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UMBC
An Honors University in Maryland
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Acknowledgements
1.1 Purpose and Scope of Document

The 2009-2019 UMBC Facilities Master Plan Update is an update of the UMBC 2003 Master Plan. This document presents a comprehensive, long-term vision of UMBC’s development, a plan reflective of the University’s academic mission, its institutional values and its impact on the landscape, environment, and the surrounding community. Our plan is a framework guiding facility additions and renovations to UMBC’s campus buildings, grounds and infrastructure over the long term. It serves to anticipate facilities needs to aid in realizing UMBC’s aspirations: to become one of the nation’s best research universities; to contribute to the intellectual, economic and cultural richness of the greater Baltimore area; and to engender pride among the faculty, staff, students, alumni and the citizens of Maryland.

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 that included a wide range of faculty, staff and student representatives to inform and review the document.

The year-long process began in January 2009, with the creation of a Steering Committee, six Stakeholder Groups and ten Space Planning Groups. Over 120 members of the campus community representing academic, research, athletics, outreach, and facilities served on one or more of these committees.

The Steering Committee was comprised of the each of the campus' six vice presidents as well as faculty, staff, and student leaders. The committee served as an advisory group, providing strategic context, validating or modifying goals developed by Stakeholder Groups, making recommendations regarding priorities and resource allocation, and promoting and championing the process.

The six Stakeholder Groups focused on specific programmatic areas to articulate needs, provide program details, define desired outcomes and goals, and provide ground-up information. The ten Space Planning Groups provided input on the space planning variables integrated in the space planning model used to quantify and define the campus’s space needs. Both of these groups had faculty, staff, and students representing all university divisions to ensure widespread participation. Together, the campus community developed this plan to guide the development of the Facilities Master Plan Update.
The master planning process was extended to the entire campus and surrounding communities through a series of forums. Meaningful input derived from these town hall style meetings were integrated into this plan. The participative process outlined herein is reflective of UMBC’s commitment to shared governance and ensures that the 2009-2019 UMBC Facilities Master Plan Update appropriately guides campus development as we move forward.

1.3 University Description

UMBC is a public research university, emphasizing graduate programs in the sciences, engineering, public policy, information technology, and human services and building on a strong undergraduate liberal arts and sciences core. Established in 1966, UMBC is one of thirteen institutions and research centers that together constitute the University System of Maryland.

UMBC’s rapid development as a major research university is reflected by its recognition and classification by the Carnegie Foundation as a Research University (High Research Activity), which constitutes one of the top tiers of American research universities. Among the nation’s research universities, UMBC is distinctive because of its emphasis on integrating research into undergraduate education. UMBC is also recognized increasingly as a major resource for building the State’s economy and addressing its social concerns.

UMBC’s more than 12,800 students come from nearly all 50 states and more than 80 other nations, creating a richly diverse student body and an exciting atmosphere for learning and teaching. More than 80% of UMBC’s approximately 55,000 alumni live and work in Maryland, contributing significantly to the State’s economic and social vitality.

UMBC 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.
University Vision

UMBC: An Honors University in Maryland seeks to become the best public research university of our size by combining the traditions of the liberal arts academy, the creative intensity of the research university, and the social responsibility of the public university. We will be known for integrating research, teaching and learning, and civic engagement so that each advances the others for the benefit of society.

Strategic Goals

Provide a Distinctive Undergraduate Experience - Strengthen UMBC’s performance as a research university that integrates a high-quality undergraduate education with faculty scholarship and research through a distinctive curriculum and set of experiences promoting student engagement, such as seminars, study groups, research opportunities, mentoring, advising, co-curricular learning experiences and exposure to diversity.

Continue to Build Research and Graduate Education - Pursue growth in PhD’s granted, faculty awards, publications, scholarly activities, creative achievements, and research grants and contracts in order to strengthen the culture of UMBC as a research university and continue to rank in a prestigious cohort of research universities.
2.1 Program Descriptions

Academics

UMBC offers 42 majors, 41 minors and 17 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. UMBC’s Graduate School offers 33 master’s degree programs, 24 doctoral degree programs and 20 graduate certificate programs in education, engineering, emergency health services, imaging and digital arts, information technology, aging services, life sciences, psychology, public policy and a host of other areas of interest. In addition, UMBC Division of Continuing and Professional Studies (CPS) delivers high-quality programs in biotechnology, social science, professional development, education and engineering and information technology that support the academic and professional success of our students.

Inquiry is central to UMBC’s curriculum. UMBC faculty and researchers actively seek collaborative research opportunities and consistently encourage students to obtain “real world” experiences via research, internships, co-op experiences and service learning. Undergraduates are encouraged to pursue their own research questions with the support of faculty mentors.

The University attracts high-achieving students through the nationally acclaimed Meyerhoff Scholars Program and a number of other specialized programs including the Humanities Scholars, the Linehan Artist Scholars, the Sondheim Public Affairs Scholars and the Center for Women and Information Technology (CWIT) Scholars.

Since the 2003 Facilities Master Plan the University has added various programs to support its mission, including seven new undergraduate degrees and seven upper division certificate programs, as well as eleven new graduate degrees and twelve post-baccalaureate certificate programs. See Table 2.1 for a full list of new programs that have been added since 2003.
Table 2.1
New Programs Added Since 2003

<table>
<thead>
<tr>
<th>Program</th>
<th>Degree</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied and Professional Ethics</td>
<td>PBC</td>
<td>Philosophy</td>
</tr>
<tr>
<td>Auditing for Information Systems</td>
<td>UDC</td>
<td>Information Systems</td>
</tr>
<tr>
<td>Business Technology Administration</td>
<td>BA</td>
<td>Information Systems</td>
</tr>
<tr>
<td>Chemistry Education</td>
<td>BA</td>
<td>Chemistry &amp; Biochemistry</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>MS/PhD</td>
<td>Civil and Environmental Engineering</td>
</tr>
<tr>
<td>Communications and Media Studies</td>
<td>UDC</td>
<td>American Studies</td>
</tr>
<tr>
<td>Decision Making Support</td>
<td>UDC</td>
<td>Information Systems</td>
</tr>
<tr>
<td>Emergency Management</td>
<td>PBC</td>
<td>Emergency Health Services</td>
</tr>
<tr>
<td>Engineering Management</td>
<td>PBC</td>
<td>Computer Science and Electrical Engineering</td>
</tr>
<tr>
<td>Gender and Women's Studies</td>
<td>BA</td>
<td>Women's Studies</td>
</tr>
<tr>
<td>Geography &amp; Environmental Systems</td>
<td>MS/Ph.D.</td>
<td>Geography &amp; Environmental Systems</td>
</tr>
<tr>
<td>Human Centered Computing</td>
<td>MS/Ph.D.</td>
<td>Information Systems for Human Centered Computing</td>
</tr>
<tr>
<td>ISD for e-learning (w/UMUC)</td>
<td>PBC</td>
<td>Education Dept and Continuing and Professional Studies</td>
</tr>
<tr>
<td>Management</td>
<td>MA</td>
<td>Division of Professional Education and Training</td>
</tr>
<tr>
<td>Management of Aging Studies</td>
<td>BA/MA</td>
<td>Erickson School</td>
</tr>
<tr>
<td>Mathematics Instructional Leadership (K-8)</td>
<td>PBC</td>
<td>Education</td>
</tr>
<tr>
<td>Media &amp; Communication Studies</td>
<td>BA/UDC</td>
<td>Media &amp; Communication Studies</td>
</tr>
<tr>
<td>Network Administration</td>
<td>UDC</td>
<td>Information Systems</td>
</tr>
<tr>
<td>Non-Profit Sector</td>
<td>PBC</td>
<td>Sociology and Anthropology</td>
</tr>
<tr>
<td>Physics Education</td>
<td>BA</td>
<td>Physics</td>
</tr>
<tr>
<td>Professional Studies: Biotechnology Management</td>
<td>PBC</td>
<td>College of Natural and Mathematical Sciences</td>
</tr>
<tr>
<td>Professional Studies: Biotechnology</td>
<td>MPS</td>
<td>College of Natural and Mathematical Sciences</td>
</tr>
<tr>
<td>Project Management for Information Technology</td>
<td>UDC</td>
<td>Information Systems for Human Centered Computing</td>
</tr>
<tr>
<td>Secondary Physical Science Education (w/i MA Education)</td>
<td>PBC</td>
<td>Education</td>
</tr>
<tr>
<td>Senior Housing Administration</td>
<td>PBC</td>
<td>The Erickson School</td>
</tr>
<tr>
<td>STEM Education (Elementary/Middle)</td>
<td>PBC</td>
<td>Education</td>
</tr>
<tr>
<td>Systems Engineering</td>
<td>MS</td>
<td>Computer Science and Electrical Engineering</td>
</tr>
<tr>
<td>Systems Engineering</td>
<td>PBC</td>
<td>Computer Science and Electrical Engineering</td>
</tr>
<tr>
<td>Teaching English to Speakers of Other Languages (TESOL)</td>
<td>MA</td>
<td>Education</td>
</tr>
<tr>
<td>Visual Arts</td>
<td>BFA</td>
<td>Visual Arts</td>
</tr>
<tr>
<td>Web Development</td>
<td>UDC</td>
<td>Information Systems for Human Centered Computing</td>
</tr>
</tbody>
</table>
Research Sponsored Programs

In terms of funding, UMBC is among the nation’s fastest-growing research universities. The University’s research funding has grown to $88.8 million, up from $36 million in 1996. UMBC has a dynamic faculty committed to research, a commitment borne out in professors’ successes in competing for research funding and external support.

Table 2.2
Growth of Research Funding

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Funding</td>
<td>74.4</td>
<td>78.2</td>
<td>81.2</td>
<td>87.6</td>
<td>87.5</td>
<td>88.8</td>
<td>119%</td>
</tr>
<tr>
<td>Number of Awards</td>
<td>434</td>
<td>448</td>
<td>462</td>
<td>497</td>
<td>481</td>
<td>654</td>
<td>151%</td>
</tr>
</tbody>
</table>

The University is home to an impressive number of research centers and institutes, including:

- the Center for Advanced Studies in Photonics Research (CASPR);
- Hilltop Institute (formerly the Center for Health Program Development and Management (CHPDM);
- Center for Urban Environmental Research and Education (CUERE);
- Goddard Earth Sciences and Technology (GEST) Center;
- Alex. Brown Center for Entrepreneurship;
- Center for Art, Design and Visual Culture;
- Center for Space Science and Technology (CSST);
- Center for Women and Information Technology (CWIT);
- Shriver Center,
- Imaging Research Center (IRC);
- Joint Center for Astrophysics;
UMBC ranks among the top U.S. universities in NASA funding, according to U.S. Census Bureau data. The University’s NASA-funded centers are the Joint Centers for Earth Systems Technology, the Goddard Earth Sciences and Technology Center and the Center for Space Science and Technology.

Athletics

Success for UMBC athletic programs, including lacrosse, swimming, soccer and basketball, has grown meteorically over the last ten years. UMBC teams are ranked nationally and generate a high level of pride and school camaraderie. More than 400 student-athletes compete in 19 NCAA Division I sports. Showcasing brains as well as brawn, UMBC takes great pride that their chess team has won the premier national chess tournament, the President’s Cup – not just in 2009, but five of the last nine years.

Facilities for athletic programs include a 4,500 seat stadium and track and field complex, the 4,000 seat Retriever Activities Center (RAC) arena, an indoor and outdoor aquatics complex, tennis courts, a soccer stadium, baseball and softball fields, as well as associated practice fields and training areas. These facilities host a wide range of events besides UMBC athletic competitions. In the last two years the Retriever Activities Center has hosted such diverse activities as the 2008 First Lego League robotics state finals, the 2007 America East Conference men’s basketball championships and the Maryland state girl’s high school basketball championships. These events draw large crowds from the community.

Community Outreach

UMBC prides itself on the synergies created by its academic, research and athletics programs. This community outreach is as varied as it is integral to the region.

Visual and performing arts programs also draw an audience to the campus from the Baltimore-Washington corridor. The campus community hosts visual arts exhibitions in the galleries of the Fine Arts Building and the Albin O. Kuhn Library. The University has an active outreach arts program with area schools.

UMBC was named to the 2008 President’s Higher Education Community Service Honor Roll with Distinction, recognizing innovative and effective community service and service-learning programs. The Shriver Center’s Choice Program has become a national model for supporting at-risk youth.
This delinquency prevention program, administered by UMBC’s Shriver Center, has provided support to 18,000 children throughout Maryland. Choice was successfully replicated in Hartford, Connecticut in 1997, San Diego, California in 1998, and Syracuse, New York in 2003. UMBC’s effective Internship, Co-op and Research Programs through The Shriver Center received the 2009 Best Practice Award from the Cooperative Education and Internship Association (CEIA).

Synergies between research and economic development are enhanced through the bwtech@UMBC Research and Technology Park. Comprised of eight buildings, including the five new buildings immediately adjacent to the main campus, bwtech@UMBC is a leading generator of jobs and income for the region.

2.2 Students

Enrollment

Overall, UMBC’s enrollment grew to 12,870 students in the fall of 2009. This enrollment growth of 8.4% over six years exceeded the 2003 USM projections of 5% over ten years. Full-time enrollment has remained steady at around 75% of the total enrollment.

Total undergraduate enrollment has increased since 2003, growing by 3.1% from a headcount of 9,646 to 9,947. The most dramatic growth has occurred in graduate level enrollment. Graduate student enrollment in fall 1999 was 1,484, in fall 2003 it was 2,226, and today it is 2,923, an increase of nearly 100% in ten years, and 31.3% since 2003. See Table 2.3, UMBC Student Enrollments.

UMBC as an institution is proud of the diversity of the student body, especially in undergraduate minority enrollments. In 2008, the African American student body comprised 16.5% of the undergraduates, with 21.2% Asian American and 4% of Hispanic origin.

Credit Hours

Along with an increase in enrollments, student contact credit hours have increased considerably, especially for graduate students. Undergraduates completed 136,197 credit hours in 2009, an increase of 5.1% since 2003. Graduate student credit hours increased dramatically from 11,377 in 2003 to 15,119 in 2009, an increase of 32.9% over the same period. See Table 2.4 UMBC Student Credit Hours.
Table 2.3
UMBC Student Enrollments

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate FT</td>
<td>8,024</td>
<td>8,162</td>
<td>7,980</td>
<td>7,991</td>
<td>7,962</td>
<td>8,279</td>
<td>8,614</td>
<td>7.4%</td>
<td></td>
</tr>
<tr>
<td>Undergraduate PT</td>
<td>1,622</td>
<td>1,506</td>
<td>1,426</td>
<td>1,425</td>
<td>1,502</td>
<td>1,333</td>
<td>1,333</td>
<td>-17.8%</td>
<td></td>
</tr>
<tr>
<td>Undergraduate Total</td>
<td>9,646</td>
<td>9,668</td>
<td>9,406</td>
<td>9,416</td>
<td>9,464</td>
<td>9,612</td>
<td>9,947</td>
<td>3.1%</td>
<td></td>
</tr>
<tr>
<td>Graduate FT</td>
<td>975</td>
<td>847</td>
<td>881</td>
<td>1,015</td>
<td>1,100</td>
<td>1,042</td>
<td>1,042</td>
<td>6.9%</td>
<td></td>
</tr>
<tr>
<td>Graduate PT</td>
<td>1,251</td>
<td>1,337</td>
<td>1,363</td>
<td>1,562</td>
<td>1,556</td>
<td>1,881</td>
<td>1,881</td>
<td>50.4%</td>
<td></td>
</tr>
<tr>
<td>Graduate Total</td>
<td>2,226</td>
<td>2,184</td>
<td>2,244</td>
<td>2,382</td>
<td>2,577</td>
<td>2,656</td>
<td>2,923</td>
<td>31.3%</td>
<td></td>
</tr>
<tr>
<td>Total Grad and Undergrad</td>
<td>11,872</td>
<td>11,852</td>
<td>11,650</td>
<td>11,798</td>
<td>12,041</td>
<td>12,268</td>
<td>12,870</td>
<td>8.4%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.4
UMBC Student Credit Hours

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate, TOTAL</td>
<td>129,559</td>
<td>131,370</td>
<td>127,945</td>
<td>128,164</td>
<td>128,133</td>
<td>131,840</td>
<td>136,197</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Undergraduate, BEFORE 5PM</td>
<td>106,828</td>
<td>109,476</td>
<td>106,120</td>
<td>107,638</td>
<td>108,146</td>
<td>111,217</td>
<td>116,102</td>
<td>8.7%</td>
<td></td>
</tr>
<tr>
<td>Graduate TOTAL</td>
<td>11,377</td>
<td>10,258</td>
<td>10,666</td>
<td>11,017</td>
<td>13,041</td>
<td>13,983</td>
<td>15,119</td>
<td>32.9%</td>
<td></td>
</tr>
<tr>
<td>Graduate BEFORE 5PM</td>
<td>7,888</td>
<td>6,561</td>
<td>7,051</td>
<td>7,137</td>
<td>8,590</td>
<td>8,267</td>
<td>10,595</td>
<td>34.3%</td>
<td></td>
</tr>
<tr>
<td>TOTAL Grad and Undergrad</td>
<td>140,936</td>
<td>141,628</td>
<td>138,611</td>
<td>139,181</td>
<td>141,174</td>
<td>145,823</td>
<td>151,316</td>
<td>7.4%</td>
<td></td>
</tr>
</tbody>
</table>

2.3 Faculty and Staff

Faculty

A university is defined not just by the quality of its students, but also by the excellence of its faculty and staff. Faculty serve not just as educators, but as mentors, advisors and researchers. UMBC ranks 76th in the nation for prestigious faculty awards, including a Mellon Research Fellow, a Presidential Early Career Award for Scientists and Engineers, a Guggenheim Fellow in the humanities, and a Woodrow Wilson Career Enhancement Fellow in the social sciences.

