WASHINGTON STATE UNIVERSITY
STEM: Undergraduate Teaching Labs

2019 – 21 Request:	$4,900,000	Project Type: Program Project Phase: D/C
Institutional Priority:	# 5	Gross Square Footage: 6,368

WSU requests $4.9 million to upgrade high-enrollment biological science learning spaces that will extend the useful life of one of the core facilities on the Pullman campus, improve safety, and enable the university to meet growing student demand for STEM programs.

This capital request will provide funding to renovate, refurbish, and modernize heavily used undergraduate teaching biology and microbiology laboratories in Eastlick Hall. This is the second phase of a long range plan to upgrade all of the aging learning spaces in the sciences at WSU to invigorate students' hands-on laboratory experience in high-demand STEM degrees, to increase programmatic options, and to bolster the "citizen scientist" experience for all students. In January 2018, the Legislature funded $1 million for 2017-19 toward this effort. That funding renovated one laboratory (before and after seen below) and part of the building systems supporting the labs. The 2019-21 request will fund five more laboratory renovations and the remaining building systems. The ten-year capital plan includes four more biennia of the same type of teaching space renewal.

The Eastlick Hall teaching labs have not been upgraded significantly in 40 years. With no other appropriate space available, these labs are heavily scheduled to support many of the university's largest and most important biological science courses, from introductory laboratory experiences for non-science majors through upper division courses critical for students pursuing healthcare and STEM-related careers.

Modern scientific teaching spaces are a vital component in training students for the 21st Century workforce and advanced studies. High-quality spaces are safer, and fully able to support modern teaching methods that enable student success. The best instructional spaces encourage small group discussions, include flexibility for various configurations, and offer easy access to communication tools for both teacher-to-student and student-to-student collaboration.

The old single-sided, fixed benches discourage interaction, a lack of ventilation presents an air quality safety risk, and little to no access to technology restricts communication and the application of advanced methodologies. Improvements are vital in order to maintain and to expand educational opportunities for the hundreds of students pursuing science degrees in Eastlick Hall laboratories every semester.

The improvements for teaching, technology and safety in these laboratories directly support WSU's strategic goals and Goal #1 of the Governor's *Results Washington* framework: Providing a world-class education for the future leaders of our global society. Modern facilities will also contribute to the recruitment and retention of the best students and faculty members.

Undergraduate students at WSU, particularly in high-demand disciplines, will significantly benefit from these teaching laboratory renovations. Providing safe, modern, experiential learning spaces will also contribute to the university's economic impact for the state and the nation by developing well-qualified, workforce-ready graduates.

Institution
Washington State University
Project Title
STEM: UNDERGRADUATE TEACHING LABS
Project Location (City)
Pullman, WA

1. **Problem Statement (short description of the project – the needs and the benefits)**

The 2019-21 STEM Teaching Lab/Building Infrastructure Upgrades request is part of a strategic, long-term plan to invigorate students' hands-on laboratory experience in high-demand STEM degrees, increase programmatic options, and bolster the "citizen scientist" experience for all students at Washington State University.

Supporting modern, effective teaching methods is a priority at WSU. This intermediate capital request targets critically improvements to high-enrollment learning spaces, extending the useful life of a core science facility on the Pullman campus and enabling WSU to better meet student demand for STEM courses.

The laboratories in Eastlick Hall serve some of the university's largest and most important biological science courses, from introductory laboratory experiences for non-science majors through upper-division courses essential to students pursuing healthcare and STEM-related careers.

To reap the full benefit of modern collaborative learning, instructional spaces must provide opportunities for small group discussions, include flexibility for various configurations, and offer easy access to communication tools for both teacher-to-student and student-to-student collaboration.

For example, replacing 40-year-old single-sided benches with flexible, modular furnishings will encourage robust dialogue, allow for easier rearrangement to support collaborative work and increase student success in all courses. Providing technological upgrades to support current and future advances in classroom communication and demonstration capabilities will greatly enhance instruction. Replacing messy, deteriorating chalkboards and outdated overhead projectors with Smartboards and document cameras will diversify pedagogical tools and widen opportunities to reach students through the four learning skills of reading, writing, listening, and speaking.

The building systems supporting these science labs include air handling (HVAC) units that also need refurbishing to ensure the health and safety of students and faculty. Other planned improvements to plumbing, electrical, storage and security (including card-swipe access) will extend the lifespan of laboratories, samples, and supplies.

Increasing WSU's ability to offer safe, collaborative, and technologically advanced learning spaces will attract increasing numbers of STEM and high-ability students, and promote active learning among all students, which is known to enhance student success.[1] Modern facilities and appropriate space also will help to recruit and retain the university's best faculty.

The safety, teaching, and technology renovations of these laboratories directly support WSU's strategic goals and goal #1 of the Governor's Results Washington framework: Providing a world-class education for the future leaders of our global society.

[1] Freeman et al: http://www.pnas.org/content/111/23/8410.full

2. History of the project or facility

This project will renovate and modernize the heavily-used STEM undergraduate laboratories in Eastlick Hall, on the Pullman campus. For the 2017-19 biennium, WSU requested $4.9 million with the plan to renovate and modernize undergraduate biology laboratories on first floor of Eastlick Hall. In January 2018 the legislature provided $1 million of the $4.9 million request. This funding covered upgrading one of the five teaching laboratories on the first floor and building systems that support the laboratories and that service half of the building. For 2019-21, WSU requests $4.9 million with the plan to upgrade the remaining four teaching laboratories and adjoining lab prep rooms included in the 2017-19 request, and to implement the remaining HVAC building system upgrades. If there is enough funding within that amount, one more laboratory located on the ground floor will be included in the project, since the ground floor teaching labs are next in line for the on-going modernization plan.

The 2021-23 capital plan includes upgrading the remaining ground floor teaching laboratories (biology, microbiology and molecular biosciences). After the Eastlick Hall teaching laboratory upgrades are completed, the university will request funding to upgrade similar undergraduate STEM laboratories in other campus buildings. Because the teaching space in the STEM fields are predominantly housed in older buildings (Eastlick, for example was built 41 years ago), the modernization backlog for this type of space and the supporting building systems is extensive. The university's 10-year capital plan reflects the intent for this intermediate-sized project to be multi-biennial in order to decrease the backlog and provide modern educational space. Both preservation and programmatic needs are addressed by modernizing the teaching spaces and renewal of the associated building systems.

Eastlick Hall is one of WSU's primary biological sciences facilities. Eastlick laboratories are significantly outdated and in need of renovation to improve and expand education and training for the hundreds of students pursuing STEM degrees every semester.

The Eastlick building was constructed in 1977 and is named in honor of Dr. Herbert Eastlick, an innovative WSU biological sciences researcher who led the world's first successful transplant between two different species of warm-blooded vertebrates. Dr. Eastlick was also a highly effective pre-medical advisor who personally invested his time and talent to prepare hundreds of undergraduates for successful careers in the health professions. Current WSU faculty are fully engaged in carrying on his legacy of preparing students for professional careers in medicine, dentistry, and veterinary medicine. Various endowments established in Dr. Eastlick's honor provide significant funding for faculty research and undergraduate scholarships.

Undergraduate students at WSU, particularly in high-demand STEM disciplines, will significantly benefit from renovating the Eastlick teaching laboratories. Providing safe, technologically advanced, hands-on learning spaces will enhance student success, thereby enhancing the University's economic impact on the state and the nation by developing workforce-ready graduates.

Renovating the Eastlick biology labs is a strategic academic and facilities planning choice. Summer session enrollments can be accommodated in alternate laboratories without disrupting teaching during academic-year, that have high enrollment sessions. As subsequent biological sciences laboratories are scheduled for upgrades and renovation, the refurbished Eastlick labs will provide similar summer session coverage for more courses.

3. University programs addressed or encompassed by the project

Resident units in Eastlick Hall span several colleges at WSU. The primary resident unit is the School of Biological Sciences, which enrolls the third-highest number of AAFTE students of all academic units across the WSU system (math and psychology are first and second, respectively). From AY 2013 to AY 2017, student credit hours taught by the unit averaged over 28,470/year.

More than 2,500 biology, microbiology, and zoology undergraduate and graduate students are trained in the building each semester.

The laboratories also provide foundational instruction for students in high-demand STEM degree programs in bioengineering, natural resource sciences, nursing, pharmacy, veterinary medicine, and all other health professions tracks. For example, Eastlick Hall is home to Biology 324, a comparative vertebrate anatomy course vital for students pursuing healthcare careers and many high-demand STEM degrees. Additionally, many laboratory sections for Biology 102, a high-enrollment introductory course that engages non-science-based majors as 'citizen scientists' and expands their scientific literacy, are held in Eastlick Hall. More than 300 Biology 102 students use the labs each semester.

Aligning with the University's strategic goal to provide a truly transformative student experience[2], high-enrollment core courses such as Biology 102 are prime opportunities to put modern tools in the hands of students to increase their collaborative, critical-thinking skills and workforce readiness. Remodeling outdated laboratories will foster small-group collaborations and use of modern audio-visual tools will diversify the University's teaching capabilities and improve both instructor-student and student-student communications.

WSU freshman enrollment is projected to remain high (> 4,000+ new students each fall semester) for the foreseeable future. Pedagogical research shows a positive correlation between active learning, such as students working together to solve problems, and increased student success[3]. Modern laboratory space in conjunction with ongoing teaching innovations will significantly enhance student performance, which in turn will enhance student retention, success, and degree time-to-completion.

4. Age of Building Since Last Major Remodel:

Identify the number of years since the last substantial renovation of the facility or portion proposed for renovation. If only one portion of a building is to be remodeled, provide the age of that portion only. If the project involves multiple wings of a building that were constructed or renovated at different times, calculate and provide a weighted average facility age, based upon the gross square feet and age of each wing.

Eastlick Hall was constructed in 1977 and has not had any substantial renovations since that time, a span of over 40 years. The central cooling system was remodeled in 2014 to remove a failing cooling tower and to connect the process cooling system to the chilled water plant. In 1998 the growth chambers were replaced in the basement of the building. There have been no significant remodels to the laboratories or classrooms since the building was completed in 1977.

5. Condition of Building:

a. Provide the facility's condition score (1 superior – 5 marginal functionality) from the 2016 Comparable Framework study, and summarize the major structural and systems conditions that resulted in that score. ***(Provide selected supporting documentation in appendices, and reference them in the body of the proposal.)***

The 2016 Comparable Framework includes a condition score for Eastlick Hall. The building condition was assessed by VFA in the Fall of 2015. The condition assessment is included in **Appendix A**. The VFA FCI condition score in 2015 was 0.58. The comparable framework number assigned to Eastlick in 2016 was 3. The current assessment in 2018 is a score of 5, with a VFA FCI condition score of 0.57. The project scope is intended to address deficiencies concerning the air handling and exhaust systems as well as the energy losses associated with the archaic system approach. The VFA study recommends replacement and/or upgrade of the air handling equipment including fans and cooling coils. These systems are 40+ years old without significant changes to any of them. In addition to HVAC items, there were:

- Five code-related items identified in the VFA assessment which were specific to egress and access
- Two life safety issues and 10 reliability issues
- 21 issues identified that were recommend to be dealt with within one year of inspection

[2] WSU Strategic Plan, Theme 2, Goals 1-3: https://strategicplan.wsu.edu/

[3] Freeman et al: http://www.pnas.org/content/111/23/8410.full

- Total deficiencies that added up to $14 million

The building is a concrete structure which in itself is sound. From a maintenance standpoint there have been failures in sanitary and storm water piping systems within the building that have allowed water to infiltrate the lower level of the structure. The university has replaced motors and various components but the basic systems are still intact and being used today.

b. Identify whether the building is listed on the Washington Heritage Register, and if so, summarize its historic significance.

Eastlick Hall is not on the historic register.

6. Significant Health, Safety, and Code Issues:

It is understood that all projects that obtain a building permit will have to comply with current building codes. Identify whether the project is needed to bring the facility within current life safety (including seismic and ADA), or energy code requirements. Clearly identify the applicable standard or code, and describe how the project will improve consistency with it. *(Provide selected supporting documentation in appendices, and reference them in the body of the proposal.)*

Current systems and building construction are consistent with the code that was in place when the building was constructed in 1977. However, ADA and other current requirements will be addressed in the renovation. The current systems do not comply with the energy and ventilation codes in force today and the project will bring these systems into compliance. The air handling systems are constant volume dual duct, which provides air to the space regardless of need and is energy inefficient. Washington Energy Code section C403.4.9 requires variable flow on heating and cooling water systems as well as air distribution. The existing controls for operation of the room temperature and regulation of air flow are pneumatic or completely manual dampers for fume hoods. This violates section C403.4.5.4. New systems would all be electronic and vary dependent on loading.

