty members across multiple departments. They are established around programmatic thrusts, considering existing and identified future research focuses as well as national trends driving research and instruction within the sciences.

Clustering of program by theme emphasizes the interdisciplinary nature of contemporary sciences. This model differs from traditional organization, which places program into discrete departments. Traditional organization often results in siloing of information and fails to effectively facilitate the multi-faceted collaboration and communication that is required to address many of the complex challenges facing sciences today.

Organization of program by thematic cluster is an effective model for Binghamton University for two main reasons. Firstly, the model provides a greater degree of alignment between the institution's strategic direction and physical facilities.

Additionally, the program organization mirrors the component-style approach to building phasing that is required for long-range implementation of renovation at the Sciences Complex. Each component must contain the full distribution of space types required by a given program cluster, including instructional lab, research, office, and support.

To effectively align Binghamton University's strategic vision for the sciences and its facilities, a detailed program study must be conducted for in-depth analysis of research and teaching themes and development of desired program clusters.

Preliminary study associated with the FMP identifies the following possible program clusters:

- + Archeology and Paleontology
- + Biochemistry
- + Biological Anthropology
- + Clinical Studies
- + Developmental Biology
- + Ecology
- + Genetics and DNA
- + Geochemistry
- + Immunology and Endocrinology
- + Microbiology
- + Molecular Biology
- + Neuroscience, Cognition, and Behavior
- + Social, Cultural, and Linguistic Anthropology

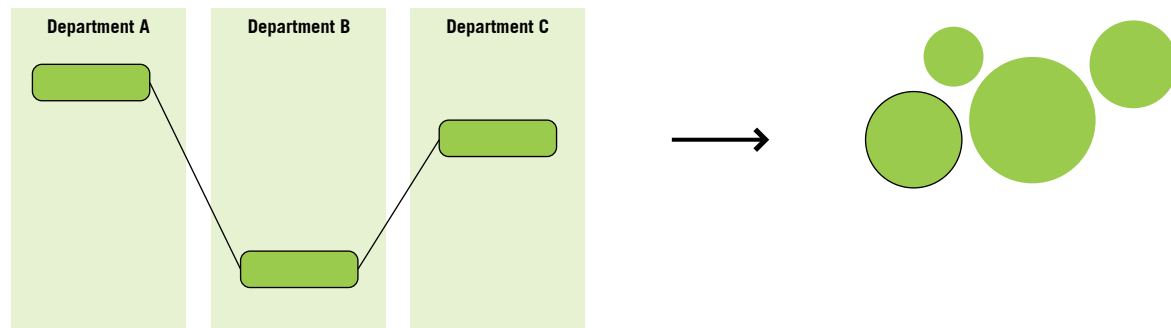


FIGURE 5.3.3.2B Diagram Demonstrating the Transition from Organization by Department to Organization by Phasing Cluster

HARPUR SCIENCES

CONDUCT PHASED RENOVATION OF SCIENCE III AND IV

Sciences III and IV are legacy buildings that were constructed in 1973. Science III currently accommodates Biology and Anthropology program; Science IV accommodates mainly Psychology program.

In 2011 the new Science V building is completed. The building is located over the Science III/IV core and provides lab animal research facilities for use by programs located in Sciences III and IV. Circulation connections provide direct links between the three buildings.

Sciences III and IV are renovated in a five-phase process, with three building components at Science III and two building components at Science IV. The cycle of renovation is initiated under the 2008 to 2013 funding cycle with a Phase 1 renovation of Science IV at the east side of the building, facilitated by Science V. Upon completion, the Phase 1 renovation will accommodate the Cognition and Behavior program cluster.

Program clusters for the remaining building components at Science III and IV will be determined through the detailed sciences study. As the buildings have direct access to the lab animal research facilities, programs that utilize these facilities should be preferred.

Both Sciences III and IV carry a significant deferred maintenance backlog. Comprehensive renovation is required to align facilities with contemporary pedagogy and technology, address building exterior, interior, and MEP system upgrades, and meet current building regulations.

BUILDING EXTERIOR AND INTERIOR

Sciences III and IV are cast-in-place concrete buildings with CMU infill. The exterior concrete requires some repair for local cracking and spalling. Roofs should be upgraded to repair local leak conditions. The buildings require comprehensive replacement of window systems for energy efficiency, thermal comfort, and abatement of possible asbestos material at seals.

Renovation should upgrade interior finishes and furnishings. Furnishings should be selected to allow for maximum flexibility among lab and other interior spaces.

MEP SYSTEMS

Due to facility age, Sciences I-IV require a near complete

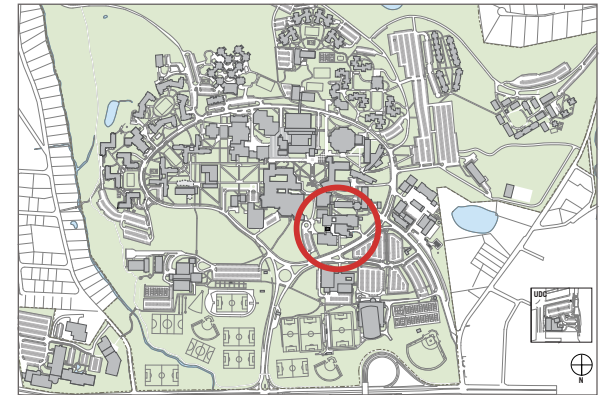
replacement of existing mechanical, electrical, and plumbing infrastructure. The Science Library requires an upgrade of such systems as it is renovated to accommodate more demanding program.

Mechanical Systems:

- + The HVAC and hood ventilation systems will be combined into a single integrated system for each building. The labs of each zone will be combined into a common central air system. The exhaust air will be brought to a single large up-blast exhaust for the group with slide inlet valves on the intake.
- + Existing basement air handling units will be removed and replaced with smaller local units with new ductwork and VAV terminals to serve offices, classrooms, corridors, and other non-laboratory spaces.
- + A VAV box on the air supply controlled by a pressure sensor will be provided to vary the amount of air brought into the room to maintain the slight negative pressure balance with the corridor. For teaching labs, an additional VAV supply air box and VAV exhaust outlet will be provided to maintain space temperature.
- + Hoods in labs will have variable position sashes that are integrated with air system controls and an “operator presence sensor”.
- + Exhaust stream will be pulled through one side of a heat-pipe-style energy recovery ventilator (ERV) that will recover waste heat from the exhaust in winter and reject heat from the outside air intake to the exhaust in the summer. The ERVs will be built into roof penthouses. The ERVs will also have hot water heating coils, chilled water cooling coils, steam humidification, and HEPA filters.
- + All chemical and gas storage will be removed from corridors and located in secure, ventilated rooms.
- + New building control systems will be provided to maintain proper air flow throughout, pressure balance between spaces, temperature consistency in rooms, and energy savings.

Electrical Systems:

- + Existing electrical services, switchgear, and transformer will



be replaced for conversion to the new campus distribution system. The remaining distribution gear will be replaced due to age.

- + New lighting fixtures will be provided.
- + New fire alarm systems will be required for complete coverage of spaces.

Plumbing Systems:

- + Piping will be replaced due to age. Individual domestic water and fire services will be brought into each building.
- + The plumbing piping to laboratories will be replaced in a common grouping with branches to each laboratory. Quick disconnects will be provided to allow for easy rearrangement of equipment.
- + Sprinkler systems will be installed in each building, required by code.

ADDITIONAL CONSIDERATIONS

The building constructions pre-date current environmental health and safety regulations, energy conservation requirements, and ADA guidelines. Renovation updates facilities to meet current regulations.

Additionally, given the nature of coursework and research that occurs within the Sciences Complex, potential hazards existing related to the use of chemical, biological, and other hazardous materials. Renovations will incorporate safety provisions throughout for the safe handling and storage of such materials.

PROJECTS AND PHASING

Science III is renovated in three phases and Science IV is renovated in two phases, defined with consideration of the following factors:

- + Characteristics of building construction, structure, and mechanical systems,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation within Sciences III and IV.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Phasing diagrams on the following pages outline boundaries associated with each phase project.

PROJECT	GSF	DESCRIPTION
Science IV Phase 1 Renovation	31,900	Renovate the east side of Science IV at the ground through third levels for the Cognition and Behavior program cluster. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science IV Phase 2 Renovation	39,800	Renovate the west side of Science IV at the ground through third levels for an applicable sciences program cluster. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science III Phase 1 Renovation and Mechanical Addition	Renovation: 33,000 Addition: 2,000	Renovate the east third of Science III at the ground through third levels for an applicable sciences program cluster, to be determined through a detailed sciences study. Upgrade for building exterior, interior, MEP, and data condition requirements. Begin upgrades at the basement mechanical room.
Science III Phase 2 Renovation	43,000	Renovate the center third of Science III at the ground through third levels for an applicable sciences program cluster, to be determined through a detailed sciences study. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science III Phase 3 Renovation	39,500	Renovate the west third of Science III at the ground through third levels for an applicable sciences program cluster, to be determined through a detailed sciences study. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science III/IV Core Renovation	19,900	Renovate the Science III/IV core at the basement level for an applicable sciences program cluster, to be determined through a detailed sciences study. Square footage excludes lab animal reserach space renvoated under the 2008 to 2013 capital plan. Upgrade for building exterior, interior, MEP, and data condition requirements.

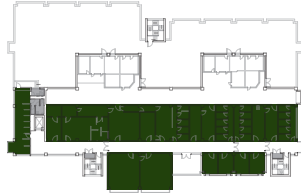
FIGURE 5.3.3.2C Project Details, Phased Renovation of Sciences III and IV

HARPUR SCIENCES

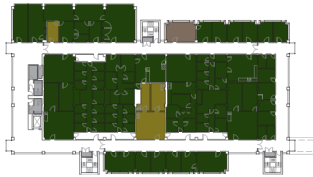
SCIENCE III AND IV PHASED RENOVATION

Science IV: Existing Condition

Third Level



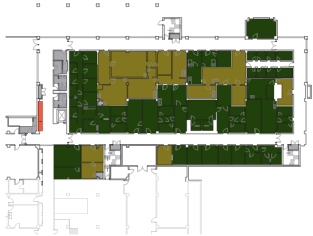
Second Level



First Level



Ground Level



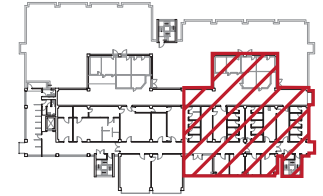
- Psychology
- Animal Care
- Classrooms & Computer Labs
- Building Services

Phase 1 Renovation

Third Level

Subtotal

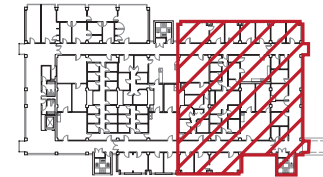
6,200 GSF



Second Level

Subtotal

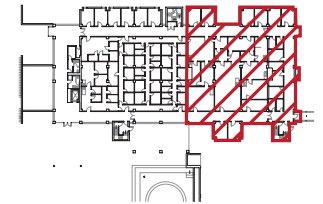
9,000 GSF



First Level

Subtotal

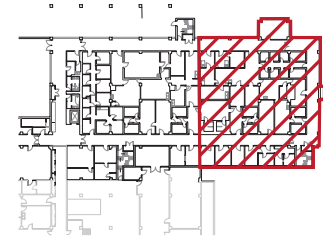
8,400 GSF



Ground Level

Subtotal

8,300 GSF



TOTAL GSF

31,900 GSF

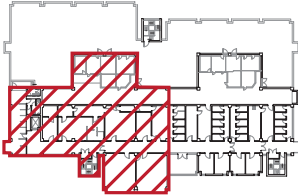
FIGURE 5.3.3.2D Renovation Phases, Science IV

BUILDING CAPACITY PERIOD

Phase 2 Renovation

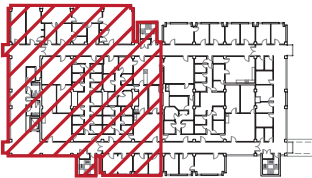
Third Level

Subtotal 7,400 GSF



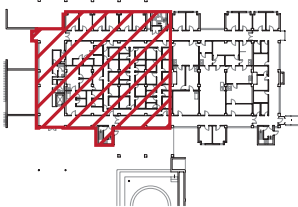
Second Level

Subtotal 12,000 GSF



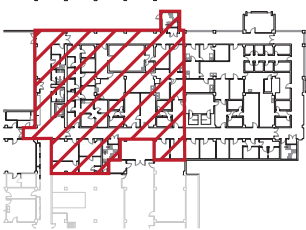
First Level

Subtotal 10,000 GSF



Ground Level

Subtotal 10,400 GSF

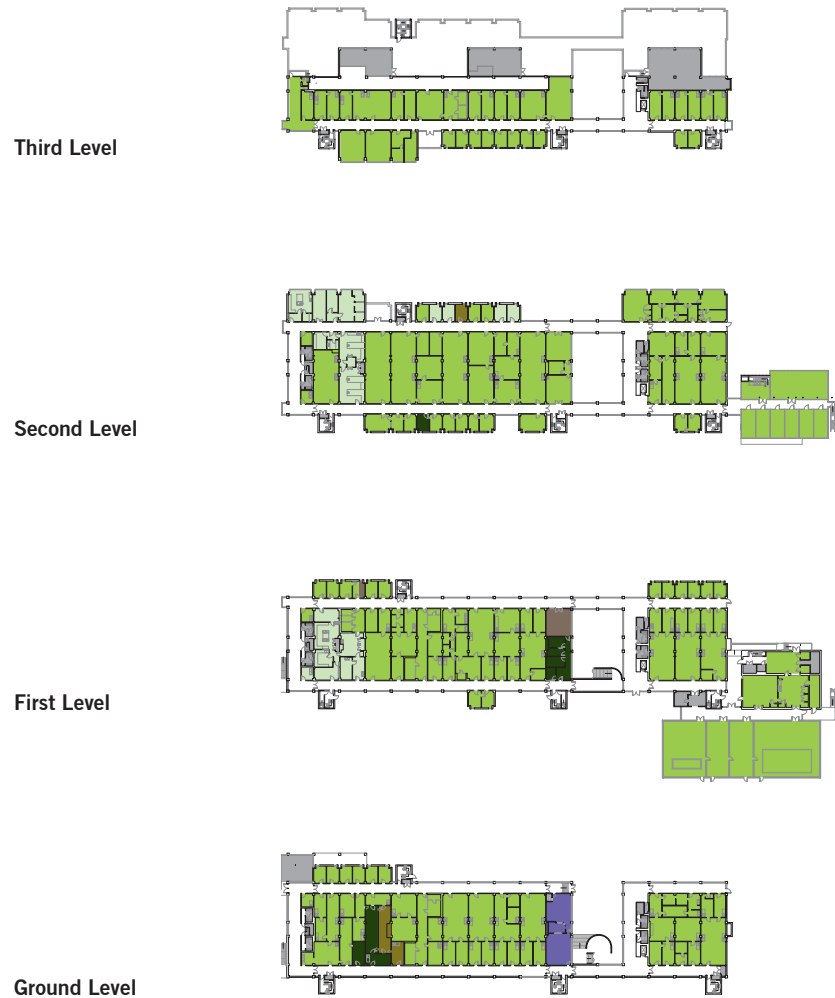


TOTAL GSF **39,800 GSF**

HARPUR SCIENCES

SCIENCE III AND IV PHASED RENOVATION

Science III: Existing Condition



Phase 1 Renovation

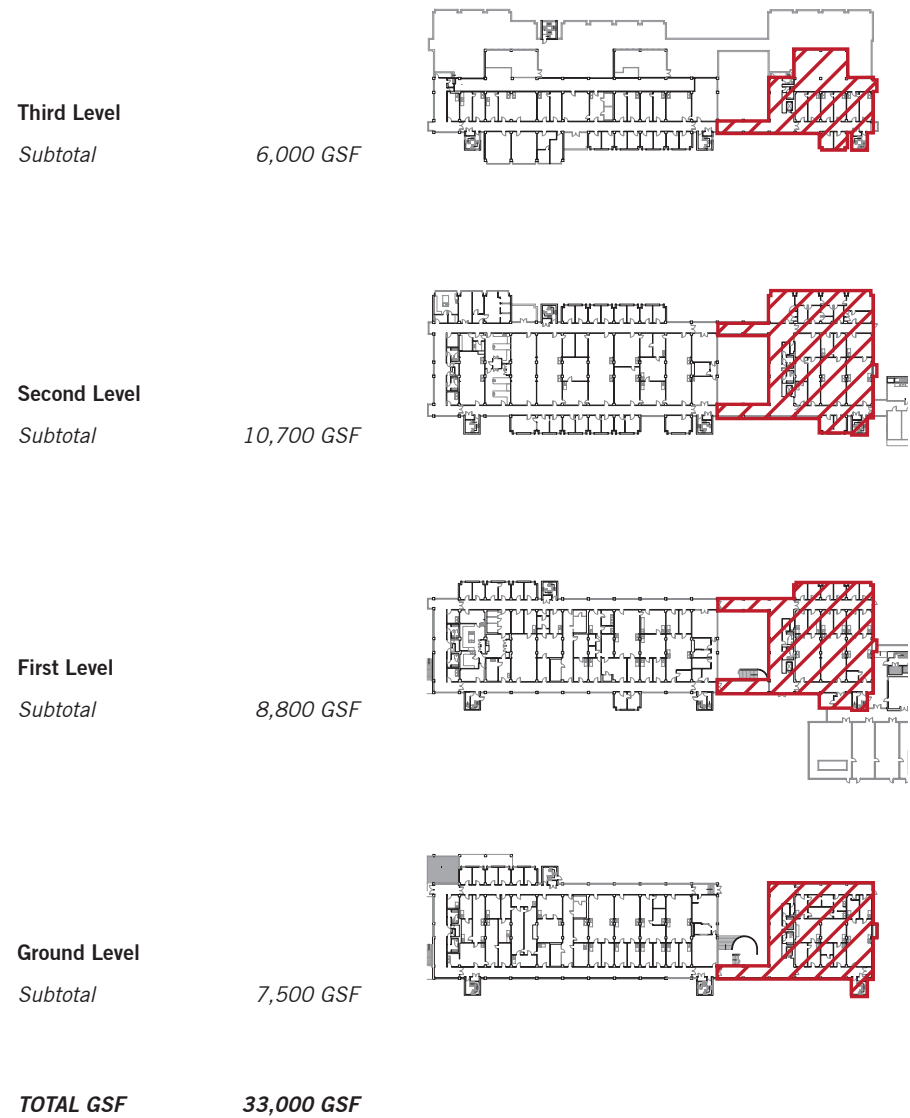
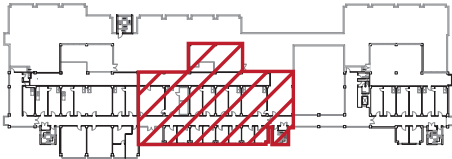


FIGURE 5.3.3.2E Renovation Phases, Science III

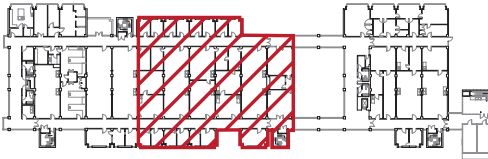
BUILDING CAPACITY PERIOD

Phase 2 Renovation

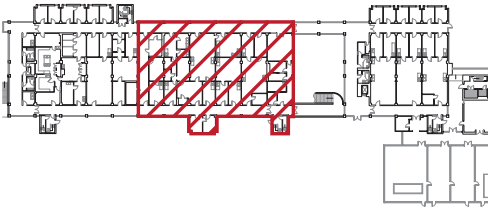
Third Level
Subtotal 8,400 GSF



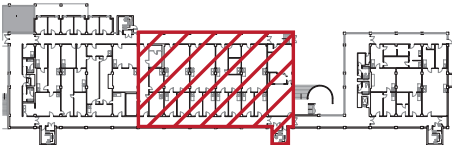
Second Level
Subtotal 13,100 GSF



First Level
Subtotal 10,900 GSF



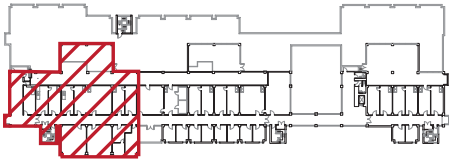
Ground Level
Subtotal 10,600 GSF



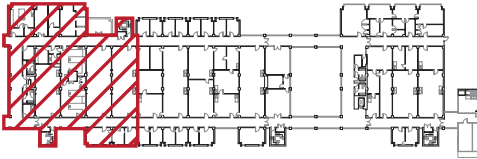
TOTAL GSF 43,000 GSF

Phase 3 Renovation

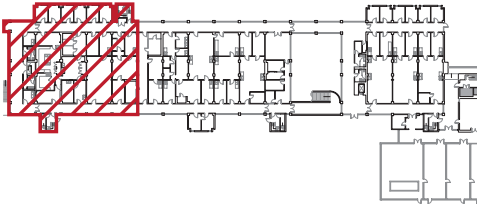
Third Level
Subtotal 8,000 GSF



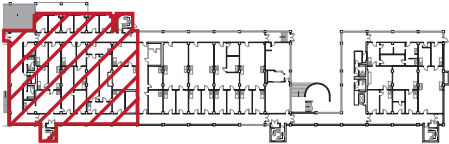
Second Level
Subtotal 11,700 GSF



First Level
Subtotal 9,900 GSF



Ground Level
Subtotal 9,900 GSF



TOTAL GSF 39,500 GSF

HARPUR SCIENCES

SCIENCE LIBRARY AND SCIENCE I PHASED RENOVATION

The Science Library and Science I are located at the Sciences Complex at Binghamton University's main campus. Both are legacy buildings that were constructed in 1973 and 1961, respectively.

The Science Library currently contains University Library space consisting of stacks, reading room, and administrative space, as well as a classroom and lecture hall suite. Science I houses the University's Anthropology and Geological Sciences programs, including departmental office facilities, laboratories, and research facilities. The building also contains the Public Archeology Facility, general classrooms, and the Chenango Room, a food service venue.

Science I carries a significant deferred maintenance backlog. The Science Library has similar maintenance requirements but they are less exposed as the current program places fewer demands on the facility. However, to facilitate comprehensive renovation of Science I, a portion of the Science Library will be repurposed for more demanding sciences program.

To this end, comprehensive renovation is required of Science I to align facilities with contemporary pedagogy and technology, address building exterior, interior, and MEP system upgrades, and meet current building regulations. The lower two levels of the Science Library must be comprehensively renovated for wet-lab facilities to support the Anthropology department. The two buildings will be renovated in three major phases, with one major phase for the Science Library and two phases for Science I.

BUILDING EXTERIOR AND INTERIOR

Science I and the Science Library require some exterior rehabilitation for local conditions issues. Both buildings require comprehensive replacement of window systems for energy efficiency, thermal comfort, and abatement of possible asbestos material at seals.

Renovation should upgrade interior finishes and furnishings. Furnishings should be selected to allow for maximum flexibility among lab and other interior spaces.

MEP SYSTEMS

Due to facility age, Sciences I-IV require a near complete replacement of existing mechanical, electrical, and plumbing

infrastructure. The Science Library requires an upgrade of such systems as it is renovated to accommodate more demanding program.

Mechanical Systems:

- + The HVAC and hood ventilation systems will be combined into a single integrated system for each building. The labs of each zone will be combined into a common central air system. The exhaust air will be brought to a single large up-blast exhaust for the group with slide inlet valves on the intake.
- + Existing basement air handling units will be removed and replaced with smaller local units with new ductwork and VAV terminals to serve offices, classrooms, corridors, and other non-laboratory spaces.
- + A VAV box on the air supply controlled by a pressure sensor will be provided to vary the amount of air brought into the room to maintain the night negative pressure balance with the corridor. For teaching labs, an additional VAV supply air box and VAV exhaust outlet will be provided to maintain space temperature.
- + Hoods in labs will have variable position sashes that are integrated with air system controls and an "operator presences" sensor.
- + Exhaust stream will be pulled through one side of a heat-pipe-style energy recovery ventilator (ERV) that will recover waste heat from the exhaust in winter and reject heat from the outside air intake to the exhaust in the summer. The ERVs will be built into roof penthouses. The ERVs will also have hot water heating coils, chilled water cooling coils, steam humidification, and HEPA filters.
- + All chemical and gas storage will be removed from corridors and located in secure, ventilated rooms.
- + New building control systems will be provided to maintain proper air flow throughout, pressure balance between spaces, temperature consistency in rooms, and energy savings.

Electrical Systems:

- + Existing electrical services, switchgear, and transformer will be replaced for conversion to the new campus distribution



system. The remaining distribution gear will be replaced due to age.

- + New lighting fixtures will be provided.
- + New fire alarm systems will be required for complete coverage of spaces.

Plumbing Systems:

- + Piping will be replaced due to age. Individual domestic water and fire services will be brought into each building.
- + The plumbing piping to laboratories will be replaced in a common grouping with branches to each laboratory. Quick disconnects will be provided to allow for easy rearrangement of equipment.
- + Sprinkler systems will be installed in each building, required by code.

ADDITIONAL CONSIDERATIONS

The building constructions pre-date current environmental health and safety regulations, energy conservation requirements, and ADA guidelines. Renovation updates facilities to meet current regulations.

Additionally, given the nature of coursework and research that occurs within the Sciences Complex, potential hazards existing related to the use of chemical, biological, and other hazardous materials. Renovations will incorporate safety provisions throughout for the safe handling and storage of such materials.

PROJECTS AND PHASING

The sciences program portion of the Science Library is renovated in a two phases, consisting of consolidation of library program and renovation for sciences program, and Science I is renovated in two phases. Phases are defined considering a number of factors including:

- + Characteristics of building construction, structure, and mechanical systems,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation within Sciences III and IV.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Phasing diagrams on the following pages outline boundaries associated with each phase project.

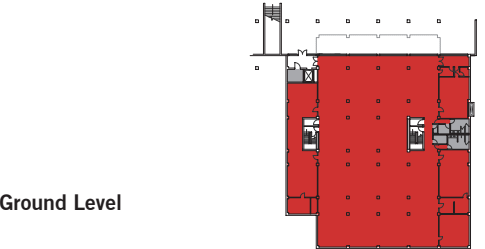
PROJECT	GSF	DESCRIPTION
Science Library Consolidation	10,200	Renovate the north side of the second level of the Science Library for a consolidated libraries program area. Refer to section 5.3.3.7 Libraries for project details.
Science Library Renovation	37,000	Renovate the ground and first levels of Science I for an applicable sciences program cluster, to be determined by the detailed sciences study. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science I Phase 1 Renovation	41,400	Renovate the south wing of Science I for an applicable sciences program cluster, to be determined by the detailed sciences study. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science I Phase 2 Renovation	45,700	Renovate the north wing of Science I for an applicable sciences program cluster, to be determined by the detailed sciences study. Upgrade for building exterior, interior, MEP, and data condition requirements.

FIGURE 5.3.3.2F Project Details, Phased Renovation Science Library and Science I

Science Library: Existing Condition



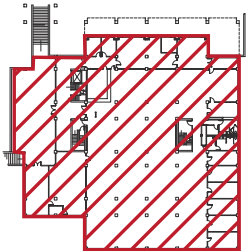
First Level



Ground Level

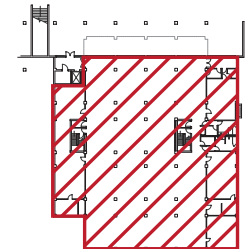
Libraries
Building Services

Phase 1 Renovation



First Level

Subtotal: 19,700 GSF



Ground Level

Subtotal: 17,300 GSF

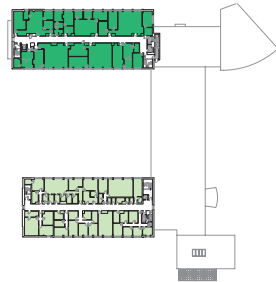
TOTAL GSF 37,000 GSF

FIGURE 5.3.3.2G Renovation Phases, Science Library

HARPUR SCIENCES

SCIENCE LIBRARY AND SCIENCE I PHASED RENOVATION

Science I Existing Condition



Second Level



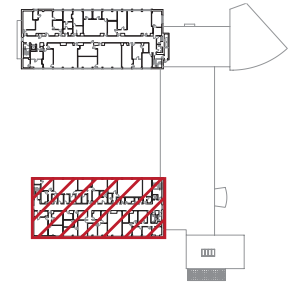
First Level



Ground Level

- Geological and Environmental
- Anthropology
- Public Archeology Facility
- Classrooms & Computer Labs
- Student Activities, Administration
- Building Services

Phase 1 Renovation



Second Level

Subtotal 10,700 GSF

First Level

Subtotal 21,700 GSF

Ground Level

Subtotal 9,000 GSF

TOTAL GSF 41,400 GSF

FIGURE 5.3.3.2H Renovation Phases, Science I

BUILDING CAPACITY PERIOD

Phase 2 Renovation



Second Level

Subtotal 11,900 GSF



First Level

Subtotal 18,300 GSF



Ground Level

Subtotal 15,500 GSF

TOTAL GSF **45,700 GSF**

HARPUR SCIENCES

ITC HEALTH AND NATURAL SCIENCES

Binghamton University is significantly under-built with respect to academic and research facilities compared to its University Center peers. To support existing enrollment and future enrollment growth, the University requires the construction of new science facilities.

The Health and Natural Sciences building is a new state-of-the-art building to provide the University with necessary instructional and research laboratories, teaching spaces, test and measurement facilities, and research computing facilities. The building will support the growth of active interdisciplinary research groups in the natural sciences.

Due to a lack of swing space in the sciences, the magnitude of the renovation required within existing Sciences I through IV, and the severe structural and architectural limitations within these buildings, the recommendation is funds be devoted to new construction. This effort will vacate significant quantities of spaces in those legacy buildings, allowing them to be redeveloped for higher and better use. Locating this new construction at the ITC Campus will allow the University to build a critical mass of advanced-level research space able to compete with both its current and aspirational peers.

STRATEGIC APPROACH

Consistent with strategic themes, the University's intent is to redevelop its complement of scientific academic and research inventory toward a model of interdisciplinary exchange and collaboration. The new Health and Natural Sciences Building organized around the natural sciences and located at the ITC represents a unique opportunity to bundle synergistic program elements that cross traditional departmental boundaries.

This new building also provides the opportunity to organize these clusters around advanced support cores, as well as the possibility of making these core resources available to support private industry with the prospect of generating additional income for the University.

As noted, to effectively align Binghamton University's strategic vision for the sciences with its facilities, a detailed program study must be conducted for in-depth analysis of research and teaching themes along with development of desired program clusters. At the level of master planning it is possible to identify the quantity of additional sciences program space required

factoring in the unavoidable inefficiency that will result from having program split between the ITC and the legacy Sciences Complex. Furthermore, the plan can make broad recommendations as to this program's location on campus as well as the nature of the spaces that might be found there.

PROGRAMMATIC CANDIDATES FOR INCLUSION

The University is currently developing a number of initiatives that will build on existing capacities across component schools and departments to create sums greater than the whole of their parts. There is strong interest in promoting an environment in which engineers can engage in long-term health management and disease diagnostics. One example of such a cross-disciplinary marriage is around the emergent science of biomimicry in which scientists seek to engineer new materials, products and processes based on the ways in which existing natural systems have evolved to accomplish comparable tasks.

Such technology exists today in the form of small-scale assisted listening implants and the continued development of what are more popularly referred to as "bionics." Once relegated to the realm of science fiction, such innovations are rapidly moving into development and deployment due in large measure to the kinds of research developments taking place in laboratories like those found throughout S3IP. This combination of electronics and biomedical engineering is foreseen as a local focus and driver of economic growth.

In addition to the development of prosthetic devices, the University also anticipates applications relevant for diagnostic protocols as well. The miniaturization of sensor technology has applications in artificial hearing or seeing; the expectation is that it will also prove instrumental in the development of devices that will detect and diagnose disease with far-reaching implications. Similar to existing diagnostic tools that read chemical signals to indicate pregnancy or infection, the hope is to produce comparable equipment that can identify diseases such as cancer more quickly and at much lesser expense.

The exact nature of the research to be carried out will also hinge on ongoing negotiations with regional healthcare providers including Lourdes and Wilson Hospitals as well as SUNY's own Upstate Medical Center. It will also likely be significantly impacted by the ongoing debate concerning healthcare reform. As the emphasis in the healthcare industry shifts from the



treatment to the prevention of illness with special emphasis on wellness we can anticipate a comparable shift in research grant funding. Binghamton University can draw on its reputation in providing access to rural health and education as well as its leadership role across the southern tier in developing devices and technologies that will respond to and relate to evolving trends in public policy.

Core Facilities. It is anticipated that a significant core of this facility will be an advanced diagnostics laboratory that will service affiliated departments. This core will require after-hours access as well as public access in order to act as a functional service department. After opening, the University's goal is to continue to expand hours of operation to eventually become a self-supporting entity.

Instructional Spaces. The University's current plans are for undergraduate instruction in both Harpur and Watson Engineering to remain within the Brain. However, development of the new facility should provide for a complement of graduate-level instructional spaces:

1. To more fully integrate learning that takes place in the laboratory with that which takes place in the classroom
2. To allow students better access to advanced core facilities and to allow these facilities to be fully incorporated into instructional curricula; and
3. To promote ties between faculty research and graduate instruction while minimizing the need for faculty to travel between the ITC and the Brain.

Additional Program Candidates. Additional program elements under consideration for location at the new Health and Natural Sciences building include the following:

+ **School of Nursing.** Based on the University's anticipated research emphases it can be concluded that the School of Nursing will be a core collaborative department. The focus on diagnostic tools and devices will dovetail with SoN's rural health initiatives, its emphasis on expanding access to healthcare in rural communities and a more widespread desire to connect advanced-level diagnostic and research facilities which are necessarily consolidated with broadly distributed remote communities.

Another area of overlap will be diagnostic simulation, one

of the key areas of growth currently experienced within the fields of Allied Health and Nursing. In the same way that small-scale electronic devices will prove instrumental in the development of prosthetic devices, they will therefore have obvious applications in ever more advanced training environments and simulation applications. The pathway to "smarter" sims will be through advanced electronics and packaging, core strengths of Binghamton University.

+ **School of Management.** It can similarly be anticipated that the School of Management will play an important role in the success of the research being conducted here. From the standpoint of technology transfer it will be critical to make available expertise in the commercialization of new and emergent technologies and draw on the experiences of faculty with particular expertise in entrepreneurship. In looking at comparable facilities and initiatives that have been developed by peer institutions there exist multiple opportunities for faculty from the School of Management to participate in developing alternate partnering paradigms for industries seeking incubator space within the new facility. The University of Virginia's Commonwealth Center for Advanced Manufacturing is perhaps the most recent example of collaborative partnerships that seek to overcome obstacles that emerge from patents, licensing and intellectual property considerations as Universities seek closer ties with private industry.

HEALTH & NATURAL SCIENCES	PROPOSED ASF
General Classrooms	9,800
Harpur Sciences	44,800
Watson Engineering	18,600
Allied Health, Nursing & Professional Programs	10,200
Centers & Institutes	31,000
Incubator Space	14,600
Student Lounge, Group Study Rooms, Café, Library Portal	15,800
Custodial Services	5,200
TOTAL	150,000

FIGURE 5.3.3.2I ITC Health and Natural Sciences Building Program

HARPUR SCIENCES

SCIENCE II PHASED RENOVATION

Science II is located at the Sciences Complex at Binghamton University's main campus. It is a legacy building within the Complex, constructed in 1969.

Science II currently contains the University's Chemistry and Physics departments, including departmental office facilities, laboratories, and research facilities. The building also contains general classrooms.

Science II carries a significant deferred maintenance backlog. The building requires comprehensive renovation to align facilities with contemporary pedagogy and technology, address building exterior, interior, and MEP system upgrades, and meet current building regulations. Construction of the new ITC Natural Sciences building will provide a critical quantity of new space for Chemistry and Physics to facilitate a phased renovation of Science II.

Upon completion of Phase 1 of the ITC Natural Sciences, Science II will be renovated in four phases.

BUILDING EXTERIOR AND INTERIOR

Sciences II is a steel construction building with brick exterior. Overall exterior condition is fair. Local instances efflorescence and moisture damage require repair. The building requires comprehensive replacement of window systems for energy efficiency, thermal comfort, and abatement of possible asbestos material at seals.

Renovation should upgrade interior finishes and furnishings. Furnishings should be selected to allow for maximum flexibility among lab and other interior spaces.

MEP SYSTEMS

Due to facility age, Sciences I-IV require a near complete replacement of existing mechanical, electrical, and plumbing infrastructure. The Science Library requires an upgrade of such systems as it is renovated to accommodate more demanding program.

Mechanical Systems:

- + The HVAC and hood ventilation systems will be combined into a single integrated system for each building. The labs of each zone will be combined into a common central air

system. The exhaust air will be brought to a single large up-blast exhaust for the group with slide inlet valves on the intake.

- + Existing basement air handling units will be removed and replaced with smaller local units with new ductwork and VAV terminals to serve offices, classrooms, corridors, and other non-laboratory spaces.
- + A VAV box on the air supply controlled by a pressure sensor will be provided to vary the amount of air brought into the room to maintain the night negative pressure balance with the corridor. For teaching labs, an additional VAV supply air box and VAV exhaust outlet will be provided to maintain space temperature.
- + Hoods in labs will have variable position sashes that are integrated with air system controls and an "operator presences" sensor.
- + Exhaust stream will be pulled through one side of a heat-pipe-style energy recovery ventilator (ERV) that will recover waste heat from the exhaust in winter and reject heat from the outside air intake to the exhaust in the summer. The ERVs will be built into roof penthouses. The ERVs will also have hot water heating coils, chilled water cooling coils, steam humidification, and HEPA filters.
- + All chemical and gas storage will be removed from corridors and located in secure, ventilated rooms.
- + New building control systems will be provided to maintain proper air flow throughout, pressure balance between spaces, temperature consistency in rooms, and energy savings.

Electrical Systems:

- + Existing electrical services, switchgear, and transformer will be replaced for conversion to the new campus distribution system. The remaining distribution gear will be replaced due to age.
- + New lighting fixtures will be provided.
- + New fire alarm systems will be required for complete coverage of spaces.



Plumbing Systems:

- + Piping will be replaced due to age. Individual domestic water and fire services will be brought into each building.
- + The plumbing piping to laboratories will be replaced in a common grouping with branches to each laboratory. Quick disconnects will be provided to allow for easy rearrangement of equipment.
- + Sprinkler systems will be installed in each building, required by code.

ADDITIONAL CONSIDERATIONS

The building constructions pre-date current environmental health and safety regulations, energy conservation requirements, and ADA guidelines. Renovation updates facilities to meet current regulations.

Additionally, given the nature of coursework and research that occurs within the Sciences Complex, potential hazards existing related to the use of chemical, biological, and other hazardous materials. Renovations will incorporate safety provisions throughout for the safe handling and storage of such materials.

PROJECTS AND PHASING

The new ITC Natural Sciences building is constructed in two phases and Science II is renovated in four phases. Phases are defined considering a number of factors including:

- + Characteristics of building construction, structure, and mechanical systems,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation within the building.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Phasing diagrams on the following pages outline boundaries associated with each phase project.

PROJECT	GSF	DESCRIPTION
Science II Phase 1 Renovation and Mechanical Addition	Renovation: 29,600	Renovate the south side of the Chemistry wing for an applicable sciences cluster.
	Addition: 2,000	Upgrade for building exterior, interior, MEP, and data condition requirements.
Science II Phase 2 Renovation	26,000	Renovate the north side of the Chemistry wing for an applicable sciences cluster. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science II Phase 3 Renovation	35,100	Renovate the Physics wing for an applicable sciences cluster. Upgrade for building exterior, interior, MEP, and data condition requirements.
Science II Tower Renovation	28,900	Renovate the Science II tower, 3-8, for departmental offices associated with an applicable sciences cluster. Upgrade for building exterior, interior, MEP, and data condition requirements.