Since 2003, the campus has seen both instructional and non-instructional faculty grow in response to increased student enrollment and sponsored research activities. The number of full-time faculty has increased by 10.1% since 2003. Currently, the ratio of FTE students to FTE instructional faculty is 19.0; and the ratio of FTE students to FTE total faculty is 12.7.
Staff

Staff includes the administration, support and maintenance personnel that keep the University functioning. Since 2003, overall staff levels have declined by 7.0% although part-time staff have increased by 2.6%. The reduction in staff is in part a result of realizing increased operational efficiencies, but also as a response to budgetary cutbacks leading to hiring slowdowns and layoffs. Due to these reductions, the current ratio of students to staff has increased from 9.3 in 2003 to 10.8 in 2009.

Graduate Assistants

The primary purpose of graduate assistantships is to enable graduate students to obtain academic or research experience while making progress toward a graduate degree. The University relies on these graduate assistants to augment services provided by faculty and staff. Since 2003, the number of graduate assistants has remained steady.

Table 2.5
UMBC Faculty and Staff

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty FT</td>
<td>670</td>
<td>654</td>
<td>651</td>
<td>680</td>
<td>700</td>
<td>714</td>
<td>738</td>
<td></td>
<td>10.1%</td>
</tr>
<tr>
<td>Faculty PT</td>
<td>252</td>
<td>295</td>
<td>314</td>
<td>301</td>
<td>292</td>
<td>304</td>
<td>279</td>
<td></td>
<td>10.7%</td>
</tr>
<tr>
<td>Faculty Total</td>
<td>922</td>
<td>949</td>
<td>965</td>
<td>981</td>
<td>992</td>
<td>1,018</td>
<td>1,017</td>
<td></td>
<td>10.3%</td>
</tr>
<tr>
<td>Staff FT</td>
<td>1,201</td>
<td>1,063</td>
<td>1,107</td>
<td>1,129</td>
<td>1,127</td>
<td>1,147</td>
<td>1,110</td>
<td></td>
<td>-7.6%</td>
</tr>
<tr>
<td>Staff PT</td>
<td>76</td>
<td>83</td>
<td>77</td>
<td>68</td>
<td>74</td>
<td>73</td>
<td>78</td>
<td></td>
<td>2.6%</td>
</tr>
<tr>
<td>Staff Total</td>
<td>1,277</td>
<td>1,146</td>
<td>1,184</td>
<td>1,197</td>
<td>1,201</td>
<td>1,220</td>
<td>1,188</td>
<td></td>
<td>-7.0%</td>
</tr>
<tr>
<td>Graduate Assistants</td>
<td>670</td>
<td>665</td>
<td>672</td>
<td>660</td>
<td>664</td>
<td>676</td>
<td>663</td>
<td></td>
<td>-1.0%</td>
</tr>
<tr>
<td>Total Students</td>
<td>11,872</td>
<td>11,852</td>
<td>11,650</td>
<td>11,798</td>
<td>12,041</td>
<td>12,268</td>
<td>12,870</td>
<td></td>
<td>8.4%</td>
</tr>
<tr>
<td>Ratio Students to Faculty</td>
<td>12.9</td>
<td>12.5</td>
<td>12.1</td>
<td>12.0</td>
<td>12.1</td>
<td>12.1</td>
<td>12.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio FTE Students to FTE Instructional Faculty</td>
<td>18.3</td>
<td>18.2</td>
<td>17.6</td>
<td>17.0</td>
<td>17.7</td>
<td>18.0</td>
<td>19.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio Students to Staff</td>
<td>9.3</td>
<td>10.3</td>
<td>9.8</td>
<td>9.9</td>
<td>10.0</td>
<td>10.1</td>
<td>10.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.1 Campus Setting

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

The site is located at the juncture between Maryland’s rocky piedmont and coastal plane. The campus’ rolling topography and landscape are characteristic of this location’s unique geology, and the University is adjacent to a rich network of green spaces along rivers 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) and a 67 acre Conservation and Environmental Research Area (CERA). The greater campus includes a nearby 30 acre complex on a site overlooking I-95 on which the University has developed the bwtech@UMBC 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 pastoral setting for the campus.
3.2 Buildings

Historical Patterns of Campus Growth

Conceived in 1962, the campus was built on the site of the former Spring Grove State Hospital farm. Little of the original farm structures or landscape remains, except a lone silo on UMBC Boulevard at the southern approach to the campus.

The original master plan concentrated the majority 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 systemic approach to planning predominated over the desire for consistency of architectural language, the creation of formal open spaces or the richness of landscape elements that define other older universities.

The other defining element of the campus is the ring road, 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. This feature has created a pedestrian-oriented core, mostly free of pedestrian and vehicular conflicts, but has become a barrier to expansion of the campus.

The largest change from the original 1960’s era master plan can be seen to the north and east of the Albin O. Kuhn Library and Gallery. A series of dense residential communities have been developed in an area once reserved for surface parking lots. Since 1970 the University has embarked on developing a large residential community, partially off-setting the need for parking lots and high capacity roadways, as the campus expands. Currently, there are 28 residential buildings providing nearly 3,800 beds for resident students and staff.

Figure 3.1 shows the campus as of 2009. Figure 3.2 illustrates the historical development of buildings on the campus, decade by decade, over the last forty years.

Facility Changes to the Campus Since 2003

Since the 2003 Facilities Master Plan, UMBC has experienced continued growth and development on campus. The current period has seen the completion of both the ITE Building and the Public Policy Building, the construction of the Walker Avenue Apartments, and the renovation of and addition to the UMBC Stadium complex. Since 2003, extensive renovations to the Chemistry Building (built in 1971) were completed, as well as renovations or systemic replacements to the mechanical systems of several buildings, including the dining hall and numerous residential communities. Today, the campus consists of 3,664,717 square feet of buildings, of which 2,178,853 are assignable.

The last six years has also seen an expansion of bwtech@UMBC, the University’s integrated research park, incubator and accelerator. The five new, high-tech buildings of bwtech@UMBC, comprising 515,000 square feet of office and lab space, are home to 55 companies, which generate over $200 million annually in total business sales. Situated at the main approach to the University from the interstates and the Thurgood Marshall BWI Airport, bwtech@UMBC serves as a handsome forecourt to the campus entry, reinforcing the strong connection between academics, research and business that is vitally important to the University.

Page updated 5.18.10
insert 11 x 17
Existing Campus Plan
Figure 3.2
Historical Growth of Buildings on Campus
### Size and Age of Existing Buildings on Campus

<table>
<thead>
<tr>
<th>Building Name</th>
<th>Gross SQ.FT.</th>
<th>Net-Assignable SQ.FT.</th>
<th>Year Constructed or Acquired</th>
<th>Year of Major Renovation</th>
<th>Current Replacement Value</th>
<th>Condition Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACADEMIC IV BUILDING</td>
<td>117,055</td>
<td>58,441</td>
<td>1980</td>
<td></td>
<td>$ 46,822,188</td>
<td>4</td>
</tr>
<tr>
<td>ENGINEERING COMPUTER SCIENCE BUILDING</td>
<td>123,173</td>
<td>74,790</td>
<td>1993</td>
<td></td>
<td>$ 73,903,956</td>
<td>1</td>
</tr>
<tr>
<td>FINE ARTS BUILDING</td>
<td>165,501</td>
<td>85,583</td>
<td>1973</td>
<td></td>
<td>$ 132,401,096</td>
<td>3</td>
</tr>
<tr>
<td>GREENHOUSE</td>
<td>9,206</td>
<td>7,426</td>
<td>1971</td>
<td>1994</td>
<td>$ 3,682,332</td>
<td>4</td>
</tr>
<tr>
<td>INFORMATION TECHNOLOGY/ENGINEERING BUILDING</td>
<td>143,467</td>
<td>82,123</td>
<td>2003</td>
<td></td>
<td>$ 86,080,482</td>
<td>1</td>
</tr>
<tr>
<td>LECTURE HALL 1</td>
<td>7,181</td>
<td>2,940</td>
<td>1967</td>
<td></td>
<td>$ 2,872,588</td>
<td>4</td>
</tr>
<tr>
<td>LECTURE HALL 2</td>
<td>9,614</td>
<td>4,274</td>
<td>1971</td>
<td></td>
<td>$ 3,845,684</td>
<td>4</td>
</tr>
<tr>
<td>MATH/PSYCHOLOGY BUILDING</td>
<td>60,031</td>
<td>30,735</td>
<td>1969</td>
<td></td>
<td>$ 36,018,888</td>
<td>4</td>
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<tr>
<td>MEYERHOFF CHEMISTRY BUILDING</td>
<td>144,107</td>
<td>73,180</td>
<td>1971</td>
<td>2003</td>
<td>$ 115,285,400</td>
<td>1</td>
</tr>
<tr>
<td>PHYSICS BUILDING</td>
<td>78,121</td>
<td>41,119</td>
<td>1999</td>
<td></td>
<td>$ 46,872,768</td>
<td>1</td>
</tr>
<tr>
<td>PUBLIC POLICY BUILDING</td>
<td>68,693</td>
<td>34,200</td>
<td>2003</td>
<td></td>
<td>$ 27,477,256</td>
<td>1</td>
</tr>
<tr>
<td>SONDHEIM HALL</td>
<td>84,870</td>
<td>50,598</td>
<td>1973</td>
<td></td>
<td>$ 50,922,186</td>
<td>4</td>
</tr>
<tr>
<td>TECHNOLOGY 2 BUILDING</td>
<td>4,200</td>
<td>1,252</td>
<td>2003</td>
<td>2003</td>
<td>$ 1,680,000</td>
<td>1</td>
</tr>
<tr>
<td>TECHNOLOGY RESEARCH CENTER</td>
<td>73,007</td>
<td>41,889</td>
<td>1957</td>
<td>2001</td>
<td>$ 58,405,608</td>
<td>4</td>
</tr>
<tr>
<td>THEATRE / ACADEMIC SERVICES BUILDING</td>
<td>31,667</td>
<td>24,165</td>
<td>1968</td>
<td>1999</td>
<td>$ 19,000,140</td>
<td>4</td>
</tr>
<tr>
<td>UNIVERSITY CENTER</td>
<td>68,906</td>
<td>45,667</td>
<td>1982</td>
<td></td>
<td>$ 41,343,792</td>
<td>3</td>
</tr>
<tr>
<td><strong>Administrative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATION BUILDING</td>
<td>85,546</td>
<td>43,842</td>
<td>1973</td>
<td></td>
<td>$ 34,218,380</td>
<td>3</td>
</tr>
<tr>
<td>ALUMNI HOUSE (S451 WILKENS AVE)</td>
<td>7,451</td>
<td>4,987</td>
<td>1970</td>
<td>2003</td>
<td>$ 1,490,222</td>
<td>2</td>
</tr>
<tr>
<td><strong>Library</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALBIN O. KUHN LIBRARY &amp; GALLERY</td>
<td>286,972</td>
<td>177,385</td>
<td>1968-1995</td>
<td></td>
<td>$ 86,091,630</td>
<td>2</td>
</tr>
<tr>
<td><strong>Auxiliary</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATION AVE GARAGE</td>
<td>117,815</td>
<td>62,606</td>
<td>1989</td>
<td></td>
<td>$ 12,900,000</td>
<td>4</td>
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<tr>
<td>CHESAPEAKE HALL</td>
<td>83,079</td>
<td>50,076</td>
<td>1971</td>
<td></td>
<td>$ 24,923,682</td>
<td>1</td>
</tr>
<tr>
<td>CHILD CARE CENTER</td>
<td>3,747</td>
<td>3,057</td>
<td>1993</td>
<td></td>
<td>$ 749,328</td>
<td>1</td>
</tr>
<tr>
<td>CLUB SPORTS HOUSE (S449 WILKENS AVE, formerly SF3)</td>
<td>4,322</td>
<td>3,025</td>
<td>2003</td>
<td></td>
<td>$ 864,400</td>
<td>1</td>
</tr>
<tr>
<td>COMMONS DRIVE GARAGE</td>
<td>145,052</td>
<td>71,467</td>
<td>2000</td>
<td></td>
<td>$ 11,820,000</td>
<td>1</td>
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<tr>
<td>DINING HALL (TRUE Grits)</td>
<td>35,041</td>
<td>27,036</td>
<td>1971</td>
<td></td>
<td>$ 14,016,312</td>
<td>1</td>
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<tr>
<td>ERICKSON HALL</td>
<td>147,475</td>
<td>91,908</td>
<td>2000</td>
<td></td>
<td>$ 44,242,422</td>
<td>1</td>
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<tr>
<td>HARBOR HALL</td>
<td>169,343</td>
<td>105,157</td>
<td>2001</td>
<td></td>
<td>$ 50,802,915</td>
<td>1</td>
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<tr>
<td>HILLSIDE APARTMENTS</td>
<td>73,537</td>
<td>61,463</td>
<td>1987</td>
<td>2003</td>
<td>$ 22,060,977</td>
<td>4</td>
</tr>
<tr>
<td>PATAPSOD HALL</td>
<td>83,574</td>
<td>53,208</td>
<td>1973</td>
<td>2003</td>
<td>$ 25,072,125</td>
<td>1</td>
</tr>
<tr>
<td>POTOMAC HALL</td>
<td>83,112</td>
<td>54,172</td>
<td>1993</td>
<td></td>
<td>$ 24,933,585</td>
<td>1</td>
</tr>
<tr>
<td>ROTC HOUSE (S447 WILKENS AVE, formerly SF2)</td>
<td>4,186</td>
<td>2,329</td>
<td>2003</td>
<td></td>
<td>$ 837,102</td>
<td>2</td>
</tr>
<tr>
<td>STUDENT DEVELOPMENT &amp; SUCCESS CENTER</td>
<td>7,480</td>
<td>5,270</td>
<td>1984</td>
<td>2004</td>
<td>$ 1,496,038</td>
<td>4</td>
</tr>
<tr>
<td>SUSQUEHANNA HALL</td>
<td>83,504</td>
<td>50,063</td>
<td>1970</td>
<td></td>
<td>$ 25,051,233</td>
<td>1</td>
</tr>
<tr>
<td>TERRACE APARTMENTS</td>
<td>62,299</td>
<td>51,914</td>
<td>1982</td>
<td></td>
<td>$ 18,689,826</td>
<td>4</td>
</tr>
<tr>
<td>THE COMMONS</td>
<td>159,656</td>
<td>87,939</td>
<td>2002</td>
<td></td>
<td>$ 55,879,590</td>
<td>1</td>
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<tr>
<td>UMBC STADIUM COMPLEX</td>
<td>13,818</td>
<td>8,635</td>
<td>1976</td>
<td></td>
<td>$ 5,527,352</td>
<td>4</td>
</tr>
<tr>
<td>WALKER AVENUE GARAGE</td>
<td>134,715</td>
<td>62,339</td>
<td>2002</td>
<td></td>
<td>$ 11,400,000</td>
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</tr>
<tr>
<td>WALKER AVENUE APARTMENTS I *</td>
<td>92,401</td>
<td>65,684</td>
<td>2004</td>
<td></td>
<td>$ 27,720,198</td>
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<tr>
<td>WALKER AVENUE APARTMENTS II *</td>
<td>135,011</td>
<td>91,215</td>
<td>2005</td>
<td></td>
<td>$ 40,503,192</td>
<td>1</td>
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<tr>
<td>WEST HILL APARTMENTS</td>
<td>77,073</td>
<td>58,047</td>
<td>1981</td>
<td></td>
<td>$ 23,121,972</td>
<td>4</td>
</tr>
<tr>
<td><strong>Non-Academic (Support)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FACILITIES MANAGEMENT BUILDING</td>
<td>45,211</td>
<td>37,577</td>
<td>1997</td>
<td></td>
<td>$ 9,042,116</td>
<td>1</td>
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<tr>
<td>SATELLITE PLANT</td>
<td>9,101</td>
<td>236</td>
<td>2001</td>
<td></td>
<td>$ 7,280,680</td>
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</tr>
<tr>
<td>SURGE FACILITY #1 (S154 WILKENS AVE)</td>
<td>1,784</td>
<td>0</td>
<td>1955</td>
<td></td>
<td>$ 499,612</td>
<td>4</td>
</tr>
<tr>
<td>WAREHOUSE</td>
<td>32,691</td>
<td>30,698</td>
<td>1974</td>
<td></td>
<td>$ 5,884,411</td>
<td>2</td>
</tr>
<tr>
<td>CENTRAL PLANT</td>
<td>47,763</td>
<td>6,275</td>
<td>1971</td>
<td>2001</td>
<td>$ 19,105,236</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3,664,717</td>
<td>2,178,853</td>
<td></td>
<td></td>
<td>$ 1,494,604,576</td>
<td>4</td>
</tr>
</tbody>
</table>

*constructed through a public/private partnership*

Page updated 5.18.10
Figure 3.3
Existing Buildings on Campus - 2009
Condition of Buildings

Of the original campus buildings, those in most need of a major renewal include the Fine Arts Building (1973), University Center (1982), Sondheim Hall (1973), the Math/Psychology Building (1969), the Academic IV Building (1980), Lecture Hall 1 (1967), the Administration Building (1973), the original wings of the Library (1968), and a wing of the Biological Sciences Building (commonly referred to as Martin Schwartz Hall, 1983).