The ducting, control mixing boxes, flooring and other finishes are insulated or made with asbestos-containing materials as was common at the time of construction. The serviceable components within these systems are currently obsolete and/or unavailable. Insulation and some building materials do not meet the new energy code requirements. The asbestos will require abatement.

The scope of work is particularly identified in the 2016 Engineering Study by McKinstry (see **Appendix B**). Generally, the work will include updates or replacements of air handling units and exhaust systems, pumps, motor controls and other ancillary equipment required to deliver a modern workable system to support the teaching labs. In addition, the labs will receive updates to systems, finishes, casework, and teaching technology.

The new work will bring the systems into compliance with current codes and technology by applying variable drives on fan motors, pump and other HVAC equipment. Finishes and insulation will be brought up to code when they are within the bounds of the project scope. Asbestos materials will be abated and replaced with new materials that are safe for new construction. Modern laboratory control strategies will be applied to maintain air quality as well as energy conservation throughout the project. The teaching labs will incorporate all new lab equipment and systems to provide modern collaborative teaching tools but also provide safe use of laboratory chemicals that are a part of the biological sciences teaching pedagogy.

7. Reasonableness of Cost:

Provide as much detailed cost information as possible, including baseline comparison of costs per square foot (SF) with the cost data provided in Chapter 5.0 of the Higher Education Capital Project Scoring Process Instructions and a completed OFM C-100 form. Also, describe the construction methodology that will be used for the proposed project.

If applicable, provide Life Cycle Cost Analysis results demonstrating significant projected savings for selected system alternates (Uniformat Level II) over 50 years, in terms of net present savings.

The proposed construction portion of the $4.9 million budget request is $2,924,892 and is based on typical renovation estimates for demolition and interior construction work within a partially occupied university facility. Upgrades will be required for mechanical, electrical, plumbing, framing and finish systems. Additionally, we have included estimated design costs, project administrative costs, construction contingencies, sales tax, telecommunications and audio/video equipment costs. Teaching labs in Eastlick are in high demand during the school year, therefore we will need to achieve an efficient construction schedule in the summer months.

In review of chapter 5.0 of the Project Evaluation Guidelines, please note that this renovation includes science teaching labs. A mid-construction date of July 2020 is anticipated, which would allow a 1.326 cost index multiplier. Per the Project Evaluation table, the science teaching laboratory has an allowable construction cost of $409.73 per gross square foot and an allowable total project cost of $579.46 per gross square foot. This project has an estimated construction cost of $459 per gross square foot and an estimated total project cost of $769 per gross square foot.

The project costs per square foot are higher than OFM standards for science lab renovations because the project is more than interior lab renovations. It includes critical building mechanical system upgrades that are located in the sub-basement, and that serve 50% of the building. This equipment is located outside of the project area square footage, but is included in the costs which explains the higher cost per square foot. Like the building itself, the facility systems (HVAC, etc.), are over 40-years-old. The building system upgrades will improve the health and safety of faculty, staff and students using the teaching laboratories and other space in Eastlick Hall. When the 2019-21 project is complete, the building systems upgrade will also positively impact the building condition of Eastlick Hall and help decrease the university's deferred maintenance backlog.

Because of the age of the building, asbestos abatement is also required. When Eastlick Hall was constructed, there were several materials used that contain asbestos. Those materials present either in the teaching laboratories or in the building systems will be abated during the project. This requirement is another reason why the project cost exceeds the OFM standard. Reference **Appendix B** for a detailed engineering study and cost estimate prepared by McKinstry Company for this project (2016). See attached **CBS Cost Form**.

8. Availability of Space/Utilization on Campus:

Describe the institution's plan for improving space utilization and how the project will impact the following:

One of the university goals is to modernize and improve teaching labs, to enhance teaching, learning and safety. Eastlick contains heavily used teaching labs, and is therefore among the first buildings to upgrade. Enhancement of the STEM Undergraduate Teaching Labs in Eastlick will in turn improve a major academic science program, biological sciences, on the Pullman campus. We will gain space efficiency with the laboratory renovations. The 40-year-old single-sided benches will be replaced with flexible, modular furnishings that can be configured as needed in each course to encourage dialogue and increase student success in all courses. The campus space use statistics are shown in **Appendix C**.

a. The utilization of classroom space

University scheduling matches the course sections with the size of classrooms and auditoria. Progress toward the state target for classroom usage has been steady. High-quality, modern instruction in STEM disciplines includes small lecture sessions held before hands-on lessons in the class laboratory which is an active learning approach that promotes greater student-teacher and student-student interactions, and dramatically improves student success.

b. The utilization of class laboratory space

Teaching laboratory use at the Pullman campus appears slightly under the state target (Appendix C) but, in fact, if all the labs scheduled after hours were counted, overall usage of those spaces is above the standard

target. The HECB formula counts usage within a nine-hour contiguous block of time. While the majority (83%) of scheduled teaching lab use on the Pullman campus occurs between 9:00 a.m. and 6:00 p.m., 17% of teaching lab use is outside this time range. If counted, those additional student contact hours of usage put the lab usage above the current standard.

Modernizing outdated teaching laboratories will significantly increase the quality of laboratory space on the Pullman campus and the number of hours used, which improves teaching space utilization rates. Modern STEM facilities are crucial to recruitment: better facilities attract better students and generate more successful graduates.

Being able to vent noxious formaldehyde fumes away from laboratory benches immediately will allow laboratories to be used more frequently and eliminate the need for down time to air out the space between lab sections. Additional improvements to plumbing, electrical, and storage will extend the lifespan of laboratories, samples, and supplies.

High-quality teaching laboratories in Eastlick Hall will help the University meet student demand for biological sciences degrees and will more efficiently and effectively educate students. Replacing the traditional single-sided benches with flexible, modular furnishings will encourage dialogue and increase student success in all courses. Technological upgrades such as Smartboards, document cameras, and infrastructure access for future advances in laboratory communication and demonstration capabilities will increase pedagogical efficiency and expand opportunities to reach students through the four learning skills of reading, writing, listening, and speaking.

The School of Biological Sciences (SBS) delivers one of the highest teaching loads of all WSU academic units. Renovation of the teaching labs will contribute to the substantial current and projected program growth. In addition to educating and training nearly 400 undergraduate majors and graduate students each year, SBS provides significant foundational instruction for core science requirements and for high-demand STEM degree programs across the University—including bioengineering, natural resource sciences, nursing, pharmacy, and all other healthcare professions.

9. Efficiency of Space Allocation:

a. For each major function in the proposed facility (classroom, instructional labs, offices), identify whether space allocations will be consistent with Facility Evaluation and Planning Guide (FEPG) assignable square feet standards. To the extent any proposed allocations exceed FEPG standards, explain the alternative standard that has been used, and why. See Chapter 4.0 of the Project Evaluation Guidelines for an example. Supporting tables may be included in an appendix.

See **Appendix D**.

b. Identify the following on form CBS002:

1. Usable square feet (USF) in the proposed facility: 5,732
2. Gross square feet (GSF): 6,368
3. Building efficiency (USF divided GSF): 5,732/6,368 = 90%

See also the required Program-Related Space Allocation **(Appendix E).**

10. Adequacy of Space:

Describe whether and the extent to which the project is needed to meet modern educational standards and/or to improve space configurations, and how it would accomplish that.

Teaching laboratory space in Eastlick Hall limits the university's ability to meet current student demand for STEM education and training. The labs are outdated, technologically inadequate, and constrain options to expand programmatic offerings.

In 2013, the consulting firm of Paulien & Associates, Inc. performed a space study in which they assessed Pullman campus teaching laboratories and rated each room on multiple "educational adequacy" factors. The consultant's report confirmed that the STEM teaching laboratories are extremely out of date and inadequate. Using room-by-room data and applying industry standards, most of the basic science teaching laboratories were rated as below average for educational adequacy (see sample evaluation in **Appendix F**).

Interior structural factors limit instructors' teaching strategies, students' learning experiences, and the overall effectiveness of the laboratory. The existing student benches are long and affixed to the floor. These do not allow for current or future adaptation to different instructional methods. They restrict student group interaction and collaboration.

Besides modernizing the lab interiors, the associated building system upgrades will improve the environment and health and safety for the faculty, staff and students working in the teaching laboratories and lab prep rooms. The renovations will greatly enhance the educational adequacy as defined by the consulting experts and enhance the recruitment of better-qualified students, staff, and faculty, particularly in the STEM disciplines.

APPENDIX A

Asset Detail Report
By Asset Name

Region: Washington State University - FCA Data
Campus: Assessed - October 2014
Asset: EASTLICK HALL
Asset Number: 0082A
Assets are ordered by Asset Name
Currency: USD

Statistics

FCI Cost:	12,389,240	FCI:	0.58
RI Cost:	14,281,402	RI:	0.67
Total Requirements Cost:	14,281,401		
Current Replacement Value:	21,405,785	Date of most Recent Assessment:	Oct 20, 2014

Type	Building		
Area	123,241 SF		
Use	ACADEMIC INSTRUCTION	Construction Type	
Floors	6	Historical Category	
Address 1	300 VETERANS WAY	City	PULLMAN
Address 2	-	State/Province/Region	UNITED STATES OF AMERICA
Year Constructed	1977	Zip/Postal Code	99164
Year Renovated	-	Architect	-
Ownership	Client Owned	Commission Date	-
		Decommission Date	-

Photo

EASTLICK HALL

Asset Description

General Description:

Eastlick Hall, also known as Building 82A, is located on the Washington State University campus in Pullman, WA at 300 Veteran's Way immediately adjacent and physically connected to Heald Hall on the south.

Asset Detail Report

By Asset Name

The structure is an 110,438 GSF, five-story structure with two basement levels and a penthouse. Portions of the Ground Floor project under paved patio areas above. According to Washington State University information the building was constructed in 1977.

The building contains offices, classrooms, and laboratories used primarily by the biological science program. The research lab spaces include a Vivarium Suite and a Biosafety Level 3 (BSL-3) Lab Suite, the latter of which not currently in use. The site slopes from northeast to southwest; the First Floor patio on the east is created by retaining walls, and the larger patio on the west, at the same floor level, is raised above the street elevation.

Generally, the survey included the portions of the site within ten feet of a building?s perimeter such as walks, fencing, retaining walls, loading dock pavement, etc. Corresponding deficiencies and corrections are then assigned to the building.

Per the Washington State Building Code, Chapter 51-50 WAC, Chapter 3, Section 304, this building is classified as Occupancy Group B Business. Based on field observations the building's Construction Type per the Washington State Building Code, Chapter 51-50 WAC, Chapter 6, Table 602, appears to meet the requirements of Type II-B, Noncombustible.

