PREDESIGN DOCUMENT

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OLYMPIC COLLEGE

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I. EXECUTIVE SUMMARY

View of Building 12 from Lincoln Ave to the west

Introduction

Olympic College in Bremerton performs a critical role in providing STEM education in the regions of Kitsap and Mason Counties. Since its founding in 1946, Olympic College's initial purpose was to educate and serve veterans post World War II, due to its proximity to the Naval Shipyard. Now, Olympic College provides necessary technology-based education that subsequently contributes to the local job markets in Cybersecurity, Data Informatics, Digital Humanities, Virtual Reality, and STEM (Science, Technology, Engineering, & Math) related fields. The Innovation and Technology Learning Center (ITLC) is essential to provide the additional spaces needed to accommodate increased enrollment and in turn, meet the occupation demand in these fields. The ITLC is a hub centered around STEM learning for current students and university and community partnerships. Currently, technology-focused courses take place in Building 12 (the Business & Technology Building) on campus. Constructed in 1968, Building 12 includes the Division Office, Classrooms, Computer Labs, and an Electronics Lab.

Serving a Need

Projected population growth in Kitsap and Mason Counties, thanks in part to improved commute opportunities from the Kitsap Fast Ferries, have the potential to impact enrollment growth at Olympic College in Bremerton. As the home of multiple Department of Defense (DOD) and National Security facilities, growth and demand in STEM jobs has improved by 72% in Kitsap and Mason counties, increasing local demand in National Security and Defense and Engineering occupations. Olympic College will continue to remain competitive in these academic fields to give local residents, veterans, K-12 students, and active military employees the necessary opportunities to achieve these jobs. They continue to build upon their extensive history of educating and serving veterans, who make up 14% and 17% of Mason and Kitsap Counties, respectively.

Partnerships with Washington State University (WSU) and Western Washington University (WWU), are important to the region as they provide pathways for students to seamlessly move from Olympic College to baccalaureate institutions. Engineering students can earn their Associate of Science - Track 2 at Olympic College and transfer as juniors to the WSU Engineering Program at the Bremerton campus. Computer Information System students can earn their Associate in Applied Science - Transfer Degree in Information Technology-Security at Olympic College and transfer as juniors to the Bachelor of Science in Cybersecurity. These current student pathways will be enhanced by establishing the new Innovation and Technology Learning Center.

Increasing Laboratories and Capabilities

The existing Building 12 includes Computer Labs, Classrooms, Offices, and Multifunctional Support Space. The 12,548 SF building split between two floors is severely undersized to meet growing enrollment and demand. The existing Mockup Data Center Lab has server racks between two different areas and not enough dedicated working space in the adjacent server room. The AR/VR room has insufficient area, circulation, and storage for multiple students to use at once. The Division Office is on the ground level in a non-central location. No informal study or breakout spaces exist since the sole area for socializing is a small conference/break room. The lack of sufficient space for projected STEM enrollment and faculty necessitates a new building that acts as a central hub on campus for STEM. With a close adjacency between the ITLC and Building 12, expansion and cross-disciplinary courses can grow and remain connected. The new facility will offer space for the College to expand labs for Engineering and Computer Information System students, with the goal of increasing Olympic College enrollments and graduates. The increases will lead to more students transferring to regional universities, such as WSU and WWU.

Project Overview

Several alternatives were considered as part of Olympic College's decision for the ITLC project.

<u>No Action</u> - Existing learning environments on campus do not support the development of students with cross-disciplinary, lifelong skills that employers seek today. The College does not have adequate space or technology required to teach the growing demand for Cybersecurity, Data Informatics, Computer Information Systems, and Computer Information Systems Security. If no action is taken, the College will be unable to meet regional demand for STEM-educated workers due to a lack of lab spaces tailored to these needs. In addition, the College's outreach to underserved populations will be negatively impacted. As the only college in North Mason and Kitsap counties, it will not meet the higher education needs of an already underserved population. However, by not constructing a new building, the College will not experience added disruption to traffic flow around the campus or the added costs of operations and maintenance. Current programming will continue as it has, as well as continued development of relationships with partners, albeit much more slowly.
No Action estimate of probable cost: $ 0.00