The campus’ buildings of this era are at the end of their useful lives and universally suffer from outdated building systems, functionally and technologically deficient classroom space, and deteriorating building envelopes. As such, each building requires: replacement and upgrade of mechanical, electrical, and life safety systems; restoration of building envelope; and modest architectural modifications to correct barriers to accessibility, improve building functionality, and enhance public spaces. In addition, the Fine Arts Building and the University Center require substantial interior modifications to accommodate changing uses and programs.

Table 3.2
Building Condition Overview

<table>
<thead>
<tr>
<th>Condition Code</th>
<th>Number Of Buildings *</th>
<th>GSF</th>
<th>NASF</th>
<th>Replacement Value</th>
<th>Percent of Total GSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 1 (normal maintenance)</td>
<td>26</td>
<td>2,023,867</td>
<td>1,168,098</td>
<td>744,706,876</td>
<td>55.2%</td>
</tr>
<tr>
<td>Code 2 (minimal renovation)</td>
<td>4</td>
<td>331,300</td>
<td>215,399</td>
<td>94,303,365</td>
<td>9.0%</td>
</tr>
<tr>
<td>Code 3 (major updating)</td>
<td>5</td>
<td>563,110</td>
<td>326,952</td>
<td>349,728,944</td>
<td>15.4%</td>
</tr>
<tr>
<td>Code 4 (major remodeling)</td>
<td>42</td>
<td>746,440</td>
<td>468,404</td>
<td>305,865,391</td>
<td>20.4%</td>
</tr>
<tr>
<td>Code 5 (immediate replacement required)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Code 6 (planned termination)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total Inventory</td>
<td>77</td>
<td>3,664,717</td>
<td>2,178,853</td>
<td>1,494,604,576</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

* Residential Communities can comprise various buildings within one complex.

With the planned completion of the first wing of the new Performing Arts and Humanities Building in 2012 and the second wing in 2014, many programs within the Fine Arts Building and the Theatre / Academic Services Building will be transferred to the new building. This will provide the unheralded opportunity to begin a full renovation of the Fine Arts Building, repurposing it to address critical space shortages in academic and research programs.

The University Center, built as a student center, saw many of its student services transferred to The Commons, upon its completion in 2002. Piecemeal renovation over the last five years has led to a patchwork of building mechanical and electrical solutions to accommodate new uses. A complete and comprehensive building renovation is required to restore the building to full functionality and complete its transformation into a multi-modal learning center contributing directly to student academic success.
3.3 Utilities

System of Utility Tunnels

The original master plan of the campus cleverly developed a series of fully-accessible utility tunnels running between and connecting the major buildings on campus. These tunnels allow for 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 currently connect all of the major academic buildings, as well as the Albin O. Kuhn Library and Gallery, the Retriever Activities Center and The Commons. The tunnels do not extend north of the Library into the residential communities or east of the quad to the Theater/Academic Services Building and the stadium complex beyond.

Natural Gas Distribution

The campus is supplied from Wilkens Avenue by BGE with a 6” HP (high pressure) gas line at Walker Avenue. Gas is distributed around the north of Hilltop Circle to the Central Plant, the Satellite Plant and various individual buildings that are not connected by the utility tunnels.

Hot and Chilled Water Systems

The existing hot water generation system located within the Central Plant consists of four High Temperature Hot Water (HTHW) 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 of the buildings that are served by the system run in the utility tunnel.

In 2001, the University constructed a satellite plant to serve 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 the Dining Hall. Two 500HP Low Temperature Hot Water (LTHW) generators provide 180 degree water during the heating season. A 100HP 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.

The existing chilled water generation capacity of the Central Plant is comprised of five 1,000-ton electric centrifugal chillers and a 10,500 ton-hour chilled water storage tank capable of supplying 1,500 tons of chilled water capacity. The thermal energy storage system (TES) 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 6,500 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.

The existing chilled water generation capacity of the Satellite Plant is comprised of two 750-ton electric centrifugal chillers. The total capacity of the system is 1,500 tons with a firm capacity of 750 tons.

Electricity Distribution

The electric substation, adjacent to the Central Plant, is comprised of two pairs of transformers. The first pair is dedicated to the buildings located on campus and second pair is dedicated to the Central Plant. The capacity of the transformers serving the campus is 10,500 kVA (9,450 kW) each. The total capacity of this system is 21,000 kVA and a corresponding firm capacity of 10,500 kVA. The capacity for each transformer serving the Central Plant is 7,500 kVA (6,750 kW). This correlates to a total capacity of 15,000 kVA and a firm capacity of 7,500 kVA.
Figure 3.4
Existing Utilities
**Potable Water**

Water for both the campus and the research and technology park is accessed independently from a Baltimore City water main below Wilkens Avenue. The two 12” CIP water lines run along Hilltop Road. The campus is served by a 12” line running adjacent to the southern half of Hilltop Circle between Walker Avenue and Poplar Street. While capacity to the campus is adequate, there have been cases where closings of the water main in Wilkens Avenue have affected water availability on campus.

**Data and Telecommunications**

UMBC is known for excellent teaching and 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 Gigabit network access to all major buildings and research labs, and switched Ethernet connections to every room. There is wireless network access throughout much of the campus, including The Commons. In addition, all residential units are provided with dedicated connections for each resident.

Communications infrastructure spaces are spread throughout the campus, located to allow for the best distribution of the network. These spaces include the cable TV head end in Academic IV Building, data hubs in the Central Plant, the Physics Building, South Campus, and the Engineering Building, and voice hubs in the Central Plant, Technology Research Center and South Campus. As the University continues to grow, communication technology and associated infrastructure and spaces will also need to expand.

### 3.4 Sustainability Initiatives

In 2007, President Freeman A. Hrabowski, III, became a signatory of the American College and University Presidents Climate Commitment. This action committed the University to develop a plan to achieve climate neutrality as soon as possible, to immediately initiate a number of tangible actions to reduce greenhouse gases, and to make our action plan, inventory, and periodic progress reports publically available.

To provide advice and expertise on ways to achieve the Commitment goals and to effectively engage the entire campus community in this effort, President Hrabowski formed the Climate Change Task Force. The Task Force provides oversight and guidance in meeting the requirements of the Climate Commitment. Currently, it advises the President on specific interim actions and goals, and establishes mechanisms for regular communications to the campus community. One of the first actions of the Climate Change Task Force was to complete a comprehensive inventory of all greenhouse gas emissions. The Task Force also submitted UMBC’s Climate Action Plan on September 15, 2009 to the American College and University President’s Climate Commitment. For a copy of the UMBC Greenhouse Gas Inventory for 2007 and 2008 go to http://www.umbc.edu/sustainability/about.html and click on Greenhouse Gas Inventory.

UMBC’s Climate Action Plan involves changes to practices, programs, and policies related to energy conservation, recycling and waste management, transportation, facilities operations, and construction.
**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. Some of the initiatives completed or underway include:

a. Upgrading heating/cooling systems for campus by retrofitting the Central Plant with high-efficiency boilers, chillers, cooling towers and water pumps.

b. Installing a thermal storage system (a one million gallon chilled water tank) to supplement the Central Plant. Charging the tank at night reduces the load on the electric grid during peak daytime hours.

c. Purchasing Renewable Energy Credits (RECs) to support development and generation of renewable energy and beginning in May 2008 committing to purchasing nearly 20% of campus’ electricity from renewable sources.

d. Upgrading heating/cooling systems for student housing by replacing stand-alone units with Satellite Plant utilizing high-efficiency boilers, chillers and pumps.

e. Working with an approved Energy Services Company (ESCO) to perform an energy audit for the campus to identify and quantify additional energy saving opportunities.

f. Upgrading exterior lighting for roadways, walkways and parking lots to high-efficiency LED lamps.

g. Upgrading interior lighting from T12 to more efficient T8 and T5 ballasts and lamps, and replacing incandescent bulbs with compact fluorescent lamps.

h. Incorporating a fleet of electric vehicles and compressed natural gas vehicles to perform many maintenance tasks around campus, reducing fuel consumption.

**Recycling**

UMBC has a comprehensive, campus-wide recycling program. Currently paper, plastic, and aluminum are collected separately and recycled. A program for recycling electronics and other office machines has been developed. UMBC also donates various office/classroom furniture and athletic equipment to charitable organizations. The campus purchases recycled paper products, cleaning products that are Green Seal certified and Energy Star appliances. In addition, UMBC participates in the annual Recyclemania program.

**Green Buildings**

UMBC is committed to sustainable construction and renovation. All new buildings will have a minimum of a LEED Silver rating, including that of the Performing Arts and Humanities Building for which design is complete and the Patapsco Hall Addition, currently under design. The sustainable design encompasses not just the building systems and materials, but extends to the site and how rain water is treated and stored. While the University will seek comparable LEED certification for all of its major building renovations, smaller renovation projects have integrated sustainable practices such as installing Energy Star roofing systems and replacing equipment with Energy Star rated products.
Environmental Awareness

To support UMBC’s commitments to a more sustainable campus the University has developed various programs to enhance student, staff and faculty awareness of energy-saving opportunities and behaviors on campus and at home, to complement recycling programs and more efficient buildings. To further the study of our environment the University has developed degree programs in Biological Sciences Building, Civil and Environmental Engineering, Geography and Environmental Systems, Physics and Public Policy among others that focus on the natural environment and sustainability.

3.5 Open Space

Commitment to a strong system of permanent, dedicated open spaces is essential to the overall health of the university community. Ranging in scale from small gathering places and walkways to broad lawns, UMBC’s open spaces are the setting for campus life. Properly designed open spaces humanize the campus and make it a comfortable environment for outdoor interaction, study and contemplation.

The last five years has seen the creation of new athletics fields and vast improvements to existing open spaces on campus. The UMBC campus has witnessed extensive tree plantings, the reseeding of quadrangles and comprehensive pedestrian walkway improvements. In general, the physical aspect of the outdoor spaces and paths on campus have improved greatly since 2003. Figure 3.5 illustrates the natural areas, recreational facilities, and open spaces on campus.

Recreation

As UMBC has transformed from a commuter-oriented to a residential campus, the need for greater and more varied amount of recreation facilities on campus has become clear. The Retriever Activities Center and The Commons provide students with indoor facilities for recreation. Exterior recreational facilities are also important open space elements for both structured and unstructured activities. The University recently added a new multi-purpose sports field off of Hilltop Road and is planning for new outdoor volleyball and basketball courts to be constructed in the next few years to keep pace with student growth.

Outdoor Teaching and Research Environments

UMBC is fortunate to have numerous environmental areas on campus to support teaching and research. One such area is CERA, (Conservation and Environmental Research Areas), a designated 45 acre natural area established in 1997 and located to the south of the main campus. The woods, wetlands, streams, pond, and transitional landscapes of the CERA offer a wide range of research and teaching opportunities for the faculty and students. Recently, access has been improved to these areas with the construction of an elevated wooden boardwalk and bridge.
Figure 3.5
Existing Open Space On Campus
3.6 Environmental Systems

Natural Areas Protection

The campus is ringed by natural wooded areas that are a valuable asset, enhancing the image of the campus environment. The wooded areas, both inside and outside of Hilltop Circle, harbor many species of indigenous flora and fauna. The University continues ongoing stewardship of these natural areas, while promoting use by student, staff and faculty for recreation, education and research.

Storm Water Management

The University completed a Storm Water Management Master Plan in 2001. The analysis of the UMBC campus indicated that many of the 20 identified drainage areas at the time did not have storm water management devices controlling runoff. Following the study, the University has been addressing both the quality and quantity of storm water run-off throughout the campus.

Most of the outfalls feed the Herbert Run, a tributary of the Patapsco River, that flanks the campus on its north and east boundary. Historically, the stream banks have suffered erosion and bank destabilization. During the last five years, the University has completed numerous bank stabilization and erosion control projects to protect waterways that are impacted by the campus. When the UMBC Stadium complex was renovated in 2008, the University took this opportunity to make comprehensive bank stabilization and outfall improvements to the stream that borders it, vastly improving water quality in this area of campus. Throughout other areas of the campus, the University is committed to annual stream restoration projects, including repairing or replacing deteriorated bridge abutments, replacing pedestrian bridges, and stabilizing stream banks.

3.7 Circulation

Vehicular Access

The University has excellent access to both the Baltimore Beltway, I-695 (via Wilkens Avenue), and I-95 via I-195 and UMBC Boulevard. The main campus road, Hilltop Circle, is a two-lane facility that doubles as a parking lot. Hilltop Circle rings the center of the campus and affords access to all campus roads including Walker, Poplar and Hilltop Avenues. Campus roads provide adequate capacity, except during peak hours at the intersection of Hilltop Circle and UMBC Boulevard. Additionally, the existing configuration of this critical intersection at the main portal to campus creates an unsafe situation for drivers and pedestrians.
Gateways

The University has four vehicular and pedestrian approaches - two from Wilkens Avenue, one from Shelbourne Avenue to the east and the main approach from I-95 via UMBC Boulevard. These vehicular approaches lack a delineated formal gateway or a symbolic gesture to mark the campus entrance commensurate with the status of the University. The University has a plan to improve the campus gateways, making them safer and more attractive while modifying the wayfinding signage to enhance visitor experience and improve user orientation.

Transit

There are a number of regional bus lines that stop on campus and UMBC Transit operates six shuttle bus routes serving surrounding communities and a satellite parking lot for residential freshmen. Bus use on campus is consistent, but light. Consistent with its commitment to minimize its carbon footprint, the University is developing plans to increase transit ridership by improving the location and shelters at bus stops, providing more alternative routes and schedules to match demands, and creating an awareness of transit options available to students, staff and faculty.

In addition, the University is encouraging alternatives to bringing a car to campus. Ride-sharing programs and car-share services are being supported and encouraged. To increase the number of students biking to and between their classes, the University has begun a program installing bike racks at key locations; and the University is developing plans for on-campus bike paths and better regional coordination.

Pedestrian Circulation

The main academic core is traversed by a strong, north-south pedestrian promenade that links the main campus entry to the Albin O. Kuhn Library and Gallery. This promenade is extremely well defined by trees and buildings and is crossed by steps leading both east and west to other levels. The clear orientation of this boulevard is not found in other areas of the campus. Most other areas are less dense and complicated by changing geometries and sloping topography.

UMBC’s constantly sloping topography makes the campus hard to comprehend as a “whole.” The Hilltop Road and Walker Avenue entrances to campus sit on higher ground; the academic core sits on a “shelf” in the middle ground; and the athletic fields, Facilities Management and Warehouse complex, and Technology Resource Center are on the lowest level. While the academic core and central green already exhibit a fine network of pedestrian paths, creating a sense of connectedness throughout the campus’ length is one of the challenges that this Master Plan Update addresses.

The hilly site for the campus affords challenges for the disabled. Many areas of campus have sidewalks with a 4 to 8% grade, making navigation and circulation at times difficult. The University is committed to improving circulation routes and ensuring that students, staff and faculty with disabilities have equitable access to campus facilities. All academic buildings on campus above one story have elevator access to all floors, but many of the pre-1980 residential buildings as well as the UMBC Stadium and the Technology Research Center (TRC), were not designed with elevators or ramps to give access to all levels. The University is currently designing improvements to the older residential communities to provide elevator access.
Figure 3.6
Existing Parking Facilities on Campus

<table>
<thead>
<tr>
<th>Key</th>
<th>Existing Parking Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>All roadway parking (including Hilltop Circle) 1,617</td>
</tr>
<tr>
<td>B</td>
<td>Hilltop Road Lot (Lot 22) 457</td>
</tr>
<tr>
<td>C</td>
<td>Lot 8a and 8b 444</td>
</tr>
<tr>
<td>D</td>
<td>Lot 9, 9a and 16 694</td>
</tr>
<tr>
<td>E</td>
<td>Lots 2, 3, 4, 5 and 12 625</td>
</tr>
<tr>
<td>F</td>
<td>Lots 13, 17 and 18 1,002</td>
</tr>
<tr>
<td>G</td>
<td>TRC Lot 117</td>
</tr>
<tr>
<td>H</td>
<td>Lots 20 and 21 428</td>
</tr>
<tr>
<td>I</td>
<td>Lots 6 and 7 191</td>
</tr>
<tr>
<td>J</td>
<td>Walker Avenue Garage 380</td>
</tr>
<tr>
<td>K</td>
<td>Administration Drive Garage 430</td>
</tr>
<tr>
<td>L</td>
<td>The Commons Garage 394</td>
</tr>
<tr>
<td></td>
<td>Satellite Lot at South Campus (not shown) 312</td>
</tr>
<tr>
<td></td>
<td><strong>Total:</strong> 7,091</td>
</tr>
</tbody>
</table>

7,091
3.8 Parking

The campus currently has 17 surface parking lots, 3 parking structures and on-street parking on 7 roadways. In total these facilities provide parking for 7,091 vehicles on the campus, including the Satellite Parking Lot on the South Campus. Figure 3.6 and the accompanying table illustrate the distribution of parking on campus.

The 2009 Planning Study for Parking Facilities determined that the University has sufficient existing parking spaces to meet current demands. The study concluded that with better utilization of existing lots outside of Hilltop Circle the campus-wide utilization rate would peak at 85%, after the construction of the Performing Arts and Humanities Building. UMBC is currently implementing improvements to increase the utilization of existing lots which are outside of the loop by improving pedestrian access, increasing safe crossings of Hilltop Circle and improving vehicular and pedestrian wayfinding signage.
4.1 Guiding Principles

A set of principles has served to guide the University in the development of this Facilities Master Plan Update. These principles were collaboratively derived early in the planning process to define the fundamental values necessary to support the University’s strategic aspirations. They establish the parameters for the master plan, which when followed, will assure that the physical environment aligns with and provides for academic, student life, and outreach program needs.