Requirements

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Concrete Overhangs - Sagging	No	B10 - Superstructure	Reliability	1- Due within 1 Year of Inspection	Oct 20, 2015	11,502
Exterior Ramp - Dock Area - Non-Compliant Rails	No	B1014 - Ramps	Building Code	4- Not Time Based		4,589
Accessible Ramp - NE Corner - Concrete Deteriorated and Handrail Maintenance	No	B1014 - Ramps	Accessibility	2- Due within 2 Years of Inspection	Oct 20, 2016	1,314
Interior Stairs and Ramps - Heald Connector - Non-Compliant Rails	No	B1014 - Ramps	Building Code	4- Not Time Based		6,418
Exterior Plaster Soffits - Damaged and Need Paint	No	B20 - Exterior Enclosure	Reliability	2- Due within 2 Years of Inspection	Oct 20, 2016	10,808
Brick Cavity Walls - CMU Backup Renewal	Yes	B2010 - Exterior Walls	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2019	178,500
Curtain Wall System - Standard Renewal	Yes	B2020 - Exterior Windows	Lifecycle	4- Not Time Based	Oct 20, 2017	114,938
Aluminum Windows Renewal	Yes	B2020 - Exterior Windows	Lifecycle	4- Not Time Based	Oct 20, 2014	272,480

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Door Assembly - 6 x 7 HM Renewal	Yes	B2030 - Exterior Doors	Lifecycle	4- Not Time Based	Oct 20, 2014	11,681
Overhead Rolling Doors - Electric Operation Renewal	Yes	B2030 - Exterior Doors	Lifecycle	4- Not Time Based	Oct 20, 2014	14,349
Door Assembly - 3 x 7 Storefront Renewal	Yes	B2030 - Exterior Doors	Lifecycle	4- Not Time Based	Oct 20, 2014	16,436
Door Assembly - 6 x 7 Storefront Renewal	Yes	B2030 - Exterior Doors	Lifecycle	4- Not Time Based	Oct 20, 2014	16,105
Door Assembly - 3 x 7 HM Renewal	Yes	B2030 - Exterior Doors	Lifecycle	4- Not Time Based	Oct 20, 2014	15,359
Mopped Membrane with Pavers Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	92,316
Mopped Membrane with Concrete Slab Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	44,964
BUR (Built-Up Roofing) Renewal	Yes	B30 - Roofing	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	15,300
Parapets Add Flashing	No	B3014 - Flashings and Trim	Reliability	3- Due within 5 Years of Inspection	Aug 28, 2020	25,500
Roof Hatch and Ladder Renewal	Yes	B3022 - Roof Hatches	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2017	6,484
Steel Ladders - Non-Compliant	No	B3022 - Roof Hatches	Building Code	4- Not Time Based		1,949
CMU Walls - Settlement Cracks	No	C1010 - Partitions	Reliability	2- Due within 2 Years of Inspection	Oct 20, 2016	3,200
Swinging Doors - Cracked	No	C1020 - Interior Doors	Reliability	3- Due within 5 Years of Inspection	Oct 20, 2019	11,534

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Restroom Accessories - Average Renewal	Yes	C1030 - Fittings	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	138,214
Toilet Partitions - Average Renewal	Yes	C1030 - Fittings	Lifecycle	4- Not Time Based	Oct 20, 2017	163,117
Egress Stairs - Non-Compliant Handrails	No	C20 - Stairs	Building Code	4- Not Time Based		28,303
Concrete Stair - M51N and G63 - Handrails Non-Compliant	No	C20 - Stairs	Building Code	4- Not Time Based		928
REPAIR FLOORS, WALLS, AND DOORS IN BASEMENT VIVARIUM	No	C30 - Interior Finishes	Reliability	3- Due within 5 Years of Inspection	Sep 1, 2020	163,200
Paint 4 Ground Floor Classrooms,	No	C3010 - Wall Finishes	Reliability	2- Due within 2 Years of Inspection	Jun 14, 2018	22,000
Painted Finish - Average (1 Coat Prime - 2 Coats Finish) Renewal	Yes	C3010 - Wall Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2020	56,313
Paint Masonry/Epoxy Finish - Economy Renewal	Yes	C3010 - Wall Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2020	54,675
Ceramic Tile Renewal	Yes	C3010 - Wall Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2020	2,731
Concrete - Painted Renewal	Yes	C3020 - Floor Finishes	Interior Finishes	1- Due within 1 Year of Inspection	Oct 20, 2014	3,456
Brick Tile Renewal	Yes	C3020 - Floor Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2020	9,895
REPAIR FLOORS, WALLS, AND DOORS IN BASEMENT VIVARIUM	No	C3020 - Floor Finishes	Maintenance	3- Due within 5 Years of	Jun 16, 2021	160,000

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
				Inspection		
Ceramic Tile Renewal	Yes	C3020 - Floor Finishes	Interior Finishes	1- Due within 1 Year of Inspection	Oct 20, 2014	31,018
Rubber Treads - Stairs Renewal	Yes	C3020 - Floor Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2019	13,005
VCT - Average Renewal	Yes	C3020 - Floor Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2019	287,227
Carpeting - Tile Renewal	Yes	C3020 - Floor Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2020	11,405
Metal Ceiling System Renewal	Yes	C3030 - Ceiling Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2019	8,390
Painted Plaster Renewal	Yes	C3030 - Ceiling Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2019	10,553
ACT System - Standard Renewal	Yes	C3030 - Ceiling Finishes	Interior Finishes	3- Due within 5 Years of Inspection	Oct 20, 2020	493,802
GWB Taped and Finished Renewal	Yes	C3030 - Ceiling Finishes	Interior Finishes	4- Not Time Based	Oct 20, 2019	103,853
GWB Ceiling - G51V - Damaged	No	C3030 - Ceiling Finishes	Reliability	2- Due within 2 Years of Inspection	Oct 20, 2016	1,084
Traction Geared Passenger Elevator Renewal	Yes	D1010 - Elevators and Lifts	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2018	234,303
Sump Pump - Pedestal - 21 GPM Renewal	Yes	D20 - Plumbing	Lifecycle	1- Due within 1	Oct 20, 2014	3,085

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
				Year of Inspection		
Custodial/Utility Sinks Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	14,958
Laboratory Sinks Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	357,273
Water Coolers - Wall-Mounted Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2015	25,960
Emergency Eyewash and Shower Units Renewal	Yes	D2010 - Plumbing Fixtures	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	49,855
Deionized Water System Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	2- Due within 2 Years of Inspection	Oct 20, 2014	75,966
Water Heater - Steam Semi-Instantaneous Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	129,551
Water Dist Complete Renewal	Yes	D2020 - Domestic Water Distribution	Lifecycle	4- Not Time Based	Oct 20, 2015	404,925
Water Well - Average Renewal	Yes	D2023 - Domestic Water Supply Equipment	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	6,540
Roof Drainage - Gravity Renewal	Yes	D2040 - Rain Water Drainage	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	256,467
Test Gas/Air and Vacuum Distribution Renewal	Yes	D2090 - Other Plumbing Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	377,706

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Natural Gas Supply for Bldg Renewal	Yes	D2090 - Other Plumbing Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2017	59,648
Lab Air Compressor Renewal	Yes	D2090 - Other Plumbing Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	61,901
Lab Vacuum Pump Renewal	Yes	D2090 - Other Plumbing Systems	Lifecycle	2- Due within 2 Years of Inspection	Oct 20, 2016	124,511
Cold Rooms Renewal	Yes	D30 - HVAC	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	283,847
Cooling Tower - Galvanized Renewal	Yes	D3030 - Cooling Generating Systems	Abandoned	4- Not Time Based	Oct 20, 2014	202,601
HEPA Filter Room Renewal	Yes	D3040 - Distribution Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	17,472
Return Fans (with heat recovery). Renewal	Yes	D3040 - Distribution Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	94,537
Central AHU - SF 1 Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	290,981
Exhaust System - Fume Hoods Renewal	Yes	D3040 - Distribution Systems	Lifecycle	4- Not Time Based	Oct 20, 2019	433,932
Central AHU - SF 3 Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	290,950
Central AHU - SF 2 Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of	Oct 20, 2020	291,061

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
				Inspection		
Perimeter Heat System - Hydronic Fin Tube Renewal	Yes	D3040 - Distribution Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	182,516
Exhaust System - General Building Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	142,792
Central AHU - SF 6 Renewal	Yes	D3040 - Distribution Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	290,993
Central AHU - SF 5 Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	290,943
Investigate Cross Contamination Threat	No	D3040 - Distribution Systems	Life Safety	1- Due within 1 Year of Inspection	Oct 20, 2015	3,869
Chilled Water Distribution System Renewal	Yes	D3040 - Distribution Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	510,000
Central AHU - SF 4 Renewal	Yes	D3040 - Distribution Systems	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	290,927
INSTALL VFDS ON SUPPLY FANS	No	D3041 - Air Distribution Systems	Reliability	1- Due within 1 Year of Inspection	Sep 9, 2016	76,500
Bio Fans Renewal	Yes	D3042 - Exhaust Ventilation Systems	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	51,547
REPLACE DAMPERS AND ACTUATORS	No	D3060 - Controls and Instrumentation	Lifecycle	1- Due within 1 Year of Inspection	Jun 10, 2017	32,516

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
Wet Sprinkler System - Ordinary Hazard Renewal	Yes	D40 - Fire Protection	Lifecycle	1- Due within 1 Year of Inspection	Oct 20, 2014	520,577
Emergency Electrical Service - 150A 208Y/120V + Distribution Renewal	Yes	D5012 - Low Tension Service and Dist.	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2019	18,180
Main Electrical Service - 4000A 208Y/120V Renewal	Yes	D5012 - Low Tension Service and Dist.	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	409,425
Distribution Equipment, Panelboards, and Feeders - 4000A 208Y/120V Renewal	Yes	D5012 - Low Tension Service and Dist.	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	866,312
Branch Wiring Renewal	Yes	D5021 - Branch Wiring Devices	Lifecycle	4- Not Time Based	Oct 20, 2019	528,507
Telephone System Renewal	Yes	D5033 - Telephone Systems	Technological Improvements	3- Due within 5 Years of Inspection	Oct 20, 2020	401,051
Fire Alarm System Renewal	Yes	D5037 - Fire Alarm Systems	Lifecycle	2- Due within 2 Years of Inspection	Oct 20, 2016	379,139
Exit Signs Renewal	Yes	D5092 - Emergency Light and Power Systems	Lifecycle	2- Due within 2 Years of Inspection	Oct 20, 2016	77,303
Fixed Casework - Institutional - High End Renewal	Yes	E - Equipment and Furnishings	Lifecycle	4- Not Time Based	Oct 20, 2019	25,500
Laboratory Casework - College Renewal	Yes	E - Equipment and Furnishings	Lifecycle	4- Not Time Based	Oct 20, 2019	2,285,238
Loading Dock Plate Renewal	Yes	E1033 - Loading Dock Equipment	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	6,921
Brick Tile Renewal	Yes	G2031 - Paving and Surfacing	Lifecycle	1- Due within 1 Year of	Oct 20, 2014	5,214

Asset Detail Report

By Asset Name

Requirement Name	Renewal	Prime System	Category	Priority	Action Date	Estimated Cost
				Inspection		
Pedestrian Pavement - Concrete Renewal	Yes	G2031 - Paving and Surfacing	Lifecycle	3- Due within 5 Years of Inspection	Oct 20, 2020	45,327
Signage - Non-Compliant	No		Accessibility	2- Due within 2 Years of Inspection	Oct 20, 2016	19,790
Air Balancing - B-56 Area	No		Reliability	1- Due within 1 Year of Inspection	Oct 20, 2015	4,141
Fire Separation - Missing	No		Life Safety	1- Due within 1 Year of Inspection	Oct 20, 2015	89,248
Total						14,281,401

APPENDIX B

WSU STEM Teaching Lab Renovation Engineering Study

July 7, 2016

Mr. Steven J. Potratz, PE
Engineering Manager
Facilities Services Engineering
McCluskey Services Building
Washington State University
Pullman, WA 99164

Subject: WSU STEM Teaching Lab Renovation Engineering Study

Purpose:

Washington State University engaged McKinstry to perform an engineering study to repurpose space in the existing Eastlick Hall facility by renovating, refurbishing and modernizing heavily used STEM undergraduate laboratories. This study incorporated WSU's goals to support modern, effective teaching methods for high-enrollment departmental learning spaces to better meet student demand for STEM courses. Repurpose of existing real estate when and where possible can be an effective use of capital funding as compared to the cost of new construction.

Methodology:

- *DOCUMENTATION REVIEW AND INTERVIEWS WITH KEY PERSONNEL* – The engineering study team reviewed available documents to familiarize themselves with WSU's goals and existing facilities to verify the needs and current state of condition. Information was captured from project champions in the biological sciences department and multiple interviews were conducted with facilities management and facilities engineering. We then gathered critical information on historic performance and known deficiencies within the Eastlick facility.

- *WALK-THROUGH SURVEY* – In addition to documentation review and interviews, our team also performed walk-through surveys to review the current state of equipment, systems design, routing and room layout to identify the optimal approach to the teaching lab upgrades.

- *PRELIMINARY DESIGN ENGINEERING REVIEW* - Performed engineering review of the physical class room space, including mechanical and electrical systems, biology lab casework systems and finishes. Preliminary design work performed with a plan in utilizing as much of the existing infrastructure as practical to maximize value.

- *REPORT* – Compiled all field observation reports, documented interviews and preliminary design into a final working report document. The following report

includes an owner's project requirements (OPR), scope of work comprised of mechanical, plumbing, electrical, structural, IT communications, lighting, security and architectural finishes. The report also contains room inclusions, ceiling service panels, case work, a sequenced project schedule and a budget estimate.

Approach:

Although several contracting methods can be utilized to accomplish this work, it is our recommendation to utilize a method that guarantees outcomes of quality, energy performance, financial guarantee, system operations, maintenance and measurement and verification. The Energy Services Performance Contracting (ESPC) method is ideally suited for this Scope of work. Additionally this method maximizes the use of all other available funding sources to maximize the amount of scope delivered by leveraging utility rebates and all other qualified funding sources.