Innovation & Technology Learning Center

Legend:
2 - Sophia Bremer Child Development Center (SBCDC)
3 - Health Occupations (HOC)
4 - Humanities & Student Services (HSS)
5 - College Service Center (CSC)
6 - Haselwood Library (HL)
7 - College Instruction Center (CIC)
8 - Science & Technology (ST)
9 - Physical Education (PED)
10 - Bremer Student Center (BSC)
11 - Rotunda & Engineering (RO & ENG)
12 - Technical & Business (TEC & BUS)
14 - Weld Shop (SHP)
15 - Facilities Services (FSB)
16 - Residence Hall (RES)
17 - Roberts B. Stewart Engineering (RBS)
18 - Electrical Engineering (EE)

Preferred alternative overall plan

Leased Space - A lease option requires leasing two existing buildings in the greater Bremerton area and renovating the spaces to house the ITLC program. The closest leasable options with adequate square footage are across the Port Washington Narrows, requiring students and faculty to shuttle between the leased facilities and existing spaces on campus. Although initial costs for lease will be less than the cost of new construction, over a ten-year cycle a lease model will cost more than the cost of a new building and the College will not have the advantage of the equity and flexibility of ownership.
Leased Space estimate of probable cost: $11,227,062 initial project cost + $603,000 annual rent in 2022 dollars (annual cost will escalate)

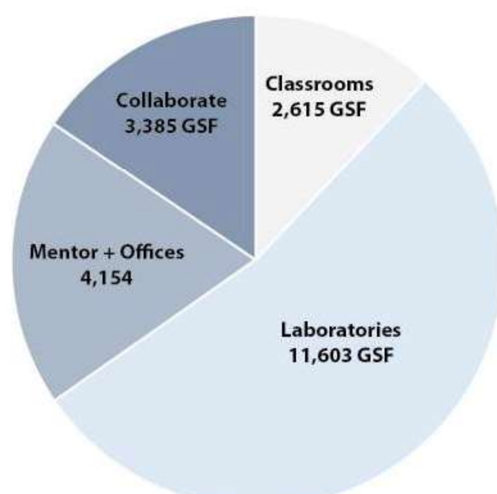
New Construction - A new 21,760 GSF building is constructed on a site across the street from Building 12, the current Business and Technology building. The two-story building would house new STEM-focused lab spaces, faculty offices, and collaboration spaces. Impacts to consider with this alternative include temporary disruption of campus traffic flow, uncertainty associated with future post-pandemic enrollments, and uncertainty of new partnerships.
New Construction estimate of probable cost: $16,866,537

This predesign provides a comprehensive solution to address the space needs for the new ITLC with a building organization and site response that balances the practical needs of a growing campus while minimizing disruption to campus activities, and aligning with the goals and intent of the Facilities Master Plan. While other alternatives of no action and leasing options were investigated, the Preferred Alternative presents a solution that unifies the campus with a comprehensive approach for building adjacency to the existing Building 12 and campus green space.

The Preferred Alternative for New Construction provides students and staff with dedicated laboratory, office, and multifunctional support spaces, with ample area to meet increased enrollment and allow for cross-disciplinary uses throughout STEM courses. By contrast, the No Action Alternative does not achieve this improvement. The proposed new ITLC building entry at the northeast end of the site allows for an ease of transition from Building 12 and the main campus green space into the ITLC. The connection between existing outdoor and proposed interior common areas creates a network of gathering spaces for students and faculty, providing flexible areas adapted to meet the needs of in-session classes and community outreach.

The Leased Space Alternative, which would require use of multiple additional buildings, does not support comparable connectivity of programs, flexibility, or relationship with resources already established on the main campus. The Preferred Alternative was determined to provide the most cost-effective and comprehensive response to current and projected capacity needs, purpose-built space, cross-disciplinary program connectivity, and core campus presence to attract potential local business partnerships. Refer to *Section 4A* and *Appendix B* for detailed information regarding the Preferred Alternative project program.

This predesign is occurring at a crucial point in the anticipated timeline and phasing of the Facilities Master Plan since it is behind schedule due to challenges such as COVID-19 and resulting supply-chain issues. This project plays an integral role in initiating extensive developments on campus since it is the first capital priority project for the College.