Moving Forward

• Continue to develop and grow to meet the institution’s mission.
• Focus on student success by continually improving retention and graduation rates.
• Develop new and expand existing academic and research programs.
• Create a physical environment, indicative of the high quality programs of the University.
• Plan for the future in a fiscally responsible way.
• Promote life-long engagement of our students through academic, alumni, professional, and co-curricular programs.

Community/Campus Life

• Embrace and foster a residential atmosphere supportive of the academic aspirations of the University.
• Create a sense of ‘campus life’ which supports multi-culturalism, student/faculty engagement, community interaction, and social responsibility.
• Create and foster partnerships throughout the greater Baltimore/Washington region. Increase collaborations with government, corporations, private enterprise, school districts, and non-profit organizations.
• Enhance efficient delivery of support services.
• Attract and retain the best faculty, staff, and students to support the Institution’s programs.
Sustainability

- Institute sustainability objectives that support Campus Climate Commitment efforts to reduce the University’s carbon footprint.
- Develop and operate in a sustainable and fiscally responsible way to enhance administrative effectiveness.
- Implement initiatives that improve energy efficiency, enhance water and air quality, and engage natural systems.
- Embrace and support a cultural shift in educational, operational and social behavior that supports a commitment to sustainability.

Campus Setting

- Assure that the campus is an aesthetic, inviting, accessible and safe place.
- Create a campus that has dynamic learning environments to foster interaction.
- Support all campus programs with high quality facilities, technology, site amenities and infrastructure.
- Support and enhance the social, physical, and cultural diversity on the campus.

4.2 Master Plan Goals and Objectives

The Master Plan Goals and Objectives are guided by the preceding Master Plan Principles. These further define specific concepts supporting the mission, strategic plan, and programmatic needs of the University. Together, the Planning Principles, and the subsequent Goals and Objectives, establish the foundation by which other aspects of the physical Master Plan follow. There are six goals with supporting objectives. They are as follows:

Goal 1. To create a physical environment that enhances the learning, working and living experiences of campus users by:

  a. Creating a sense of place and community.
  b. Promoting interaction and collaboration among all campus users.
  c. Improving the interconnectivity between athletics, academic, residential, and economic development areas of campus.
  d. Reducing the physical barriers of Hilltop Circle.
  e. Providing a utility and information technology infrastructure that is reliable and efficient, and organized in a manner that provides ample opportunity for building expansion.
  f. Assuring that facility plans are driven by program directives and functional adjacencies.
Goal 2. To establish land use strategies to support future programs and facilities needs by:

a. Clustering similar activities in identifiable zones to foster collaboration and improve efficiency.
b. Creating a walkable campus by concentrating development and balancing building densities.
c. Integrating fully, preserving, and enhancing the natural environment.
d. Using buildings and site features to traverse the topographical challenges of the campus.
e. Reducing the impact of motor vehicles and the potential pedestrian/vehicular conflicts.
f. Exploring options for acquisition of adjacent land to provide for growth of university programs and expansion of economic development initiatives.
g. Embracing the residential campus with strong connections to the academic core and student services.

Goal 3. To organize and plan for exterior open space by:

a. Developing and documenting a strong and timeless organizational framework to guide campus development.
b. Extending the strength of the academic core through a compact and coherent arrangement of buildings around a series of connected open spaces.
c. Creating more gathering places in a variety of scales for both formal and informal meetings.

Goal 4. To support teaching, research, student life and outreach programs with adequate facilities by:

a. Improving the quality, functionality, and use of existing buildings and spaces.
b. Providing adequate amounts of recreation space both inside and outside buildings.
c. Developing flexible and adaptable learning environments, rich with technology.
d. Maintain the highly residential classification of campus while enhancing the quality of residential communities.
e. Developing additional comprehensive learning, social, and collaborative spaces.
f. Developing multidisciplinary core academic and research facilities.
g. Using the natural areas of the campus as an educational tool.
h. Using the natural areas of the campus as a recreation resource.
i. Examining the relationship between and amount of athletic and recreation space.

Goal 5. To reduce the physical and environmental impact of vehicular circulation and parking on campus by:

a. Altering the design of Hilltop Circle to allow for better and safer crossings.
b. Redistributing parking to allow for a more efficient use of the campus.
c. Creating better pedestrian circulation paths on campus, encouraging walking.
d. Encouraging biking, walking, and other alternative modes of transportation to reduce the demand for parking.

e. Organizing and enhancing the wayfinding signage for both drivers and pedestrians.

Goal 6. To be **good stewards** of the earth and its natural resources by:

a. Heightening environmental awareness of our natural areas that illustrates stewardship and conservation of natural systems.

b. Supporting the Maryland Green Building Council, USGBC, University Presidents Climate Commitment, and LEED certificate programs with measurable programs and strategies.

c. Minimizing impervious surfaces to help in controlling water runoff and sedimentation of local streams.

d. Establishing ecological principles for all aspects of campus landscape design, restoration, management and maintenance.
4.3 The Campus Land Use Plan

As part of this update to the 2003 Master Plan, a campus Land Use Plan was developed which clusters similar activities and programs into identifiable zones. This fosters community, provides an order and sense of place, improved interdisciplinary interaction, and improves efficiency. Each zone has an atmosphere and physical environment that best supports and identifies the uses within it. These land use zones help inform how the UMBC campus approaches building and open space development, utility distribution, vehicular and pedestrian circulation, and parking. The links between diverse zones are planned and implemented in ways that foster collaboration and collegiality.

The campus can be characterized into seven basic land use zones. Each has distinct characteristics which support the various activities within the specific zone. The scale and density of buildings, the types and quality of open spaces, the type of access, and diverse uses all contribute to the overall atmosphere and success of each part of campus. The UMBC land use zones include: Student Life, Academic, Residential, Athletics, Outreach, Natural Areas, and Support and Service.

Student Life

UMBC is proud of its “student centered” philosophy. It is clearly evident even in the physical campus. Land uses are organized around the central Student Life zone which is flanked by academic uses to the south and residential uses to the north. The Student Life zone acts as the bridge between academics and residential life. It embraces The Commons and the Albin O. Kuhn Library and Gallery at the center of campus.

Academic

The Academic zone includes almost all of the instruction and research programs. The traditional core of campus reaches to the main south entry to the Albin O. Kuhn Library and Gallery. The intent is to develop the precincts for academic expansion matching the successful densities of the existing academic core, using limited land resources as efficiently as possible.

Residential

The Residential zone is located to the north of the Academic and Student Life zones. As the percentage of students living on campus has increased over the years, the University has responded by developing new, higher-density residential communities offering a variety of housing options appealing to today’s students. As the student population continues to grow, new residential facilities will be modeled after our most successful communities, organized around intimate courtyards.
Athletics

The Athletics land use zone, located to the south and east of the Academic land use zone, is isolated due to the hilly terrain and its location outside of Hilltop Circle. With the continued consolidation of Athletic programs in this area, the need to interconnect with adjoining land uses rises in importance. Steps are being taken to mitigate the impact of Hilltop Circle to better connect athletic facilities and programs back to the campus community with increased visibility and access.

Outreach

The Outreach land use zones are strategically located near the three main entries to campus. This not only provides ideal access for such programs, but also places these activities adjacent to academic, research and residential activities, providing improved opportunities for future economic development partnerships, alumni outreach and research centers for collaboration with external partners.

Natural Areas

Deciduous forests surround the campus on the north, east, and southern sides. The largest tract is within the CERA and is comprised of a wide variety of ecological conditions, including mature upland forest, early- and mid- successional forest, and riparian and wetland environments. To protect, preserve, and integrate these natural areas a distinct land use zone was developed in this plan. The campus framework provides for improved connectivity into and within the Natural Areas zones to create opportunities for recreation, education and research while increasing awareness of the natural environment.

Support and Service

The University’s principal support and service functions are currently located on the eastern edge of campus, adjacent to the campus entry along Poplar Avenue. Designating this area as the Support and Service land use zone is ideal now and in the future due to its ease of access, adjacency to the eastern Outreach land use zone, and ability to support all other land use zones in an efficient manner.
Figure 4.1
The Campus Land Use Plan
4.4 The Campus Framework

One of the main objectives of the Campus Master Plan is to further develop the collegiate nature of the campus, creating a sense of place and community. UMBC has a unique physical environment, defined by its physical elements: the landscape and terrain, the pedestrian paths, the relationship of buildings to one another, and the character of the open spaces. It is with this in mind that we developed the campus framework.

This framework is the underlying design concept by which all components of the master plan follow. It provides organization and a unique structure for campus development by which campus buildings, open space, and circulation are organized. The framework for UMBC is comprised of three basic parts: the Spine, a series of major Linkages, and three major Open Spaces.

**Spine**

The campus Spine is the heart of the framework. It is comprised of two main pedestrian ways which radiate from the center of campus at UMBC’s landmark building, the Albin O. Kuhn Library and Gallery, in both the south and east directions. The Spine acts as the main promenade for pedestrian movement and terminates at the main vehicular portals on their respective sides of campus.

**Linkages**

Complementing the Spine is a series of Linkages that act as major circulation routes. The Linkages help connect diverse land uses, improving program collaboration and creating a more unified collegiate atmosphere. A series of secondary linkages support the main connections by providing connectivity among the academic, residential, athletic and natural areas of campus. Locating buildings and open spaces appropriately along the Linkages creates a more walkable, pedestrian-friendly campus.

**Open Spaces**

There are three major Open Spaces within the central core of campus. These spaces, due to their scale and importance on campus, are part of the campus framework. They are well defined and memorable spaces, providing relief from the main circulation paths of campus. The Open Spaces, considered part of the campus framework, include the academic quadrangle south of The Commons, the pond adjacent to the Albin O. Kuhn Library and Gallery, and a planned central green north of The Commons. The Open Spaces are bound by the major pedestrian circulation elements of campus, like the Spine and Linkages, reinforcing the framework of the campus plan.

Figure 4.2 shows how these three elements create the Campus Framework. The Albin O. Kuhn Library and Gallery is UMBC’s signature building, serving as the anchor of the Spine and as a major campus landmark. Included in the Campus Framework are five pedestrian nodes or points where pedestrian-related amenities are grouped to increase the perception of an active, urban corridor and to support the pedestrian orientation of the campus core.
Figure 4.2
The Campus Framework
4.5 The Open Space Plan

The UMBC community has placed a high priority, not only on its buildings, but also on its open spaces. Open spaces provide a sense of place and are key factors in creating a collegiate atmosphere indicative of higher learning. They provide places for learning, research, contemplation, gathering, study and recreation. Depending on their design, open spaces can either isolate or they can successfully connect buildings, programs and communities.

UMBC classifies its open spaces into two basic categories: informal and spontaneous outdoor spaces; and areas designed for programmed uses. Exterior spaces for programmed uses such as athletic competition and practice, organized recreation, and other scheduled activities are designed into the campus fabric, much like building spaces. The non-programmed exterior spaces are considered part of this Open Space Plan.

The Open Space Plan integrates a series of well-scaled outdoor places organized by the Campus Framework. The objective is to carefully balance the massing of buildings with the open space they create. It is important to provide a variety of environments to support the variety of needs on campus.

Iconic Green Spaces

The rising stature and advancing maturity of UMBC warrant investment in iconic and memorable green spaces indicative of most mature universities of its size. These spaces are scaled to the size of the campus buildings with distinctive landscape elements.

The open space north of The Commons and east of the Albin O. Kuhn Library and Gallery is currently not well utilized due to its large size and configuration, though it sits at an important crossroad between academic, student life and residential land use zones. The Master Plan proposes to redefine this important space by lining it with new student-oriented facilities and reconnecting it to the Pond. This new green space will be the heart of the campus and will reinforce the elements of the framework.

Additional open spaces in this category include the Quad south of The Commons, and the Pond area adjacent to the library. The redevelopment of these spaces will greatly enhance the sense of place and collegiate character of the UMBC campus.

Plazas

Complementing the Iconic Green Spaces are more intensively used Plazas. These spaces serve as the forecourt for academic buildings and, properly designed, allow for a mix of uses, including events, congregation and at times access to buildings by service vehicles. Examples include the plaza to the south of The Commons and also the open space in front of the University Center.
Figure 4.3
The Campus Open Space Plan
Quadrangles

Typically, quadrangles present places more intimate in scale yet still ample in size for informal activities and gatherings. They help provide a safe, comfortable atmosphere indicative of higher learning and conducive to study and interaction, yet supportive of residential life, education and interdisciplinary collaboration. A successful example on campus is the terraced, landscaped area adjacent to the Pond, leading up to the Albin O. Kuhn Library and Gallery, and the open space between the Public Policy Building and the Physics Building.

Residential Courts

The newest residential communities on campus, Erickson Hall, Harbor Hall and the Walker Avenue Apartments are successfully organized around courtyards. These courts serve as gathering places for residents, typically equipped with benches, tables, cooking grills and other landscape elements. Typically, the intimate nature of these courts lend them identity, lacking in most of the older residential communities on campus. The University is upgrading the existing open spaces around the traditional residential halls to better serve the needs of the residents.
5.1 Enrollment Projections

The future development of the UMBC campus will respond directly to the projected growth of the student body. Factoring in the economy, historic trends, regional influences, demographic studies, campus mission, and strategic plans, the University projects student enrollment growth of approximately 10% and equally between undergraduate and graduate students in the next ten years. It is believed much of the growth will occur in the first five years resulting in a cumulative projection of 10.4% over the next decade. The following table illustrates the projected growth for undergraduate and graduate students in terms of credit hours, full time equivalent (FTE) students, and overall student headcount.

Table 5.1

Student Enrollment Projections based on Credit Hour Growth

<table>
<thead>
<tr>
<th></th>
<th>Credit Hours 2009</th>
<th>Student Enrollment 2009 FTE</th>
<th>Headcount 2009</th>
<th>Credit Hours 2019</th>
<th>Student Enrollment 2019 FTE</th>
<th>Headcount 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate, TOTAL</td>
<td>136,197</td>
<td>9,080</td>
<td>9,947</td>
<td>150,372</td>
<td>10,025</td>
<td>10,983</td>
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<tr>
<td>Undergraduate, BEFORE SPM</td>
<td>119,467</td>
<td>7,964</td>
<td>131,901</td>
<td>8,793</td>
<td></td>
<td></td>
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<tr>
<td>Graduate TOTAL</td>
<td>15,119</td>
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<td>16,693</td>
<td>1,532</td>
<td>3,227</td>
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<tr>
<td>Graduate BEFORE SPM</td>
<td>12,299</td>
<td>1,145</td>
<td>13,579</td>
<td>1,264</td>
<td></td>
<td></td>
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<tr>
<td>TOTAL</td>
<td>151,316</td>
<td>10,468</td>
<td>12,870</td>
<td>167,065</td>
<td>11,557</td>
<td>14,210</td>
</tr>
</tbody>
</table>

5.2 Faculty and Staff Projections

Many factors influence faculty and staff growth and development including operating procedures, teaching and learning pedagogies and research endeavors. Partnerships amongst corporations, federal government, public schools, industry, and other institutions, are being sought out per the University Strategic Plan. Not only will additional human resources be necessary for academic purposes, but also for increases in research activity, community outreach and University development. Projections of faculty and staff are based upon successful student to faculty ratios and reasonable growth in staff to meet campus needs as we move forward.
Faculty Projections

For this master plan update, the University is projecting growth in faculty based on maintaining successful student to faculty ratios of 19.0 FTE students to each FTE Instructional Faculty. When factoring in non-instructional faculty, the overall ratio of FTE students to FTE Faculty of 12.9 is used in projecting total faculty requirements in the Fall of 2019. This approach is compatible with our objectives, leading to improved learning experiences, while supporting research and community involvement. This approach leads to a 10.5% net projected increase in total faculty in the 2009 to 2019 period.

Staff Projections

Campus staff support all campus services, including academic, research, administration, residential life, student life, athletics, and outreach. Staff are projected based on the necessary support to successfully manage operations. While new technologies can enable higher efficiencies in staffing, there are limits to this approach. This is especially true after periods of economic downturn when staffing slowdowns and layoffs have been required in response to budgetary limitations. The projected growth in staff has been tailored for each staff employment category. For instance, professional non-faculty growth projections are tied to the current FTE students to FTE professional staff ratio of 16.3; and technical and administrative support staff are assumed to grow at a rate of 5% for full-time staff and 10% for part-time staff. Overall, this approach leads to a total projected increase of 16.3% for staff in the 2009 to 2019 period.

Graduate Assistants Projections

Supporting faculty are graduate student teaching and research assistants, with projected growth based on maintaining current ratios of full-time faculty to graduate assistants. Based upon maintaining the current 0.9 graduate assistants to each full-time faculty member ratio, graduate assistants are projected to increase by approximately 10%.

Table 5.2 illustrates the projected growth in faculty, staff and graduate assistants on campus.

