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University of Maryland, Baltimore County

2018 Facilities Master Plan

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Section 1: Introduction

1.1 Purpose and Scope

The *2018 Facilities Master Plan* is a framework guiding facility additions and building renovations, landscape and grounds improvements, and infrastructure upgrades over the next ten years and beyond.

The plan anticipates facility needs to adequately support a growing university population, foster innovative teaching and learning, encourage research across disciplines, and promote civic engagement.

The *2018 Facilities Master Plan* presents a comprehensive, long-term vision for UMBC's physical development. UMBC's plan is reflective of the university's academic mission, its institutional values, and its impact on the landscape, the environment, and the surrounding community.

1.2 Development Process and Community Involvement

UMBC is committed to a facilities master plan that reflects the interests, needs, and desires of the large and diverse community it serves. To achieve this goal of cooperative involvement, the university employed a process of broad participation of over 300 people that included a diverse range of faculty, staff, and students, as well as neighboring community leaders to inform and review the plan.

The 18-month long process was led by a Facilities Management team and began in the fall of 2016 with the creation of a Steering Committee and ten Stakeholder Groups. The Steering Committee's five Vice Presidents and Provost provided strategic context, validated or modified goals developed by Stakeholder Groups, made recommendations regarding priorities and resource allocation, and promoted and championed the process.

The Stakeholder Groups focused on diverse programmatic areas to articulate needs, provide program details, and define desired outcomes and goals. These groups included faculty, staff, and students representing all university divisions to ensure widespread participation.

Full campus participation was ensured through UMBC's shared governance process with engagement of the five Senates, the President's Council, the Council of Vice Presidents and Deans, and the Landscape and Stewardship Committee. The entire campus community was involved in contributing to this plan in a series of focused meetings and open forums.

Outreach to neighboring communities ensured that interested citizens were active partners in the planning process. Meaningful input derived from town hall meetings with community and political leaders was integrated into the plan.

University professional staff contributed to the assessment of existing utilities, buildings, circulation patterns, parking, and outdoor places. Technical consultants contributed to an assessment of stormwater management strategies and the analysis of utility systems.

2.1 Mission and Vision

Mission

UMBC is a dynamic public research university integrating teaching, research, and service to benefit the citizens of Maryland. As an Honors University, the campus offers academically talented students a strong undergraduate liberal arts foundation that prepares them for graduate and professional study, entry into the workforce, and community service and leadership. UMBC emphasizes science, engineering, information technology, human services, and public policy at the graduate level. UMBC contributes to the economic development of the state and the region through entrepreneurial initiatives, workforce training, K-16 partnerships, and technology commercialization in collaboration with public agencies and the corporate community. UMBC is dedicated to cultural and ethnic diversity, social responsibility, and lifelong learning.

Vision

Our UMBC community redefines excellence in higher education through an inclusive culture that connects innovative teaching and learning, research across disciplines, and civic engagement. We will advance knowledge, economic prosperity, and social justice by welcoming and inspiring inquisitive minds from all backgrounds.

2.2 Strategic Plan

UMBC's strategic plan, *Our UMBC: A Strategic Plan for Advancing Excellence,* provides a focused, complementary set of goals, strategies, and recommendations to guide faculty, staff, students, and alumni as we further UMBC's evolution as a nationally and internationally recognized public research university. The *2018 Facilities Master Plan* aligns campus development with the four fundamental elements of academic excellence addressed in the strategic plan.

1. **The Student Experience:** Create vibrant, exceptional, and comprehensive undergraduate and graduate student experiences that integrate in- and out-of-classroom learning to prepare graduates for meaningful careers and civic and personal lives.

The following key strategic goals and supporting objectives of the UMBC strategic plan influenced the *2018 Facilities Master Plan*:

- Continue to build a campus culture that creates, supports, and expects applied learning experiences that present a wide variety of options for all students (e.g., study abroad, internships, cooperative education, service learning, engaged scholarship, artistic performance, and teaching and graduate assistantships).
- Promote the health and well-being of students as a foundation for academic and life success.
- Expand the amount, type, and utilization of on- and off-campus informal space that is available to students to study together, collaborate on creative work, recreate, socialize, or interact with faculty and staff. These spaces should create opportunities for informal peer-to-peer communication and relationships that increase retention, graduation rates, and sense of community.
- Improve student services to significantly increase students' satisfaction with hours, availability, and responsiveness of services used and needed by undergraduate and graduate students, including access to off-campus services, venues, and social opportunities.

2. **Collective Impact in Research, Scholarship, and Creative Achievement:** Elevate UMBC as a nationally and internationally recognized research university strongly connected with the economic and civic life of the Baltimore region and the State of Maryland.

The following key strategic goals and supporting objectives of the UMBC strategic plan influenced the *2018 Facilities Master Plan*:

- Increase national prominence in selected multidisciplinary areas spanning the arts, engineering, humanities, information technology, social sciences, and natural sciences and mathematics. Potential focus areas for the development of multidisciplinary scholarship, creative activity, and research excellence include, but are not limited to, environmental studies, health, national security, data science, civic engagement, and global/transnational.
- Position UMBC faculty to win prestigious national and international awards and honors for scholarship, creative activities, and research.
- Grow UMBC's funded research portfolio to achieve annual research expenditures that consistently place the university among the top 150 institutions in the nation.
- Improve infrastructure and support for research, creative activities, and scholarship by investing in state-of-the-art research facilities and equipment such as shared instrumentation, studio space, and library resources.

3. **Innovative Curriculum and Pedagogy:** Develop innovative curricula and academic programs that support and enhance the success of our undergraduate and graduate students and prepare them for meaningful careers, lifelong learning, and engaged citizenship; and thereby enhance our position as a national leader in undergraduate and graduate education.

The following key strategic goals and supporting objectives of the UMBC strategic plan influenced the *2018 Facilities Master Plan*:

- Provide exemplary support for educators in creating state-of-the-art undergraduate and graduate curricula delivered through innovative and effective approaches to teaching and learning.
- Enhance the capacity of the Faculty Development Center to provide support for research on and training in best pedagogical practices and transform it into the Center for Teaching Excellence.
- Increase the size and diversity of full-time faculty and their engagement in first- and second-year student learning experiences.
- Expand campus-wide capacity for graduate education, increasing graduate assistant stipends, providing pedagogical training, and increasing the availability of informal learning spaces.
- Provide state-of-the-art learning spaces, both formal and informal, which support both the best of traditional pedagogies and new evidence-based practices.
- Reorganize the way classrooms are designed and redesigned to take full account of the perspective of classroom faculty and students regarding space quality and usefulness.

4. **Community and Extended Connections:** To build, nurture, and extend connections with diverse internal and external partners to enrich campus life, local neighborhoods, the state, and the surrounding region. To foster innovative problem-solving and responsible entrepreneurship through strategic partnerships with alumni, government agencies, businesses, and community-based organizations to create a sustainable and prosperous future for all.

The following key strategic goals and supporting objectives of the UMBC strategic plan influenced the *2018 Facilities Master Plan*:

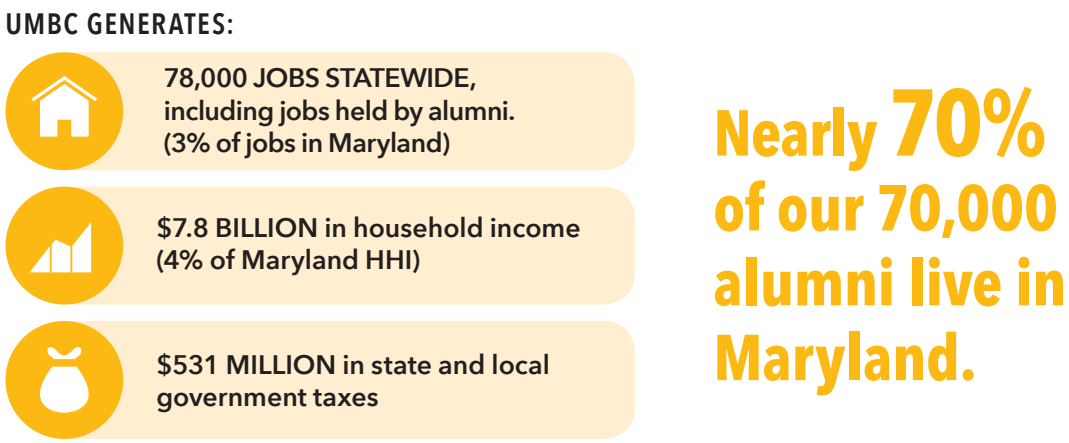
- Promote a campus-wide culture that recognizes, supports, catalyzes, and celebrates collaboration and partnerships with groups, including the K-12 education system, at the local, state, regional, national, and international levels.
- Advance UMBC's regional reputation as a vital stakeholder in Maryland's innovation economy.
- Strengthen UMBC's position as an anchor institution for the greater Baltimore metropolitan region.
- Strengthen and grow UMBC's research and technology park, bwtech@UMBC, leveraging UMBC's strengths and alignment with state needs and opportunities.
- Use campus facilities to leverage community connections.

2.3 University Description

Established in 1966, UMBC is now one of twelve institutions that along with two regional centers and one system office constitute the University System of Maryland. UMBC is a public research university, emphasizing graduate programs in the sciences, engineering, public policy, information technology, and human services; building on a strong undergraduate liberal arts and science core.

Ten minutes away from downtown Baltimore and from the Baltimore-Washington Thurgood Marshall International Airport, and within commuting distance of Washington and Annapolis, the campus is amid one of the greatest concentrations of research facilities and talent in the nation. Universities, libraries, and laboratories serving virtually every academic discipline are within easy commuting distance, as are state, federal, and private institutions, museums, theatres, symphonies, aquariums, zoos, historic monuments, and other institutions and activities.

UMBC is recognized as a major resource for building the state's economy and addressing its social concerns. A majority of UMBC's alumni live and work in Maryland, contributing significantly to the state's economic and social vitality.



UMBC's commitment to innovative teaching, basic and applied research, and supportive community empowers and inspires inquisitive minds. Others recognize the university as a national leader. The *2018 U.S. News & World Report* college guide ranks UMBC as #7 in Most Innovative Schools, #13 in Best Undergraduate Teaching, and #83 in Top Public Schools. In January 2018, *Kiplinger's Personal Finance* named

UMBC a "Best Value University" for eighth year in a row. In late 2017, the *Center for World University Rankings* named UMBC in the top 1.9 percent of higher education institutions worldwide and joins only four other institutions in Maryland on the list.

The university has six major divisions: Academic Affairs, Administration and Finance, Information Technology, Institutional Advancement, Research, and Student Affairs.

UMBC has three colleges and four schools:

- College of Arts, Humanities and Social Sciences
- College of Engineering and Information Technology
- College of Natural and Mathematical Sciences
- The Erickson School
- Graduate School
- School of Public Policy (established in 2014)
- School of Social Work

2.4 Student Headcount, Credit Hours, and Degrees Awarded

Student Enrollment

Over the past decade, UMBC's enrollment has expanded significantly. Total student headcount for the fall 2017 semester is 13,662 students, an increase of 13.5 percent since the fall 2007 semester. This growth comes despite a drop off in total student enrollment nationally with the waning of college-aged Millennials. UMBC is pursuing strategies to maintain robust enrollment across existing and planned new academic programs to ensure that its contribution to Maryland's workforce and economy remains strong.

UMBC's student body continues to reflect the diversity of young people today. In the fall 2017 semester, seven percent of UMBC's students were classified as international and hailed from 96 different countries. State of Maryland residents accounted for 86 percent of the student body; and the remaining six percent of UMBC's students were residents of 45 states other than Maryland. Among the American students, 55 percent categorized themselves as other than white. Minorities made up 45 percent of the American student body, with African Americans comprising 19 percent, Asian Americans 21 percent, and Hispanic/Latino Americans seven percent.

Since 2007, undergraduate headcount enrollment in STEM majors has increased by 61 percent, greatly outpacing the 19 percent overall undergraduate enrollment growth at UMBC in the same period. In the fall 2017 semester, STEM majors accounted for 57 percent of all undergraduate enrollment.

Table 2.1 Student Headcount Since Fall 2007

	FALL 2007	FALL 2012	FALL 2017	TEN-YEAR % GROWTH
UNDERGRADUATE	9,464	10,953	11,234	18.7%
GRADUATE	2,577	2,684	2,428	-5.8%
TOTAL	12,041	13,637	13,662	13.5%

Credit Hours

Along with an increase in enrollment, credit hours also have increased. In the Fall 2017 semester, undergraduate students took 152,193 credit hours, an increase of nearly 19 percent since the Fall 2007 semester. The graduate student credit hours increased by nearly 17 percent over the same ten-year period.

Table 2.2 Student Credit Hours Since Fall 2007

	FALL 2007	FALL 2012	FALL 2017	TEN-YEAR % GROWTH
UNDERGRADUATE	128,133	148,451	152,193	18.8%
GRADUATE	13,041	15,898	15,225	16.7%
TOTAL	141,174	164,349	167,418	18.6%

Degrees Awarded

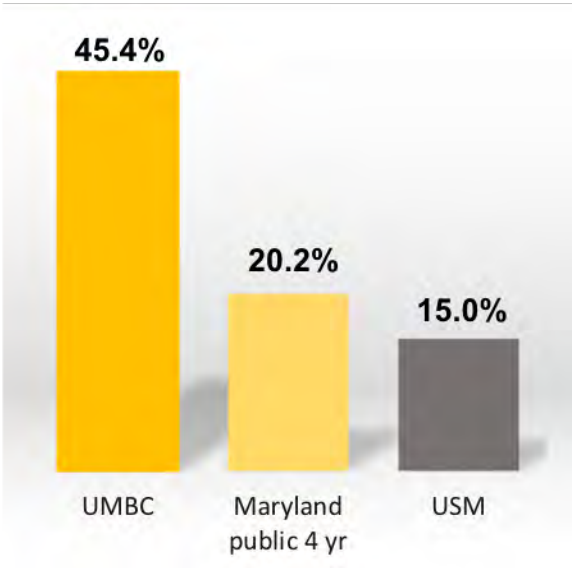
UMBC takes special pride in its graduates, whose vital contributions to society and the economy extend UMBC's impact throughout Maryland and beyond. In 2017, the university awarded 2,571 bachelor's degrees, 631 master's degrees, 88 doctorates, and 124 graduate certificates. As compared to 2007, UMBC awarded 34 percent more bachelor's degrees and 54 percent more graduate level degrees in 2017.

Table 2.3 Degrees Awarded Since Fall 2007

	2007	2012	2017	TEN-YEAR % GROWTH
College of Arts, Humanities, and Social Sciences	971	1,189	1,242	27.9%
College of Engineering and Information Technology	471	433	627	33.1%
College of Natural and Mathematical Sciences	355	389	549	54.7%
The Erickson School	0	10	8	100.0%
School of Social Work	89	94	123	38.2%
Interdisciplinary Studies	28	25	22	-21.4%
TOTAL UNDERGRADUATE	1,914	2,140	2,571	34.3%

	2007	2012	2017	TEN-YEAR % GROWTH
College of Arts, Humanities, and Social Sciences	308	417	321	4.2%
College of Engineering and Information Technology	176	301	439	149.4%
College of Natural and Mathematical Sciences	62	96	73	17.7%
The Erickson School	0	17	10	100.0%
TOTAL GRADUATE*	546	831	843	54.4%

* includes Post-Bacc Certificate



At just over 45 percent, UMBC has a higher percentage of STEM bachelor's degree recipients than any other public Maryland institution.

2.5 Faculty and Staff

In 2017, *The Chronicle of Higher Education* named UMBC one of the nation's top academic workplaces for the eighth year in a row. UMBC is one of 18 large universities from across the United States to be recognized on the "Great Colleges to Work For" list, and one of just 10 large universities to be featured on the distinguished "honor roll" for institutions that excel in nearly every measured category.

Employment at UMBC provides an opportunity to play a vital role in realizing the mission of UMBC. Through the grit and greatness of our faculty and staff, UMBC is one of the best public research universities of its size in the country, a major center for intellectual activity in the metropolitan Baltimore region, and a campus community that finds enrichment in cultural and ethnic diversity. UMBC is dedicated to attracting, motivating, and retaining a highly talented, committed, and diverse workforce.

While UMBC's faculty and staff are devoted to providing excellence in teaching and research, they are dedicated to the university's role of public service to the region and state. Since the founding of the campus, UMBC has taken special pride in bringing students together with faculty who are dedicated to both teaching and research. It is equally committed to promoting a community that encourages diversity and fosters cooperation among its members. UMBC takes seriously its responsibility for developing an environment that meets the needs of its students and enables them to fulfill their educational goals.

Table 2.4 Faculty and Staff Headcount Since Fall 2007

	FALL 2007	FALL 2012	FALL 2017	TEN-YEAR % GROWTH
Full-time Faculty	700	664	697	-0.4%
Part-time Faculty	292	306	322	10.3%
Full-time Staff	1,127	1,143	1,275	13.1%
Part-time Staff	74	64	42	-43.2%
Graduate Assistants	541	612	596	10.2%

2.6 Program Descriptions

Academics

For undergraduates, UMBC offers 57 majors, 37 minors, and 31 undergraduate certificate programs in the physical and biological sciences, the social and behavioral sciences, engineering, mathematics, information technology, the humanities, and the visual and performing arts. At the undergraduate level, new programs have been added that relate to and complement UMBC's mission, including degree programs in media and communications, public health, Asian studies, global studies, entrepreneurial studies, and areas related to the environment and engineering. Other program activities build on existing strengths in the sciences, engineering, technology, human services, and public policy.

The university attracts high-achieving students through many nationally acclaimed programs, including the Meyerhoff Scholars Program, the Humanities Scholars Program, the Linehan Artist Scholars Program, the Sondheim Public Affairs Scholars Program, the Sherman STEM Teacher Scholars Program, and the Center for Women in Technology Scholars.

UMBC's Graduate School offers 43 master's degree programs, 24 doctoral degree programs and 34 graduate certificate programs. Programs are offered in education, engineering, emergency health services, imaging and digital arts, information technology, aging services, life sciences, psychology, public policy, and a host of other fields. In addition, UMBC's Division of Professional Studies helps address regional and national workforce shortages by delivering programs in high demand areas of study such as cybersecurity.

The Graduate School facilitates a number of activities that support students, including PROF-It (Professors-in training); Success Seminars that foster academic, personal, and professional development; and an in-house dissertation and thesis coach.

"Most Innovative Schools"

UMBC ranked #7 according to *U.S. News & World Report* in its *2018 Best College Guide*, joining Arizona State University, Stanford University, MIT, Georgia State University, Carnegie Mellon University, and Northeastern University.

"Best Value College"
8th year in a row.

Kiplinger's Personal Finance recognizes the value of a UMBC degree in its national ranking that combines affordability and exceptional academics.