Preferred Alternative Program Distribution GSF

Space Name	Total NSF	GSF (x65%)	New Workstations
CLASSROOMS			
Classroom	1,500	2,308	48
Storage	200	308	
Subtotal Classroom	**1,700**	**2,615**	**48**
LABORATORIES			
Cyber Range Lab + Mock Up Data Center Lab	3,024	4,652	64
Small Projects Lab	1,008	1,551	18
MakerSpace 1	1,344	2,068	24
MakerSpace 2	672	1,034	6
Engineering Lab 1	1,344	2,068	24
Lab Storage	150	231	
Subtotal Laboratory Space	**7,542**	**11,603**	**136**

Space Name	Total NSF	GSF (x65%)	New Workstations
MENTOR + OFFICES			
Faculty Offices (quantity: 15)	1,500	2,308	15
Multifunctional Support Space	400	615	
Division Office	800	1,231	4
Subtotal Office Space	**2,700**	**4,154**	**19**
COLLABORATE			
Informal Student Study	800	1,231	
Open Breakout	600	923	
Meeting/Conference	400	615	
Team Rooms	400	615	
Subtotal Office Space	**2,200**	**3,385**	**-**
TOTAL	**14,142**	**21,757**	**203**

Preferred Alternative Program summary table

Project Target Cost Summary

Project costs have been prepared based on conventional cost estimating systems. Construction cost estimation commonly involves data from similar prior projects and applies those costs to the proposed project, allowing for factors such as adjustments in location, scope, and construction timeline. The estimate facilitates budgetary and feasibility determinations and develops a project budget based on historical information with adjustments made for specific project conditions. Project information required for cost estimates at this level might typically include a general functional description, schematic layout, geographic location, size expressed as building area, and intended use. A design contingency allows for the fact that projects often contain more elements when fully designed than could have been anticipated earlier in the design process.

The preliminary project schedule proposes design and documentation services starting in August 2022 with construction funding becoming available in July 2023. The project is anticipated to reach an adequate level of development of Construction Documents for construction permit application in October 2023. Considering the City of Bremerton's initially anticipated timeframe for construction permit review and issuance, construction is scheduled to begin in August 2024 and will be completed in December 2025, lasting 16 months.

The maximum allowable construction cost (MACC) is $16,866,537. The total project cost involves other fees such as consultant services, construction, equipment, and artwork, and it is $25,038,000. A total of $24,255,000 of capital funding is being requested and Olympic College has committed to securing the additional project funding as well as demolition funding from private industry.

The request for construction funding is anticipated to include an increase for lost buying power since the original Project Request Report was completed. Without the requested 15.8% lost buying power, Olympic College faces several risks. The additional funding would help maintain or perhaps restore originally programmed space lost to increased costs resulting from inflation and supply chain and related issues, and protect the current student-to-faculty ratio ideal for learning in these programs. This would fulfill Olympic College's mission of providing a quality education in programs essential to local industries, and the College's vision of providing opportunities to expand community relationships through the accessibility of the facility to our communities and partners to encourage innovative thinking and creative, scientifically focused entrepreneurship.

If Olympic College is unable to receive the added lost buying power and must rely solely on the existing funds plus the added $800,000 in funds committed by the College, the project risks losing physical program building area, which would jeopardize the student-to-faculty ratio and disrupt students' educations. In order to stay within budget, the project has already undergone a significant reduction in building area and programming since the original Project Request Report. Any further impact could cause the College to lose one or more programs, partnerships, or even the entire building.

Section 4 provides further information on the project schedule, and *Section 5* includes a detailed project budget analysis, the C-100 and the itemized cost estimate for the Preferred Alternative. Refer to *Appendix C* for the OFM Life Cycle Cost Analysis. Refer to the Cost Summary Table below for an overview.

Consultant Services	*$4,157,000*
Construction	*$19,340,000*
Equipment	*$1,385,000*
Artwork	*$84,000*
Other Costs	*$71,000*
Total Project Cost	***$25,038,000***

Occupancy Date	***January 2026***

Cost Summary

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Olympic College

2. PROBLEM STATEMENT

View of HSS Building from the Southeast

A. PROBLEM STATEMENT

Kitsap and Mason counties have a high unmet demand for workers trained in Cybersecurity, Software Development, and STEM (Science, Technology, Engineering, & Math). For Cybersecurity and Software Development occupations, new Emsi reports state there is "Aggressive Job Posting Demand Over a Thin Supply of Regional Jobs." The number of job postings for Cybersecurity and Software Development is 96% higher in this region than the national average for one of comparable size, and the projected growth in demand is an increase of 13% and 20% for Kitsap and Mason counties by 2030, respectively. In STEM-related fields, the number of regional job postings is 100% higher than the national average in these two counties, with Engineering at 231% higher.