FIGURE 5.3.3.2J Project Details, Science II Phased Renovation

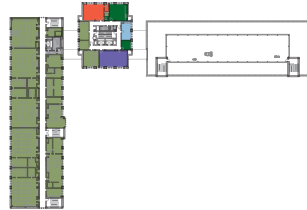


HARPUR SCIENCES

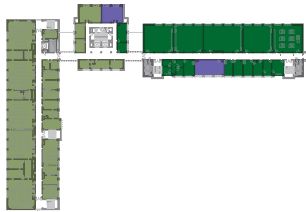
SCIENCE II PHASED RENOVATION

Science II: Existing Condition

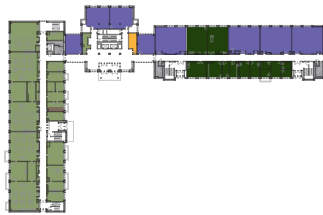
Third Level



Second Level



First Level



Ground Level

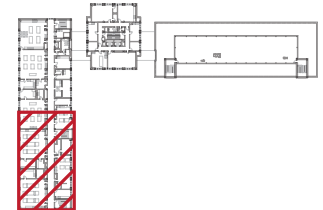


Phase 1 Renovation

Third Level

Subtotal

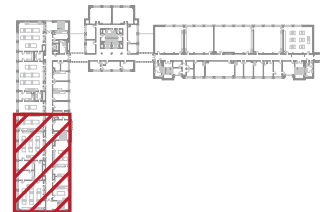
7,400 GSF



Second Level

Subtotal

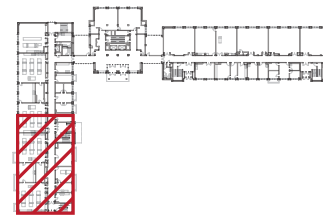
7,400 GSF



First Level

Subtotal

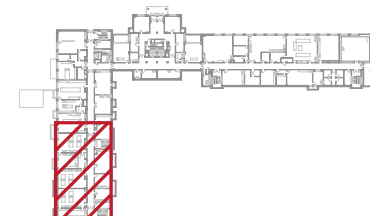
7,400 GSF



Ground Level

Subtotal

7,400 GSF



TOTAL GSF

29,600 GSF

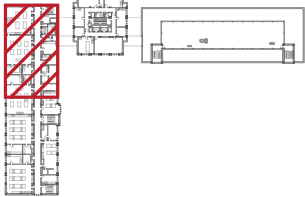
FIGURE 5.3.3.2J Renovation Phasing Diagrams, Science II

BUILDING CAPACITY PERIOD

Phase 2 Renovation

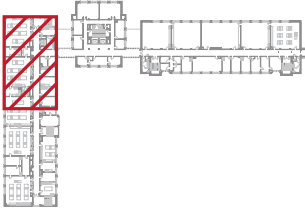
Third Level

Subtotal 6,500 GSF



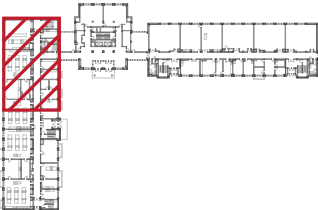
Second Level

Subtotal 6,500 GSF



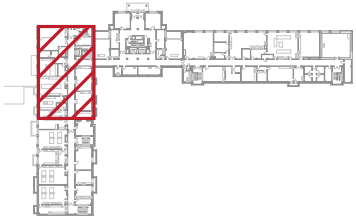
First Level

Subtotal 6,500 GSF



Ground Level

Subtotal 6,500 GSF

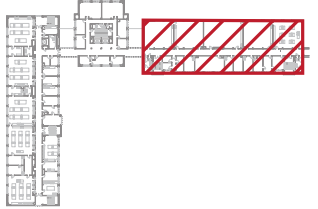


TOTAL GSF 26,000 GSF

Phase 3 Renovation

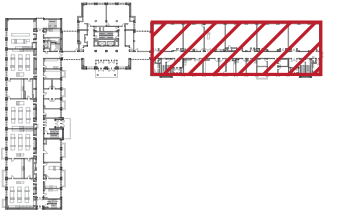
Second Level

Subtotal 11,700 GSF



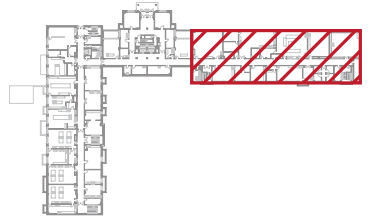
First Level

Subtotal 11,700 GSF



Ground Level

Subtotal 11,700 GSF



TOTAL GSF 35,100 GSF

5.3.3.3 WATSON ENGINEERING

The Thomas J. Watson School of Engineering and Applied Sciences at Binghamton University prepares students for future challenges with an innovative curriculum and real-world approach. The Watson Engineering program family of the FMP includes Bioengineering, Computer Science, Electrical and Computer Engineering, Mechanical Engineering, Systems Science and Industrial Engineering, and the Engineering Design Division.

The Engineering program is currently located in four campus locations: the Engineering Building and Bartle Library at the Brain, and ITC Biotech and ITC Engineering and Science at the ITC Campus. The location of program between the Brain and ITC Campus is a function of department and space type. The Watson Dean's Office, Biotechnology, Electrical and Computer Engineering (excluding instructional labs), Mechanical Engineering (excluding instructional labs) are located at the ITC Campus.

The ITC Engineering and Science building provides new, state-of-the-art facilities for Watson program and facilitates renovation of the Engineering Building by vacating a significant amount of program. The Engineering Building was constructed in 1976 and received major renovation in 1985. Under the 2008 to 2013 capital plan, the building is undergoing critical renovations to the exterior envelope, mechanical systems, and key building pods.

As a part of the FMP, additional renovation will be conducted at the Engineering Building for more complete facilities upgrades. Renovation will also facilitate the vacating of all Watson program from the ground level of Bartle Library. Capacity expansion will be provided at the ITC Campus at the new Health and Natural Sciences building.

The following section outlines objectives, strategy, and projects associated with the Watson Engineering Track.

OBJECTIVES

Consolidate Engineering program to the Engineering Building and ITC Campus to co-locate departments.

Upon completion of ITC Engineering and Sciences, the School of Engineering programs will occupy four buildings across two campus locations: Bartle Library and the Engineering Building at the Brain and ITC Biotechnology and ITC Engineering and Sciences at the ITC Campus. The location of program by campus is a factor of department, with certain departments located at each campus, and function, with the ITC Campus featuring research facilities and the Brain campus as the location of undergraduate instruction.

In the future, engineering program is expected to maintain presence at both the Brain and the ITC Campus. Due to the inherent division between the campuses, the plan seeks consolidation within each campus location to improve the flow of departmental facilities, clarify operations, and reduce the need for redundant facilities. To achieve consolidation at the Brain, program is vacate from Bartle Library to a renovated Engineering Building.

Provide designated facilities for the freshman foundational program in Engineering Design in the Engineering Building.

The Engineering Design program offers first-year engineering students a strong foundation through personal faculty contact, peer support in small group sections, and hands-on project-based immersion. The program has the dual intention of aiding students in identifying their strengths and interests for a successful sophomore transition, and positioning students for long-term success in the engineering profession. The Engineering Design program currently utilizes facilities at the ground level of Bartle Library, which are intended to be phased off-line. Comprehensive renovation of the Engineering Building allows for creation of new facilities tailored to meet the needs of the unique program.

Upgrade instructional laboratories to provide facilities that meet industry standards and address contemporary methods of curriculum delivery and technological requirements.

Comprehensive renovation of the Engineering Building and the relocation of facilities from Bartle Library provides the opportunity to upgrade instructional laboratories. New lab facilities reflect contemporary pedagogy, with a focus on integrated technology and meeting industry standards so that students may experience a seamless transition to the profession.

STRATEGY

NEAR-TERM

In the near-term, construction of the new ITC Engineering & Sciences is completed at the ITC Campus. The following departments are relocated to the new facility: the Dean's office and administration, all non-instructional components of Electrical & Computing Engineering and Mechanical Engineering. The move will vacate space within the Engineering Building as well as at the ground level of Bartle Library.

Phase 1 and Phase 2 renovations of the Engineering Building are conducted in the near-term. Phase 1 consists of upgrades to the building facade for conditions improvements. Phase 2 consists of renovation of approximately one-quarter of interior spaces within the building, including Pods E, F, G, and R, portions of Pods A, J, and Q, and the classroom in Pod Q.

INTERMEDIATE-TERM

In the intermediate-term, a Phase 3 renovation is conducted at the Engineering Building and capacity expansion provided at the new ITC Health and Natural Sciences building.

The Phase 3 renovation of the Engineering Building is conducted to continue conditions upgrades to remaining spaces and vacate Watson program from the ground level of Bartle Library. The project includes a new suite for the Engineering Design program and relocates all labs and research spaces currently located in the library.

Watson program expansion is provided at the new Health and Natural Sciences building at the ITC Campus. For program information, refer to section 5.3.3.2 Harpur Sciences.



WATSON SCHOOL OF ENGINEERING

ENGINEERING BUILDING RENOVATION

Upon completion of the new ITC Engineering and Science building, the Watson Dean's office and non-instructional components of Electrical and Computer Engineering and Mechanical Engineering will be relocated to the ITC Campus, vacating a significant amount of space in the Engineering Building and at the ground level of Bartle Library.

The vacating of space at the Engineering Building facilitates renovation and reconfiguration of spaces. Additionally, due to the age of the facility, the building requires conditions-related critical maintenance repairs and upgrades. Two projects under the 2008 to 2013 capital plan initiate upgrades: a Phase 1 exterior rehabilitation and a Phase 2 critical maintenance and renovation project for a portion of interior spaces.

An additional Phase 3 renovation project of the Engineering is conducted under the FMP. The project facilitates upgrade of remaining spaces and mechanical systems, provides a new suite for the Engineering Design Division, and relocates remaining Watson program from Bartle Library.

BUILDING EXTERIOR AND INTERIOR

Following the completion of the Phase 1 exterior rehabilitation, the building exterior and fenestration will be in excellent condition and meet targets for energy and thermal comfort. The Phase 2 renovation will upgrade interior conditions at approximately 25 percent spaces, focusing on key PODs and rest rooms.

The Phase 3 renovation upgrades remaining interior spaces, including configuration, finishes, and furnishings. Renovation requires abatement of asbestos, which exists in some building materials.

MEP SYSTEMS

The Engineering Building itself is conceived of as a teaching space, with structural and mechanical systems exposed to view. Renovation of the building provides an opportunity to build on that concept while replacing and upgrading original systems. The building has two mechanical spaces, in the basement and on the roof. Proper renovation and the provision of access paths could convert each of these spaces into active teaching spaces.

The Phase 2 project at the building addresses many system

upgrades including HVAC upgrades, emergency power and lighting, fire alarms, power wiring and electrical distribution, and installation of a new sewage ejector pump. Additional upgrades required in Phase 3 renovation include the following.

Mechanical Systems:

- + Provide an integrated lab hood, exhaust, and make-up air temperature control system that includes lab hood shutters with occupancy sensors, variable flow control air valves to reduce exhaust when not required, combined hood exhaust ducts that run through recovery heat coils, and up-blast exhaust fan group with variable inlet vanes.
- + The system should also include an energy recovery ventilator (ERV) to use the energy recovered from the exhaust to temper make-up air. This unit would be mounted on the roof with its own penthouse enclosure. Supply air ducting from the ERV would supply air VAV boxes in rooms with hoods to balance the air flow.
- + Replace existing basement air handlers and VAV boxes, utilizing existing ductwork. Provide additional VAV boxes to allow for individual temperature control of spaces.
- + Relocate vertical duct shafts concealed in corridor walls, as required for room rearrangement.
- + Replace heating and cooling pumps, reusing existing variable frequency drives (VFDs).
- + Develop a system that reuses chilled water and medium temperature hot water from Bartle Library. Keep existing chillers at the Engineering Building in place as backup or to augment future expansion in the area.
- + Provide new exhaust systems for the instructional labs and shops that are relocated from the ground floor of Bartle Library.

Electrical Systems:

- + Building electrical upgrades are addressed in the Phase 2 renovation. Phase 3 must provide for electrical distribution associated with space reconfiguration.

Plumbing Systems:

- + Building plumbing upgrades are addressed in the Phase



2 renovation. Phase 3 must provide for plumbing and sprinkler distribution associated with space reconfiguration.

ADDITIONAL CONSIDERATIONS

The opportunity exists to incorporate sustainable solutions into Engineering Building upgrades to align the building with the University's Climate Action Plan and further its use as a systems teaching space. The following sustainable measures should be considered:

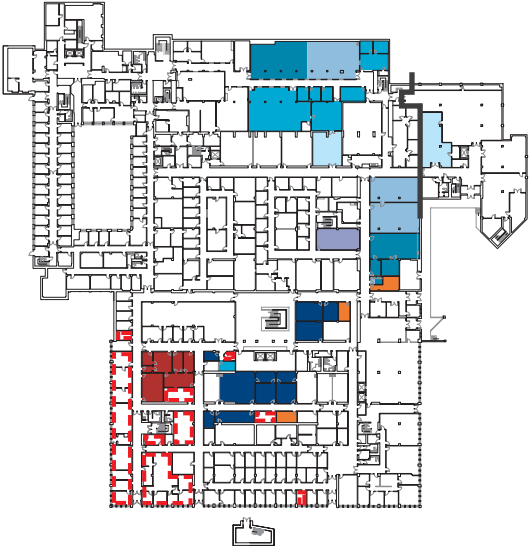
- + Solar domestic hot water heating,
- + Rainwater harvesting for use as grey water for labs and toilets,
- + Photo voltaic solar electric system to feed the building electrical distribution system,
- + A green roof to support building cooling and rainwater absorption.

BUILDING CAPACITY PERIOD

LOCATION OF WATSON PROGRAM AT THE BRAIN

The adjacent diagrams indicate the location of Engineering program at the Brain in the Engineering Building and Bartle Library following completion of the ITC Engineering and Sciences building. The red dashed areas represent areas where program is vacated to the new building.

Bartle Library



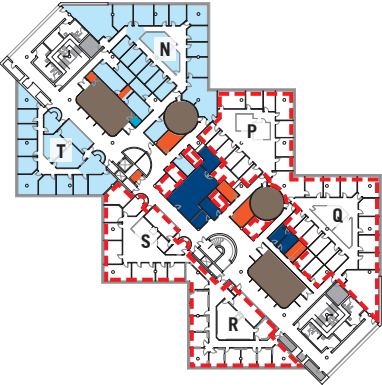
Ground Level

FIGURE 5.3.3.3A Engineering Program Vacated at Bartle Library Ground Level

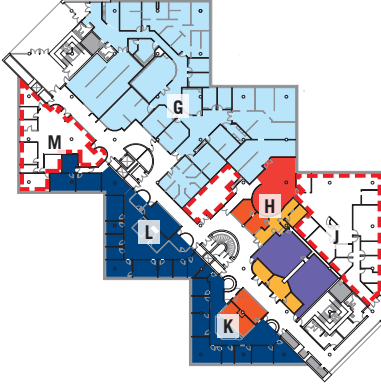
Legend

- Computer Science
- Electrical & Computing Engineering
- Engineering Design
- Mechanical Engineering
- Systems & Industrial Engineering
- Bioengineering
- Classrooms
- Student Union
- CCUP, Educational Communications, Technical Support
- Dean's Office / Advising
- Building Services
- Program Vacated by ITC Engineering & Science

Engineering Building



Third Level



Second Level



First Level

FIGURE 5.3.3.3B Engineering Program Vacated at Engineering Building

5.3.3.4 PROFESSIONAL PROGRAMS

Binghamton University offers a wide range of degree programs through its four professional schools: The College of Community and Public Affairs (CCPA), the School of Education, the School of Management, and the School of Nursing. The Professional Programs program family of the FMP includes all academic departments associated with these four schools.

The Schools of Education, Management, and Nursing are located within the Academic Complex at the University's main campus, and CCPA is located at the University Downtown Center. At the main campus, the School of Management is located in Academic Building A and the Schools of Education and Nursing are located in Academic Building B.

All three buildings containing professional programs are newer facilities to the campus, with the Academic Complex constructed in 1998 and the University Downtown Center constructed in 2007. As a result, all buildings are in good physical condition.

However, facilities realignment and expansion is required to address past and anticipated program growth, as well as to upgrade for technology and pedagogy shifts.

The FMP address facilities requirements for the professional programs through two lenses: provision of local expansion to accommodate current and intermediate-range needs, and provision of new facilities to accommodate longer-range needs.

At the main campus, local expansion is provided at the Academic Complex in spaces vacated by other programs, and in the Student Wing and Science I, adjacent facilities. Expansion is provided at the University Downtown Center by enhancing utilization at classroom and library facilities.

Longer-range expansion is provided for the professional programs through a new Professional Program building at the main campus and a new School of Law, which will be located at an off-campus location that is yet to be determined.

The following section outlines objectives, strategy, and projects associated with the Professional Programs track of the FMP.

OBJECTIVES

Provide additional capacity for the Schools located in the Academic Complex that have outgrown their existing facilities.

The Academic Complex was constructed for the University's School of Education, School of Management, and School of Nursing at a time when the population was significantly less than it is today. To support existing program populations and future projected growth, additional departmental space and expanded laboratory facilities are required for the Schools to expand. The plan provides expansion capacity through program backfill of space at Academic A and B and additional departmental office facilities at the Student Wing and Science I.

Provide competitive laboratory facilities for the professional programs that meet industry standards and address changing technological needs.

Changing pedagogy, particularly in Management and Nursing, are driving demand for new typologies of instructional space. Both are seeing an increase in technology-enhanced simulation facilities that allow students to experience a wider range of applications in an instructional setting prior to entering the profession. The plan calls for modest upgrades to existing laboratory facilities on campus to meet shifting technological demands.

Construct a new School of Law building to support the University's future academic program.

Binghamton University is moving forward with its proposal to establish a new School of Law. The School is projected to come on-line in the 2015-2018 time frame. The plan constructs a new facility for the School of Law at an off-campus location within the surrounding region. At this time the precise location is undefined, however the plan recommends a site that complements existing campus development locations or fosters other strategic relationships within the community.

Construct a new Professional School building at the East Campus in the out-year to support the University's anticipated enrollment growth over the building capacity period.

Given projected growth in the professional programs over the course of the building capacity period, the programs will no longer be adequately accommodated at the existing Academic Complex. To support growth, a new Professional School building is constructed as the second building at the East Campus in the out-year of the building capacity period. The building provides expansion capacity in state-of-the-art program space for the professional schools. A more detailed program will be developed closer to the building's conception.

STRATEGY

INTERMEDIATE-TERM

In the intermediate-term, local expansion is provided for the professional programs at Academic A, Academic B, and the Student Wing.

As a part of the Student Wing Phase 1 renovation, a portion of the second level of the Student Wing is renovated to accommodate departmental office expansion for the professional programs. Reference section 5.3.3.5 Classrooms and Computer Labs for project details.

Additional projects vacate space in Academic A and B, which is backfilled with professional program space. The Dickinson Dining Hall Addition for Admissions vacates the existing admissions office in Academic A. The Harpur Center project at the Computer Center vacates the academic advising suite in Academic B.

In conjunction with program expansion, select offices in Academic A and B may be taken off-line to allow for expansion of and upgrade of existing laboratory facilities.

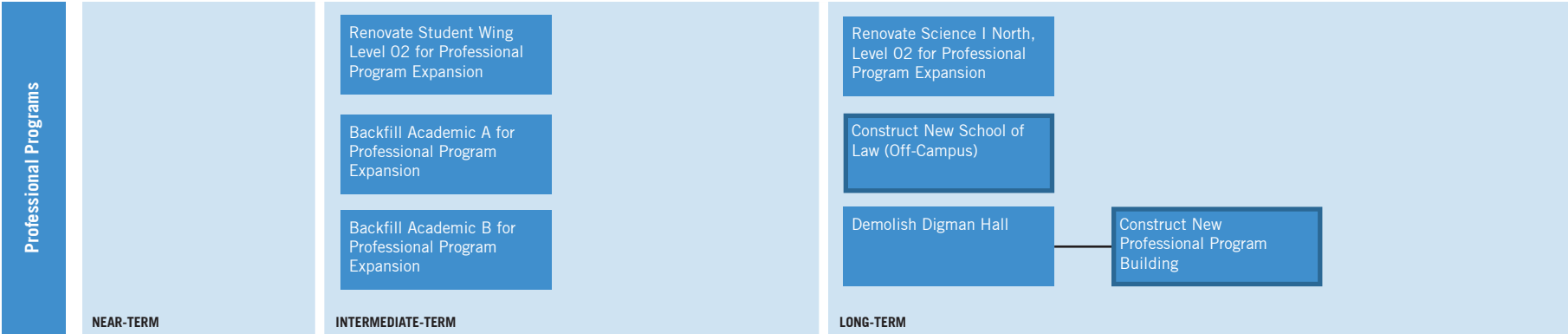
LONG-TERM

In the long-term, local facilities expansion for the professional programs is provided at Science I. Substantive expansion for program growth is provided through two new buildings.

As a part of the Science I Phase 1 renovation, the second level of the south wing of the building is renovated for departmental office expansion for professional programs. Reference section 5.3.3.2 Harpur Sciences for project details.

In the long-term, projected enrollment growth within the professional programs will cause them to exceed the capacity of existing facilities. To accommodate growth, a new Professional Program building is constructed as the second building at the East Campus.

Additionally, a new building for the School of Law is provided in the long-term to support the program that is to come online in 2015. The new building is provided in an off-campus location, yet to be determined.



PROFESSIONAL PROGRAMS

ACADEMIC COMPLEX BUILDINGS A & B PROGRAM BACKFILL

Due to their recent construction and the good physical condition of their architectural and engineering components it is recommended that minimal capital investment be made in Academic A and B. However, the master plan recognizes that the three professional programs contained in the two buildings have seen significant growth and change in recent years. As identified in the space needs assessment, the schools have outgrown their current homes and crowd each other for available space. Although conceptually the original intent of both Academic A and B remains sound, the programs contained therein have proven successful beyond the foreseen scope.

Additionally, professional programs operate in a highly competitive environment. While all academic program development must be made with an awareness of target audience and potential market share, graduate professional programming is particularly sensitive to comparison with current and aspirational peers. From the points of view of both potential students and potential faculty, the condition and nature of facilities factor prominently. While Academic A and B may still be in good physical condition, the misalignment between the buildings and the programs they house must be addressed. Special attention must be given to the kinds of spaces that have emerged as critical to education, management and nursing instruction since the buildings were built, that are not currently accommodated in Academic A or B and that leave Binghamton University at a disadvantage relative to its professional school competitors.

In the near-term the master plan calls for relocating unrelated programs out of Academic A and B to provide needed room for expansion in the professional programs. Longer term, the plan builds a new building dedicated to professional programming along with a dedicated facility for the proposed School of Law.

ACADEMIC A

Academic A currently contains the School of Management, the Admissions office and supporting functions of Enrollment Management and other student services, as well as a host of shared facilities including general classrooms and computer labs, centers and institutes, lounge space, and educational communications / ITS facilities.

Upon completion of the new Admissions addition to Dickinson Dining Hall, the Admissions office and supporting functions

is relocated out of Academic A. Completion of the new Alumni Center at O'Connor Hall relocates the Binghamton Foundation space. As a result, approximately 5,900 ASF of space is vacated in Academic A. This space is repurposed for professional program expansion. Additional space can be reclaimed in Academic A by right-sizing the Braudel Center.

As part of the maintenance of the academic reputation of the School of Management it will be important to keep Academic A facilities current with modern technologies and pedagogies. Two decades after their construction the instructional spaces in the lower level appear dated: their fixed seating, lecture format arrangement reflecting a then current approach to business education. More recently, business school planning has seen an emphasis on project based learning in an attempt to instill in students the same skills and work habits they will find in the business world such as at Ithaca College and University at Albany. Another space in need of renewal is the Trading Room, also located at the lower level. At other top institutions at which finance figures prominently, these simulated environments typically designed to accommodate 24 to 36 students at about 28 ASF per station with dual screen monitors including Bloomberg terminals. This translates into larger rooms that are often positioned as showpieces: featured prominently and open to view such as at Baruch College. Renovations in Academic A can also increase the availability of group study rooms while incorporating video-conferencing including telepresence capabilities. Such spaces have successfully been used on other campuses to bridge the gaps of physical location: allowing students and faculty to interact with peers over great distances from giving lectures to conducting interviews.



ACADEMIC B

Academic B currently contains the School of Education, the School of Nursing, the Harpur Academic Advising office and supporting functions, as well as shared facilities such as general classrooms, centers and institutes, lounge space, and a cafe.

Completion of the new Harpur Center at the renovated Computer Center relocates the Academic Advising suite out of the building. Relocation of student services and the Admissions office to the Dickinson Dining Hall and addition relocates other supporting student service functions. As a result, approximately 3,200 ASF of space is vacated in Academic B. This space is repurposed for professional program expansion.



BUILDING CAPACITY PERIOD

NEW PROFESSIONAL PROGRAM BUILDINGS

Binghamton University is projecting significant future enrollment growth in the professional programs, equating to an associated increase in facilities requirements. Additionally, the University is establishing a new School of Law program. To support growth and the new program, the University requires construction of new professional program buildings in the long-term period of the plan.

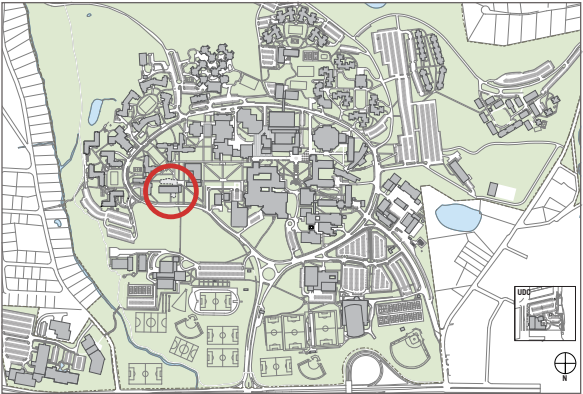
In addition to overall capacity expansion, new buildings add high-quality, contemporary instruction and research space to the University's inventory. In particular, spaces that cannot be accommodated in existing facilities should be provided with new construction, such as technology-rich functions.

PROFESSIONAL PROGRAM BUILDING

The new Professional Program Building is provided in the long-term time frame of the FMP. It is anticipated that enrollment growth by this time will cause programs to outgrow existing facilities. The new building is constructed at the south edge of the East Campus, adjacent to the new Globalization Center. Of the three candidates for the new professional program building the School of Education is the most easily accommodated with expansion space adjacent to its existing location. Both the School of Nursing and the School of Management include a range of specialty class lab environments that are well-served by new construction.

SCHOOL OF LAW

The new School of Law is provided in the long-term time frame of the FMP to support the University's new academic school. The School will be founded in 2015, and will occupy temporary facilities as it builds enrollment. During the second half of the 2013 to 2018 planning cycle program and design for the building will occur, with construction taking place in the 2018 to 2023 planning cycle. The building will be sited at an off-campus location that is yet to be determined.



PROFESSIONAL PROGRAM	PROPOSED ASF
General Classroom & Computer Lab	16,400
Professional Program	28,800
Dean's Office	5,800
Centers and Institutes	4,500
Career Development Center Location	3,600
Informal Lounge and Study Space	3,000
ITS	500
Building / Campus Services	3,200
TOTAL ASF	65,800
<i>Available ASF</i>	<i>66,000</i>
<i>Available GSF</i>	<i>115,000</i>

SCHOOL OF LAW	PROPOSED ASF
General Classroom & Computer Lab	9,000
School of Law	37,100
Dean's Office	4,800
Centers and Institutes	5,400
Law Library	31,600
Law Clinic & Academic Support	7,600
Student Services	3,600
Assembly & Exhibition	10,200
Informal Lounge and Study Space	4,800
Cafe	1,200
Building / Campus Services	4,200
TOTAL ASF	119,500
<i>Available ASF</i>	<i>120,000</i>
<i>Available GSF</i>	<i>220,000</i>

FIGURE 5.3.3.4A New Professional Program Building Program

FIGURE 5.3.3.4B School of Law Building Program, Off Campus Location

5.3.3.5 CLASSROOMS & COMPUTER LABS

Classrooms and computer labs represent six percent of Binghamton University's total inventory, however are the location of over 80 percent of all instruction. Classrooms by nature are more resource efficient than class labs, their instructional counterparts, both in terms of space requirements as well as construction and maintenance costs. Due to the combination of these factors, the FMP develops a high-quality classroom inventory to provide the University with significant value at a modest resource investment.

The Classrooms & Computer Labs program family of the FMP includes spaces coded as instruction general or instructional terminals.

Currently, classrooms are provided on the main campus at the Brain and at the University Downtown Center. Classroom space is not provided at the ITC Campus. At the Brain, the Lecture Hall Center and Student Wing contain a concentration of classrooms that are centrally allocated. Additional rooms are distributed to provide instructional space adjacent to departmental program locations, including: the Academic Complex, the Appalachian Center, Bartle Library, the Engineering Building, the Fine Arts Building, Nelson A. Rockefeller, the Sciences Complex, and the University Union.

Computer labs, referred to as PODs, are also provided on the main campus at the Brain and at the University Downtown Center. At the Brain, computer PODs are located in the Academic Complex, the Appalachian Center, Bartle Library, Nelson A. Rockefeller, and the Sciences Complex.

Much of the University's classroom inventory is located in facilities that date from the 1960s to 1980s. With renovation of major facilities, the FMP calls for renovation and upgrade of the classroom inventory to incorporate contemporary pedagogy and technologies.

Additionally, new academic buildings and targeted additions support enrollment growth and provide large section classrooms that legacy buildings are not able to accommodate.

The following section outlines objectives, strategy, and projects associated with the Classrooms & Computer Labs track.

OBJECTIVES

Improve the overall quality of the University's classroom inventory through renovation and replacement, and expand the variety of typologies to support the full range of contemporary pedagogy needs.

Classrooms comprise six percent of the University's total inventory, yet are the location of over 80 percent of total instruction, making a high-quality classroom inventory an investment with a strong return. The majority of the classrooms in Binghamton University's existing inventory are located in legacy buildings that date from the 1960s to 1980s. Facilities reflect the pedagogy of the time, which tended to emphasize lecture-style teaching. At a macro-scale, the provision of a balanced inventory of classrooms is gauged using the metric of ASF per station. The existing inventory reports an average of just under 16.0 ASF per station, reflecting an inventory heavy in lecture-style rooms.

During the time since many existing classrooms were built, significant pedagogy shifts have impacted higher education. Pedagogy shifts result in a dramatic shift in instructional delivery from teacher-centric to learner-centric. As a result, contemporary pedagogy engages a wider array of instructional methodologies, and thus places increasingly diverse demands on classrooms, a primary location for instruction. To reflect the full range of classroom typologies required to support contemporary pedagogy, the FMP establishes a target average of 22.0 ASF per station.

The target ASF per station is achieved over the course of the planning period as new classrooms are introduced to complement legacy facilities. New classrooms emphasize group-based and project-based learning, technology-enhanced learning, and other alternate strategies, as well as provision of contemporary facilities for large-section lectures. Factors of configuration to support instructional style, quality and durability of furnishings and finishes, lighting, and technology are considered in the provision of quality classrooms.

Create primary hubs of shared classrooms at the Lecture Hall Center and Student Wing, Bartle Library Media Center, Engineering Building, and in new academic buildings. Maintain additional classrooms distributed throughout instructional buildings.

Unlike their instructional counterpart class laboratories, classrooms are highly fungible and may be shared across a myriad of users. To foster shared use, nodes of classrooms are established on campus at key locations, including the Lecture Hall Center and Student Wing, Bartle Library Media Center, Engineering Building, and in new academic buildings, including the Health and Natural Sciences building, Interdisciplinary Academic Center, and Globalization Center. Additional classrooms are provided distributed throughout other academic buildings for adjacency to departmental program locations.

Provide a consistent level of technology in every classroom, complemented with distinct media-rich facilities at the Bartle Library Media Center, the ground level of the Student Wing, and in new academic buildings.

Technology is a primary driver in the pedagogy shifts that impact higher education. The majority of today's students incorporate basic technology into nearly every aspect of their learning processes. Specialized distance learning and technology-enhanced courses employ more advanced technologies. To support the technological demands of students, all classrooms incorporate a basic level of technology. Specialized facilities in new buildings and at the Bartle Library Media Center include media-rich technologies to support more technology-intensive coursework.

STRATEGY

NEAR-TERM

In the near-term the Lecture Hall Center is renovated for interior conditions upgrades at the concourse.

INTERMEDIATE-TERM

In the intermediate-term, renovation and new construction projects expand capacity and improve conditions of the University's classroom inventory.

The Student Wing Phase 1 renovation provides new small- and medium-section classrooms at the first level and professional program departmental offices as the second level. To support the integrated learning styles of today's students, instructional space is complemented with informal student lounge and study spaces.

An addition is constructed at the Lecture Hall Center between the legacy Center and the Student Wing to provide large-section lecture halls that are not able to be accommodated in existing facilities. New lecture halls provide the University with learning environments that reflect contemporary pedagogy, but

allow for teaching in large-section format.

The Bartle Library South Phase 1 renovation creates a designated hub of media-rich instructional environments in a Media Center located at the ground level of the building. The Media Center includes classrooms, group study rooms, and an information commons with the latest technologies to support student learning. Reference section 5.3.3.7 Libraries for project details.

The Engineering Building Phase 2 renovation provides a core of general purpose classrooms in the building, adjacent to the existing lecture hall. Reference section 5.3.3.3 Watson Engineering for project details.

Additional new classrooms and large section lecture halls are provided with construction of new buildings. The ITC Natural Sciences provides the first instructional classroom space at the ITC Campus. The Interdisciplinary Academic Center provides new facilities at the Brain.

Renovation projects throughout the intermediate-term at legacy facilities update the classroom inventory that is distributed across the campus. Key buildings that are affected include Bartle Library, the Fine Arts Building, and the Sciences Complex.

LONG-TERM

Upgrade and expansion of the classroom inventory is continued in the long-term.

Following the relocation of Cinema to the Fine Arts Building, the ground level of the Student Wing is renovated for additional media-rich instructional environments.

New classrooms and large section lecture halls are provided with construction of the Globalization Center at the East Campus. Renovation of projects at legacy facilities continue to upgrade classrooms across campus.



CLASSROOMS & COMPUTER LABS

STUDENT WING RENOVATION & LECTURE HALL CENTER ADDITION

The Lecture Hall Center and Student Wing are the primary location for shared lecture halls and classrooms. Renovation and addition to the buildings enhances the quality and quantity of instructional facilities and significantly improves the University's overall classroom inventory.

The buildings are situated in a key location at the west campus along two primary pedestrian walkways: the Lois B. DeFleur walkway that extends east and west, and the walkway that extends north and south to connect Appalachian Hall with down to the West Gym.

The Student Wing renovation and Lecture Hall Center addition is conducted in three phases. Upon completion, the buildings form a connected complex featuring state-of-the-art classrooms across a wide range of section sizes. Due to the phased nature of implementation, early phases must consider the desired circulation and program organization of the complete complex in order to be successful.

The Student Wing is a legacy campus facility that was constructed in 1968. The column grid and limited floor-to-floor heights constrain the range of program and size of spaces that the building is capable of accommodating. Therefore, the building is best suited for departmental office suites and small to medium-section classrooms. Additionally, the building requires systems upgrades to support program.

BUILDING EXTERIOR AND INTERIOR

Renovation projects at the Student Wing require abatement of all asbestos containing material.

MEP SYSTEMS

Mechanical System:

- + Replace absorption chiller for the complex, expanding capacity to handle the addition.
- + Add CO2 sensing to the control of outside air dampers for the air handlers at lecture halls for energy savings and improved air quality.

Electrical System:

- + Upgrade lighting systems for improved controls and energy efficiency.



Plumbing System:

- + Provide a new, larger fire service to the complex and provide sprinklers throughout.

ADDITIONAL CONSIDERATIONS

Additional vertical circulation is required to accommodate the volume of traffic associated with the Lecture Center Addition.

Circulation Organization

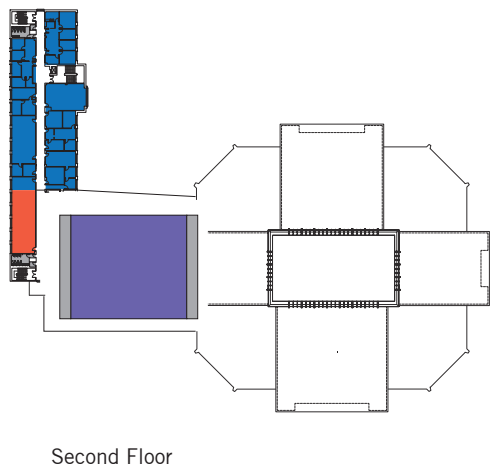
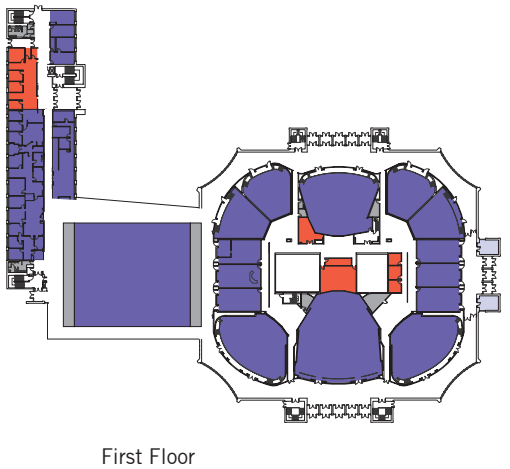
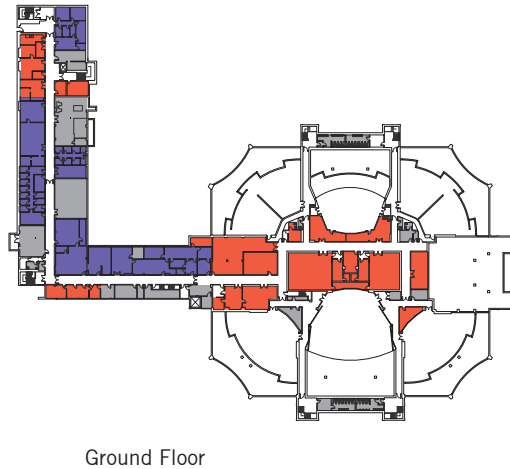
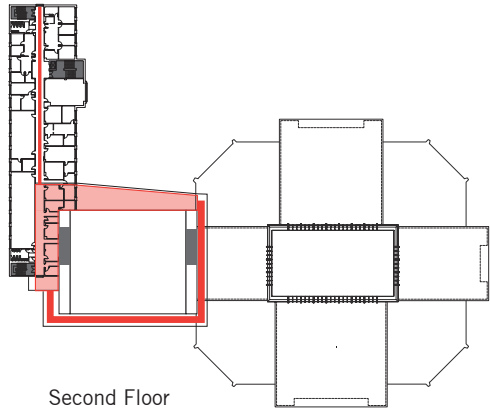
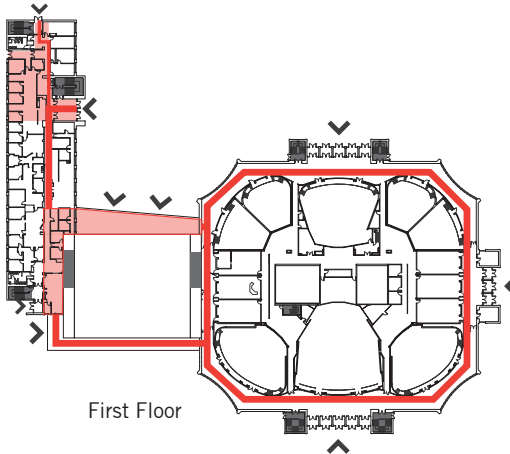
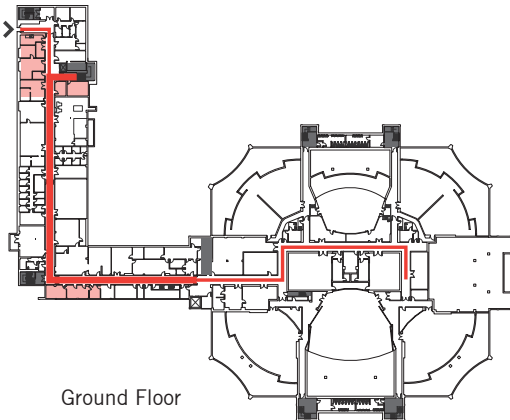
- Building Entrance >
- Major Circulation Route █
- Minor Circulation Route █
- Major Building Public Space █
- Stairway or Elevator █

Program Organization

- Professional Programs █
- Classrooms & Computer Labs █
- Student Services and Administration █
- Building Services and Circulation █

FIGURE 5.3.3.5A Building Organization, Lecture Hall Center and Student Wing

BUILDING CAPACITY PERIOD



CLASSROOMS & COMPUTER LABS

STUDENT WING RENOVATION & LECTURE HALL CENTER ADDITION

PROJECTS AND PHASING

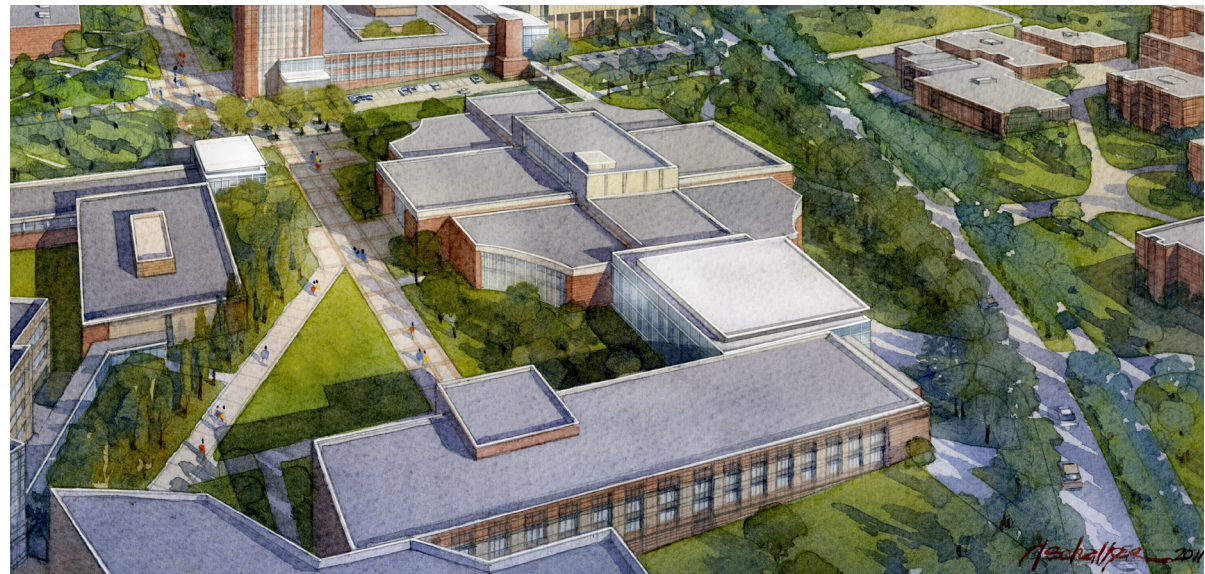
The Student Wing is renovated and added to in three phases, defined with consideration of the following factors:

- + Characteristics of building construction, structure, and mechanical systems,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Phasing diagrams on the following pages outline boundaries associated with each phase project.

PROJECT	GSF	DESCRIPTION
Phase 1A Renovation	30,400	Renovate the first and second levels of the Student Wing for classrooms on the first level and departmental offices for professional program expansion on the second level. Renovation must organize circulation and program space to receive the Lecture Center Addition in Phase 2. Upgrade for building interior, MEP, and data systems, as required. Abate existing asbestos.
Phase 1B Lecture Center Addition	Renovation: 10,700 Addition: 22,200	Construct an addition to the Lecture Hall Center between the legacy Center and the Student Wing for large section lecture halls. Renovate impacted portions of existing facilities to provide connectivity.
Phase 2 Renovation	15,200	Renovate the ground level of the Student Wing for media-rich classrooms. Project implementation occurs following the move of Cinema to the Fine Arts Building. Upgrade for building interior, MEP, and data systems, as required.