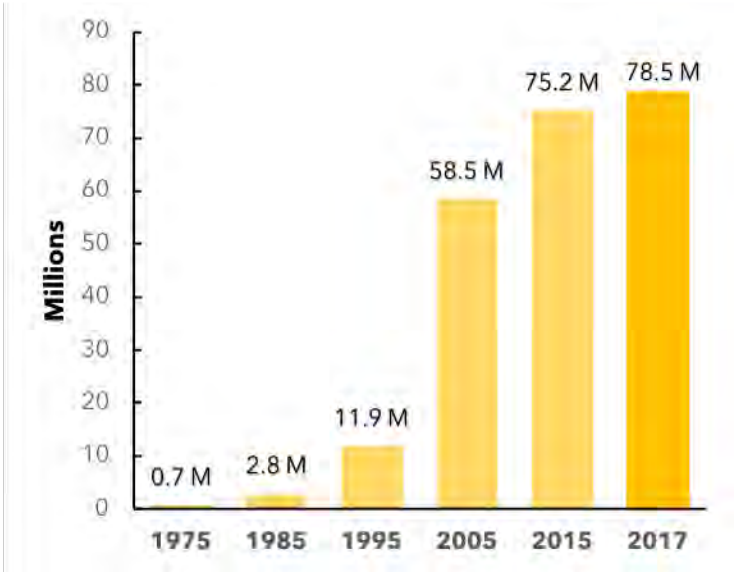
Research Sponsored Programs

UMBC is a thriving research university focused on areas that help build Maryland's economy. For FY 2017, UMBC had $98 million in extramural research awards and nearly $80 million in research expenditures. UMBC is classified by the Carnegie Foundation as a Doctoral University – Higher Research Activity. *Times Higher Education* has twice named UMBC as one of the world's top young universities for strong research, innovation, and a global outlook.

UMBC's key research themes are well-aligned with regional and national priorities: computer information sciences and engineering, environmental sciences and engineering, life sciences and biotechnology, arts and humanities, and social sciences. UMBC's most successful, impactful research efforts are based on collaborations across the campus, with other academic institutions, and with government partners.

UMBC's research expenditures have grown dramatically.

Table 2.5 Growth of Research Funding



UMBC has a vibrant, interdisciplinary, and collaborative research culture with a national reputation for integrating undergraduates in mentored research. UMBC's research motto "Innovation That Matters" reflects the university's strong focus on translational and applied research. UMBC's faculty thrive on the opportunity to have a direct impact on the academic community, on students, and on the world.

Inquiry is central to UMBC's curriculum. UMBC faculty actively seek collaborative research opportunities and consistently encourage students to obtain "real world" experiences via research, internships, co-op experiences, and service learning. Undergraduates at UMBC are given the rare opportunity to pursue their own research questions with the support of faculty mentors.

UMBC has a leadership role in the recently awarded Federally Funded Research and Development Center (FFRDC) for Cybersecurity under the NIST National Cybersecurity Center of Excellence – a partnership between the University System of Maryland (UMBC and UM College Park) and MITRE. The contract for this FFRDC has a maximum value of $5 billion over 25 years.

UMBC has many campus-wide centers and institutes that support scholarship and research on campus. UMBC also has shared facilities to support all types of research on campus and, in some cases, supports outside researchers. In addition, an independent institute, the Howard Hughes Medical Institute supports research and undergraduate students on campus.

Centers and Institutes

- Alex. Brown Center for Entrepreneurship
- Center for Advanced Sensor Technology
- Center for Aging Studies
- Center for Architectures for Data-Driven Information Processing Research
- Center for History Education
- Center for Hybrid Multicore Productivity Research
- Center for Information Security and Assurance
- Center for Innovation, Research, and Creativity in the Arts
- Center for Space Science and Technology
- Center for Urban Environmental Research & Education
- Center for Women in Technology
- Computational Photonics Lab
- Dresher Center for the Humanities
- Goddard Earth Sciences and Technology Center
- Goddard Planetary Heliophysics Institute
- The Hilltop Institute
- Imaging Research Center
- Innovation and Design Lab
- Institute of Marine and Environmental Technology
- Institute of Fluorescence
- Interactive Systems Research Center
- Joint Center for Earth Systems Technology
- Laboratory for Healthcare Informatics
- Martha Ross Center for Oral History
- Maryland Institute for Policy Analysis & Research
- The Shriver Center
- UMBC Center for Cybersecurity

Core Research Support Facilities

- Functional Magnetic Resonance Imaging
- Glasswork Facility
- High Performance Computing Facility
- Keith R. Porter Core Imaging Facility
- Micro-fabrication, Machining and Electronics Technical Services Center
- Molecular Characterization and Analysis Complex
- NanoImaging Facility
- Center for Architectures for Data-Driven Information Processing
- Center for Art, Design and Visual Culture
- Center for Brain Imaging

Synergies between research and economic development are enhanced through the bwtech@UMBC Research and Technology Park, located adjacent to the main campus. The bwtech@UMBC complex hosts 130 companies and provides over 1,600 jobs, offering internship opportunities for students, and leading the generation of jobs and income for the region.

Athletics

The UMBC Retrievers are rapidly becoming a nationally recognized Division I program that develops champions in athletics, academics, and life, while building community-wide traditions and pride. UMBC Athletics' CORE values are: Growth, Respect, Integrity, and Teamwork - GRIT!

More than 400 student-athletes compete in 15 NCAA Division I sports as the UMBC Retrievers within the America East Conference. Teams include men's and women's basketball, cross country, lacrosse, soccer, swimming and diving, and track and field; men's baseball; women's softball; and women's volleyball. Success for UMBC Athletic programs has grown significantly over the last ten years. Many of UMBC's teams are ranked nationally and generate a high level of pride and school camaraderie. UMBC made history as the first ever No. 16 seed team to best a No. 1 seed in the 2018 NCAA men's basketball tournament. The UMBC community will carry the pride of this moment with it for years to come. And, through this achievement, the nation has come to understand what a special place UMBC is.

To support athletic programs and campus social and cultural events, the university recently inaugurated the UMBC Event Center, a 172,000 square foot multi-purpose facility located on campus adjacent to the UMBC Stadium Complex. The UMBC Event Center provides UMBC's athletic teams an exceptional home base while also enabling the university to host commencement, concerts, featured speakers, and banquets.

UMBC Athletics are supported by these additional facilities:

- 4,500-seat UMBC Stadium with the track and field complex
- Retriever Soccer Park
- Baseball and softball fields
- Indoor and outdoor aquatics complex within the Retriever Activities Center

UMBC's athletic facilities serve the greater campus community by hosting: summer baseball, softball and swimming camps for local K-12 students; LEGO challenge regional championships; career fairs; summer day camps for children ages six to 13; and high school graduations.

The Retriever Nation proudly embraces its nationally-recognized chess team. The UMBC Chess Team competes in major intercollegiate chess tournaments such as the Pan-American Intercollegiate Team Chess Championship (champions 10 out of the past 20 years) and the President's Cup (champions six out of the past 13 years).

Community Outreach

UMBC prides itself on its cultural programs. Visual and performing arts programs draw an audience to the campus from throughout the Baltimore-Washington corridor. The Performing Arts and Humanities Building, completed in 2014, with a proscenium theatre, a black-box theatre, a concert hall, and a dance performance space, is a showcase of the performing arts. The university hosts public visual arts exhibitions in the galleries of the Fine Arts Building and the Albin O. Kuhn Library & Gallery; and has an active arts outreach program with area schools.

Just one example of UMBC's commitment to community outreach and positive social change is The Shriver Center. Through community partnerships, mentoring, and transformational education, the center seeks to address critical social challenges in our surrounding communities and nation. The Shriver Center's Choice Program has become a national model for supporting at-risk youth. This delinquency prevention program has provided support to many thousands of children throughout Maryland. Other distinguished Shriver Center programs include Public Service Scholars, and Shriver Peaceworker, and SUCCESS (Students United for Campus-Community Engagement for Post-Secondary Success).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UMBC 2017

3.1 Setting and Campus Character

UMBC is in south Baltimore County, on the I-95 corridor between Baltimore and Washington, D.C. The campus is surrounded by one of the greatest concentrations of commercial, cultural, and scientific activity in the nation. The location gives UMBC a high profile in the metropolitan area, attracting new entrepreneurial partnerships.

The site is located at the juncture between Maryland's rocky piedmont and coastal plane. UMBC's rolling topography and landscape are characteristic of this location's unique geology. The campus has a rich network of green spaces and streams leading to the Chesapeake Bay.

In 1963, the original campus was formed on 432 acres of mostly former farmland. Subsequent land acquisitions have increased the university's holdings on its main campus to 482 acres. Within the main campus are a 41-acre research and technology park (bwtech@UMBC North) and a 67-acre Conservation and Environmental Research Areas (CERA). The greater campus includes a nearby 30-acre complex adjacent to I-95 on which the university has developed the bwtech@UMBC South Incubator and Accelerator. Together, these properties form the 512-acre UMBC campus.

The campus has excellent access to both I-95 via I-195 and the Baltimore Beltway (I-695) via Wilkens Avenue. The impact of the proximity of these major roadways is not felt on campus due to the heavily wooded periphery of the campus site. The forested edges, sloping topography with views to the east, and the low density of surrounding residential development all work to define the setting for the campus.

3.2 Historical Patterns of Campus Growth

Before the university was established, the land was farmed and grazed in support of the neighboring Spring Grove State Hospital. The Maryland State Legislature passed a bill in 1963 to establish an undergraduate and graduate campus on the 432-acre tract of land operated by the hospital. The school opened in 1966 with 750 students, 3 buildings, 45 faculty, 35 staff, and 500 parking spaces. Within one year, enrollment reached 1,400 students. Over the years, the university has acquired additional land and facilities when they became available. Remnants of its agrarian past are still somewhat evident on campus, particularly with respect to riparian corridors, woodlands, and soil condition.

Figure 3.1

Development of the UMBC Campus (1968)

Figure 3.2

Development of the UMBC Campus (1978)

Figure 3.3

Development of the UMBC Campus (1988)

Figure 3.4

Development of the UMBC Campus (1998)

Figure 3.5

Development of the UMBC Campus (2008)

Figure 3.6

Development of the UMBC Campus (2018)

The original master plan concentrated most of the academic core in a compact grid of nine blocks on one of the hilliest sections of the site. The compact nature of the original development and the strong axial relationship focused on the library building allowed for utility development in a grid of tunnels below the buildings. This practical and systematic approach to planning predominated over the desire for consistency of architectural language, the creation of formal open spaces, and the richness of landscape elements that typically define older universities.

The other principle defining element of the campus is Hilltop Circle which surrounds the academic core. This road was planned to facilitate access to parking and services, while relieving the original academic core of vehicular congestion. The development of Hilltop Circle and the lack of through roads has created a pedestrian-oriented core, mostly free of conflicts between pedestrian and vehicles.

The most notable change from the original 1960's-era master plan is to the north and east of the Albin O. Kuhn Library & Gallery. A series of dense residential communities was developed in an area once reserved for surface parking lots and service buildings. Since 1970, the university has embarked on developing a large residential community, currently consist of ten distinct communities providing over 4,000 beds for resident students and staff.

UMBC master plans have evolved over the years with each one building upon the previous version. Since the *2009 Facilities Master Plan Update*, transformations have continued with new buildings, open spaces, and other site improvements. The changes have made a significant positive impact on how students, faculty, staff, and visitors perceive the university and experience the campus.

3.3 Facility Changes Since 2009

Academic Buildings

- New Performing Arts and Humanities Building
- Fine Arts Building Partial Renovation
- Preschool Education Center Renovation
- Naval ROTC Building Renovation
- Sherman Hall Partial Renovation
- Campus-wide Classroom and Lecture Hall Upgrades

Figure 3.7

The Performing Arts and Humanities Building

Residential Communities and Facilities

- New Apartment Community Center
- Patapsco Hall Addition
- Potomac Hall Renovation
- Chesapeake and Susquehanna Halls Partial Renovations
- Terrace, Hillside, and West Hill Apartment Renovations
- Harbor and Erickson Halls Partial Renovations

Figure 3.8

West Hill Apartments: Before and After Renovation

Parking and Roadways

- New Lots 9 and 29
- Additions to Lots 1 and 3
- Administration Drive Garage Modifications
- Hilltop Circle Pedestrian and Crosswalk Improvements
- New Campus Entrance

Figure 3.9

Campus Entrance at University Boulevard and Hilltop Circle

Sustainability

- Library Pond Improvements
- New Green Roofs at Administration Building, Patapsco Hall, and the Apartment Community Center
- Central Utility Plant Equipment Upgrades
- New Energy-Saving Roofs on Multiple Academic Buildings
- Campus-wide Replacement of Interior and Exterior Site Lighting

Figure 3.10

Library Pond at Dusk

Accessibility

- Campus-wide Restroom Upgrades
- Accessible Signage and Maps
- Campus-wide Elevator Upgrades
- Addition of Accessible Residential Units
- Improved Routes from Parking Garages

Athletics and Recreation

- New Exterior Basketball Courts
- New Recreation Field
- New Temporary Press Box, Artificial Turf and Track Surface at UMBC Stadium Complex
- New UMBC Event Center

Figure 3.11

UMBC Event Center

3.4 Existing Buildings and Facilities

There are 73 buildings on the UMBC main campus totaling over four million gross square feet (GSF). In addition, there are five buildings of the Walker Avenue Apartments that are privately-controlled in a public-private partnership, totaling 227,384 GSF. Other partnerships at bwtech@UMBC South and North and the Columbus Center in downtown Baltimore comprise an additional 747,000 GSF of research, administrative, teaching and retail space affiliated with the university.

On campus, the university has over 258,000 net assignable square feet (NASF) of teaching spaces and associated support. Of these, 118,280 NASF is in classrooms. Study spaces not dedicated to library stacks comprise an additional 50,672 NASF. Prior to the completion of the Interdisciplinary Life Sciences Building, research spaces on campus total 151,935 NASF.

Buildings on campus are clustered in concentrated land use zones. Figure 3.12 highlights the current land use zones from the fall of 2017.

3.5 Building Conditions

In 2016, UMBC celebrated 50 years since its founding. Several academic buildings from the first two decades of the university are now over 40 years old. Of the original campus buildings, those in most need of a major renewal includes the Fine Arts Building (1973), University Center (1982), Sondheim Hall (1973), Math/Psychology Building (1969), and a wing of the Biological Sciences Building (commonly referred to as Martin Schwartz Hall, 1983). Other buildings, principally Sherman Hall (1980), suffer from failing brick veneer and disintegrating stone copings.

The campus buildings of this era are at the end of their useful lives and universally suffer from outdated building systems, functionally and technologically obsolete teaching and research space, and deteriorating building envelopes. As such, each building requires: replacement and upgrade of mechanical, electrical, and life safety systems; restoration of the building envelope; and architectural modifications to correct barriers to accessibility, improve building functionality, and enhance shared spaces.

In addition, with the completion of the UMBC Event Center, most of the existing Athletics Department offices and programs will be moving out of the Retriever Activities Center. This will provide the opportunity to both address substantial mechanical deficiencies and provide needed space for health and wellness programs on campus.

Table 3.1 Fall 2017 Inventory of State-Supported Buildings

Building Name	Gross Square Feet	Net Assignable Square Feet	Year Constructed or Acquired	Year of Major Renovation	Current Replacement Value
Administration Building *	86,093	44,735	1973		$43,843,958
Albin O. Kuhn Library & Gallery	296,083	160,159	1968-1995		$172,307,484
Alumni House	7,559	4,701	1970	2003	$2,041,805
Army ROTC Building	4,199	3,268	2003		$1,134,216
Biological Sciences Building	122,474	58,966	1967-1983	2000	$82,885,337
Central Plant	52,522	6,868	1971	2001	$46,136,648
Engineering Building	143,160	73,852	1993		$70,737,385
Facilities Management Building *	50,904	37,658	1997		$16,768,259
Fine Arts Building *	169,693	88,174	1973		$83,847,717
Greenhouse	8,828	7,381	1971	1994	$2,423,356
Information Technology / Engineering Building	153,009	81,738	2003		$75,603,916
Janet and Walter Sondheim Hall *	92,944	51,765	1973		$45,924,948
Lecture Hall I	8,633	2,849	1967		$4,265,688
Math & Psychology Building *	66,429	30,782	1969		$32,823,511
Naval ROTC Building	4,539	2,984	2003	2016	$1,226,055
Performing Arts and Humanities Building	199,674	102,591	2012		$184,609,693
Physics Building *	81,130	40,760	1999		$40,087,483
Public Policy Building	70,321	34,143	2003		$34,746,603
Robert and Jane Meyerhoff Chemistry Building *	174,512	77,438	1971	2003	$118,420,958
Sherman Hall *	120,484	59,661	1980		$59,532,852
Student Development & Success Center *	8,546	5,977	1984	2004	$2,308,409
Tech 2 Building	4,256	2,702	2003	2003	$1,149,613
Technology Research Center *	75,802	43,542	1957	2001	$64,921,727
University Center *	72,818	44,875	1982		$35,916,171
Warehouse *	38,058	33,942	1974		$8,557,777
	2,112,669	1,101,511			$1,232,221,567

* A small portion of the building is non-state supported

Table 3.2 Fall 2017 Inventory of Auxiliary Buildings

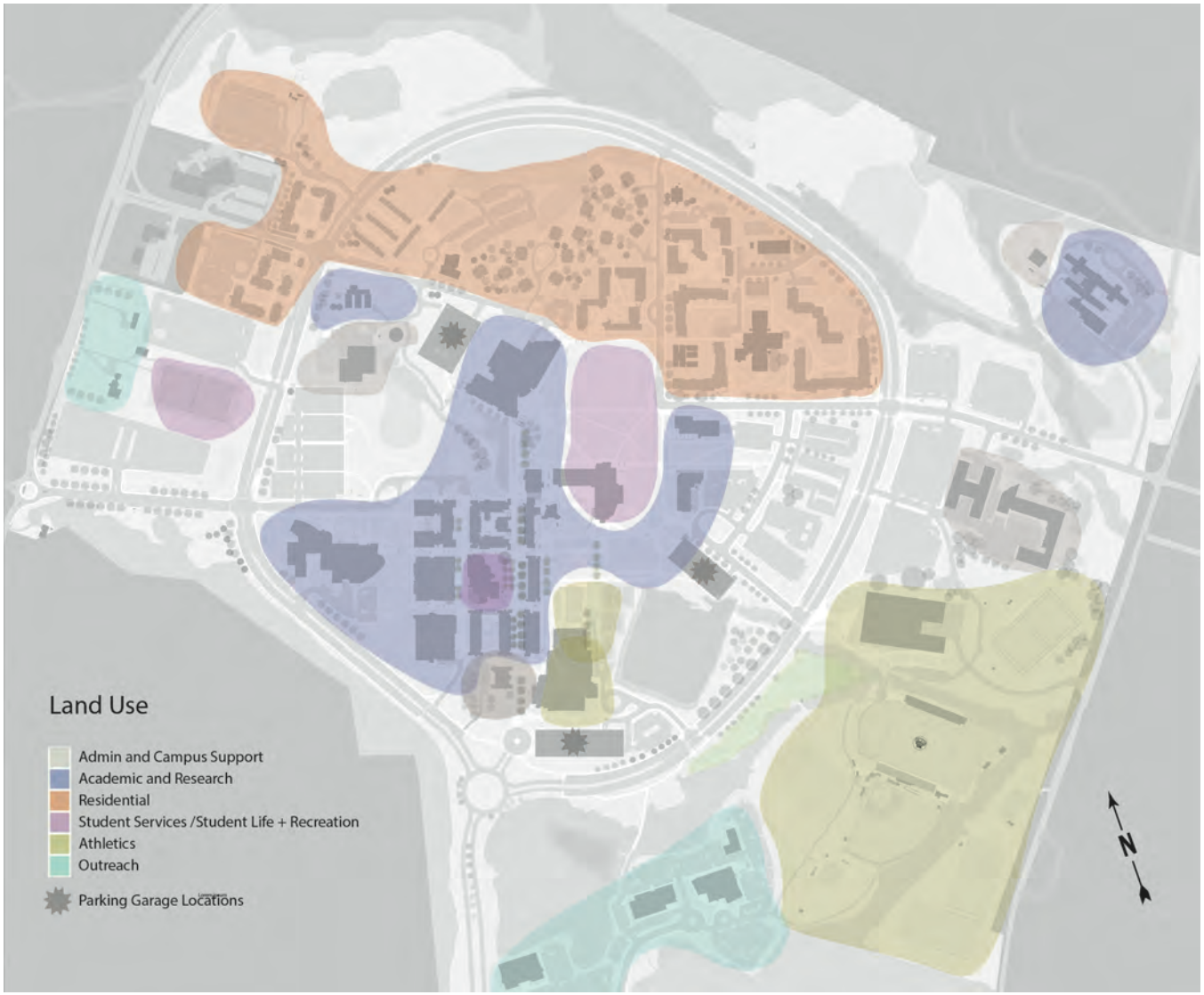
Building Name	Gross Square Feet	Net Assignable Square Feet	Year Constructed or Acquired	Year of Major Renovation	Current Replacement Value
Administration Drive Garage	101,192	54,760	1989		$9,203,999
Apartment Community Center	7,823	4,700	2013		$3,512,405
Chesapeake Hall	83,735	49,695	1971		$39,355,450
Commons Drive Garage	145,052	72,043	2000		$9,818,844
Erickson Hall *	147,374	101,236	2000		$69,265,780
Harbor Hall	169,343	104,321	2001		$79,591,210
Hillside Apartments (8 buildings)	81,754	61,885	1987	2012	$38,424,380
Patapsco Hall	135,751	84,624	1973	2003	$63,802,970
Potomac Hall	84,004	51,392	1993		$39,481,880
Preschool Center	4,053	3,235	1993		$1,094,773
Retriever Activities Center	137,052	95,204	1972-1999	2003	$60,210,530
Satellite Utility Plant	10,148	440	2001		$8,914,259
Surge Facility 1 (condemned)	1,784	1,504	1955		$391,778
Susquehanna Hall	84,071	49,930	1970		$39,513,370
Terrace Apartments (8 buildings)	69,109	52,123	1982	2012	$32,479,820
The Commons *	160,608	86,464	2002		$93,466,901
True Grit's (Dining Hall)	35,311	27,057	1971		$15,509,036
UMBC Event Center	184,000	129,000	2018		$85,000,000
UMBC Stadium Complex (5 buildings)	21,772	8,567	1976, 2016	2009	$11,391,964
Walker Avenue Apartments **	227,384	156,814	2002-2003		$99,869,919
Walker Avenue Garage	134,715	62,339	2002		$9,469,951
West Hill Apartments (5 buildings)	66,303	48,757	1981		$31,163,350
	2,092,339	1,306,090			$840,932,568