Table 5.2
Faculty and Staff Projections

<table>
<thead>
<tr>
<th></th>
<th>Current 2009</th>
<th>Projected 2019</th>
<th>% Change 2009-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-Time Faculty</td>
<td>738</td>
<td>815</td>
<td>10.4%</td>
</tr>
<tr>
<td>Part-Time Faculty</td>
<td>279</td>
<td>308</td>
<td>10.4%</td>
</tr>
<tr>
<td><strong>Total Faculty</strong></td>
<td><strong>1,017</strong></td>
<td><strong>1,123</strong></td>
<td><strong>10.4%</strong></td>
</tr>
<tr>
<td>Full-Time Staff</td>
<td>1,110</td>
<td>1,297</td>
<td>16.8%</td>
</tr>
<tr>
<td>Part-Time Staff</td>
<td>77</td>
<td>84</td>
<td>9.1%</td>
</tr>
<tr>
<td><strong>Total Staff</strong></td>
<td><strong>1,187</strong></td>
<td><strong>1,381</strong></td>
<td><strong>16.3%</strong></td>
</tr>
<tr>
<td>Graduate Assistants</td>
<td>663</td>
<td>734</td>
<td>10.7%</td>
</tr>
</tbody>
</table>
5.3 Facility Projections

Development of the Space Planning Model

UMBC has created a space modeling tool (“Space Model”) that can illustrate facilities needs based on specific and unique planning variables that represent the actual conditions of the UMBC campus environment and current projections. This model was used to calculate the long range space needs for the campus in this report.

The UMBC Space Model utilizes thousands of programming variables that best describe the operating practices of all campus departments. This assures the master plan is as programmatically driven as possible. For purposes of the Master Plan Update, campus departmental representatives identified planning variables with the help of third party planning consultants and influenced by national trends and guidelines issued by the Maryland Higher Education Commission.

With this Space Model, building space needs and projections can be formulated under any number of planning scenarios. People, and what activity they perform, drives space requirements. Thus, the impacts of students, faculty, and staff, and what they do (programs) drive the amount of space needed on campus. This planning tool is explained further in an appendix to this document entitled UMBC Space Model.

Academic, Administrative and Student Service Space Needs

The space model quantifies current and projected deficits in every space use category. Instructional, research and student life programs are severely limited by these shortages of spaces and facilities. As the campus has grown and the number of programs increased the campus often finds itself limited by the existing number of teaching spaces, including classrooms and labs.

Approximately 67% of the projected space needs are associated with providing or supporting the University’s academic, research, and student life programs. By Fall 2019, it is anticipated the campus will need approximately 136,000 square feet of classrooms, 411,000 square feet of laboratory space, and 438,000 square feet of office space. Space deficits for classrooms, labs and offices total over 207,000 assignable square feet.

The greatest needs for academic and student service space are in special use and general use room-use categories. These include meeting, assembly, athletics, performance and exhibit spaces. Historically, much of this space has been shared by academic units, student life groups, and athletics and recreation programs. The campus has grown to a point that it requires additional space to support
these programs. In addition, the campus has current and projected deficits in other specialized room types that are needed to directly support teaching and research activities. These include animal housing and media production. The total deficit for special use and general use spaces is projected at over 192,000 assignable square feet. Table 5.3 lists the existing space on campus and the space deficit as projected for 2019.

### Table 5.3

**Academic and Student Service Space Needs by 2019 (NASF)**

<table>
<thead>
<tr>
<th>Space Type</th>
<th>Existing Space</th>
<th>Projected Space</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>99,491</td>
<td>136,262</td>
<td>(36,772)</td>
</tr>
<tr>
<td>Laboratories</td>
<td>292,934</td>
<td>410,837</td>
<td>(117,903)</td>
</tr>
<tr>
<td>Office</td>
<td>385,300</td>
<td>437,687</td>
<td>(52,388)</td>
</tr>
<tr>
<td>Study</td>
<td>146,390</td>
<td>180,269</td>
<td>(33,878)</td>
</tr>
<tr>
<td>Special Use</td>
<td>103,896</td>
<td>245,775</td>
<td>(141,879)</td>
</tr>
<tr>
<td>General Use</td>
<td>156,636</td>
<td>207,578</td>
<td>(50,942)</td>
</tr>
<tr>
<td>Support</td>
<td>71,427</td>
<td>123,616</td>
<td>(52,189)</td>
</tr>
<tr>
<td>Health</td>
<td>2,982</td>
<td>7,993</td>
<td>(5,011)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,259,056</strong></td>
<td><strong>1,750,017</strong></td>
<td>(490,961)</td>
</tr>
</tbody>
</table>

### Residential Space Needs

Many of the college campuses in the University System of Maryland are ringed by neighborhoods of 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 and, subsequently, must provide for the housing demand of students on its campus. This demand for student housing remains strong and the University is committed to providing this essential service to students.

The projected amount of residential space was determined by the need for additional beds to accommodate growth in undergraduate enrollment. To retain its highly residential character, the University plans to continue to provide housing for 40% of its undergraduate population, including 75% of its entering Freshman. This commitment requires an additional 642 beds on campus by 2019. Residential space needs arising from this demand total approximately 132,000 square feet.

### Table 5.4

**Residential Growth Projections (including the Walker Avenue Apartments)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Assignable SF</td>
<td>714,517</td>
<td>848,486</td>
<td>(131,969)</td>
<td>18%</td>
</tr>
<tr>
<td>Beds</td>
<td>3,771</td>
<td>4,413</td>
<td>(642)</td>
<td>17%</td>
</tr>
</tbody>
</table>
Recreation and Open Space Needs

UMBC is a dynamic campus requiring additional open spaces that promote interaction, congregation, and assembly. The campus envisions developing new and enhancing existing open spaces to create memorable spaces that foster formal and informal collaboration between faculty, staff, and students. There are varying factors that determine need for exterior open space. The number and types of spaces are driven by academic programs in the health and physical education fields, athletic programs, club sports, intramurals, and general recreation. Outdoor facilities may also be limited to athletics programs only, or developed for scheduled recreational club and intramural use.

The University has recognized that there is a shortage of spaces and facilities for recreation on campus. This deficit is a result of the rapid growth of the residential community on campus.

The University projects a need for:

- multi-purpose fields for soccer, lacrosse, football and rugby;
• a field for softball to replace the one field lost due to the expansion of housing communities;

• additional outdoor tennis and basketball courts;

• additional sand volleyball courts and badminton courts;

In addition, the opportunity exists to create additional facilities for students to recreate informally. These include bike trails through the wooded areas and non-traditional sports like a ropes courses or a disc golf course. Other spaces, located within residential communities can afford opportunities for unscheduled games and activities like horse shoes, bocce ball and ball throwing.
6.1 Principal Building and Open Space Projects

The University has developed specific projects to satisfy the space needs generated by enrollment growth over the next ten years. A series of major capital projects are required to address both current space deficits and future space needs in support of UMBC’s teaching, research and service mission.

Figure 6.1 illustrates the projects in the context of the existing campus. The projects range in scale from roadway improvements to the 167,000 square foot Performing Arts and Humanities Building. Each project reinforces the salient elements of the Campus Framework, as well as the Campus Land Use and Open Space Plans.

Two projects are currently underway: the Performing Arts and Humanities Building and the Patapsco Hall Addition. Both of these projects are expected to break ground in the summer of 2010. Both also are designed to address adjoining exterior spaces, with appropriate landscape and open space elements.

The remainder of the projects are grouped by type, with academic buildings first. There are two additional new academic projects and five renovations; two new residential projects and three renovations; two student centered projects; an athletics project; and several roadway, infrastructure and parking projects.

Together the projects add 969,000 gross square feet of buildings (not including parking structures) and will add 642 beds to the campus inventory. The new construction, renovations of existing buildings, site work and utility upgrades and parking structures have been calculated to cost $874,600,000 in 2009 dollars. Collectively, the facilities support UMBC’s Vision – to be the best public research university of our size.
PROJECTS UNDERWAY

Performing Arts and Humanities Building

Design is underway for a proposed 167,641 GSF / 89,340 NASF facility which will house the performing arts and various academic units in the humanities. The construction of the Performing Arts and Humanities Building will play a large and essential role in our general curriculum, fully integrating learning in both the arts and sciences. The facility will house classroom and lab space for several departments, like English, that have mandatory classes for Freshman students, ensuring a high degree of use by all students.

The University plans to begin Phase I construction in July 2010. The 90,641 GSF / 45,726 NASF building will provide a 275-seat theatre, a 100-seat black box theatre, studios and classrooms, and writing labs for the departments of Theatre and English. Space will be provided for the Dresher Center for the Humanities, the Linehan Artist Scholarship program and the Arts Management office. The campus’ central plant will be expanded and distribution lines extended to support the utility requirements of this new facility.

UMBC is awaiting funding approval to construct the Phase II, a 77,000 GSF / 43,614 NASF building for the departments of Music, Dance, Ancient Studies, and Philosophy. The facility will provide a 350-seat concert hall, a 100-seat dance studio, recording studios, instrument ensemble room, classrooms, as well as an archaeology laboratory.

The Performing Arts and Humanities Building will provide an appropriate environment for students to not only be formally and informally involved in the development and production of performances, but otherwise gain exposure to the arts through cross-disciplinary activities. This project is central to supporting the University’s mission to offer academically talented students a strong undergraduate liberal arts foundation.
replace with 11x17 proposed campus plan
replace with 11x17
proposed campus plan
**Patapsco Hall Addition**

Patapsco Hall, constructed in the 1970’s will have a new wing, providing additional meeting and study spaces in addition to 184 additional beds. The project will also provide elevator access to all of the rooms of the original building, create a new fore-court for True Grit’s (the newly renovated dining facility), and provide much needed recreation facilities. The Patapsco Hall Addition is expected to be completed by Fall 2011.

This addition will facilitate the renovation of the residential communities of West Hill, Hillside and Terrace Apartments through sequential phases, without a loss of total beds on campus. The project will not add housing capacity to the campus until all three of these residential communities are renovated.

**ACADEMIC PROJECTS**

**Interdisciplinary Life Sciences Building and The Commons Plaza**

The new Interdisciplinary Life Sciences Building will provide 123,000 GSF of flexible and adaptable research and education spaces to support on-going and future interdisciplinary life science programs requiring labs, offices, and support space. In order to address the deteriorating condition of the campus’ current animal housing facilities and a campus-wide deficit for research space, this project will construct a new vivarium as a central resource for all of the campus’ research and academic programs involving animal use protocols.

This academic building will replace the one-story Theater and Academic Services Building and will bridge between the two academic zones to the east and west of The Commons. The project will enhance a key campus plaza, balancing pedestrian use and circulation with the service needs of The Commons. The impact of service vehicles will be mitigated with appropriate paving, plantings and other design features, creating a new student-oriented plaza consistent with the campus Open Space Plan.
Global Studies and Culture Building Renovation

Upon completion of the Performing Arts and Humanities Building, the 41-year old Fine Arts building will be sufficiently vacated (as academic programs relocate to the new building) to permit its phased renovation. This adaptive reuse, facilities renewal project will include replacement and upgrade of mechanical, electrical, and life safety systems; restoration of the building envelope; correction of barriers to accessibility; and architectural modifications for a number of academic programs. In order to correct life safety deficiencies and building circulation problems, a 33,000 GSF addition is proposed between the two building wings, creating a new entrance to the building oriented to the new Performing Arts and Humanities Building and the campus beyond.

Concurrent to this project will be a much needed renovation of the Pond. The Pond is one of the most important pieces of the campus storm water management system. It is also a central feature of the campus. This renovation project is envisioned to include the design of the green space around the Pond in order to make this a more accessible and attractive feature of the campus.

Multi-disciplinary Academic Building

To address additional campus-wide space deficits for classrooms, and teaching and research laboratories, a new 148,000 GSF Multi-disciplinary Academic Building is proposed adjacent to the Physics Building. The four story structure will reinforce the quadrangle created by the Public Policy Building and the Physics Building and will share a service area with the latter. The space model projects needs for additional laboratory and general classroom space to accommodate increased enrollment delineated in the planning scenario.

University Learning Center

This project will renovate the 68,900 GSF University Center, originally built as a student union and in the heart of the academic core of the campus, into the University Learning Center. The current deficit of space, especially for teaching, limits the university’s ability to adequately serve different pedagogies and instructional styles. National trends have moved towards student-centered, integrated, flexible, active
learning modalities which require higher instructor to student ratios in technology-equipped environments. Furthermore, national data ties student success to programs which provide on-demand tutoring and informal group learning centers.

With the completion of this capital facilities renewal project, the newly renovated University Learning Center will provide a central location for: new general purpose classrooms to serve the entire campus community; active learning teaching studios for courses such as introductory chemistry, math, physics, and biology; one-on-one and group tutoring rooms; an intensive English language program center; disability support services; and other related student services. In this way, the proposed project will address the lack of appropriate and functional interactive teaching and learning support spaces to ensure student success at UMBC.

Building Renewals

Four existing campus buildings house a majority of the general purpose classrooms and teaching labs on campus and are scheduled for major renovations. These include Sondheim Hall (built in 1973), the Math/Psychology Building (built in 1969), a wing of the Biological Sciences Building (built in 1983), and the Academic IV Building, (dates from 1980). These buildings are nearing the end of their useful life. Without significant renewal, continued operation will not be functional or economically feasible.

UMBC proposes a systematic approach to renewal of these buildings through the replacement and upgrade of mechanical, electrical, and life safety systems; restoration of building envelope; and modest architectural modifications to correct barriers to accessibility, improve building functionality, and enhance public spaces. The sequencing of these major facilities renewal projects has been adjusted to follow the completion of the New Interdisciplinary Life Sciences Building project. Due to limited availability of surge space and the critical nature of maintaining a functioning animal housing facility, the campus must implement a phased renovation tied to the construction of a new vivarium and additional interdisciplinary life science research space.

The Math/Psychology Building renovation is critically needed to address deteriorating building conditions, such as a failing roof, brick cladding failure, and deficient teaching facilities due to dated technology. The Sondheim Hall renovation project will upgrade the envelope and replace mechanical, electrical, and life
safety system components in support of academic programs. The Academic IV renovation project will refurbish one of the campus’ primary teaching buildings through upgrade of the building’s infrastructure, renewal of public spaces, and modernization of general purpose classrooms and teaching labs.

**STUDENT LIFE PROJECTS**

**Student Services/Student Life Building**

The construction of The Commons in 2003 created a central focus for student activity on campus, grouping student services, meeting spaces, lounges and dining facilities. Its success has put strains on the facility and as the campus grows new student life spaces are needed. Complimenting The Commons, the 100,000 GSF Student Services/Student Life Building will consolidate currently scattered student services and finally find an appropriate home for facilities that have been housed in temporary sheds.

The Student Services/Student Life Building is sited to reinforce the “student centered” core of the campus and to frame the main campus open space or green. This space will be the iconic open space for the campus, reinforcing the Campus Framework Plan. In addition, the building will be designed to retain a critical play field adjacent to Erickson Hall and reinforcing the campus pedestrian Spine.

**UMBC Stadium Renovation**

The UMBC Stadium Complex renovation project will improve the existing bleachers, press boxes, restrooms and concession areas of the existing stadium, built in 1976. These modifications will bring stadium facilities up to the level of UMBC’s divisional peers, while providing for handicapped accessible services that are not currently available.
**UMBC Events Center**

The proposed UMBC Events Center will be a 200,000 GSF building, housing a series of flexible meeting rooms and a large multi-purpose gathering space that can serve for student events, regional performances, convocation, and as a new athletic arena for the University. The main space will have flexible seating configurations for 6,000 to 8,000, with adequate support facilities such as concessions, a box office and athletic program offices and training rooms. The building will also have meeting and assembly spaces of a variety of sizes, with appropriate technologies meeting the needs of a broad array of activities.

This building will serve the UMBC campus in many ways. It will give our campus the ability to host events and meetings, including convocation/commencement ceremonies that currently cannot be hosted on campus for lack of facilities. Site improvements include pedestrian improvements to traverse Hilltop Circle, providing greater access to the UMBC Stadium Complex beyond.

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**RESIDENTIAL PROJECTS**

**New Walker Avenue Residential Community**

This project develops a new residential community along Walker Avenue that would add an additional 342 beds to the campus residential inventory. The community is sited to reinforce the approach from Wilkens Avenue, enhancing the street environment of Walker Avenue, one of the important portals to both the campus core and to other residential life facilities. The community will replace the greenhouses that occupy this important corner of the campus and will take advantage of the sloping site with a landscaped, terraced courtyard, screening the Central Plant facility and framing the Walker Avenue/Hitop Circle intersection.
Chesapeake Hall Addition

A new addition to Chesapeake Hall will provide 120 additional beds to the residential building and will vastly improve access and handicapped accessibility. The project will create a new lobby at the sidewalk level and provide elevator access to all rooms of the hall, that currently are not accessible above the first floor.

The addition will frame and develop two new residential courts, one green and informal to the south and one more interactive to the north, with benches, grills, and tables and paving.

6.2 Recreation

UMBC has transformed from a commuter campus to a residential campus. While providing on-campus housing has been an important element of this transformation, equally important is providing areas and facilities for social interaction, play and recreation. Additional facilities for recreation and athletics are needed for a university of this size. In 2008, training facilities for athletics were dedicated and the following year a new multi-purpose field was constructed. To meet recreational needs over the next ten years the following projects are planned:

- Three additional multi-purpose fields for such diverse sports including football, soccer, rugby and field hockey. These fields will be used by student club and intramural teams. Where feasible, some fields will be nestled against the natural areas.
- Several new outdoor basketball courts. One is currently being funded through the development of the Patapsco Hall addition.
- New hard-surface, multi-purpose courts for games and sand courts for volleyball.
- Additional active and passive recreation spaces for students, within or adjacent to the residential communities.
- An improved play field adjacent to Erickson Hall for pick-up games and unscheduled recreation.
- A network of trails for jogging, walking, and biking that utilize natural areas and connect other recreational facilities in the area.
6.3 Access and Circulation

The University has four vehicular portals, UMBC Boulevard, Hilltop Road, Walker Avenue and Poplar Avenue. These main access points lead one directly to a ring road, Hilltop Circle that must serve as a welcoming element, an organizing device for orienting visitors and at the same time provide a linear parking lot. While Hilltop Circle provides easy access to parking and removes the majority of traffic from the center of campus, it remains a physical barrier to the cohesive growth of the campus beyond the ring road.