FIGURE 5.3.3.5B Project Detail, Lecture Hall Center and Student Wing



Lecture Hall Center Addition

BUILDING CAPACITY PERIOD

PHASE 1A AND 1B RENOVATION AND ADDITION DETAIL

Phase 1A at the Student Wing renovates the first and second floors for classrooms and professional program expansion space. To reflect contemporary learning styles, informal lounge and study space is distributed throughout.

The diagrams to the right outline the renovation zone and target departmental organization. The renovation locates classrooms on the first floor to create highly accessible spaces. Professional program departmental offices are located on the second floor. This location provides office space in a lower-activity zone. Offices may be accessed via the north stairwell of the building, which connects back to the Academic Complex at Building A.

The following projects facilitate implementation of the Phase 1 renovation project:

- + Relocation of EOP to the University Union,
- + Relocation of the Geography department to Johnson Hall,
- + Relocation of student service functions to the One-Stop at Dickinson Dining Hall,
- + Temporary consolidation of departmental offices for the Cinema department.
- + Taking two existing classrooms at the second level off-line during renovation.

The subsequent Phase 1B project at the Lecture Center / Student Wing complex is an addition for large-section lecture halls. The addition will be located in the zone between the existing Lecture Center and Student Wing, and will adjoin to both. If proper funding can be secured, Phase 1A and 1B are to be implemented concurrently. However, if funding does not allow for the phases to occur simultaneously, the Phase 1A renovation of the Student Wing must be designed and constructed to receive the addition. Of particular importance is management of the flow of circulation through the complex.

Second Floor

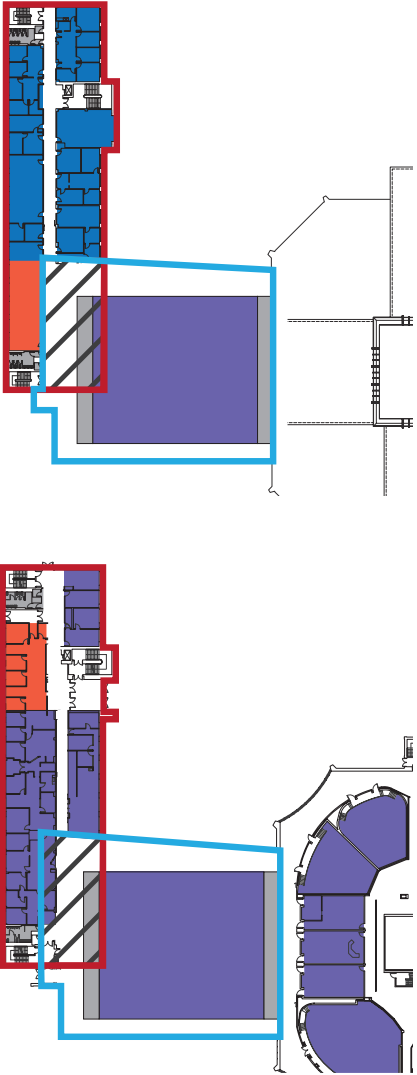
Professional Programs	7,300 ASF
Informal Lounge & Study Space	1,600 ASF
Building Services / Custodial	600 ASF
<i>Subtotal</i>	<i>9,500 ASF</i>

First Floor

Classrooms	7,000 ASF
Informal Lounge & Study Space	1,500 ASF
Building Services / Custodial	600 ASF
<i>Subtotal</i>	<i>9,100 ASF</i>

TOTAL ASF **18,600 ASF**

FIGURE 5.3.3.5C Phase 1 Detail, Lecture Hall Center and Student Wing



Legend

Phase 1A Construction Area		Professional Programs	
Phase 1B Construction Area		Classrooms & Lecture Halls	
Phase 1A and 1B Intersection		Informal Student Lounge	
		Circulation, Integrated Lounge	

CLASSROOMS & COMPUTER LABS

STUDENT WING RENOVATION & LECTURE HALL CENTER ADDITION

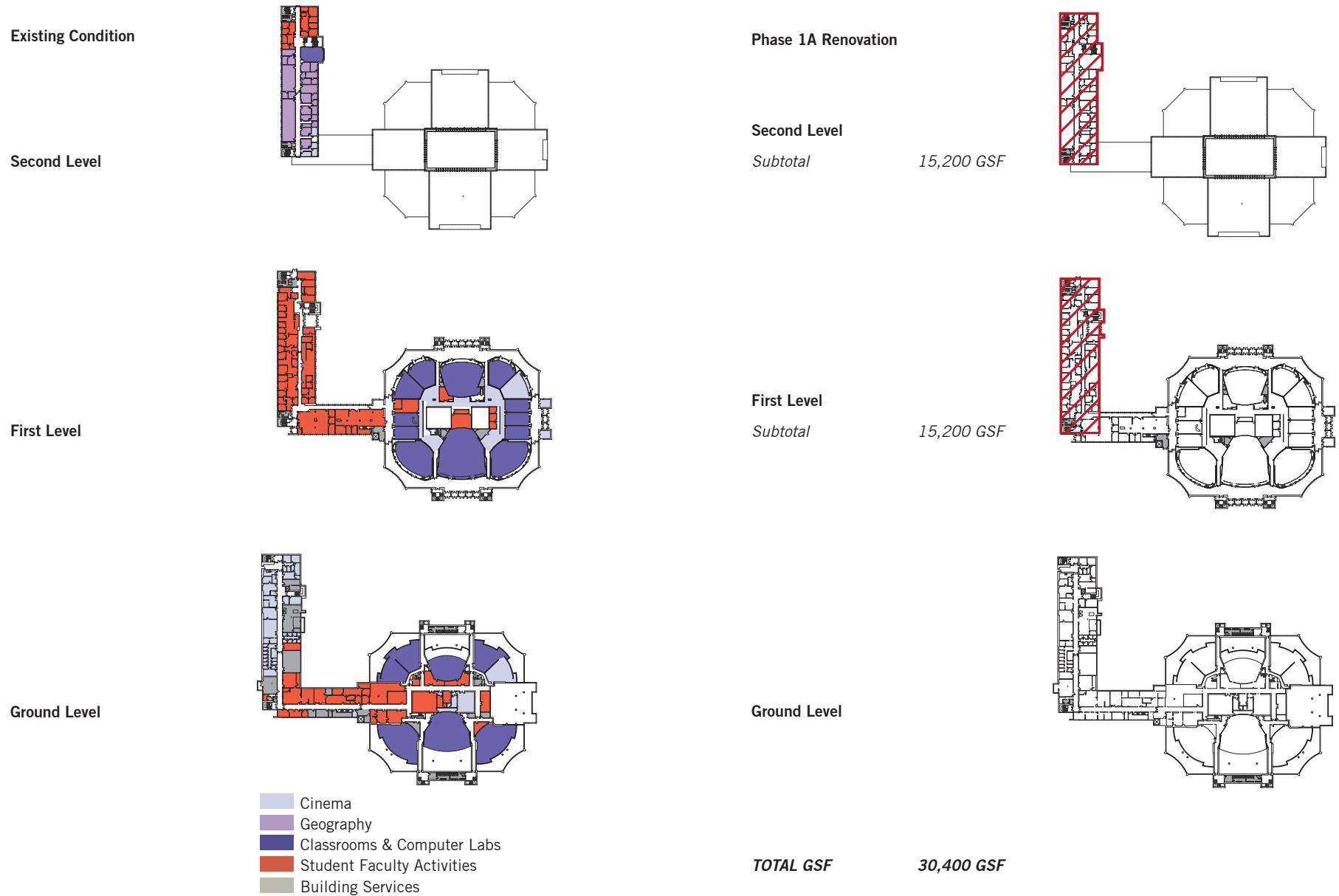
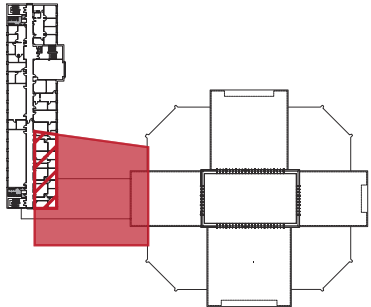


FIGURE 5.3.3.5D Phasing Plan, Lecture Hall Center and Student Wing

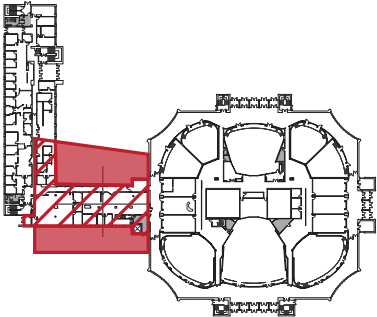
BUILDING CAPACITY PERIOD

Phase 1B Renovation and Addition

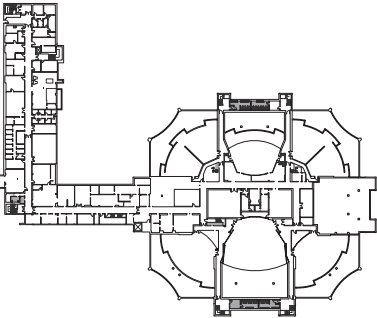
Second Level
Subtotal Renovation 2,300 GSF
Subtotal Addition 14,200 GSF



First Level
Subtotal Renovation 8,400 GSF
Subtotal Addition 8,000 GSF



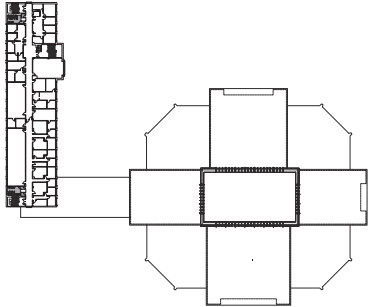
Ground Level



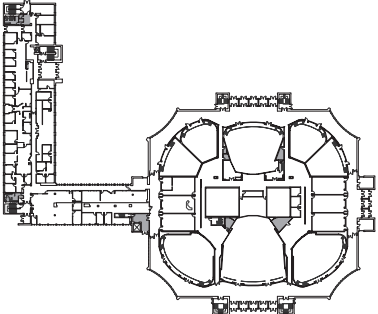
Renovation GSF 10,700 GSF
Addition GSF 22,200 GSF

Phase 2 Renovation

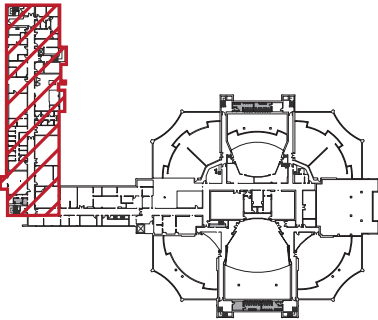
Second Level



First Level



Basement Level
Subtotal Renovation 15,200 GSF



TOTAL GSF 15,200 GSF

5.3.3.6 CENTERS, INSTITUTES, AND GRANT FUNDED PROGRAMS

Binghamton University promotes innovation and discovery across all of its departments and schools through support of a range of centers, institutes, and grant funded programs. Collectively, the programs engage students, faculty, and industry and community partners to make discoveries that enrich the campus, community, and world.

The Centers, Institutes, and Grant Funded Programs program family of the FMP includes all affiliated programs engaged in research and discovery. Research at the University spans a wide spectrum of size, focus, and level of interdisciplinarity. This results in diverse facilities requirements, ranging from more traditional office space to highly specialized facilities. It also yields a distributed model of space allocation, with facilities provided in buildings throughout campus.

Existing facilities for centers, institutes, and grant funded programs are largely located adjacent to their affiliated academic departments distributed throughout legacy facilities at the Brain. Programs that require more specialized facilities and engage in interdisciplinary connections are co-located at the Innovative Technologies Complex for direct access to specialized services, equipment, and faculty members.

The FMP maintains the distributed model of facilities provision for centers, institutes, and grant funded programs, with space needs met at both legacy and new academic facilities across campus. Renovation of a number of legacy facilities allows for conditions upgrade and reprogramming.

Targeted capacity expansion is provided for programs with highly specialized facilities needs. Projects include the new Health and Natural Sciences at the ITC Campus and an addition to the Institute for Child Development.

The following section outlines objectives, strategy, and projects associated with the Centers, Institutes, and Grant Funded Programs track of the FMP.

OBJECTIVES

Provide state-of-the-art facilities for S3IP and its affiliated programs at the ITC Center of Excellence and for health and science-related programs at the new ITC Health and Sciences building.

Binghamton University's Center of Excellence is designated as a New York State Center of Excellence and brings together partners from government, industry, and academia to provide opportunities for collaboration that advances microelectronics research and development. The new ITC Center of Excellence building will house the Small Scales Systems Integration and Packaging (S3IP) and its affiliate programs.

The new ITC Health and Natural Sciences building will provide facilities for centers, institutes, and grant funded programs that study the intersection between natural and life sciences and technology. The building will bring together scientists, industry ties, and healthcare partners to support interdisciplinary research.

Construct an addition to the Institute for Child Development to expand the capacity of the program's facilities.

The Institute of Child Development provides a wide range of clinical, educational, and diagnostic services to children with a myriad of learning disabilities and related disorders. The program also is instrumental in conducting research and training for students entering the field. The Institute has grown beyond the capacity of its existing building, and requires additional facilities to support its operations. An addition to the building provides such facilities and allows for removal of the existing trailers that currently house administrative functions.

Continually improve the quality and quantity of facilities for existing centers, institutes and grant funded programs through various renovation and new construction projects.

BU conducts research in multiple venues and is home to a number of diverse centers, institutes, and grant funded programs. Some programs are directly affiliated with a particular department and are co-located with that department. Other programs function in a more interdisciplinary manner and draw on expertise from multiple departments. New construction and renovation of legacy facilities identifies the range of needs of the University's centers, institutes, and grant-funded programs and provides the appropriate facilities.

Provide seed space for future centers and institutes to encourage innovation.

In keeping with the University's commitment to innovation, the plan provides facilities to support future avenues of research in the form of seed space for future centers and institutes.

STRATEGY

NEAR-TERM

In the near-term, the ITC Engineering and Science and Center of Excellence buildings are completed. The facilities incorporate high-quality spaces for research associated with engineering and sciences programs. The Center of Excellence provides state-of-the-art spaces for Binghamton University's Small Scales Systems Integration and Packaging (S3IP) program.

INTERMEDIATE-TERM

In the intermediate-term, renovation and new construction projects expand capacity and improve conditions of facilities for centers, institutes, and grant funded programs.

The ITC Health and Natural Sciences building provides high-quality, interdisciplinary facilities to support science-related research programs. Refer to section 5.3.3.2 Harpur Sciences for detail.

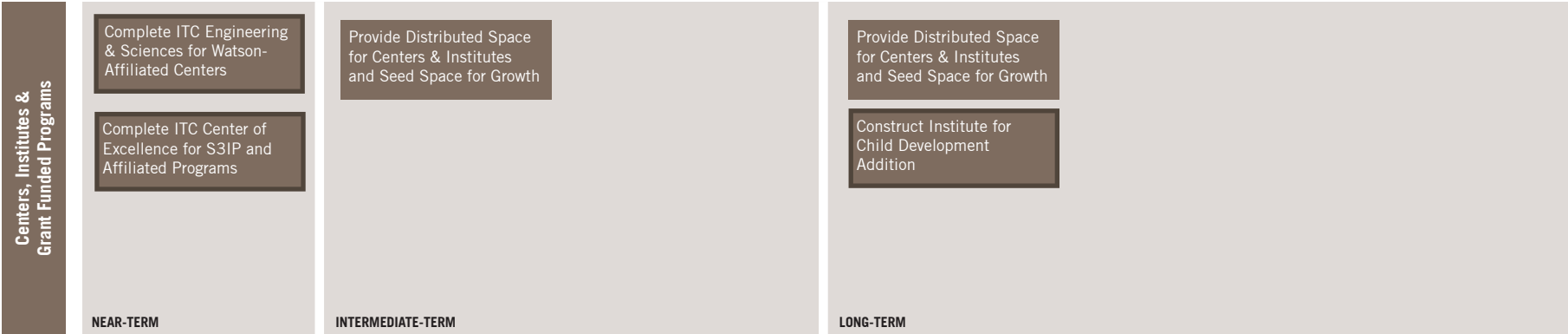
Renovation and new construction projects throughout the intermediate-term provide additional facilities for related programs. Key buildings include Bartle Library, the Fine Arts Building, the Harpur Center at the Computer Center, the Sciences Complex, and the new Interdisciplinary Academic Center.

LONG-TERM

Upgrade and expansion of facilities for centers, institutes, and grant funded programs is continued in the long-term.

An addition to the existing Institute for Child Development building provides specialized spaces for the program adjacent to existing facilities.

Renovation and new construction projects throughout the long-term provide facilities for related programs at Bartle Library, the Fine Arts Building, the Sciences Complex, and the new Globalization Center.



5.3.3.7 LIBRARIES

Binghamton University Libraries are at the center of the University's intellectual community. They provide leadership to the University community in accessing and using information resources for teaching, learning, and research, facilitating the management of knowledge through innovative thinking, open inquiry, and collaborative partnerships.

The Libraries are organized as learner-centric systems and provide both first-rate print and electronic collections with a wide range of approaches to information discovery and delivery. The program features state-of-the-art information technologies and anticipates changes and trends in scholarship, publishing, and education.

The Libraries program family of the FMP consists of all University Library programming, including stacks and special collections, administration and operations, reader spaces, and other supporting functions. Program is currently located in three locations - the Bartle Library, the Science Library, and the University Downtown Center.

The FMP develops Libraries at BU around an emphasis on the student interaction with information. As such, facilities are re-aligned to reduce the quantity of space employed for stacks and increase reader amenities and technology spaces. Construction of an on-site storage facility facilitates this shift.

Of the three library locations, the Bartle Library at the University's main campus carries the most significant maintenance needs. Within the building, library functions are predominantly located in the south portion, the newest addition. Despite its more recent construction, this portion of the building requires comprehensive renovation is required to align facilities with contemporary libraries operations, clarify building circulation routes, and address building interior, exterior, and MEP system upgrades. The fourth floor of Bartle Library South was recently renovated and abated.

The following section outlines objectives, strategy, and projects associated with the Libraries track of the FMP.

OBJECTIVES

Reprogram libraries at the main campus to reduce facilities emphasis on stacks and collection storage and amplify emphasis on the Library as the center of the University's intellectual community, fostering inquiry and collaboration.

Technology and pedagogical shifts have profoundly impacted the nature of the library for institutions of higher education. Once approached as a repository for knowledge with an emphasis on reference and retrieval of print collections, the digital age has expanded the role of the library beyond a store of collections to a hub of information transfer and interpersonal interaction. Binghamton University's Libraries are at the forefront of the shift, providing leadership to the University community in strategies for engaging information resources for teaching, learning, and research.

While shifting to incorporate new models of information access and delivery, the University's Libraries continue to house distinguished print and special collections. With the advent of data locating technology and inter-library loan programs, the University is experiencing an increase in circulation of its print collections, particularly for more rare resources.

Reprogramming of facilities redistributes space to allow the physical environment to exhibit the Library's role as an intellectual hub of knowledge transfer. The plan engages compact storage strategies and technology to consolidate the facilities occupied by collections storage while increasing access. Facilities gained in the consolidation meet growing space needs for information kiosks, InfoCommons, formal and informal study space, and group meeting facilities.

Conduct a comprehensive renovation of library program at Bartle Library and the Science Library to improve conditions.

University libraries occupy the south side of Bartle Library and the Science Library. Both buildings were constructed in the 1970s according to a model of information storage and access that is much different than the contemporary model. With reprogramming, library facilities are upgraded for conditions improvements to clarify circulation routes, upgrade mechanical systems, and improve interior finishes.

Upgrade facilities to support the University's information access and management strategies that engage technology and innovative programming to anticipate changes and trends in scholarship, publishing, and education.

Comprehensive reprogramming and renovation of library facilities allow for the integration of state-of-the-art technologies to support evolving models of information access and delivery. Reprogramming addresses issues of space organization and layout to encourage members of the campus community to engage technology resources. A new Media Center provides a concentration of technology rich instruction and collaboration spaces to support technology-enhanced learning. The Media Center serves as a test location for developing technologies that the University is engaging on a trial basis and considering adopting. Renovation of library spaces also installs core technology infrastructure into buildings that were constructed prior to its existence. Infrastructure upgrades are built to be nimble to future technology shifts, allowing for ease of upgrade.

STRATEGY

The chart below and following narrative outline project initiatives in the Libraries program family. Projects are presented in detail on subsequent pages.

INTERMEDIATE-TERM

In the intermediate-term renovation is conducted to University Library program space at Bartle Library and the Science Library, facilitated by construction of a new On-Site Library Storage Facility.

The On-Site Library Storage Facility is also constructed in the intermediate-term. The facility consists of climate-controlled spaces for the storage of print collections and other artifacts. It is designed to accommodate print collections from the main campus as well as additional collections currently at the Library Annex in Conklin. The facility should also consider accommodation of other key BU collections associated with the sciences, student services, and administrative functions.

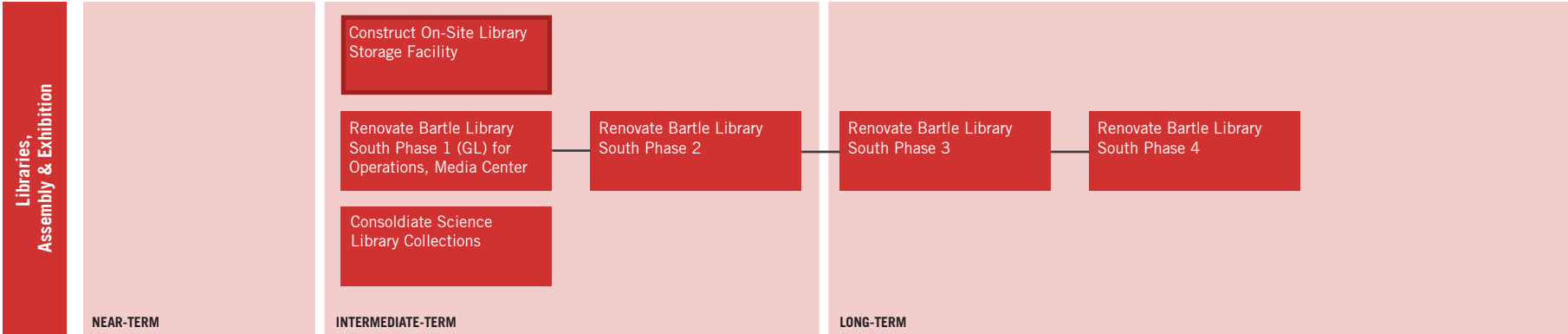
The Phase 1 renovation of Bartle Library south renovates the space for a new Media Center, containing media-rich instructional environments and group study rooms, a new InfoCommons, Libraries administrative and receiving spaces, and technology support departmental facilities. The Phase 2 renovation occurs at the first level of the building. It creates a new front door for the main library location, containing a reference desk, InfoCommons, key print collections, and study and reading spaces.

Simultaneously, library program at the second level of the Science Library is consolidated to the ground and first levels to facilitate renovation of the second level for a new technology-rich library portal. The consolidated facility will contain key print volumes, an InfoCommons for access to digital information, and a reference point for assistance and print collections delivery.

LONG-TERM

In the long-term phased renovation is continued at Bartle Library south. Renovation is conducted at the upper levels for a combination of stack space and learner-centric reading and study spaces. A targeted renovation is conducted at the fourth floor, which was recently renovated, to create a designated walkway connecting to the new Globalization Center at the Visitor's Parking Lot.

Library special collections space is also provided in the long-term at Bartle Library north. For details refer to section 5.3.3.1 Harpur Fine Arts, Humanities, Social Sciences, and Math.



LIBRARIES

NEW ON-SITE STORAGE FACILITY

The master plan proposes the construction of a new On-Site Storage Facility to house a range of University special collections and holdings in the appropriate climate controlled environment but in close proximity to campus faculty and staff. Collocating these valuable resources will have multiple ancillary benefits including the vacating of space that can be made available to other expanding programs and departments. It will also allow provide the opportunity to create appropriate spaces to for visiting faculty and staff to consult and view the works without removing them from their new home.

Primary consideration for inclusion will be the quantity of holdings currently in Bartle Library. Vacating considerable space from this building in the short term is essential to allow for its envisioned comprehensive renovation and redevelopment. The move to appropriate new construction on campus will also allow for the transference of material currently housed in off-site storage and the divestiture from the financial obligation of leased space in neighboring Conklin.

This new storage facility will also provide opportunities for long-term storage for material under the aegis of the Public Archaeology Facility (PAF). A research center within the Department of Anthropology, the PAF commits to the storage, in perpetuity, of the resources uncovered in connection with its sponsored digs. The PAF is one of the University's more successful sponsored entities, and their services are rendered all the more attractive to private sponsors by the public underwriting of this storage mandate. Over the years the PAF as accumulated a considerable quantity of material including a core of culturally sensitive objects related to Native American heritage. Consolidation of this work within this central repository will allow for the appropriate levels of security control and public access while the climate controlled environment will ensure its preservation.

This facility will also allow for the transference of much of the physical collections currently housed in the Science Library, to allow that building to be redeveloped as part of a consolidated sciences complex. Currently, the primary driver for access to the physical collections is the portion of the periodicals collection that has neither been digitized nor is otherwise available in digital format.

The diagram below (5.3.3.7A) outlines two program scenarios for the On-Site Storage Facility, one assuming storage of library

volumes in standard shelving, and the other considering storage of volumes in compact storage. The column titled "Library: Number of Volumes" indicates the number of volumes projected to be accommodated in the storage facility from each library location. Standard storage allocates 0.08 ASF per volume and compact storage allocates 0.02 ASF per volume. Storage in compact shelving is recommended for efficiency of facilities, and is carried in the implementation costing model.



ON-SITE STORAGE FACILITY	(LIBRARY: NUMBER OF VOLUMES)	PROPOSED ASF (LIBRARY: STANDARD SHELV)	PROPOSED ASF (LIBRARY: COMPACT SHELV)
Storage for University Libraries	1,300,000	104,000	26,000
<i>Bartle Library</i>	<i>700,000</i>	<i>56,000</i>	<i>14,000</i>
<i>Science Library</i>	<i>200,000</i>	<i>16,000</i>	<i>4,000</i>
<i>Library Annex in Conklin</i>	<i>400,000</i>	<i>32,000</i>	<i>8,000</i>
Storage for Sciences & Anthropology	N/A	4,000	4,000
Storage for Student Services & Administration	N/A	2,400	2,400
Building / Campus Services	N/A	6,600	2,000
TOTAL ASF	65,800	117,000	34,400
<i>Total GSF</i>	<i>115,000</i>	<i>148,000</i>	<i>45,000</i>

FIGURE 5.3.3.7A New On-Site Storage Facility Program, Considering Scenarios of Standard vs. Compact Library Shelving

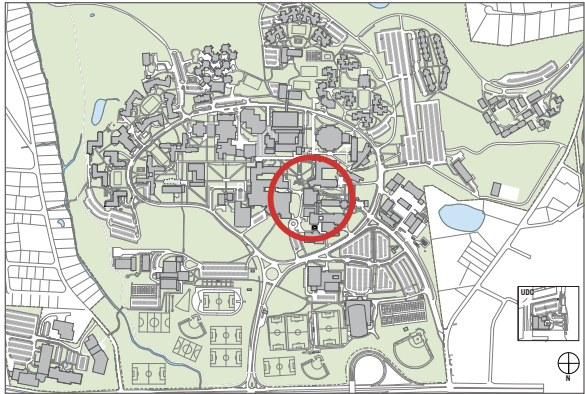
SCIENCE LIBRARY CONSOLIDATION

The Science Library currently contains University Library space at the ground, first, and a portion of the second floors. Library space consists of stacks, reading room, and administrative space. The remainder of the second floor and the third floor contains a suite of classrooms and lecture halls.

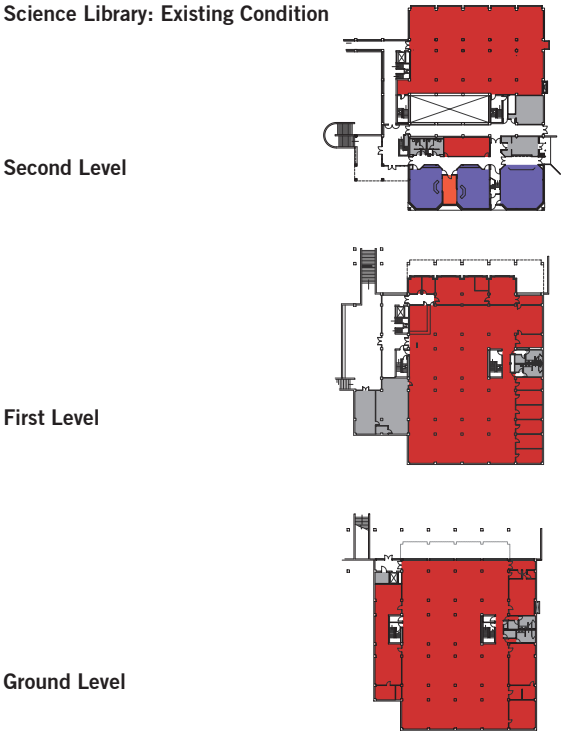
The Science Library is located within the Sciences Complex, a zone of campus that critically requires the provision of swing space to facilitate renovation of legacy sciences buildings. To this end, the library presence at the building is reconceived of. It is transformed from a traditional location for collection storage to an information portal featuring key scholarly journals, digital collection access, librarian assistance, and inter-library loan volume pick-up. This results in a reduced facilities requirement, allowing the library to occupy space at the second level and the ground and first levels to be renovated for Sciences functions.

To create the new library presence at the Science Library, the second level of existing program space is renovated for new Libraries space. This is achieved by first consolidating program from the second level to the ground and first levels to vacate the space. Following completion of the second level, a portion of the program is relocated to the second level, and the remainder of the program is relocated out of the building to the On-Site Library Storage Facility.

For details on renovation at the ground and first levels for sciences program, refer to section 5.3.3.2 Harpur Sciences.

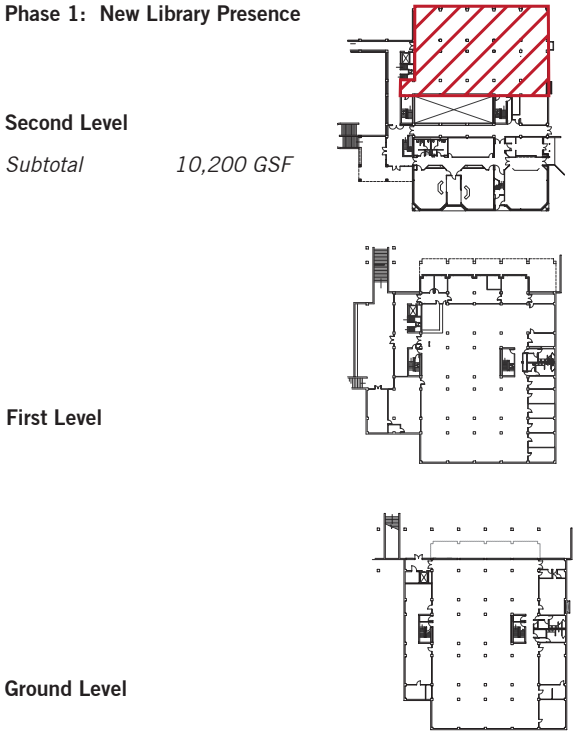


Science Library: Existing Condition



■ Classrooms
■ Libraries
■ Student Activities
■ Building Services

Phase 1: New Library Presence



TOTAL GSF 10,200 GSF

FIGURE 5.3.3.7B Science Library Consolidation Project Area

LIBRARIES

PHASED RENOVATION OF BARTLE LIBRARY SOUTH

The Bartle Library was constructed in three segments. A portion of the building was constructed in 1960 with the original Harpur College campus. The tower and north building expansion were constructed in 1966. The south building and connector addition were constructed in 1973.

Bartle Library primarily contains Harpur and University Library program, with Harpur program at the north side and University Library program at the south side. The building also contains support functions such as a cafe and the Counseling Center, as well as ancillary and surge facilities for other department functions.

Due to the age of the building, coupled with a loss of building organization clarity with multiple additions, Bartle Library requires comprehensive renovation for pedagogy alignment, circulation clarification, building exterior, interior, and MEP system upgrades, and asbestos abatement.

This section outlines a process and requirements for phased renovation at the south portion of Bartle Library. As the fourth floor was recently renovated, the scope under the FMP includes only a targeted renovation to create a designated walkway connecting to the new Globalization Center at the Visitor's Parking Lot. For phased renovation of the north portion, refer to section 5.3.3.1 Harpur Fine Arts, Humanities, Social Sciences, and Math.

BUILDING EXTERIOR AND INTERIOR

Portions of Bartle Library contain asbestos material and require abatement with renovation projects. Renovation that occurs in asbestos-containing zones must begin with a major abatement phase that will require removal of utilities added beneath the ceiling, such as the fire alarm and data systems. Renovations should also include removal and replacement of all HVAC equipment and piping, except for main ducts or pipe that is determined to have a serviceable life.

MEP SYSTEMS

The south portion of Bartle Library has one penthouse mechanical room that serves the building.

Mechanical room and related distribution systems throughout the north building of Bartle Library require comprehensive upgrade for conditions and provision of contemporary systems.

Renovations within the building must upgrade air handling units at mechanical rooms, chilled and hot water coil distribution systems, humidifiers, outdoor air mixing boxes, and fans with variable frequency control drives.

Due to the phased nature of renovation, implementation of mechanical upgrades must be considered. The first phase project should include mechanical room upgrades. Upgrades must provide new air handling units and heat exchangers to support new distribution systems that are installed in the renovated spaces. However, during the course of the cycle of phased renovation legacy mechanical equipment must be retained to support un-renovated spaces. Final phase renovations associated with each building segment may remove all legacy equipment in mechanical rooms, as all spaces will be supported by the new equipment.

The main ducts within the building may be reused, however require cleaning. The existing chillers and tower are in good condition.

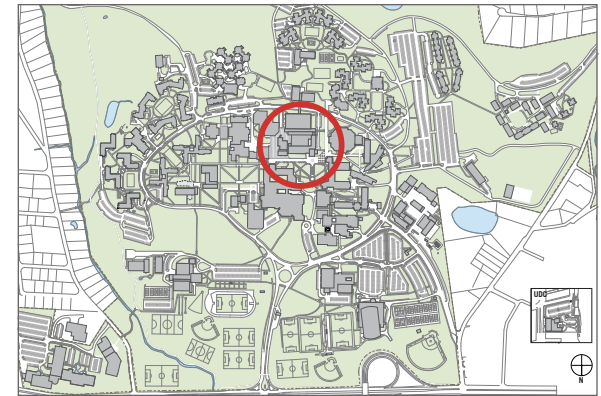
A host of other MEP system issues must be addressed in building renovation. Where recent renovation and abatement projects have occurred, significant infrastructure changes will not be required. In all other areas the following must occur:

Mechanical Systems:

- + Removal of the HTHW / steam exchanger and all steam perimeter heating, replacement with hydronic heating,
- + Addition of humidification to all AHUs,
- + Replacement of the 750-ton chiller in the central penthouse, which uses R22 refrigerant that will become obsolete,
- + Addition of central cooling at the Tower and removal of all window air conditioning units,
- + Upgrade of the dedicated DX cooling system for the rare-books collection will be required by 2023.

Electrical Systems:

- + Addition of significantly more emergency power capacity, with consideration of a new diesel generator in each section of the building to support equipment critical to maintaining environmental systems,



- + Replacement of primary substations, transformers, and switchgear to upgrade the electrical distribution system,
- + Provision of a new fire alarm system that initially employs existing fire alarm panels and eventually converts to new panels with renovation phase completion.

Plumbing Systems:

- + Addition of a sprinkler system to the unprotected majority of the building.

ADDITIONAL CONSIDERATIONS

The building should be rewired with data rooms and data drops to accommodate the shift in media to digital both at library and academic programming.

Rainwater harvesting may be added to the roof drainage system for reuse in the building as cooling tower make-up water, water for humidifiers, and water for toilet flushing.

BUILDING ORGANIZATION

Due to the size of Bartle Library and the fact that it was constructed as three projects over the course of more than a decade, the building today contains a wide array of program elements and lacks consistent and clear circulation patterns.

Comprehensive renovation over the course of the planning period represents an opportunity to clarify circulation routes and program zones, allowing for improved user wayfinding and effectiveness and usability of program spaces.

Building Circulation:

- + Define the connector between the north and south buildings as a major building landmark and the location for heavy circulation, high connectivity, and soft program spaces.
- + Strengthen the major circulation spine at the first level that extends from the north and south building connector to the north entrance to the Lois B. DeFleur walkway. Add a major circulation spine at the second level at the same location of the spine at the first level, extending from the

north and south building connector addition to the north stairwell. Create major circulation routes at the ground level to connect the extreme north and south edges of the building, through the north and south building connector.

- + Allow the column grid to dictate secondary circulation routes for efficiency.
- + Define a new public walkway at the fourth floor of the south portion of the building leading from the new bridge to the Interdisciplinary Academic Center to the connector between the north and south portions of Bartle Library.

Building Program:

- + Define Harpur Fine Arts, Humanities, and Social Sciences departments as the primary occupants of the north building. Additionally provide for ancillary shared and support functions such as the Cafe, the Counseling Center, etc.
- + Define the University Library as the primary occupant of the south building. Consolidate a significant amount of

library program out of the north building, using the storage facility. Reconfigure a portion of the second floor of the north building for special collections.

- + Provide high-activity informal seating and study space at primary building entrances and main circulation zones to support contemporary informal student learning.

Program Organization

Harpur Departments	
Classrooms & Computer Labs	
University Libraries	
Student Services and Administration	
Building Services and Circulation	

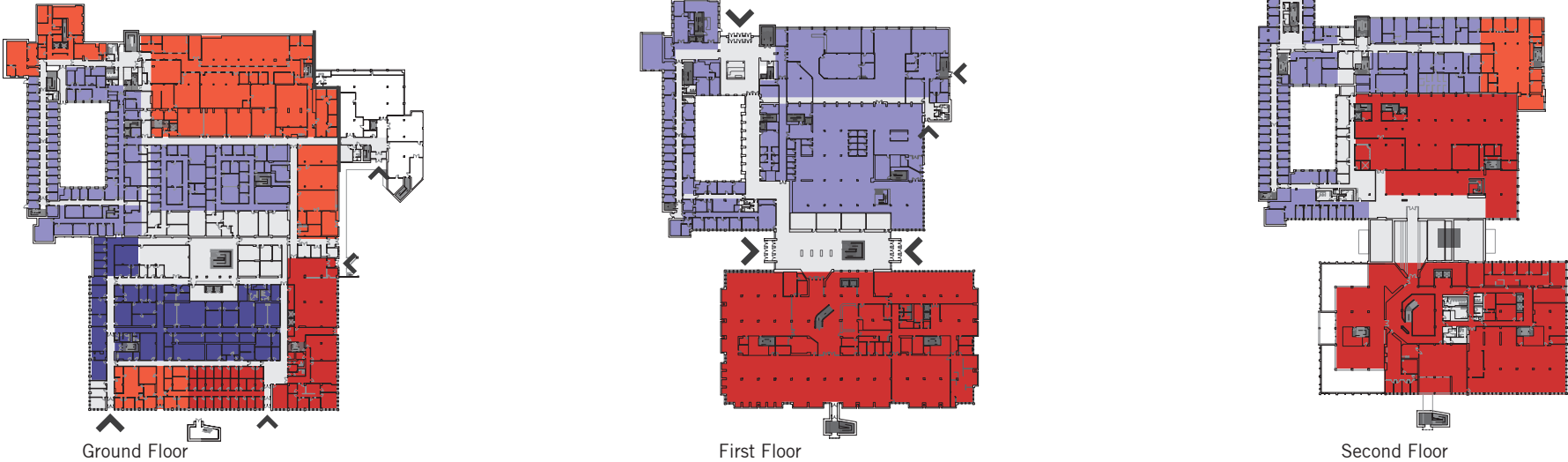


FIGURE 5.3.3.7A Bartle Library Program Organization

LIBRARIES

PHASED RENOVATION OF BARTLE LIBRARY SOUTH

PROJECTS AND PHASING

The south building of Bartle Library is renovated in five phases, defined with consideration of the following factors:

- + Characteristics of building construction, structure, and mechanical systems,
- + The requirement for asbestos abatement,
- + The logistics associated with conducting renovation while the building is partially occupied,
- + The ability of phasing zones to aid in realization of target circulation and program organization,
- + The ability of phasing zones to catalyze future cycles of renovation in Bartle Library or at another campus facility.

The table to the right summarizes each phase, indicating the associated gross square footage and project description. Detail for the Phase 1 project is provided on the opposite page. Phasing diagrams on the following pages outline boundaries associated with each phase project.

DETAILED PROGRAM STUDY

To fully realize a strategic alignment of facilities with the University's objectives for the University Libraries, a detailed program study must be conducted to develop the organization of library program in greater detail. The project phasing summary outlined to the left and on the following pages provides the framework for each project.

PROJECT	GSF	DESCRIPTION
Phase 1A Renovation	40,000	<p>Renovate the ground level of the south portion of the building for a new Media Center, technology support functions such as the University Center for Training and Development and ITS, and Library operations functions.</p> <p>Conduct first phase upgrades to the mechanical room to support new distribution equipment, while maintaining legacy equipment for unrenovated space.</p> <p>Upgrade program spaces for building exterior, interior, MEP, and data condition requirements.</p>
Phase 1B Renovation and Addition	Renovation: 47,000 Addition: 10,200	<p>Renovate a portion of the ground, first, and second levels at the connector between the north and south buildings of Bartle Library and construct minor additions at each end to extend the connector.</p> <p>Upgrade program spaces for building exterior, interior, MEP, and data condition requirements. Relocate the entrance to the library to the east during construction.</p>
Phase 2 Renovation	12,000	<p>Conduct a moderate renovation at the fourth floor of the building for a walkway connecting the bridge from the new Interdisciplinary Academic Building at the Visitor's Parking Lot back to Bartle Library.</p>
Phase 3A Renovation	28,100	<p>Renovate the west portion of the first and second levels of the north portion of the building for University Libraries program.</p> <p>Upgrade program spaces for building exterior, interior, MEP, and data condition requirements.</p>
Phase 3B Renovation	28,400	<p>Renovate the east portion of the first and second levels of the north portion of the building for University Libraries program.</p> <p>Upgrade program spaces for building exterior, interior, MEP, and data condition requirements.</p>
Phase 4 Renovation	48,100	<p>Renovate the third level of the south portion of the building for University Libraries program.</p> <p>Upgrade program spaces for building exterior, interior, MEP, and data condition requirements.</p>

FIGURE 5.3.3.7B Project Details, Phased Renovation of Bartle Library

BUILDING CAPACITY PERIOD

PHASE 1A AND 1B RENOVATION DETAIL

Phase 1 at Bartle Library south is conducted in two stages - 1A and 1B. Phase 1A renovates the ground level for a new Media Center, technology support functions such as the University Center for Training and Development, Educational Communications, and ITS, and Library operation functions. Phase 1B renovates a portion of the ground, first, and second levels to create a circulation connection corridor between the north and south buildings, a major building landmark and the location for heavy campus circulation and soft program spaces.