Olympic College in Bremerton is the only public institution of higher education serving the 334,000 residents of Kitsap and Mason counties, educating more than 13,000 students annually. It is the primary training source to meet the high regional job demand in STEM-related fields. Not only does Olympic College lack the teaching space or the specialized spaces needed to educate enough workers to meet this demand, but they also have a 24% shortage relative to the space allowance calculated for Olympic College in the Capital Analysis Model (CAM), which translates to a shortage of 27,880 net square feet. In addition to the lack of adequate space, the College's STEM-related programs are dispersed throughout the campus without a core. It is fundamental for the College to have a central gathering space for STEM to highlight the programs within the College and for successful outreach to the underserved local population. Funding for the project will provide additional space and a central hub for STEM-related programs for the College to meet the regional demand for skilled workers.

The Innovation and Technology Learning Center (ITLC), a new 21,760 GSF cross-disciplinary STEM-focused building, provides purpose-built teaching spaces to educate more students in high-demand fields. The facility is a core location for STEM-related activities that foster outreach within the College and out into the community, enabling Olympic College to address the high demand for skilled workers in the region.

Olympic College Campus, Bremerton

B. STATUTORY REQUIREMENTS AND OTHER DRIVERS

The need for this project is driven by the factors below:

Enrollment Demand
Enrollment at Olympic College is projected to increase in the coming years due to population growth in the surrounding communities. According to the Kitsap and Mason County Comprehensive Plans, Kitsap County will grow by 32%, and Mason County will grow by 34% from 2016 to 2036. This regional growth will lead to an increase in enrollment at Olympic College. The State Board forecasts an enrollment increase of 7% in new FTEs from Fall 2019 to 2029, which would bring the total enrollment to 5,437 FTEs. Currently, Olympic College does not have the space to support this enrollment demand, which is illustrated in the 24% space shortage shown in the CAM. Departmental growth projections are discussed in greater detail in section 4B of the report. The new ITLC building will help reduce the shortage of teaching space on campus and provide learning environments tailored to the needs of STEM courses.

Learning Environments
The Olympic College Bremerton campus does not have an adequate amount of teaching space that specifically address the needs of STEM curricula. An epicenter for STEM does not exist on campus, but instead, classes are dispersed throughout. A central hub for the STEM curriculum will create a place for students to gather and enable the valuable chance interactions that help students to develop communication, critical thinking, and collaboration skills.

Cybersecurity, Software Development, and Engineering are fields in high demand in which Olympic College is working to increase enrollment. However, to do so, additional labs are needed to provide the right kind of space and equipment for these courses. The new ITLC building will contain program-specific learning spaces such as a combined Cybersecurity Range and Mockup Data Center Lab, two Makerspaces, a Small Projects Lab with AV/VR facilities, an Active Learning Classroom, and an Engineering Lab focused on training in Electrical Engineering. The College is in the process of pursuing certification to become a DHS/NSA Center of Academic Excellence in Cyber Defense (CAE-CD), a designation that requires a dedicated teaching space with specific equipment. The certification has the potential to draw additional students to the College since it will be the only certified program in the county. Eleven certified programs exist in Washington State and all are located east of Puget Sound. This certification creates a pipeline for qualified graduates into cyber defense occupations. The addition of these specialized teaching spaces is necessary for the College to provide the number and type of classes required to produce competitive candidates for STEM-related fields. The new building will also include Informal Student Study and Open Breakout spaces that foster the vibrant energy envisioned in this building. Having more areas to cultivate student socialization and relationships is another key factor for students to stay enrolled and graduate from degree programs. These informal and flexible spaces are an opportunity for interdisciplinary collaboration and outreach initiatives. The new ITLC building will facilitate more outreach from within the College and also throughout the region.


Students at Olympic College

Underserved Populations
Further outreach to K-12 students and veterans in the surrounding communities could provide vital opportunities for these underserved populations. With a high school graduation rate of 95% in Kitsap County and 90% in Mason County, it's notable that only 34% and 18% of the population has a Bachelor's Degree or higher in Kitsap and Mason Counties, respectively. This illustrates that a large population in the region is qualified to move on to higher education but often does not, so outreach programs will make a significant impact. Within these counties, there is a sizable veteran population: veterans make up 17% of Kitsap and 14% of Mason County.

