Fiscal Year 2016
Capital Outlay Project Request

Institution Name: University of Michigan-Flint
Project Title: Murchie Science Building Expansion
Project Focus: Academic
Type of Project: Addition / Renovation
Program Focus of Occupants: Science Instruction
Approximate Square Footage: 30,000 gross square feet new construction
Total Estimated Cost: $30 million
Estimated Start / Completion Dates: January 2016 (design start) / August 2019 (complete)

Is the Five Year Plan posted to the Institution’s public internet site? Yes
Is the requested project the top priority in the Five Year Capital Outlay Plan? Yes
Is the requested project focused on a single, stand-alone facility? Yes

Describe the project purpose

Since opening in 1988, the Murchie Science Building (MSB) has provided excellent space for the laboratory science programs at UM-Flint. Approximately one-half of the building features wet labs, approximately 90,000 sq. ft. Our laboratory science programs are flourishing and offering new degree programs (e.g. BS/MS Bio-chemistry, BS major in Sustainability and the Environment), with excellent accomplishments by our faculty and students including many undergraduate research opportunities. MSB, however, was designed for much smaller scientific programs than we have today and for a different generation of scientific equipment. The condition and design of the current laboratories impedes critical goals of the University. Specifically, the University of Michigan-Flint has made expansion of its programs to train future scientists, and science educators, and other health professional a top priority. Further, the University is committed to working with K-12 students and educators throughout our region to meet State of Michigan goals to increase the supply of citizens in Science/Technology/Engineering/ Mathematics (STEM) careers. The University is expanding its offering of science and math camps and other STEM promotion activities. The University is also the lead higher education partner with the Genesee Intermediate School District in providing an early/middle health professions college on the campus of the UM-Flint. Discussions are also underway with Grand Blanc Public Schools to offer students an opportunity to earn up to 48 college credits while still in high school.
Our programs in Biology, Chemistry, Nursing, Physical Therapy, as well as other health professions are experiencing a substantial increase in demand, spurred by the needs of employers throughout the State of Michigan including Genesee and Shiawassee Counties.

The increased demand and the concomitant increased utilization of the laboratories have created an academic bottleneck for students in the sciences and related health fields. We need to reconfigure space to add several additional instructional labs for chemistry and biology plus attendant equipment storage space. Our Chemistry Department cannot admit additional students in organic chemistry because of the lack of laboratory space. The Biology Department, which has recently added a Master of Science program, requires an additional 24-student lab to accommodate student demand at the undergraduate and graduate levels.

As the UM-Flint campus continues to plan for the future, in addition to providing state-of-the-art classrooms, we envision a state-of-the-art environmentally “green” designed science laboratory building. Such a state-of-the-art science/education building would create ideal space for future science teachers to learn how to teach science, would eliminate competition for lab usage between the Genesee Early College (Health professions) and the BIO/CHM student - both growing fields, would provide aspiring undergraduate students the facilities they will find in industry and in research universities, would provide our scientists research labs in which to involve undergraduate and graduate students, and would enable us to bring thousands of K-12 students from throughout the region to experience the thrill of science with hands-on activities on Super Science Fridays and at Summer Science camps. In short, a science laboratory building that will enable UM-Flint to help better prepare K-12 science teachers, excite younger students about becoming scientists and teachers of science, and better prepare our students for STEM careers. Such a building will be particularly important as we grow the early health professions college, a partnership with the Genesee Intermediate School District and, as we collaborate with the Ann Arbor campus to grow our cooperative programs in engineering.

Describe the scope of the project

Approved in 2012 as part of House Bill 5541, Phase 2 renovations to the Murchie Science Building have focused on renovations within the existing footprint of the building. The scope of Phase 2 renovations are intended to address the most critical, current programmatic needs. Priority has been placed on providing much needed updates to instructional lab spaces in the building to enable them to meet the needs of today’s students. Instructional labs for chemistry and biology are being reconfigured to enable improved teaching methodologies and “hands on” activities by the students. Approximately 92 fume hoods have been replaced in order to facilitate a safer environment for students and to improve energy efficiency. Facility infrastructure improvements to extend the useful life of the building include a new fire alarm system, electrical upgrades and new information technology infrastructure throughout the building. Phase 2 will be complete in August 2015.
While the Phase 2 renovations to the Murchie Science Building will make significant improvements to the quality of education that can be provided within the building, increased enrollment growth will not be possible without creating additional instructional and collaborative spaces. Therefore, Phase 3 - an expansion and additional renovation of the Murchie Science Building - is proposed as the next priority for the University of Michigan-Flint. The building expansion will complement the renovations that will be implemented as part of initial scope of work and will provide additional space to enable UM-Flint to address growth patterns which have occurred since the early/mid-2000’s, including:

- Physics/Engineering: Majors have increased from 131 in 2003 to 281 in 2013.
- Biology: Majors have increased from 261 in 2003 to 450 in 2013.
- Earth & Resource Sciences: Majors have increased from 48 in 2003 to 111 in 2013.
- Mathematics: Majors have increased from 54 in 2003 to 84 in 2013.
- Computer Science/Information Systems: Majors have increased from 253 in 2003 to 316 in 2013.
- Chemistry: Majors have increased from 110 in 2003 to 113 in 2013.

In total, between 2003-2013, UM-Flint students majoring in STEM-subject disciplines such as the ones listed above have increased by nearly 500 students. This school year, Fall 2014, students majoring in these same STEM-subject disciplines at the University of Michigan-Flint have increased by another 140 students over Fall 2013 levels. In addition, nursing student enrollment has increased from 400 students in 2003 to 1,666 students in Fall 2014 while during this same period, Physical Therapy enrollment has increased from 105 to 239. To sustain these growth patterns, additional MSB space is required. An expansion to the existing Murchie Science Building will provide the following:

- New state of the art instructional teaching labs that will foster interactive learning in the sciences as a result of the opportunity to merge lecture and lab formats into a unified “studio lab” concept.
- Flexible dry lab space that can be assigned based on need and can adapt as needs change over time.
- Increased opportunities for transparency between public areas and lab spaces that will put “science on display”. This will help foster increased interest in the sciences, especially by high school students that may be attending an event in the facility.
- Properly outfitted lab support spaces.
- Increased opportunities for faculty/undergraduate student research and interdisciplinary collaboration through the provision of dedicated research lab space.
- Student collaborative areas that will include small group study rooms for team activities and comfortable lounge seating. We propose to create collaborative areas in both the
new building as well as in the existing connecting link between the classroom and lab portions of the original building.

- Increase facilities needed for STEM oriented summer camps programs for local communities
- Additional faculty and staff office space that will support the increased instructional and research operations taking place as a result of the expansion.
- A new elevator (housed in a new addition) in the west wing of the building is needed to address student, faculty and staff access, usage and internal traffic patterns. In addition, it will allow persons with disabilities to move about the building with greater ease and in a more user friendly manner.

The expansion will contain new instructional space that will be accessible to students attending classes in all of the departments on campus. The concept for the expansion would call for a vertically-stacked approach with new laboratory and collaborative space located on each of the five floors as an extension of the lab portion of the existing building. To accommodate the growth patterns that have been identified above, an addition of approximately 30,000 square feet will be needed.

Selective renovations to the remaining 25% of spaces within the building will also be included. Spaces consist of:

- Replacement of finishes that have exceeded their useful life in corridors and student collaborative spaces will be implemented.
- Accessibility improvements will be made to the remaining restroom facilities.
- To address current pedagogy, general improvements to classrooms, including finishes, technology infrastructure and furnishings will be implemented.

1. **How does the project enhance Michigan’s job creation, talent enhancement and economic growth initiatives on a local, regional and/or statewide basis?**

Programs offered by the University of Michigan-Flint are critical to the continued economic strength of Michigan. Centrally located in downtown Flint, the UM-Flint campus provides access to quality educational programs that yield highly marketable graduates. UM Flint is currently working to expand its enrollment beyond its traditional base of Genesee county residents to first time students, military veterans, as well as international students. UM-Flint introduced student housing in 2008. Many of the students that are now drawn to UM-Flint are choosing to reside on campus, providing a boost to the local economy.