* A small portion of the building is state supported

** Public-Private Partnership

Figure 3.12

Current Land Use Zones



3.6 Building Accessibility

UMBC is committed to making its programs and facilities accessible, and to improving circulation and parking on campus for faculty, staff, students, and visitors with disabilities. For the last ten years, Facilities Management has partnered with the Office of Student Disability Services and the Maryland Department of Disabilities to remove barriers to its facilities throughout the campus. The university has worked closely with the campus community of faculty, staff, and students to identify barriers, set priorities, and implement remediation.

Examples of improvements completed over the past five years include:

- Accessibility survey of all campus buildings and facilities
- Restroom modifications in the Fine Arts Building, Sondheim Hall, University Center, Sherman Hall, and the Math & Psychology Building
- Elevator upgrades in the Administration Building and most academic buildings in the academic core
- Adaptive listening technology added in many of the larger classrooms and all lecture halls
- Sidewalk improvements throughout the West Hill and Terrace Apartments residential communities to eliminate damaged or steep paths between buildings
- New accessible path from Walker Avenue Garage to the central core of the campus
- 24-hour accessible route to circulate between levels of the academic core after hours when buildings are locked
- New accessible residences in Potomac Hall, and the West Hill and Terrace Apartment communities
- New Apartment Community Center with accessible meeting rooms, common room and laundry
- New elevators in Susquehanna Hall, Patapsco Hall and Chesapeake Hall
- Improved pedestrian pathways to main academic core buildings from new accessible parking within the Administration Drive Garage and Lot 9

Issues Common to Multiple Buildings

While new buildings like the Performing Arts and Humanities Building and the Apartment Community Center are built to the latest accessibility codes, many of the existing campus buildings designed prior to the passage of the Americans with Disabilities Act are not completely compliant with the latest codes. The recent accessibility survey highlighted barriers in buildings built before 1990 that remain to be addressed, including:

- Doors with round knob hardware that cannot be operated easily by users with dexterity disabilities
- Access doors that require more than 5 pounds of pressure to open or are not power assisted
- Restrooms lacking full compliance on numerous floors of academic buildings
- Drinking fountains in corridors that are not mounted at the proper height or located to allow for adequate approach clearances
- Handrails in existing stairwells that are not compliant with codes
- Adequate access to multi-level lecture halls
- Full access to seating and patron amenities at older athletic facilities including the UMBC Stadium
- Accessible entrances and adequate interior vertical circulation within older, repurposed research buildings such as the Technology Research Center

Facilities that Support Inclusivity

Along with a commitment for accessibility, the university is committed to inclusivity and has been providing facilities to ensure that the campus is welcoming to all. Recently, the university identified restroom facilities throughout campus that can be used by all genders. Facilities are also provided in support of other members of our campus community such as disabled veterans, parents with babies, the visually impaired, and those who use motorized wheelchairs and service animals. The designers of new buildings and renovated facilities are being challenged to acknowledge a wide range of issues to ensure that the campus serves our expanding community.

3.7 Outdoor Places

Outdoor spaces at UMBC serve numerous important roles for the campus. Natural areas on campus include beautiful wooded stream corridors, riparian corridors, and wooded buffers to adjoining residential development and major roadways. Natural areas supporting long-term ecological research include the Knoll and CERA.

There are also outdoor areas where people meet, gather, play, and rest. These open spaces include quadrangles, plazas, athletic fields, meadows, gardens, and pedestrian spines and other walkways. While these active open spaces may be associated with specific programming needs and/or architectural aesthetics, they also provide important ecological and hydrological functions.

Natural Systems

Following the topography of the campus are perennial streams that typically flow in a southeastern direction. The campus drains to two main tributary streams that run adjacent to Hilltop Circle around the outer perimeter of the main campus. Most drainage areas inside of Hilltop Circle drain to existing streams via culverts and storm drain systems. These tributaries then drain to Herbert Run Western Branch, which is classified as a Use Class I stream. The Performing Arts and Humanities Building and the UMBC Event Center projects have recently provided the university with the opportunity to restore two important stream corridors by clearing invasive species and restoring deteriorated stream banks.

Much of the woodland on campus is successional forest growing on areas that were farmed or grazed for many prior years. On the perimeter of campus are dense forest zones that have been identified as areas of forest conservation. These areas total approximately 24 acres and satisfy the regulatory requirements of the Maryland Forest Conservation Act.

Research Areas

The Knoll, a mixed-aged canopy woodland on a hilly area adjacent to the Retriever Activities Center, is a prominent land resource on campus being used in long-term environmental research. The UMBC lab for Anthropogenic Landscape Ecology has an EcoSynth program which is using the Knoll woodland as a site to test a user-deployed system for mapping and measuring vegetation biomass, carbon, and biodiversity. The Knoll can continue to be managed to promote the health of the existing native tree canopy and to control invasive non-native plant species.

The CERA was established in 1997 to support environmental education and conservation. There are two CERA parcels. The larger tract, covering approximately 45 acres of the south end of the main campus, is composed of a wide variety of ecological conditions: mature upland forest, early- and mid-successional forests, and riparian and wetland environments. The smaller tract is about 3 acres and surrounds the historic farm pond, now commonly referred to as the CERA Pond.

Pedestrian Spines

One of the most memorable and defining elements of the UMBC campus landscape is Academic Way (also referred to as '196' indicative of its elevation above sea level). This pedestrian spine connects multiple academic buildings, the library, the Administration Building, and the Retriever Activities Center. A series of willow oaks and other deciduous species of trees, planted in the first few decades of the campus, soften the hard lines of the academic buildings providing an integral component of the successful character of Academic Way.

Other aspects of Academic Way that contribute to its success include the pedestrian nature of the street, the lack of bicycles, and the sheer number of buildings (nine) that open onto it. The pedestrian street also benefits from numerous plazas and other active spaces located along it.

Other important pedestrian routes on campus do not reflect the success of Academic Way. A secondary pedestrian spine referred to as "220" is located 24 feet above Academic Way and serves six academic buildings. The "220" pedestrian route has loading areas and vehicular traffic without the mature trees, intense plantings, and gathering spaces that make Academic Way appealing.

An additional strong pedestrian spine extends from The Commons past the north side of the Physics Building through Lot 3 into the Stadium Lot. This route collects students walking to the academic core from several parking lots on the east side. This pedestrian route does not have the mature tree canopy or relationship to academic buildings needed to make it as aesthetically pleasing as Academic Way.

Overall the campus would benefit from applying to the other pedestrian spines on campus the elements that make Academic Way so successful. Each pedestrian path should be treated as an important open space and not just as a route or concrete sidewalk.

Quadrangles

Referred to as The Quad, the area between The Commons and the outdoor swimming pool, is at the center of many organized student activities, fairs, and events, and is identified as the center of student life on campus. The terraced dining court of The Commons, facing south, is extremely popular and lends definition to the north edge of the space supporting frequent activity. In contrast, the fenced, outdoor pool to the south does not reinforce the definition of the Quad.

When the Interdisciplinary Life Sciences Building is completed in 2019, the Quad will have a busy new academic and research building on its east edge, further improving the functionality of this outdoor space.

Figure 3.13

Campus Event in the Quad

Referred to as the Central Green, the large open area to the north of The Commons suffers from poor definition and is crossed by pedestrian paths in seemingly haphazard ways. This outdoor space, more than any other on campus, feels like it is in a level of transition and could benefit from planning and design improvements to become successful and appealing.

Figure 3.14

Aerial view of the Central Green

Other quadrangles that would benefit from additional design include the green space between the Public Policy Building and the Physics Building, and the green space to the north of the Performing Arts and Humanities Building. The Physics quadrangle, bisected by a poorly sited sidewalk running east-west, is underused as a gathering space and lacks definition on both Its east and west edges. The more recently created quadrangle associated with the Performing Arts and Humanities Building lacks a mature tree canopy. It also suffers from a lack of definition on the north and from a lack of an effective entrance to the Fine Arts Building on the east.

Plazas and Courtyards

Recently, UMBC has improved outdoor plazas by refurbishing and updating existing spaces and by creating new ones as components of capital projects. Thoughtful designs of pavers, furniture, and landscaping have given the campus highly utilized and valued spaces for gathering, socializing, and studying.

Examples include the terrace south of The Commons, the edge of the Library Pond, and the gateway plaza at the entry to the Retriever Activities Center. Other spaces include the seating area surrounding the memorial to Walter Sondheim, and the new sculpture plaza to the north of the main Performing Arts and Humanities Building entrance. Most plazas on campus are located at campus entrances or in areas with high pedestrian traffic, and the majority remain unnamed.

The plaza to the east of the University Center is an example of a well-used plaza that would greatly benefit from a redesign, including an update of furnishings, paving, and other plaza details.

The residential communities built after 2000, like Harbor Hall, Erickson Hall, and the Walker Avenue Apartments, are successfully organized around residential courtyards. Recent renovations to other communities, especially the apartment communities, have created shared outdoor spaces with benches, tables, and grills to foster a sense of community.

Informal Recreation Fields

Complementing the interior recreation facilities in the Retriever Activities Center, the university maintains outdoor recreational fields and courts for both organized sports and informal recreation. These spaces play an important role in student life on campus. The range of spaces for organized sports include full-size fields, hard courts for basketball, tennis courts, and sand volleyball courts. Some are associated with the residential communities while others serve the larger campus community.

The large area to the south of Erickson Hall is surrounded by berms that keep students from creating crisscrossing paths through it. This field does not have proper drainage and is not of regulation size or configuration to support intramural competition. Because of the generally poor condition of the field, organized intramural sports are not played on it. Yet, the area remains popular with students for informal sports due to its central location.

Figure 3.15

Grassy area south of Erickson Hall is frequently used as an informal play field

3.8 Circulation and Parking

Vehicular Access and Circulation

The regional freeway system, including I-95, I-695, and I-195, provides excellent access to UMBC. The campus has four entry points – referred to as 'portals' - with connections at the west, east, and south.

The main portal via UMBC Boulevard is fed by I-195 which directly connects to I-95 and the Baltimore/Washington International Thurgood Marshall Airport. The terminus of the main portal leads to a traffic circle at the intersection of Hilltop Circle and UMBC Boulevard. Within the circle is a curving wall, surrounded by beautiful and sustainable plantings, which announces one's arrival to UMBC.

The Hilltop Road and Walker Avenue portals to the west are accessed from Wilkens Avenue which provides connections into the City of Catonsville and I-695. The fourth portal is at the intersection of Poplar Avenue and Shelbourne Road and connects the City of Arbutus to the east.

Once on campus, a wayfinding system of roadway signage identifies destinations and directs drivers to nearby parking facilities accessible from Hilltop Circle.

Campus roads typically provide adequate capacity, except during peak hours when portals experience heavy traffic. Part of the congestion is caused by commuters using UMBC as a short-cut between I-95 and I-695.

Hilltop Circle contains the academic core and features two drive lanes separated by a grassy median. Hilltop Circle provides pull-in parking along much of its length. The design of Hilltop Circle as a loop road has been attributed to the University System of Maryland's former Chancellor Albin O. Kuhn during the early planning stage of the campus.

Commons Drive, Administration Drive, Hilltop Road, Back Road, and Walker Avenue provide drop-off areas, service zones, and accessible parking near the campus core. These roads all end in turn-arounds and drop-offs, and do not cross the central campus. The roadway intersection of Hilltop Circle and Walker Avenue would benefit from a redesign to improve pedestrian safety.

On the east side of campus, Center Road, Park Road, and Poplar Avenue extend into the campus core creating potential pedestrian-vehicular conflicts between on-campus residential communities and academic buildings. However, 20 mph speed limits and well-marked roadway crossings reduce potential conflicts between pedestrians and vehicles.

Figure 3.16

UMBC Boulevard campus entrance

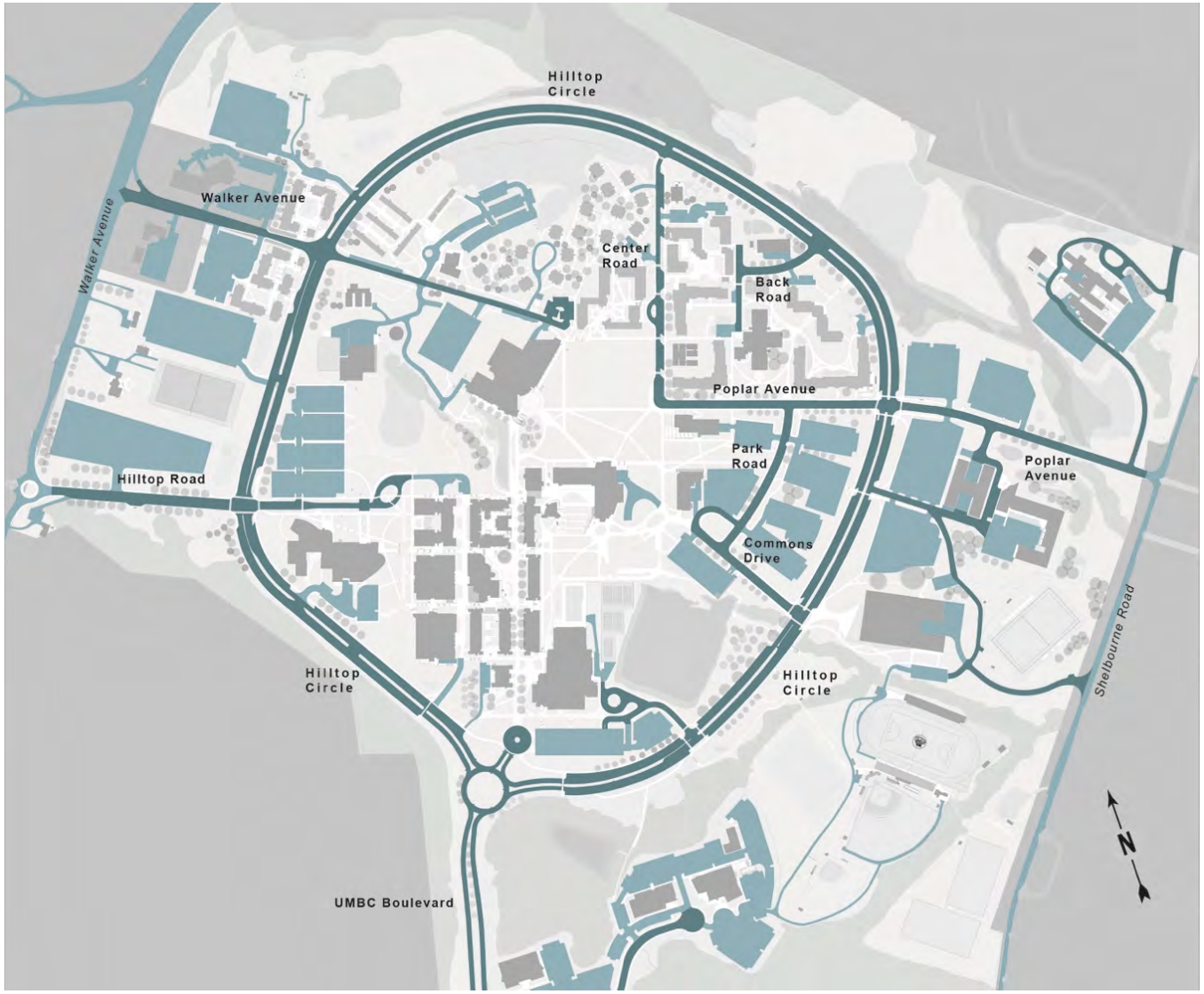


Figure 3.17

Campus roadways, service drives and parking areas

Transit

The university operates seven transit routes serving students, faculty, and staff with access to the surrounding communities of Catonsville and Arbutus, as well as to the Halethorpe MARC commuter train station, the BWI Amtrak and MARC station, and downtown Baltimore. For more information on bus routes see www.umbc.edu/transit/routes.

All buses operated by UMBC Transit have bicycle racks and are accessible to riders with disabilities. The buses are equipped with GPS transponders that work with a UMBC Transit phone application to provide riders with instantaneous information on the location and estimated arrival time of each bus. There are eight shuttle bus stops on campus.

The UMBC campus is also served by four regional Maryland Transit Administration (MTA) bus routes. There are five campus MTA bus stops shared with UMBC Transit shuttle buses. For MTA bus routes serving the campus go to https://mta.maryland.gov/content/baltimorelink-schedules.

Parking

UMBC has 7,203 parking spaces of which 6,521 are permitted spaces, reserved for students, faculty, and staff. The remaining 682 spaces are a mixture of accessible, visitor, limited-time, service, and special assignment spaces. There are 4,594 spaces reserved for students – a ratio of 0.34 spaces per student. Of these spaces, 386 are in a remote lot reserved for first-year residents living in campus residence halls.