Olympic College's mission is to enrich its diverse communities through quality education and support so students achieve their educational goals. The College plans to increase investment in K-12 school and veterans outreach programs to expose the community to STEM activities and provide an earlier start for STEM education, and the new ITLC building plays an important role. As the STEM hub on campus, the new building functions as a showroom to demonstrate Olympic College's vision as a life enhancing journey of discovery. Although some key outreach elements like tutoring, academic, and career counseling remain in their current locations, the ITLC building is a place where groups can meet to see and participate in STEM, sparking curiosity and interest. For example, the Makerspaces are designed to be visible, inviting, and flexible are also for community outreach classes or programs. The new ITLC building has the potential to help make a positive impact on neighboring underserved populations.

University Partnerships
Olympic College has several partnerships with nearby Washington State University (WSU) and Western Washington University (WWU). The new facility is key to enabling the College to fulfill its commitments to these partners. The partnership with WSU is a program that offers the second two years of instruction for a Mechanical Engineering B.S. and Electrical Engineering B.S. degree through WSU and is on the Olympic College campus in Bremerton. The partnership with WWU is a program that offers the second two years of instruction for a Cybersecurity B.S. and Environmental Science B.S. degree through WWU and is on the Olympic College campus in Poulsbo. Olympic College needs more dedicated STEM classrooms to meet the demand for the last two years of coursework for these partnerships.

C. RELATIONSHIP BETWEEN PROBLEM STATEMENT AND STATUTORY REQUIREMENTS

This project is driven by a critical need in Kitsap and Mason Counties that cannot be met with Olympic College's existing learning environments. In order to meet its commitment to lifelong learning, the practice of civil and constructive discourse with a respect for diversity, and the quest for community and environmental health, the College needs both additional square footage and different types of learning environments from what currently exists. There is no related statutory requirement; however, with this funding, Olympic College will deliver on providing a competitive STEM program that meets the needs of enrollment, job demands, and provides additional education for the local communities through outreach programs.

D. SOLUTIONS TO THE PROBLEM STATEMENT

The new cross-disciplinary STEM-focused building called the Innovation and Technology Learning Center (ITLC) is a centralized hub on the Olympic College campus. The new project provides specialized spaces that allow the College to educate students in high-demand fields, preparing them for STEM-related jobs such as Cybersecurity, Data Informatics, Digital Humanities, and Virtual Reality. The new building showcases STEM activities that help with the College's outreach efforts to nearby underserved communities. The new learning spaces are vital for fulfilling Olympic College's commitments to partner institutions, WSU and WWU.

The new 21,760 GSF ITLC building is organized around the four program categories below:

Laboratories
Over half of the new ITLC building consists of various types of STEM laboratories. The combined Cybersecurity Range and Mockup Data Center Lab is the largest laboratory in the ITLC. The lab has two classroom spaces that accommodate 32 students each. One room is set up in lecture format with a workstation at each seat, and the other is a collaborative active learning space. The two teaching spaces act independently or as one large classroom where students move freely from one activity to another. There are dedicated server rooms for the Cybersecurity Range and the Mockup Data Center Labs, allowing simultaneous use of each classroom.
An Engineering Lab focusing on Electrical Engineering allows Olympic College to increase course offerings in Electrical Engineering and is an essential part of the cross-disciplinary activity in the building.

A new Small Projects Lab that focuses on AR/VR provides a much-needed facility for courses that utilize these types of equipment and spaces. The current AR/VR space, as seen in the top-right image, lacks necessary space and circulation.

Two new Makerspaces accommodate the need for digital fabrication and other hands-on experiences. These Makerspaces are highly visible and provide an opportunity to showcase student work and can host student outreach.

Classroom

An Active Learning Classroom that accommodates up to 48 students for project-based courses provides a collaborative learning layout where students can sit in groups. The classroom is a flexible space for hybrid learning and reconfigures to hold more traditional lecture-based classes if needed.

Mentoring Spaces

A new Division Office for the Business and Technology department is in the ITLC. By being located near the front entry, the office will be a welcome center where people can go for help with orientation and questions. The current Division Office, as seen in the middle-right image, is tucked away in a hard-to-find location in Building 12, so the new office will increase the visibility of the Business and Technology departments.