Looking ahead to the year 2020, the career outlook for Genesee and Shiawassee County (as prepared by the State of Michigan Department of Technology, Management and Budget), focuses on several STEM careers. The path to graduation for these high demand careers
requires the basic science programs that are offered by UM Flint College of Arts and Sciences and taught in the renovated and expanded Murchie Science Building. Some of the careers that have the highest growth projections for Genesee and Shiawassee counties include:

<table>
<thead>
<tr>
<th>Career</th>
<th>Growth Rate</th>
</tr>
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<tbody>
<tr>
<td>Registered nurses</td>
<td>15.8% growth</td>
</tr>
<tr>
<td>Medical and public health social Workers</td>
<td>22.5% growth</td>
</tr>
<tr>
<td>Physical Therapists</td>
<td>24.0% growth</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>10.0% growth</td>
</tr>
<tr>
<td>Physician’s Assistants</td>
<td>15.7% growth</td>
</tr>
</tbody>
</table>

At the state level, there is a similar story. By 2018, Michigan will have 274,000 more openings to fill; 92% of STEM workers will need a post-secondary education; 65% of total job openings will require a bachelor’s degree; and 35% of the remainder will require a certificate or an associate degree. Registered nurses are identified as having the greatest projected annual job openings over the next five years at 3,285 openings annually. This is a 20.2 percent growth over the period from 2008 – 2018.

2. **How does the project enhance the core academic and/or research mission of the institution?**

The University of Michigan-Flint is a comprehensive urban university of diverse learners and scholars committed to advancing our local and global communities. In the University of Michigan tradition, we value excellence in teaching, learning, and scholarship; student centeredness; and engaged citizenship. Through personal attention and dedicated faculty and staff, our students become leaders and best in their fields, professions, and communities.

The 2011-2016 Strategic Plan identifies eleven priorities that “build upon the successes of previous years, renew the commitment to unfinished initiatives and continue UM-Flint’s expansion as a premier regional institution where students, faculty, staff and administrators are fully engaged across the campus and community.” The proposed expansion of the Murchie Science Building will directly respond to seven (7) of the eleven (11) Priorities that have been established in the Strategic Plan:

- Priority #1 – Enhance the quality and breadth of academic programs and be a school of first choice;
- Priority #2 – Foster a culture in which faculty are supported in pursuing disciplinary and interdisciplinary teaching, scholarship, creative activity, and expand faculty professional development;
- Priority #4 – Expand participation in civic engagement, experiential learning, and service learning;
- Priority #5 – Fulfill our student-centered mission as we serve a growing and increasingly diverse student population;
- Priority #6 – Cultivate a campus climate that embraces diverse social identities and perspectives;
- Priority #7 – Increase enrollment, student retention and degree completion to achieve planned growth;
3. **How does the project support investment in or adaptive re-purposing of existing facilities and infrastructure?**

As outlined above, this Project Request is focused on increasing the functionality and longevity of the Murchie Science Building. The current phase of work at Murchie (Phase 2 as outlined in the current UM Flint Five Year Capital Outlay Plan) has concentrated on making upgrades to the existing building, including but not limited to the following:

- Instructional labs for chemistry and biology are being reconfigured to enable improved teaching methodologies and “hands on” activities by the students. Approximately 92 fume hoods have been replaced in order to facilitate and ensure a safer environment for students as well as improve energy efficiency.
- Facility infrastructure improvements to extend the useful life of the building include a new fire alarm system, electrical upgrades and new information technology infrastructure throughout the building.
- Existing windows have been sealed to improve energy efficiency and thermal performance.

This project request (Phase 3 as outlined in the Five Year Capital Outlay Plan) will provide additional classroom and instructional lab space that will complement the existing renovations. In terms of the operational and maintenance benefits for the University and the State, the additional lab and classroom space will enable UM Flint to offer additional courses and sections. Additionally, the new space will offer the possibility of including dedicated laboratory space and supporting offices for the Genesee Early College (GEC).

4. **Does the project address or mitigate any current health / safety deficiencies relative to existing facilities? If yes, please explain.**

As noted above, the scope of the project will include a new elevator that will significantly improve barrier free access throughout the building. Additionally, the balance of existing restrooms will be upgraded to meet current accessibility code and ADA requirements.

5. **How does the institution measure utilization of existing facilities, and how does it compare relative to established benchmarks for educational facilities? How does the project help improve the utilization of existing space and infrastructure, or conversely, how does current utilization support the need for additional space and infrastructure?**

Laboratory utilization is measured by the departments hosting the twelve (12) Murchie Science Building (MSB) labs. Utilization factors include: class time, prep and clean-up time, open lab for tutoring, and research by students and faculty. Fall 2014 lab utilization is 70% with lab station utilization 78% - using a 40 hour scheduling week. National benchmarks typically fall within the following ranges:
• Instructional Lab time utilization - 50 to 60%
• Instructional Lab station utilization – 75 to 80% (of available seats)

As noted above, the existing twelve (12) MSB labs are optimally utilized. Therefore, to sustain UM-Flint’s desire to grow the number of graduates in STEM related disciplines over the next 10-years to meet the growing economic needs of the City of Flint, Genesee County and the State of Michigan, additional space will be required.