UMBC continues to strive for a pedestrian-friendly and sustainable campus. The Master Plan addresses this desire with four distinct projects:

1. The modification of Hilltop Circle with enhanced tree plantings, crosswalks and signage to alter the character of the roadway and reduce vehicular speeds. The University is installing enhanced pedestrian crossings at Poplar Avenue and other areas to improve connectivity to areas outside the ring road. In addition, the section of roadway between Walker Avenue and Hilltop Road to the west of the campus core and between Commons Drive and Poplar Avenue to the east will be redesigned to allow for an expansion of development and stronger pedestrian connections.

2. The Commons Plaza will be transformed into a student-oriented plaza allowing for service to The Commons when it is needed. The current configuration creates a large and unnecessary, vehicular loop that impedes pedestrian circulation between the academic and residential neighborhoods of the campus.

3. Poplar Avenue and Center Road will be transformed from a traditional street to a pedestrian way that can support motor vehicles when necessary. This will alter the feel of the campus in these areas and provide for improved connectivity between residential communities, academic buildings and parking areas. Emergency vehicles, planned service deliveries, maintenance vehicles, and other service vehicle access (loading and unloading) will still be possible. Walker Avenue, Administration Drive and Commons Drive will remain accessible vehicular ways to parking garages, but enhancements to these streets are planned to improve the walkability of the campus.
4. In addition, the campus is proposing a roadway and access project to address both safety and orientation. The proposed Campus Traffic Safety and Circulation Improvement Project will create a safer vehicular access at the intersection of UMBC Boulevard and Hilltop Circle. The project will also create a more visitor friendly gateway into the campus, with a drop-off area aligned with the main campus pedestrian spine.

This project provides renewal of the south campus entrance via UMBC Boulevard. This major entrance directly connects I-195 to the campus’ primary road, Hilltop Circle. The current configuration of this primary campus access point is unsafe for pedestrians and drivers, leads to vehicular backups during peak times, is confusing for visitors, is un-welcoming, and requires a circuitous route to enter and leave the visitor parking area.

The project will redesign the intersection of UMBC Boulevard and Hilltop Circle to correct vehicular, bicycle, and pedestrian safety and circulation problems. Specific measures that will be taken to eliminate safety concerns will include the installation of a roundabout at the intersection, an appropriate roadway signage system, and clearly delineated pedestrian and bicycle pathways. A secondary circular drive will be installed to provide direct access to visitor parking as well as a safe, designated passenger drop-off near the Administration Building. The south campus entrance will become a boulevard, providing the requisite presence for the gateway to the UMBC campus.

Transit

To encourage transit use the University has embarked in 2009 on a program of enhancing bus stops on campus. Through the cooperation of the Maryland Transit Administration campus bus stations have been relocated to facilitate use and wayfinding. In addition, on-going projects are improving access routes, widening waiting areas and replacing existing bus shelters with new structures. The University is committed to increasing convenience and awareness of transit options as a way to reduce the number of single occupancy vehicles on campus, thereby reducing UMBC’s carbon footprint.
Pedestrian Circulation

The master plan for the UMBC campus seeks to enhance pedestrian circulation on campus by:

- developing a campus framework to inform decisions on the placement of buildings and the development of open space and circulation paths;
- improving pedestrian routes within the campus and extending these routes out beyond Hilltop Circle with clear crossings of this roadway, which currently serves as a barrier to pedestrian circulation;
- providing better access to the natural areas on campus with new bridges over streams and clear entries and paths leading to these wonderful, but underappreciated assets;
- providing better access to and between the residential communities with clear and accessible paths;
- creating a campus that accommodates all users. This challenge is great given the topography. The University is increasing the full accessibility of more buildings on campus, especially residential units that were built without elevators. In 2010 new elevator cores will grant full accessibility to Susquehanna and Patapsco Halls, and in the future to Chesapeake Hall.

In addition, the University is studying access routes on campus and developing a signage system with maps and trailblazers to guide mobility impaired students, faculty, staff and visitors to accessible routes. The University will also construct two new ramps in 2010 to replace or augment existing stairs on important pedestrian routes and improve mobility.

The University desires to improve pedestrian and biking connectivity to the commercial areas of the adjoining communities of Arbutus and Catonsville. Better physical connectivity will support ongoing outreach programs between the university and its neighbors.

6.4 Transportation Demand Management

In response to increased enrollments and campus growth, UMBC will reduce the potential strain on the existing parking inventory through implementation of Transportation Demand Management (TDM) strategies and policies. A number of TDM options will be employed to reduce single-occupancy vehicle travel onto campus, better utilize existing parking facilities, and improve access to alternative transportation modes.

UMBC has launched its first TDM initiative which focuses on improving utilization of existing surface parking lots that appear to be distant from the core. This sustainable project will improve pedestrian crossings along Hilltop Circle on the east side of the campus to greatly increase utilization of existing lots that are currently underused. See Section 6.3 for an illustration of these improvements. Future projects will be needed to enhance linkages to other parking areas.

The University will integrate a variety of TDM strategies into its daily operations and implement sustainable facility projects to improve the campus and reduce its impact on the environment. A number of strategies are being considered to reduce the demand for new parking areas and increase use of alternatives to driving including:

- Improvements to bus routes and stations;
- Installation of bike lanes and bike parking facilities including in new residential communities;
- Introducing a bike rental program;
• Development of ride share programs such as carpooling and vanpooling;
• Increasing use of existing remote parking lots;
• Providing car-sharing services for faculty, staff, and students who elect to use alternative modes of transportation;
• Improving pedestrian pathways; and
• Promoting teleworking for faculty and staff.

Even as UMBC strives to reduce its carbon footprint through implementation of TDM strategies, the University is prepared to respond to additional parking needs as they arise on campus. These new parking facilities are included in this plan:
• New surface lot for approximately 150 cars on a parcel of cleared land between lots 3 and 12 near the Commons Avenue Garage; and
• New parking structures with approximately 1,300 spaces located near campus portals.

6.5 Utilities

UMBC is committed to promoting the design and construction of buildings and infrastructure that reduce the amount of energy used on our campus. This commitment reduces both the carbon footprint of the campus and operating expenses in the long run. Initiatives that are an integral part of each project referenced in the 2009 Facilities Master Plan Update include:
• budgeting, designing and constructing new buildings to meet or exceed LEED silver rating.
• optimizing efficiency of existing hot and chilled water systems.
• upgrading building envelopes on existing buildings. Energy saving measures are now incorporated into the design of replacement roofs, windows and mechanical systems in building renovations.
• improving building utilization and scheduling of existing buildings for increased efficiency.
• upgrading existing buildings with more efficient lighting and controls.
• developing student, staff and faculty orientation programs to enhance energy-saving behaviors.

This commitment to sustainability and energy conservation is integral to every decision on campus regarding buildings and systems.

Hot and Chilled Water Systems

The new Performing Arts and Humanities Building will upgrade the Central Plant to accommodate the increased demand for cooling and power. The existing hot water generation system located within the Central Plant has been determined to be adequate to support the new PAHF. The utility tunnel system will be extended to serve the new facility.

The Central Plant has been designed to be expandable in a modular fashion to accommodate 1,000 ton chillers. In lieu of a costly building expansion to provide the needed cooling capacity required by the
Performing Arts and Humanities Building, the University will be installing a larger, more efficient, 2000-ton duplex chiller within the existing building and to refurbish and upgrade the six existing cooling towers with high efficiency motors and controls. This approach addresses the deteriorating condition of the existing cooling towers and creates a greater efficiency over the existing cooling system.

Additional building on campus will require continued upgrades to the Central Plant. Improvements include a new boiler and additional chillers in an addition to the existing plant, and/or a new satellite plant to serve the eastern part of the campus. The tunnel network will be expanded with each building project, consolidating and extending this valuable system.

**Electricity Distribution**

The proposed Performing Arts and Humanities Facility will require the upgrade and replacement of the two electrical transformers that serve the campus. The PAHB project will replace both 10,500 kVa transformers with 20,000 kVa units.

**Data and Communication**

Data and telecommunication systems are continuously updated on campus as technology changes and demand grows. UMBC is envisioning new and expanded facilities to ensure that technology keeps pace with campus growth. It is critical to plan for future capacity like any other utility on campus, realizing that data infrastructure affects both space needs and mechanical systems.

While most communication infrastructure needs to be adjacent or near the end user, data centers can be remotely located. Currently to expand data center capacity the University is looking to lease space in bwtech@UMBC, instead of expanding on campus within existing buildings.

### 6.6 Additional Sustainability Initiatives to Support Growth

UMBC is working with an outside energy consultant, Naresco, to develop specific and proven programs and projects to reduce energy usage on campus. Sustainable initiatives include:

- **Chilled water system** – Replace chilled water pumps. Add variable speed drives for chilled water pumps and cooling tower fans at Central Plant. Improve chilled water distribution via improvements to the main loop and tertiary systems (replace 3-way valves with 2-way valves).

- **Space utilization** – Improve building utilization and scheduling for increased efficiency by the consolidation of night classes into fewer buildings.

- **Water conservation** – Ensure appropriate devices are in place for low flow for toilets, urinals, faucets, and shower heads. Repair/replace devices as needed. Evaluate waterless urinals via trial installation.

- **Combined Heat and Power System** – Investigating grants to replace two boilers with a natural gas turbine producing four megawatts of electricity. The waste heat will be recovered via a flue gas heat exchanger providing heating water for the campus. In the summer months, the heat recovery system will power an absorption chiller providing chilled water for air conditioning.
6.7  Projected Costs

A summary of capital project costs for the facilities highlighted in the 2009 Campus Plan are illustrated in Table 6.1. This table summarizes the approximate project size of new buildings, renovations and parking structures. These projects have been developed to support and advance University objectives and address enrollment growth, necessary reinvestment in existing buildings, and important infrastructure projects.
### Table 6.1 Projected Costs

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>AREA (GSF)</th>
<th>APPROX. PROJECT COST (in 2009 dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEW ACADEMIC BUILDINGS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Performing Arts and Humanities Building and plazas</td>
<td>168,900</td>
<td>$ 165,300,000</td>
</tr>
<tr>
<td>B. Interdisciplinary Life Sciences Building and Commons Plaza renovation</td>
<td>123,000</td>
<td>$ 104,000,000</td>
</tr>
<tr>
<td>C. Multidisciplinary Academic Building</td>
<td>148,000</td>
<td>$ 114,000,000</td>
</tr>
<tr>
<td><strong>NEW STUDENT SERVICES BUILDING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Student Services / Student Life Building and campus quadrangles</td>
<td>100,000</td>
<td>$ 54,000,000</td>
</tr>
<tr>
<td><strong>NEW ATHLETIC BUILDING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. UMBC Events Center and UMBC Stadium Plaza</td>
<td>200,000</td>
<td>$ 80,000,000</td>
</tr>
<tr>
<td><strong>NEW RESIDENTIAL BUILDINGS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Patapsco Hall Addition and True Grit’s Plaza</td>
<td>52,000</td>
<td>$ 15,000,000</td>
</tr>
<tr>
<td>G. Chesapeake Hall Addition and quadrangle</td>
<td>35,000</td>
<td>$ 11,000,000</td>
</tr>
<tr>
<td>H. Walker Avenue Residential Community and Walker Avenue improvements</td>
<td>142,000</td>
<td>$ 39,000,000</td>
</tr>
<tr>
<td><strong>TOTAL NEW</strong></td>
<td>968,900</td>
<td></td>
</tr>
<tr>
<td><strong>BUILDING RENEWALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. Global Studies and Culture Building (former Fine Arts Building) and Pond renovation</td>
<td>185,000</td>
<td>$ 58,000,000</td>
</tr>
<tr>
<td>J. University Learning Center and plaza</td>
<td>70,700</td>
<td>$ 16,300,000</td>
</tr>
<tr>
<td>K. Math / Psychology Building</td>
<td>60,030</td>
<td>$ 20,500,000</td>
</tr>
<tr>
<td>L. Sondheim Hall</td>
<td>84,870</td>
<td>$ 29,000,000</td>
</tr>
<tr>
<td>M. Academic IV Building</td>
<td>109,106</td>
<td>$ 37,000,000</td>
</tr>
<tr>
<td>N. Biological Sciences Wing</td>
<td>50,220</td>
<td>$ 20,400,000</td>
</tr>
<tr>
<td>O. West Hill Apartments and recreation fields</td>
<td>77,050</td>
<td>$ 15,000,000</td>
</tr>
<tr>
<td>P. Terrace Apartments</td>
<td>62,300</td>
<td>$ 10,700,000</td>
</tr>
<tr>
<td>Q. Hillside Apartments</td>
<td>73,550</td>
<td>$ 12,600,000</td>
</tr>
<tr>
<td>R. UMBC Stadium</td>
<td>13,800</td>
<td>$ 3,000,000</td>
</tr>
<tr>
<td><strong>NEW ROADWAY IMPROVEMENTS / PARKING FACILITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Campus Traffic Safety and Circulation Improvements</td>
<td>NA</td>
<td>$ 11,500,000</td>
</tr>
<tr>
<td>T. Hilltop Road Garage</td>
<td>500 spaces</td>
<td>$ 15,000,000</td>
</tr>
<tr>
<td>U. Events Center Garage and Hilltop Circle improvements</td>
<td>800 spaces</td>
<td>$ 25,800,000</td>
</tr>
<tr>
<td>V. Park Drive Lot</td>
<td>150 spaces</td>
<td>$ 500,000</td>
</tr>
<tr>
<td><strong>NEW RECREATIONAL FACILITIES</strong></td>
<td></td>
<td>$ 2,000,000</td>
</tr>
<tr>
<td><strong>UTILITY UPGRADES AND SITE IMPROVEMENTS</strong></td>
<td></td>
<td>$ 15,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$ 874,600,000</td>
</tr>
</tbody>
</table>
7.1 Future Growth

The implementation plan illustrates the facility needs of the University, addressing current and projected space deficits based on expected enrollment growth. The University has also developed a Campus Build-out Plan (Figure 7.1) that investigates the future growth capacity of the UMBC campus site and confirms that the proposed implementation plan is appropriate to promote and provide for a sustainable and successful future campus.

The Campus Build-out Plan builds upon the 2003 Facilities Master Plan and illustrates how UMBC could move forward, developing a campus aligned with the University mission and its strategic goals. The Campus Build-out Plan shows that the existing campus footprint could support up to 17,000 students and the corresponding facilities and infrastructure required to sustain a campus of this size.

This Campus Build-out Plan promotes the University’s Master Plan Principles, Goals, and Objectives and adheres to the Land Use, Framework, and Open Space Plans outlined in Chapter 4. It follows the strategy of clustering similar activities and programs into identifiable zones, providing order, efficiency and improving collaborative interaction. The scale and density of buildings, the types and quality of open spaces, the type of access, and diverse uses all contribute to the overall atmosphere and success of each part of campus. The plan is rendered in color by building use to facilitate an understanding of the development possibilities envisioned.

The Campus Build-out Plan seeks to:

• show that the campus can continue to meet its mission into the future, while growing modestly;
• build upon the Campus Land Use, Framework, and Open Space Plans as developed in the 2009 Facilities Master Plan Update;
• continue to create a welcoming and pedestrian friendly campus environment;
• provide for the housing needs of our growing residential community;
• provide sufficient opportunities for outreach facilities;
• and, develop into the future in a sustainable way including the preservation of the natural environment.

Growth will be accommodated on campus principally in a region of currently underdeveloped land running northwest to southeast through the campus. This region provides ample space for future growth, while preserving and enhancing existing open space on campus. Strategic future development of the campus will result in expanded academic, research and residential precincts along with potential new areas of business and community outreach.
The Campus Build-out Plan illustrates several development strategies for long range growth of the campus. These include:

A. Expanded Academic Precincts
B. Campus Core Renewal
C. Student Life Enrichment
D. Residential Communities Renewal and Expansion
E. Outreach Partnerships
F. Natural Areas Preservation

The development shown reinforces the key elements of the campus framework. It is in the completion of the Campus Build-out Plan that the key elements of the framework, including the Spine and the Linkages will be fully realized. Academic development lining the east-west leg of the Spine (currently Poplar Avenue) will help transform this route into a pedestrian promenade, linking the Albin O. Kuhn Library and Gallery in the core of the campus to newly-developed academic, athletic, and student life facilities.

**Figure 7.1  Underutilized Land Area for Future Growth**

The Campus Build-out Plan continues to cultivate linkages by connecting the center of campus with academic, residential, athletic, and outreach zones. These linkages will connect programs beyond Hilltop Circle, taming the loop road and allowing for the seamless growth of campus outside this barrier. They define the development patterns of the buildings and open spaces that line them, extending the pedestrian oriented campus.
replace with 11x17
proposed long-range plan
replace with 11x17
proposed long-range plan
**Expanded Academic Precincts**

Underutilized land in the Academic zone of campus provides for sufficient space to extend the academic core, both to the west and to the east. This development extends the successful pedestrian-friendly attributes of the core. The intent would be to create a relatively dense development of buildings clustered around quadrangles, using limited land resources as efficiently as possible. In the future as UMBC grows further, more detailed definition of land use may create programmatically oriented clusters within the overarching framework.