The diagrams to the right outline the renovation zones and target departmental organization. The following moves facilitate implementation of the Phase 1A renovation project:

- + Relocation of Watson Engineering program to the ITC Engineering & Science building and the Engineering Building,
- + Relocation of the Career Development Center to the University Union Phase 2 north project,
- + Relocation of the Asian & Asian American Studies department to swing space at the Original Dickinson Community,
- + Consolidation of Libraries program or provision of swing space at the Original Dickinson Community,
- + Consolidation of miscellaneous administrative functions or provision of swing space at the Original Dickinson Community or another location.

Second Level

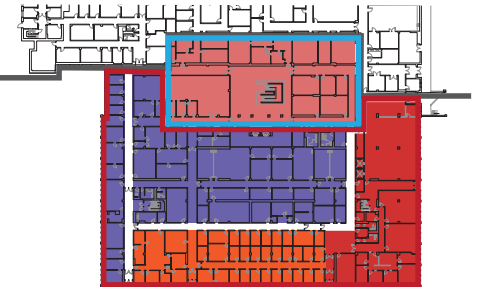
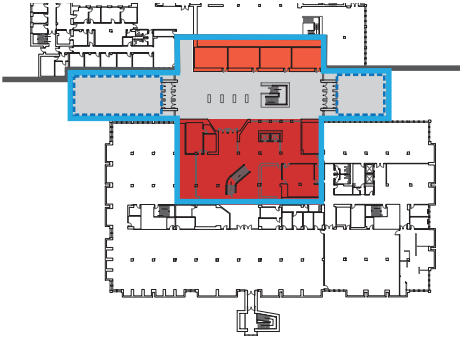
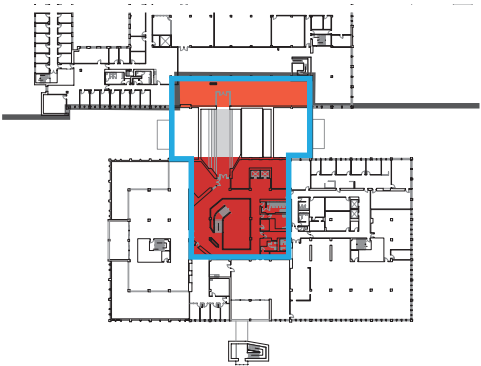
Informal Lounge/Circ	3,100 ASF
University Libraries	6,800 ASF
<i>Subtotal</i>	<i>9,900 ASF</i>

First Level

Informal Lounge/Circ	3,100 ASF
University Libraries	7,100 ASF
<i>Subtotal</i>	<i>10,200 ASF</i>

Ground Level

Media Center	10,600 ASF
InfoCommons/Student	5,200 ASF
University Libraries	10,000 ASF
Technology Support	2,600 ASF
Custodial Services	1,200 ASF
<i>Subtotal</i>	<i>29,600 ASF</i>
TOTAL ASF	49,700 ASF



Legend

Phase 1A Construction Area		Media Center	
Phase 1B Construction Area		University Libraries	
		InfoCommons	
		Student Lounge	
		Major Circulation, Lounge	

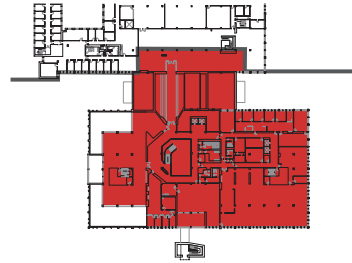
PERKINS+WILL

FIGURE 5.3.3.7C Phases 1A and 1B Renovation Details, Bartle Library South

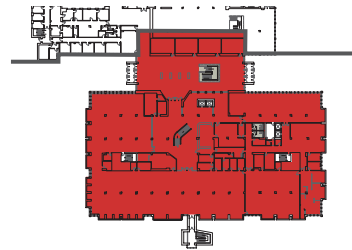
LIBRARIES

PHASED RENOVATION OF BARTLE LIBRARY SOUTH

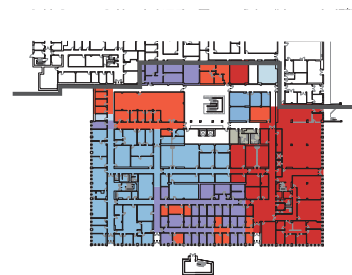
Existing Condition



Second Level



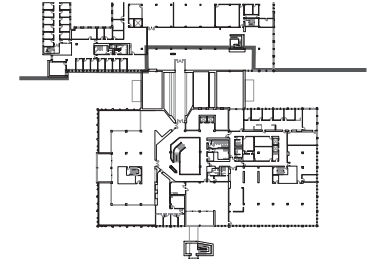
First Level



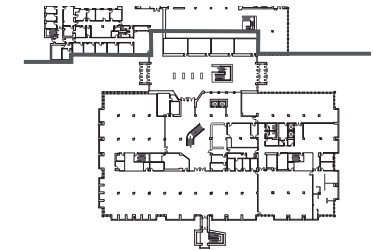
Ground Level

- Harpur Departmental Program
- Watson Engineering Program
- Student Activities, Services, Admin
- University Libraries
- Building Services

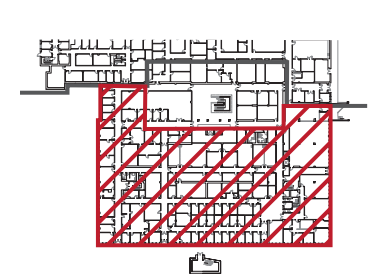
Phase 1A Renovation



Second Level



First Level



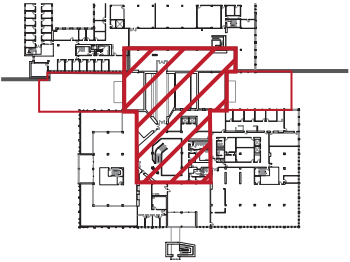
Ground Level

Subtotal Renovation 40,000 GSF

TOTAL GSF 40,000 GSF

BUILDING CAPACITY PERIOD

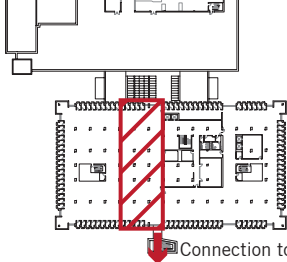
Phase 1B Renovation



Second Level

Subtotal Renovation 17,000 GSF

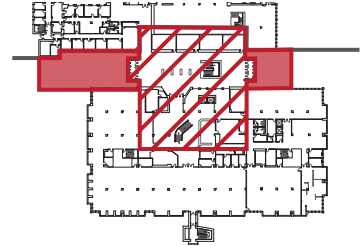
Phase 2 Renovation



Fourth Level

Subtotal Renovation 12,000 GSF

Connection to Interdisciplinary Academic Building

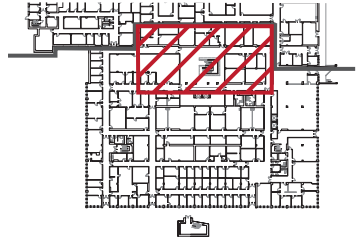


First Level

Subtotal Renovation 18,000 GSF

Subtotal Addition 10,200 GSF

TOTAL GSF 12,000 GSF



Ground Level

Subtotal Renovation 12,000 GSF

Renovation GSF 47,000 GSF

Addition GSF 10,200 GSF

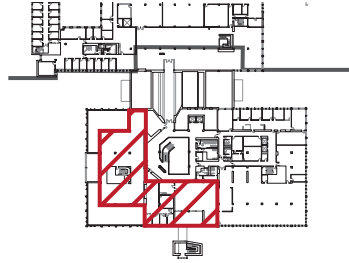
LIBRARIES

PHASED RENOVATION OF BARTLE LIBRARY SOUTH

Phase 3A Renovation

Second Level

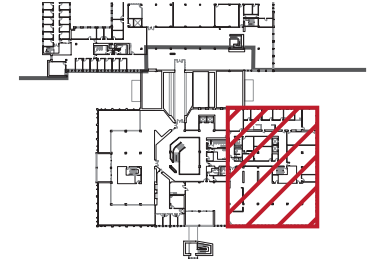
Subtotal Renovation 10,100 GSF



Phase 3B Renovation

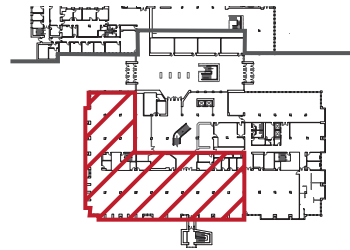
Second Level

Subtotal Renovation 15,200 GSF



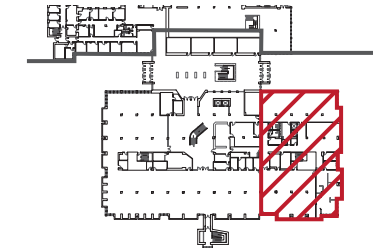
First Level

Subtotal Renovation 18,000 GSF



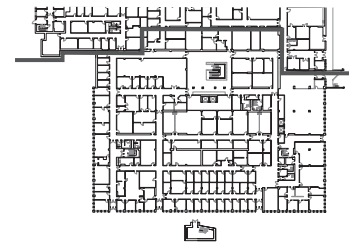
First Level

Subtotal Renovation 13,200 GSF



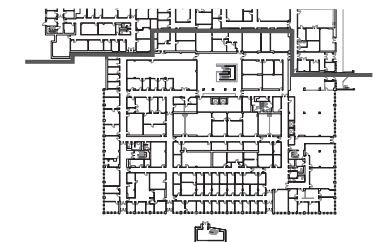
Ground Level

TOTAL GSF 28,100 GSF



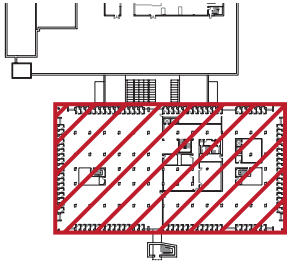
Ground Level

TOTAL GSF 28,400 GSF



BUILDING CAPACITY PERIOD

Phase 4 Renovation



Third Level

Subtotal Renovation 48,100 GSF

TOTAL GSF 48,100 GSF

5.3.3.8 STUDENT ACTIVITIES, STUDENT SERVICES, ADMINISTRATION, ITS

An effective University experience is supported by a number of functions that extend beyond the classroom, including student activities and services as well as administrative services. The Student Activities, Student Services, Administration, and Information Technology Services (ITS) program family of the FMP includes the full range of support services that collectively support Binghamton University.

Student activity and student service functions are currently provided at a number of facilities across campus. Centralized student activity functions are provided at the University Union, with distributed cafes, student organizations, and support functions in a number of other academic and residential facilities. Student service functions are currently located in the Student Wing at the Lecture Hall Center, the Academic Complex, and the Administration Building (graduate admissions).

Binghamton University has identified a models of delivery for student activity and student service programming. Student activity space is provided with centralized program area at the University Union, complemented by supporting spaces distributed across campus. Admissions and student financial services are co-located to leverage complementary functions. Student academic services are distributed throughout campus facilities for location adjacent to nodes of student activity. The FMP maintains these models of service delivery, and enhances their facilities provision.

Administrative functions are currently predominantly located in the Administration Building, with supporting units at the University Union and the McGuire Building. Information Technology Services (ITS) is currently located at the Computer Center, and will be relocated to Johnson Hall during the 2008 to 2013 cycle. The FMP also maintains the existing model of administrative service functions, with co-location of the majority of administrative services and provision of specialized facilities for key functions.

The following section outlines objectives, strategy, and projects associated with the Student Activities, Student Services, Administration, and Information Technology Services track of the FMP.

OBJECTIVES

Co-locate student service functions at Dickinson Dining Hall for efficiency and improved service, and construct an addition between Dickinson Dining Hall and the University Union for undergraduate and graduate Admissions.

Technology and shifting expectations for service have profoundly impacted the delivery of student services provided by departments such as Financial Aid, Student Accounts, etc. Technology has moved student service accounting into a digital format, allowing for many services to be delivered in an on-demand online environment. Binghamton University has adapted this model that has come to be expected by the majority of students and families. As a result of shifts in technology and delivery, the space requirements for student services have changed. The FMP co-locates student service functions into Dickinson Dining Hall, a facility that supports an open-play layout that better suits the departments' needs in providing improved efficiency and service. An addition is constructed between Dickinson Dining Hall and the University Union to co-locate undergraduate and graduate Admissions with student services in a new facility.

Provide a designated place for Binghamton University alumni at O'Connor Hall.

Binghamton University's Alumni Association has over 100,000 members, and grows with each graduating class. Alumni actively participate in a broad range of events on campus all throughout the calendar year. Alumni are supported by the University's Alumni Relations department. To foster continued alumni involvement with the University and its current students, the plan provides a designated Alumni Center at O'Connor Hall within the Brain.

Showcase the University's commitment to internationalization by co-locating related student services and student organizations at the new Globalization Center.

Through its academic programming and strategic objectives, Binghamton University emphasizes a global experience for all students. Additionally, international students comprise a large portion of the University's student body. The University offers a wide range of services for both international students and domestic students and supports a number of student organizations and campus events exist to celebrate the University's global emphasis. The new Globalization Center provides a venue for the University to showcase such programs.

Maintain a distributed model of student academic support facilities, and develop a new facility for Harpur Academic Advising at the new Harpur Center.

Binghamton University has developed a distributed model for student academic support. Under the model, academic support facilities are located adjacent to nodes of student activity, at the University Union, the residential colleges. Future development under the FMP maintains a distributed model for student academic services, and enhances it with a new core student advising facility, located at the new Harpur Center at the renovated Computer Center.

Complement centralized student life spaces in the University Union with distributed spaces that are integrated throughout all campus facilities.

The University Union is the campus hub for student life and contains a wide range of functions including food service, bookstore, recreation and game rooms, student organization offices, lounge space. Future development maintains the University Union as the primary centralized student life facility, and complements it with distributed informal student space that is integrated throughout all campus facilities. Co-locating "soft seating" lounge space with formal learning environments supports serendipitous encounters, informal information exchange, and learning outside of the classroom.

STRATEGY

The chart below and following narrative outline project initiatives in the Student Activities, Student Services, Administration, and Information Technology Services program family. Projects are presented in greater detail on subsequent pages.

NEAR-TERM

In the near-term, the University Union Phase 2 project is completed to conduct a renovation and addition at the north side of the building. The project provides facilities for academic support services. Key program elements include offices for EOP, a tutoring and TRIO tutoring center, a new Center for Career Development, and the Center for Civic Engagement. The project also corrects existing circulation issues that exist between the original building and the University Union West addition.

Additionally, Johnson Hall is repurposed to accommodate the Geography department and ITS functions from the Computer Center, with the exception of existing servers, which remain at the ground level of the Computer Center. This facilitates abatement and repurposing of the Computer Center.

INTERMEDIATE-TERM

In the intermediate-term, Dickinson Dining Hall is taken off-line as a dining facility and renovated for a Student Services One-Stop. The facility is modeled around a contemporary, technology-enriched method of delivery for student services, with an open-plan organization to accommodate and efficiently serve large crowds at key points in the academic year.

An addition is constructed between Dickinson Dining Hall and the University Union for undergraduate and graduate Admissions, allowing the departments to be co-located with the student financial services functions.

O'Connor Hall is renovated for an Alumni and Visitor's Center at the main level with departmental office space at upper levels. The Alumni and Visitor's Center include the Alumni Relations and Binghamton Foundation departments, supported by reception and gathering spaces.

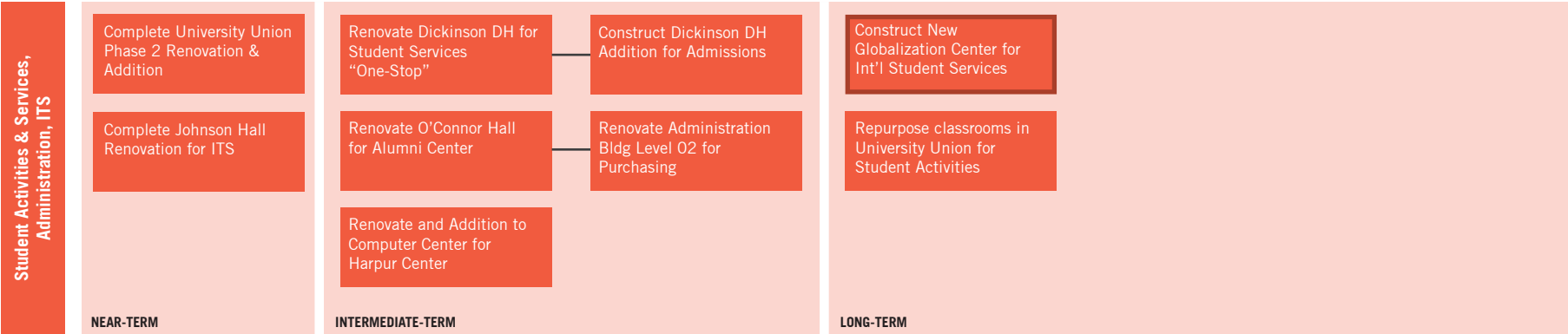
Relocation of the two departments to O'Connor Hall vacates a portion of the second level of the Administration Building. This space is moderately renovated for the administrative departments Commission and Purchasing, which are currently located in the McGuire Building. Relocation of these departments facilitates renovation of the McGuire Building for

SUCF site representative offices, resulting in the removal of existing SUCF trailers.

Additionally, renovation and addition to the Computer Center creates a new Harpur Center for the Harpur Dean's office, Harpur Advising, and key programs.

LONG-TERM

In the long-term, the new Globalization Center at the East Campus provides high quality facilities and showcases the University's internationally-related student services and student organizations. The building includes the following programs: English as a Second Language, International Student & Scholar Services, Languages Across the Curriculum, Office of International Programs, Translation Program, as well as internationally-related centers and institutes and student organization facilities. For program details refer to section 5.3.3.1 Harpur Fine Arts, Humanities, Social Sciences, and Mathematics.



STUDENT ACTIVITIES, STUDENT SERVICES, ADMINISTRATION, ITS

STUDENT SERVICES ONE-STOP AT DICKINSON DH AND ADMISSIONS ADDITION

STUDENT SERVICES ONE-STOP RENOVATION

The existing Dickinson Dining Hall is located at the east campus within the Brain, adjacent to the University Union. With the completion of the New Dickinson and Newing Communities at the east campus, the Original Dickinson Community and the Dickinson Dining Hall will be taken off-line as residential facilities. The Dining Hall is repurposed as a new Student Services One-Stop for financial aid, student accounts, registrar, and ancillary back-of-house admissions functions. Full admissions offices will be located adjacent to the one-stop following the completion of the Admissions Addition.

In recent years the delivery model for student service functions has been significantly impacted by technology. Technology enables students to complete most functions in an online environment, either at the service office or on their personal computer at another location. Student services are also trending toward the requirement to deliver services to an increasingly high number of students with limited staff group members. Departments seek to provide services in a group setting when possible to maximize limited staff resources.

The shift toward technology-enhanced service delivery, coupled with the trend of limited staff resources in the context of increasing student population, changes the demands placed on physical spaces for student services.

The student services one-stop co-locates related student service functions at the Dickinson Dining Hall to enhance the user experience and allow for sharing of staff resources. The scale of the main space provided at the Dickinson Dining Hall allows for an open plan layout for front-of-house functions. This offers a welcoming, accessible experience for visitors and allows for services to be delivered in a variety of ways, including from self-serve, group settings, individual meetings, etc. The volume also effectively accommodates peak demand at key points in the day and semester. Enclosed office spaces may be provided at the back of space for functions that require greater privacy.

Building Interior. To support student services program the building requires comprehensive interior renovation and the provision of new furnishings and finishes. During renovation, the building requires abatement of asbestos containing material in floor and ceiling tiles.

MEP Systems. Comprehensive upgrade of mechanical systems is required at the Dickinson Dining Hall, with the exception of the cooling system. The building has a new rooftop cooling unit that is in good condition. Asbestos abatement is likely required in the building mechanical room. The electrical system requires upgrade for capacity and to match system voltage. The building requires a sprinkler system.

Additional Considerations. The renovation project Dickinson Dining Hall should be designed together with the addition for admissions to ensure that spaces within the two projects function contiguously. Project phasing and implementation must also be considered. The Dickinson Dining Hall renovation project will proceed the addition and must be in operation before and during the addition construction.

ADMISSIONS ADDITION

The admissions department at a university is crucial in creating a welcoming environment for prospective students and their families. The department also provides prospective students with a wide array of information about the institution to aid in their college selection. A successful admissions department is able to meet the needs of a high number of visitors, yet provide a personal BU experience for each.

The FMP relocates the undergraduate and graduate admissions departments at BU from their current locations in Academic A and the Administration Building, respectively, to a new facility located between the Dickinson Dining Hall student services one-stop and the University Union. The location offers ideal placement adjacent to the services provided in the renovated Dickinson Dining Hall, many of which share staff and functions with the Admissions department. The siting of the building also creates a gateway into the Brain, leading onto the Peace Quad from West Drive.

Construction of Admissions addition must be coordinated with renovation of Dickinson Dining Hall for the Student Services One-Stop, to ensure optimal circulation and connectivity between the two buildings. The Admissions addition also has the opportunity to connect to the University Union, for a complete student services and student activities precinct.



STUDENT SERVICES ONE-STOP	PROPOSED ASF
Admissions	1,100
Financial Aid	4,500
Student Accounts	4,200
University Registrar	4,800
TOTAL	14,600
Available ASF	14,600

FIGURE 5.3.3.8A One-Stop at Dickinson Dining Hall

ADMISSIONS ADDITION	PROPOSED ASF
Undergraduate Admissions	7,700
Graduate Admissions	3,100
Informal Student Spaces	1,600
Building Services	700
TOTAL	
Available ASF	13,100
Available GSF	18,800

FIGURE 5.3.3.8B Admissions Addition Program

HARPUR CENTER AT THE COMPUTER CENTER

The Computer Center is located at the heart of the main campus within the Brain, adjacent to the Bartle Library, University Union, and Engineering Building and along the Lois B. DeFleur walkway. With its prime location at the academic core, the Computer Center is repurposed as a new Harpur Center to showcase Harpur College, a rich component in the University's history and today its largest academic school.

The Computer Center requires renovation for conditions improvements and asbestos abatement. The building is vacated upon completion of the Johnson Hall renovation and relocation of the ITS department. An addition is constructed at the north side of the building for additional program space and to face the building toward the Lois B. DeFleur walkway. The existing ITS and Watson servers located at the ground level of the building remain.

BUILDING EXTERIOR AND INTERIOR

The Computer Center requires minimal exterior upgrades. The roof and windows are in good condition and efficiency.

To support Harpur Center program, the building requires comprehensive interior renovation and the provision of new furnishings and finishes. During renovation, the building requires abatement of asbestos containing material in floor and ceiling tiles.

MEP SYSTEMS

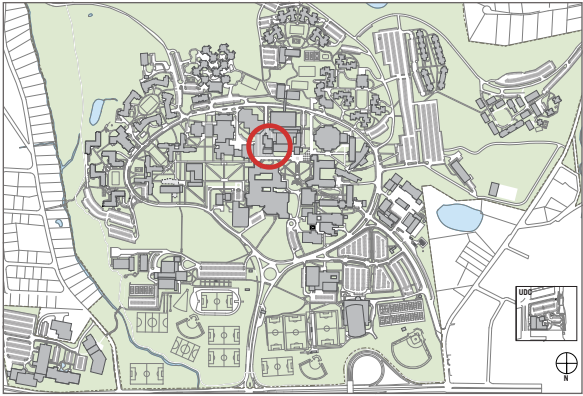
The Computer Center largely runs on mechanical systems fed through the Bartle Library. Upgrades to systems should tap into upgrades at the Library. Fan coil units associated with the perimeter heating require replacement.

The existing cooling units could be enhanced by the provision of greater emergency back-up power supply. Small cooling units in the server room could be replaced with new water cooled units, supported by a pair of air-cooled chillers (on emergency power). A sustainable solution to cooling would be to add rack mounted water cooled cooling units directly to the back of the server racks on a hinged panel that swings out of the way for service access to the racks. This puts cooling directly in between the new thin "wafer" servers which improves their performance and is claimed to use 60 percent of the energy of whole room cooling systems.

ADDITIONAL CONSIDERATIONS

Implementation of building renovation must occur with the machine and data rooms in the basement remaining operational.

To increase the total ASF at the building to accommodate the Harpur Center functions, an addition is constructed to the north and the existing double height space at the ground level is filled in. The addition also serves to re-orient the building toward the Lois B. DeFleur walkway at the heart of the campus. The infill addition improves the utilization of the floor plate and increases the range of program distribution options.



HARPUR CENTER	PROPOSED ASF
Classrooms & Seminar Rooms	5,000
Harpur Dean & Schweitzer Chair	4,030
Centers & Institutes	3,000
Harpur Advising	4,600
BU Scholars Program	700
Bridges to Baccalaureate Program	700
Writing Initiative	3,300
Informal Lounge & Study Space	1,000
Group Meeting Rooms	1,000
ITS & Watson Server Rooms (GL)	5,125
Custodial Services	1,200
TOTAL	29,655
<i>Available ASF</i>	<i>30,000</i>

FIGURE 5.3.3.8C Harpur Center Program



Addition to the Computer Center for the new Harpur Center, from along the Lois B. DeFleur Walkway

5.3.3.9 ATHLETICS, RECREATION, HEALTH & WELLNESS STUDIES

Binghamton University is committed to student success and recognizes that it extends beyond the classroom. As a component of the development of the complete BU student, the University fosters a culture of physical activity among students with program offerings through Varsity Athletics, Campus Recreation, and Health and Wellness Studies. The three departments share common goals of promoting student wellbeing and lifelong health, fostering leadership skills among BU students, and building community at the around the spirit of the University.

Facilities for Athletics, Recreation, and Health & Wellness Studies are currently provided at the East Gym, the West Gym, the Events Center, as well as a series of outdoor fields and supporting buildings. The Events Center is a new facility constructed in 2006 and the East Gym is currently undergoing comprehensive renovation. The West Gym, a legacy campus facility constructed in the 1960s, carries a significant maintenance backlog. Outdoor field facilities also require improvements for drainage and condition issues.

This program family of the FMP is characterized by a high degree of complexity with respect to facilities requirements. Complexity is informed by the unique missions and programming of each constituent department, and magnified by the current status of shared facilities among the three main groups. Additionally, recommendations for the program family must be considered within the broader context of space needs on campus, recognizing that this represents only one component of total need, particularly compared with academic need.

As such, the FMP approaches the Athletics, Recreation, and Health & Wellness Studies program family strategically, seeking strategies to improve facilities with modest capital investment and focusing on solutions to enhance the utilization of existing spaces. The FMP outlines the primary areas of need within the program family, and recommends a detailed program study to study the full range of solutions and identify specific projects that best achieve the University's strategic objectives.

OBJECTIVES

Foster a culture of physical activity at Binghamton University that promotes student wellbeing and lifelong health, cultivates student leadership skills, and builds a community around the spirit of the University.

Binghamton University is committed to student success and recognizes that it extends beyond the classroom. As a component of the development of the complete BU student, the University fosters a culture of physical activity among students. The FMP identifies the facilities for Varsity Athletics, Campus Recreation, and Health and Wellness Studies that are required to promote physical activity for their respective constituents, and outlines key capital projects required to bring such facilities on-line.

Recommendations for the Athletics, Recreation, and Health & Wellness Studies are considered within the broader context of space needs on campus, recognizing that needs for this program family represent only a small component of the total need, particularly compared with academic need. As such, the FMP seeks strategic solutions to achieve facilities requirements with more modest capital investment.

Renovate the West Gym for improved utilization of legacy spaces.

The West Gym was constructed in the 1960s and carries a significant maintenance backlog for conditions issues. Additionally, the facility was constructed at a time when physical activity offerings at universities were fundamentally different than they are today, particularly with respect to services provided for each gender, the number of students served, and contemporary findings about the role of physical activity in student success.

Both conditions and qualitative factors present opportunities to upgrade and right-size spaces within the West Gym to provide improved utilization of this key facility. A detailed program study must be conducted to identify the full range of such spaces and determine associated program uses. The program study must align space use with the University's future direction for the three program areas.

Provide additional indoor court space to support a wide array of activities and meet high capacity demands.

At the level of study conducted under the FMP, large indoor court spaces were determined to be a particular area of need for the University. These spaces are used by all three program groups, Athletics, Recreation, and Health and Wellness Studies. Following the completion of the East Gym Renovation, court space with exist at the East Gym for use by Recreation, the West Gym for shared use by all programs, and the Events Center for use by Athletics. Additional court space is required for the three departments to meet their basic program requirements, and given the full range of need, court space is identified as a typology that provides a high degree of value for its investment. The detailed program study must identify the best location for the addition of court space given the University's strategic direction.

Upgrade outdoor fields to an artificial turf surface with lighting to expand their daily and seasonal utilization.

Binghamton University features a number of outdoor fields at the north side of its campus, along Vestal Parkway. However, due to the downhill location of the fields, a soil type that is not ideal for drainage, and the regional climate, maintenance of the fields for significant utilization is problematic. The FMP identifies the provision of artificial turf fields with lighting as a capital investment with high return in expanding the daily and seasonal utilization of outdoor facilities for the constituents within the program family. The detailed program study must identify the best location and configuration of such fields.

STRATEGY

The chart below and following narrative outline project initiatives in the Athletics, Recreation, and Health & Wellness Studies program family. Projects are presented in greater detail on subsequent pages.

The intermediate-term also provides a new artificial turf outdoor field with lights to expand the daily and seasonal capacity of outdoor field space. The drilldown study of the program area will determine the best location and configuration.

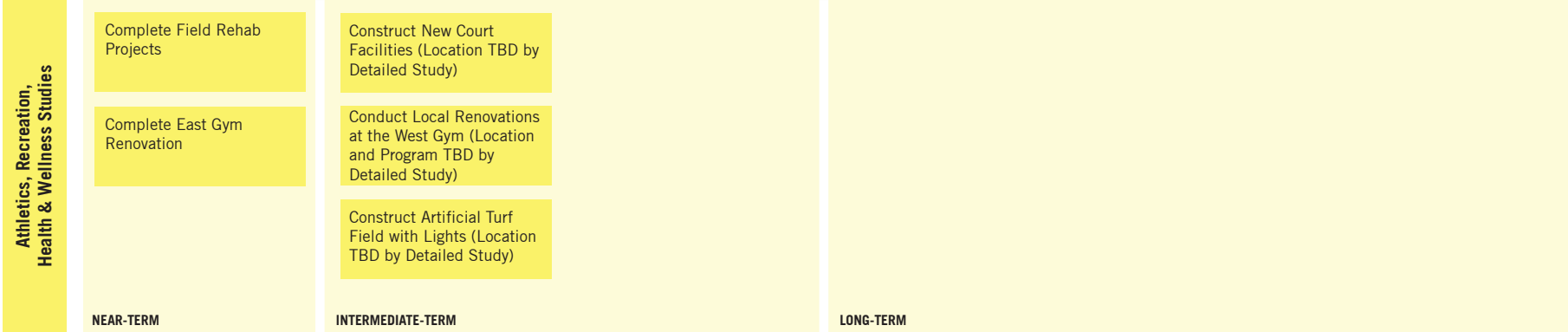
NEAR-TERM

In the near-term, field rehabilitation projects and a comprehensive renovation of the East Gym contribute to upgrades of Athletics, Recreation, and Health & Wellness Studies facilities.

INTERMEDIATE-TERM

In the intermediate-term, new court facilities are constructed for capacity expansion in the space type. The location of the addition will be determined through a future drilldown study of the program area.

Local, targeted renovations at the West Gym are conducted to improve the utilization of the facilities, considering both conditions and qualitative upgrade requirements. Specific locations and program will be determined through the drilldown study. Areas identified under the FMP for improved utilization through renovation include: the locker rooms at the ground level, specifically the men’s locker room, the racquetball courts, and the courtyard at the first level.



5.3.3.10 CAMPUS SERVICES AND BUILDING SERVICES

Campus services and building services include a myriad of functions that ensure the daily maintenance and operation of Binghamton University's facilities and environs with the goal of providing an atmosphere conducive to learning, safe for the University community, and attractive to visitors and prospective students.

The Campus Services and Building Services program family of the FMP includes all programs related to operations at the campus and building level. Campus Services include most notably Physical Facilities, which are predominantly located at the Physical Facilities Complex at the west campus. Other main campus service functions include Environmental Health and Safety, located at the Health Center, and the University Police, located in the Administration Building, and other supporting units such as Harpur's Ferry emergency service. Building services includes all custodial, storage, and other functions local to individual buildings.

The FMP largely maintains the existing organization of Campus Services and Building Services, with Physical Facilities functions clustered at the west campus Complex, other units maintaining their existing locations, and continuing a distributed model of building services. Space needs within the program family are predominantly related to Physical Facilities functions, and are provided by conducting local renovation of existing facilities and a small-scale addition to increase the capacity of the buildings within the Physical Facilities Complex.

Binghamton University is committed to developing campus and building services around a model of sustainability. In 2007 the University was a charter signatory in endorsing the American College and University Presidents Climate Commitment. Since that time, the University has identified strategies to continually green the campus through energy, water, and other resource use, and sustainable renovation and construction projects. Development associated with the FMP of both buildings and campus infrastructure continues to promote sustainable solutions at BU.

The following section outlines objectives, strategy, and projects associated with the Campus Service and Building Service track of the FMP. Related infrastructure projects are presented in section 5.4 Infrastructure.

OBJECTIVES

Renovate legacy buildings in the Physical Facilities Complex to maximize their useful capacity.

Physical Facilities is charged with maintaining, operating, and protecting Binghamton University's facilities and environs to provide an atmosphere that is conducive to learning, safe, and attractive for members of the University community. Growth in student population, addition to the University's inventory of facilities, and major capital new construction and renovation projects increase the demands placed on the Physical Facilities department.

The existing Physical Facilities Complex located to the west of the Brain is the primary location for the department's centralized operations. The Complex is located on a highly constrained site, bounded by the M parking lots, West Drive, the Bunn Hill Access Road, and the University's site boundary. The Complex contains six buildings, four of which require upgrades for condition due to age. To meet the demands associated with future growth within the context of site limitations, legacy buildings are renovated within the plan in a manner that maximizes their capacity.

Upgrade infrastructure at Central Heating Plant around a model of sustainability to allow for increased capacity.

The Central Heating Plant contains four boilers that provide high temperature hot water (HTHW) to many buildings in the area of the Brain at the main campus. The Plant currently operates at a fraction of its capacity (1) as that operating capacity meets the current load demand and (2) because increasing the capacity would result in the University exceeding its DEC Title V permit for emissions. Recently the central HTHW system was expanded to include the East Campus Housing, raising output of the Plant to just within the emissions limits.

Future growth at the main campus that is tied into the HTHW system will require boilers at the Central Heating Plant to operate at a higher capacity. To achieve this, the Plant must be upgraded for emissions. The plan outlines scenarios for infrastructure upgrades to facilitate increased capacity around a model of sustainability.

Continue to develop the feasibility of a co-generation to attend to the base campus electrical loads and advance sustainable infrastructure solutions.

With its commitment to sustainable solutions, Binghamton University has extensively studied the opportunity for a co-generation plant on campus. Such a plant would allow for the simultaneous generation of both electricity and heat around a model of sustainability.

Create a designated facility for SUCF site representatives and allow for removal of existing trailers.

SUCF site representatives working at the University currently operate out of trailers that are located immediately south of the Physical Facilities Complex. The plan provides SUCF reps with lightly renovated office and meeting space in the McGuire Building, located at the west side of the F parking lots. The move allows for the removal of existing SUCF trailers.

STRATEGY

The chart below and following narrative outline project initiatives in the Campus Services and Building Services program family. Projects are presented in greater detail on subsequent pages.

INTERMEDIATE-TERM

A key project in the intermediate term is an infrastructure upgrade at the Central Heating Plant for emissions to allow for increased capacity. The FMP outlines three scenarios for development of the plant, considering possible alternate futures and funding allowances. For project details, refer to section 5.4.1 Central Plant and High Temperature Hot Water within the Infrastructure section of the FMP.

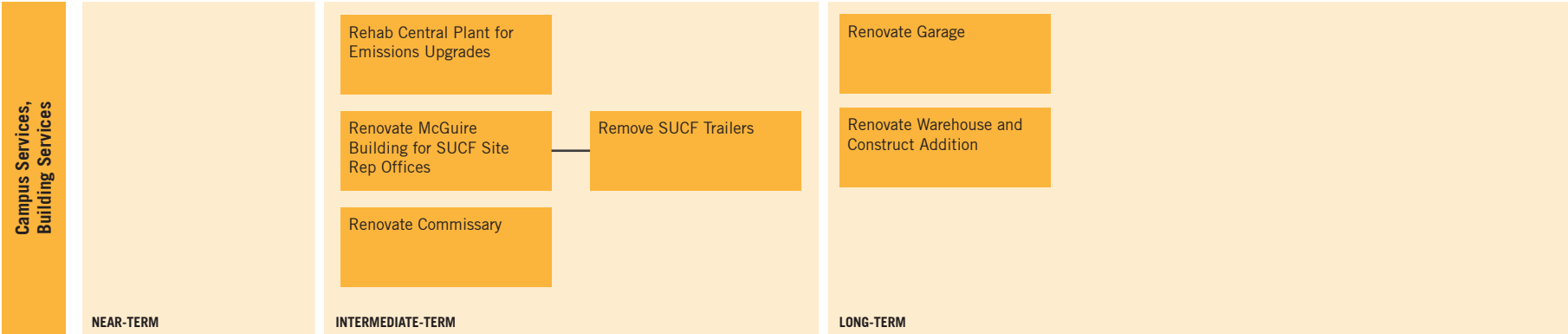
The McGuire Building is moderately renovated for office and meeting space for SUCF site representatives. The renovation is facilitated by projects at O'Connor Hall and the Administration Building. Renovation of O'Connor for an Alumni Center vacates a portion of the second floor of the Administration Building, which is renovated for the departments that currently occupy the McGuire Building.

Renovations are also conducted at the Commissary and Warehouse. Renovations upgrade building conditions and to maximize the capacity of the buildings to support future campus growth.

LONG-TERM

In the long-term, renovation within legacy facilities at the Complex is continued at the Garage. The building is renovated for conditions upgrades and to maximize capacity to support future campus growth.

Long-term capacity expansion is provided with an addition to the existing Warehouse building.

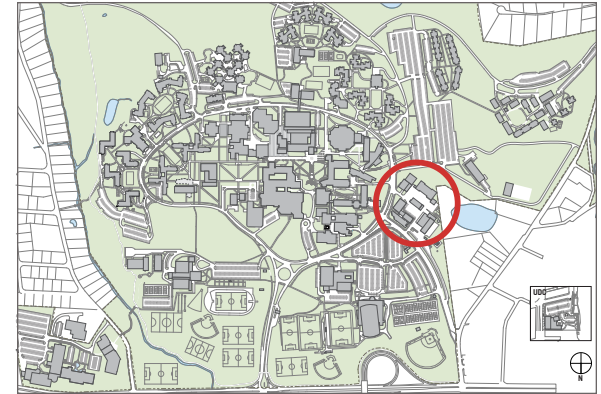


RENOVATE BUILDINGS AT THE PHYSICAL FACILITIES COMPLEX

The Physical Facilities Complex is located at the west campus, outside of the Brain. The Complex consists of six buildings: Physical Facilities and Physical Facilities North, the Central Heating Plant, Commissary, Garage, and Warehouse. With the exception of the newly constructed Physical Facilities North and renovation of the adjacent Physical Facilities building, structures within the Complex have received minimal upgrade since their construction in the 1960s.

The existing Physical Facilities Complex site is highly constrained by boundaries of West Drive and the Bunn Hill Access Drive to the east and south, the campus boundary to the west, and parking to the north. From an operations standpoint, the department is interested in maintaining the existing co-location provided at the Complex, however limited space exists for outward expansion at the current location.

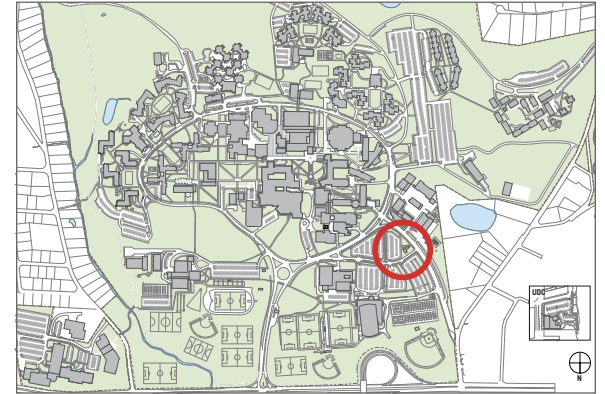
To meet needs associated with campus services in the building capacity period, the Central Plant, Commissary, Garage, and Warehouse are renovated to maintain the integrity of the buildings, align their use with contemporary service requirements, and maximize the capacity at the existing Complex. A modest addition is constructed at the Warehouse to increase capacity.



BACKFILL THE MCGUIRE BUILDING FOR SUCF SITE REPS

The McGuire Building is located just north of the Physical Facilities Complex. The building is modest in scale, and is currently occupied by the University's Purchasing department.

Projects within the FMP relocates existing program from the McGuire Building to the Administration Building, vacating critical facilities space adjacent to the Physical Facilities Complex. The McGuire Building is then moderately renovated to provide a designated place on campus for SUCF site representatives. Given the magnitude of renovation and new construction projects at the University over the course of subsequent planning periods, SUCF site representatives will play an increasingly significant role in execution of campus development.