6. How does the institution intend to integrate sustainable design principles to enhance the efficiency and operations of the facility?

The University of Michigan-Flint is committed to environmental stewardship in its approach to all building projects. All new construction projects, including both new construction and major renovations, are required to meet the American Association of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 90.1-2007. In addition, projects that have a construction budget of $10 million or more are required to target improved performance exceeding the base ASHRAE requirements by 30%.

The project design will strive to achieve the highest possible level of sustainability and energy efficiency. Design practices will follow the criteria of the Leadership in Energy and Environmental Design (LEED) silver level, will be implemented for the proposed project. In addition to the building systems performance noted above, the siting of the expansion, the design of the exterior envelope, interior finish selections, occupant comfort and well-being will be all be considered in the design process, consistent with the requirements of the LEED system.

7. Are match resources currently available for the project? If yes, what is the source of the match resources? If no, identify the intended source and the estimated timeline for securing said resources?

Yes. The University will use a combination of debt and equity (including investment proceeds) that have been set aside for infrastructure renewal and new construction.

8. If authorized for construction, the state typically provides a maximum of 75% of the total cost for university projects and 50% of the total cost for community college projects. Does the institution intend to commit additional resources that would reduce the state share from the amounts indicated? If so, by what amount?

As prior practice has dictated, the University’s financing strategy is dependent on the state’s 75% contribution. If funding is available, but at a reduced level, the University would like to discuss options rather than not be funded.

9. Will the completed project increase operating costs to the institution? If yes, please provide an estimated cost (annually and over a five year period) and indicate whether the institution has identified available funds to support the additional cost.

Yes, operational costs will increase with the additional square footage that is added by approximately $215K/year or about $1.1 M over five (5) years. The following table provides a
comparison of current operating costs (based on 192,000 gross square) with the projected future costs based on an increased overall square footage of 30,000, for a total of 222,000 gross square feet. Additional reoccurring annual operating funds, as described above, will be available upon completion of this project.

<table>
<thead>
<tr>
<th>Service</th>
<th>$/gsf</th>
<th>Current</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custodial Building Cleaning</td>
<td>0.87</td>
<td>$167,040</td>
<td>$193,140</td>
</tr>
<tr>
<td>Outside Grounds</td>
<td>0.35</td>
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<tr>
<td>Plant Maintenance</td>
<td>1.37</td>
<td>$263,040</td>
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<td>Purchase Utilities</td>
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<td>Security</td>
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<td>$355,200</td>
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<td>Communications</td>
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<td>$65,280</td>
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<td>Insurance</td>
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<tr>
<td>Service Contracts</td>
<td>0.14</td>
<td>$26,880</td>
<td>$31,080</td>
</tr>
</tbody>
</table>

$1,374,720                     $1,589,520

10. **What impact, if any, will the project have on tuition costs?**

No impact on tuition costs is anticipated as a result of this project.

11. **If this project is not authorized, what are the impacts to the institution and its students?**

Currently, there are no other funding approaches that are feasible if this proposed project is not funded through State of Michigan Capital Outlay process. And, without the expansion of the Murchie Science Building, continued enrollment growth for the sciences and health professions will not be possible. Therefore, the University will not be able to accept an increased number of students, resulting in fewer science and health profession graduates that are qualified for job opportunities in Michigan.

In addition, the quality of the educational experience will be compromised without the flexible, hands-on learning environments that would be created in the expansion. These innovative instructional spaces would complement the existing labs and allow faculty to implement new pedagogies.

12. **What alternatives to this project were considered? Why is the requested project preferable to those alternatives?**

Alternatives to provide the additional interactive lab and classroom space that is proposed as part of this expansion project have been considered. The alternatives would require displacing current functions and would require costly renovation of existing space. The infrastructure requirements for science labs is intensive – often renovation can cost nearly as much, or in some cases, more than new construction. The on-going renovations to the existing Murchie Science Building have focused on making the most of current resources and extending the useful life of
the existing asset. With the completion of Phase 2 of these renovations in August, 2015, the upgrading of the existing instructional lab spaces will be completed. Any further efforts to increase the quality and quantity of the space will require the implementation of an expansion, as outlined in this request.

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