Table 3.3 Parking Spaces by Type

	Commuting Students	Resident Students	Faculty and Staff	Motorcycle	Accessible	Visitor	Limited Time	Service	Special Assignment	Total
On-campus	3,185	1,409	1,510	31	159	245	29	174	70	6,812
Off-campus		386			5					391
Total	**3,185**	**1,795**	**1,510**	**31**	**164**	**245**	**29**	**174**	**70**	**7,203**

There are three campus parking garages containing a total of 1,159 spaces. The garages are accessed from Administration Drive, Commons Drive, and Walker Avenue, respectively. The distribution of parking spaces is 16 percent in garages, 62 percent in surface parking lots, and 22 percent on roadways, especially Hilltop Circle.

Pedestrian Circulation

Topography, the compact academic core, and the location of parking play major roles in the patterns of pedestrian movement. The most heavily trafficked pedestrian path is "Academic Way" which connects the Administration Drive garage to the Albin O. Kuhn Library & Gallery and runs between many of the academic buildings, including Sherman Hall and Sondheim Hall.

Campus roadways and parking are generally located away from academic and residential areas, thereby supporting a safe pedestrian-oriented zone within Hilltop Circle. The main commuter parking lots are west and east of campus resulting in a busy east-west circulation pattern. Students who live in residential communities to the north of the academic core travel more frequently in a north-south pattern.

Improvements have been made over the last ten years to beautify the pedestrian paths of the campus. Tree plantings, consistent paving patterns, and improved landscape areas throughout the academic core and residential areas create a more consistent character for the campus and improve the pedestrian experience.

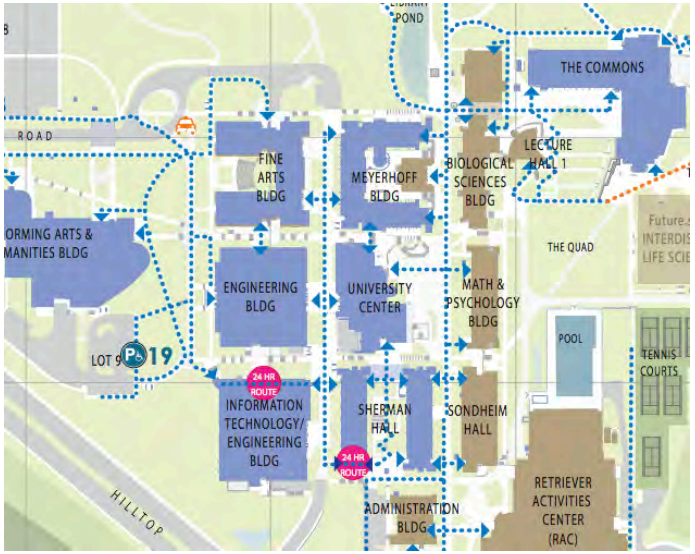
Accessible Routes

The topography of the UMBC campus has historically created challenges for students, faculty, and staff with mobility disabilities. In addition to the rolling terrain, the campus slopes down more than 180 feet from west to east. Streams also cross the campus at several locations creating additional challenges to mobility.

Well before the Americans with Disabilities Act was enacted in 1990, early planning at UMBC incorporated interior connecting bridges between buildings to span elevation changes in the academic core. In other cases, elevators within buildings provide the most accessible route for traversing the steepest levels of the campus. As a result, all campus buildings are served by one or more accessible routes. Even so, further accessibility improvements would be beneficial especially along Walker Avenue, leading to the Technology Research Center, and between the apartment communities.

Figure 3.17 shows accessible routes, entrances into buildings, and parking locations in the academic core. Buildings shaded in blue assist in the navigation of the various campus elevation levels. The full accessible route map is posted at https://about.umbc.edu/files/2012/08/2017-accessible-map.pdf.

Figure 3.18
Detail of the
Accessibility Route Map



3.9 Sustainability

In 2007, Freeman Hrabowski, UMBC's President, signed the American College and University Presidents' Climate Commitment (ACUPCC).

UMBC is committed to bringing carbon emissions down to zero and building campus climate resiliency. From 2007 to 2016, UMBC reduced carbon emissions by 17 percent, despite a 13 percent growth in student enrollment and the construction of the Performing Arts and Humanities Building and the Apartment Community Center. The UMBC Climate Action Steering Committee oversees the implementation of the UMBC Climate Action Plan which is being updated. The plan outlines strategies to reduce greenhouse gas emissions generated by the campus community. The university has actively engaged the campus community in its efforts to reduce greenhouse gas emissions. Instruction and research focused on the environment and sustainability have been promoted and supported.

Since 2007, UMBC has honored our commitment to become a more sustainable campus in many ways:

- Built greener buildings with all new construction designed to a minimum of Leadership in Energy and Environmental Design (LEED) Silver certification. The Performing Arts and Humanities Building and the addition to Patapsco Hall both received the even higher certification of LEED Gold.
- Implemented building system upgrades focused on improving energy efficiency. Projects have included building and roof insulation, replacement windows and doors, installation of more efficient interior lighting, and heating/cooling systems upgrades.
- Employed high-efficiency standards and energy-conservation guidelines in renovations.
- Purchased energy from renewable sources.
- Used an Energy Performance Contract (EPC) as a means for implementing energy-saving projects that pay for themselves over time via the associated energy savings.

As energy-saving technologies have evolved, so has UMBC. Years before "going green" and "climate change" were mainstream issues, UMBC was transforming the campus by leveraging technology to conserve energy and reduce the university's impact on the environment.

- Installed reduced-flow toilets, urinals, faucets, and shower heads in all new construction and renovations.
- Promoted and supported transportation alternatives to reduce car use.
- Expanded campus-wide recycling and composting programs.
- Upgraded stormwater management practices to protect the Chesapeake Bay.
- Initiated educational programs, like the Green Office program, to create an awareness of our daily impact on the environment.

3.10 Utility Infrastructure

System of Utility Tunnels

The original campus master plan cleverly laid out a series of fully-accessible utility tunnels running between and connecting the major buildings on campus. These tunnels facilitate the installation, upgrade and maintenance of utility piping, electrical distribution, and data/communication lines. The tunnels radiate out from the Central Plant building.

The utility tunnels connect all major academic buildings, as well as the Albin O. Kuhn Library & Gallery, the Retriever Activities Center, and The Commons. The construction of the Performing Arts and Humanities Building in 2012 extended the tunnel system and provided a buried return loop that provides some redundancy to the high-temperature hot-water and chilled water systems within the central academic core. The tunnel system is being extended to the Interdisciplinary Life Sciences Building from a spur south of the Biological Sciences Building.

The tunnel system, with only one spur out from the Central Plant, does not provide the campus with a redundant path in the event of a piping failure in the main trunk line. Studies have indicated the need for a complete loop system to provide redundancy and resilience to the systems carried by the utility tunnel system.

A condition assessment of the existing tunnels was conducted in 2017. The study found deterioration at certain locations resulting in some areas of water infiltration. The report recommends repair of the tunnel at select locations.

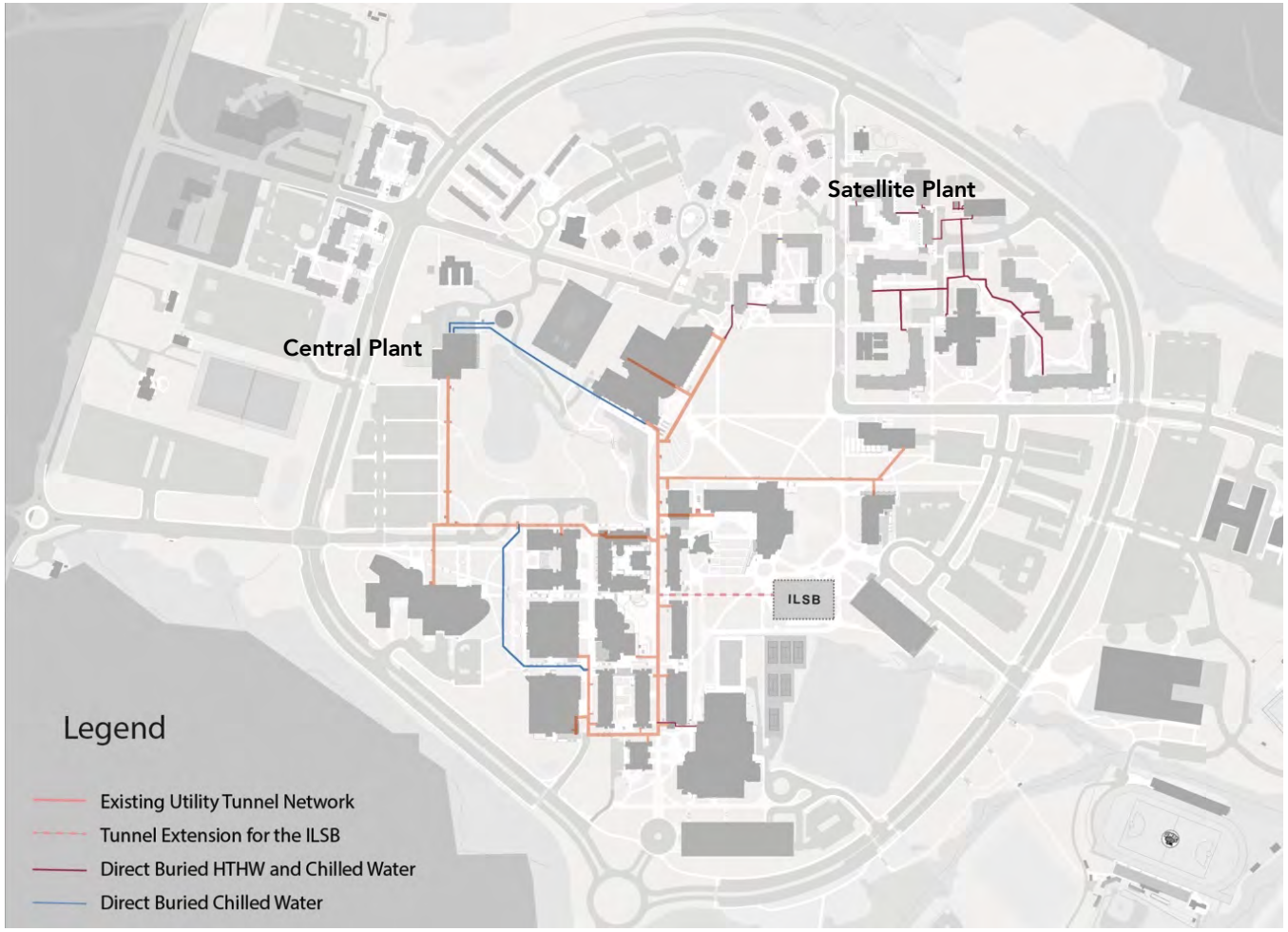


Figure 3.19

Network of utility tunnels and direct buried hot and chilled water lines

Natural Gas Distribution

Baltimore Gas and Electric supplies the campus with gas via Wilkens and Shelbourne Avenues. A 6" HP (high pressure) gas line runs along Walker Avenue and serves the Central Plant, The Commons, the Satellite Plant, and various individual buildings where gas is needed for programs or where buildings are not connected to central services. From the east, a secondary gas line serves the Facilities Management Building and the UMBC Event Center. Most of gas lines are owned and maintained by BGE, but some distribution lines are owned by the university.

Hot and Chilled Water Systems

The existing hot water generation system located within the Central Plant consists of four high-temperature hot-water generators with a total capacity of 150,000 MBH. The firm capacity of the system is 100,000 MBH. Supply and return piping to all buildings that are served by the system run in the utility tunnel.

The existing chilled water generation system in the Central Plant is composed of five 1,000-ton electric centrifugal chillers and one 2,000-ton chiller. The system includes a 10,500 ton-hour chilled water storage tank capable of supplying 1,500 tons of chilled water capacity when fully charged. The thermal energy storage system located adjacent to the Central Plant discharges chilled water produced during non-peak hours to reduce daytime peak demand. The total capacity of the system is 7,500 tons with a firm capacity of 5,500 tons. The firm capacity is defined as the total installed capacity minus the capacity of the single largest generation subsystem. One of the aged 1,000-ton chillers will be upgraded to a 2,000-ton chiller as part of the Interdisciplinary Life Sciences Building project. The total capacity is capped at 8,000 tons since the existing cooling towers cannot support additional chillers.

The Satellite Plant serves the residential communities not connected by the utility tunnel system. This plant provides both chilled and hot water for the five residential communities east of Center Road and True Grits Dining Hall. Two 500 HP low-temperature hot-water (LTHW) generators provide 180-degree Fahrenheit water during the heating season. A 100 HP boiler is utilized for domestic hot water needs during the warmer months and is rated at a capacity of 3,450 MBH. The total capacity of the system is 37,950 MBH with a firm capacity of 34,500 MBH. Water lines travel below the ground in a concrete-encased duct bank.

The existing chilled water generation system of the Satellite Plant is composed of two 750-ton electric centrifugal chillers. The total capacity of the system is 1,500 tons with a firm capacity of 750 tons. Adequate space is available to add a chiller, a cooling tower section, and a boiler as demand increases.

Electricity Distribution

The electric substation, adjacent to the Central Plant, is composed of two pairs of transformers. The first pair is dedicated to the buildings located on campus and a second pair is dedicated to the Central Plant. The capacity of the transformers serving the campus is 20,000 kVA each. The total capacity of this system is 40,000 kVA with a corresponding firm capacity of 20,000 kVA.

In addition, the campus is served by eight feeders. Two additional feeders will be added as part of the Interdisciplinary Life Science Building project to address loads imposed by the new building. A 2017 condition assessment indicates that the feeders and primary equipment require replacement and upgrades.

Domestic Water

Two water lines separately connect to a Baltimore City water main below Wilkens Avenue and distribute water to the campus and the research and technology park from. The two 12" cast iron pipe water lines run along Hilltop RoadWater lines split from the main serving the campus and run below Hilltop Circle between Walker Avenue and Poplar Street. This provides a certain amount of redundancy to most campus buildings.

A 2017 condition assessment of the domestic water piping has found tuberculation in a majority of the piping which is over thirty years old. Over 10,000 linear feet of piping needs to be cleaned and relined to prevent hydraulic degradation.

Data and Telecommunications

UMBC is known for innovative use of technology to support teaching and learning. As a major research university, it is critical that UMBC students, faculty, and staff have access to an extensive array of computing services for research and scholarship, as well as for communication and collaboration.

Systems on campus are planned and maintained by the UMBC Division of Information Technology (DoIT). DoIT provides a state-of-the-art campus network with multiple Ten Gigabit/s Ethernet feeds to all major buildings and research labs, and Gigabit Ethernet connections to every room. High speed wireless network access is provided throughout campus. In addition, all residential units are provided with dedicated Gigabit Ethernet and wireless connections.

The university continues to upgrade classroom technology to support changes in pedagogy and new developments in technology. Since 2009, numerous classrooms have been upgraded with multiple screens or wall monitors, and the corresponding technology to allow students to collaborate and solve problems in class using this technology.

UMBC is seen as a national leader in the use of analytics (or "actionable intelligence"). DoIT provides the technical infrastructure and expertise for the official UMBC Report Exchange (REX) data warehouse supported and curated by Institutional Research, Analysis & Decision Support (IRADS). As data and communications continue to play a vital role in all aspects of university functions, larger spaces to accommodate IT equipment are being programmed into major renovations and new buildings.

Communications infrastructure spaces are spread throughout the campus, located to allow for the best distribution of the network. These spaces include data hubs in the Central Plant, the Engineering Building, the Performing Arts and Humanities Building, and bwtech@UMBC South as well as the cable TV head end in Sherman Hall. In addition, voice hubs are sited in the Central Plant, Technology Research Center, and bwtech@UMBC South.

Maintaining a safe and resilient computing environment that supports the UMBC's teaching, research, and administrative operations is mission-critical to the university. UMBC is one of a handful of universities in the country that has achieved InCommon Bronze status signifying that UMBC is using best practices in operating its identity management and user account management. UMBC operates its security program under the security requirements of the USM Board of Regents and operates a risk management program based on the data that must be protected. DoIT works closely with the UMBC Center for Cybersecurity and the UMBC Center for Women in Technology on programs to give scholars real-world experience in cyberinfrastructure by working within DoIT to help maintain our systems and secure our university.

Energy Conservation

UMBC has been a leader in developing and implementing plans, strategies, and upgrades to conserve energy use on the campus and to operate in a more sustainable and efficient way. UMBC strives to use less energy and to buy green power. The average electricity used per square foot of building on campus has been reduced over the last ten years by 22.5 percent. Some of the initiatives completed or underway that have helped UMBC reduce energy costs include:

- Upgrading heating/cooling systems for campus by retrofitting the Central Plant with high-efficiency boilers, chillers, and hot water variable frequency drives and new pumps
- Installing a 1.6 million-gallon thermal storage system to supplement the Central Plant. Charging the tank at night reduces the load on the electric grid during peak daytime hours
- Purchasing Renewable Energy Credits (RECs) to support development and generation of renewable energy. UMBC increased the percent of electricity it purchases from regional renewable sources, like wind and solar projects, from 3.5 percent in FY 2007 to 24 percent in FY 2016
- Modernizing heating/cooling systems serving student apartments and residence halls

- Upgrading exterior lighting for roadways, walkways, and parking lots to high-efficiency metal halide lamps and LEDs
- Upgrading interior lighting and providing room sensors to automatically turn lighting off when the spaces are not occupied
- Replacing pneumatic controls with Direct Digital Controls tied to a Building Automation System with graphical user interface to improve set point control and occupancy scheduling

Facilities Management has continued to take a lead role in UMBC's sustainability efforts. These efforts in energy conservation, energy management and purchase, recycling and composting, and building design are summarized on the FM website. For information on UMBC's past and ongoing energy-related initiatives go to http://fm.umbc.edu/energy-related-initiatives/.

Recycling

UMBC has a comprehensive, campus-wide recycling program. While paper, plastic, and aluminum were until recently collected separately and recycled, in early 2018 the campus switched to single-stream recycling, simplifying the recycling process on campus. It is expected that this simplified program will create less waste on campus and will ensure that most recyclable products are actually recycled.

Additional programs have been extremely popular and successful on campus, including:

- Recycling of electronics and consumer goods
- Collection of office/classroom furniture and athletic equipment for donation to charitable organizations
- Purchasing of recycled paper products, and ensuring that cleaning products are Green Seal certified
- Purchasing of Energy Star rated appliances for laboratories and residence halls
- Participation by students in annual recycling programs like Recyclemania

Green Buildings

UMBC is committed to sustainable construction and renovation. All new buildings will have a minimum of a LEED Silver certification (or equivalent). LEED provides a framework to create healthy, highly efficient, and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement. LEED employs a holistic approach to green building design incorporating sustainable sites, water efficiency, energy, atmosphere, materials, indoor environmental quality, and innovation. The university will seek LEED certification for all major building renovations. For smaller renovation projects, the university will integrate sustainable practices such as installing Energy Star roofing systems and replacing equipment with Energy Star rated products.