Please find the report in the following pages.

Warren F. Tastad
Operations Manager

Karen Hedglin
Senior Program Manager

Subject: PE Statement – WSU STEM Teaching Lab Renovation Engineering Study

I state that I am a licensed Professional Engineer in the State of Washington, and that I am the engineer of record for the WSU STEM Teaching Lab Renovation Engineering Study.

Michael Sill
Design Engineering Manager

52534
State of Washington License Number

Contents: Exhibits

McKinstry
For The Life Of Your Building

EXHIBIT 1

Owners Project Requirements
Modify Eastlick STEM Teaching Labs

SECTION 1 Overview

The Owner's Project Requirements (OPR) provides an explanation of concepts and criteria that are important to the Owner, and will serve as the basis for assessing the project's success.

The OPR is a living document and will be revised throughout the design process by the Project Team. The Project Team consists of the Owner, Design Team, GC/CM, and Owners Representative. Updates during the design are the responsibility of the Design Team.

This initial draft of the OPR will be a guidance document for use in supplementing a capital budget request for the first floor lab remodel.

Once selected, the Design Team will utilize the OPR to develop the Basis of Design (BOD) document. The BOD will record the concepts, design assumptions, important decisions, and rationale used to satisfy the OPR, regulatory requirements, and industry standards and guidelines.

The OPR generally is not a description of what specifically will be included in the project design, but is more of a general overview with specific performance criteria to be met by the design.

SECTION 2 Owner and User Project Requirements

Primary Purpose, Program and Use

The primary purpose of these teaching labs are active learning instructional spaces connected to biology, microbiology or veterinary medicine undergraduate curriculum. These labs are not intended for research or for animal facilities.

The lab spaces need to be flexible, academic spaces that help to foster collaboration amongst small student groups and also encourage dynamic exchanges of ideas in a larger setting.

The building infrastructure will be brought up to modern code requirements to accommodate these new spaces and the size of classes and types of instruction taking place within. The infrastructure category in this instance includes mechanical systems, temperature controls, lighting and IT (smart boards, document cameras, card swipes).

Safety issues that must be resolved as a part of this project include proper egress signage and lighting, safety showers, fume hood and biosafety hood controls, GFCI receptacles, floor drains and vents, and emergency gas shutoffs.

SECTION 3 Performance Goals

These lab modifications are expected to have a minimum life expectancy of 50 years. The major mechanical system components are expected to last at least 30 years without replacement assuming routine and preventative maintenance is accomplished.

LEED certification is not contemplated at this time as a part of the project budget. All aspects of the project should strive for energy efficiency and be designed with ease of maintenance in mind.

Each lab shall accommodate a maximum of 24 students per section. Group work of a minimum of 4 students per group shall be accomplished in the configuration of the casework. Specific lab requirements in Section 6 shall also apply.

Collaborative and productive spaces:

- Movable, flexible lab casework in new classrooms that allows sitting or standing working heights. Orienting utilities to overhead service carriers and ceiling umbilicals can improve flexibility of teaching layouts.
- Mobile screens and technology interfaces that can be configured for large group presentations, small group presentations, or possibly distance learning
- Connectivity points at each station for different mobile devices like tablets, wireless instruments
- Integration of daylighting into the lighting design
- Public displays of learning: real time or digital video views into best teaching labs or experimental stations

Infrastructure:

- Improve indoor air quality
- Improve equipment run time, equipment useful life duration and energy efficiency by implementing variable air volume system
- Provide new controls that enable energy efficient operation
- Consider lighting that is occupancy controlled, dimmable for technology, and suitable for general classroom illumination with options for task lighting
- Evaluate existing electrical distribution system for available expansion space
- Evaluate floor drain adequacy and quantity, and their relationship to safety showers
- Modify venting to improve airflow

Lab casework modifications:

- 1" thick molded epoxy resin tops are required
- Flexible casework
- Mobile seating with chemical resistant coverings, height adjustable
- Overhead service carriers or ceiling umbilicals for utilities required at bench
- Lighter, steel construction may improve likelihood of reconfiguration
- Provide ADA required stations in each lab to accommodate all users

Occupancy requirements:
The buildings will be regularly occupied from 7:00 am to 6:00 pm, Monday through Friday.

Project cost: No more than $4.9MM.

SECTION 4 Indoor Environmental Quality Requirements

Conformance to Local Codes:
These building additions will be regulated by Washington State University and the local Authority Having Jurisdiction. All applicable mechanical, plumbing and electrical, and energy conservation codes will also be adhered to.

Mechanical:
Air handling units 3 and 4 currently serve the classrooms being discussed for renovation. The units operate 24/7/365 and vary between 35% outside air to 100% outside air. The system is currently a dual duct constant volume system that has an individual mixing box serving each classroom. The AHU's provide approximately 15 air changes per hour of supply air to the classrooms. In addition to serving the classrooms, the AHU's also serve ancillary spaces adjacent to the classrooms. Conversion to variable air volume must accommodate the additional zones. A detailed load calculation for the classrooms should be performed to evaluate the reduction of supply air required to meet peak space load.

AHU-3 ~~is being~~ updated 2018-2019.

Fumes hoods shall be provided with variable air volume controls to maintain a constant sash velocity independent of sash height position.
Appropriate emergency gas shutoffs shall be provided at each lab location.

Classroom condition setpoints shall be:
Winter Heating Minimum Setpoint – 65 degrees F
Winter Heating Maximum Setpoint – 72 degrees F
Summer Cooling Minimum Setpoint – 72 degrees F
Summer Cooling Maximum Setpoint – 76 degrees F
Unoccupied:
Minimum – 60 degrees F
Maximum – 80 degrees F

Exhaust/return air grilles in the space shall have volume controls to maintain the exhaust/return air approximately 10% above the supply airflow.

Existing tile at all lab floors will be removed, abated as required for mastic, and replaced with new tile. Prior to new flooring, the necessary core drilling and patching driven by new floor drains and new utility routing will be completed.

Existing ceilings will remain 2'x4' lay-in acoustical, however the grid will be rearranged to accommodate the utility panels for the flexible casework and new lighting layout. Lighting will be LED, dimmable and occupancy sensor controlled. Lighting at the bench surface is prewired into the flexible casework and also will be LED, except where curriculum requires alternate lighting types.

SECTION 5 Equipment and System Expectations

Air Handling Units
Air handling units shall have a fan wall, pumped tertiary loop chilled water coil, hot water coil, MERV 8 and 14 filtration, steam preheat coil with face and bypass dampers.

Tertiary Pumping Loops
Chilled water coils in the new AHU's shall be pumped with a two-way control valve.

Fume Hood Controls
Basis of design is TEL.

VAV boxes
Basis of design is Titus or Nailor dual duct inlet boxes.

Building Automation System
Basis of design is Siemens.

Variable Frequency Drives
Basis of design is ABB.

Data/LAN Systems
Both the telephone and data network systems within the building shall be extended from existing infrastructure to the central lab ceiling utilities panels. Cable and receptacles types shall match current standards. In general, emergency telephone, wireless and LAN connections shall be provided in all remodeled labs and as directed by users. Benchtop data connectivity prewired into the Enterprise casework will support tablets, laptops and other devices. Final locations for telephone and LAN connections shall be determined during design.

SECTION 6 Summary of Building Components

New casework and chairs typical in all rooms.

Room G80: No existing fume hood. A fume hood will not be added as part of this remodel.

Room G94: Consider replacement of fume hood. Consider snorkel umbilicals to groups of 4 students.

Room G95: (3) BSC class 2 Type A/B3, unducted. Consider reconfiguring these in the room for improved egress. Consider snorkel umbilicals to groups of 4 students.

Room G96: Consider replacement of fume hood. Consider snorkel umbilicals to groups of 4 students.

Room G98: No existing fume hood. A fume hood will not be added as part of this remodel.

Room G99: (3) vented cabinets – are these still required, and if so, is dehumification desired? Identify what is being vented in these cabinets to ensure proper exhausting.

Room 162: Consolidate tstats via controls remodel. Careful placement of tstats in all labs will be required. Consider snorkel umbilicals to groups of 4 students.

Room 166: No existing fume hood. A fume hood will not be added as part of this remodel.

Room 170: Consolidate tstats via controls remodel. Careful placement of tstats in al labs will be required. Consider snorkel umbilicals to groups of 4 students.

RM.170 is being renovated summer 2018. The college requested collaborative tables for 6 students, for a total of 42 seats Exhaust is bein brought to the tables via HVAC duct for most effective removal of chemical.

Room 192: No existing fume hood. A fume hood will not be added as part of this remodel.

Room 196: No existing fume hood. A fume hood will not be added as part of this remodel.

Section 7 Schedule

General work flow:
Demolition and removal of casework
Abatement
Demolition of finishes
Infrastructure system upgrades
Reinstall architectural finishes
Install new casework
Commissioning

Detailed schedule to be provided in this section following schematic design of infrastructure.

<END OF OPR>

EXHIBIT 2

Scope of Work

Eastlick STEM Labs
Room 170 and 192 Modifications

GENERAL

This scope of work describes the necessary modifications to the infrastructure at Rooms 170 and 192, including ventilation, plumbing, electrical, and code-required items. This scope also describes educational environment upgrades to enable the STEM labs to be flexible, academic spaces that help to foster collaboration amongst small student groups and also encourage dynamic exchanges of ideas in a larger setting. The end result, when extended across all labs in the building, will be a more efficient, flexible learning space.

SCOPE OF WORK INCLUDES

1. Mechanical - HVAC
   A. Demolition and Removal
      1) Existing mechanical system conditions are as follows:
         (i) Supply air to Room 170 is currently through two dual duct mixing VAV boxes, each sized to provide 1955 CFM. Supply air is from AHU-3. Air is exhausted through three constant volume exhaust boxes, each sized at 1435 CFM. Air is exhausted by EF-11.
         (ii) Supply air to Room 192 is currently through two dual duct mixing VAV boxes, each sized to provide 1925 CFM. Supply air is from AHU-4. Air is exhausted through three constant volume exhaust boxes, each sized at 1395 CFM. Air is exhausted by EF-12.
      2) Remove existing dual duct mixing boxes in Rooms 170 and 192 (two boxes each room) and all associated controls.
      3) Remove existing exhaust boxes in Rooms 170 and 192 (three boxes each room) and all associated controls.
      4) Remove existing ductwork, diffusers and accessories downstream of dual duct boxes.
      5) Remove existing motors for:
         (i) AHU-3 supply fan
         (ii) AHU-4 supply fan
         (iii) EF-11
         (iv) EF-12
         (v) RF-1
         (vi) RF-2

2018-2019 cleaning

   B. Furnish and install new inverter-duty rated motors with shaft grounding rings for:
      1) AHU-3 supply fan
      2) AHU-4 supply fan
      3) EF-11
      4) EF-12
      5) RF-1
      6) RF-2

summer 2018

   C. Install new 2-way control valve for AHU-3 and 4 chilled water coils.
   D. Furnish and install new inline chilled water pump and bypass line for AHU-3 and 4 coils.
   E. Furnish and install new 14-inch inlet 1600 CFM dual duct VAV box for Rooms 170 and 192, one box for each room.

Scope of Work

F. Furnish and install new acoustically lined ductwork, linear diffusers and accessories downstream of new VAV box for Rooms 170 and 192. summer 2018
G. Furnish and install four new 3-inch flexible snorkel exhaust, 100 CFM each in Rooms 170 and 192 (8 total snorkels). Snorkels shall be connected to a single constant volume exhaust box (one per classroom) that shall be manually activated upon need for local snorkel use.
H. Furnish and install one new 400 CFM VAV exhaust box and two 800 CFM VAV exhaust boxes for Rooms 170 and 192.
I. Fume hood controls: not applicable to these labs on the first floor.