5.3.4 SUSTAINED GROWTH PERIOD

Developing on the foundation established during the building capacity period, the sustained growth period achieves facilities capacity to support the full 2023 projected enrollment. Given the magnitude of enrollment growth, the University requires significant expansion in both academic and support facilities.

Preferred development sites for future buildings are identified on the opposite page. Development at the main campus is recommended to occur within range of existing development. Benefits to such locations include: easy access to new buildings for greater utilization of both existing and new; densification, which fosters a culture of a walkable campus and aids in traffic demand management strategies; and access to existing campus infrastructure and reduced infrastructure costs associated with development.

PLAN COMPONENTS	PROGRAM
1. New Academic Building	General Classrooms and Lecture Halls; Computer POD; Harpur Academic Departmental Program for Fine Arts, Humanities, and/or Social Sciences; Centers & Institutes; Distributed Lounge and Informal Study Space; Group Study Rooms; Satellite Library Portal. (125,000 GSF)
2. New Student and Academic Center	General Classrooms and Computer Labs; Central “Forum” for informal gathering; Large Assembly Space for designated student activity use; Distributed Lounge and Informal Study Space; Group Study Rooms; Office Space for Student Functions; New Bookstore and Retail; Supporting Food Service and/or Cafe. (110,000 GSF)
3. New Sciences Building	General Classrooms and Computer Labs; Harpur Sciences Departmental Program, with emphasis on research and facilities with high technical requirements; Distributed Lounge and Informal Study Space; Group Study Rooms; Satellite Library Portal. (125,000 GSF)
4. New Recreation Center	Specific Program TBD by Future Study. Potentially includes: Indoor Court Space, Men’s and Women’s Locker Rooms, Multipurpose Rooms and Fitness Rooms, Weight Room, Other Specialized Facilities, Administrative Offices. (90,000 GSF)
5. New Physical Facilities Building	Storage and Staging Facilities; Garage Expansion; Administrative Office Expansion. (40,000 GSF)
6. New Campus Safety Building	Location TBD by Future Study. Co-Located Campus Safety Functions potentially including Campus Police, Environmental Health and Safety, and other related functions. (28,000 GSF)

FIGURE 5.3.4A Sustained Growth Period Projects

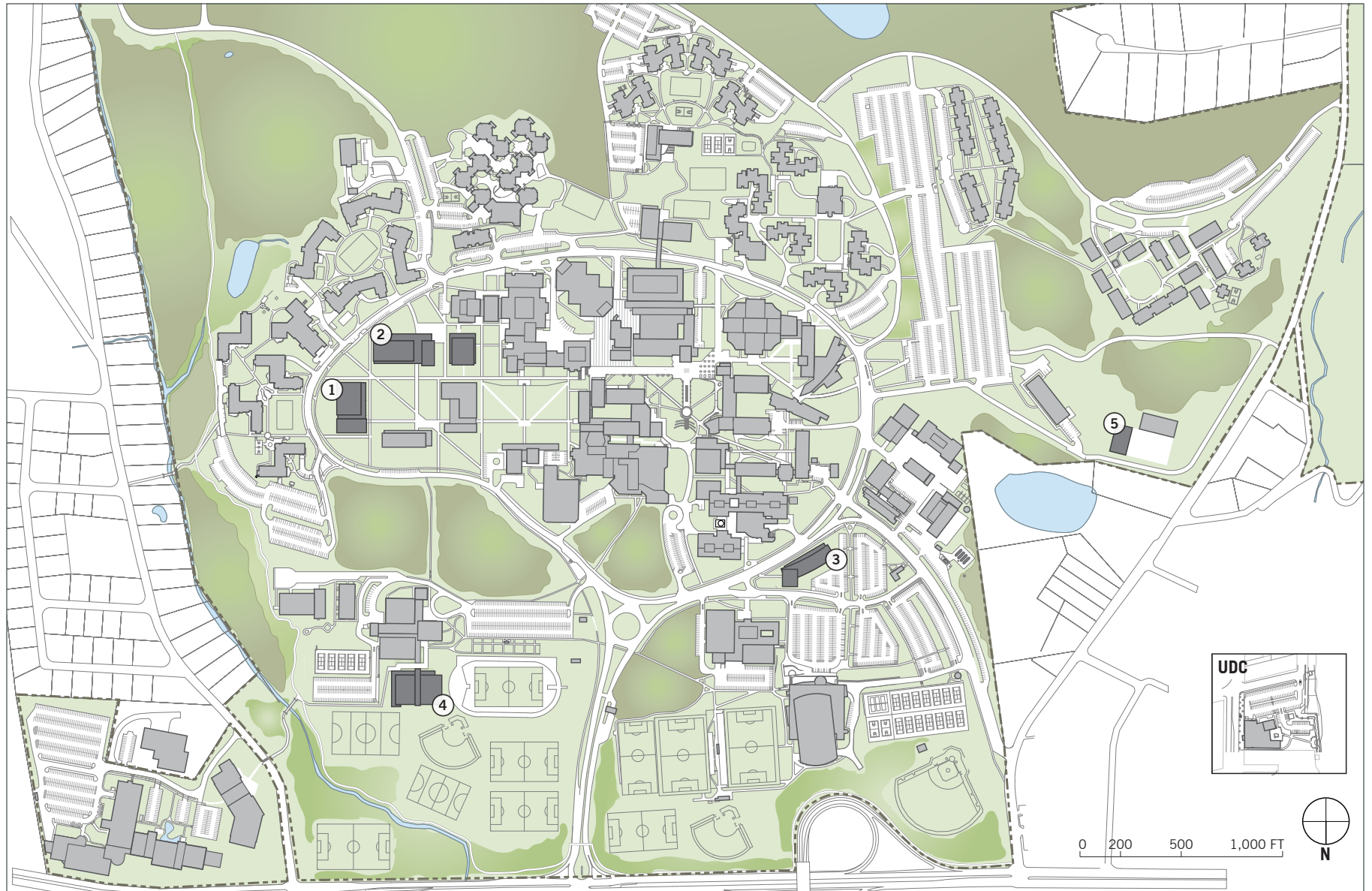


FIGURE 5.3.4B Campus Diagram: Sustained Growth Period

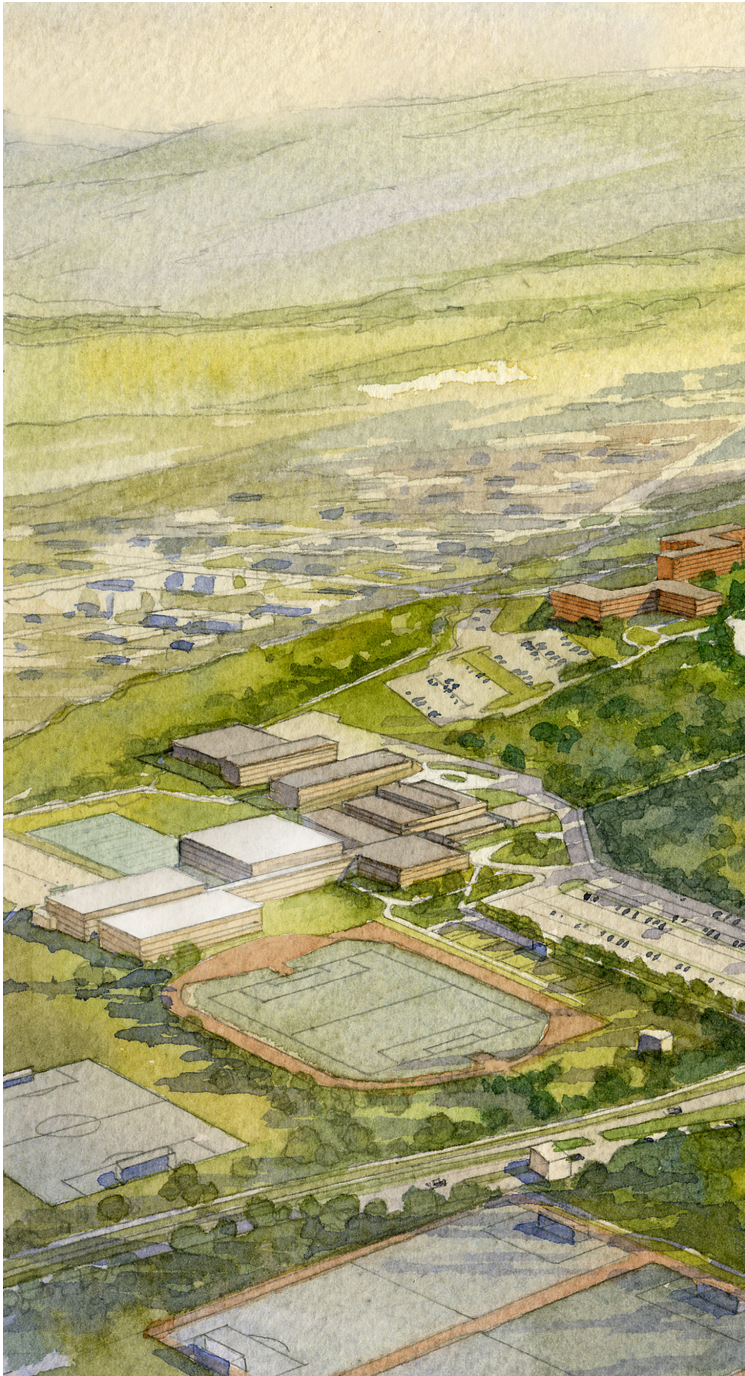


FIGURE 5.3.4C Binghamton University Main Campus Development



5.4 Infrastructure

5.4.1 CENTRAL HEATING PLANT & HIGH TEMPERATURE HOT WATER

CENTRAL HEATING PLANT

SYSTEM CAPACITY

The University's Central Heating Plant has three 100,000 MBH boilers and one 50,000 MBH boiler. Of the total, three are capable of burning coal and wood, and one burns coal only. A project is currently being studied to replace the oldest coal-only 100MMBH boiler with a newer model that is capable of burning both coal and wood. The Central Heating Plant serves buildings at the main campus, with the exception of certain residence halls that are served by local gas-fired boilers. The Plant does not serve the ITC Complex.

Currently full existing demand at the main campus is approximately 50MMBH and can be handled by one of the 100MMBH boilers operating at half-capacity. The East Campus Housing and the transition of the Original Dickinson Community residence halls to the HTHW system will add a demand of approximately 25MMBH each, for a new total demand of 100MMBH.

The Central Heating Plant has the capacity to serve both the revised load due to near-term inventory changes and is also projected to have sufficient capacity to serve the full extent of future build-out due to enrollment growth. The constraining factor in increasing usage of the Plant is compliance with a DEC Title V permit for emissions, which is detailed in System Opportunities and Constraints below.

SYSTEM CONDITION

The Central Heating Plant is in good operating condition. Recent projects have improved material handling and controls. Heating Plant Upgrade project 07A26 could replace the remaining antiquated boiler and improve the Plant's ability to burn biomass.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

The primary constraint related to the Central Heating Plant is emissions. The University campus operates under a New York State Department of Environmental Conservation (NYSDEC) Title V permit for emissions, which imposes a cap on emissions. The permit has the effect of limiting the capacity at which the Plant operates. As a result of this and other factors, a significant portion of the main campus is not connected to the HTHW system, despite the fact that the Plant has sufficient boiler capacity.

To allow the Plant to support the East Campus Housing, the University introduced burning of wood chips. This reduces emissions per MMBH of heat produced, allowing the Plant to operate at a higher load capacity while staying within the limits of the Title V cap.

The University is currently investigating alternative fuel strategies that would allow for further increase in boiler capacity within the emissions cap. One alternative is the use of natural gas, which burns with fewer emissions, however is typically less cost-efficient. Another alternative fuel strategy is a cogeneration plant.

HIGH TEMPERATURE HOT WATER

SYSTEM CAPACITY

The existing HTHW system has sufficient capacity to serve all buildings within the Brain as well as those immediately south of East Drive and West Drive.

The system has recently been extended to the east to serve the new East Campus Housing, however it does not serve the other residential college complexes to the south and west of the Brain.

The boiler plant has capacity to provide additional heat output if the stack emissions are reduced. This would allow increased boiler output while staying within the Title V emissions cap. Additional HTHW mains serving other portions of campus and future new growth could then be added to the system.

SYSTEM CONDITION

The HTHW system distribution piping has undergone replacement, and is nearly all in good condition. The last section of original piping that extends through part of the Science Complex will be replaced by 2012. The piping that extends from the Central Heating Plant to the new East Campus Housing has been recently replaced and is in good condition.

Heat exchangers in new campus buildings are in good condition. Many older buildings on the main campus contain original heat exchangers that are in need of replacement as facilities are renovated.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

The opportunity exists to extend the HTHW system along East and West Drives at the south edge of the Brain to serve existing residential college complexes that are currently served by direct natural gas fired boilers. Production of HTHW from the Central Plant coal and wood boilers is commonly about half the cost of the natural gas purchased to feed individual boilers. However, there is some inefficiency for the long pipe run to the buildings. Additionally, the elevation of the dormitories above the Central Plant must be reviewed as a loss of pressure of the HTHW, when not circulating, would allow it to flash to steam. This would cause a circulation problem.

Construction of a cogeneration plant on the east side of campus presents an opportunity to provide additional HTHW capacity on that side of campus without increasing the loads on HTHW mains from the Central Heating Plant. Such a plant, if connected to the HTHW system, could operate during the summer, picking up domestic hot water and sterilization loads campus-wide and allowing for shut down of the Central Heating Plant boilers during the summer months. The cogeneration plant could then supplement the HTHW plant during the heating season to meet load demand while removing the exhaust heat from the cogeneration engines.

FUTURE DEVELOPMENT FOR THE CENTRAL HEATING PLANT AND HTHW SYSTEM

There are three factors that influence the direction that will be taken in meeting the University's heating needs in the future: the Title V permit requirements, locally available energy sources, and the University's own "green initiatives" outlined in its Climate Action Plan.

Title V Permit. The Title V Permit is issued by the NYSDEC to the University because one of the regulated pollutants has exceeded the threshold as defined by the Environmental Protection Agency (EPA) to be a "major source." The current permit expires in December of 2011 and the University is working on a renewal application. Pollutants currently regulated under the Title V Permit include SO₂, NOx, HCl, and particulate matters (PM). Recently finalized federal Boiler MACT rules will also add regulations of other hazardous air pollutants to future permits.

The sulfur in the coal burned in the Central Heating Plant is the main contributor to SO₂. Burning more biomass (such as wood chips) and natural gas reduces this emission. However, a sustainable supply of wood chips cannot be guaranteed as other large energy producers are also turning to biomass to reduce coal consumption. Burning more natural gas instead of coal reduces SO₂, but still contributes to NOx and other greenhouse gasses. In the Central Heating Plant, natural gas is primarily used for startup and supplemental heat input during load swing periods.

Local Availability of Energy Sources. All fuel markets have experienced significant pricing fluctuation in recent years due to global events and increased international demands. Although the prices are evening out, coal is still less expensive to burn. From environmental and fiscal perspectives, it is to the University's advantage to maintain multi-fuel capabilities while continuing to improve utilization efficiency.

BU Climate Action Plan. Binghamton University's Climate Action Plan lists as one of its goals the total elimination of burning coal and the introduction of more renewable energy sources. Burning natural gas instead of coal for the creation of high temperature hot water (HTHW) does avoid coal use, however it is still a fossil fuel.

Renewable sources such as wind and solar generated electricity will reduce the need for fossil fuel energy off-campus by utility

companies, but reasonably can only be expected to contribute to about five percent of BU's electricity needs given current technologies. Burning natural gas at maximum efficiency and minimum emissions should therefore be a major component of the University's long-range energy plan. Natural gas powered cogeneration is one such technology that should be evaluated, as it is the most efficient use of natural gas, which is expected to be readily available and price-competitive as regional development occurs.

Other sustainable energy sources should be considered in future building developments. Geothermal heat pumps utilize the earth as a heat-sink. When utilized in a building with balanced seasonal heating and cooling needs, the energy removed from the earth during heating is restored during cooling with a net-zero effect. Any new building project that does not have a high make-up air requirement and has some open space near it for geothermal wells would be a good candidate for this system. Particularly, new residential development at the west campus should be considered due to its distance from the HTHW loop.

In the northeast, solar hot water collectors are successful at producing low temperature water (120 to 140 degrees). They are effective in generating domestic hot water, supplementing heat to a heat pump system and low temperature heating systems, such as radiant floors. Suitable applications require day time hot water usage with low inlet water temperature for maximum heat transfer. At BU, campus dining services and supplemental air preheating are some potential applications for solar hot water systems. The application for summertime domestic hot water could contribute to the shutdown of the Central Heating Plant in the summer.



FUTURE DEVELOPMENT FOR THE CENTRAL HEATING PLANT AND HTHW SYSTEM, CONTINUED

SCENARIO 1: EMISSIONS CONTROL

Scenario 1 adds emissions controls to the stacks at the Central Heating Plant. Emission controls consist of adding baghouse units to one or multiple stacks, or combining the stacks with a common exhaust system. The system would allow for the removal of particulate, gas, and acids. This scenario does not reduce the quantity of emissions at the plant, but rather captures and controls those that are produced.

Pros:

Reduces emissions per unit of fuel at the Plant.

Allows Plant to meet future HTHW demand with existing boiler equipment and remain within emissions cap.

Maintains fuel flexibility of existing distribution of fuel to hedge against price hike in any one fuel market.

Cons:

Expensive first cost for equipment and installation.

Ongoing maintenance required, resulting in increased O&M costs.

Flue gas treatment solid waste by-product produced. Associated need for landfill disposal.

Does not meet Climate Action Plan initiatives.

SCENARIO 2: ADD BIOMASS BOILER

Scenario 2 replaces the boiler Unit 1 at the Central Heating Plant with a biomass unit to serve as the primary HTHW source. The blend of wood chips would increase in the overall fuel distribution. A wood chip handling facility would be required. This scenario reduces SO₂ emissions associated with coal burning, but increases NO_x emissions from burning of wood. It may require emissions control for new emissions typology.

Pros:

Reduces SO₂ emissions at the Central Plant due to reduced reliance on coal.

Replaces coal with woodchips for a more renewable fuel source in accordance with the Climate Action Plan.

Maintains fuel flexibility to hedge against price hike in any one fuel market.

Beneficial ash utilization with increase of biomass fuels.

Cons:

Expensive first cost for boiler and wood chip facility.

NO_x emissions increase due to wood fuel source.

Biomass fuel may face supply limitations due to increased future demand.

May require emissions control for new emissions typology.

SCENARIO 3: COGENERATION PLANT

Replace boiler Unit 1 at the Central Heating Plant with a biomass unit for the primary HTHW source (per Scenario 2). Install a natural gas cogeneration plant to produce electricity, HTHW, and chilled water. This scenario reduces SO₂ emissions associated with burning coal, but increases NO_x emissions from burning wood. It may require emissions control for new emissions typology. The scenario is the most sustainable fuel option for the University.

Pros:

Eliminates reliance on coal as a fuel source, in accordance with the Climate Action Plan.

Represents most sustainable fuel solution and most significant reduction in greenhouse gas emissions.

Efficient application of natural gas as fuel.

When coupled with other sustainable solutions (see opposite page), presents the opportunity to shut down the Plant in the summer.

Cons:

Expensive first cost for boiler, wood chip facility, and cogeneration plant.

NO_x emissions increase due to wood fuel source.

Biomass fuel may face supply limitations due to increased future demand.

Substantial increase in natural gas consumption.

Moves away from fuel flexibility between three sources (however maintains flexibility between wood chips and natural gas).

Requires new maintenance efforts compared with existing fuel types.

SUSTAINABLE ENERGY SOLUTIONS

The following sustainable energy solutions may be combined with the scenarios presented on the opposite for a greener approach to campus infrastructure at BU. The solutions are not limited to any one scenario, and are not mutually exclusive. Future study must determine the financial and logistical viability.

REDUCE THE TEMPERATURE OF THE HTHW LOOP.

The HTHW loop is currently utilized year-round at nearly the same temperature (about 350 degrees F in the summer and 375 degrees F in the winter). The system is used for generating heating, domestic hot water, and process heating. The need for HTHW for summer applications is small and should be reviewed as maintaining the full loop for the small load is inefficient.

Lowering the temperature of the HTHW loop would reduce heat losses through the piping and improve the overall condition of boilers. However, lowering the temperature of the loop would require the addition of parallel heat exchangers where higher temperature water is required to meet loads. Additional gas appliances may also be required for high temperature loads. The energy capacity in existing piping would be reduced.

GEOHERMAL

The addition of geothermal systems to remote buildings reduces the need for these facilities to run off of the HTHW loop, fueled by the Central Plant. Geothermal heat pumps utilize the earth as a heat-sink. When utilized in a building with balanced seasonal heating and cooling needs, the energy removed from the earth is restored during cooling with a net-zero effect.

Buildings that do not have high make-up air requirements and have open space for geothermal wells should be considered. New development at the remote west campus should be considered due to their distance from the existing HTHW loop. The main constraint to geothermal energy is the cost of new equipment.

SOLAR COLLECTORS AND THERMAL FLUID BOILERS

Solar collectors for domestic hot water supply would perform well in the summer months at BU. Higher temperature needs could be met locally with gas-fired appliances.

Solar collectors and thermal fluid boilers are a green solution using solar energy. Use during the summer months may allow for the shut down of the HTHW loop, for energy and emissions reduction. The cogeneration plant could support a small sub-loop of hot water for the Sciences Complex, as required, should a portion of the loop need to be retained. The main constraint to solar collectors and thermal fluid boilers is the cost of new equipment and local high temperature hot water units.

5.4.2 CHILLED WATER

SYSTEM CAPACITY

The existing chilled water supply for the campus is produced and distributed among the individual buildings, with some chiller and tower sharing at the Science Complex and among Bartle Library and Engineering Building.

Currently chillers are at-capacity, with capacities matching the existing loads in the buildings. Redevelopment of academic buildings, conversion of residential buildings to academic functions, and construction of new buildings on campus will produce additional cooling loads that will require chilled water capacity is added. Future projects should be served with new dedicated electrical centrifugal chillers, a frictionless bearing type chiller that has excellent efficiency.

SYSTEM CONDITION

Chilled water on campus is provided by a blend of absorption chillers and electrical centrifugal chillers. The original absorption chillers serving legacy buildings on campus have undergone replacement from 1997 through 2010, with the exception of chillers at the Couper Administration Building and a portion of the Lecture Hall Center. The campus is currently migrating toward electrical centrifugal chillers with a life expectancy of ten to 20 years in upgrade replacement projects.

Cooling towers have been replaced routinely, resulting in an existing mixed inventory of those that are new, rebuilt, and in need of repair. The chilled water piping within most legacy buildings is original. In any building over 40 years old, piping should be evaluated for replacement as a part of major facilities upgrade.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

With future campus growth, the opportunity exists to construct satellite central chiller plant clusters to serve groupings of new buildings with sufficient load diversity. Through such load diversity, a satellite chiller plant would allow for the installation of a lower total equipment capacity than standard local units.

Additionally, the construction of a new cogeneration near the Science Complex could provide cooling for the six buildings in the complex as well as the Events Center by producing HTHW

from the exhaust stack to operate an absorption chiller. The existing centrifugal chillers could remain as a backup cooling source or be moved to service new loads at other campus locations.

Operating natural gas-fired cogeneration engines to generate electricity alone is not practical. However, capturing the waste heat from exhaust stacks to generate HTHW allows it to be used to heat buildings and generate cooling. The waste heat from the engine block can also be captured to generate domestic hot water. The combination of electricity, hot water, and chilled water produced by the plant from the initial combustion of natural gas in the engine makes it feasible to operate.

5.4.3 DOMESTIC WATER

SYSTEM CAPACITY

The domestic water distribution system for the main campus is fed from two separate street mains along Vestal Parkway. The two mains combine at the Information Booth at Center Drive to feed three 1,000,000-gallon storage tanks, which provide a stable system pressure and fire storage capacity. The minimum storage capacity required to meet flow requirements for a fire event and one day domestic use (minimum recommendations per the Ten States Standards), is less than 1,000,000 gallons. Therefore, the existing tank has sufficient capacity to support existing usage and significant future growth.

Due to the high tank elevation, they provide a system pressure of 230 psi at the pump house, located near the traffic circle. The pressure is reduced to 110 psi for distribution to buildings. This reduced pressure is appropriate for plumbing throughout the campus and fire protection in most buildings.

SYSTEM CONDITION

Much of the domestic water distribution system at the heart of the main campus is original, dating back to the 1960s, and is beyond its dependable life expectancy. The campus has water system upgrade projects scheduled for completion in 2012 to replace the water main through the Brain and replace key pressure reducing stations and isolation valves. A long-range plan for replacement of the remaining original piping after the 2012 project should be designed.



As growth has occurred outside of the Brain, the system has been expanded. Piping outside of the Brain varies in age, however most has good serviceable life expectancy.

The distribution from the connection point at Route 434 to the water tanks requires further study to evaluate for condition. The water storage tanks are noted to be in good condition. They were installed in 1964, 1968, and 1998, and the two oldest were relined in 2001.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

The opportunity exists for upgrade and reconfiguration of the domestic water system with future major renovation of legacy facilities at the Brain. A separate fire branch line could be taken off of the pressure main from the storage tanks, ahead of the pressure reducing valves. This line could run with a higher rated pressure to serve new sprinkler services in tower facilities requiring upgrades, including the Library, Science II, or the Couper Administration Building. This would be an effective alternative to installing fire pumps for sprinkler system upgrades.

With future growth, the provision of a second return main from the storage tanks down to one of the main branches should be studied. A second main would provide additional capacity and system redundancy. Should the current main to the tanks fail, this main could also maintain incoming flow. Currently the campus has limited capacity to handle problems with the existing tank main. If there is an issue with the main, the utility service and main pumps must by-pass the tanks, serving the campus without the benefit of pressure stabilization and matching of peak flow demand.

5.4.4 SANITARY SEWER

SYSTEM CAPACITY

The sanitary sewer system has two main connections to the municipal sewage system near the intersection of Vestal Parkway and Murray Hill Road, one 12-inch connection and one 15-inch connection. From this point, they extend south to branch out across the Brain and along the west perimeter of campus to the residential colleges.

The sizes of the system mains are small for the quantity of buildings they connect, particularly at the West Drive main

and the west main that serves the largest residential college concentration, both of which are 8-inch mains. Sections of the older 8-inch main were replaced with 12-inch mains by a process of pipe busting to accommodate the East Campus Housing, however portions of the 8-inch system remain downstream. An April 2011 rain event added sufficient extra flow through infiltration at manholes to cause a sewer back-up into the East Gym.

The Events Center and development in the northwest quadrant of the campus is collected in a sewage pump station north of the Events Center, which pumps to connect to a gravity system at the traffic circle. Preference is to provide gravity sewage flow, where possible, as sewage grinder pumps require significant maintenance due to inappropriate objects that may be flushed into the system and plug impellers.

SYSTEM CONDITION

The core of the sanitary sewer system is still original piping that was installed at the campus founding. Issues exist with inadequate sizing and known locations of failing pipe. Piping upgrades to route mains around new buildings has resulted in a disjointed system with portions of campus that have no access to sewer mains except through buildings. Although recent survey work has improved understanding of the system connectivity between manholes, much of the underground piping remains unknown in terms of condition and size.

A detailed study is recommended to understand the condition of manholes and piping location, condition, and size. This study should inform a long-range plan outlining strategies for immediate system repair or replacement and new future sewer main installations.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

Any future major road improvements should include implementation of sewer system upgrades. Future development at the main campus should remove sections of abandoned sewer piping and clarify system distribution routes, as possible.

To serve potential future growth at the west side of campus, including any possible residential expansion, and to provide relief on the east mains and a gravity outlet for the Events Center, the opportunity exists for a new sewer connection along Bunn Hill Road. A study is recommended to evaluate the feasibility of installing this west campus sewer main.

5.4.5 STORM DRAIN

SYSTEM CAPACITY

Storm water flows in three general directions off of the main campus: to the east, down the center, and to the west. Storm water at the east side of campus drains into Lake Lieberman, which is currently meeting its maximum potential retention capacity. To reduce the amount of storm water flow through the middle of the Brain, the water from the residential colleges on the hill, Mountainview College and College-in-the-Woods, is diverted laterally to the east. Storm water from the East Campus Housing is also diverted to Lake Lieberman.

Storm water from the center of campus drains through a system of pipes and down along the main entrance drive. The Visitor's Parking Lot and the land immediately north of the Brain drains down the hill, joining into the storm systems that run north between the academic buildings, picking up roof and courtyard runoff along the way. Specific drainage problems exist between Bartle Library and the Engineering Building, where large storm events cause flooding to the service deck at the lower level and carry the potential for significant flood damage to the basements of the buildings. There are also several other buildings on campus that have ground water penetrating into basement levels and require additional subsurface drainage.

The systems running through the Brain join together along the north side of the East and West Drives, and run down both sides of the main entrance drive. The system on the west side of the entrance drive empties into a retention pond near Route 434. This pond was observed overflowing during the spring of 2009, with surface water flooded onto the roadway and closing one lane.

The west parking lots and Susquehanna and Hillside residential colleges drain to the north and along the South Connector Road to the Bunn Hill Access Road. Here the system picks up drainage from major parking lots M and F, before discharging into a swale along Route 434 adjacent to the 201 loop. There is currently no capacity in the system to retain additional storm water runoff created by new buildings or site work.

SYSTEM CONDITION

The physical condition and age of the storm water system is largely undocumented. There exist some areas with deteriorating manhole covers or broken connections.

The system consists of a mixture of piping and structures that were put into place with the original campus, and then extended, re-routed, or abandoned. Although a remapping of the system was recently conducted, there exists a large portion of the distribution between the academic buildings within the Brain that requires further study. Specifically, there appear to be sections of abandoned piping not identified as such, outlets from courtyard systems that are not documented, and incomplete documentation at Lot M. There is no storm drainage documentation for the ITC site. Additionally, pipe sizes are not documented. A thorough conditions survey is recommended to determine system replacement or enlargement requirements.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

The campus requires a long-range plan for storm water system upgrades, storm water quantity and quality control, and to meet sustainability opportunities.

Any future redevelopment of residential housing at the west campus should include an upgrade of the storm water system on that side of campus. Drainage from the Hinman Community, which is currently routed into the central system between the Lecture Hall Center and Bartle Library, should be redirected to the west campus system to reduce demand at the Brain.

Storm water piping at the central system within the academic buildings require evaluation for condition and capacity. The grading at the loop north of the Bartle Library and the Engineering Building should be evaluated to ensure water from the road is not running into the plaza. The University Commons renovation and any other site or road work should include upgrades to the storm water system.

The northern edge of campus is the best location for implementation of long-range storm water management. Additional detention ponds should be constructed between the new baseball and softball field, intramural fields, and Route 434. The soil at this location is the best for water absorption.

The new ITC Center of Excellence building includes a storm water storage system beneath the parking lot for reuse as grey water. The water will be utilized for cooling water make-up and irrigation. Cooling tower evaporation and bleed-off consume 70 percent of the water used in the academic buildings, and represent a significant opportunity for use of grey water. New parking lots, major parking lot renovations, and major new construction projects should consider underground storage systems for this purpose.



FUTURE DEVELOPMENT FOR WATER SYSTEMS

Opportunities existing for BU to develop its future water systems around a model of sustainability. Such a model for water usage would reduce domestic water intake, stormwater output, and sanitary sewer output.

CURRENT ISSUES

The need for development for water systems is rooted in three main issues surrounding current water use. First, reduction in the quantity of domestic water intake has an associated cost savings for the University, as it pays for domestic water use per unit. Use of captured gray-water for specific functions presents the opportunity to reduce domestic water use.

A reduction in domestic water intake has an associated implication of reducing the quantity of sanitary sewer output, which also has a municipal service cost.

Stormwater also impacts the water equation at BU. The main campus currently experiences issues with stormwater runoff and drainage. Local flooding occurs in locations in and around the Brain, as well as at the downhill side of campus along Vestal Parkway. The soil type for the land along Vestal Parkway is not ideal for water infiltration, limiting the capability of this land to be used for extensive water infiltration. To reduce the impact of stormwater runoff on the campus and on surrounding environs, water should be held and either absorbed into the ground or captured for re-use as close as possible to the location that it falls. Additionally, due to the condition of the sanitary sewer system, stormwater infiltrates the system, resulting in an escalation in the metered usage.

HOLISTIC SOLUTIONS

By looking at the three water systems holistically, improvements can be made to systems in composite, measured in metered water usage and output and stormwater runoff conditions.

Solutions for improvements to water systems at BU are outlined to the right. The three options presented are not mutually exclusive, and may be taken in any combination.

OPTION 1: RAINWATER HARVESTING AND GRAYWATER SYSTEMS

New building projects or major site landscape projects may include water storage tanks, pumps, and treatment systems and piping for rainwater harvesting and associated graywater systems.

These systems have the impact of reducing stormwater runoff and reducing the quantity of domestic water required for specific building systems.

The University's first rainwater harvesting system is to be installed at the ITC Campus with the new ITC Center of Excellence Building. Additional future locations may include the Peace Quad, the new East Campus Quad, and new artificial turf outdoor fields.

OPTION 2: LOCAL LANDSCAPED DETENTION STRATEGIES

Local strategies may be employed throughout the campus to detain stormwater close to the site where it falls, reducing the overall impact of runoff. This strategy would also reduce the impact of excess water infiltrating into the sanitary sewer system until the time of its upgrade.

Detention strategies include designated bioswales and detention ponds that keep water in a given location for a longer period of time, allowing it to infiltrate; as well as green roofs and permeable paving surfaces, which convert a formerly impervious surfaces to permeable locations for water infiltration.

Possible locations for bioswales include the zones located down-hill of major campus parking lots. Detention ponds may be created at the north side of campus where a greater amount of stormwater infiltration is required. Existing and future campus buildings should consider green roofs.

OPTION 3: LOW FLOW PLUMBING FIXTURES

Low flow plumbing fixtures reduce the amount of water used for key building functions, and as a result reduce the campus' overall domestic water intake and sanitary sewer output. Low flow fixtures may be employed for toilets, urinals, faucets, shower heads, service sinks, etc. Such fixtures should be considered for all campus locations.

Low flow fixtures may also be used in combination with graywater systems to further reduce domestic water intake.

5.4.6 ELECTRICAL

SYSTEM CAPACITY

The main substation at the University is fed from two 34 KV circuits from NYSEG. The existing active circuit from NYSEG has the capacity to serve significant future growth at the main campus.

The University is currently conducting a multi-phased project to upgrade the existing electrical distribution capacity at the main campus. Upon project completion, the substation capacity will increase from 24,000 KVA to 40,000 KVA. The upgraded system will provide sufficient capacity to meet the existing peak demand of 18,000 KVA and is anticipated to meet future peak demands with new construction at the main campus.

The project will also replace existing electrical distribution infrastructure, rated at 4,800 volts and 13,200 volts, to distribution rated at 12,470 volts. This will require future replacement of several existing transformers on campus to match operation at the common voltage. All distribution on campus will be at 12,470 volts when the project is complete.

The main electrical substation does not serve the ITC Complex, which receives separate service from NYSEG directly from Vestal Parkway.

SYSTEM CONDITION

The existing substation 34 KV / 12.4 KV transformers and switchgear area are currently being replaced in a fifteen-year program that began in 2005 and will be conducted in two phases. Upon completion, the substation will be in excellent condition. The first transformer upgrade installation at the substation is scheduled for completion in 2011.

The duct bank distribution along the north side of the Brain from the substation has been replaced and new feeders are being installed, both in the duct bank and extending to the building main electric rooms.

A series of additional projects are underway to replace building transformers rated at 4.8 KV or 12.3 KV. Additional projects will be required prior to the new circuits being switched over to the upgraded 12.5 KV voltage. An existing program

includes future projects to replace the duct bank on the south side of the Brain, where circuits will be replaced. Following this project, additional transformers will require replacement. Until the program is complete, there will be feeders, manholes, switchgear, and transformers in use that have reached the end of reliable service.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

Based on past studies, the University has an understanding of the projects required to fully upgrade electrical infrastructure, however funding for design and construction is required for implementation. Such projects include: building transformer replacements, the south Brain duct bank design and construction, and the second phase of the main substation upgrade which will remove the abandoned equipment.

Duct banks under construction are being upgraded with spare conduit capacity and will be able to receive additional future circuits to feed new building construction in and around the Brain. Duct bank extension will be required for new development to the west.

Feeders have not yet been replaced to many buildings. The original 4800 volt feeder system cannot be fully switched out until the building 4800 transformers and switchgear have been replaced.

The main campus substation is fed from two 34 KV circuits from NYSEG. The active circuit currently has the capacity to serve proposed growth at the University. The back-up feeder is shared with local distribution but has back-up capacity, which the campus goes on when needed. There exists the opportunity to upgrade this circuit, however there is no agreement with NYSEG to do so. See greater detail in section 4.4.9 Emergency Power.

5.4.7 EMERGENCY POWER

SYSTEM CAPACITY

The University campus is currently served by 45 fixed emergency generators dedicated to individual buildings and shared between adjacent buildings. The existing emergency power system is not designed to keep the campus operating during a prolonged power outage. It provides power for safe

evacuations of most buildings and to maintain the central heating plants.

Of the total units, 11 are sized greater than 75 kW and are capable of handling some equipment load along with emergency lighting and alarms. Buildings with data hubs or laboratories have the larger units. The five largest units serve the Central Heating Plant, Events Center, ITC Complex, Sciences III/IV, and the Science Library and Greenhouse. These units provide power to operate sensitive equipment, HVAC, and lighting.

Of the total units, 22 are fueled by natural gas and 18 are fueled by diesel. The reliability of the natural gas supply is limited as the University purchases it under an "interruptible rate" plan.

The life safety upgrade program is expected to replace portable temporary generators at the Computer Center and Health Center. A study is planned to consider replacement of more generators.

SYSTEM CONDITION

The generators and the related automatic transfer switches are of varying age. Generators are commonly used lightly when installed as stand-by equipment, resulting in a good life expectancy for most equipment.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

A delay of two hours minimum is predicated for transfer of power from the main line to the back utility feeder. For all but the most critical areas, emergency power will support only safe egress of the buildings. The main heating plant will operate, but most of the building HVAC systems that rely on air handling units will not.

As previously discussed, the back-up feeder connected to the local neighborhood distribution does not have sufficient capacity to accept an automatic transfer of the full BU load. Time will be lost coordinating load shedding on campus to reduce the load before NYSEG is able to throw the switch in the BU substation to the back-up circuit.

The status of many of the back-up generators as natural gas fired adds further complexity to the emergency power system, as the natural gas is purchased at an "interruptible rate" from the utility. Should the utility call for an interruption during a

period of high demand that coincides with a power failure, all of the gas generators will be off-line, with the exception of the Central Plant generator which may be switched over to propane. Many buildings have life safety and critical equipment mixed. They should be split.

The life safety upgrade project for 2011 that was intended to review the system has been deferred to 2012 for completion.

The opportunity exists for a cogeneration plant to improve the emergency power system at the main campus. The plant could provide a significant amount of generation capacity that could serve a severely reduced load campus-wide, with the impact of keeping campus facilities from shutting down. Individual building diesel generators capable of running food operations, HVAC systems, elevators, and computer networks should be considered for all buildings on campus.

As an alternative to load reduction and provision of alternate emergency power, the University is negotiating with NYSEG for the upgrade of the back-up 34 kV circuit. This would allow for automatic switch-over should the primary feeder fail. The cost of such an upgrade is unknown at this time. The solution would not address situations in which all aerial power lines are simultaneously damaged, such as recent ice storms.

5.4.8 NATURAL GAS

SYSTEM CAPACITY

The existing natural gas piping feeds the campus from Bunn Hill Road to the Central plant. This portion of the system is owned by the Utility. The distribution from central plant across the campus is owned by the Campus. The system feeds Central plant as a back-up supply to the coal/wood fuel. The distribution from there crosses the north part of campus feeding dining halls and boilers in the dorm complexes and radiates south between the buildings inside the brain to feed boilerplants in the Library and Univ. Union. Smaller branch lines run to individual buildings with needs for lab equipment, food services or dedicated process equipment. With the transfer of East Campus Housing to high temperature hot water there is additional spare capacity in the system. The gas distribution is at 23 PSI pressure allowing a large capacity in the relatively small 3 and 4 inch lines.

SYSTEM CONDITION

The original steel piping has all been replaced with plastic gas piping underground and is in good condition.

SYSTEM OPPORTUNITIES AND CONSTRAINTS

The campus buys gas at an interruptible rate which allows NYSEG to shut off the campus in an emergency. The campus gas is backed up. However, in January 2011, a break in the main transmission pipe through the southern tier caused NYSEG to shut off BU for three days. During the outage the campus supplied a mix of propane and air into the distribution from its storage tanks at the central plant. This kept the remote gas equipment in operation. This is not a desirable solution for the emergency generators that run on natural gas, however. The gas generators should be phased out in favor of diesel except for those that are directly connected to the liquid propane tank.

The gas piping can support new boilers in future housing projects. It also could support new remote hot water or steam generators on campus that could allow the total shutdown of the Central Boiler plant during the summer once the last two remaining absorption chillers are replaced.

5.5 Circulation

5.5.1 OVERVIEW AND APPROACH

Each day Binghamton University's campus is active with students, faculty, staff, and visitors moving from one place to another by walking, bicycling, driving, or riding. Circulation routes define how and where each user traverses the campus to their destination, and serve a defining role in the experience of the campus.

As the student and campus population at Binghamton University increases, it will become important to define circulation routes. Clearly defined routes help users find their way around campus to their destination, reduce conflicts and promote safety among different modes of transport, and showcase the full range of transportation options that exist.

Due to the campus location, it is understood that the automobile will remain an important mode of transportation for members of the BU community. However, given the magnitude of projected growth, the University will reach a point at which the campus is longer able to support the existing culture of single occupant vehicles as it does now. As a result, future development at the campus must promote alternate modes of transportation, including walking, bicycling, and use of transit, in order to gradually reduce the magnitude of vehicular traffic.