4.1 Strategic Planning

Our UMBC: Strategic Plan for Advancing Excellence requires the purposeful development of the university's physical assets to attain the outlined strategic goals and supporting objectives. The *2018 Facilities Master Plan* integrates these specific recommended approaches to:

Support the Student Experience

- Create informal gathering places on campus where students can socialize, study, and interact more effectively with peers and faculty.
- Upgrade and add classrooms to promote utilization, respond to enrollment growth, and support effective pedagogies such as active learning.
- Improve and expand recreation and health facilities to advance health and wellness programs focused on reducing student stress and anxiety and improving academic success, academic efficacy, and career outlook.
- Develop dining and retail opportunities next to campus to support the campus community and promote visitor engagement in cultural and athletic campus events.

Promote Research, Scholarship, and Creative Achievement

- Invest in state-of-the-art research laboratories, core/shared research facilities, and instrumentation to fully support multi-disciplinary research and technology transfer.
- Improve utility infrastructure to eliminate power and water outages and ensure continuity of operations.
- Enhance information technology infrastructure to support and promote the creative use of technology (e.g. cybersecurity, virtual laboratories, and digital humanities).
- Develop fabrication areas including "maker" and "design" labs to promote interdisciplinary collaboration.

Foster Innovative Curriculum and Pedagogy

- Provide space to support research and training in best pedagogical practices, including facilities for a Center for Teaching Excellence.
- Provide offices for additional full-time instructional faculty so that 70 percent of all courses are taught by full-time faculty.
- Renovate, redesign, and create classrooms to support enrollment growth, expansion of active learning techniques, and introduction of other state-of-the-art instructional practices.
- Add informal learning spaces for student collaboration, team-based work, and class projects.

Nurture Community and Extended Connections

- Strengthen and grow UMBC's research and technology park to support research, technology transfer, and workforce development.
- Provide space necessary to adequately support entrepreneurship, social innovation, and technology commercialization efforts.
- Ensure key campus facilities appropriately engage immediate neighbors and strengthen regional community connections.

4.2 Evolving Program Offerings

As UMBC continues its ascendancy as a premier public research university integrating teaching, research, and service to benefit the citizens of Maryland, availability of high quality physical resources is a critical factor. The *2018 Facilities Master Plan* dynamically responds to growth and evolution of:

- Health and Wellness programs emphasizing healthy living, exercise, nutrition, and stress relief for students, faculty, and staff
- Army and Naval ROTC programs developing military officers and leaders
- Media and Communication Studies offering theoretical and practical encounters in communication, culture, and knowledge to prepare students for an increasingly digital, interactive, and global world
- Biotechnology graduate programs preparing science professionals to fill management and leadership roles in biotech-related companies or agencies
- Cybersecurity graduate programs preparing computer science, information systems, and other professionals to fill management, analytical, investigative, operational, and/or technical leadership roles in the Cybersecurity profession
- Computing disciplines teaching students in the ever-evolving areas of computer science to be problem solvers with the ability to design, implement, and evaluate systems
- Academic programs including Interdisciplinary Studies, Visual Arts, and Mechanical Engineering offering hands-on, creative, and problem-solving approaches to learning (e.g. kinetic sculpture, intermedia and digital art, and three-dimensional design and fabrication)

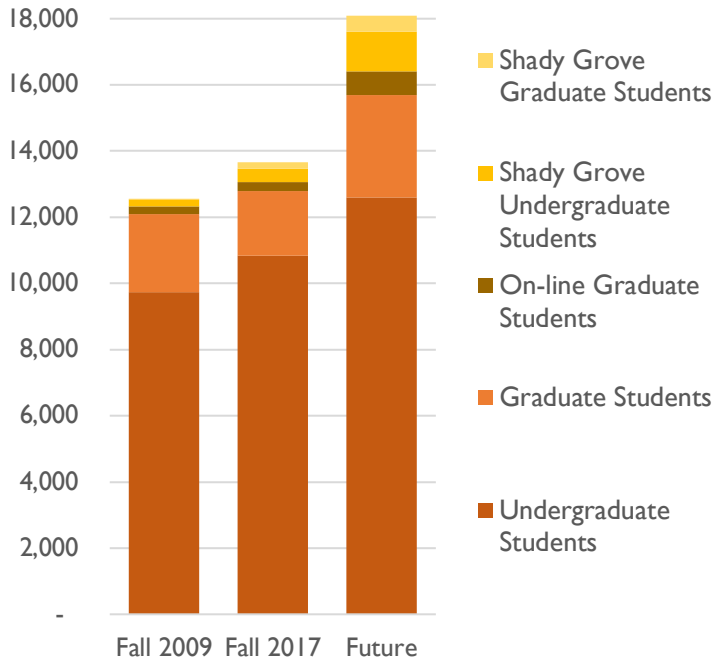
4.3 Enrollment Projections

UMBC's exceptional national reputation for undergraduate education has resulted in steady increases in undergraduate enrollment even in times of lower national college-aged population trends. Strong programs in humanities and STEM disciplines are attracting the finest students from Maryland, other states and nations, and transfer students from other state institutions. The university projects that the number of undergraduate students will continue to grow. The historic success of UMBC's men's basketball team in the 2018 NCAA tournament is projected to provide a further boost in undergraduate enrollment.

The Graduate School at UMBC offers a variety of challenging programs leading to terminal doctorates and master's degrees in the sciences, arts, public policy, and professional studies. UMBC's emphasis on growth in translational and applied research will provide even more opportunities for graduate students to excel. The university anticipates that the rate of graduate student enrollment growth will outpace even that of undergraduate students. Rising enrollment reflects the caliber of UMBC's graduate programs, the emphasis on expanding research excellence and opportunities, and the demand for a highly trained workforce.

UMBC will continue to cultivate its programs focused on non-traditional students. The university projects additional growth in on-line and hybrid graduate program offerings and the number of undergraduate and graduate students enrolled in UMBC's programs at the Universities at Shady Grove. These two areas have seen dynamic growth in the last few years, and UMBC projects that this trend will continue in the next few decades.

Based upon economic factors, historic trends, regional influences, demographic studies, institutional capacity, and UMBC's and USM's strategic plans, a future student population of 18,000 is assumed for this *2018 Facilities Master Plan.*



4.4 Faculty and Staff Projections

Enrollment growth forms the basis for projected growth in UMBC's faculty and staff. Other factors influencing the need for more faculty and staff include business practices, operating procedures, research activity, community outreach, and university development. Furthermore, partnerships with the federal government, public schools, industry, and other institutions require additional resources to flourish.

Faculty

UMBC has earned a strong reputation for high quality, innovative instruction. That quality is largely dependent on the university's excellent and dedicated faculty. National research has shown that student engagement with full-time faculty has a substantial positive impact on retention and success, particularly in first- and second-year learning experiences. To maintain UMBC's reputation for outstanding undergraduate education, the university will focus attention on increasing the number of full-time faculty to lower the student-faculty ratio which was 18:1 in 2017-2018. *Our UMBC: A Strategic Plan for Advancing Excellence* further emphasizes the need for increasing the number of full-time research faculty to continue the university's ascendancy as one of the world's top young universities for strong research, innovation, and a global outlook.

Staff

UMBC's staff contribute to the university's extraordinary success in a variety of ways. Staff promote excellence and support students, faculty, other staff, alumni, and visitors. UMBC emphasizes leveraging technology to maximize efficiency and provide improved service to every aspect of campus life: academic, research, administrative, residential, recreation, athletics, and outreach. Even so, additional staff will be required to keep pace with the added workload resulting from growth in enrollment and research activity.

Graduate Assistants

In teaching, research, and administrative environments, UMBC's graduate assistants are afforded the opportunity to work closely with distinguished faculty members and elite undergraduate students. Graduate research and teaching assistants extend the capabilities of and support full-time faculty, thereby maximizing faculty productivity and contributing to their success. With the growing number of undergraduate students and increased research opportunities, the number of graduate assistants is projected to increase accordingly.

4.5 Space Needs and Facility Projections

Moving forward, the university is committed to serving the citizens of Maryland and reaching the next level of inclusive excellence. The availability and accessibility of appropriate, high-quality space is a key resource necessary to further UMBC's evolution as a nationally and internationally recognized public research university.

The projection of future space needs is driven by many factors including enrollment, academic programs, research activities, and strategic planning goals.

Assuming future fall enrollments of 18,000 students, over one million square feet of additional net assignable space will be needed.

Table 4.1 Projected Space Needs
(net assignable square feet)

Room Use Type	Fall 2017	At 18,000 students	Deficit
Classroom	122,051	162,000	39,949
Laboratories	285,028	579,000	293,972
Office	413,619	510,000	96,381
Study	111,981	303,000	191,019
Special Use	193,850	322,000	128,150
General Use	213,058	261,000	47,942
Support	266,230	309,000	42,770
Health	1,597	6,000	4,403
Residential	744,138	1,006,000	261,862
Other	32,364	33,000	636
Total	2,383,916	3,491,000	1,107,084

Academic and Research Space

Availability of modern classrooms and teaching laboratories are essential to supporting and enhancing the success of UMBC's undergraduate and graduate students. Space deficits are projected to increase for classrooms, teaching labs, and open labs specifically configured and equipped to provide opportunities for hands-on learning, exploration, and innovation.

Providing a sufficient number of appropriately-sized research laboratories, studio spaces, and library resources is integral to UMBC's strategic goal to develop excellence in new intellectual frontiers and foster multidisciplinary and inter-institutional approaches to research. Current space deficits, particularly in research labs, will rise with the growing number of graduate students and research faculty.

Students seek plentiful and convenient space for project team collaboration, independent study, and group study. Current deficits in study space will become worse with projected enrollment growth.

Teaching and research facilities in many of the existing academic buildings are outdated and require renewal. Preliminary building condition assessments reveal that building infrastructure is failing and space reconfigurations are needed for many academic buildings in the campus core.

At the eastern edge of campus, the Technology Research Center originally designed as a juvenile detention facility was converted to a research building. Building systems are failing and the Technology Research Center no longer adequately supports existing and projected research needs.

New academic and research buildings are needed to address space shortages, support future growth, and provide opportunities to relocate current activities away from poorly performing buildings. Building renewals are needed to extend the useful life of Sondheim Hall, Sherman Hall, and the Math and Psychology Building, as well as portions of the Fine Arts Building and the Biological Sciences Building.

Student Life and Student Services Space

Academic success in the classroom is not the only factor in preparing graduates for meaningful careers and personal lives. Out-of-classroom learning areas provide opportunities to activate the imagination, foster innovation, and promote civic engagement. A vibrant student community relies upon the availability and accessibility of meeting rooms, lounges, and increasingly specialized areas such as maker labs, fabrication studios, entrepreneur centers, and informal performance studios. In the fall 2017 semester, a 30,000 nasf deficit existed for these types of spaces. In addition, existing spaces assigned for student services are often undersized, inefficiently designed, widely distributed throughout campus.

A new building would provide the means to consolidate student services and offer new opportunities to foster vibrant, exceptional, and comprehensive undergraduate and graduate student experiences. Vacated space in existing academic buildings then could be repurposed for teaching and research.

Recreation

In the last 50 years, UMBC has transformed from a commuter to a highly-residential campus. Development of indoor and outdoor recreation areas to promote social interaction, fitness, health, and wellness has lagged construction of academic and residential buildings.

New indoor and outdoor recreation areas are needed to support physical education classes, club sports, intramurals, and informal recreation. UMBC students would welcome multi-purpose recreation fields and hardcourts which support a variety of intramural sports, games, and

recreation activities. A new network of bike trails and running paths would promote an active lifestyle for students, faculty, and staff, as well as the neighboring community. UMBC's proximity to Patapsco State Park and the campus natural areas can be leveraged to support a new outdoor adventure recreation program. Finally, informal recreation areas located within or adjacent to residential communities would provide opportunities for unscheduled games and recreational activities.

Residential

Many of the college campuses in the University System of Maryland are ringed by medium- to high-density residential communities affording students off-campus living opportunities. The UMBC campus is situated in an area of established low-density residential development with few options for off-campus living. As a result, current demand for on-campus housing is high, with 40 percent of undergraduate students and 75 percent of freshmen living in campus residential communities. UMBC is committed to maintaining its highly residential character. An additional 640 beds on campus is required to satisfy on-going and future housing demand driven by projected enrollment growth. As new residential facilities are planned, opportunities will be explored to integrate new dining, maker labs, and additional academic support to enrich the student experience.

4.6 Emphasis on Sustainability

UMBC is committed to on-going and planned sustainability efforts to reduce its environmental impact and to strengthen resilience to the effects of climate change. The university is targeting specific improvements in energy efficiency, stormwater management, carbon reduction, and environmental stewardship.

Energy Efficiency

Much of the energy used by the university is to heat and cool its academic, residential, and athletic buildings. Most state-supported buildings are connected to the boilers and chillers at the Central Plant. Most of the larger residence halls are served by the Satellite Utility Plant. Specific opportunities for future energy savings include:

- Upgrading one or more existing chillers and one large boiler in the Central Plant with high-efficiency models
- Installing more efficient interior and exterior lighting throughout the campus
- Installing metering to monitor energy consumption

- Continuing implementation of high performance criteria in new building design

Environmental Stewardship

UMBC is a responsible steward of the university's natural environment and related resources. The university has been recognized for its leadership and innovation in programs that promote, educate, and create a more sustainable campus environment. The campus is implementing programs and practices to hone environmental consciousness and educate students, faculty, and staff. The university is committed to the development of the next generation of leaders to tackle global climatic issues. Specific opportunities for responsible stewardship and appropriate engagement of the natural environment include:

- Extending the 15-acre forest conservation bank into additional areas of mature contiguous forests
- Preserving other forested natural areas for environmental instruction and research
- Installing interpretive signage along paths of the Herbert Run Greenway, a natural stream corridor
- Stabilizing streams running through campus
- Removing invasive plant species that overwhelm the existing native understory
- Providing signage to illustrate how our investments and practices impact the stability of the natural environment
- Targeting areas where mown turf can be converted to ecologically robust meadows

Stormwater Management - Institutional Management Plan

A recently completed hydrologic study provides UMBC with a holistic strategy for managing rainfall run-off originating from campus as well as from upland sources in Catonsville. Best management practices and site improvements that maximize environmental benefit and can be effectively integrated into future campus development were recommended.

Submitted to the Maryland Department of the Environment as an Institutional Management Plan, the study includes specific projects that have the potential to drastically improve how UMBC manages stormwater. Specific opportunities for stormwater management improvements include:

- Installing green roofs on existing and new buildings to treat rainfall that falls on these buildings
- Creating a new wetland area to the west of the UMBC stadium in a depression created by the confluence of several streams

- Creating working landscapes within existing and planned campus open spaces in ways that lend beauty, provide water management, and create environments for pollinators

Carbon Reduction

Besides reduction of energy use, the most impactful way to reduce the university's carbon footprint is to decrease the prevalence of commuting via single-occupancy vehicles. Specific opportunities to promote mobility and commuting alternatives include:

- Expanding carpooling facilities
- Supporting car sharing and ride sharing services
- Expanding the electric vehicle charging network
- Creating off-road trails, marked routes on roadways, and repair and parking facilities for bicycling
- Expanding the university's transit shuttle service with its fleet of clean-fuel and energy-efficient vehicles

4.7 Guiding Principles

1. Align campus development with UMBC's strategic plan.
2. Provide for enrollment growth in an intentional manner.
3. Assure that the campus is welcoming and accessible.
4. Promote meaningful interactions through thoughtful planning.
5. Advance carbon neutrality and protects the natural environment through responsible stewardship.
6. Optimize utilization of existing resources.
7. Encourage interdisciplinary scholarship and research through purposeful adjacencies.

5.1 Implementation Plan

UMBC's *2018 Facilities Master Plan* implementation plan is illustrated in Figure 5.2. The Implementation Plan reflects the outcome of an extensive campus-wide process and aligns with the seven guiding principles. The proposed projects are part of a responsible development strategy to insure UMBC's continued success integrating teaching, research and service to benefit the citizens of Maryland.

Figures 5.4 to 5.14 illustrate distinct campus precincts and highlight proposed renovations and new development that will contribute to supporting *Our UMBC: A Strategic Plan for Advancing Excellence*.

Figure 5.1

The Implementation Plan in numbers

Table 5.1 Proposed Projects

Project	New Area (GSF)	Renovation (GSF)
Academic and Research		
Albin O. Kuhn Library & Gallery renewal		296,000
Biological Sciences Building (north wing) renovation		54,000
East Academic and Research Building	160,000	
Global, Cultural, and Visual Studies Building	28,000	100,000
Interdisciplinary Life Sciences Building	133,000	
Math and Psychology Building renovation		66,000
Northeast Academic and Research Building	160,000	
Sherman Hall renovation		120,000
Sondheim Hall renovation		93,000
West Academic and Research Building	160,000	
Student Affairs		
Informal Recreation Park	5,000	
Outdoor Recreation Area	10,000	
Retriever Activities Center renewal		137,000
Retriever Soccer Park improvements	20,000	
Student Services/Student Life Building	110,000	
The Commons improvements and additions	115,000	48,000
Residential		
East Residential Community with Dining	123,000	
West Residential Community with Learning Commons	113,000	
Parking and Circulation		
East Parking Garage	1,500 spaces	
West Parking Garage	1,000 spaces	
Westland Boulevard realignment		
Campus Support and Site Improvements		
Central Green		
Central Utility Plant equipment upgrades		
Center Road and Poplar Avenue pedestrianization		
Satellite Central Utility Plant (SCUP)	20,000	
Public-Private Partnerships		
Innovation District	TBD	