2. Mechanical – Plumbing summer 2018
   A. Furnish and install a new emergency eyewash/shower in Rooms 170 and 192, two total.
      1) Extend 1.5" hot water and 1.5" cold water line to new shower location.
      2) Furnish and install mixing valve for tepid water requirements.
      3) Extend or provide new venting associated with this plumbing.
   B. Furnish and install new floor drain for emergency eyewash/shower in Rooms 170 and 192, two total. Connect to existing acid drain system.
   C. Extend natural gas, compressed air and vacuum to ceiling interface panels. Panels shall have quick connect fittings for connecting the mobile casework.
   D. Extend cold water, domestic hot water and acid drain to predetermined floor panel locations. Panels shall have quick connect fittings for connecting the mobile casework.
   E. Emergency gas shutoffs to remain.
3. Controls
   A. Furnish and install new thermostats with setpoint adjustment and occupancy override for Rooms 170 and 192.
   B. Furnish ABB ACH-550 variable frequency drives with disconnect, no bypass required for:
      1) AHU-3 supply fan
      2) AHU-4 supply fan
      3) EF-11 clean 2018
      4) EF-12
      5) RF-1
      6) RF-2
   C. Furnish and install Ebtron GTx116 Gold airflow measuring stations for:
      1) AHU-3 hot deck supply air
      2) AHU-3 cold deck supply air
      3) AHU-3 outside air
      4) AHU-3 return air
      5) AHU-4 hot deck supply air
      6) AHU-4 cold deck supply air
      7) AHU-4 outside air
      8) AHU-4 return air
      9) EF-11 exhaust air
      10) EF-12 exhaust air

2018-2019 scope

Included in the 2018-2019 scope of work is a change of utility from steam to hot water. The equipment installed will be sized for the whole building, so we will be ready to change over AHU-4 in phase 2.

   D. Furnish new modulating 2-way control valve for the chilled water coils for AHU-3 and AHU-4.
   E. Furnish and install new controller for supply and exhaust air terminals for Rooms 170 and 192. Room differential shall be maintained by an airflow offset command. Controller shall be capable of the following:
      1) Room temperature (analog input)

2) Room temperature setpoint (analog input)
3) Hot deck airflow (analog input)
4) Cold deck airflow (analog input)
5) Hot deck damper open/close (analog output)
6) Cold deck damper open/close (analog output)
7) Mixed air temperature (analog input)
8) Exhaust airflow (analog input)
9) Exhaust air damper open/close (analog output)
10) Snorkel exhaust airflow (analog input)
11) Snorkel system enable (digital input)
12) Snorkel exhaust air damper open/close (analog output)

F. Extend BACNet connection to all new VFDs.
G. Hardwire the following points to each new VFD:
1) Start/stop (digital output)
2) Speed command (analog output)
3) Current feedback (analog input)
H. Add the following points to the AHU controllers:
1) Chilled water pump start/stop (digital output)
2) Chilled water pump running (digital input from current sensing relay)
3) Chilled water valve open/close (analog output)
4) Cold duct static pressure (analog input)
5) Hot deck static pressure (analog input)

4. Electrical
A. Install variable frequency drives for:
1) AHU-3 supply fan
2) AHU-4 supply fan
3) EF-11
4) EF-12
5) RF-1
6) RF-2
B. GFCI receptacles will be prewired at all new lab benches. Additional electrical capacity at individual lab panels may be required.
C. Additional IT capacity will be required for the addition of smart boards and document cameras at the instructor station. Additional IT capacity will be prewired at all new lab benches. New IT hard wired ports will be routed to the central floor utility panel locations at each lab.
D. Provide new LED Exit lights at each lab per building code.
E. Provide magnetic strip card readers at each lab, to be programmed to allow access to designated cards. Basis of design to be Best Access Systems – BASIS V. Primary power is (4) AA batteries thus rewiring at the door frames is not required.
F. Provide LED 2x4 lay-in fixture lighting throughout each lab, with occupancy sensing and dimming ability. New lab benches will also contain task lighting at the lowest shelf.

5. Structural
A. Core drilling at slabs and ceilings will be required for safety shower drains and vents. Additional core drilling or hanger-attachments may be necessary for other service routing utilities to the service panel serving each bench. As a precaution, xray technology at the core drilling locations will be used to ensure that the structure is not compromised.
B. Preliminary structural evaluation indicates that the new lab casework will be less lbs/SF than

Scope of Work

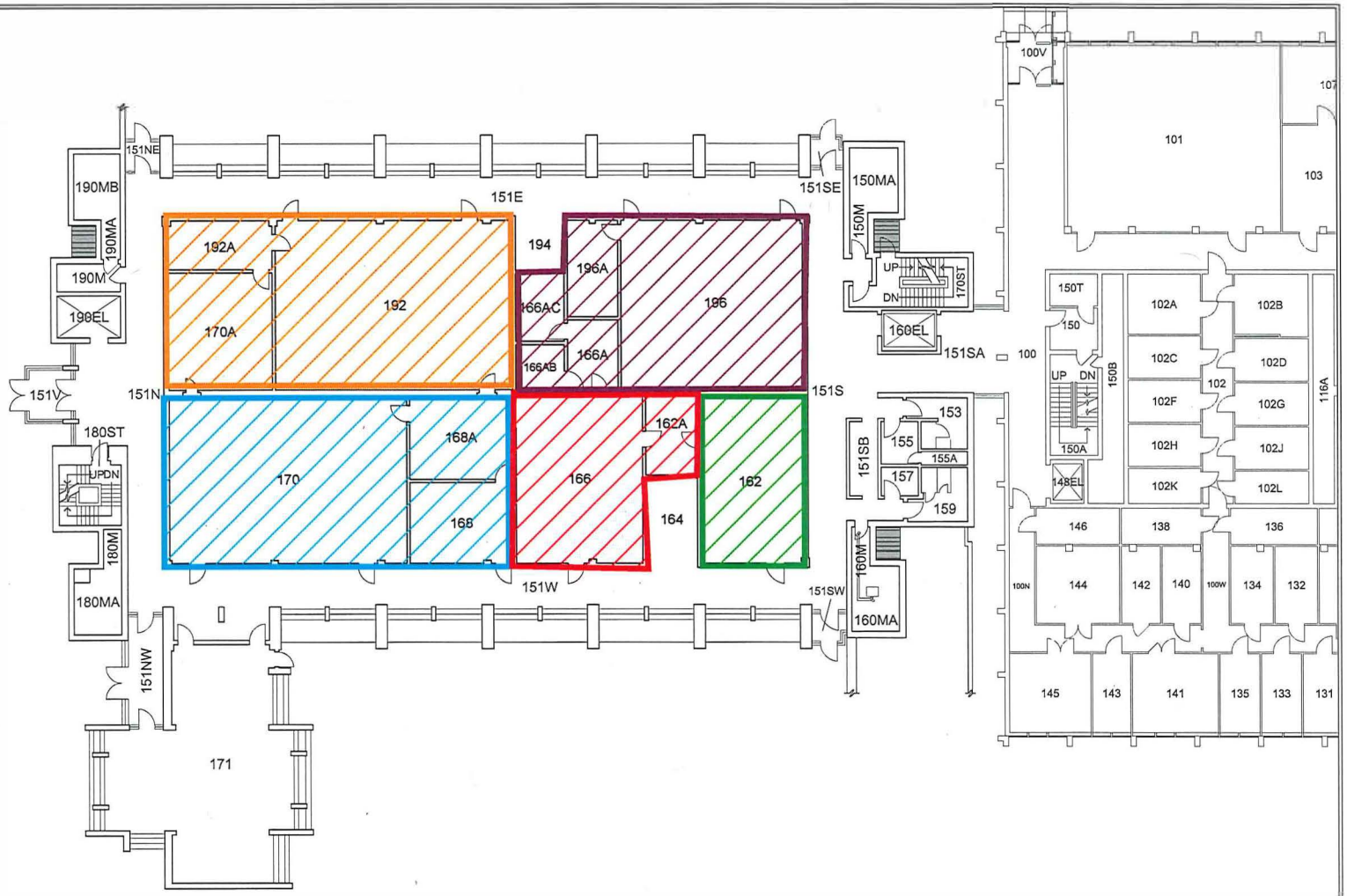
the existing, and therefore structural improvements are not included in the budget or scope at this time.

6. Architectural
   A. Remove and replace existing ceiling tiles.
   B. Remove and replace VCT flooring and base. Remove mastic and etch concrete floor per manufacturer's instructions. Provide new VCT flooring and rubber base. Basis of design is Armstrong Excelon.
   C. Provide egress signage per code at each door to the lab and ancillary spaces.
   D. Patch all doors and frames as required following removal of existing hardware and to accommodate new magnetic swipes.
   E. Paint all doors and frames interior to the lab space.
   F. Finishes at the corridors are not included in the budget or scope at this time.
   G. Patch as necessary at all locations where previous casework was secured to the walls or floors.
   H. Paint all existing walls within the lab space.
   I. Provide new lab casework that is reconfigurable, with ADA-required work stations to accommodate all users.
7. Commissioning and Testing, Adjusting and Balancing (TAB)
   A. New mechanical systems will be balanced and commissioned to ensure compliance with design.
8. Design
   A. Design fees have been estimated assuming a GC/CM approach with Guaranteed Maximum Price. Lab design specialty subconsultants have been included in the budgeted fee.

CLARIFICATIONS AND EXCLUSIONS

1. Hazardous materials abatement is not included in this budget or scope at this time.
2. Based on phasing noted in schedule Exhibit 3.
3. Assumptions noted in Exhibit 1 Owners Project Requirements.

Abatement in classroom 170 is scheduled for summer 2018.



FIRST FLOOR PLAN

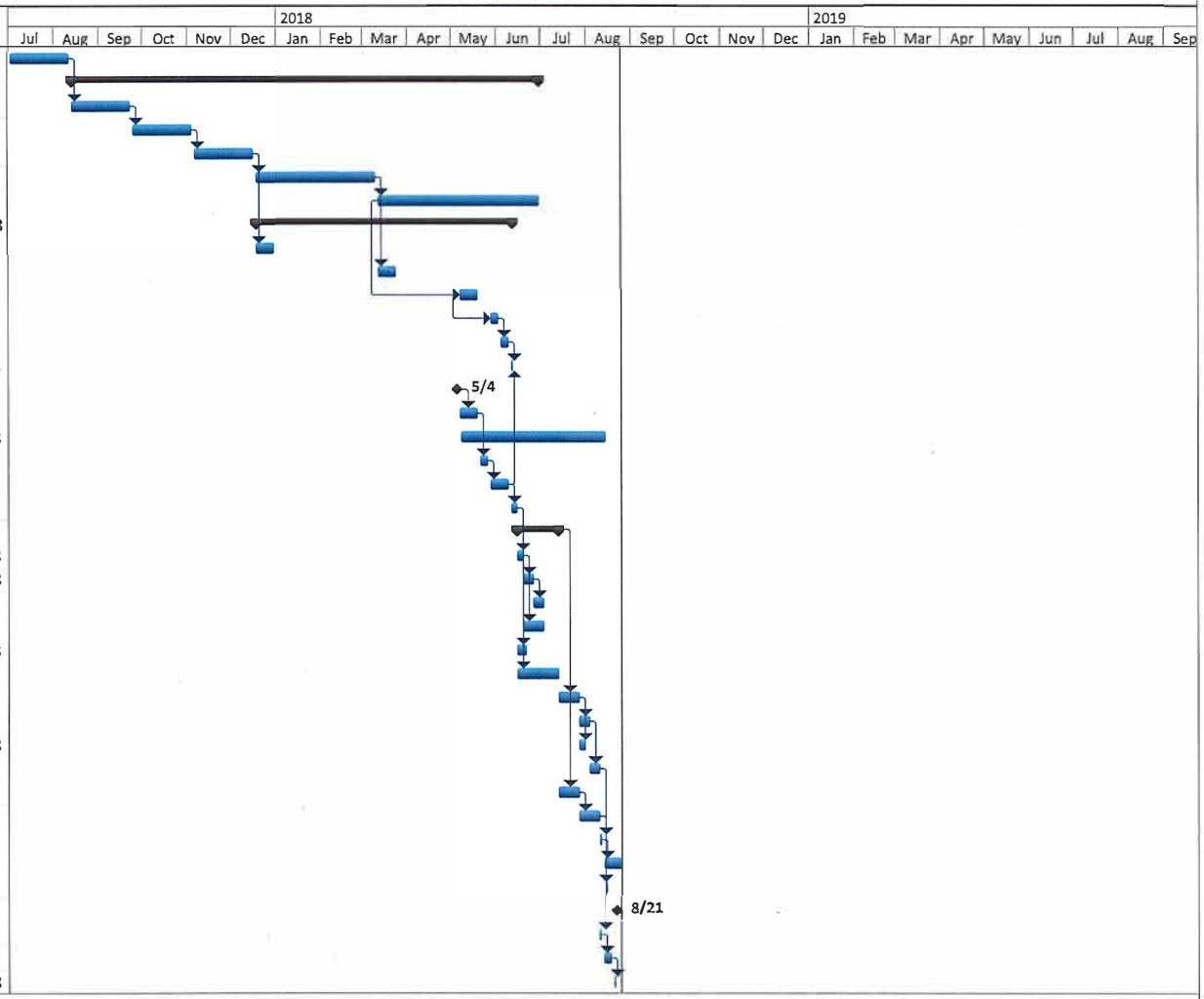
GROSS SQUARE FEET	REVISION DATES		SCALE: 1" =20'	EASTLICK HALL	NORTH	WASHINGTON STATE UNIVERSITY	BLDG. NO.
17,207	10-28-1981	05-27-1999	0 5 10 20				82A
BLDG. TOTAL: 123,241 S.F.	04-28-1987	02-07-2001					SHEET NO.
	08-14-1996	02-11-2015					R-4
	WSU FILE NO.	0082A_R04					