The circulation plan outlined in the FMP develops a strategy for effective movement of University's full population for years to come by emphasizing the following drivers:

Create a campus that promotes walking and biking. Walking and biking are low-cost, sustainable modes of transportation that also have associated health benefits. The circulation plan encourages walking and biking through enhanced connectivity between buildings, creation of a pedestrian preferred zone at the south side of the Brain to reduce pedestrian-vehicular conflicts, and improvements to site accessibility.

Provide easy access to transit. Transit options move more people to, from, and around campus using a single vehicle, resulting in a sustainable way to reduce the impact of single occupant vehicles. Transit options at BU include the University's Off Campus College Transport (OCCT) service, Broome County Transit, and commercial bus service shuttle. The circulation plan promotes the use of transit by enhancing the ease of access and improving connectivity between campuses.



FIGURE 5.5.1A Proposed Improvements along the Lois B. DeFleur Walkway

Reduce the volume of vehicular circulation. To provide effective circulation for the campus community in the future given the magnitude of growth, BU will need to become less reliant on the single occupant automobile. The circulation plan identifies strategies to reduce the impact of remaining vehicular traffic by minimizing the need for vehicles to circulate within the campus. This is achieved by defining specific vehicular preferred routes to destinations, such as parking, and moving vehicles directly to those routes. Additionally, pedestrian preferred routes at high pedestrian activity zones complement vehicular zones by discouraging vehicular traffic.

Meet parking demand. Parking demand is related to the volume of single occupant automobile traffic on campus. To effectively support future growth at BU, reduction in vehicular circulation on campus must also reduce the overall parking demand. The circulation plan outlines near, middle, and long term strategies toward parking. Near term strategies enhance the utilization of existing lots. Middle term strategies identify key locations on campus that may support the additional surface parking lots. Long term strategies provide parking expansion with vertical parking structures, complement on-campus parking with off-campus solutions, and seek strategies to enhance alternative modes of transportation to reduce the overall parking demand.

5.5.2 PEDESTRIAN AND BICYCLE CIRCULATION

Improved walk-ability and bike-ability at the BU campus will reduce vehicular congestion, promote to the health of members of the campus community, and contribute to a sustainable future. The FMP creates a campus that promotes walking and biking by clarifying existing routes and providing new routes to create a network of pathways with strong connectivity between destinations.

CONNECTIVITY

The plan expands the existing network of pathways to more comprehensively connect between campus locations, including locations in and around the Brain, as well as peripheral locations such as the ITC Campus, outdoor fields, and natural areas. Designated bicycle routes are provided along roadways, and bicycle parking kiosks are provided in close adjacency to key amenities.

Extension of existing circulation routes. Existing major circulation routes within the Brain are clarified and enhanced with landscape and signage. New major routes build upon the existing network of pathways for greater connectivity. In many locations pedestrian routes move through buildings to promote walking even in instances of the inclement weather often experienced in the region.

New east-west circulation route. An important new circulation route is the second east-west connection provided along the north side of the Brain, extending from the F parking lots at the west, through the Sciences Complex and Fine Arts Building, to the Peace Quad and East Campus. This route allows for more direct connection between the east and west campus with less grade change. A designated public circulation corridor is provided through the Fine Arts Building, allowing program within to be showcased for the campus population.

Direct access to Appalachian Hall. Development at the existing Visitor's Parking Lot provides a new, more direct, and safer pedestrian route extending between Appalachian Hall and the Brain. The route is provided as an outdoor path between Appalachian Hall and the new Interdisciplinary Academic Center building, with a single cutback to accommodate the slope of the hill. A direct walkway connection is provided

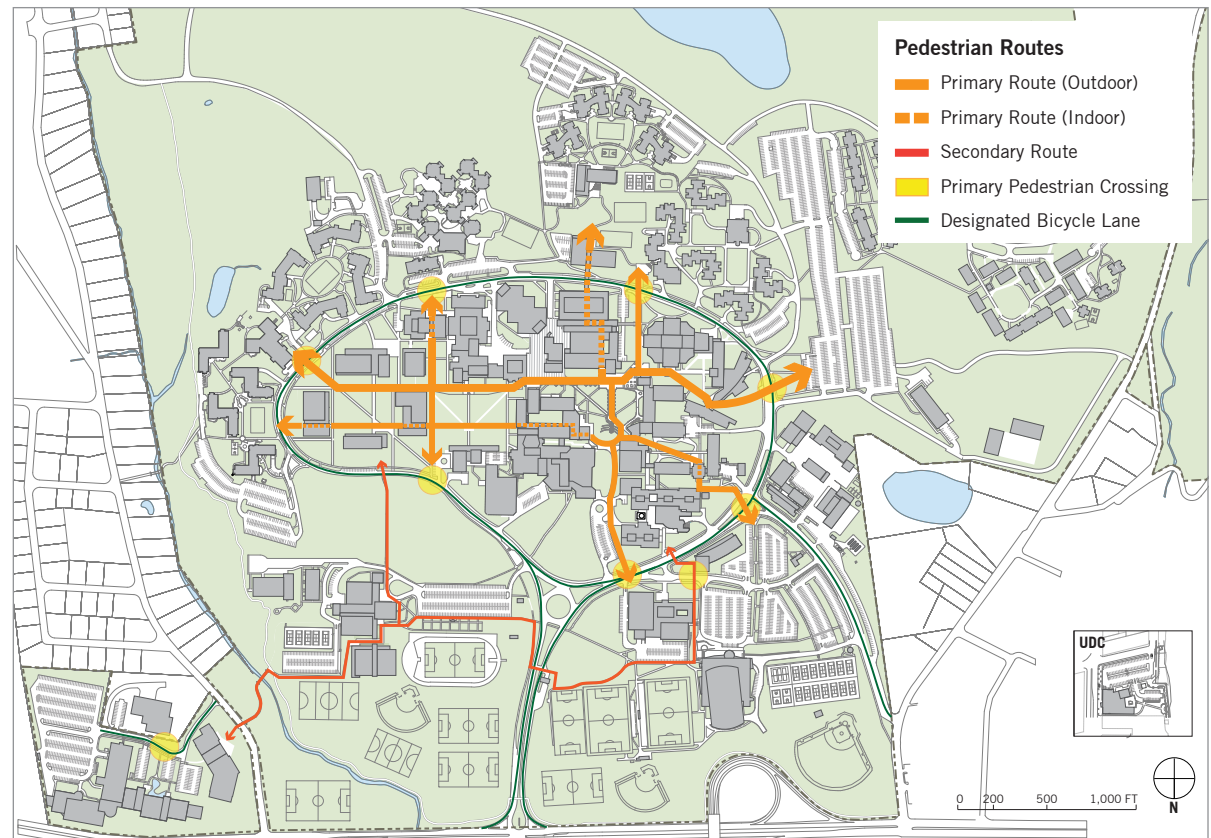


FIGURE 5.5.2A Proposed Pedestrian and Bicycle Routes

through the Academic Center to Bartle Library within the Brain, bridging over West Drive.

Pathway to the ITC Campus. Future expansion of the ITC Campus will result in an increase in pedestrian traffic between it and the Brain. To encourage walking between the two locations, designated pedestrian pathways are provided to connect the ITC Campus with key locations at the Brain. The routes improve the pedestrian experience with consideration for topography, landscaping, and site lighting.

PEDESTRIAN PREFERRED ZONE

Organization of the campus locates primary academic facilities inside the Brain and primary residential functions outside of the Brain with the zones separated by East and West Drives. Pedestrian migration across the road create a number of pedestrian-vehicular conflict points, potential safety concerns. The FMP establishes a designated pedestrian preferred zone along the south portion of East and West Drives, extending from the East Campus Housing around to the entrance between Academic A and B. This portion of the roadway is open to vehicles, however measures are taken to reduce the impact of vehicular traffic including strategies outlined in section 5.5.3 to reduce the volume of traffic as well as traffic calming measures such as raised crosswalks with surface differentiation, pedestrian right-of-way signage, landscape and streetscape interventions defining a pedestrian friendly sense of place.



FIGURE 5.5.2B Major Pedestrian Circulation Axes within the Brain

5.5.3 TRANSIT

The use of transit presents a sustainable method to move members of the BU campus community to, from, and around campus and results in an overall reduction in the use of single occupant automobiles. Growth of the campus population will require an increase in the use of transit by members of the campus community in order to effectively move the full population. As such, the FMP defines overall circulation routes that promote the use of transit.

EASY ACCESS TO TRANSIT

Transit options at BU currently include the 12-route, University-operated OCCT service, five Broome County Transit (BCT) routes, and a van shuttle connection service to local commercial bus lines. To accommodate an increase in the use of transit, the FMP locates infrastructure to make services easy to access and convenient for members of the campus community to use when moving between destinations. The diagram at the right provides an overview of transit access points.

Hierarchy of access points. The plan establishes a hierarchy of access points to provide stops in close adjacency to demand points. Access points include primary transit exchange points, secondary stops between campus locations, and tertiary stops for main campus locations only. Primary transit exchange points are provided along the south side of the Brain and at the Bunn Hill Connector Road. The Campus and off-campus OCCT routes, BCT routes, and shuttle service routes stop at these exchange points for easy access and transfer.

OCCT access points distributed around the Brain. Access points to the OCCT at the main campus are distributed around the Brain at 1/4 mile intervals so that access is never more than a five minute walk away.

CAMPUS AND COMMUNITY CONNECTIVITY

OCCT at the main campus. The OCCT shuttle provides excellent connectivity at the main campus, which includes areas in and around the Brain, the residential communities, and the ITC Campus. Proposed stops at the main campus are indicated on the diagram with a light blue dot.

OCCT between campus locations. The OCCT shuttle also provides direct connectivity between the main campus,

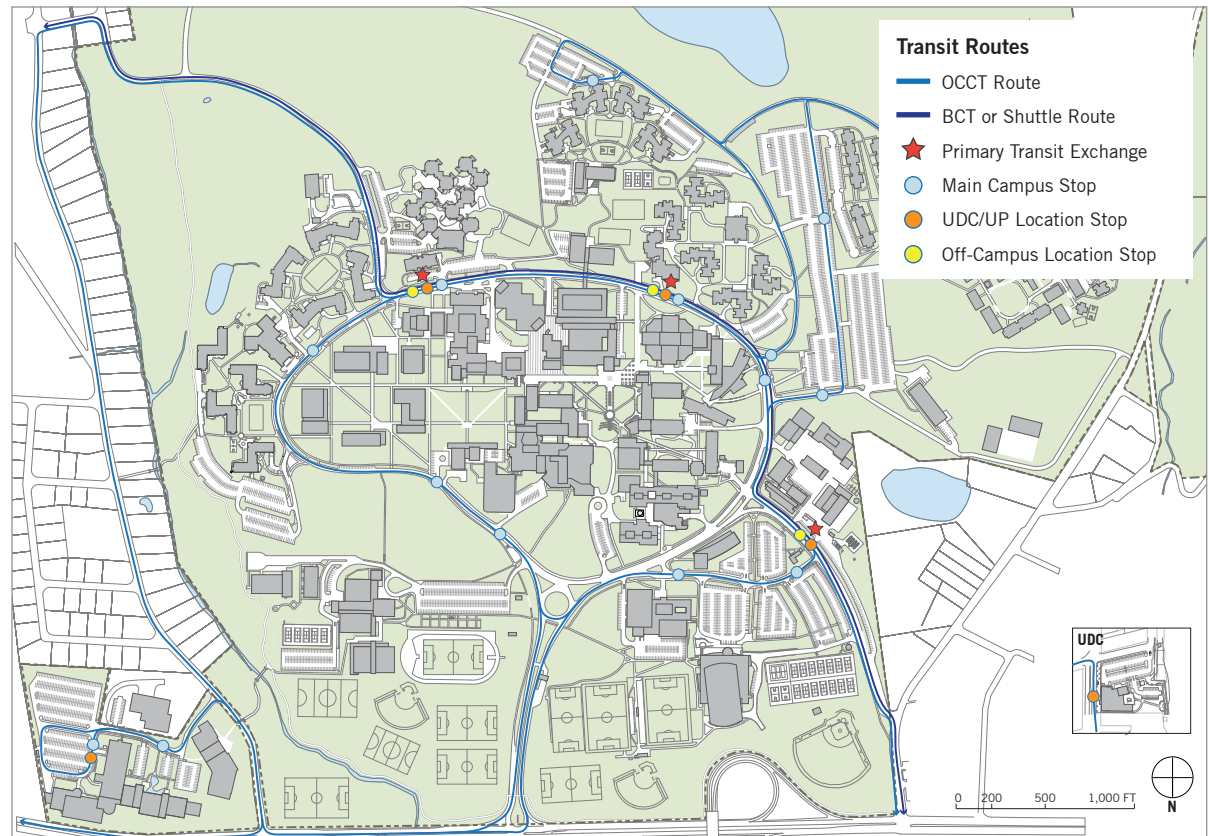


FIGURE 5.5.3A Proposed Transit Routes

the University Downtown Center, and the University Plaza residential community. An additional stop at the ITC Campus is recommended for the shuttle connecting between the main campus and the University Downtown Center.

OCCT in the community. The OCCT shuttle connects to a number of locations in surrounding communities. Proposed stops correspond with the primary transit exchange points and are indicated on the diagram with a yellow dot.

Broome County Transit and other shuttle services. Broome

County Transit routes that serve the campus include routes 5, 15, 17, 25, and 47. Other shuttle services connect between the campus and Broome County Bus Terminal in downtown Binghamton. Proposed stops correspond with the primary transit exchange points and are indicated on the diagram with a yellow dot.

5.5.4 VEHICULAR CIRCULATION

Binghamton University is located at the nexus of three major interstates that connect the northeast: Interstate 81 extending north-south, and Interstates 86 and 88 extending east-west. This roadway framework makes the University highly assessable by vehicle from locations across the southern tier of New York.

The main campus is located in Vestal, New York in a suburban area. Due to its location, the automobile is currently an important mode of transportation to and from campus for members of the campus community, and will likely remain such in the future. However, given the magnitude of projected growth, the University will reach a point at which the campus is longer able to support the existing culture of single occupant vehicles as it does now. The plan seeks strategies to provide effective circulation for the entirety of the University's future growth through newly designed roadways that limit the volume of traffic where pedestrians are most active and moving vehicles directly to their destinations to reduce circulation within the campus.

DEFINE ROADWAY ZONES

The plan gives definition and hierarchy to the roadways at BU's main campus by designating them as either a pedestrian preferred zone or a primary or secondary vehicular preferred zone. The different zone types are represented with different streetscape and landscape solutions. Organization by zones breaks up the campus into more local, unique places, which aids in campus placemaking and wayfinding. It also allows for sections of roadway to be more closely aligned with functional requirements. Each zone is described below in greater detail, and illustrated with diagrams on the opposite page.

Vehicular preferred zones. Main vehicular access routes, particularly those connecting between campus entrances and primary parking locations, are designated as vehicular preferred zones. These zones contain two lanes of traffic in either direction to accommodate a higher volume of vehicles. In key locations, one lane directly serves as an access lane to parking. Center Drive, the north portions of East and West Drives, and Bunn Hill Access Road are defined as the major vehicular preferred zones. East and West Access Roads and other peripheral roadways are identified as secondary vehicular routes as they are primarily used for vehicular traffic due to their location.

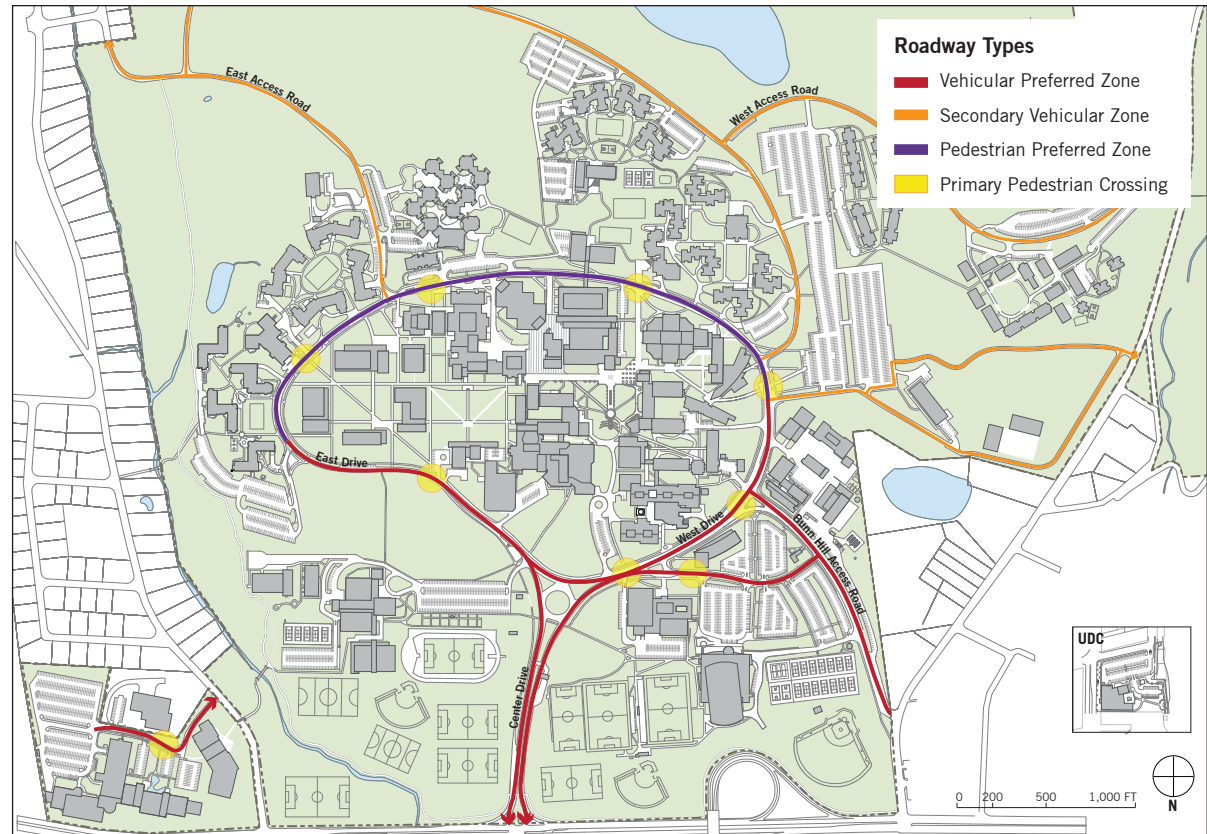


FIGURE 5.5.4A Proposed Roadway Types

Pedestrian preferred zones. The portion of East and West Drives extending from the East Campus Housing to the Academic Complex is identified as a pedestrian preferred zone. This stretch of roadway divides academic functions within the Brain from residential functions outside the Brain, which results in a high volume of pedestrian crossing. This portion of the roadway remains open to vehicles, however strong traffic calming and traffic demand management measures are employed to reduce the overall volume and discourage casual passing through.

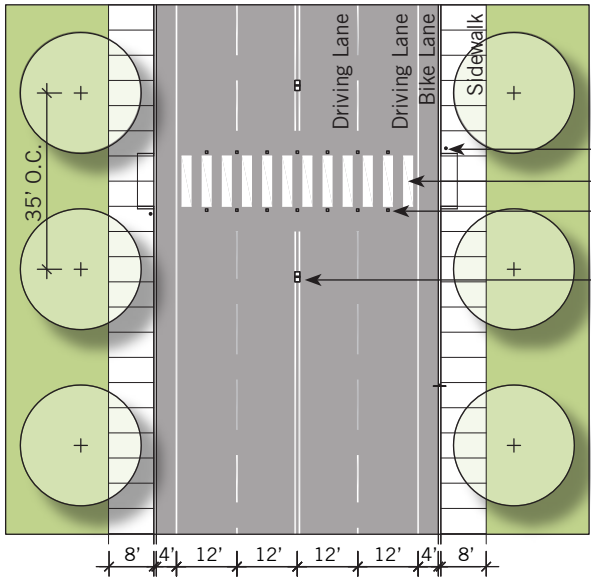


FIGURE 5.5.4B Vehicular Preferred Roadway Prototype

- Warning light sensor
- Crosswalk
- In grade warning lights
- Signage

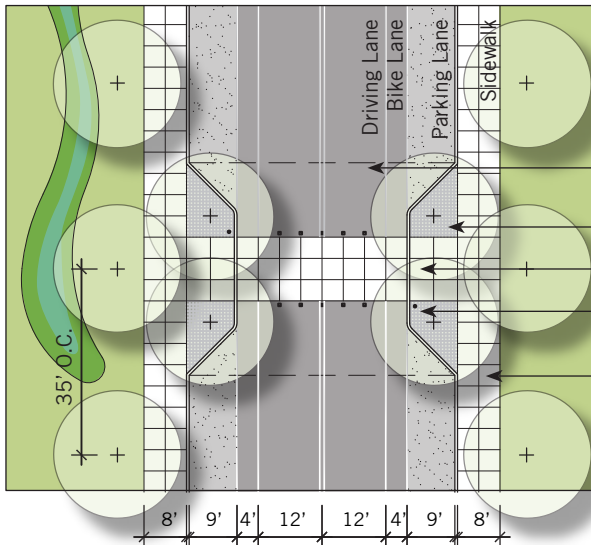


FIGURE 5.5.4C Pedestrian Preferred Roadway Prototype

- In grade warning lights
- Pervious pedestrian pavement
- Flush crosswalk
- Warning light sensor
- Decorative pavement

REDUCE TRAFFIC WITHIN THE CAMPUS

While members of the BU campus community will rely on use of the automobile for travel to and from campus, it is possible to reduce the overall volume of vehicular travel within the campus. As the University's population grows, this will become increasingly necessary, particularly within the identified pedestrian priority zone.

To reduce the volume of vehicular circulation on campus, vehicles are routed directly from the entrances to parking destinations. The plan establishes two major categories of parking destinations, corresponding with primary user groups: first-time users or visitors, and routine users.

Users that do not fall into these two categories include those with disabilities that use accessible parking spaces and those with passes to park in designated locations, such as the Administration Building parking garage. The plan maintains parking amenities for these users, either at existing locations or with new facilities.

First time users and visitors. First time users and visitors are often less familiar with the campus and visit for shorter periods of time. Common destinations for this user group include the admissions office, the Alumni Center, the Administration Building, Clearview Hall or Science IV for participation in a study, the Globalization Center for a visit to the International Offices, or a designated campus location to visit a specific individual.

Parking for first time users and visitors is provided in closer adjacency to key destinations. The Q Lots and parking adjacent to the new Academic Center provide access to locations within the Brain. Parking at the drop off outside of the Administration Building and within the existing garage provide access to the Administration Building. Designated parking adjacent to Science IV and Clearview Hall provide access for those visiting to participate in studies.

Returning users. Returning users comprise the largest cohort of the daily campus population, and include the students, faculty, and staff members that come to campus on a regular basis. They visit a wide range of destinations across campus, with many visiting multiple sites within the course of a single day.

Due to the number of returning users, vehicular strategies for this group have the greatest opportunity to reduce the overall

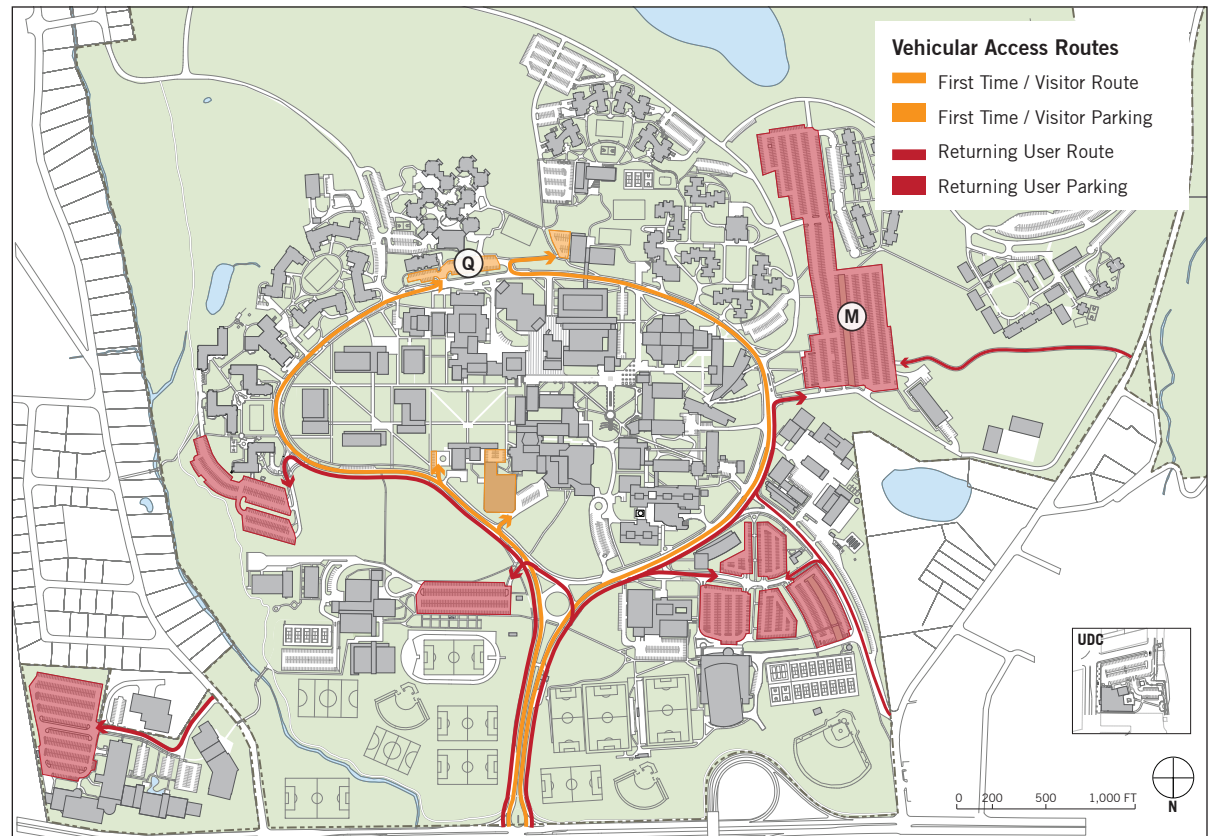


FIGURE 5.54D Parking Access Routes and Destinations

volume of traffic on campus. As such, users are encouraged to park in lots along the north side of campus that are directly accessible from the entrances without traveling through the pedestrian preferred zone. The plan also establishes a new entrance and arrival route for returning users off of Bunn Hill Road to access the M Lots.

IMPLEMENTATION CONSIDERATIONS

Implementation of the vehicular strategies outlined in this section require a combination of physical campus upgrades

and modifications to existing vehicular and parking policy. Upgrades to the physical campus are addressed through streetscape and landscape site improvements. However, in order to successfully reduce the volume of vehicular traffic within the campus, alterations to the physical environment must be complemented with policy modifications to define designated parking locations for different user groups and encourage a culture of alternate transportation at Binghamton University.

5.5.5 PARKING

Parking demand is directly related to the volume of single occupant automobile traffic on campus. As demonstrated, to effectively support the magnitude of future growth projected for BU, the overall volume of vehicular circulation and associated parking need must be reduced.

Binghamton University's main campus currently contains just under 7,000 parking spaces both in and around the Brain and at the ITC Campus. To provide parking for projected population growth at the same level as current parking, the number of spaces on campus would need to increase by 50 percent, or about 3,500 spaces. This quantity of parking would correspond with 26 acres of additional paved surface parking and have significant associated construction and operational costs.

Given the range of site constraints at the main campus, there does not exist sufficient land of an appropriate grade to accommodate this quantity of additional surface parking. Much of the land on the main campus west, south, and east of the Brain is characterized by significant grade changes. To level these portions for surface parking would take considerable effort and in most instances require the removal of significant tree cover.

As an alternative to surface parking on campus, the University could consider the development of structured parking or tiered garages. However, at the current time there are important procedural and policy hurdles that would need to be addressed in order to build more structured parking on campus. Given the relative costs, such new construction would very likely not be supported by special initiative funding. Instead, fees would need to be charged to pay down the debt service on bonds issued through a state agency, such as the Dormitory Authority of the State of New York (DASNY).

The procedural hurdles are compounded in that the campus is not able to mix income received from separate parking fee sources. Students, faculty, and staff currently pay to park in the existing open lots. To park in the existing or any future garage, there is a separate fee that pays down the original cost of construction for that structure and the University does not have the option of using funds generated from one source toward the other. While the possibility exists to market garage parking as "premium convenience parking," the perception among the campus community is of paying double for a

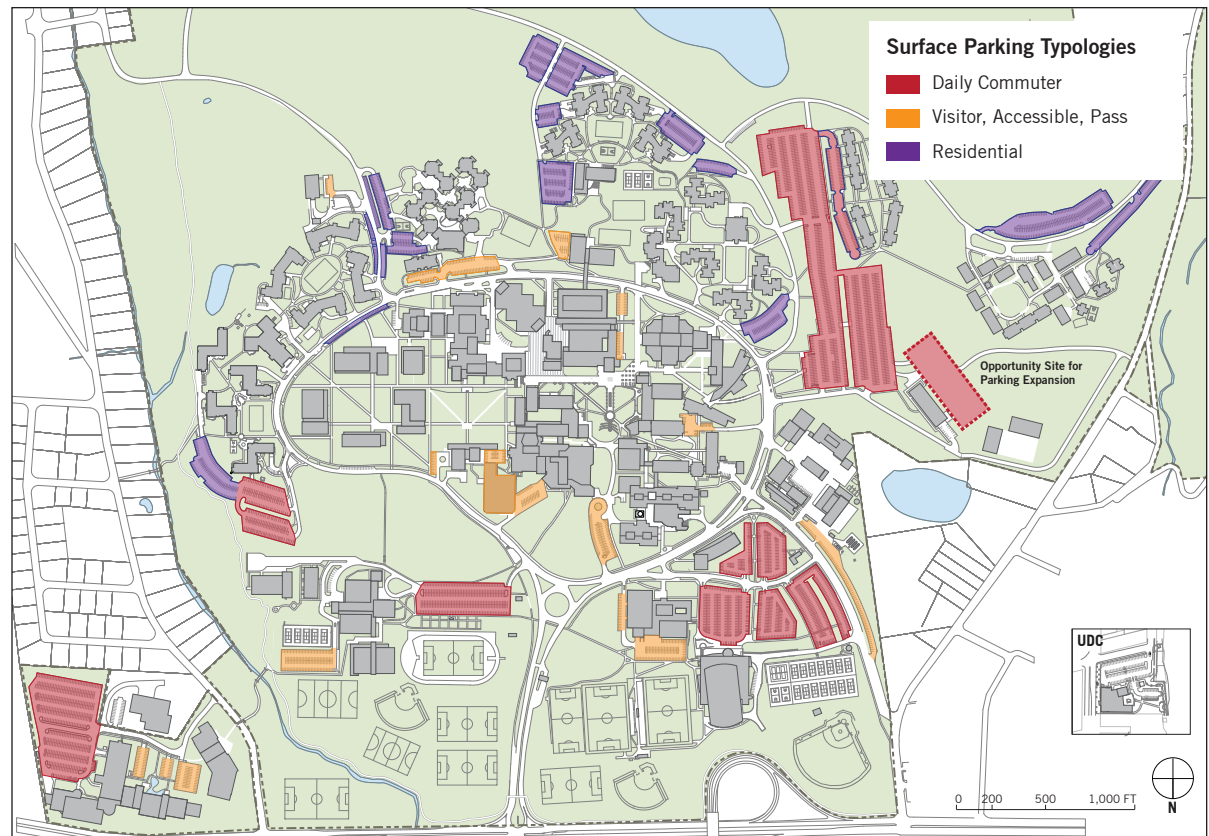


FIGURE 5.5.5A Surface Parking Typologies

service. Furthermore, it is our understanding that current SUCF policies limit the use of money bonded under special initiative legislation for the creation of income-generating space to no more than 5 percent of a building's gross square footage.

Given this range of constraints, the FMP outlines a variable plan for campus parking with distinct strategies for near-term, intermediate term, and long-term development. The staging allows each term of development to focus on critical issues, and allows the University to develop a culture that seeks alternate solutions to the single-occupant vehicle over time.

NEAR-TERM: IMPROVE EXISTING LOT UTILIZATION

In the near-term, the parking strategy seeks to promote an evolution of parking practices on campus through key policy shifts. As a part of the broader intention to foster a culture of a walk-able campus and reduce the vehicular impact in and around the Brain, parking must be evaluated and designated differential value.

Clarifying the nomenclature of the existing distributed lots and associating those lots with specific values and parking passes, the University can begin to reduce the practice of searching for

spaces and its associated vehicular traffic. Additionally, the University must recognize that parking spaces that are located within and immediately surrounding the Brain, or in other key locations, have heightened value in the spectrum of campus parking for use by those with disabilities, for University visitors and guests, and for service vehicle use. In the near-term, to support users with disabilities and visitors, the University should seek to expand the provision of such parking within the Brain.

In recognizing the differential value of parking spaces across campus, the University may enact a tiered pricing structure for parking passes. Spaces that have higher value due to their location may be provided at a higher cost, providing the University with an expanded income stream. A frequent criticism of this tiered pricing is that drivers pay for premium parking and then find lots full. By carefully adjusting the pricing structure it is possible to regulate supply: pricing such convenience parking sufficiently high to ensure that no more than the maximum number of drivers are looking for spots at the same time. Such a pricing hierarchy might also include lower-priced "storage" lots for students who use their cars infrequently and are willing to leave them close to the campus perimeter.

MIDDLE-TERM: MODERATE CAPACITY EXPANSION

In the intermediate-term it is advisable for the University to provide moderate expansion to the capacity of parking on campus through the construction of an additional surface lot. As noted above, given the paucity of flat land conducive to surface parking the opportunities for such development are limited. The best apparent option is sited to the southwest of Clearview Hall: a modest lot that is well suited to minor regarding and paving. Furthermore, this location is proximate to the west entrance to the campus, supporting the attempt to direct vehicles coming onto campus as quickly as possible into lots in an effort to minimize single-passenger traffic around the Brain.

LONG-TERM: MEET FULL DEMAND GIVEN GROWTH

Given the anticipated significant enrollment growth, it will be necessary for the University to consider options for providing long-range parking solutions, ranging from the provision of structured parking to policy changes. As noted above, to provide the existing ratio of parking to an expanded quantity

of students and staff will require the creation of an additional 3,500 spaces. Given the improbability that this quantity can be accomplished entirely through the construction of surface parking and even parking garages, it will be necessary to consider provision of remote parking lots likely connected to the main campus by OCCT bus service or other shuttle.

It may be possible for the University to identify regional business partners who would see a benefit in hosting University affiliates in existing lots. For example, if striped or permitted appropriately a large quantity of subscribers with trackable demographic data may be seen as a net positive to an under-performing shopping center. It may prove that selling day passes to park in a grocery store or mall parking lot creates a revenue stream that benefits OCCT (which currently services these locations) as well as the local retailers, not to mention the increase in shoppers' foot traffic.



5.5.6 WAYFINDING

Wayfinding refers to the ways in which members of the campus community and visitors to campus orient themselves in physical space and navigate from one place to another. Wayfinding is an important component in the user experience of both a campus and an institution, in terms of the communication of the institution's broader brand.

WAYFINDING STUDIES

Binghamton University has recently developed a preliminary set of wayfinding guidelines as a first essential step toward rendering the campus more user-friendly and accessible. However, the campus currently has significantly fewer wayfinding strategies and instances of signage in place than is ideal for a major university.

Diagnostic Wayfinding Study. To develop a thorough, comprehensive wayfinding plan that captures the full potential and most effectively communicates the brand of BU, it is recommended that the campus commission a more comprehensive diagnostic wayfinding study. The study must document the full range of signage currently in place, as well as the vocabulary of the various kinds of signage necessary given the interior and exterior landscape.

A similar effort was recently undertaken by Columbia University in an attempt to tie together the various spaces and experiences found across its Morningside Campus which is composed of buildings that span a range of styles and configurations akin to those found at Binghamton University. The strategy behind starting with a diagnostic study is to identify principal areas of weakness so that improvements can be made incrementally toward a unified vision. Such a study can also identify the quantity of markers already in-place that can be salvaged and incorporated into an eventual signage master plan.

Wayfinding Design Study. Once the range of issues, opportunities and constraints have been identified a follow-up wayfinding design effort should be commissioned to develop comprehensive wayfinding, graphic, and signage solutions based on the results of the diagnostic. At the minimum, such standards should include signage for pathways with exterior directional signage. A useful point of departure may be the recently developed graphics and signage master plan developed for the University at Albany, intended to make

the undifferentiated spaces of the Academic Podium more navigable.

ADDITIONAL CONSIDERATIONS

Based on discussions with the Binghamton University community and observations of the campus, it is recommended that the study be extended to include a number of additional components.

Accessibility. Given the University's commitment to making its facilities accessible to the full range of the campus population, the study should include consideration of visual and tactile cues and signals for the visually and hearing impaired.

Weaving Together Indoor and Outdoor Spaces. Furthermore, given the master plan's recommendations that interior and exterior pathways be woven together to facilitate wintertime travel across the campus, there should be a clear relationship between interior and exterior signage packages.

Vehicular and Service Components. Ideally, these subsequent studies will extend beyond the pedestrian experience to include vehicular and service signage as well. In response to the ongoing streetscape improvements to the Vestal Highway such a planning effort will provide opportunities to provide clear direction to a bicycle friendly network both on and off campus. It will be particularly important to structure a hierarchy of signals that guides newcomers while not being visually obtrusive to campus regulars.

Communicating the Brand of BU. Such studies present numerous opportunities to reinforce the brand message of Binghamton University. Current themes, such as the campus' commitment to the environment, can be broadcast through the choice of materials, the design of the components as well as directly through the incorporation of didactic elements. Similarly, the development of a comprehensive system presents numerous opportunities to incorporate recognition for alumni and corporate support for key facilities. It will also allow the opportunity to "zone" the main campus into precincts or neighborhoods. A comprehensive system need not be monotonous: in fact, it can begin to define different components of the campus bridging the gap between the overall campus and the component buildings.



5.6 Landscape

5.6.1 OVERVIEW AND APPROACH

A strong landscape presence reflects the culture of a community and provide a sense of place, critical components of a successful university campus. The campus consists of varied components that serve many roles. It facilitates circulation and movement between built nodes, fosters interaction between members of the campus community, and provides designated places to support a wide array of activities, from large group assembly to individual reflection. Effective landscape design and networks of open spaces knit together disparate elements of a campus to create a cohesive whole.

Binghamton University's existing landscape at the main campus is characterized by a dualism of formal quadrangles and pedestrian spines at the Brain, balanced with pockets of wooded areas at the perimeter and sweeping natural zones around the periphery.

Future development at the main campus poses a significant opportunity to enhance the landscape and move it into greater alignment with the University's strategic plan. The following section outlines landscape recommendations for Binghamton University.

LANDSCAPE CHARACTER

Recommendations for landscape character outline opportunities to build a rich network of places and promote sustainable landscape solutions across Binghamton University's campus.

Build a rich network of places. From the Peace Quad, to the natural areas, to open spaces at each residential college, Binghamton University's campus already contains outdoor places that serve as the backdrop of campus life. The FMP builds on the network of places that define BU by enhancing what is existing and capitalizing on opportunities to create new. The plan defines a clear hierarchy of open spaces, aligns them with ideal functions, and outlines how landscape and building projects can optimize their ability to project the spirit of BU.

Promote sustainable landscape solutions. Binghamton University is ranked among the top green institutions in the nation for its culture of sustainability. In addition, the campus

features abundant natural systems and landscapes, including varied ecosystems that range from woodland to marsh, and habitats for a wide array of species. The FMP preserves existing natural landscapes and builds on them by pulling threads of natural systems all throughout the campus. Additionally, the plan identifies opportunities for sustainable solutions at built landscapes, such as quadrangles and outdoor playing fields. These solutions showcase BU's commitment to sustainability and transform the campus into a teaching environment.

DESIGN OF PROTOTYPICAL SPACES

Prototypical spaces recommendations outline strategies to address landscape improvements at a campus entrance condition, major quadrangles and pedestrian spines, local quadrangles, and hardscape plazas.

FURTHER STUDY: LANDSCAPE MASTER PLAN

Given the findings of the landscape study conducted for the FMP, it is recommended that the University conduct a comprehensive landscape master plan. The recommendations in sections 5.5 Circulation and 5.6 Landscape of this report serve as the basis of a landscape master plan in terms of circulation organization, streetscape and pathway prototypes, landscape character and open space organization.

The recommended landscape master plan should study the following items in greater detail:

- + Development of standard campus site furnishings, such as lighting, trash receptacles, bus shelters, etc.,
- + Development of standard campus materials,
- + Development of a standard campus planting palette,
- + Development of a standard campus aesthetics guideline,
- + Development of a standard campus wayfinding and signage package.

Conceptual Site Plan Legend

1. Main Campus Entrance*
2. Native Planting and Retention Pond Entry Feature
3. Peace Quad and Pedestrian Spine*
4. Science Quadrangles*
5. Engineering Plaza*
6. University Commons
7. University Commons Expansion
8. ITC Campus
9. Pathway to ITC Campus
10. Parking Lot Bio-Filtration
11. Pedestrian Mall
12. Athletic & Recreation Fields
13. Existing Wooded Areas Adjacent to the Brain
14. Existing Natural Areas

*Detail provided in design of prototypical spaces.



FIGURE 5.6.1A Conceptual Site Plan

5.6.2 LANDSCAPE CHARACTER

BUILD A RICH NETWORK OF PLACES

Open spaces on a university campus facilitate movement, provide place for formal gathering and informal encounters, and offer the opportunity for solitary study or respite. Well designed spaces on a campus effectively become a network of places that serve as the backdrop for campus life. This network of places projects the spirit of the university, and is central to the student, faculty, staff, and visitor experience of the campus.

The FMP builds on the network of places that define BU by enhancing what is existing and capitalizing on opportunities to create new ones.

DEFINE A HIERARCHY OF OPEN SPACES

To support the wide range of activities that occur on a university campus, open spaces must be varied in size, formality, and landscape treatment. Establishing a hierarchy of spaces ensures that the full range of space types are provided. It also makes it easier for routine users and visitors alike to organize the campus in their mind, helping them to identify where they are and find their way to their destination.