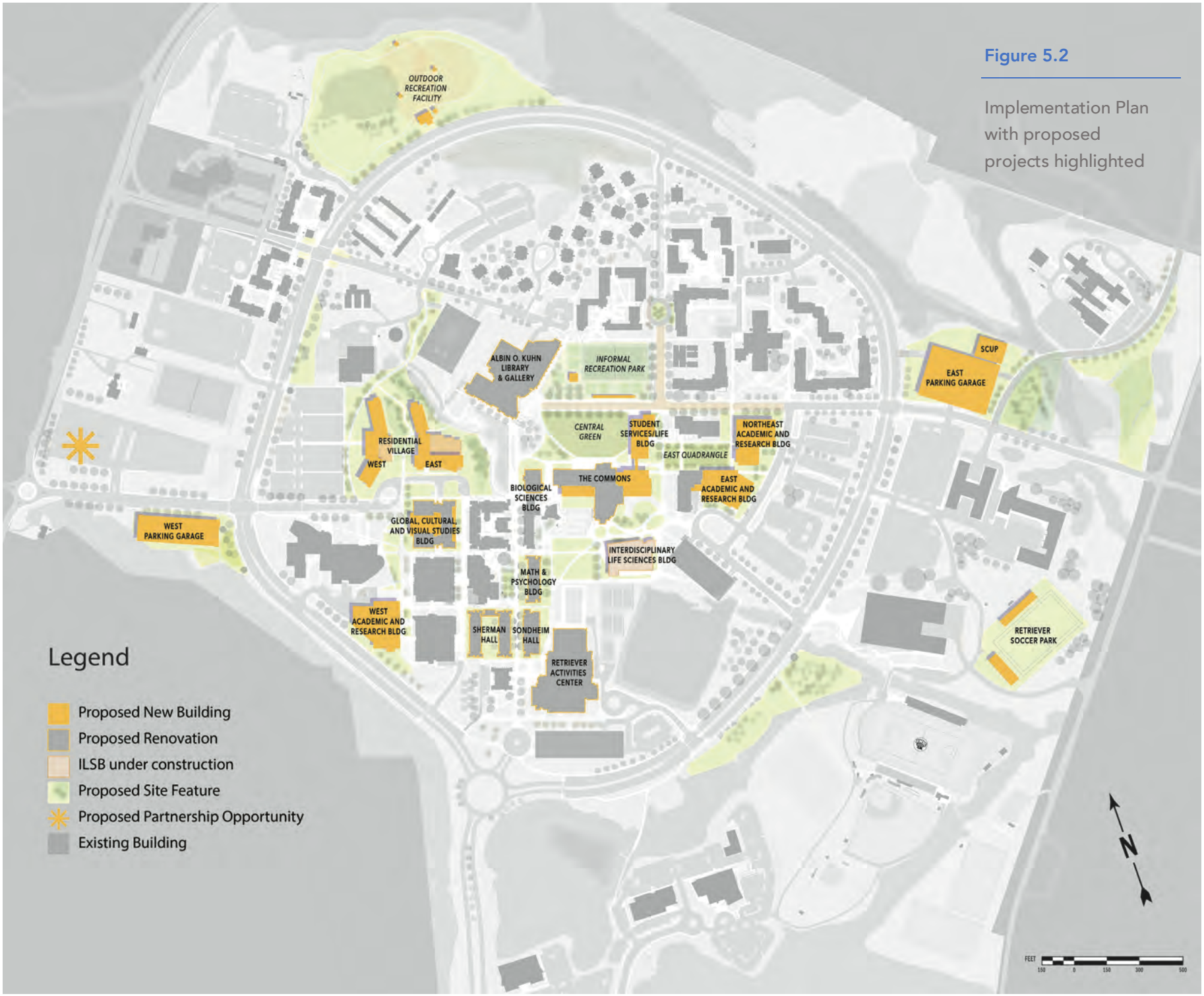


Figure 5.2

Implementation Plan with proposed projects highlighted

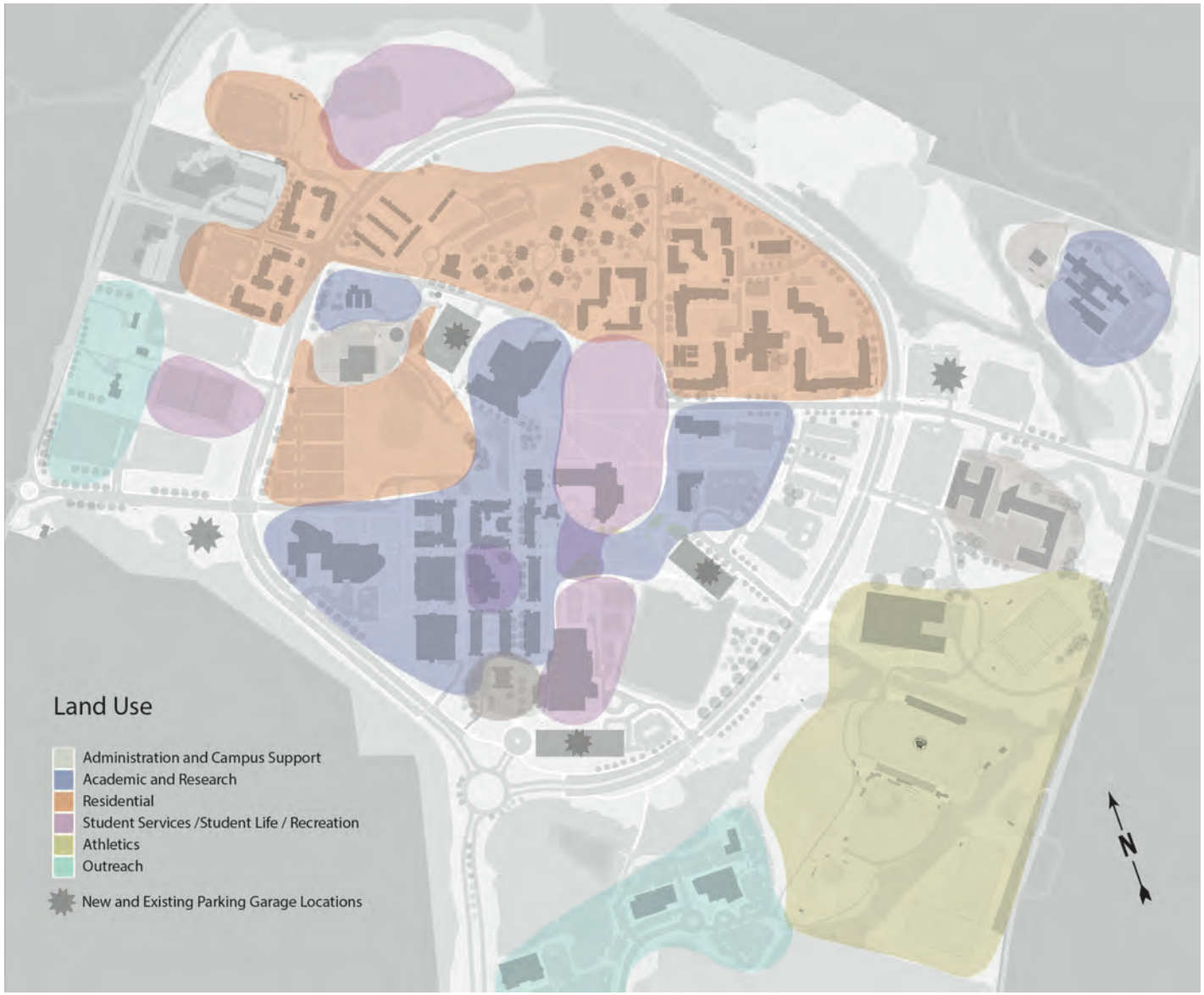


Figure 5.3

New Land Use Patterns

5.2 Land Use Changes

Land use changes are proposed to respond to enrollment growth, advance strategic planning goals, and align with the facilities master planning guidelines:

- Develop on existing parking lots to extend the academic and research core to the east.
- Extend residential development to the southwest to make proximal to the academic core.
- Concentrate parking into multi-story parking garages outside of Hilltop Circle.
- Extend outdoor recreation north of residential housing while preserving forested areas and stream buffers.
- Provide opportunities for expanded partnerships along Wilkens Avenue on the west side of campus.

5.3 Plan Features

The implementation plan guides future campus development with each project supporting one of several planning goals:

RENEW THE ACADEMIC CORE with renovations to aging academic buildings, new interdisciplinary academic and research buildings, renewal of the Retriever Activities Center, and renovation and addition to the Global, Cultural, and Visual Studies Building.

VITALIZE THE HEART OF THE CAMPUS with the renewal of the Albin O. Kuhn Library & Gallery, open space and recreation improvements, renovations and additions to The Commons, and a new Student Life / Student Services Building.

CREATE A NEW RESIDENTIAL VILLAGE to increase capacity and integrate student amenities like dining, study, and hands-on learning in true living/learning communities.

EXPAND THE EAST ACADEMIC DISTRICT with pedestrian improvements, new academic and research buildings framing a campus quadrangle, new parking garage and SCUP, and realignment of Westland Boulevard.

EXPAND OPPORTUNITIES FOR RECREATION, ATHLETICS, AND PUBLIC-PRIVATE PARTNERSHIPS with new and renovated recreation facilities, enhancements to the Retriever Soccer Park, and an innovation district for new partnership opportunities.

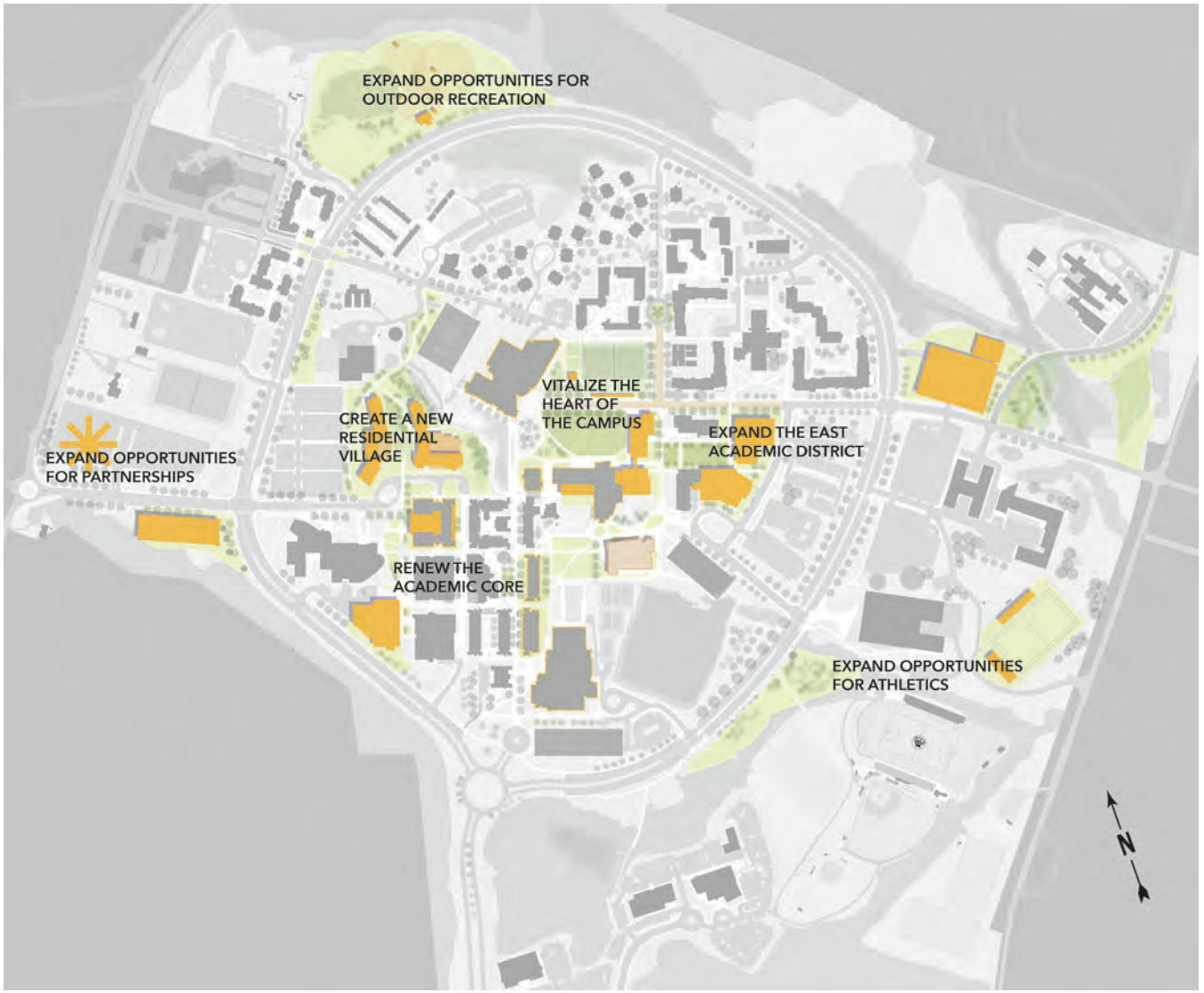


Figure 5.4

Plan Features

RENEW THE ACADEMIC CORE

Within the academic core is a rich concentration of teaching, office, research, athletic, recreation, and student support facilities. The Academic Core includes some of the oldest and newest campus buildings and is a well-travelled pedestrian zone with students, faculty, staff, and campus visitors.

As good environmental stewards, UMBC proposes to renew the university's oldest buildings. Optimizing use of existing resources is one of the master plan's guiding principles. However, additional space is essential to support and expand computing programs. With each proposed project, pedestrian paths will be upgraded, building utility services improved, new plazas developed, and stormwater management features integrated as working landscapes.

PROPOSED PROJECTS

Retriever Activities Center Renewal

The Retriever Activities Center was built in three phases beginning in 1969 and much of the building's infrastructure is failing and requires continual maintenance. By early spring 2018, the Athletics Department and many of its programs will be relocating from the Retriever Activities Center to the new UMBC Event Center. This move provides the university with a unique opportunity to renovate this aging facility, while supporting and expanding health and wellness programs on campus.

Project elements may include replacements or upgrades to: mechanical systems, plumbing, electrical service and distribution, and roofs. In addition, the project may include limited reconfiguration of interior space to correct code deficiencies and accommodate relocated and/or new health and wellness functions.

Figure 5.5

Proposed Projects to Renew the Academic Core

Global, Cultural and Visual Studies Building Renovation and Addition

The Global, Cultural and Visual Studies Building project will renovate and add to the existing 166,989 GSF Fine Arts Building. The project will create a hub at UMBC for three arenas of teaching, learning, and thinking essential to 21st century students, citizens, and communities: the global, the cultural, and the visual.

The adaptive reuse project will address failing building systems, extending the life of the 1972 building. Project elements may include: replacement and upgrade of mechanical, electrical, and life safety systems; restoration of the building envelope; and architectural modifications to address changing program needs, especially for the Visual Arts department.

A 30,000 GSF addition is proposed between the two wings of the building which will improve internal circulation on all floors and create a new western entrance oriented toward the Performing Arts and Humanities Building. The addition and renovated existing spaces will include state-of-the-art facilities including teaching facilities, critique spaces, and fabrication labs.

Biological Sciences North Wing Renovation

The existing vivarium and some related animal researchers housed in the north wing of the Biological Sciences Building will be assigned space in the new Interdisciplinary Life Sciences Building. The proposed project would include a limited renovation to prepare the vacated areas for other critical teaching and research functions.

Academic Building Renovations

Three existing academic buildings are nearing the end of their useful life and require renovation. The 45-year-old Sondheim Hall supports three research intensive programs and has the highest density of classrooms of any academic building. The 48-year-old Math & Psychology Building supports a mixture of academic programs, student services, and teaching facilities. The 38-year-old Sherman Hall is a large u-shaped building supporting numerous academic programs.

Each building will be fully renovated, replacing mechanical and life safety systems, upgrading the envelope, and improving teaching and support facilities.

New West Academic and Research Building

Sited adjacent to the Engineering Building and the Information Technology/Engineering Building, this new teaching and research building may support expanding computing, cybersecurity, and engineering programs. The new building may provide team-based learning experiences, with visualization labs and fabrication studios to support hands-on projects, like the nationally recognized Baja team.

The facility may create much needed teaching labs, fabrication labs, and core research facilities to provide students and faculty opportunities for interdisciplinary exploration and innovation. Shared study spaces may be added to support the high volume of student group projects typical for classes taught in this area of campus.

Figure 5.6

New West Academic and Research Building

VITALIZE THE HEART OF THE CAMPUS

The center of the campus is framed by the Albin O. Kuhn Library & Gallery and The Commons. These two buildings are where students - commuter and resident - come together. Historically, this area has been defined by large, unfinished, open spaces crisscrossed by pedestrian paths.

The proposed new facilities and outdoor spaces will support students throughout their academic careers. For students, this area will remain the heart of the campus and student life, from the first campus visit, to registering for classes, to meeting life-long friends, and culminating with award of a degree.

PROPOSED PROJECTS

New Informal Recreation Park

A low lying, over-used informal field will be transformed into a park-like setting for student recreation. Project elements may include a shortened play field, a variety of smaller game courts, a pavilion for outdoor events, and outdoor seating.

The Commons Renovation and Addition

The Commons will be improved in several phases to provide the additional meeting, dining, and kitchen space required to meet the needs of expanding student enrollment. Project elements may include:

- Expanding the kitchen to improve food service and catering support
- Improving the service area to allow for better delivery of goods and removal of waste
- Expanding dining with an addition to the south side of the building
- Improving the north entrance plaza facing the Central Green
- Providing an addition to expand meeting and conference opportunities

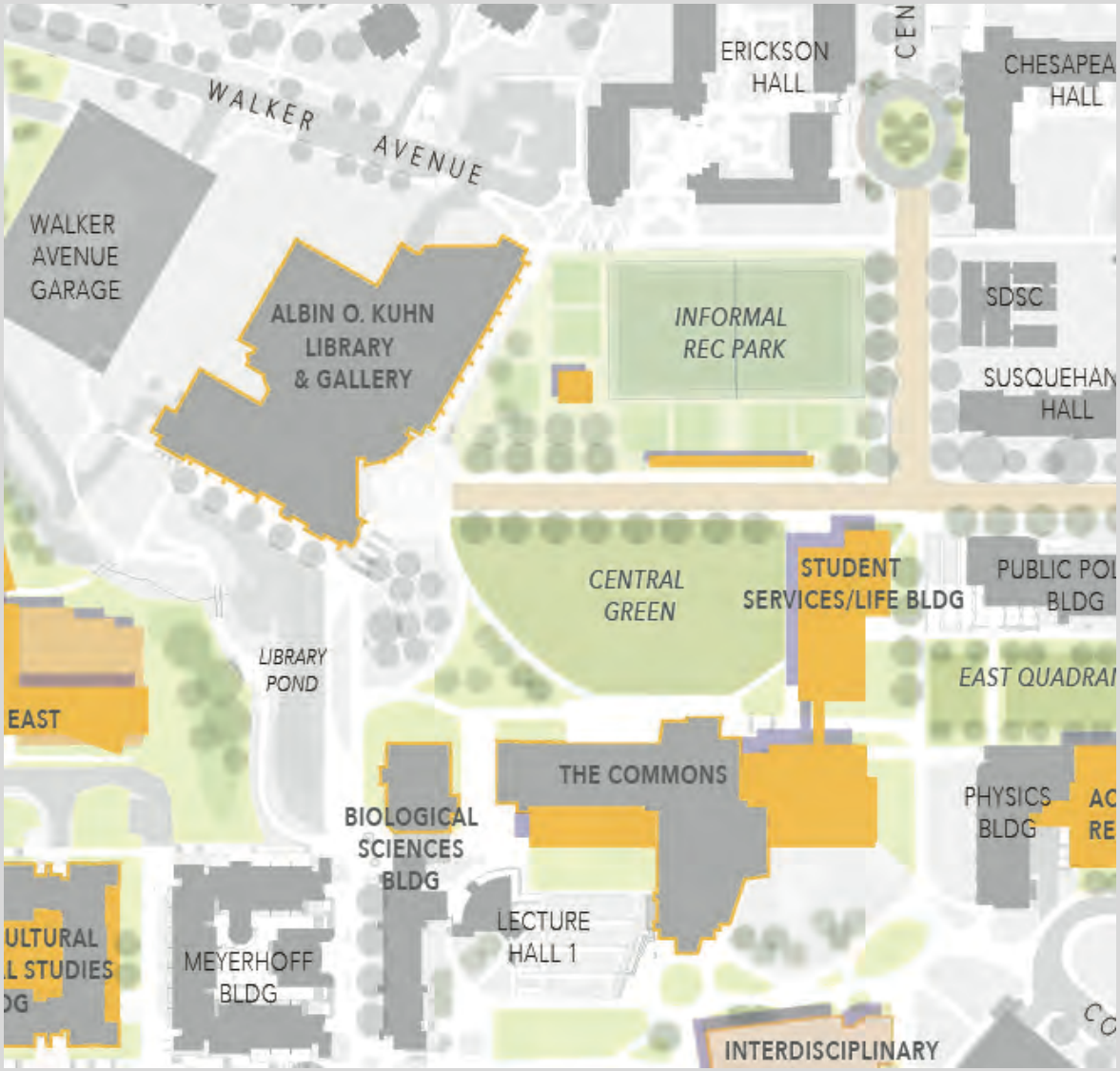


Figure 5.7

Proposed Projects to Vitalize the Heart of the Campus

Albin O. Kuhn Library & Gallery Renewal

The 296,000 GSF library was built in three phases starting in 1968 and has become outdated. The proposed project will transform the aged building into a *learning commons* that better serves students, faculty, and the public. Project elements may include:

- Creating additional student group study spaces modeled after the successful Retriever Learning Center
- Developing new shared facilities such as 3D visualization studios and maker labs
- Developing faculty research and graduate student study rooms
- Converting stack areas with reduction of on-site collection
- Focusing on community with expanded gallery, special collections room, and meeting rooms

New Student Services/Student Life Building

As a complement to The Commons, the 100,000 GSF facility will consolidate student services currently scattered on campus and create a hub of student-centered activity. Project elements may include creating space for key student services such as academic support, admissions, enrollment management, financial aid, and disability services.