EXHIBIT 3

WSU Eastlick STEM Labs

Preliminary Schedule

ID	Task Name	Duration	Start	Finish
1	Receive Funding for Project	30 days	Mon 7/3/17	Fri 8/11/17
2	**Design**	**230 days**	**Mon 8/14/17**	**Fri 6/29/18**
3	RFQ and Selection Process	30 days	Mon 8/14/17	Fri 9/22/17
4	Programming	30 days	Mon 9/25/17	Fri 11/3/17
5	Schematic Design	30 days	Mon 11/6/17	Fri 12/15/17
6	Design Development	60 days	Mon 12/18/17	Fri 3/9/18
7	Construction Documents	80 days	Mon 3/12/18	Fri 6/29/18
8	**GC/CM Selection Process**	**126 days**	**Mon 12/18/17**	**Mon 6/11/18**
9	Schematic Design Estimate	10 days	Mon 12/18/17	Fri 12/29/17
10	Design Development Estimate	10 days	Mon 3/12/18	Fri 3/23/18
11	50% Construction Documents Estimate	10 days	Mon 5/7/18	Fri 5/18/18
12	GMP Established	5 days	Mon 5/28/18	Fri 6/1/18
13	Contract Process	5 days	Mon 6/4/18	Fri 6/8/18
14	Notice to Proceed	1 day	Mon 6/11/18	Mon 6/11/18
15	Last Day of Classes	1 day	Fri 5/4/18	Fri 5/4/18
16	Staff and Volunteers Move Furniture	10 days	Mon 5/7/18	Fri 5/18/18
17	Building Empty for Summer	70 days	Tue 5/8/18	Mon 8/13/18
18	Demolition of Casework	5 days	Mon 5/21/18	Fri 5/25/18
19	Asbestos Abatement by Owner	10 days	Mon 5/28/18	Fri 6/8/18
20	Ceiling Removal	4 days	Mon 6/11/18	Thu 6/14/18
21	**Infrastructure Mods**	**20 days**	**Fri 6/15/18**	**Thu 7/12/18**
22	Xray Slabs and Core Drill	2 days	Fri 6/15/18	Mon 6/18/18
23	Provide new plumbing	5 days	Tue 6/19/18	Mon 6/25/18
24	Reroute utilities	5 days	Tue 6/26/18	Mon 7/2/18
25	Reroute/provide new power/IT	10 days	Tue 6/19/18	Mon 7/2/18
26	Code required modifications	4 days	Fri 6/15/18	Wed 6/20/18
27	Mechanical System Modifications	20 days	Fri 6/15/18	Thu 7/12/18
28	Provide new ceilings and lighting	10 days	Fri 7/13/18	Thu 7/26/18
29	Paint and patch	5 days	Fri 7/27/18	Thu 8/2/18
30	Card swipe modifications	2 days	Fri 7/27/18	Mon 7/30/18
31	Install casework	5 days	Fri 8/3/18	Thu 8/9/18
32	Test and Balance	10 days	Fri 7/13/18	Thu 7/26/18
33	Commissioning	10 days	Fri 7/27/18	Thu 8/9/18
34	Final Construction Clean	1 day	Fri 8/10/18	Fri 8/10/18
35	Reassemble Classrooms - ongoing	10 days	Mon 8/13/18	Fri 8/24/18
36	Staff May Return to Select Areas	1 day	Tue 8/14/18	Tue 8/14/18
37	First Day of Classes	1 day	Tue 8/21/18	Tue 8/21/18
38	Substantial Completion	1 day	Fri 8/10/18	Fri 8/10/18
39	Closeout	5 days	Mon 8/13/18	Fri 8/17/18
40	Final Completion	1 day	Mon 8/20/18	Mon 8/20/18



Thu 7/7/16

McKinstry
For The Life Of Your Building

EXHIBIT 4

Budget Summary

Project	WSU Eastlick STEM Labs
	Budget Estimate for First Floor Labs
Date	7/7/2016

	Description	Mechanical	Electrical	Controls	IT	Architectural	Structural	Casework	Total
Rm 170, 192	Priority 1, Priority 2: Modify lab space per Scope of Wor	$ 183,440	$ 92,966	$ 77,600	$ 27,541	$ 161,680	$ 6,562	$ 646,720	$ 1,196,509
Rm 166	Priority 3: Modify lab space per Scope of Work	$ 59,020	$ 20,884	$ 24,516	$ 7,242	$ 36,320	$ 1,608	$ 145,280	$ 294,870
Rm 196	Modify lab space per Scope of Work	$ 102,180	$ 36,156	$ 42,444	$ 12,266	$ 62,880	$ 2,412	$ 251,520	$ 509,858
Rm 162	Modify lab space per Scope of Work	$ 38,870	$ 13,754	$ 16,146	$ 4,803	$ 23,920	$ 1,018	$ 95,680	$ 194,191
		$ 383,510	$ 163,760	$ 160,706	$ 51,852	$ 284,800	$ 11,600	$ 1,139,200	$ 2,195,428

Construction Costs				
	Commissioning	$37,991		$37,991
	Testing, Adjusting and Balancing	$60,000		$60,000
	GC/CM Fee, OH & Profit	$573,355		$573,355
	Utilities Allowance	$6,000		$6,000
	Permitting	$50,000		$50,000
	Construction Bonds	$43,842		$43,842
	Construction Testing & Inspection	$5,000		$5,000
				$ 2,971,616

Professional Services Costs				
	Design	18%	Architectural, Lab Specialist, Structural, MEP Engineering	$534,891
	Agency Project Management	$253,036	Provided by WSU	$253,036
	WSU CM Fee	$110,000	Provided by WSU	$110,000
	Waste Management	$25,000	Provided by WSU	$25,000
	EH&S	$25,000	Provided by WSU	$25,000
	Facilities Services Support	$50,000	Provided by WSU	$50,000
				$ 997,927

Other Project Costs				
	Higher Ed Artwork	$14,685	Provided by WSU	$14,685
	Sales Tax	7.80%		$309,624
	Project Contingency	20%	Industry-standard for conceptual design	$594,323
				$ 918,633

Escalation on Construction Budget				
	From 7/2016 to 7/2018: 24 months	3%		$89,148
				$ 89,148

Total Project Budget	$ 4,977,324

APPENDIX C

AVAILABILITY OF SPACE

Project Name: STEM: Undergraduate Teaching Labs

Campus location: WSU Pullman Campus

REQUIRED FOR ALL CATEOGRIES EXCEPT ACQUISITION AND INFRASTRUCTURE

Identify the average number of hours per week each (a) classroom seat and (b) classroom lab is expected to be utilized in Fall 2018 on the proposed project's campus. Please fill in the gold shaded cells for the **campus** where the project is located.

(a) General University Classroom Utilization	
Fall 2017 Weekly Contact Hours	213,271
Multiply by % FTE Increase Budgeted	0%
Expected Fall 2018 Contact Hours	213,271
Expected Fall 2018 Contact Seats	10,566
Expected Hours per week Utilization	**20.2**
HECB GUC Utilization Standard	22
Difference in Utilization Standard	-8%

(b) General University Lab Utilization	
Fall 2017 Weekly Contact Hours	42,569
Multiply by % FTE Increase Budgeted	0%
Expected Fall 2018 Contact Hours	42,569
Expected Fall 2018 Class Lab Seats	3,003
Expected Hours per Week Utilization	**14.2**
HECB GUL Utilization Standard	16
Difference in Utilization Standard	-11%

If the campus does not meet the 22 hours per classroom seat and/or the 16 hours per class lab HECB utilization standards, describe any institutional plans for achieving that level of utilization.

As reflected above, usage of campus classrooms and labs nearly meet the HECB standards. In fact, if all the classes and labs scheduled after hours were counted, overall usage of those spaces is above the HECB standard. The HECB formula counts usage within a nine-hour contiguous block of time. While the majority (93%) of scheduled classroom use occurs between 8:00 a.m. and 5:00 p.m., (the hour block used for this calculation), 7% of classroom time is scheduled outside this timeframe. If counted, those additional contact hours of usage put the classroom space use above the current standard. While the majority (87%) of scheduled lab use occurs between 9:00 a.m. and 6:00 p.m. (the block used for this calculation), 13% of the teaching lab use is outside this time range. If counted, those additional contact hours of usage put the lab space use above the current standard. This project increases the quality and usability of the laboratory space and the number of hours used (which directly improves the space utilization rates). As to quality, for example, the 40-year-old single-sided benches affixed to the floors will be replaced with flexible, modular furnishings that will encourage dialogue and increase student success in all courses.

APPENDIX D

Efficiency of Space Allocation - Major Functions After Renovation - FEPG Comparison

STEM Teaching Labs/Building Infrastructure Upgrades

Use Code	Major Function Space Type	Project ASF/Station	FEPG Standard	Meets Standard (Y/N)	Comments
210	Class lab - Physical Sciences	38-59	40-90%	Yes	Two small teaching labs out of five have slightly less than standard allowable/meets programming needs
215	Class/ Lab Service			N/A	Sized appropriately to serve labs

Excerpt from FEPG Planning Guide:

Teaching Labs:

3. ASF Per Station

The ASF per station guideline numbers which follow establish an order of magnitude for class laboratory space within the major Classification of Instructional Programs (CIP) categories. (Appendix A shows square feet per station data for those specific disciplines within each major CIP group that had data. However, it is only the CIP group average that is intended to be meaningful within the arrayed data.)

The guidelines are for both research and regional institutions of higher education and all levels of study (i.e., lower division, upper division and graduate course levels). The guidelines include both space classified in category 210 (Class Laboratory) and space in category 215 (Class Laboratory Service). Justification is necessary if space requirements vary significantly from the guidelines. Such justification must be supported by the curricular and/or pedagogical requirements of the discipline(s).

Major CIP Groups*	Recommended ASF per Station Planning Guidelines	Range Low	Range High
Area Studies	35	35	40
Law	35	30	40
Letters	35	N/A	40
Library Science	35	30	40
Mathematics	35	30	40
Public Administration	35	35	40
Business	35	35	40
Foreign Languages	45	40	50
General Studies	45	40	50
Social Sciences	45	30	70
Education	50	35	150
Psychology	50	30	70
Natural Sciences	60	25	70
Communications	60	35	96
Computer Sciences	60	50	60
Agricultural Business	65	50	125
Biological Sciences	65	25	80
Health Professions	65	40	175
Home Economics	70	45	100
Agricultural Sciences	75	55	160
Architecture	75	60	85
Physical Sciences	80	40	90
Arts	90	50	175
Engineering	120	35	180

**See Appendix A at the conclusion of this section for specific disciplines included within each major CIP group, and comparative standards from nine higher education systems or institutions.*

APPENDIX E

Program-related Space Allocation
Assignable Square Feet Template

STEM Teaching Labs/ Building Infrastructure Upgrades

Input the assignable square feet for the proposed project under the appropriate space type below:

Type of Space	Points	Assignable Square Foot	Percentage of Total	Score [Points X Percentage]
Instructional Space (Classroom, Lab, Library)	6	5,732	100.0%	6.0
Student Advising/Counseling	4		0	-
Childcare	4		0	-
Faculty Offices	4		0.0%	-
Administrative	2		0.0%	-
Maintenance/Central Stores/Student Center	2		0	-
Total		5,732	100%	6.0

APPENDIX F

Educational Adequacy Evaluation Form

Building	Eastlick Hall	Room Number	0192
Room Description	Biology 102 Lab	Assignable Square Feet	1,432
Station Count	48	Weekly Room Hours	30
ASF per Station	30	Student Station Occupancy Percent	76