A hierarchy of spaces categorizes campus locations along a range of typologies. The diagram on the opposite page illustrates the open space hierarchy established for Binghamton University. It defines spaces as campus entrance, major quadrangle, local quadrangle, hardscape plaza, or residential quadrangle.

Within the broader, consistent language of landscape treatment used at the campus-level, the opportunity exists to provide variation to the landscape character at specific zones. The following narrative outlines components of each category and identifies opportunities for unique treatment of the different components.

Campus entrances. The main entrance to Binghamton University's main campus is located at Center Drive off of Vestal Parkway. This entrance is retained as primary in the future. Landscape and signage interventions at the main entrance announce the presence and strongly project the spirit of BU to those traveling along Vestal Parkway.

The entry along Bunn Hill Road via the Bunn Hill Access Road is maintained as a secondary entrance to the main campus. It serves the functional role of leading more to key parking lots than the main entrance, and is less formally defined. Additional tertiary entry points are maintained at the East and West Access Roads, connecting through the campus natural areas.

The main entrance to the ITC Campus is located off of Murray Hill Road. Future construction of the new ITC Health and Natural Sciences relocates the entry drive to the south and provides opportunity to enhance the character of the space with landscape and signage.

Major quadrangles. Full development at Binghamton University's main campus features a rhythm of three quadrangles within the Brain: the University Commons, the Peace Quad, and the East Campus Quadrangle. The three quadrangles are defined by a compact arrangement of academic and student life buildings. The University Commons and Peace Quad are components of the existing campus that are retained and strengthened with future development. The East Campus Quadrangle builds on the existing framework of open spaces with future development at the East Campus.

+ **Formal landscape at the University Commons.** The University Commons is the western-most quadrangle within the Brain. It is defined by the Science Complex to the west, the Fine Arts Building to the East, and Bartle Library to the south. At its north edge, the University Commons blends into an linear open space that extends the length of the Brain. Reflecting the topography of the region, the quadrangle experiences significant topography change, moving downhill from Bartle Library to the north.

Located at the existing academic core, the University Commons is formal in nature. Upon completion of a quadrangle rehabilitation project, the space will feature a linear pathway element running north-south, anchored by hardscape plazas at either end. The primary linear element is to be supported by a network of pathways that extend diagonally through the space to connect between primary destinations. Upgrades to the University Commons will also adjust the topography of the site in such a way that improves the view corridor from the south, extending from West Drive to the tower at Bartle Library. An opportunity exists to extend the University Commons to the south to showcase this view corridor in the entry sequence to the campus.

+ **A place for gathering at the Peace Quad.** The Peace Quad is located to the east of the University Commons. It is currently defined by the Fine Arts Building to the west, the Administration Building to the north, the Original Dickinson Community to the east, and the University Union to the south. The new Globalization Center will define the eastern edge of the Quad. The space has moderate topography change, with slight downhill movement to the north, as evident by standing runoff water.

The Peace Quad is currently the eastern-most academic quadrangle at the main campus and is a culturally significant space for members of the University community to gather. With development at the east campus, the Peace Quad will become the central major open space, gaining in prominence and serving as a transition space between the east and west campus.

Future development enhances the condition and usability of the Peace Quad through landscape upgrades while maintaining the character of the space as a place on campus for gathering. Prominent circulation axes are defined to connect the east and west sides of campus at the north and south edges of the space. An additional visual and physical corridor is established at the eastern edge of the space on axis with the new admissions addition to the Dickinson Dining Hall.

+ **Natural landscape at the East Campus Quad.** The plan establishes a new quadrangle at the east campus that is defined by future new buildings, including the Globalization Center to the west, new academic and professional buildings to the north and east, and a new student and academic center to the south. Prominent cross-campus circulation axes travel through the space along the north and south edges. The space is also located in close range of the new East Campus Housing.

Binghamton University is committed to sustainable practices, as represented by its campus landscape and built environment, curriculum offerings, and the myriad of clubs and organizations around the theme. The East Campus Quad presents an opportunity to create a prominent open space at the heart of campus around a natural landscape. The space will have the effect of creating a sustainable micro-environment at the east campus while also serving as a working landscape to educate members of the campus community on the possibilities and benefits of naturalized landscape treatments.

Local quadrangles. A university's main quadrangles are supported by a series of secondary, local quadrangles. The spaces are often smaller and set back from primary pedestrian circulation routes. They serve as opportunities to create unique and more intimate senses of place within the larger landscape framework. Prominent local quadrangles at BU include the Sciences quadrangles, the University Commons extension to the north and south, the Peace Quad extension to the south, a new academic commons adjacent to the Interdisciplinary Academic Center, and the ITC Campus. Additional locations to define local quadrangles away from the Brain include the open spaces surrounding the Institute for Child Development and Child Care Center, as well as Clearview Hall.

Hardscape plaza. Hardscape plazas facilitate circulation among buildings in densely developed portions of a campus. Plazas evoke zones of more urban environment and provide places for different types of student programming. A hardscape plaza exists at the Engineering Plaza.

Outdoor fields and courts. Outdoor fields and courts support a wide array of formal and informal campus athletic, recreation, and physical activities. At BU fields and courts are clustered at the north side of campus along Vestal Parkway.

Residential Quadrangles. Each residential college is formed around an open space or series of open spaces. The residential colleges form smaller, localized sub-communities within the University. BU students often forge strong connections with their residential college and identify it as a defining element in their university experience. In keeping with the culture of distinctly defined residential college experiences, the opportunity exists to define unique landscape treatments for each college.

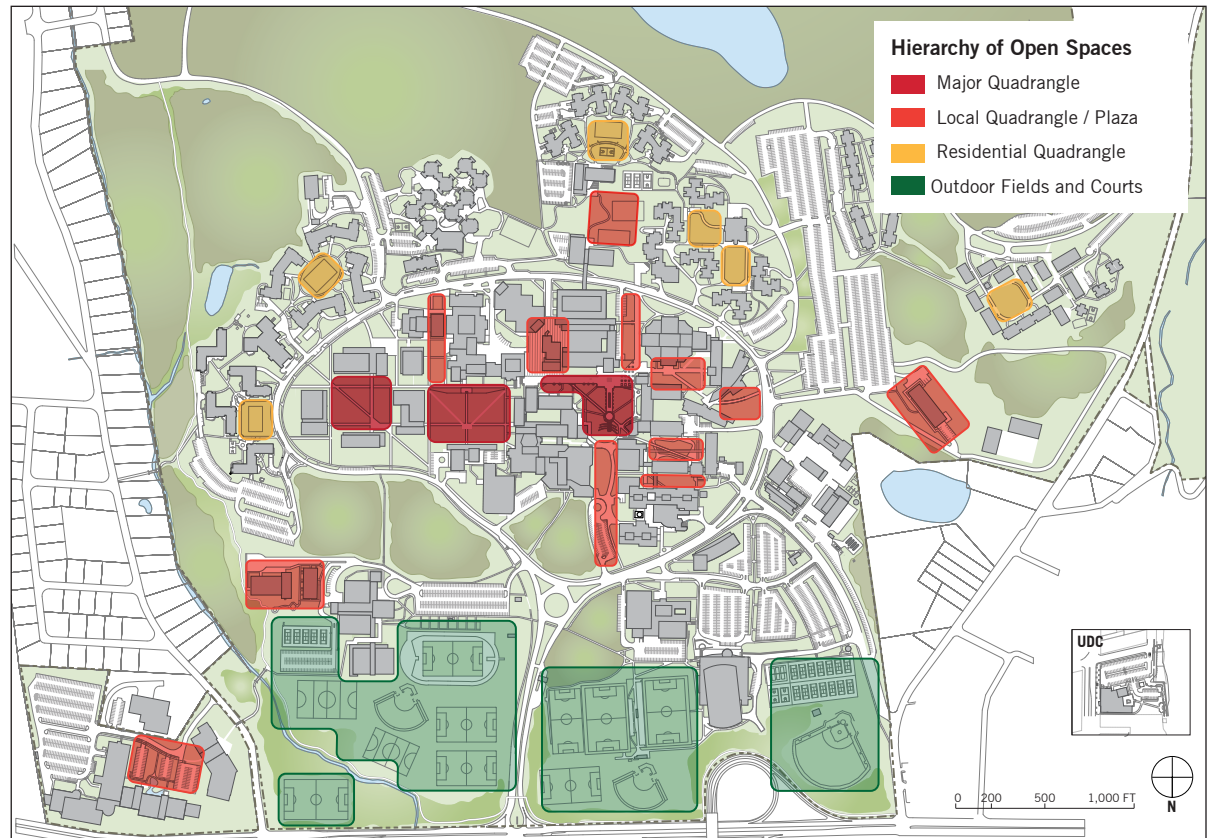


FIGURE 5.6.2A Hierarchy of Open Spaces

OPTIMIZE THE PEDESTRIAN EXPERIENCE

As described in the circulation plan, to support its future campus population, Binghamton University must improve the walkability of its campus and foster a culture of pedestrian circulation between campus locations. Walking is a sustainable mode of transportation that also has associated health benefits. The plan outlined in section 5.5.2 Pedestrian Circulation identifies strategies to enhance campus walkability by clarifying existing routes and providing new routes to create a network of pathways with strong connectivity between destinations.

The campus landscape is also a critical component in providing a successful pedestrian experience. Effective landscapes for pedestrian circulation achieve the following:

- + **Clearly connect between destinations.** A fundamental role of pedestrian routes is to connect between destination points on campus, including buildings, outdoor amenities, and parking. Pedestrians often travel along the most direct route between locations; pathways should be provided along these lines of demand and scaled according to the flow of traffic along the route. Landscape helps to clearly define pedestrian routes. The width and treatment of the paved surface provides hierarchy within a network of pathways. Plantings and trees define the edges of pathways and reinforce visual axes.
- + **Foster interaction between members of the campus community.** As members of the campus community move around campus, informal encounters and gatherings often occur. The network of pathways can support such interaction by providing sufficient width to allow for groups of people to walk together and pass each other. Additionally, benches and gathering areas located immediately off of pathways provide designated places for pedestrians to stop and gather.
- + **Provide rich landscape treatments.** Landscape treatments that incorporate a variety of color, texture, and size enhance the pedestrian experience of moving around campus. Where possible, native species should be selected to reduce maintenance requirements and ensure the success of the landscape environment. Natural environments also create working landscapes that may be used as teaching tools within the campus.



PROMOTE SUSTAINABLE LANDSCAPE SOLUTIONS

CREATE THREADS OF NATURAL LANDSCAPE THROUGHOUT THE CAMPUS

Binghamton University's campus features a large natural zone along the southern portion of the site, and additional pockets of natural zones located in and around the Brain. With future development a thread of natural landscape is pulled from the south side of the campus around the eastern edge to the north side, defining the edge along Vestal Parkway. A pathway is provided through the natural zone, extending the network of pathways at the natural areas. This extension showcases the campus' natural landscape along Vestal Parkway and projects the University's commitment to sustainability to the community.

STORMWATER RETENTION

The topography of Binghamton University's main campus creates significant stormwater runoff conditions. Development at the ITC Campus incorporate's the University's first stormwater detention site, with rainwater harvested for building system use and local irrigation. Stormwater conditions at the Brain present an opportunity to introduce detention at a second site on campus at the Peace Quad.

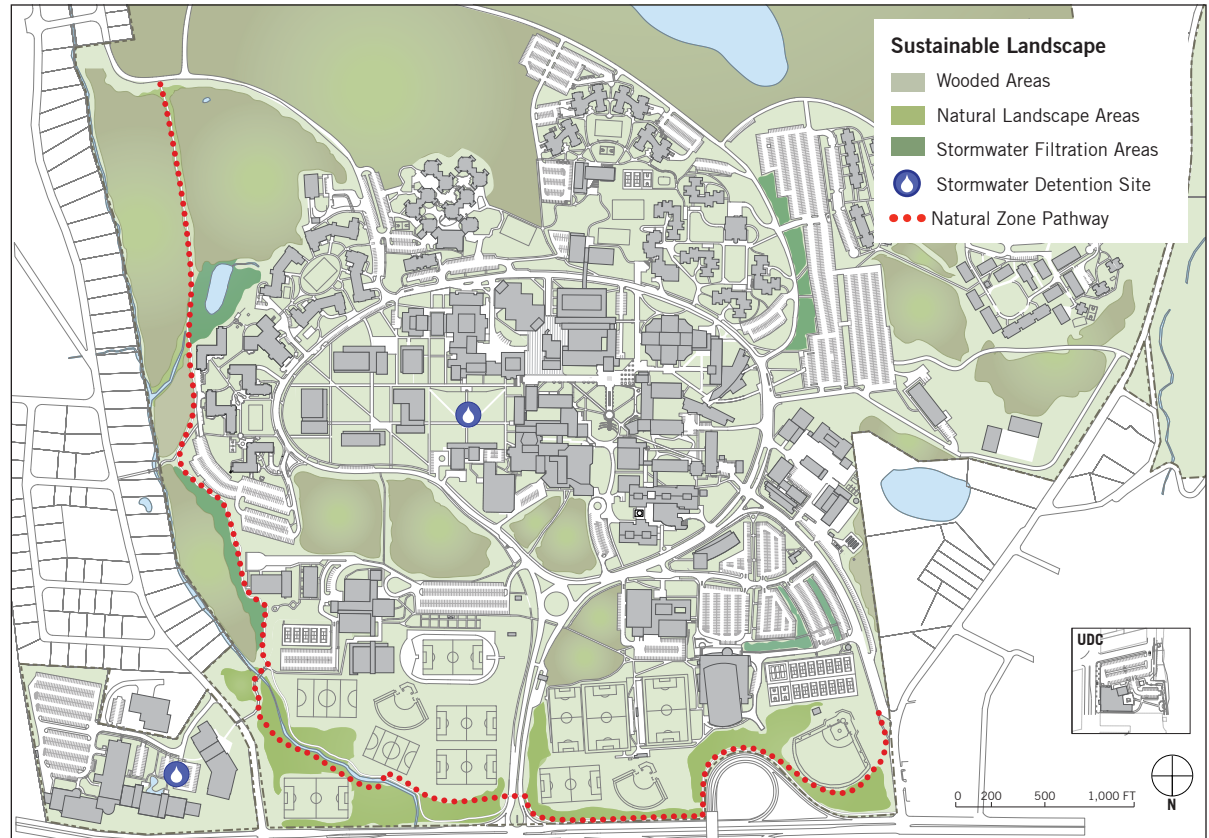


FIGURE 5.6.2B Opportunities for Sustainable Landscape Solutions

5.6.3 DESIGN OF PROTOTYPICAL SPACES

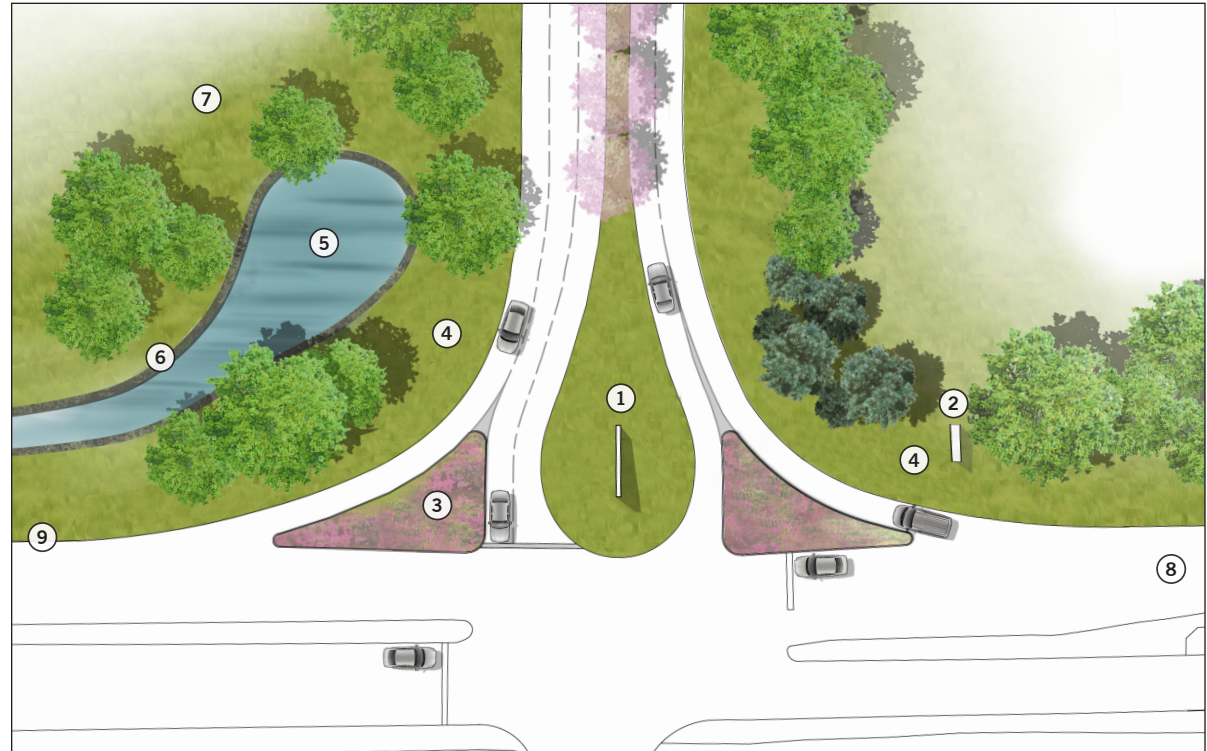
CAMPUS ENTRANCE

The proposal for the main entrance enhancements seek to project the spirit and identity of the University along Vestal Parkway while improving the circulation and primary gateway into the campus.

Rolling down the grade at Glenn G. Bartle Drive to the Vestal Parkway, a sign rises from the ground cover planting, prominently identifying the University. The signage draws attention to the University from the Parkway and provides a strong sense of separation for those entering and exiting campus.

The existing stands of large evergreens and shade trees provide the backdrop of the view toward the University for those traveling along Vestal Parkway. At the ground level, treatments of natural grasses and retention ponds buffer the recreation fields. Traffic islands planted with seasonal perennials add color and layer to the entrance composition. Together, the natural treatments convey the University's commitment to sustainable practices.

The treatment of natural grasses and retention ponds along Vestal Parkway and at the entrance also aids in campus storm water management, collecting and filtering storm water from the entry drive and recreation and athletic fields. This strategy harkens to the campus site's pre-development history as agricultural land and transplants seeds of the ecological preserve from the campus backyard to the front door, while also reducing maintenance and operations costs. Additionally, the strategy enhances the aesthetic quality of the campus' public face and strengthens the presence along Vestal Parkway and within the surrounding community.



MAIN ENTRANCE LEGEND

1. Future Sign in Ground Cover Planting
2. Legacy Harpur College Sign
3. Traffic Island with Seasonal Perennial Planting
4. Native Grass Planting
5. Water Retention Pond
6. Gabion Retaining Wall Edge
7. Earth Mound Barrier to Recreation Fields
8. Vestal Parkway
9. Existing Power Lines Run Underground



Existing Condition



Proposed Condition

MAJOR QUADRANGLES

Major quadrangles are often distinguishing features of university campuses. Binghamton University's main campus currently contains two major quadrangles, the University Commons and the Peace Quad. Future development and academic expansion at the East Campus will create a third major quadrangle bring greater prominence to the Peace Quad as a central campus open space.

PEACE QUAD

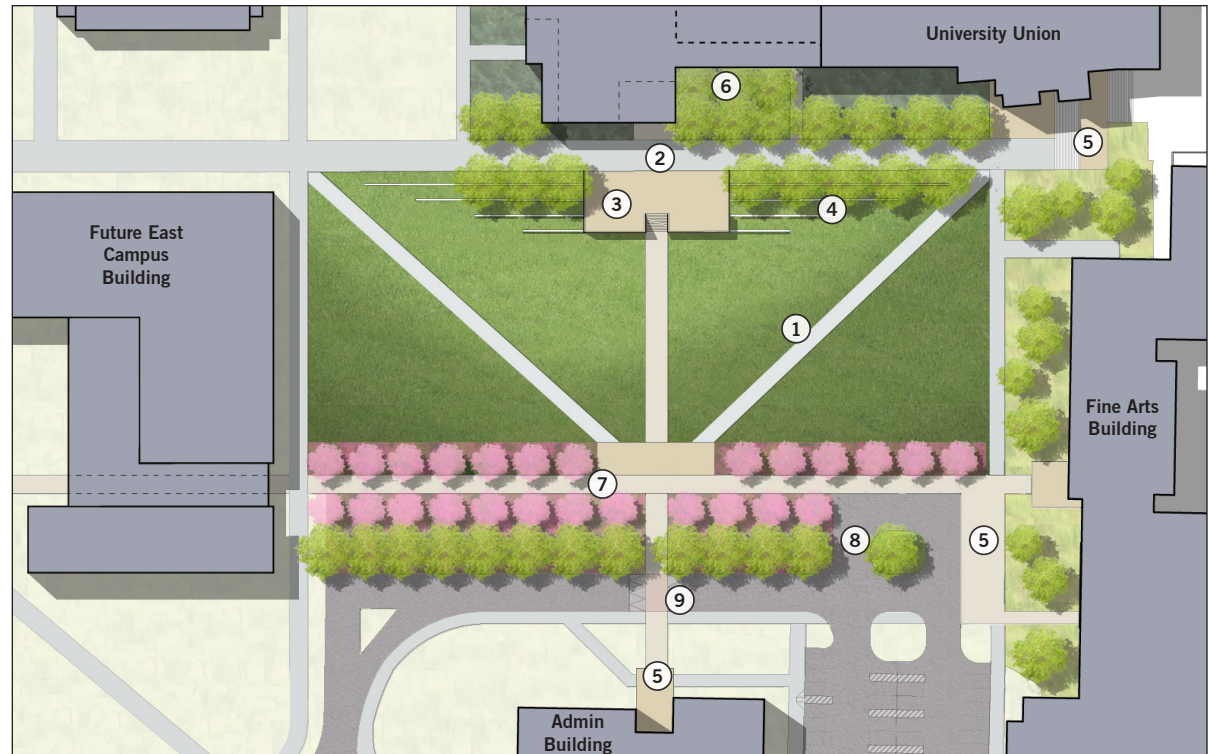
The Peace Quad has a rich history at Binghamton University as a place for the collective voices of campus community. Given its history and adjacency to the University Union and surrounding student precinct, the Peace Quad is established as a civic center for the student body. A large grassed area encourages regular passive use as well as formalized gatherings.

The Peace Quad is a key space along major east-west pedestrian corridors across the Brain. As such, strong walkways are established along the north and south edges of the space. The southern spine extends the Lois B. DeFleur walkway, and bears similarities in scale, function, and treatment. Long seat-walls extend along the spine, capturing grassed planes that step down from the walkway to the Peace Quad lawn. At the center of the walkway, a raised overlook platform supports campus functions and gatherings.

The northern spine extends from a new pedestrian circulation path established through the Fine Arts Building to connect to the East Campus. Both pedestrian spines facilitate transition to the Peace Quad and establish a framework of entry plazas. Secondary pathway connections are proposed to connect to the Administration Building from the University Union, West Campus, and East Campus.

Landscape elements frame and reinforce circulation corridors. The southern walkway is flanked by large shade trees to provide a more formal canopy. The northern spine from Fine Arts is an allee of cherry trees to provide a more intimate sense of scale and enclosure.

Parking is removed from the quadrangle, but an access drive to a drop-off in front of the Fine Arts Building and parking to the west of the Administration Building is maintained.



PEACE QUAD LEGEND

1. Peace Quad Lawn
2. Pedestrian Spine Extension
3. Overlook
4. Lawn Steps
5. Entry Plaza
6. Cafe Bosque
7. Cherry Walk
8. Vehicular Drop-off
9. Crosswalk with Speed Table



Existing Condition



Proposed Condition

LOCAL QUADRANGLES

A university's main quadrangles are supported by a series of secondary, local quadrangles. The spaces are often smaller and set back from primary pedestrian circulation routes. They serve as opportunities to create unique and more intimate senses of place within the larger landscape framework.

A successful network of local quadrangles are approached with consistent strategies to impart a cohesive quality to the campus. Binghamton University's local quadrangles should organize circulation based on use, introduce native plant material, and capitalize on existing topography and hydrology.

SCIENCE QUADRANGLES

Quadrangles at the Sciences Complex are examples of a local quadrangles at the main campus. The quads are conceived of as softer and more sustainable, and they provide the campus community with spaces for a range of passive activities.

The framework of the quadrangles is functionally driven by patterns of circulation and observed uses. A direct path serving as a primary organizing force is provided from the University Commons to the main entrance of Science II. Additional connections link east-west between the main entrance of the Library and Science II, and from the upper quadrangle north-south the lower quadrangle.

The pathways create a range of spaces within the southern quadrangle. A lawn is enclosed to the south, capturing prime sun, for passive recreation, studying, and lounging. Smaller gathering spaces marked by bosques of trees with movable seating are established at the intersections of main walkways.

A variety of planting limits the quantity of mowed lawn to social spaces and introduces native plant species that reference the campus' natural areas. This has the dual benefit of establishing habitat for wildlife and reducing maintenance and water requirements.

The lower courtyard builds upon existing topographical and hydraulic conditions by reducing the amount of pavement in a largely circulatory space and encouraging the pooling and infiltration of rainwater in situ. This approach can also be used in other academic quadrangles.

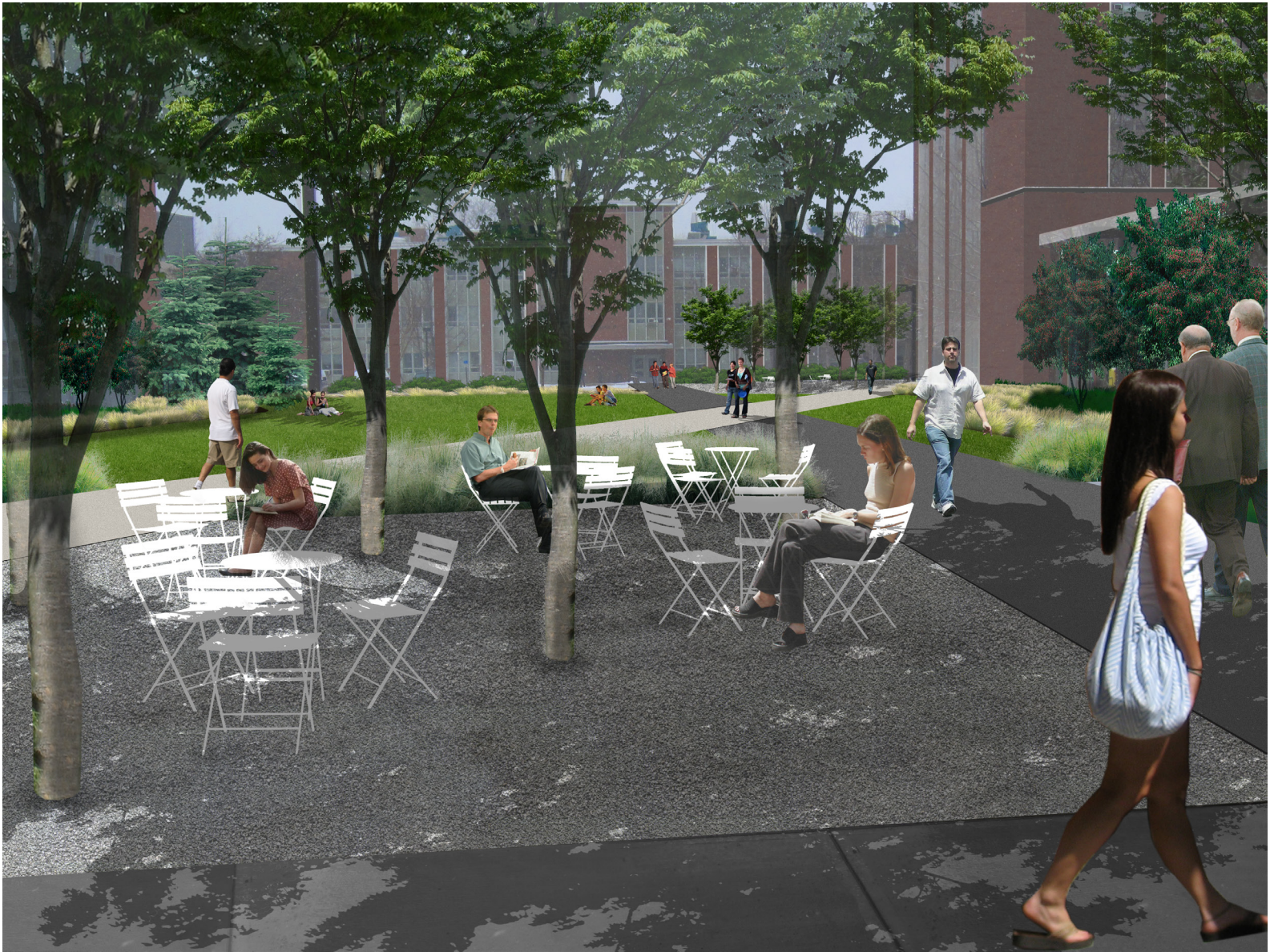


SCIENCE QUADRANGLES LEGEND

1. Lawn Area
2. Seating Bosque
3. Deciduous Forested Area
4. Native Planting - Shrubs
5. Native Planting - Grasses
6. Evergreen Screen
7. Plaza
8. Access to Main Quad
9. Service Drive
10. Bioswale



Existing Condition



Proposed Condition

HARDSCAPE PLAZAS

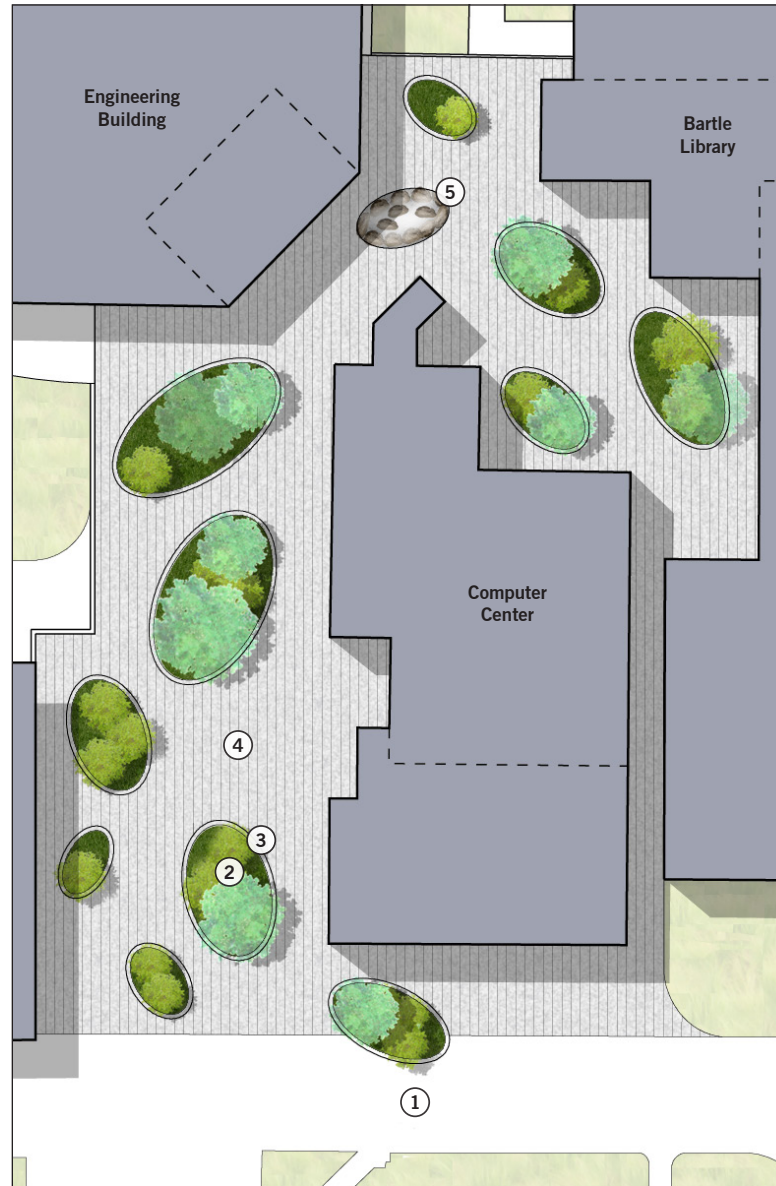
Hardscape plazas facilitate circulation among buildings in densely developed portions of a campus. Plazas evoke zones of more urban environment and provide places for different types of student programming.

ENGINEERING PLAZA

The Engineering Plaza is a zone of hardscape located between the Engineering Building, Bartle Library, University Union, and Computer Center, all buildings of concrete and brick. The Plaza is a raised, waterproof slab deck that serves as the roof to a service area beneath. In its current condition it is nearly devoid of greenery.

To evoke a sense of place at the Engineering Plaza and encourage members of campus community to occupy the space, planting is introduced in a series of freestanding planters. The planters vary in size and planting material, evoking clusters of forest that have been transported to the urbanized court. They are situated to allow for free-flowing traffic through the stands of tall trees, shrubs, and grasses, gently suggesting movement in the plaza.

The surface of the Plaza is paved in a corduroy paving at a right angle to the Lois B. DeFleur Walkway, encouraging movement into the space. Planters adjacent to the walkway are oriented to further draw pedestrians in.

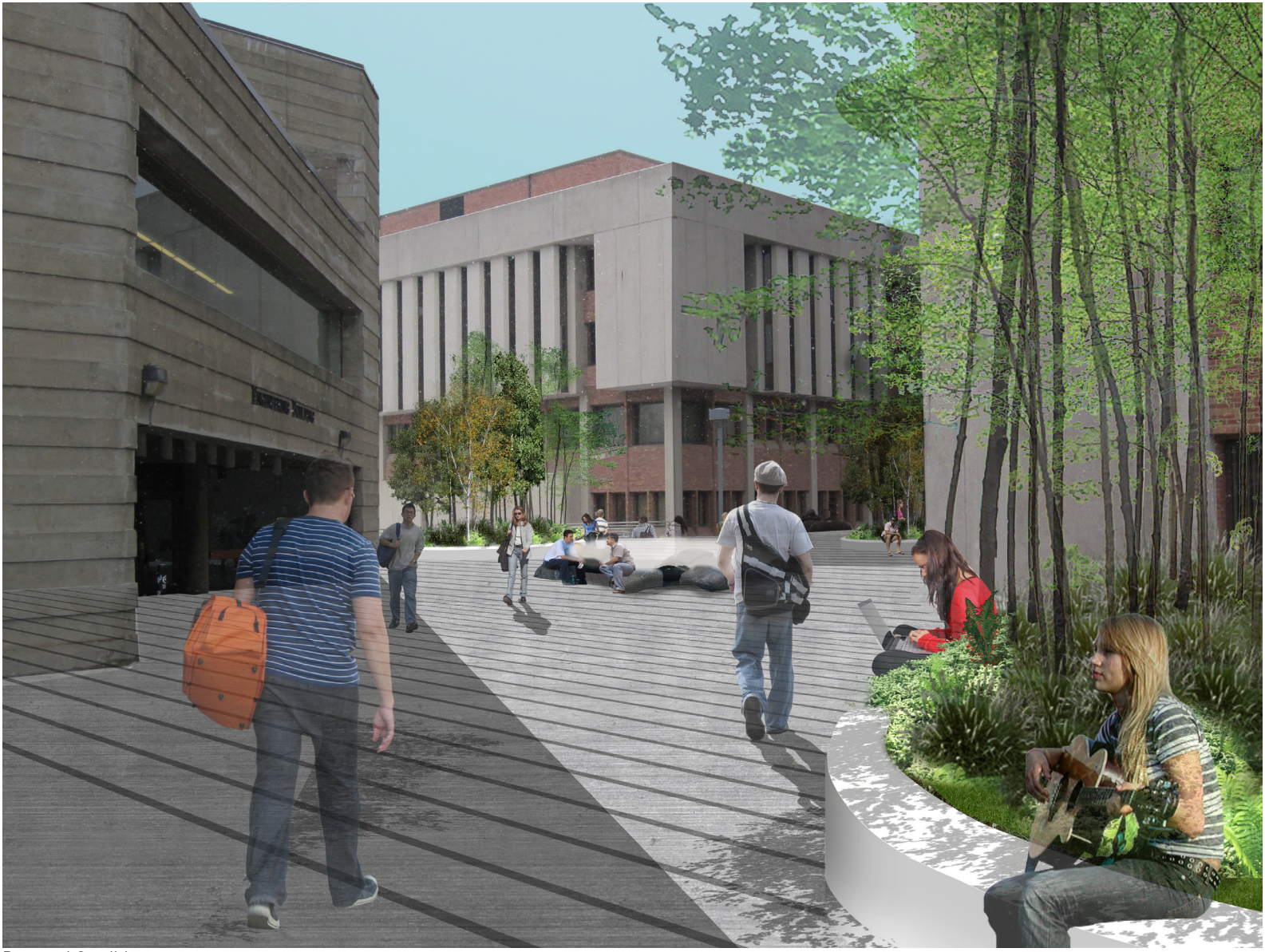


ENGINEERING PLAZA LEGEND

1. Lois B. DeFleur Walkway
2. Earthen Mound Planter
3. Seatwalls
4. Corduroy Paving
5. Mist Fountain



Existing Condition



Proposed Condition

5.7 Technology & Security

5.7.1 TECHNOLOGY SYSTEMS

BACKBONE

The existing technology infrastructure has sufficient physical capacity to support all existing and near-term requirements for the campus. As additional buildings are constructed, new underground pathways must be installed and new fiber optic backbone cable must be pulled in order to connect each to the existing signal duct banks and network. The only limitation is the physical constraints of existing ductbank system; especially inside “The Brain”.

The process of upgrading all existing backbone connections to 10 Gbps should continue, in order to accommodate all current and future deployments of high-speed network applications. It is also important to have a high-capacity backbone in-place to support anticipated higher-levels of technology convergence. Security, BMS, and CATV will invariably be traveling over the backbone in one way or another, in spite of the fact that they aren’t doing so right now. All backbone connections should be upgraded as soon as possible in preparation for next capital plan cycle and associated construction expansion projects and existing building renovations.

The only observed deficiency is the physical redundancy of fiber optic backbone connections which can be improved in certain areas of the campus (specifically the east side of campus). There may be an opportunity to improve redundancy when the proposed East Campus expansion construction projects commence. Redundancy is not critical to the functionality or speed of the network, but can have a major impact on functionality if an existing backbone link is damaged. Potential network failures are always a possibility without full network redundancy in place.

PATHWAYS

The entire signal ductbank system should be surveyed and analyzed for current capacity and future expansion. Additional ductbanks should be added as required and feasible, and should be coupled with other underground infrastructure

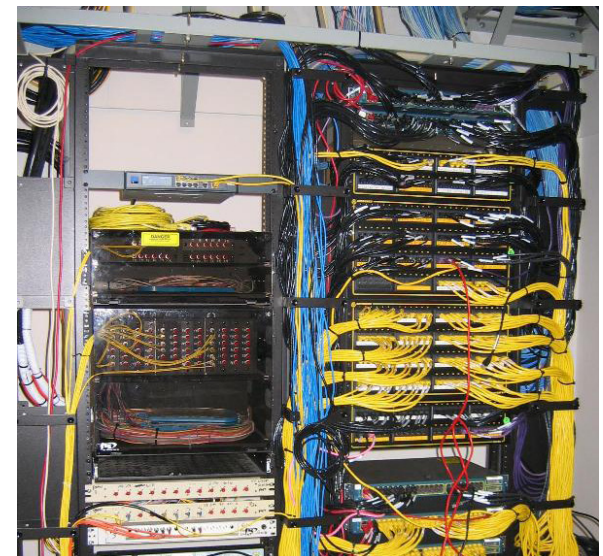
projects on campus (specifically the proposed East Campus expansion projects).

Cable pathways within existing buildings (both vertical and horizontal) should be improved during proposed building renovation projects. Re-wiring of buildings is challenging due to concrete masonry construction and ad-hoc locations of Telecom Rooms. New cable trays and/or wiremold pathways should be installed on each floor to properly manage horizontal cable runs. In addition, Telecom Rooms should be relocated so they are vertically stacked within each building, making intra-building backbone cabling runs much easier. These recommendations generally apply to all upcoming building renovations and are not building-specific.

DATA CENTER

The room needs some targeted HVAC ductwork upgrades to strategically deliver cooling to hot spots. Installation of return-air ductwork for hot-aisle cabinet exhaust is the first option to pursue. This will pull the hot air away from the rear of all cabinets and direct it back to the CRAC’s intake vents, which also allow each unit to work more efficiently. As heat loads increase, chimney cabinet exhaust ducts can be installed above each cabinet to further alleviate cooling issues around and within each cabinet. As high-density cabinets (cabinets with equipment heat loads greater than 8 kW each) are deployed later on, in-row cooling systems and/or aisle-containment systems may need to be considered to alleviate cooling issues that will arise. However, these advanced cooling approaches do not appear to be required in the near future, but may come into effect towards the end of this capital plan cycle.

The total overall HVAC capacity is sufficient for current and near-term future equipment deployments. There is expansion space for more systems, with the limit being the available power and cooling capacity; the space may be needed with any future technology changes such as virtualization of computer PODs.



BACKUP POWER

The campus should continue to install UPS and emergency generator power feeds in all Telecom Rooms and CDF locations, to be ready to support the continuous rollout of POE enabled data switches, VoIP technology, and convergent systems across campus.

WIRELESS SYSTEMS

Benefits of wireless systems for a Campus environment include the following:

- + Revenue - A wireless network presents potential revenue-generating opportunities. For example, universities could charge visitors for wireless Internet access. Also, colleges that may have once charged for long-distance phone services, but have seen such opportunities evaporate in recent years, might consider introducing wireless VoIP services to students.
- + Competitiveness - Today's students are more technologically savvy than ever. Wireless access throughout campus and student living areas helps academic institutions compete for students and faculty.
- + Innovation - By fostering a more collaborative and creative learning environment, wireless technologies enables the university to better support its academic mission and research objectives.

Students and faculty are quick to embrace new technologies for convenience and "just because." While many organizations begin to adopt wireless for basic Internet access, university users want access to advanced applications such as wireless Voice over IP (VOIP), which demands higher levels of quality of service to ensure reliable network performance along with less disruptive handoffs between APs as users move across the campus.