Central Green

The Central Green project will transform the large open space to the north of The Commons into an iconic and memorable outdoor space. The tree-lined green will allow for study, relaxing, and informal activities while adjoining plaza areas will encourage congregation and socializing.

The activity generated by the Student Services/Student Life Building and the Informal Recreation Park will add to the success of this open space, as does the spatial definition provided by the adjacent new buildings, proposed new trellis, and tree plantings.

Figure 5.8

New Informal Recreation Park

Figure 5.9

New Student Services / Student Life Building and Central Green

CREATE A NEW RESIDENTIAL VILLAGE

Since 2009, the university has focused on improving existing campus housing with full rehabilitation of the apartment communities, partial renovations of Patapsco, Potomac, Chesapeake, and Susquehanna Halls, and improvements in Erickson Hall. Except for the 192 bed addition to Patapsco Hall, the university has not added new beds on campus since 2004 when the Walker Avenue Apartments were built.

A new residential village will provide diverse housing types, integrated learning facilities, and other amenities like dining, lounges, and study space. These dynamic living-learning communities will encourage students to live on campus until attaining their degrees.

The location, just north of the Global, Cultural, and Visual Studies Building, is a grassy field accessed from Hilltop Road and bordered on the north by a stream. The new residential village will have desirable views over the Library Pond and the campus to the east extending to the Baltimore City skyline.

PROPOSED PROJECTS

New Residential Community

A new residential community, closely aligned with the academic core, will accommodate student growth, support vibrant student experiences, encourage student retention, and enrich the experience for residential students.

The east residential buildings will provide amenities that encourage social interaction and a strong sense of community among its residents. A new dining facility overlooking the Library Pond and Central Green will be integrated into the new residential communities and serve residents, commuter students, faculty, and staff.

The west residential community will include academic and study facilities to create a learning commons focused on supporting student success.

New Pedestrian Pathways

The development of the residential village will allow the university to better knit the academic core with the residential apartment communities along Walker Avenue by providing new pedestrian and bicycling paths. Key to this connectivity is a pedestrian bridge over the ravine east of the Central Utility Plant.

Figure 5.10

New Residential Village

Figure 5.11

Proposed Projects to Create a New Residential Village

EXPAND THE EAST ACADEMIC DISTRICT

Between 2000 and 2003, the campus added the Physics Building and the Public Policy Building, creating an academic district east of the academic core. The proposed development plan expands this district with three new academic buildings, a new parking garage, a new satellite central utility plant, and improved pedestrian outdoor spaces and paths. The first phase of this plan is under way with construction of the Interdisciplinary Life Sciences Building. Two additional buildings are sited over small parking lots to the west of Park Road and oriented to complete a new campus quadrangle. The expansion of the district will extend the pedestrian zone of the campus to the east.

PROPOSED PROJECTS

New Interdisciplinary Life Sciences Building

When the 133,267 GSF Interdisciplinary Life Sciences Building opens in the fall of 2019, new teaching facilities will promote greater student success and address enrollment pressures. New core facilities and interdisciplinary research labs will expand research opportunities in areas of strategic importance to the state.

Figure 5.12

New Interdisciplinary Life Sciences Building

Figure 5.13

Proposed Projects to Expand the East Academic Village

New Academic and Research Buildings and academic quadrangle

The two proposed 160,000 GSF Academic and Research Buildings, sited adjacent to the Public Policy and Physics Buildings, will build upon UMBC's success in innovative teaching and research. The new buildings will address teaching and research space deficiencies and be built as enrollment and research growth dictate.

A new quadrangle will create an outdoor gathering space and extend the pedestrian-oriented academic core. The quadrangle will unify the academic buildings and create a setting for university events and outdoor study, as well as feature working landscapes to sustainably manage stormwater.

Pedestrianization of Center Road and Poplar Avenue

Portions of Center Road and Poplar Avenue will be converted to a new pedestrian plaza linking the new East Parking Garage to the heart of campus. The project will remove potential conflicts between vehicles and pedestrians with Center Road terminating in a vehicular turn-around circle. The existing street between this new circle and the intersection of Park Road and Poplar Avenue will become pedestrian except for controlled access reserved for emergency and service vehicles.

New East Parking Garage

The proposed five-level, 1,500 parking space garage will alleviate the stress experienced by commuters searching many small lots and roadways for available parking spaces. The new garage will provide convenient parking for patrons of the 5,000-6,000 seat UMBC Event Center; and it will replace parking lost to new academic building development. The garage will be accessed from both Hilltop Circle and from Westland Boulevard which could reduce vehicular volume on Hilltop Circle.

Westland Boulevard Realignment

Campus access from the City of Arbutus to the east has been limited by the narrow right-of-way of Shelbourne Avenue. Characteristic of early rural roadways, this county road lacks shoulders or sidewalks. Westland Boulevard will be realigned to allow campus traffic from the north and east to avoid Shelbourne Avenue and reduce impacts to the adjacent single-family residential neighborhoods.

The realignment project will allow the university to improve access to the Technology Research Center, and with new sidewalks and a bicycle lane, improve pedestrian and bicycle access to the dense residential communities north of the campus where many students reside in off-campus housing.

New Satellite Central Utility Plant

Proposed adjacent to the East Parking Garage, the new satellite utility plant will provide the utility infrastructure necessary to support proposed new development in the East Academic District. The new facility will be sized and equipped constructed incrementally as demand dictates.

Figure 5.14

Two New Academic and Research Buildings Framing a New Quadrangle

EXPAND OPPORTUNITIES TO SUPPORT RECREATION, ATHLETICS AND PUBLIC-PRIVATE PARTNERSHIPS

In the previous sections the proposed projects were grouped by area, to illustrate how each investment works toward the transformation of the whole district. This section focuses on other projects that are distributed around the campus that support student life, student growth, and partnering goals as proposed in UMBC's strategic plan.

PROPOSED PROJECTS

Retriever Soccer Park Improvements

Though the Retriever Soccer Park is the home field of the extremely successful UMBC Soccer teams, it lacks appropriate fan amenities. Project elements may include: restrooms, concessions, and a field house to provide lockers and media support. The project will also provide visitors with disabilities better access, parking, and fan experience.

Figure 5.15

Retriever Soccer Park Improvements

New Outdoor Recreation Area

UMBC is fortunate to have abundant natural areas surrounding the academic and residential core of campus. Yet, these areas are underutilized due to limited access. In response to student requests for additional recreation opportunities on campus, a new outdoor recreation area is proposed north of Hilltop Circle adjacent to residential communities.

A new facility has the potential to challenge students with recreational activities for personal growth and team building, while fostering a greater appreciation for the outdoors and nature. Project elements may include low ropes courses and ziplines, bicycle and walking paths, and other outdoor adventure challenge features.

New West Parking Garage

A new multi-level, 1,000-space parking garage is proposed to provide convenient parking for performing and visual arts events, and support student, faculty and staff growth. The garage likely would be accessed from Hilltop Road, located adjacent to the two major vehicular portals of the university. Improved pedestrian crossings of Hilltop Circle will support the garage and improve pedestrian safety.

New Innovation District

The area of campus at the corner of Hilltop Road and Wilkens Avenue may be explored as a potential public-private development opportunity.

5.4 Pedestrian Circulation and Access

The main pedestrian corridor referred to as Academic Way (marked with an A on Figure 5.16) links numerous academic buildings between the Administration Drive Garage and the Albin O. Kuhn Library & Gallery. This pedestrian spine is strongly established with a series of plazas, gardens, concentration of uses, and mature landscaping that makes it successful and appreciated by the university community. Additional corridors run perpendicular to Academic Way. They organize pedestrian movements to the west and to the east. New buildings and open spaces along these corridors will reinforce pedestrian movement.

The west pedestrian spine (B) begins at Hilltop Circle and Hilltop Road and runs downhill toward the Quad and the site of the future Interdisciplinary Life Sciences Building. This path knits together new outdoor spaces at the Performing Arts and Humanities Building, the Global Cultural and Visual Studies Building, the University Center and the Quad. The east pedestrian spine (C) begins again at Hilltop Circle on the east side of campus, where it intersects with Poplar Avenue. The path runs west past the east academic village, True Grits, the new Student Services / Student Life Building and culminates at the Albin O. Kuhn Library & Gallery. This spine links new spaces in the east academic village, True Grits, the Central Green and the new student recreation park.

Site improvements are proposed to remove barriers to access that our students with physical disabilities encounter. The goal is to improve connectivity between facilities and increase convenience and safety for the entire campus community. Proposed projects that achieve these goals of facilitating movement and increasing access are also denoted on Figure 5.16 and include:

- (1) Pedestrian path and bridge adjacent to the Central Plant that connects the academic core to the poorly connected upper areas of Walker Avenue, including the surrounding apartment communities and the Apartment Community Center
- (2) Pedestrian bridge at the entrance to the UMBC Stadium will allow for better connectivity with the academic core and accessible parking on Hilltop Circle
- (3) Reconfiguration of Center Road and Poplar Avenue inside Hilltop Circle to mirror the pedestrian-friendly character that is found in the academic core. Improvements will include new paving, pedestrian scaled lighting, landscaping, and site furniture. Center Road will become two-way and have a drop-off and turn-around adjacent to Erickson and Chesapeake Halls. Poplar Avenue will continue to accept vehicles from Park Road, but the section west of Park Road will become pedestrian. These pedestrian paths will be designed to accommodate service and emergency vehicles when needed, and vehicular traffic during residential move-in and move-out.
- (4) The realignment of Westland Boulevard will provide improved vehicular and pedestrian access to both the Technology Research Center and to the adjoining community north of the campus

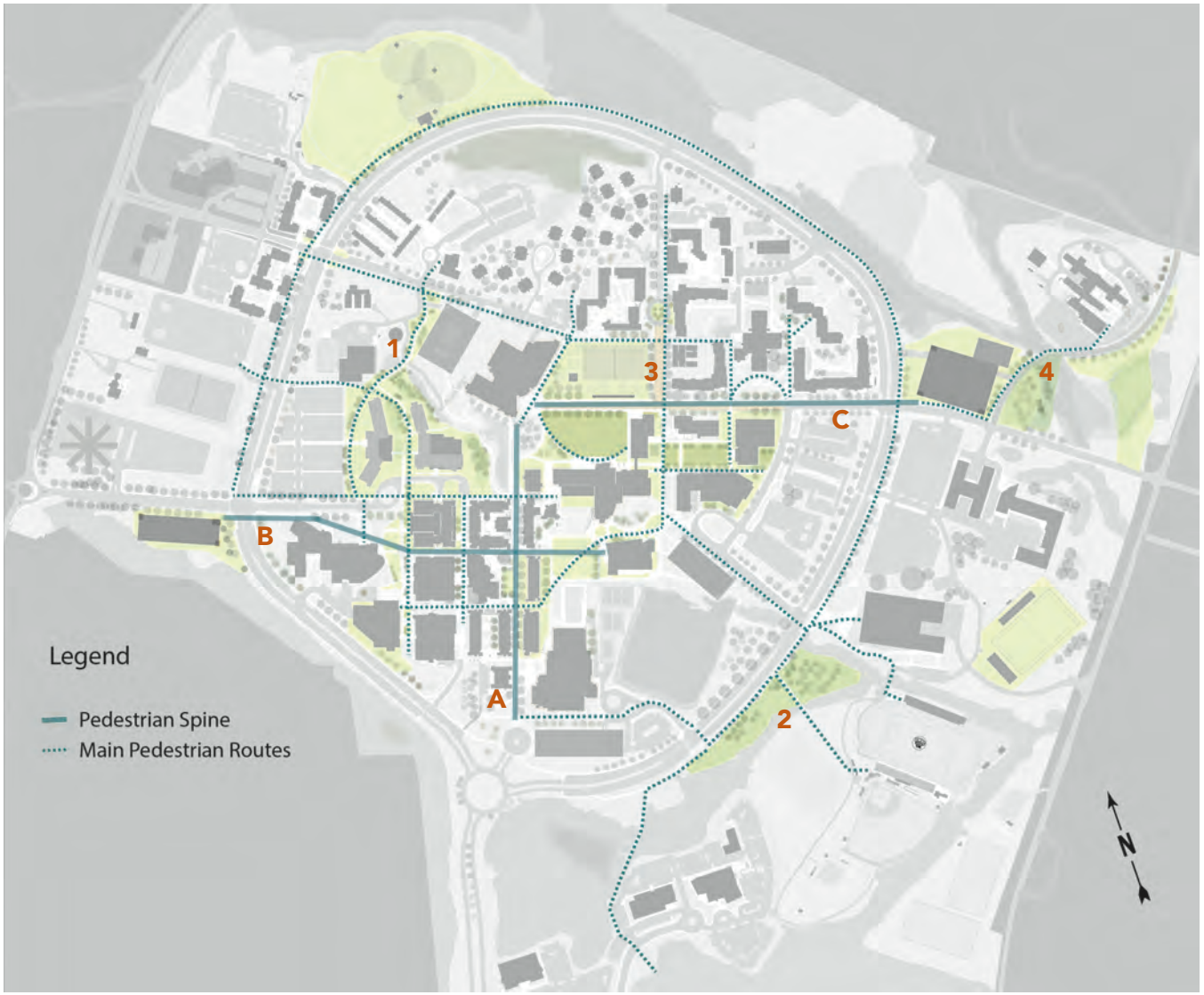


Figure 5.16

Proposed Pedestrian Circulation Improvements and Open Space Framework

5.5 Open Space and Stormwater Management

The vision guiding the future development of outdoor spaces on campus is to transform existing open spaces, knitting them into the network of pedestrian paths, and integrating distinctive landscape features that function to treat our campus rainfall runoff. This open space framework consists of spines of pedestrian movement linking academic quadrangles, plazas, natural areas, and park-like settings. The goal is to enrich the campus experience and build upon the plazas and other successful open spaces that have been created over the last decade.

As the campus extends to the east and west, the framework for open space illustrates potential areas for new outdoor gathering spaces. These spaces will be formed by the design and siting of new academic, student life, and residential buildings along three critical pedestrian corridors.

As part of UMBC's Institutional Management Plan, planned elements of a comprehensive stormwater management strategy may include:

- Installing green roofs on existing and new buildings to treat rainfall that falls on these buildings
- Creating a new wetland area to the west of the UMBC stadium in a depression created by the confluence of several streams
- Creating working landscapes within existing and planned campus open spaces in ways that lend beauty, provide water management, and create environments for pollinators

5.6 Natural Systems

A holistic approach to campus development and sustainability will reinforce the existing natural systems of the campus including our approach to the treatment of stormwater management. The approach is to protect, enhance, and create functional landscapes that demonstrate and celebrate the way water serves as a resource. These landscapes also provide important habitat, microclimate, and aesthetic benefits that will be consistent with their specific locations on campus. Through a combination of forest preservation, stream rehabilitation, landscape conversions and progressive water management solutions, like the creation of wetlands, the campus moves closer to a level of ecological balance.

Many active outdoor spaces will be transformed in conjunction with other capital projects. Each redevelopment and new development of quadrangles, courtyards, plazas, and walkways will target opportunities to incorporate working landscapes that enhance ecology and water management. Proposed ecological transformations to improve campus stormwater management and open space are delineated on Figure 5.17 and include:

- (1) Extension of an existing stream bed into a new 10-acre wetland, enhancing stormwater treatment, habitat, and ecological function of the south of the campus within an existing low-lying stream buffer
- (2) Improvements to the Central Green to improve the integration of stormwater management into existing outdoor spaces to control erosion, improve drainage, and enhance functionality
- (3) Transformation of existing mowed grass areas, especially on steep slopes, into working native landscapes, to support pollinators and improve local water quality
- (4) Increased engagement with the surrounding natural areas for recreation, research, and education
- (5) Growth of forest conservation areas that will preserve existing wooded areas and protect our stream valleys

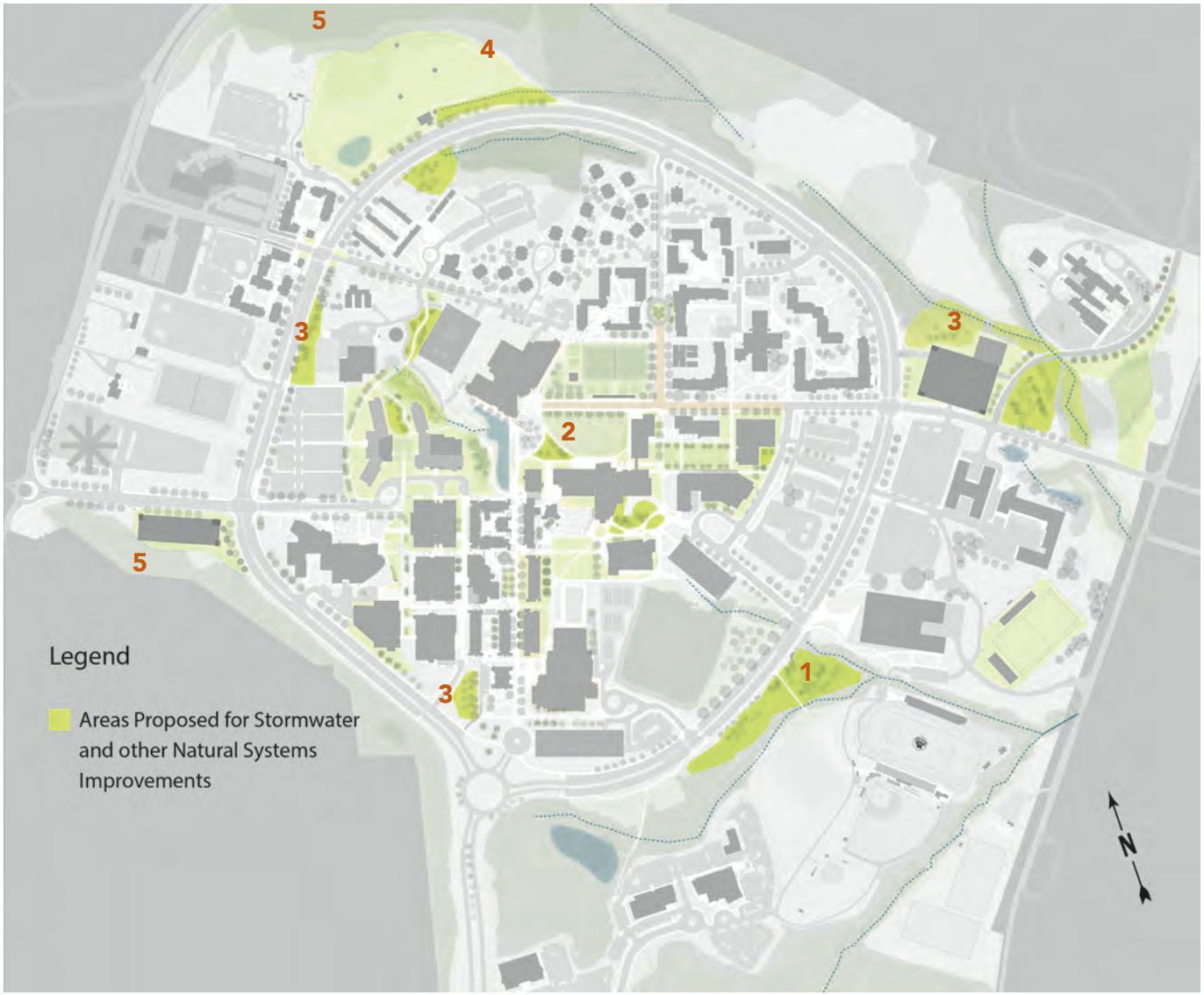


Figure 5.17

Proposed Natural Systems Improvements

5.7 Vehicular Circulation and Access

Various circulation improvement projects are proposed to advance the university's goal of improving campus access, building service, wayfinding, and pedestrian safety:

- Westland Boulevard will be realigned to connect Poplar Avenue west of the stream located east of Lot 24. The roadway change will: improve access to the campus from the north; provide access to a proposed parking facility at the corner of Poplar Avenue and Hilltop Circle; and improve both pedestrian and bicycle access to the private residential communities north of campus. The realignment will allow most eastbound traffic to avoid Shelbourne Avenue, a narrow county road with a distinctive residential character and inadequate right-of-way for sidewalks.
- Central Road and Poplar Avenue will be modified to limit vehicular traffic and improve pedestrian safety.
- Campus portals along Wilkens Avenue and Shelbourne Avenue will be enhanced. Project elements may include roundabouts, signage, and landscaping enhancements.