**Renewal of the Core Campus**

In the future, the Retriever Activities Center, currently the largest building in the academic core, will reach the end of its useful life and need to be replaced. This will provide an opportunity to relocate the facility adjacent to residential communities to better serve the student community and enhance the delivery of recreation and student life programs. The facility location would logically provide a bridge between Academic and Student Life zones. As importantly, the relocation of the Retriever Activities Center will facilitate the renewal of the central academic core. New academic buildings can be developed in response to growth in STEM programs with adjacencies to existing academic buildings promoting the collaborative relationships that are at the core of UMBC’s mission and vision.

**Student Life Enrichment**

The Campus Build-out Plan reinforces the student-centered focus of UMBC by envisioning a new student life building adjacent to The Commons and linked to the new Student Services/Student Life Building proposed as part of the Implementation Plan. A new building in this location would further define the edges of both the Central Green and The Commons Plaza. It would also provide needed space to support student life activities as an extension of The Commons and reinforce the linkage between Academic and Residential Life land use zones.

The relocation of the student activities center adjacent to the proposed new Event Center and residential community would include indoor and outdoor recreational facilities promoting and enhancing student life activities. The Plan sites this building complex at the end of one of the radiating promenades that comprise the campus Spine and would include such amenities as basketball and tennis courts, an indoor track and weight room and a natatorium for recreation and competition. Over time, new walking and biking paths will be developed connecting the campus community to the campus’ forested natural areas as well as to the adjacent Athletics precinct.
Residential Communities Renewal and Expansion

The Campus Build-out Plan assumes a continued commitment to renew and replace existing residential communities that are no longer able to support the residential program. At some point, continuing to maintain the three 1970-era low-density apartment-style communities will be unfeasible. Replacement of these complexes with higher density residential communities will make more effective use of limited land area and respond to anticipated enrollment growth.

The Campus Build-out Plan illustrates new residential communities, modeled after our most successful ones. These medium-density buildings are sited to take advantage of the sloping site and organized around intimate courtyards. A new dining and recreation facility would be needed to support this development.

Outreach Partnerships

Two areas for potential expansion of outreach are strategically located near campus entries to provide ideal access for such programs. These highly accessible and visible building locations will place outreach activities adjacent to academic, research and residential zones, providing improved opportunities for future economic development partnerships. As envisioned in the Campus Build-out Plan, outreach can be as traditional as alumni activities and research and academic partnerships, but can also potentially include retail and community support services.

Natural Areas Preservation

The Campus Build-out Plan preserves and protects the majority of the deciduous forests surrounding the campus on the northern, eastern, and southern sides, while continuing to encourage improved connectivity to these areas for recreational, educational and research opportunities. A network of trails will connect low density recreation areas knitted within and adjacent to existing natural areas. Ideally, this trail system will connect with the 13,847 acres of Patapsco Valley State Park and serve to engage the Southwest Baltimore County community.
Appendix A
Projection of Space Needs using the UMBC Space Model

Introduction

UMBC's Space Model is a tool that allows the campus to continually evaluate its space needs at the macro-scale. It is built upon thousands of variables used to determine the amount of assignable and non-assignable area the campus requires to satisfy its mission and operate effectively. The model compares appropriate space quantities to the university's existing space and/or to a proposed plan.

Projections can be made for a variety of desired scenarios by changing any number of variables in the model. The model allows the campus to test planning scenarios and project facility impacts due to programmatic changes under consideration. Typical planning scenarios include changes in enrollment growth projections, evolving classroom and laboratory pedagogies and uses, new research emphases, staffing trends, demographic changes in the community or surrounding region, and increased campus housing capacity. When variables are changed, the model presents the resulting space impacts associated with the adjustments.

As such, the Space Model is a valuable tool to evaluate facility space impacts driven by strategic goals and objectives. The ability to provide sound data is particularly beneficial in an academic planning process, a strategic planning process, and especially, in long range facility planning.

Use of the Model

The Space Model was initiated specifically for the campus Master Plan Update. However, it is intended to be dynamic and used on an ongoing basis as a planning tool. It can be used for a variety of planning and prioritization processes.

As it was crafted, detail was incorporated in a way that allows the university to evaluate the impact of individual departments on space needs related to classroom demand, research activities, administrative functions, and student life activities. The Space Model provides very specific data at the departmental level for spaces such as classrooms, laboratories, and offices. The intent is not to identify the amount of space to be assigned to each department but rather quantify space needs driven by each department's programmatic requirements. It is important to view the results of this model from a macro perspective because of the varying levels of detail for each variable and the fact that most campus spaces are shared resources.

The Space Model is intentionally designed as a flexible tool to respond to changes in space guidelines and continually improve upon the space and personnel variables. The model is configured to permit
addition of other space factors, such as quality and condition, functional obsolescence, and adjacency issues. The facilities audit or facilities condition assessment can be incorporated into the model.

By adjusting the variables, the model provides a description of the space needs for the campus at any given time. Current, planned, and projected enrollment scenarios can be input. Adjustments on faculty and staff loads can be manipulated. Guidelines used to determine the space needs can be changed at any time as well. The “what ifs” are almost endless.

The Space Model directly ties into the physical master planning and long range facilities plans. It provides data necessary for each, and can also help identify priorities for project planning. However, the model is not intended to replace program level analysis and space issues associated with planning for specific projects should be dealt with on a case-by-case basis in the form of facility programs.

Development of the Model

UMBC enlisted the services of the consultant Joseph E. Bilotta of JBA, Inc. to guide the development and generate UMBC’s Space Model. JBA, Inc. employed a consensus-built process over a period of a year directly engaging over 90 faculty, deans, staff, and students. Participants were assigned to one of ten space planning groups based upon their individual knowledge of and experience with specific space types. The space planning groups were:

- Animal Support Space
- Campus Open Space
- Classroom Space
- General Use and Special Use
- Housing and Food Service Space
- Instructional and Lab Space
- Library and Study Space
- Office Space
- Student Life Space
- Support and Service Space

Over a series of workshops with each space planning group, variables influencing and driving space needs were identified and defined for both interior building space and exterior infrastructure assets, such as recreation fields and courts. For interior building space, both assignable and non-assignable space variables were evaluated and establish.

Interior building space types were defined in accordance with the nationally recognized Postsecondary Education Facilities Inventory and Classification Manual developed and published by the National Center for Education Statistics (NCES). The NCES classification system defines ten major space use categories of assignable space and three major space use categories of nonassignable space as described on the website: http://nces.ed.gov/pubs2006/2006160.pdf.
In UMBC’s Space Model, this classification system was modified slightly by combining the three nonassignable space use categories with the unclassified assignable space use category into a single category. The ten space categories employed in the model are:

100 Classroom Facilities  
200 Laboratory Facilities  
300 Office Facilities  
400 Study Facilities  
500 Special Use Facilities  
600 General Use Facilities  
700 Support Facilities  
800 Health Care Facilities  
900 Residential Facilities  
000 Non-assignable & Inactive

The Maryland Higher Education Commission Space Guidelines for Four-Year Public Institutions formed the foundation of UMBC’s Space Model. Variables were customized to reflect the campus’ specific space needs applied at the department level to forecast each program’s impact on the need for particular space types.

The Space Model was built upon an easy-to-use spreadsheet platform consisting of four worksheet categories: institutional data; space factors; space allowances; and summary data.

**Institutional Data**

The minimum institutional data required to be entered into the Space Model includes FTE enrollment, credit hours, employee data, and space inventory. All institutional data is keyed to unique department identification numbers that are common to all campus databases. By following this convention, periodic updates of institutional data and inclusion of new data will be straightforward.

FTE enrollment and credit hours are provided in terms of undergraduate and graduate students, and day and evening hours. The Space Model was crafted to run scenarios projecting the impact to facilities in changes to any combination of student factors. For the purposes of the projections developed for the 2009 Facilities Master Plan Update, only day FTE and credit hours were considered.

Employee data within the Space Model is structured after the existing EE06 employee categories:

- Executive/Administrative/Managerial
- Faculty
- Professional Nonfaculty
- Secretarial/Clerical
- Technical/Paraprofessional
- Skilled Crafts
• Service Maintenance Workers
• Graduate Assistant

The space inventory includes all campus spaces identified by department and space use category, in accordance with the structure developed for the Space Model. Within each of the ten major space use categories, there are subcategories following the nomenclature outlined in NCES’ Postsecondary Education Facilities Inventory and Classification Manual. A total of 90 space use categories are employed in the Space Model.

**Space Factors & Space Allowances**

Space factors and space allowances worksheets are provided for each of the 10 space use categories employed in the Space Model.

**100 Classroom Facilities**

Classrooms are defined as any room generally used for scheduled instruction requiring no special equipment. At UMBC, this category includes classrooms, seminar rooms, and lecture halls. Classroom service space directly supports one or more classrooms as an extension of the classroom activities. Service includes audiovisual equipment closets, preparation areas, or storage rooms.

The Space Model projects the need for classroom space driven by each department based upon this set of utilization and efficiency factors:

- **Percent Credit Hours in Classroom** - This is the percentage of student credit hours supported by classrooms. The balance flows into the laboratories.
- **Contact Hours per Credit Hour** - This is the amount of time a person is in class to earn the credit.
- **Hours per week available** - This is the number of hours a classroom is typically available to teach. It is not necessarily when it is “open”; but the window in which scheduling typically occurs.
- **Utilization Target** - This is the percentage of the week in which the classrooms should be utilized to be determined in good use. The balance of the week is necessary for cleaning, scheduling flexibility, testing, meetings, and set up time.
- **Efficiency Target** - This is the percentage of stations that should be filled, on the average, every time a classroom is used.

The Percent Credit Hours in Classroom space factor was customized for each department and varies from 15% to 100%. For the remaining classroom facilities space factors, the model assumes that they remain constant for all departments as:

- **Contact Hour per Credit Hour of 1:1**
- **Hours per week available of 40 hours from 8 am to 5 pm Monday through Friday**
- **Utilization target of 75%**
- **Efficiency target of 67%**
For hours per week available, the model is crafted to accommodate day and evening windows. Only the day portion of the model is used at this time since it was determined that this is the primary force driving the need for classroom space. In essence, the same rooms needed during the day can be reused in the evening.

The Classroom Space Planning Group identified four classroom styles of different sizes as appropriate for UMBC’s pedagogical approach. These include:

- Small seminar with 1 to 12 seats in conference room setting
- Large seminar with 13 to 24 seats in conference room setting
- Small classroom with 13 to 24 seats in table and chairs setting
- Medium classroom with 25 to 49 seats in table and chairs setting
- Large classroom with 50 to 100 seats in tablet arm chair setting
- Large lecture hall with over 100 seats in tiered fixed seating setting
- Active learning room with under 50 seats
- Active learning room with more than 50 seats

For each classroom type, the model assigns an appropriate area per station type and service area as a percent of the classroom. The station size represents the area needed to support the specific teaching pedagogies intended for the classroom style. The space per station also takes into account space needed for an instructor. Classroom service is a percentage of the classroom space needed.

Since each department has its own requirements for which classroom type is appropriate for their instructional material, the Space Model identifies by academic department the percentage of that department’s credit hours which should be scheduled in each classroom type. In this way, the Space Model aligns teaching and learning pedagogies with classroom projections so that the needs of the programs are truly met.

The projections are calculated by first determining the percent of student credit hours that are typically held in a classroom setting versus a laboratory setting. This is then adjusted per the ratio of credit hours to contact hours. Space needs are determined by taking the contact hours produced by each department and dividing that by the department’s efficiency and use variables. This determines the number of stations required. The model then determines the number of stations of each classroom style needed by applying the percentages established for each department. The area needed is then calculated by simply multiplying the number of stations for each classroom style by its own unique station size and adding the applicable percentage for classroom service.

**200 Laboratory Facilities**

NCES defines a laboratory as “a facility characterized by special purpose equipment or a specific space configuration that limits instructional or research activities to a particular discipline or a closely related group of disciplines”. While laboratories are most often associated with science disciplines, laboratories are found in all fields of study including humanities, natural sciences, social sciences, engineering, and computer science.
Laboratory facilities are subdivided into three categories:

- An instructional laboratory is a specially configured and/or outfitted space used for scheduled instruction. Class laboratories serve the needs of particular disciplines for group instruction, participation, observation, experimentation, or practice in an academic discipline.

- An open laboratory is a specially configured and/or outfitted space supporting instruction but not formally scheduled. Instead, these spaces are used primarily for individual or group instruction that is informally scheduled, unscheduled, or open.

- A research/nonclass laboratory is a specially configured and/or outfitted space used for research, experimentation, observation, research training, or structured creative activity that supports extension of a field of knowledge. Included in this category are labs for faculty, staff, and students engaged in the conduct of research and controlled or structured creative activities related to a specific academic discipline.

The Space Model projects the need for laboratory facilities driven by each department based upon a set of variables for each laboratory category. There are a set of general variables common to all three laboratory categories related to people data and demands for use. However, the space model factors and allowances for each type of laboratory facility are generally unique as described below.

The Space Model projects the need for instructional laboratory space driven by each department based upon a set of utilization and efficiency factors that are similar to those established for classroom facilities:

- Percent Credit Hours in Instructional Laboratory - This is the percentage of student credit hours supported by instructional laboratories. It is the balance of the credit hours not conducted in a classroom facility.

- Contact Hours per Credit Hour - This is the amount of time a person is in an instructional laboratory to earn the credit.

- Hours per week available - This is the number of hours an instructional laboratory is typically available to teach. It is not necessarily when it is “open” but the window in which scheduling typically occurs.

- Utilization Target - This is the percentage of the week in which the instructional laboratory should be utilized to be determined in good use. The balance of the week is necessary for cleaning, scheduling flexibility, testing, meetings, and set up time.

- Efficiency Target - This is the percentage of stations that should be filled, on the average, every time an instructional laboratory is used.

The Percent Credit Hours in Instructional Laboratory space factor was customized for each department and varies from 0% to 85%. For the remaining instructional laboratory space factors, the model assumes that they remain constant for all departments as:

- Contact Hour per Credit Hour of 2:1
- Hours per week available of 40 hours from 8 am to 5 pm Monday through Friday
- Utilization target of 50%
- Efficiency target of 75%
For hours per week available, the model is crafted to accommodate day and evening windows. Only the day portion of the model is used at this time since it was determined that this is the primary force driving the need for instructional laboratory space. In essence, the same rooms needed during the day can be reused in the evening.

The model assigns an appropriate area per lab station and service area as a percent of the instructional laboratory. The station size represents the area needed to support the specific teaching pedagogy intended for the lab setting. Since academic disciplines require varying amounts of space per station, the station sizes are tailored for each department. The space per station also takes into account space needed for an instructor. Instructional laboratory service is a percentage of the instructional lab space needed.

The projections are calculated by first determining the percent of student credit hours that are typically held in an instructional laboratory setting versus a classroom setting. This is then adjusted per the ratio of credit hours to contact hours.

Space needs are determined by taking the contact hours produced by each department and dividing that by the department’s efficiency and use variables. This determines the number of stations required. The area needed is then calculated by simply multiplying the number of stations each department needs by its own unique station size and adding the applicable percentage for classroom service.

The Space Model projects the need for open laboratory space driven by each department based upon these space factors:

• Percent FTE for Open Labs - This is the percent of student FTE’s in the department being used as a load to determine the number of stations for open laboratories.

• Percent Computational Labs – This is the percent of open lab stations that are required to be of the traditional computer lab style station.

• Percent Special Use Labs – This is the percent of open lab stations that are required to be configured to meet the needs of a particular department. Examples of this style include electronics labs and dance studios

The model assigns an appropriate area per lab station and service area as a percent of the open laboratory. The station size represents the area needed to support the lab style. While the station sizes could be tailored for each department, the Space Model assumed that the values remained constant across departments:

• Percent FTE for Open Labs at 10%

• Percent Computational Labs at 80%

• Percent Special Use Labs at 20%

Open laboratory space needs are determined by taking the FTE’s for each department and calculating the number of open lab stations needed of each of the two styles. The area needed is then calculated by simply multiplying the number of stations of each style by the unique station size and adding the applicable percentage for open laboratory service.

The Space Model projects the need for research laboratory space driven by each department based upon these space factors:
• Percent Full Time Faculty for Research - This is the percent of employees of this type that conduct research for the specific department.

• Percent FT Professionals Non-Faculty for Research - This is the percent of employees of this type that conduct research for the specific department.

• Percent FT Technical for Research - This is the percent of employees of this type that conduct research for the specific department.

• Percent Graduate Student for Research - This is the percent of employees of this type that conduct research for the specific department.

The Instructional and Lab Space Planning Group identified four laboratory types as appropriate for UMBC’s research activities. These research laboratory types include:

• Wet – These research labs are those where chemicals, drugs, or other material or biological matter are tested and analyzed requiring water, direct ventilation, and specialized piped utilities. While there may be one or more computers in the lab, the primary distinguishing feature is the requirement for piped utilities and possibly fumehoods.

• Dry – These research labs are those which do not require specialized piped utilities or fumehoods but do require special configuration or equipment. Examples includes a lab that uses primarily electronic equipment, for example, a robotics lab. A dry lab could also refer to a dance studio restricted to the use of faculty, staff, or students engaged in research. While there may be one or more computers in the lab, the primary distinguishing feature is that there are no piped utilities or fumehoods but there is special equipment or configuration for other non-computational activities.