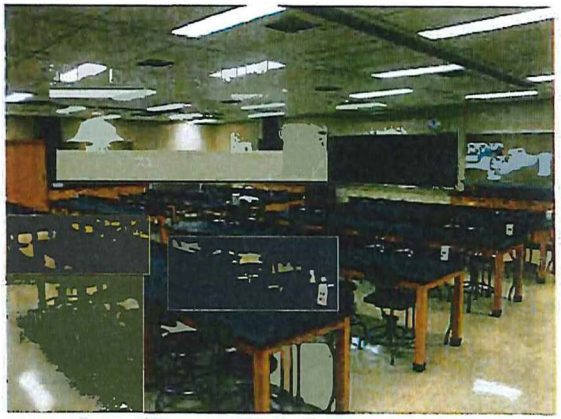
Rating Scale: 1 2 3 4

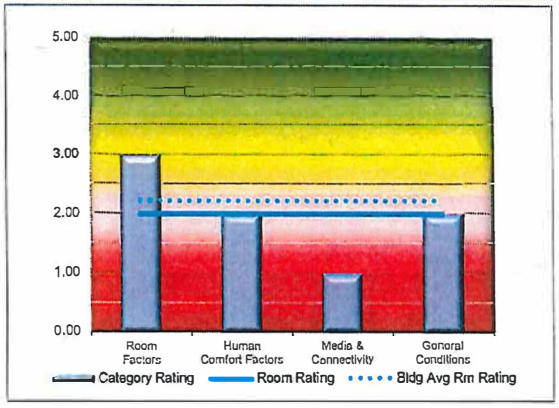
Rating Scale: 1 = Poor; 2 = Below Average; 3 = Average; 4 = Above Average; 5 = Excellent

Category	
Room Factors (30%)	
Capacity	3
Student belongings storage	
Room dimensions appropriate	
Sightlines to front and sides of room, front of room depth	
Accessibility/ability to move throughout room	
Writing surfaces (quantity of chalkboards, whiteboards)	
Human Comfort Factors (20%)	
Temperature (noticeably too hot/cold)	2
Lighting (appropriate ambient natural lighting and task appropriate brightness)	
Lighting control (ability to dim lighting)	
Acoustics (noise level, hall distractions, sound reverberation)	
Air quality (odors, dusty, etc.)	
Media and Connectivity (30%)	
Power at every student station	1
Instructor/room controls	
Projection capability (overhead, flat panels, smart boards)	
Computer Connectivity (Wi-Fi, data port)	
General Conditions (20%)	
Equipment up-to-date	2
Sufficient storage space within room for appropriate items	
Floors, walls, and ceilings	
Furnishings (condition of the furniture, casework, whiteboards, etc.)	
Room Rating	**2.00**

Overall Rating: 0.50 - 1.49 = Poor; 1.50 - 2.49 = Below Average; 2.50 - 3.49 = Average; 3.50 - 4.49 = Above Average; 4.50 - 5.00 = Excellent

Comments





OFM

365 - Washington State University
Capital Project Request
2019-21 Biennium

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Version: 10 2019-21 WSU Capital Budget Request

Report Number: CBS002
Date Run: 7/30/2018 1:45PM

Project Number: 30001326
Project Title: Washington State University Pullman - STEM Teaching Labs

Description

Starting Fiscal Year: 2018
Project Class: Preservation
Agency Priority: 5

Project Summary

WSU requests $4.9 million for critical upgrades in high-enrollment biological science learning spaces that will extend the useful life of one of the core facilities on the Pullman campus and enable the university to better meet high student demand for STEM programs. This is the second phase of a long range plan to upgrade the aging learning spaces in the sciences at WSU and invigorate students' hands-on laboratory experience in high-demand STEM degrees, increase programmatic options, and bolster the "citizen scientist" experience for all students. In January 2018, the legislature funded $1 million for 2017-19 toward this effort. That funding renovated one laboratory and part of the building systems supporting the Eastlick Hall labs. The Eastlick teaching labs have not been upgraded significantly in 40 years. The 2019-21 request will fund renewal of five undergraduate teaching laboratories and the remaining building support systems.

Project Description

Identify the problem or opportunity addressed. Why is the request a priority? (Provide numbers of people or communities not served, students without classroom space, operating budget savings, public safety improvements, history, or other backup necessary to understand the need for the request.) Be prepared to provide detailed cost backup.

The Eastlick Hall teaching labs (and STEM program labs in other science buildings) have not been upgraded significantly in the past 40 years. With no other appropriate space available, these labs are heavily scheduled to support many of the university's largest and most important biological science courses, from introductory laboratory experiences for non-science majors through upper division courses critical for students pursuing healthcare and STEM-related careers. More than 2,500 biology, microbiology and zoology undergraduate and graduate students are trained in the building each semester. WSU requests $4.9 million for critical upgrades in high-enrollment biological science learning spaces that will extend the useful life of one of the core facilities on the Pullman campus, improve safety, and enable the University to better meet high student demand for STEM programs.

The old single-sided, fixed benches discourage interaction, a lack of ventilation presents an air quality safety risk, and little to no access to technology restricts communication and the application of advanced methodologies. Improvements are vital in order to continue and to expand educational opportunities for the students pursuing science degrees in Eastlick Hall laboratories every semester.

The building systems supporting these science labs include, for example, the air handling (HVAC) units, which need refurbishing to ensure the health and safety of students and faculty. Being able to vent noxious formaldehyde fumes away from laboratory benches will improve student concentration, eliminate the need to have lab doors open to the hallways, and significantly reduce ongoing health concerns. The project includes other improvements to plumbing, electrical, storage and security (including card-swipe access) to extend the lifespan of laboratories, samples, and supplies.

The 2016 Comparable Framework included a condition score for Eastlick Hall. The building condition was assessed by VFA in the fall of 2015 with a score of 0.58. The comparable framework number assigned to Eastlick in 2016 was 3. The project scope is intended to address deficiencies concerning the air handling and exhaust systems as well as the energy losses associated with the archaic system approach. The VFA study recommends replacement and/or upgrade of the air handling equipment including fans and cooling coils. These systems are nearly 40 years old without significant changes to any of them.

What will the request produce or construct (i.e. design of a building, construction of additional space, etc.)? When will the project start and be completed? Identify whether the project can be phased, and if so, what phase is included in this request.

This is the second biennial request of WSU's long-range plan to upgrade the aging learning spaces in the sciences at WSU. It will invigorate students' hands-on laboratory experience in high-demand STEM degrees, increase programmatic options, and bolster the "citizen scientist" experience for all students. Renovations are scheduled for summer months with the plan to accommodate summer session enrollment in alternate laboratories without disrupting lab courses taught during the heavily scheduled academic year semesters. This intermediate-sized project (greater than $2 million and less than $5 million) is part of a long-range plan to systematically refurbish and modernize the Pullman campus STEM teaching labs. The request for 2019-21 is the second phase of the long-range plan. Funding would have a near-term impact on students' educational experience in existing facilities in contrast to waiting six years or a major construction project to provide the only modern teaching labs. Specifically, $4.9 miilion in funding will renovate, refurbish, and modernize several heavily used undergraduate teaching biology

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365 - Washington State University
Capital Project Request
2019-21 Biennium

*

Version: 10 2019-21 WSU Capital Budget Request

Report Number: CBS002
Date Run: 7/30/2018 1:45PM

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Project Title: Washington State University Pullman - STEM Teaching Labs

Description

and microbiology laboratories in Eastlick Hall. WSU's 2017-19 request was the first of an ongoing biennial plan to upgrade full floors of labs at a time and the associated building systems. In 2017-19, the legislature appropriated only enough funding to remodel one first floor teaching lab (there exist five) and part of the associated building systems. The 2019-21 request is for similar funding, i.e. enough to complete the full first floor of teaching labs (there are four remaining) and supporting building systems for $4.9 million plus a lab on the ground floor if the budget allows. If construction costs remain flat (no inflation), then it may be possible to include one ground floor teaching lab if the full $4.9 million request is funded. The 2021-23 capital request would be focused on all the remaining teaching labs on the ground floor. The 2023-25 request will focus on the next highest priority building with outdated STEM program teaching labs.

How would the request address the problem or opportunity identified in question #1? What would be the result of not taking action?

The high priority assigned to remodeling the Eastlick first floor labs targets safety concerns for students and badly needed modernization of the teaching lab spaces. Because of the age and rigidity of the laboratory spaces, not doing the project prevents faculty and students from teaching and learning in updated science space using modern collaborative methods.
The renovation will bring the building systems into compliance with current codes and technology by applying variable drives on fan motors, pump and other HVAC equipment. Finishes and insulation will be brought up to code where they are within the bounds of the project scope. Asbestos materials will be abated and replaced with new materials that are safe for new construction. Modern laboratory control strategies will be applied to maintain air quality as well as energy conservation throughout the project. The teaching labs will incorporate new lab equipment and systems to provide modern collaborative teaching tools but also provide safe use of laboratory chemicals that are a part of the biological sciences teaching pedagogy.
The result of not taking action continues to put students and faculty in a building that does not comply with the energy and ventilation codes in force today. This project will bring these codes into compliance.

Which clientele would be impacted by the budget request? Where and how many units would be added, people or communities served, etc. Be prepared to provide detailed cost backup.

More than 2,500 biology, microbiology, and zoology undergraduate and graduate students are trained in the building each semester. The laboratories also provide foundational instruction for students in high-demand STEM degree programs in bioengineering, natural resource sciences, nursing, pharmacy, veterinary medicine, and all other pre-healthcare tracks. For example, Eastlick Hall is home to Biology 324, a comparative vertebrate anatomy course vital for students pursuing healthcare careers and many high-demand STEM degrees. Additionally, many laboratory sections for Biology 102, a high-enrollment introductory course that engages non-science-based majors as 'citizen scientists' and expands their scientific literacy, are held in Eastlick Hall. In the academic year 2016 alone, there was a 6% increase in enrollment for this introductory course and now more than 300 Biology 102 students use the labs during each semester.
The WSU freshman enrollment is projected to remain high and pedagogical research shows a positive correlation between active learning, where students are working together to solve problems, and increased student success. Modern laboratory space in conjunction with teaching innovation will significantly enhance student performance, which in turn will enhance overall students retention, student success and degree time-to-completion.

Does this request include funding for any IT-related costs (See the IT Appendix for guidance on what is considered an IT-related cost)

This request does not include funding for any IT-related costs.

Will non-state funds be used to complete the project? How much, what fund source, and could the request result in matching federal, state, local or private funds?

Non-state funds will not be used to complete the project. None have been identified.

Describe how this project supports the agency's strategic master plan, contributes to statewide goals, or would enable the agency to perform better. Reference feasibility studies, master plans, space programming, and other analyses as appropriate.

The safety, teaching, and technology improvements in these laboratories directly supports WSU's strategic goals and Goal #1 of the Governor's Results Washington framework: Providing a world -class education for the future leaders of our global society. Modern facilities will also contribute to the recruitment and retention of top faculty and students.
Aligning with the University's strategic goal to provide a truly transformative student experience, high-enrollment core courses such as Biology 102 are prime opportunities to put modern tools in the hands of students to increase their collaborative critical-thinking skills and workforce readiness. Remodeling outdated laboratories to foster small-group collaborations and modern audio-visual tools will expand the University's teaching capabilities and improve both instructor-student and student-student communications.

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365 - Washington State University
Capital Project Request
2019-21 Biennium
*

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Project Title: Washington State University Pullman - STEM Teaching Labs

Description

If the project is linked to the Puget Sound Action Agenda, describe the impacts on the Action Agenda, including expenditure and FTE detail. See Chapter 14.4 (Puget Sound recover) in the 2017-2019 Operating Budget Instruction.
This project is not linked to the Puget Sound Action Agenda.
Is there additional information you would like decision makers to know when evaluating this request?
Renovation of teaching laboratories will also contribute to significant program growth (both current and anticipated) for the building's primary resident unit, the School of Biological Sciences (SBS), which delivers one of the highest teaching loads of all WSU academic units. In addition to educating and training nearly 400 undergraduate majors and graduate students each year, SBS provides significant foundational instruction for core science requirements and for high-demand STEM degree programs across the University—including bioengineering, natural resource sciences, nursing, pharmacy, and all other healthcare professions.
Undergraduate students at WSU, particularly in high-demand disciplines, will significantly benefit from the Eastlick teaching lab renovations. Providing safe, modern, hands-on learning spaces will also contribute to the university's economic impact for the state and the nation by developing well-qualified, workforce-ready graduates.
*Refer also to the full project proposal document and supporting appendices.