5.8 Parking

New parking facilities totaling 2,500 spaces are proposed to: off-set the loss of parking in Lots 2, 4, 22, 23, and 24 by proposed building development; and accommodate the projected growth in new students, faculty, and staff. Additional structured parking facilities will be located outside of Hilltop Circle and reinforce the pedestrian circulation spines along Hilltop Road and Poplar Avenue.

The Implementation Plan provides for a net growth of approximately 1,600 parking spaces. By consolidating the parking from several dispersed lots and improving vehicular access to the proposed parking garages, fewer cars will travel on Hilltop Circle thereby increasing pedestrian safety.

New parking facilities will be designed to incorporate sustainable practices in management, programming, design, and technology. New garages will be designed to accommodate alternative modes of transportation, like bicycle parking and repair stations, shuttle bus stops, electric vehicle charging, and potentially, autonomous vehicles. Garages may also provide opportunities to showcase the university's commitment to sustainability with green features like rain cisterns, efficient LED lighting, and solar canopies located on the upper level.

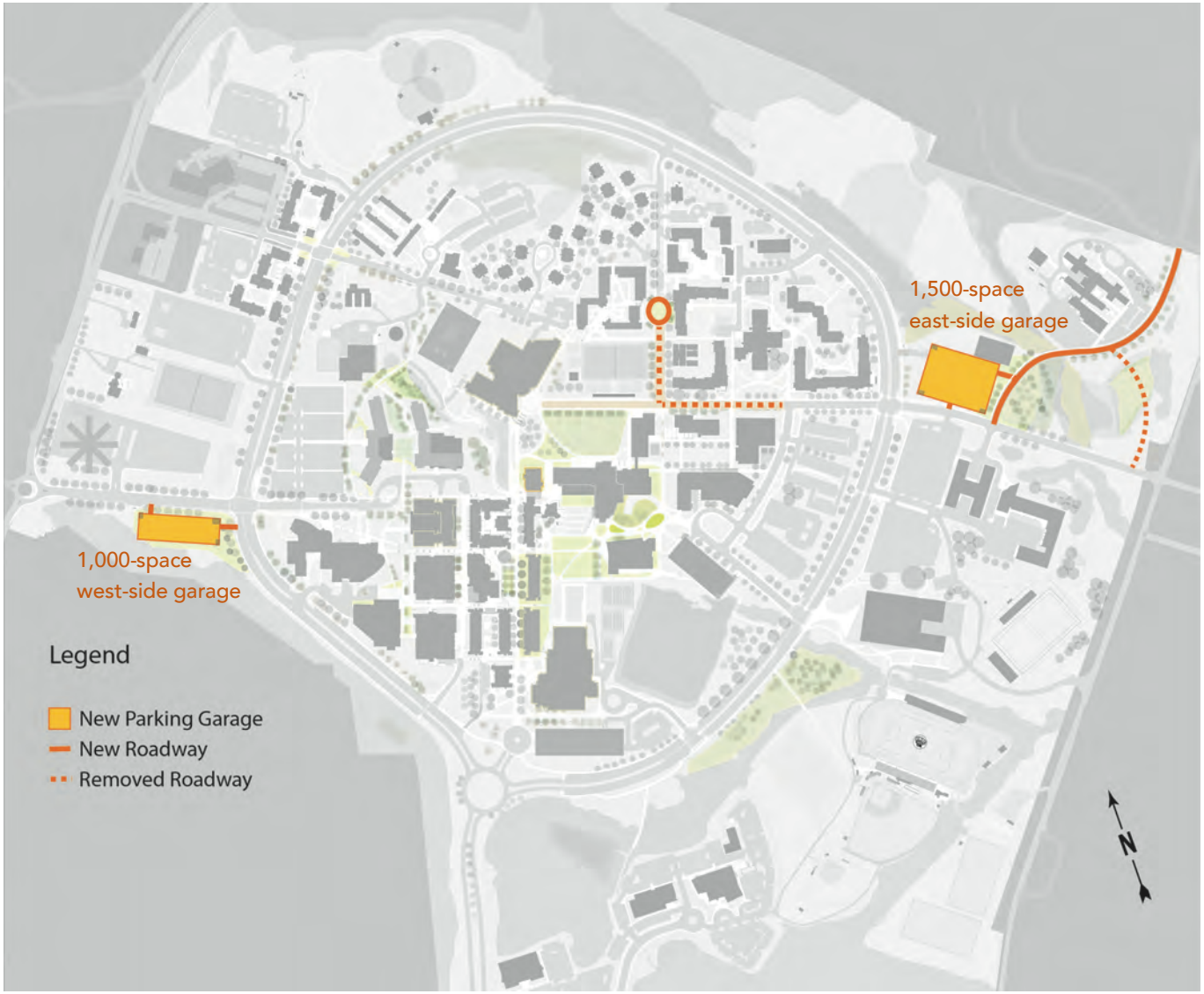


Figure 5.18

Proposed Vehicular Access and Parking Changes and Improvements

5.9 Sustainable Transportation

Supporting other campus sustainability efforts and the Climate Change Commitment signed by the university president, additional transportation initiatives are proposed to further reduce UMBC's carbon footprint. The focus will be on reducing fossil fuel use by providing alternatives to traditional car commuting. Physical improvements may include:

- Expand the network of electric vehicle (EV) charging stations throughout the campus to encourage the shift to more efficient and cleaner commuting.
- Design new parking garages with the capability to accept and efficiently park autonomous vehicles.
- Install parking management technology in all parking facilities to reduce the driving time students, faculty, and staff take to find a parking space, thereby, reducing energy use and emissions.

Targeted improvements to support bicycle commuters and recreational cyclists may include:

- Develop a dual-use, paved path that can accommodate bicycles and pedestrians along the north side of Hilltop Circle between the Event Center and Walker Avenue. This path will facilitate safe circulation through the campus from Arbutus to Catonsville, avoiding the potentially dangerous condition of Hilltop Circle.
- Add covered bicycle parking for residents and commuters to keep bicycles out of the rain.
- Add self-serve, bicycle repair stations to complement the two on campus that allow cyclists to make small repairs.
- Allocate space for a conveniently located, student-run, bicycle maintenance shop.
- Collaborate with Catonsville Rails-to-Trails and Baltimore County Planning Department to establish a safe crossing of Wilkens Avenue and dedicated bicycle lanes along Westland Boulevard and Shelbourne Avenue.
- Delineate clearly marked bicycle routes on campus.

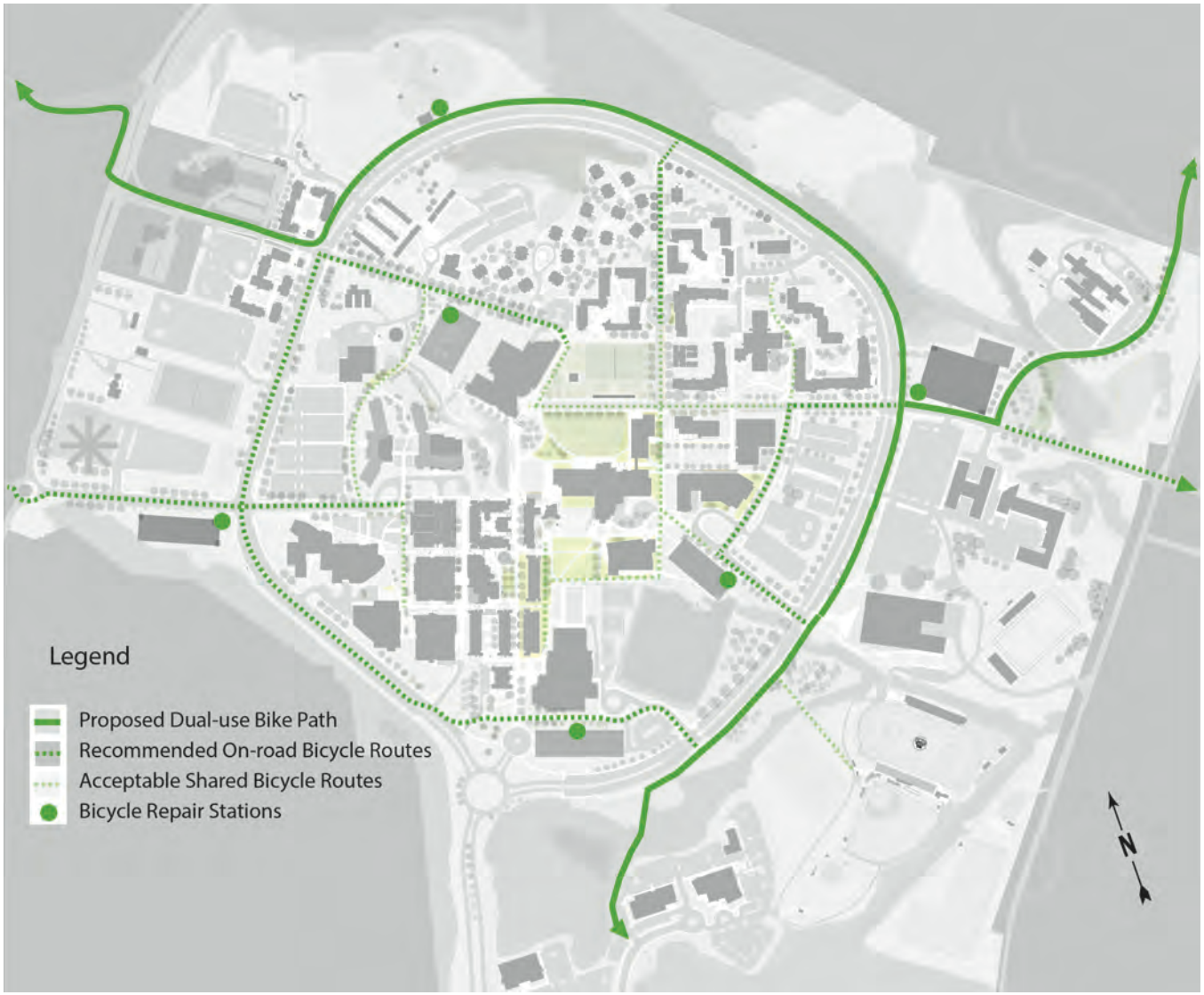


Figure 5.19

Proposed Bicycling Improvements

5.10 Utilities

As part of USM's capital budget request, UMBC's Utility Upgrade project will begin to address the existing condition of aging and inadequate utility infrastructure. The Utility Upgrades project proposes to:

- Repair and/or replace elements within the existing utility tunnels to address structural deterioration, stem the infiltration of ground water, and replace failing structures that support distribution piping.
- Reline or replace aged water distribution piping and valves.
- Replace aged power distribution feeders.
- Replace a primary boiler in the Central Plan.

Where possible, additional needed utility improvements and upgrades will be incorporated in other capital projects. The Interdisciplinary Life Sciences Building will be upgrading an aging 1,000-ton capacity chiller in the Central Plant with a 2,000-ton unit, as well as extending the utility tunnel. With this upgrade, the Central Plant has cooling capacity for an additional 150,000 GSF building. With this upgrade, the cooling towers in the Central Plant will have reached their maximum capacity. No additional chillers can be added to the plant without cooling tower expansion.

A satellite utility plant on the east side of campus, adjacent to the proposed east parking garage, will accommodate growth.

To improve reliability of the campus power network, redundant power service is needed to supplement the existing service from Wilkens Avenue. A supplemental incoming electric service, most likely from the east side of campus, would achieve desired redundancy to support campus research activities. The two utility plants will connect with tunnels, ductbanks, and utility piping to provide for future networked redundancy and more reliable infrastructure.

Data and telecommunications systems are continuously upgraded on campus as technology changes and demand grows. UMBC is envisioning new and expanded facilities to keep pace with campus development. It is critical to plan for future IT infrastructure needs like any other utility on campus, realizing that data infrastructure has both space needs and mechanical system requirements.

The university is investigating the potential for energy generation as the technology for solar and geothermal continues to mature. Opportunities will exist to locate photovoltaics on the roof of new and renovated buildings or suspended over the upper level of the proposed parking garages.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Biological Sciences Building

A measure of the success of a facility master plan is what it will allow the university to become. Through the thoughtful engagement of the campus community over many months and countless meetings, UMBC has developed a plan that provides the framework to continue its trajectory of sustained excellence.

UMBC's *2018 Facilities Master Plan…*

1 Aligns campus development with UMBC's strategic plan.

Our UMBC: A Strategic Plan for Advancing Excellence serves as a road map with numerous recommendations to enhance research, scholarship, and creative achievement to support the student experience, to support the development of innovative curriculum and pedagogy, and to build community and extended connections. The plan relies upon the availability of physical resources to support these recommendations.

The university is experiencing acute shortages in many types of space including:

- Teaching laboratories supporting project-based learning pedagogies
- Hands-on student fabrication and 3D modeling studios
- Research laboratories and core facilities supporting digital humanities, cybersecurity, engineering, and space sciences, among others
- Health and wellness, recreation, meeting, study, and student-centered activity areas that support a vibrant student life
- Residential and dining

A combination of new and renovated buildings and site features will provide the physical resources necessary to advance the recommendations of the strategic plan and address these space shortages.

2 Provides for enrollment growth in an intentional manner.

The university will continue to attract high-caliber students, elite faculty, and dedicated staff from throughout the state, the region, and the world. The campus needs to grow in a deliberate manner to meet demand. The proposed development plan will be implemented incrementally, providing new facilities required to support the student population, new and evolving academic and research programs, and the extended university community.

The proposed addition of new academic buildings and residential facilities, indoor and outdoor recreation areas, and parking facilities ultimately will support a future student population of 18,000.

3 Assures that the campus is welcoming and accessible.

UMBC's hilly terrain and numerous streams create challenges which are addressed in the *2018 Facilities Master Plan*. New pedestrian paths and bridges will connect the academic core to residential communities and athletic facilities. Thoughtful placement of new buildings, renovations of existing buildings, new recreation facilities, parking, and paths will serve to remove physical barriers and ensure that the campus is accessible to all. Furthermore, the development plan ensures that UMBC continues to serve as a public resource that provides cultural, athletic, and recreation opportunities, in addition to scholarly engagement.

4 Promotes meaningful interactions through thoughtful planning.

Proposed siting of new buildings will continue to bridge between disciplines and promote collaborative research. New buildings such as The Commons addition and Student Life/Student Services Building will address current shortages of meeting spaces for events, clubs, and social groups. The planned creation of interior and outdoor meeting places will contribute to the further development of a dynamic campus community and vibrant student life.

5 Advances carbon neutrality and protects the natural environment through responsible stewardship.

As a public institution, UMBC serves as a model for exemplifying operating efficiency, preserving open space, controlling and improving the quality of water run-off, and encouraging alternatives to single occupancy commuting. The importance that the university places on sustainability and highlights efforts to reduce our environmental impact and strengthen our resilience to the effects of climate change strongly influenced the *2018 Facilities Master Plan*. Focus areas include:

- Energy Efficiency: upgrading our existing physical plant and building control systems, installation of more efficient lighting, and continued implementation of high performance building criteria for the design of all projects
- Environmental Enhancement and Education: protecting our abundant natural environment and resources, continued management of wooded research areas, and implementing programs and practices to educate students, faculty, and staff which hones environmental consciousness
- Stormwater Management: integrating new wetlands, working landscapes, and green roofs to control and treat run-off and proposes to treat and reduce untreated paved areas throughout the campus
- Carbon Reduction: providing facility enhancements that promote commuting alternatives such as carpooling, electric vehicle charging, bicycling, and transit

6 Optimizes utilization of existing resources.

The need for critical new facilities to support expanding programs must be balanced with the need to remain good stewards of the existing campus. To optimize use of existing buildings, the development plan includes numerous renewal projects to extend the life of the UMBC's oldest buildings and utility system upgrades to improve reliability and minimize increases in operating costs.

7 Encourages interdisciplinary scholarship and research through purposeful adjacencies.

The pursuit of scholarly and creative advancement will be strengthened with proposed development that supports innovation and collaboration across all colleges. All new academic and research buildings are envisioned to support multiple academic disciplines and research centers. The development of an innovation district provides an opportunity to create meaningful partnerships that serve a greater community, work to create social change, and incentivize local businesses.

UMBC involved over two hundred people on campus in the development of the *2018 Facilities Master Plan*. This truly has been a team effort of which we are proud. The university would like to acknowledge the contributions of these individuals, organizations, and committees:

Freeman A. Hrabowski, III, President

Steering Committee

- Philip Rous, Provost and Senior Vice President for Academic Affairs
- Lynne Schaefer, Vice President for Administration and Finance
- Greg Simmons, Vice President for Institutional Advancement
- Karl Steiner, Vice President for Research
- Jack Suess, Vice President for Information Technology
- Nancy Young, Vice President for Student Affairs

Ten Stakeholder Groups

Council of Vice Presidents and Deans

President's Council

Shared Governance

- Faculty Senate
- Non-Exempt Staff Senate
- Professional Staff Senate
- Graduate Student Association
- Student Government Association

Landscape and Stewardship Committee

Classroom Committee

Neighbor Relations Group

Southwest Community Leaders

Facilities Management's Master Plan Development Team

- Lenn Caron, Assistant Vice President for Facilities Management
- Julianne Simpson, Director of Planning
- Joseph Rexing, Director of Design and Construction Services (DCS) and University Architect
- Celso Guitian, Campus Planner
- Heather Bishop, Facilities Planner
- Tomasz Argasinski, DCS Project Manager
- William Wiley, GIS IT Support Specialist
- Sean Holland, CAD Specialist II

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For the full 2018 Facilities Master Plan see
fm.umbc.edu/long-range-planning