• Computational – These research labs are ones in which computational or applied mathematical analyses are done on a computer-generated model to simulate a phenomenon in the physical realm.

• Special Use – These research labs include any that require exceptionally large space to accommodate over-sized equipment or materials.

The model assigns an appropriate area per lab station and service area as a percent of the laboratory for each of the four research laboratory types. The station size represents the area needed to support the research activities intended for the lab setting. Since academic disciplines require varying amounts of space per station, the station sizes are tailored for each department.

Research laboratory space is calculated by applying the research variables to the FTE employment data to determine the number and type of persons involved in research for planning purposes. This load is then distributed across the lab types and an area is calculated based on station sizes for the specific laboratory type. Service is added as a percentage of total research laboratory type.
300 Office Facilities

Office facilities include the offices, office service, conference rooms, and conference service spaces assigned to academic, administrative, and service functions. Offices provide individual or multiperson workstations and are typically equipped with furniture, computers, or other office equipment. Office service space directly serves an office or group of offices and includes file rooms, copy and fax rooms, closets, break rooms, kitchenettes, student counseling rooms, testing rooms, and open and private circulation areas. Conference rooms serve an office complex and are used primarily for staff meetings and departmental activities. Conference service rooms include kitchenettes, storage rooms, and audio-visual equipment rooms that serve one or more conference spaces.

The Space Model projects the need for office facilities driven by each department based upon the number of people employed by the department in each of the eight EE06 employment classifications. The model assigns an appropriate area per office workstation based upon the employee category and whether an employee is full or part-time.

**Table A-1**

**Area Assignments by Office Type**

<table>
<thead>
<tr>
<th>EE06 Ctgry</th>
<th>Employment Type</th>
<th>ASF Per Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive/Administrative/ Managerial</td>
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<td>225</td>
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<tr>
<td></td>
<td>PT</td>
<td>120</td>
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<tr>
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<td>135</td>
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<tr>
<td></td>
<td>PT</td>
<td>75</td>
</tr>
<tr>
<td>Professional Nonfaculty</td>
<td>FT</td>
<td>125</td>
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<tr>
<td></td>
<td>PT</td>
<td>70</td>
</tr>
<tr>
<td>Secretarial/Clerical</td>
<td>FT</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td>60</td>
</tr>
<tr>
<td>Technical/ Paraprofessional</td>
<td>FT</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td>70</td>
</tr>
<tr>
<td>Skilled Crafts</td>
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<td>25</td>
</tr>
<tr>
<td></td>
<td>PT</td>
<td>10</td>
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<tr>
<td>Service Maintenance Workers</td>
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<tr>
<td></td>
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<td>Graduate Assistant</td>
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<td>80</td>
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<tr>
<td></td>
<td>PT</td>
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</tr>
</tbody>
</table>

Service is calculated as an allotment per employee to be used for work, file, copy, mail, etc. as a percentage of total office space. While conference and conference service is calculated for each department even though this space may be shared, especially among smaller departments.

400 Study Facilities

Study facilities encompass those spaces typically associated with library stack, process, and study areas as well as other study spaces located outside a library. The Space Model variables for study facilities are broken into space needed for materials and resources, study space, and service space for libraries:

- Current Inventory - This is the number of materials currently in the university’s library collections.
- Physical Bound Volume Equivalent (PBVE) – This is a standard space planning measure for counting...
library materials of various shapes and sizes. Typically, one PBVE is a bound volume book stock and bound periodicals.

- Conversion Factor - This converts the various types of materials in the inventory into the PBVE equivalent.
- Percent Growth - The projected growth of each material type.
- Percent Type of Storage - This breaks the materials into 3 different types of storage systems: low density browsable shelving, medium density browsable, and high density non-browsable.
- Area per Item - Provides an area per type of storage system per type of material.
- Percent Seats for Undergraduates and Graduates, Non-library – This is the percent of the total FTE per category of students for seating stations outside the Library.
- Percent Seats for Undergraduates and Graduates, Library - This is the percent of the total FTE per category of students for seating stations in the Library.

The Library and Study Space Planning Group identified eight seating types appropriate for UMBC’s students:

- Individual Seating
- Seating (2-4 Stations)
- Seating (4-8 Stations)
- Small Study (4-6 Stations)
- Study Medium (6-8 Stations)
- Study Large (12 Stations)
- Carrels

The model assumes a distribution of seating across styles and client type (i.e. undergraduate, graduate, and public). Each seating type is assigned an appropriate station size.

The Space Model projects the need for study by calculating the number of seats necessary for study both in the Library and outside the Library. Space needs for seating are projected based on the percentage and type of seating in the planning variables with seating service a percent of the total seat space necessary.

The model projects the need for material storage space by applying the percentage to be stored in browsable shelving and compact storage. Additional space needed for library service and processing space is calculated as a percentage of the materials space accordingly. Space projections are currently only using the browsable figure since the campus does not intend to store materials in compact or high density shelving in the near future. When it does, the model can help identify the space saving accordingly.

500 Special Use Facilities

The special use facilities category captures spaces that are sufficiently specialized in their primary activity or function to merit a unique space code. Included in this category are armories, athletic facilities, media production, clinic, demonstration, animal facilities, and
greenhouse. Access to special use facilities is typically limited to a small group or special population.

Many of the special use variables are specific to a unique space and specific department. Variables are independent of many other variables and stand alone when being used to project special use facilities needs.

The Space Model projects the need for sports related facilities space based on the actual number of participants in recreation, intramurals, physical education, athletics, and club sports. The number of participants in recreation and intramurals are based on a percentage of the student body. While the number of participants in physical education, athletics, and club sports was based on actual counts or planned figures.

The model projects the need for clinic stations as a percent FTE of faculty of departments engaged in clinic activities. Similarly, the need for animal space is projected based upon the percent of faculty in departments utilizing animal protocols in their research or as part of an instructional program; and an average number of animals of each species per faculty.

The need for other special use facility types are similarly developed based upon evaluating the programmatic drivers impacting the need for the unique space type.

600 General Use Facilities

General use facilities include all those facilities characterized by their broader availability to faculty, staff, students, and campus visitors. Spaces in this category include theaters, auditoria, exhibit halls, food facilities, day care, public lounges, merchandising establishments, meeting rooms, and indoor recreation space.

The classification of athletic and recreation space at UMBC is particularly challenging since most areas are shared by athletic teams and recreational users. Therefore, the space could be classified as either special or general use.

The model projects the need for general use space similar to the methodology for special use space. Each general use space type has its own unique set of programmatically driven variables driving the need for the space. The calculation of demand is based upon the number of stations needed, the area per station, and a service percentage for the specific space type.

700 Support Facilities

Support facilities include centralized spaces supporting various auxiliary support systems and services required to maintain and operate the campus. Included in this space category are centralized computer or telecommunication centers, shops, vehicle storage, general storage and supply, mail facilities, and hazardous material areas.

The Support and Service Space Planning Group identified which departments required support facilities and customized variables based upon the needs of these departments. For example, while the need for shop facilities is generally understood to be driven by the activities of facilities management operations, it was also identified as being driven by academic departments. Shop space is needed for fabrication of research equipment, manufacture of devices as part of nationwide student competitions, and production of materials (e.g. floats) by student life organizations. The number of shop workstations was then estimated as a
percentage of FTE students in specific departments; and an appropriate station size applied to project space needed to support these activities.

For support and service spaces relate to vehicle storage, the Space Model variables relate to storage for service vehicles and areas to maintain and service vehicles. The variables include the number, area, and percent service of vehicles for each department requiring vehicles to conduct their business. These include the Department of Facilities Management, Athletics, Student Life, Residential Life, and some academic and administrative units.

The space required to support general campus storage needs space was projected based on the total student body and the university’s employees, with an additional percent of space on the campus for non people driven needs.

A variety of other space issues includes both the demand variable to measure the number of stations as well as the area per station and service percentage for the specific space type. This includes data centers, hazardous materials storage and central service support.

800 Health Care Facilities

The health care facilities space category includes those areas for patient care located in separately organized and budgeted health care facilities. The space factors driving the need for these facilities revolve around the demand for health center and wellness activities. The Space Model projects space needs in this category by determining the number of beds and wellness stations as a percent of the total student population. Each bed and station type is assigned an appropriate station size.

900 Residential Facilities

Residential facilities are defined as housing for students, faculty, staff, and campus visitors that are owned or controlled by the institution. Within this category, the Space Model projects the need for residential facilities based upon the following ten housing types:

- Residence Hall Singles, no bath
- Residence Hall Doubles, no bath
- Residence Hall Singles, w/ bath
- Residence Hall Doubles, w/bath
- Residence Hall Triples, no bath
- Residence Hall Triples, w/bath
- Residential Suite Style, 2 bedrooms
- Residential Suite Style, 4 Bedrooms
- Apartment Style, 4 Bedrooms w/ Kitchen
- House

The model projects space needed for each of these housing types by projecting the number of bed spaces planned for each of the basic undergraduate student class levels, the graduate
student class, faculty, staff, and visitors.

For the purposes of the 2009 Facilities Master Plan Update, the Space Model assumes that the university will provide housing for:

- 40% of its total undergraduate population
- 75% of its entering freshman
- Less than 2% of its graduate students
- None of its faculty and staff

It was further assumed that visitors primarily need housing in the summer when there are sufficient vacancies in the existing housing inventory.

The model assigns a bed station size for each of the ten housing types. These station sizes account for bed and bath space and their associated service areas. The other types of spaces (e.g. study rooms and offices) found in most residence halls are not projected as part of this space category but in the appropriate space category (e.g. 400 Study Facilities and 300 Office Facilities).

Space needs for residential facilities are determined by applying the station sizes to the number of beds identified as being driven by the population to be housed on campus.

**000 Nonassignable & Inactive**

Non-assignable space is defined as those areas not available for assignment to an occupant or for a specific use, but necessary for the general operation of the building. Nonassignable areas include building areas required for pedestrian circulation, mechanical operations, building service, and to contain structural building elements. Some examples of nonassignable space includes mechanical and electrical rooms, telecommunication closets, janitorial closets, elevators, stairs, restrooms, hallways, vestibules, lobbies, loading docks, trash room, shafts for ductwork, and walls.

The space model incorporated unclassified spaces into this space category. Unclassified space includes areas unavailable for assignment due to renovation activities or to a condition that renders it inhabitable.

Space needs for nonassignable and inactive areas are projected as a percentage of the total of all the assignable space needs combined. These percentages add to approximately 37.5% of the total gross space needs.

**Summary Data**

The Space Model has a series of summary data sheets which display the results of planning scenario. These sheets include space projections and space deficits for each of the 90 space use categories, as well as rolled up summaries for the ten major space use categories. Charts and tables present high-level information suitable for administrative use and presentation.
Results of the Model

Initial Planning Assumptions

The base year for the model is Fall 2009. The Office of Institutional Research provided all student, faculty, and staff data frozen on the 10th day of the Fall 2009 semester. The Department of Facilities Management provided the existing space inventory based upon the completion of a campus-wide space survey completed in December 2009.

Based upon the Fall 2009 campus-wide space survey, the total existing space on campus was 3,289,422 square feet of which 1,973,573 was assignable.

Table A-2
Fall 2009 Space Inventory by Space Type

<table>
<thead>
<tr>
<th>Space Type</th>
<th>Existing Space</th>
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</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>99,491</td>
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<tr>
<td>Laboratories</td>
<td>292,934</td>
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<tr>
<td>Office</td>
<td>385,300</td>
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<tr>
<td>Study</td>
<td>146,390</td>
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<tr>
<td>Special Use</td>
<td>103,896</td>
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<tr>
<td>General Use</td>
<td>156,636</td>
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<td>Support</td>
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<tr>
<td>Health</td>
<td>2,982</td>
</tr>
<tr>
<td>Residential</td>
<td>714,517</td>
</tr>
</tbody>
</table>

**Total NASF** 1,973,573

Non-Assignable* 1,315,850

**Total GSF** 3,289,422

* Includes approximately 1,300 nasf of inactive space.

Excluding campus housing, the majority of existing space is devoted to instruction and research. Space devoted to student life and student services constitute only 13% of the total space; and administrative functions such as financial services, human resources, procurement, police, and facilities management comprise only 12% of the total existing space.
Projected Space Need

Two planning scenarios were considered in the development of the 2009 Facilities Master Plan Update:

- Scenario A – Projected space need based upon a ten year enrollment growth of 10.4%
- Scenario B – Projected space needed for full build-out of the campus to support 16,000 to 17,000 students

**Scenario A**

The space model was employed to determine the amount of space that would be needed to support one possible enrollment growth scenario. This scenario assumes the following:

- Enrollment growth of 2% per year for the first five years and 0% per year for the second five years for a total growth of 10.4% over ten years
- The enrollment growth applies to both undergraduate and graduate students across all academic programs
- Current student to faculty ratios will be maintained
- Current student to professional nonfaculty ratios will be maintained
- Modest increase in all other full-time and part-time staff positions
- Current FT Faculty to Graduate Assistants (employed) will be maintained

The space model projected a total need for over 2.5M of net assignable square feet and nearly 4.2M of gross square feet. Nearly half of the projected space need is to support instruction and research programs; and 49% of the projected space deficit is in support of campus housing and student life programs.
## Table A-3
Projected Space Need and Deficit in Fall 2019 for One Scenario

<table>
<thead>
<tr>
<th>Space Type</th>
<th>Existing Space</th>
<th>Projected Space</th>
<th>Deficit</th>
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<tbody>
<tr>
<td>Classroom</td>
<td>99,491</td>
<td>136,262</td>
<td>-36,772</td>
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<td>Laboratories</td>
<td>292,934</td>
<td>410,837</td>
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<td>Office</td>
<td>385,300</td>
<td>437,687</td>
<td>-52,388</td>
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<td>146,390</td>
<td>180,269</td>
<td>-33,878</td>
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<tr>
<td>Special Use</td>
<td>103,896</td>
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<td>General Use</td>
<td>156,636</td>
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<td>71,427</td>
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<td>Health</td>
<td>2,982</td>
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<td>714,517</td>
<td>846,486</td>
<td>-131,969</td>
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<td><strong>Total NASF</strong></td>
<td><strong>1,973,573</strong></td>
<td><strong>2,596,503</strong></td>
<td><strong>-622,930</strong></td>
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<td>Non-Assignable</td>
<td>1,315,850</td>
<td>1,563,610</td>
<td>-247,760</td>
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<td><strong>Total GSF</strong></td>
<td><strong>3,289,422</strong></td>
<td><strong>4,160,113</strong></td>
<td><strong>-870,690</strong></td>
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</tbody>
</table>

## Figure A-2
Projected Space Need and Deficit in Fall 2019 for One Scenario
**Scenario B**

The space model was employed to determine the space needed for full build-out of the campus to support 16,000 to 17,000 students. This scenario assumes the following:

- The proportion of undergraduate and graduate students will be maintained
- Current student to faculty ratios will be maintained
- Current student to professional nonfaculty ratios will be maintained
- Modest increase in all other full-time and part-time staff positions
- Current FT Faculty to Graduate Assistants (employed) will be maintained

The space model projected a total need for 3.4M NASF and 5.5M GSF. As compared to Scenario A, a greater percentage of the projected space need is for campus housing as would be expected with a significant increase in student enrollment.
### Table A-4

**Projected Space Need and Deficit for Full Build-out of Campus**

<table>
<thead>
<tr>
<th>Space Type</th>
<th>Existing Space</th>
<th>Projected Space</th>
<th>Deficit</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Laboratories</td>
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<td>545,853</td>
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<tr>
<td>Office</td>
<td>385,300</td>
<td>553,070</td>
<td>-167,771</td>
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<tr>
<td>Study</td>
<td>146,390</td>
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<td>Special Use</td>
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<td>156,636</td>
<td>269,343</td>
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<td>Support</td>
<td>71,427</td>
<td>151,086</td>
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<td>Health</td>
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<td>Residential</td>
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<td><strong>Total NASF</strong></td>
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<tr>
<td><strong>Total GSF</strong></td>
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<td><strong>5,516,948</strong></td>
<td><strong>-2,227,526</strong></td>
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### Figure A-4

**Projected Space Need and Deficit for Full Build-out of Campus**

- Housing: 37%
- Instruction: 18%
- Research: 18%
- Student Life: 16%
- Library/Study: 4%
- Academic Support: 3%
- Administrative: 4%
Conclusions

The UMBC Space Model developed in conjunction with the 2009 Facilities Master Plan provides a means of quantitatively analyzing impacts of changes in enrollment projections, programmatic direction, and strategic policy. Reliability of the projections for space needs is dependent upon the quality of the institutional data entered into the model, the degree of thoughtfulness applied to development of assumptions, and the appropriateness of the space standards used.

The Space Model projections appear to be consistent with the space allowances calculated using the state’s guideline application report, supporting its reliability as a planning tool. One major advantage of the UMBC’s Space Model over the state report is that it provides greater diversity and flexibility to the university. The Space Model is a dynamic and versatile tool that instills confidence that space planning and long-range planning is driven by programmatic requirements.

For the 2009 Facilities Master Plan Update, the Space Model provided valuable space planning data directly employed in the development of the proposed implementation plan and campus build-out plan. The university was able to extract sufficiently detailed information from the Space Model to inform the scope and size of proposed buildings- and assure the university that it is moving forward in the right direction.
Acknowledgements

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<td>Kimberly Peng</td>
<td>Andrea Wyntner</td>
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<tr>
<td>Vin Grabill</td>
<td>Mike Pound</td>
<td>Nancy Young</td>
</tr>
</tbody>
</table>

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