Wireless LAN systems should all be upgraded to 802.11n, the latest WLAN standard, in order to handle increased traffic and high-bandwidth audio and video applications from mobile users.

Cellular system coverage on Campus was deemed to be fairly complete by the IT staff. As the reliance on cellular devices

by students and faculty increases, it will be important that the campus provide ubiquitous cellular service within all levels of each building. Distributed antenna systems (DASs) should be installed in areas that require this type of augmentation such examples include

- + Basement floors of buildings containing classrooms or research spaces
- + New buildings with glass exteriors that prevent penetration of cellular signals

FUTURE TECHNOLOGIES

A technology that may be implemented on campus sometime down the road is desktop PC virtualization. This technology separates a personal computer desktop environment from a physical machine using a client-server model of computing. The resulting "virtualized" desktop is stored on a remote central server, instead of on the local storage of a remote client; thus, when users work from their remote desktop client, all of the programs, applications, processes, and data used are kept and run centrally. This scenario allows users to access their desktops on any capable device, such as a traditional personal computer, notebook computer, smartphone, or thin client.

Advantages of desktop virtualization include

- + Improvement of the data integrity of user information since all data is maintained and backed-up in the data center.
- + Simpler provisioning of new desktops
- + Reduced downtime in the event of server or client hardware-failures
- + Lower cost of deploying new applications
- + Desktop image-management capabilities
- + Longer refresh cycle for client desktop infrastructure
- + Secure remote access to an enterprise desktop environment

The major impact of this technology is that it will occupy additional space in the Data Center, which means it will need additional power, cooling, and network cabling within that room. As stated before, there is expansion space in the Data Center for new systems deployment, which may be necessary if this technology is eventually implemented on campus.

Virtualization could potentially drive the need for installation of in-row cooling and/or aisle containment systems within the Data Center due to the increased heat loads that would be generated by this equipment.

BACKUP SITES

Currently, the main Data Center is not backed up by a disaster recovery data center (although some servers on Campus are mirrored to other locations). The IT group mentioned that a backup Data Center is to be fitout within the Innovation Technology Complex's research data center. This room should be properly fitout with the correct amount of HVAC and EM power to act as successful DR site for the main Data Center. Otherwise, the IT group should research off-site opportunities such as a co-location facility, for backup and disaster recovery.

Other recommendations to improve existing systems are as follows:

- + The existing buried signal conduit and manhole system should be cleaned out of all legacy and unused copper cables to provide capacity for future cable installations around campus.
- + All existing inter-building and intra-building 62.5 μ m multimode fiber optic cable should be replaced with 50 μ m laser optimized multimode cable (OM3 rated) which will support 10 Gbps network speeds up to a distance of 300 meters (almost 1,000 feet) with relatively low-cost emitters. If longer distances are required then OM4 rated fiber optic cable should be installed (for links up to 550 meters).
- + Existing Telecom Rooms located in hazardous locations should be protected in the best possible ways, such as constructing drywall partitions, moving equipment into locked cabinets, etc.

5.7.2 AUDIO / VISUAL SYSTEMS

Recommendations listed in this section are based on information gathered from the SUNY Binghamton University Information Technology Services (ITS) and the Audio Visual services support sub-group, as well as from their support website.

TECHNOLOGY ADMINISTRATION

The campus has a dedicated Audio Visual support staff in place to assist and maintain the audio visual classroom systems. The group has extensive documentation of the specific systems and contents of classrooms and lecture halls posted on their website, known as the 'Educational Communications Center.' The dedicated Audio Visual support website is easy to use and informative. We would suggest that there be careful maintenance of the site, to keep it up-to-date and current. Allocations for this effort are solid investments, because they free support staff that would normally be forced to train new users. This will have a positive impact on overall system availability and uptime.

The website is designed as a 'self-help' tool to enable end-users to identify the required audio visual components of various rooms on the campus. The interface is intuitive and arranged in the form of a FAQ, with the ability to search for a specific room. Additionally, there are extensive system wiring diagrams and images of the installed systems within each room description. This comprehensive approach facilitates self-help for scheduling rooms based on the type of technology required for a specific presentation, and eases the demand on the IT staff for day-to-day operational support. There is also a section within the room equipment lists that shows the date of last renovation for that particular room, which could play an important role in the selection of a room for a specific type of presentation or course. As above, this online documentation needs to be regularly maintained to remain effective.

Additionally, the campus should consider the addition of self-help kiosks located in visible 'nexus' or common areas. These kiosks could provide access to the self-help technical website, as well as access to campus way finding resources and any other web-based content that the University chooses. These types of kiosks provide a dynamic and cost effective method to enhance the visitor and user experience on-campus, without

a high ongoing cost of ownership. They essentially leverage existing assets in a user-friendly way.

CLASSROOM AUDIO VISUAL SYSTEMS

The classroom audio visual systems are compartmentalized within each room; the systems that are utilized within the room are generally located within a "Multimedia Podium" that is used to house the associated equipment, and as a surface for the instructor to place materials or equipment on during a lecture.

The University has taken a "tiered" approach to the audio visual systems installed in the classrooms. The tiered approach consists of various levels of installed systems within the classrooms, depending on the location and type of room. Therefore, there are more complex rooms available for larger and more content-rich presentations or lectures when necessary. This approach also tends to slowly transition the staff and students to leverage the installed systems as part of their learning and interacting environment.

BASIC TECHNOLOGY CLASSROOM

- + Projection screen
- + Overhead projector
- + VHS Playback (with video monitor or projector, determined by room size)
- + Black Chalkboard

LAPTOP READY CLASSROOM

- + Basic Technology equipment plus:
- + Network connection at teaching station
- + Computer display for PC & Mac laptop computers
- + Campus cable television
- + Telephone (restricted to on-campus calls only)
- + Lighting controls
- + Sound system (determined by classroom size)
- + Window treatment
- + Shelf and wiring (power and remote control) for Slide Projector
- + Projected image and chalkboard can be used simultaneously

- + Document Camera/Visual Presenter (e.g. Elmo)

MULTIMEDIA CLASSROOM

- + Laptop Ready equipment plus:
- + PC & Mac installed
- + DVD player
- + Slide Projector
- + Cassette deck (audio)

USER INSTRUCTIONS

Instructions for use of the audio visual systems are clearly defined within a set of 'how-to' videos on the campus website. The instructions are easy to follow for untrained users; the systems are designed to be consistent so that a user can use any room without needing specific instructions or training. There is some disparity in the age of equipment within some of the campus areas, as a technical refresh appears to be due to bring the systems up-to-date. Generally, the age of the systems does not seem to affect the operational requirements of the older rooms- but the reliability is adversely affected. Replacement of failed equipment can also present an operational issue, since there is no assurance of backward compatibility with new replacement equipment.

Recommendation: The user instructions must continue to be updated continuously through the life of the systems, to retain relevancy. The dedicated A/V staff should set aside time to maintain this knowledge base.

OVERHEAD PROJECTORS

The overhead projectors currently installed throughout the campus are either SVGA (800x600) or XGA (1024x768) resolution. The units appear to meet the current display requirements and user needs adequately. The ongoing maintenance costs and the supply of spares for the existing projectors will make it desirable to perform an equipment upgrade within a year.

Recommendation: The older projectors on campus should be upgraded to a 'standard' brand and appropriate output range. This will meet new 'graphic-intense' presentation needs, as well as reduce the amount and variety of spares needed to support the campus. A current 'spares database' should be

kept by the A/V staff to prevent extended downtimes due to equipment failures.

DVD AND VHS PLAYERS

The playback source units, such as the currently-installed DVD and VHS players are somewhat dated and will soon need to be upgraded. The requirement for obsolete technology like VHS format content continues to persist due to the lack of copyrighted instructional content on DVD. As the transition is made to digital media, the need for VHS will diminish. The effort to convert content to digital formats should be well underway already.

Recommendation: DVD and BluRay players are an integral part of digital media presentations, and should be made widely available in campus classrooms.

PORTABLE OVERHEAD PROJECTORS

Portable overhead projectors remain a viable method for displaying handwritten notes, marked-up documents, and images that are not digitized. They can be essential for annotation in real-time for printed documents, and continue to be a mainstay for many instructors. The equipment itself will eventually be phased out of the environment by digital capture devices, but the transition will likely not occur for a few years. The equipment available on-campus appears to be a bit dated but serviceable.

Recommendation: Overhead projector stock can be retained and upgraded as required by the staff; however the campus should plan to transition to digital media types as analog transport approaches obsolescence. Smart boards are an example of digital document markup devices. Additionally, there is an opportunity (where space permits) to implement multiple projectors/projection screens in some of the larger classrooms. This would provide the ability to 'compare and contrast' two images, and generally enhance the quality of multimedia presentations for a minimal investment. The projection screens could be selectively raised to provide whiteboard visibility when needed. Multiple projectors in a classroom also provide a layer of redundancy. The implementation of multiple projectors provides a larger 'digital palette' for an educator to work with in the presentation process. This creates a media-rich environment that allows for more data (and more interesting content) to be viewed in the classroom setting.

AUDIO CASSETTE PLAYERS

The audio cassette players are quite obsolete, and should be transitioned into the digital domain as soon as possible. The degradation of quality from playback and the probability that there will eventually be a complete loss of recorded data via tape failure are important considerations. Digital media storage is inexpensive, just as easy to use, and much simpler to transport. If portable audio recording devices are required they should be digital and hard-memory based.

Recommendation: Replace the analog equipment currently installed with digital devices, preferably standardized across the campus.

DISTANCE LEARNING SYSTEMS

There are a few instances on campus where distance learning systems are implemented. The transition to distance learning on the whole depends on numerous factors. The campus network must be designed with the increased demands that a large distance learning infrastructure would require. There would need to be more extensive training and support for the faculty and staff to use the systems effectively. There would also need to be a significant investment in network video storage and retrieval of recorded events and seminars. Similar investments must also be made at the "far end", to fully utilize the systems. There are already systems in place and efforts underway to further the above goals on the campus. No timetable has been given regarding milestones or requirements.

Recommendation: Distance learning and lecture recording systems are rapidly becoming vital to the educational environment. They can be utilized as profit centers, marketing tools, learning aids, and for general admissions outreach. The use of teleconferencing equipment by corporations and even individuals has greatly increased reliability and compatibility between systems. This benefits educational institutions through lowering costs of ownership and use, and preventing early obsolescence. The campus should be upgraded to include a number of distance learning-capable classrooms in order to realize the benefits that can be attained through familiarity and connectivity of such systems.

Video teleconferencing and distance learning rooms are rapidly become critical to University business models. There is a trend amongst Universities to utilize distance learning classrooms

to record lectures, and (coupled with archive and retrieval software packages) provide the recorded lectures to students at a fee that would recover the expense of the equipment. This has many benefits to both students and faculty, including reducing faculty workload for 'make-up classes' and allowing students a greater chance for retaining core concepts and course information through the ability to visually review a seminar. The design of distance learning classrooms should be dedicated for that purpose, though retrofit to existing spaces is possible.



5.7.3 SECURITY SYSTEMS

TRENDS IN SECURITY

The types and levels of threat and risk have placed a greater reliance on accurate and reliable identification and authentication. Security systems and operations must be proactive in determining who/what and if access/passage is allowable. This has created a greater reliance on credentialing and identification methods. The current movements are towards the creation and implementation of national identity cards and increased usage of biometrics.

Unified systems will increasingly be the norm for security system deployments and operations. By connecting and integrating security with other critical aspects of an organization, the level of protection is increased. This allows other systems and operations to drive security functions and vice-versa. For example, an armed intruder alarm can trigger an operational response of sheltering in place and lock and secure automatic doors. A local computer login from someone who has not entered the building can result in the local intranet from being closed from outside access. This physical/logical convergence can result in unified credentials and simplified administration of systems by streamlining department management of these systems.

FUTURE TECHNOLOGY

Security systems will further increase their IP functionality resulting in reduced equipment costs and needs. Traditional security systems require server-based architecture and rely on large amounts of equipment all cabled together. Newer, IP-based systems require no more infrastructure than a computer workstation; a single network connection. These PoE (Power over Ethernet) controllers contain all the necessary functionality and intelligence needed to manage the security system. Web-based software allows operational staff to maintain and monitor the system regardless of geographical location.

The unified infrastructure cabling strategies that allow for better ROI and structured management. Manufacturers will continue to push intelligence to the end security devices such as surveillance cameras.

Intelligent video analysis provides the ability for the security

system to provide event-based alerts and initiate responses based on actions taking place. As image quality and size increases, these cameras will further be configured to contain on-board storage of video to minimize network traffic and bandwidth impacts.

Improved wireless signal transmission will provide the ability for security devices and systems to be deployed and installed without the typical reliance on hardwired infrastructure. With the intelligence being pushed to the device, security equipment will be able to operate and function autonomously, only needing to transmit data under a pre-configured set of criteria. This will also provide the advantage of better usage of mobile technologies. Mobile devices and connectivity are a way of modern life today but are rarely used in security systems. The wireless, autonomous devices would allow the proper personnel to access data and view images from the devices from handheld smart phones, tablets, etc.

CAMPUS ENTRANCE

By making the Vestal Parkway entrance the primary campus entrance would allow greater control of vehicular traffic entering and exiting the facility. The UP can have an officer to screen the vehicles upon entering. The University may also elect to furnish an electronic gate or barrier which is controlled via the access control system to provide for better flow into the University, whereby a person not authorized to enter the campus will need to stop and speak with an officer. Exiting can be controlled in a similar fashion but allowing vehicles to freely exit.

At present, there are four (4) other entry points to the University. These locations are closed from midnight until 5 a.m., as they are manual gates. Keeping these other gates locked, will allow for the Vestal Parkway entrance to function with the desired results.

Additionally, the University may elect to install another campus entrance with this setup to allow only persons with the proper credential to enter thereby giving another entry point for faculty and students. There are other University campuses that have installed some type of barrier to deter unauthorized entry to the campus grounds.

CCTV SYSTEM

The existing CCTV system consists of individual DVR's (Digital Video Recorder) in a central location in the building, connected to cameras via a coax cable. The current system is using analog cameras. In order to provide the best video coverage and to be able to integrate the CCTV system easily to the access control system, an IP/networked CCTV system needs to be implemented.

A new Video Management Software (VMS) platform, which integrates to the existing Lenel access control system should be considered for ease of use and functionality.

In order to provide for this IP technology, the network infrastructure should be able to handle approximately 2-4Mb/s per IP camera. A server for the system handling approximately 30 to 40 IP cameras would require about 80-100Mb/s of data throughput. The University network would need to be upgraded to handle the additional burden by the IP CCTV system.

ACCESS CONTROL

Card readers can be installed for the entrances to academic buildings and other heavy use and/or restricted locations, such as; staff entrances, receiving areas, IT closets, server room(s), vivariums, lab rooms, chemical storage, etc. Also, note that uncontrolled entrances to buildings present a breach in safety and security.

At many campuses across the US, the trend is to have a "keyless" facility. Card readers will be used in lieu of keyed entries which will help to curb control key-distribution issues.

Panic or duress alarms placed in classrooms can help provide early notification to alert UP of an event taking place. At present, the door locks are manual for a lockdown situation at most campuses. There is a growing trend to have an electrified mortise lockset in the door that would provide locking ability upon a duress/panic button activation.

Strengths of the security system and general:

- + University Police force is adequate in size and with trained personnel
- + Telecommunications group does the majority of the cable installation for the security infrastructure

- + Various means and methods for the mass notification systems to provide information to the student/faculty population
- + The "Blue Light" system, with sixty-five (65) units, has been incorporated in strategic locations throughout the campus and will need to be expanded as the campus develops new buildings

Weaknesses in the security system:

- + The residence halls at the present time do not have CCTV cameras to monitor the main entrance or the entrance points to the exterior of the building

Opportunities/Enhancements for the security system:

- + Integration between the access control and the CCTV systems will enhance security effectiveness
- + Expand cellular coverage to be more effective in using the mass notification systems that are currently implemented
- + Exterior doors to academic buildings can be controlled via the access control system which will eliminate the effort of the UP locking/unlocking doors on a daily basis. This will free up valuable officer time and allow for better monitoring of buildings as well.
- + The University should work in conjunction with the Local law enforcement to acquire the equipment necessary for interoperable communications between the agencies, in the event of a campus situation requiring outside intervention

Threats regarding the security system:

- + Having four (4) additional entry points that allow any vehicle on to the campus grounds.

5.8 Implementation

5.8.1 OVERVIEW AND APPROACH

The recommended program initiatives outlined in the previous sections are prioritized based on Binghamton University's strategic and programmatic direction, space deficits, and the interdependence of projects, particularly as related to major cycles of renovation. Initiatives are distributed between two capital funding cycles, 2013 to 2018 and 2018 to 2023. Additional projects are outlined in the period Beyond 2023.

FACTORS THAT DRIVE PHASING

Implementation phasing of projects within the FMP is driven by the factors outlined below. Factors range from unique drivers based on the University's strategic direction to best practices for capital project implementation.

Defining BU's strategic objectives. Binghamton University has identified a number of strategic objectives to guide future development of the institution. Due to the magnitude of renovation and new construction associated with the FMP, a unique opportunity exists to reflect strategic objectives in the physical campus environment. Key objectives include:

- + **Interdisciplinary research.** Expansion of state-of-the-art research and the introduction of instruction at the ITC Campus, contributing to interdisciplinary discovery and economic development,
- + **Liberal arts education.** Provision of a strong liberal arts education foundation for all BU students,
- + **Global experience.** Emphasis on the international experience for all BU students, both domestic and global, through academic programming as well as student life,
- + **A green future.** Growth of sustainable practices, through both curriculum and research development, as well as campus operations.

Identifying foundational projects. BU's campus faces significant renovation requirements at legacy buildings, particularly at Bartle Library, the Fine Arts Building, and the Sciences Complex which require multi-phase renovations. To conduct such large scale renovation, existing program must

be vacated to another location, either on a permanent or temporary basis. However, due to the under-built quality of the University, the campus faces an extreme deficiency in available swing space to catalyze early stage renovations.

As such, the FMP must approach projects strategically to capitalize on opportunities to vacate contiguous areas of space to initiate first phase renovations. To meet existing needs due to pedagogy and support service delivery shifts, these foundational projects must also achieve programmatic objectives. Projects that achieve these intents are considered foundational projects.

Existing projects under the 2008 to 2013 capital plan are critical to future development. These projects include the completion of new facilities at the main campus and ITC Campus and renovation projects at the University Union Phase 2, Student Wing, Johnson Hall, and Science IV Phase 1 renovation. Key foundational projects within the 2013 to 2018 capital plan include renovation and addition to the Computer Center, renovation of Dickinson Dining Hall, and repurposing of legacy Dickinson Residence Halls.

Maximizing limited capital and time resources. The magnitude of renovation required in the context of limited swing space creates unique implementation challenges at BU. This is of particular concern at Bartle Library, the Fine Arts Building, and the Sciences Complex, which require renovation across multiple phases due to the size of the facilities. To conduct renovation given the existing limited quantity of vacant space would require projects to be implemented in small-scale phases.

However, this is not a desirable approach to phased renovations, and is particularly problematic for BU. In general, conducting phased renovation projects at a small scale results in a significant increase in the number of phases, which translates to an increase in overall project duration and cost. It also creates less continuity between spaces, with more "seams" between project areas to be stitched together. Analysis indicates that capital availability and time will serve as the limiting factors with respect to implementation of BU's FMP.

As such, a successful implementation plan approaches phased renovation through larger zones of contiguous space in fewer phases.

Planning in the context of an unknown future. The process of planning for the future is highly complex. Study of the existing context reveals a number of “known” factors, such as development requirements for building condition and pedagogy, general academic program direction, and space requirements to meet existing deficiencies. However, future planning also inherently touches on factors that are unknown and cannot be predicted. Effective planning considers these factors, and develops overt strategies to account for them.

The FMP identifies the following unknown future factors:

+ **Available funding.** The FMP is conducted during a period of economic downturn that is affecting the availability of funding sources, particularly at the New York State level. Two primary funding streams impact implementation of the FMP: one for renovation projects and another for new construction. Due to structuring of funding at the state level, funding for renovation projects is much more predictable than for new construction.

To account for this, the implementation plan for the FMP develops a series of independent tracks and alternate routes within each track that address different availability of new construction funding. The plan establishes a series of new construction projects, critical to capacity expansion given existing deficiencies, however also develops a contingency plan to move forward and affect significant change on campus should new construction funding not be available.

+ **Enrollment growth.** As a University Center in the SUNY system, BU has the opportunity to contribute significantly to higher education and economic development within the Southern Tier and New York State. The University's enrollment projects, which serve as the basis for FMP space needs projects, reflect this growth opportunity.

Given the University's application and acceptance rates, enrollment growth is anticipated to be possible in the future. However, to ensure its future viability, the FMP must also consider a scenario in which demographic downturn or other factors inhibit growth. To account for this, the FMP is developed in two planning horizons, Building Capacity and Sustained Growth. This strategy allows the plan to achieve a higher level of focus on near-term development associated with existing need and more modest growth, which also ensuring that near-term projects do not inhibit significant future expansion.

ADDITIONAL CONSIDERATIONS

Provision of Swing Space. Due to its under-built status, Binghamton University faces a significant shortage of swing space. Existing projects being conducted under the 2008 to 2013 funding cycle vacate a modest quantity of swing space at Bartle Library, Science IV, and the Student Wing. To initiate the major renovation projects required legacy facilities such as Bartle Library, the Fine Arts Building, and the Sciences Complex, additional swing space is required.

The FMP concept alternatives build on the campus' available of swing space through renovation and new construction. Conversion of two legacy residence halls at the Original Dickinson Community to office space provide critical swing space for low-impact departmental offices. New construction of academic buildings provides further capacity expansion, allowing larger portions of legacy buildings to be vacated.

Due to the nature of facilities requirements, swing space for sciences programs is difficult to achieve in existing facilities. The concept alternatives provide additional space to facilitate renovation at the Sciences Complex at the Science Library and with new construction of either additions or a new ITC Natural Sciences building.

Campus Housing. Prior to construction of the new East Campus Housing, Binghamton University had just under 6,200 beds on campus, a ratio of 40 percent of the total population. Following expansion at the East Campus, this figure increases to 7,400 and 50 percent of the total population.

Given future enrollment growth, the University will reach a point where it will require construction of additional residential beds on campus to maintain its ratio of residential students. Given the projected growth at the main campus of just under 21,300 FTEs, to maintain a 40 percent ratio of on-campus students, the University will need to add 1,100 beds for a total of 8,500. The provision of additional beds is recommended to occur at the existing sites of the Susquehanna and Hillside communities, two legacy communities with aging facilities and populations under the University's target of 1,000 beds. Development in these locations also ensure access to existing infrastructure.

5.8.2 PHASING AND IMPLEMENTATION

CURRENT 2008 TO 2013 FUNDING CYCLE

Under the current 2008 to 2013 funding cycle, the University is conducting a number of projects that set up for major renovation of legacy facilities in the subsequent cycle.

Johnson Hall Renovation and Connector Addition renovates Johnson Hall for Geography and ITS and constructs a connector addition for circulation, vacating key spaces in the Student Wing and the Computer Center.

University Union Phase 2 renovates and constructs an addition at the north side of the building for student services, vacating key spaces in the Student Wing and Bartle Library.

Science IV Phase 1 is facilitated by the completion of Science V and renovates the east portion of Science IV for sciences program, initiating a cycle of renovations at the Sciences Complex.

2013 TO 2018 FUNDING CYCLE

The 2013 to 2018 funding cycle conducts four key project typologies: foundational renovation and infill addition projects that upgrade legacy facilities and catalyze major cycles of renovation; the initial phases of major renovation projects at Bartle Library, the Fine Arts Building, and the Sciences Complex; new construction for capacity expansion; and sitework and infrastructure projects.

FOUNDATIONAL PROJECTS

A one-stop location for student services is provided at the Dickinson Dining Hall, with an infill addition between the Dining Hall and the University Union for undergraduate and graduate admissions. The renovation and addition are recommended to be designed together for best connectivity of spaces, and may be constructed in separate phases. The project vacates the undergraduate admissions office from Academic A allowing capacity expansion for the professional programs, and the graduate admissions office from the Administration Building, allow capacity expansion for administrative units.

An Alumni Center for Alumni Affairs and the BU Foundation is provided at the first level of O'Connor Hall, and departmental office swing space is provided at the upper levels. The project

vacates Alumni and Foundation space at the second level of the Administration Building, facilitating repurposing of facilities and relocation of the Purchasing Department from McGuire Hall. McGuire Hall is then renovated for SUCF site representatives, facilitating removal of existing SUCF trailers.

The Engineering Building is renovated to accommodate all Watson program that is located at the Brain. Following the completion of the ITC Engineering and Science, a significant portion of the building is vacated, facilitating renovation for upgrades and reconfiguration. The project vacates all Watson program from the ground level of Bartle Library.

The Student Wing is renovated for small and medium-section classroom and professional program departmental office expansion. An addition is constructed to the Lecture Hall Center for capacity expansion of large-section lecture halls. The renovation and addition are recommended to be designed together for best connectivity of spaces, and may be constructed in separate phases.

The Computer Center is renovated and an addition is constructed to convert the building to a new Harpur Center to showcase the University's rich history in the liberal arts. Upon completion, the advising office is relocated from Academic B, allowing capacity expansion for the professional programs.

Whitney Champlain Halls are renovated for departmental office swing space to facilitate renovation of legacy facilities at the west campus. An addition is constructed for circulation.

An addition is within the gyms to provide three additional indoor courts, program space required to facilitate recreation programming. The location and detailed program of the addition will be determined through a drilldown study for the program family.

A renovation is conducted at the West Gym for program to be determined through a drilldown study for the program family.

At the Physical Facilities Complex, the Central Plant is upgraded for emissions requirements and the Commissary is renovated to maximize capacity.

MAJOR PHASED RENOVATIONS

Phase 1 renovations projects are conducted at both the north and south buildings of Bartle Library. Phase 1 at the north building is renovated for Art History, the counseling center, and other Harpur departmental space to be determined. Phase 1

at the south building is renovated for a new Media Center and new connector circulation zone to connect the north and south buildings, improve building wayfinding, and provide new access points to the University Library. The projects facilitate future cycles of renovation at both the north and south buildings.

A Phase 1 renovation at the Fine Arts Building renovates and constructs and addition at the north wing to receive Art Studio and Cinema. The project vacates Cinema from the ground level of the Student Wing, facilitating conversion to classrooms, and sets up for future cycles of renovation at the Fine Arts Building.

Early phase renovations are conducted at the Sciences Complex to initiate ongoing cycles of renovation at Sciences I-IV and the Science Library. Initial projects include Science IV Phase 2 which catalyzes renovation of Science III; consolidation and renovation at the Science Library; and a Phase 1 renovation at Science II, which is facilitated by new space provided at the ITC Campus.

NEW CONSTRUCTION

Academic expansion for both classrooms and departmental facilities is provided at the new Interdisciplinary Academic Building.

The new Health & Natural Sciences Building at the ITC Campus provides capacity expansion and state-of-the-art facilities for the sciences. The building also provides the first undergraduate instruction space at the ITC.

A new On-Site Storage Facility provides climate-controlled storage space for library collections, facilitating consolidation of physical volumes at Bartle Library and the Science Library and allowing off-site collections at the Annex to be relocated back to campus.

SITWORK AND INFRASTRUCTURE

Sitework projects include: campus entry improvements, engineering quadrangle upgrade, landscaped pathway to the ITC Campus, landscaped mall to the Events Center, East Drive and West Drive streetscape improvements, and stormwater detention and filtration along Vestal Parkway.

Infrastructure projects include: upgrades to HTHW system, upgrades to electrical system, sanitary sewer and storm sewer study and critical repair (in addition to specified upgrades to Central Heating Plant under 3.0 Independent Track).

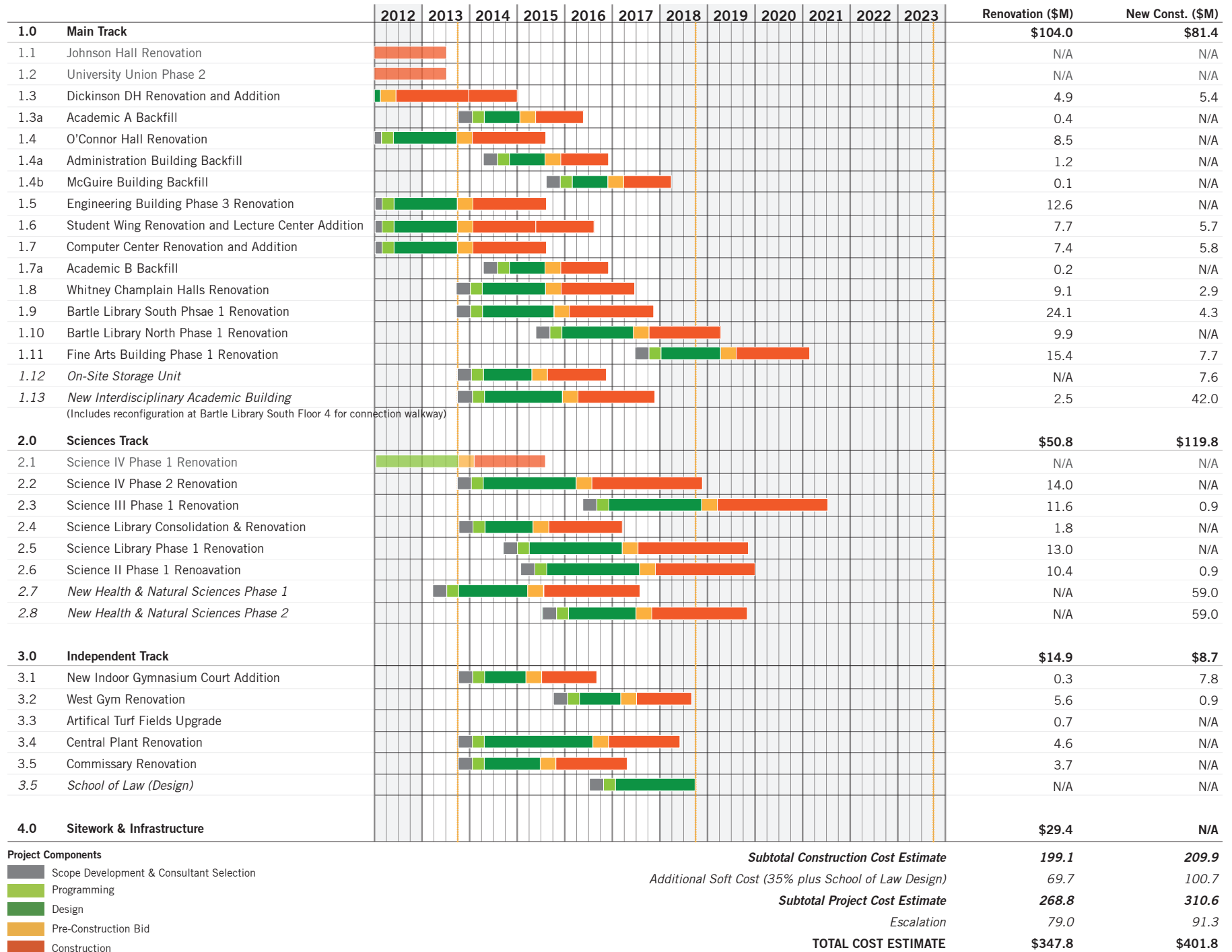


FIGURE 5.8.2A Implementation Phasing, 2013 to 2018 Funding Cycle

2018 TO 2023 FUNDING CYCLE

The 2018 to 2023 funding cycle conducts three major project types: continued major phased renovation projects at Bartle Library, the Fine Arts Building, and the Sciences Complex; smaller, independent renovation and addition projects at other campus facilities; and new construction for capacity expansion.

MAJOR PHASED RENOVATIONS

Major phased renovation projects are continued in the 2013 to 2018 funding cycle at both the north and south buildings of the Bartle Library. Phases 2 and 3 are conducted at the south building, and Phase 2 is conducted at the north building.

Phases 2 and 3 of the Fine Arts Building renovation are conducted, completing renovation of the south portion of the building surrounding the Memorial Courtyard.

Major phased renovation at the Sciences Complex is continued with complete renovation of Science I in two phases, Phase 2 and 3 renovation of Science II, and Phase 2 and 3 for the completion of renovation at Science III.

INDEPENDENT PROJECTS

Independent renovations occur at the ground level of the Student Wing, following completion of the Phase 1 renovation of the Fine Arts Building under the previous cycle and the associated relocation of the Cinema department.

An addition is provided at the Institute for Child Development for expanded capacity. The addition facilitates removal of existing office trailers.

Renovation and addition is also conducted within the Physical Facilities Complex. The Garage is renovated to maximize the building's useful capacity. The Warehouse is renovated and an addition is constructed at the south side of the building to expand the building's capacity.

NEW CONSTRUCTION

Academic expansion for both classrooms and departmental facilities is provided at the new Globalization Center, the first building in the new academic quadrangle at the East Campus. Construction of the Globalization Center requires demolition of Rafuse Hall. Completion of the Globalization Center

vacates international student service program from Nelson A. Rockefeller, allowing the building to undergo renovation for administrative offices.

A new building is constructed for the new School of Law program at an off-campus location that is yet to be determined (design for the building completed in the 2013 to 2018 cycle).

Expansion for the professional programs that are located on campus is provided at the new Professional Program Building, the second building in the new academic quadrangle at the East Campus. Construction of the Professional Program Building requires demolition of Digman Hall.

SITWORK AND INFRASTRUCTURE

Sitework projects include: landscape upgrades at the Peace Quad, upgrades to the sciences quadrangles, University Commons expansion to the north, new East Campus Quadrangle landscaping and circulation.

Infrastructure projects include: upgrades to the domestic water system, upgrades to the sanitary sewer and storm sewer system based on study findings, storm water harvesting at the Peace Quad.

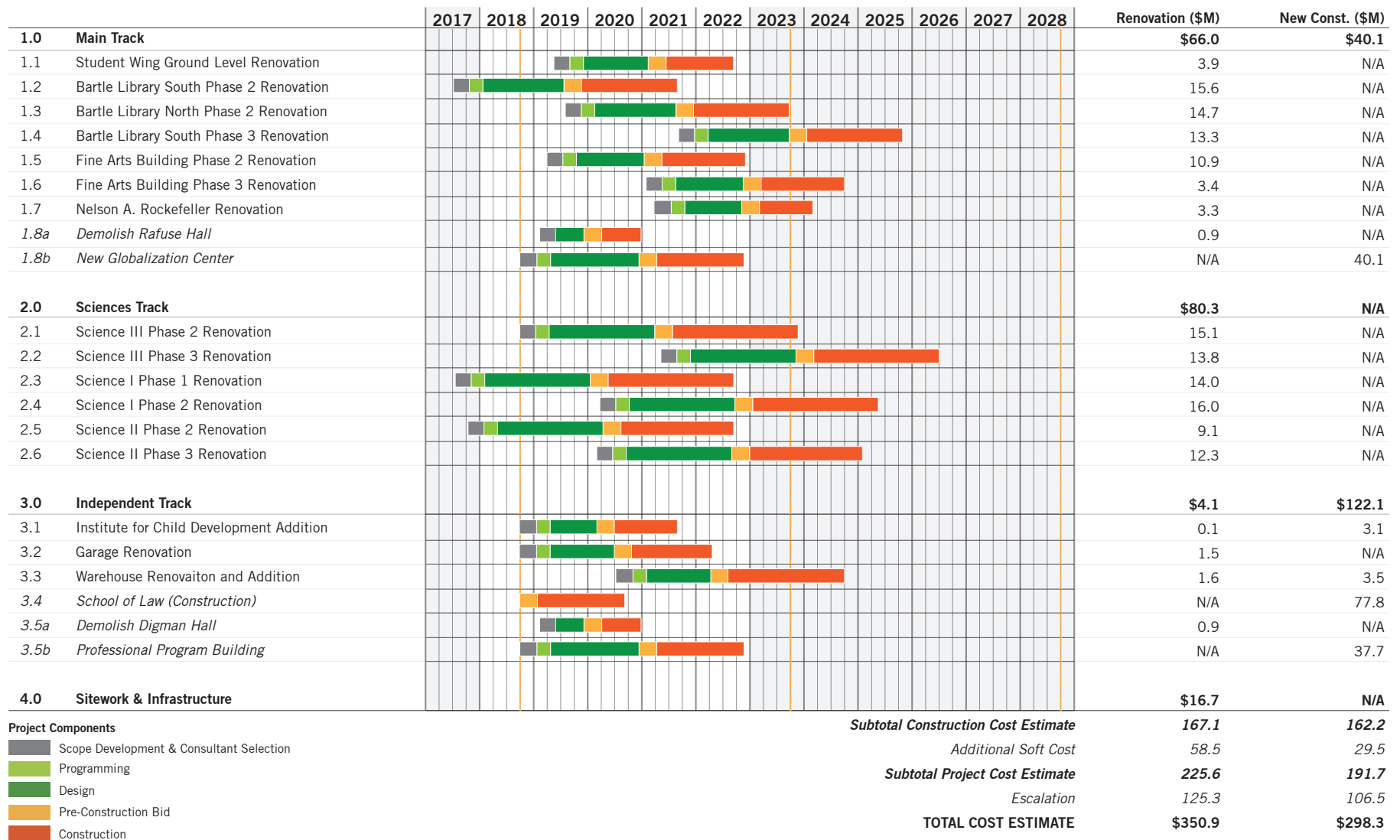


FIGURE 5.8.2B Implementation Phasing, 2018 to 2023 Funding Cycle

FUNDING CYCLES BEYOND 2023

Beyond 2023 two major project types are conducted: continued major phased renovation projects at Bartle Library, the Fine Arts Building, and the Sciences Complex; and new construction for capacity expansion given the full enrollment projections.

MAJOR PHASED RENOVATIONS

Major phased renovation projects are continued beyond 2023 at both the north and south buildings of the Bartle Library. The final Phase 4 is conducted at the south building, Phases 3 and 4 are conducted at the north building, and the tower is renovated.

Phase 4 of the Fine Arts Building renovation is conducted, completing renovation of legacy portion of the building.

Major phased renovation at the Sciences Complex is continued with the final phase of renovation at the Science II Tower.

NEW CONSTRUCTION

Capacity expansion associated with the sustained growth period of the FMP is constructed beyond 2023 with six new buildings at the main campus. The new buildings provide the full range of academic and support facilities to support the University's full projected enrollment growth.

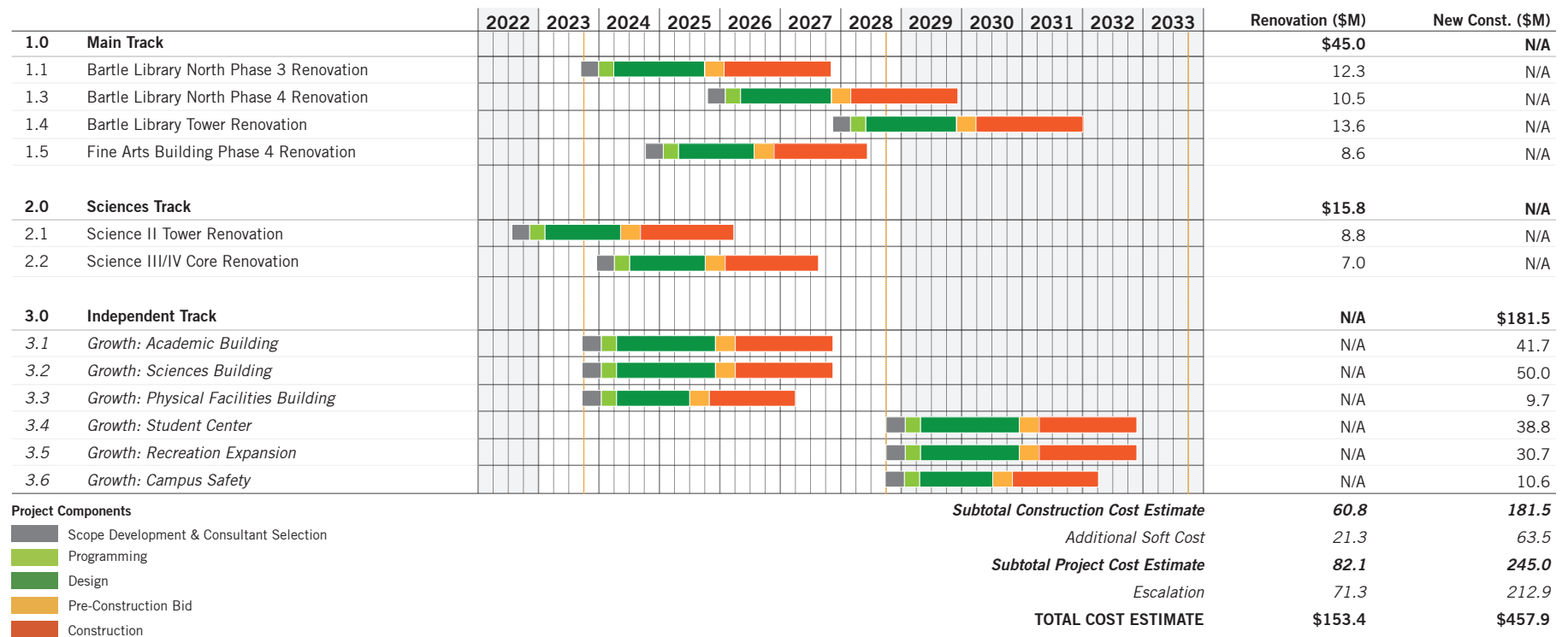


FIGURE 5.8.2C Implementation Phasing, Beyond 2023 Funding Cycle

4.8.3 FUTURE STUDIES

During the course of the FMP, several areas were identified that require further, more detailed drill down study. Requirements associated with such studies are provided in the respective subject areas within the body of the report. Future studies required include the following:

- + Sciences Program and Facilities Study
- + Libraries Program and Facilities Study
- + Athletics, Recreation, Health & Wellness Studies Program and Gymnasium Facilities Study
- + Sanitary Sewer and Storm Drain System Study
- + Campus Wayfinding Diagnostic Study and Wayfinding Design Study
- + Campus Landscape Master Plan