Location
City: Pullman **County:** Whitman **Legislative District:** 009

Project Type
Remodel/Renovate/Modernize (Major Projects)

Growth Management impacts
WSU Pullman's physical planning policies are coordinated with many agencies and government units. The Growth Management Act and its companion Traffic Demand Management legislation and the State Environmental Policy Act, however, are applicable to WSU's physical facilities and programs. Growth Management Act (GMA)-WSU will coordinate with Counties and Municipalities throughout the State to ensure compliance with GMA. WSU will avoid construction or activities which would permanently impair "critical" areas on its campuses as they are defined in the GMA. Transportation Demand Management-A companion piece of legislation sets forth a policy for Transportation Demand Management in which the State of Washington will provide leadership. The Director of the State of Washington Department of General Administration (DGA) is required to develop a commute trip reduction plan for state agencies which are Phase I major employers WSU will conform to the plans developed by DGA. State Environmental Policy Act (SEPA)-WSU has adopted procedures set forth in the State Environmental Policy Act Handbook December 1988 and the State Environmental Policy Act Rules Chapter 197-11 Washington Administrative Code Effective April 4, 1984. Adherence to these procedures will be one of the principal means by which WSU coordinates its compliance with Growth Management requirements.

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Current Biennium	2019-21 Fiscal Period Reapprops	2019-21 Fiscal Period New Approps
057-1	State Bldg Constr-State	19,600,000				
062-1	WSU Building Account-State	5,900,000		1,000,000		4,900,000
	Total	**25,500,000**	**0**	**1,000,000**	**0**	**4,900,000**

		Future Fiscal Periods			
		2021-23	2023-25	2025-27	2027-29
057-1	State Bldg Constr-State	4,900,000	4,900,000	4,900,000	4,900,000

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365 - Washington State University
Capital Project Request
2019-21 Biennium

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Version: 10 2019-21 WSU Capital Budget Request

Report Number: CBS002
Date Run: 7/30/2018 1:45PM

Project Number: 30001326
Project Title: Washington State University Pullman - STEM Teaching Labs

Funding

	Future Fiscal Periods			
	2021-23	2023-25	2025-27	2027-29
062-1 WSU Building Account-State				
Total	**4,900,000**	**4,900,000**	**4,900,000**	**4,900,000**

Schedule and Statistics

	Start Date	End Date
Predesign	08/01/2019	08/01/2019
Design	8/1/2019	2/1/2020
Construction	5/1/2020	6/1/2021

	Total
Gross Square Feet:	6,368
Usable Square Feet:	5,732
Efficiency:	90.0%
Escalated MACC Cost per Sq. Ft.:	459
Construction Type:	Laboratories
Is this a remodel?	Yes
A/E Fee Class:	A
A/E Fee Percentage:	13.74%

Cost Summary

		Escalated Cost	% of Project
Acquisition Costs Total		**0**	**0.0%**
Consultant Services			
Pre-Schematic Design Services		0	0.0%
Construction Documents		0	0.0%
Extra Services		24,549	0.5%
Other Services		10,785	0.2%
Design Services Contingency		47,820	1.0%
Consultant Services Total		**515,633**	**10.5%**
Maximum Allowable Construction Cost(MACC)	**2,924,892**		
Site work		0	0.0%
Related Project Costs		0	0.0%
Facility Construction		2,924,892	59.7%
GCCM Risk Contingency		0	0.0%
GCCM or Design Build Costs		0	0.0%
Construction Contingencies		292,489	6.0%

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365 - Washington State University
Capital Project Request
2019-21 Biennium

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Version: 10 2019-21 WSU Capital Budget Request

Report Number: CBS002
Date Run: 7/30/2018 1:45PM

Project Number: 30001326
Project Title: Washington State University Pullman - STEM Teaching Labs

Cost Summary

	Escalated Cost	% of Project
Construction Contracts		
Non Taxable Items	0	0.0%
Sales Tax	250,956	5.1%
Construction Contracts Total	**3,468,337**	**70.8%**
Equipment		
Equipment	415,223	8.5%
Non Taxable Items	0	0.0%
Sales Tax	32,387	0.7%
Equipment Total	**447,610**	**9.1%**
Art Work Total	**14,624**	**0.3%**
Other Costs Total	**54,096**	**1.1%**
Project Management Total	**399,453**	**8.2%**
Grand Total Escalated Costs	**4,899,753**	
Rounded Grand Total Escalated Costs	**4,900,000**	

Operating Impacts

No Operating Impact

Narrative

This is a lab upgrade and infrastructure project.

OFM

Capital Project Request

2019-21 Biennium

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Parameter	Entered As	Interpreted As
Biennium	2019-21	2019-21
Agency	365	365
Version	10-A	10-A
Project Classification	*	All Project Classifications
Capital Project Number	30001326	30001326
Sort Order	Project Priority	Priority
Include Page Numbers	Y	Yes
For Word or Excel	N	N
User Group	Agency Budget	Agency Budget
User Id	*	All User Ids

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Agency	Washington State University
Project Name	Washington State University Pullman - STEM Teaching Labs
OFM Project Number	30001326

Contact Information	
Name	Joanie Thomas
Phone Number	509-335-9027
Email	thomasjl@wsu.edu

Statistics			
Gross Square Feet	6,368	MACC per Square Foot	$426
Usable Square Feet	5,732	Escalated MACC per Square Foot	$459
Space Efficiency	90.0%	A/E Fee Class	A
Construction Type	Laboratories (Research)	A/E Fee Percentage	13.74%
Remodel	Yes	Projected Life of Asset (Years)	
Additional Project Details			
Alternative Public Works Project	No	Art Requirement Applies	Yes
Inflation Rate	3.12%	Higher Ed Institution	Yes
Sales Tax Rate %	7.80%	Location Used for Tax Rate	3812
Contingency Rate	10%		
Base Month	June-18		
Project Administered By	Agency		

Schedule			
Predesign Start	August-19	Predesign End	August-19
Design Start	August-19	Design End	February-20
Construction Start	May-20	Construction End	June-21
Construction Duration	13 Months		

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Project Cost Estimate

Total Project	$4,554,653	Total Project Escalated	$4,899,758
		Rounded Escalated Total	$4,900,000

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Agency	Washington State University
Project Name	Washington State University Pullman - STEM Teaching Labs
OFM Project Number	30001326

Cost Estimate Summary

Acquisition			
Acquisition Subtotal	**$0**	**Acquisition Subtotal Escalated**	**$0**

Consultant Services			
Predesign Services	$0		
A/E Basic Design Services	$282,825		
Extra Services	$23,500		
Other Services	$137,066		
Design Services Contingency	$44,339		
Consultant Services Subtotal	**$487,731**	**Consultant Services Subtotal Escalated**	**$515,636**

Construction			
Construction Contingencies	$271,200	Construction Contingencies Escalated	$292,490
Maximum Allowable Construction Cost (MACC)	$2,712,000	Maximum Allowable Construction Cost (MACC) Escalated	$2,924,892
Sales Tax	$232,690	Sales Tax Escalated	$250,956
Construction Subtotal	**$3,215,890**	**Construction Subtotal Escalated**	**$3,468,338**

Equipment			
Equipment	$385,000		
Sales Tax	$30,030		
Non-Taxable Items	$0		
Equipment Subtotal	**$415,030**	**Equipment Subtotal Escalated**	**$447,611**

Artwork			
Artwork Subtotal	**$14,624**	**Artwork Subtotal Escalated**	**$14,624**

Agency Project Administration			
Agency Project Administration Subtotal	$237,378		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$370,378**	**Project Administation Subtotal Escalated**	**$399,453**

Other Costs			
Other Costs Subtotal	**$51,000**	**Other Costs Subtotal Escalated**	**$54,096**

Project Cost Estimate			
Total Project	**$4,554,653**	Total Project Escalated	**$4,899,758**
		Rounded Escalated Total	**$4,900,000**

Cost Estimate Details

Acquisition Costs					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Purchase/Lease					
Appraisal and Closing					
Right of Way					
Demolition					
Pre-Site Development					
Other					
Insert Row Here					
ACQUISITION TOTAL	**$0**		**NA**	**$0**	

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Cost Estimate Details

Consultant Services				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Pre-Schematic Design Services				
Programming/Site Analysis	$0			
Environmental Analysis	$0			
Predesign Study	$0			
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0365**	**$0**	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	$282,825			69% of A/E Basic Services
Other	$0			
Insert Row Here				
Sub TOTAL	**$282,825**	**1.0446**	**$295,440**	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	$0			
Geotechnical Investigation	$0			
Commissioning	$15,000			
Site Survey	$0			
Testing	$8,500			
LEED Services	$0			
Voice/Data Consultant	$0			
Value Engineering	$0			
Constructability Review	$0			
Environmental Mitigation (EIS)	$0			
Landscape Consultant	$0			
Other				
Insert Row Here				
Sub TOTAL	**$23,500**	**1.0446**	**$24,549**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$127,066			31% of A/E Basic Services
HVAC Balancing	$10,000			
Staffing	$0			
Other				
Insert Row Here				
Sub TOTAL	**$137,066**	**1.0785**	**$147,827**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$44,339			
Other				
Insert Row Here				
Sub TOTAL	**$44,339**	**1.0785**	**$47,820**	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	**$487,731**		**$515,636**	

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Cost Estimate Details

Construction Contracts				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Site Work				
G10 - Site Preparation	$0			
G20 - Site Improvements	$0			
G30 - Site Mechanical Utilities	$0			
G40 - Site Electrical Utilities	$0			
G60 - Other Site Construction	$0			
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0607**	**$0**	
2) Related Project Costs				
Offsite Improvements	$0			
City Utilities Relocation	$0			
Parking Mitigation	$0			
Stormwater Retention/Detention	$0			
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0607**	**$0**	
3) Facility Construction				
A10 - Foundations	$0			
A20 - Basement Construction	$0			
B10 - Superstructure	$0			
B20 - Exterior Closure	$0			
B30 - Roofing	$0			
C10 - Interior Construction	$178,000			
C20 - Stairs	$0			
C30 - Interior Finishes	$135,000			
D10 - Conveying	$0			
D20 - Plumbing Systems	$128,000			
D30 - HVAC Systems	$2,050,000			
D40 - Fire Protection Systems	$18,000			
D50 - Electrical Systems	$113,000			
F10 - Special Construction	$0			
F20 - Selective Demolition	$15,000			
General Conditions	$75,000			
Other				
Insert Row Here				
Sub TOTAL	**$2,712,000**	**1.0785**	**$2,924,892**	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	**$2,712,000**		**$2,924,892**	

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7) Construction Contingency				
Allowance for Change Orders	$271,200			
Other				
Insert Row Here				
Sub TOTAL	**$271,200**	**1.0785**	**$292,490**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0785**	**$0**	
Sales Tax				
Sub TOTAL	**$232,690**		**$250,956**	
CONSTRUCTION CONTRACTS TOTAL	**$3,215,890**		**$3,468,338**	

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Cost Estimate Details

Equipment				
Item	Base Amount	Escalation Factor	Escalated Cost	Notes
E10 - Equipment	$85,000			
E20 - Furnishings	$300,000			
F10 - Special Construction	$0			
Other				
Insert Row Here				
Sub TOTAL	**$385,000**	**1.0785**	**$415,223**	
1) Non Taxable Items				
Other	$0			
Insert Row Here				
Sub TOTAL	**$0**	**1.0785**	**$0**	
Sales Tax				
Sub TOTAL	**$30,030**		**$32,388**	
EQUIPMENT TOTAL	**$415,030**		**$447,611**	

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Cost Estimate Details

Artwork				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
Project Artwork	$0			0.5% of Escalated MACC for new construction
Higher Ed Artwork	$14,624			0.5% of Escalated MACC for new and renewal construction
Other				
Insert Row Here				
ARTWORK TOTAL	**$14,624**	**NA**	**$14,624**	

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Cost Estimate Details

Project Management				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
Agency Project Management	$237,378			
Additional Services				
Onsite Supervision	$133,000			
Insert Row Here				
PROJECT MANAGEMENT TOTAL	**$370,378**	**1.0785**	**$399,453**	

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Cost Estimate Details

Other Costs				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
Mitigation Costs	$0			
Hazardous Material Remediation/Removal	$51,000			
Historic and Archeological Mitigation	$0			
Other				
Insert Row Here				
OTHER COSTS TOTAL	**$51,000**	**1.0607**	**$54,096**	

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C-100(2018)
Additional Notes

Tab A. Acquisition

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Tab B. Consultant Services

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Tab C. Construction Contracts

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Tab D. Equipment

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Tab E. Artwork

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Tab F. Project Management

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Tab G. Other Costs

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