An additional 15 Faculty Offices for STEM department faculty will ensure a cross-disciplinary faculty presence in the building and help meet a campus-wide need. Adjacent to the offices is a multi-functional support space for tutoring and advising.

Collaboration Spaces

An Informal Student Study area and Open Breakout Spaces provide much-needed space for student interaction and collaboration as well as a place to facilitate outreach. The existing informal student study lounge, as seen in the bottom-right image, is too confined and hidden from existing classrooms.

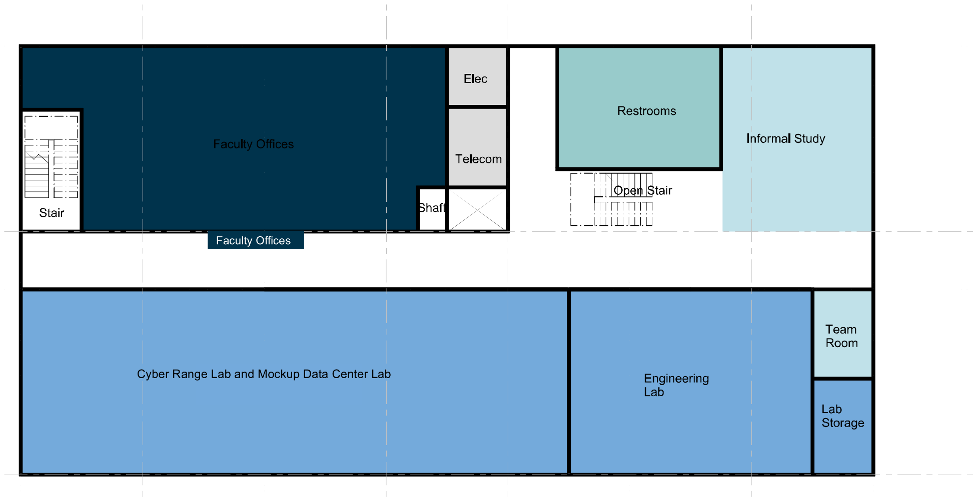
The new spaces in the ITLC building live along the primary circulation spine of the building to activate the common areas in the building and create an energetic hub for the campus. There will also be Conference and Team Rooms provide quieter collaboration spaces for more focused activities.

With these four programmatic components, the ITLC is a gateway for students to advance in STEM, reaching students within Olympic College and beyond. This facility is a critical component for meeting the regional demand for workers in STEM-related fields, greatly benefitting regional communities, industries, and economies.

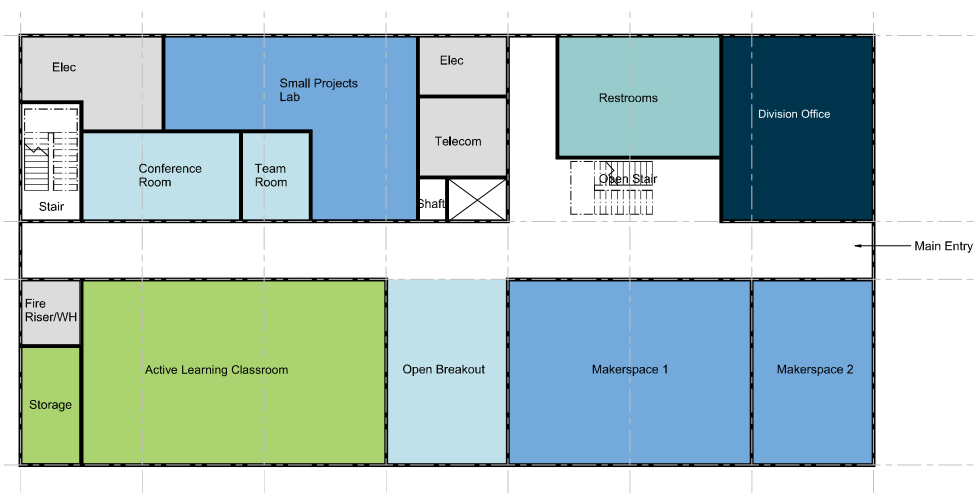
Existing AV/VR Space at Olympic College

Existing B+T Division Office at Olympic College

Existing Makeshift Informal Study Space at Olympic College



Solutions to the Problem Statement: Level 2 Diagram



Solutions to the Problem Statement: Level 1 Diagram

Legend:

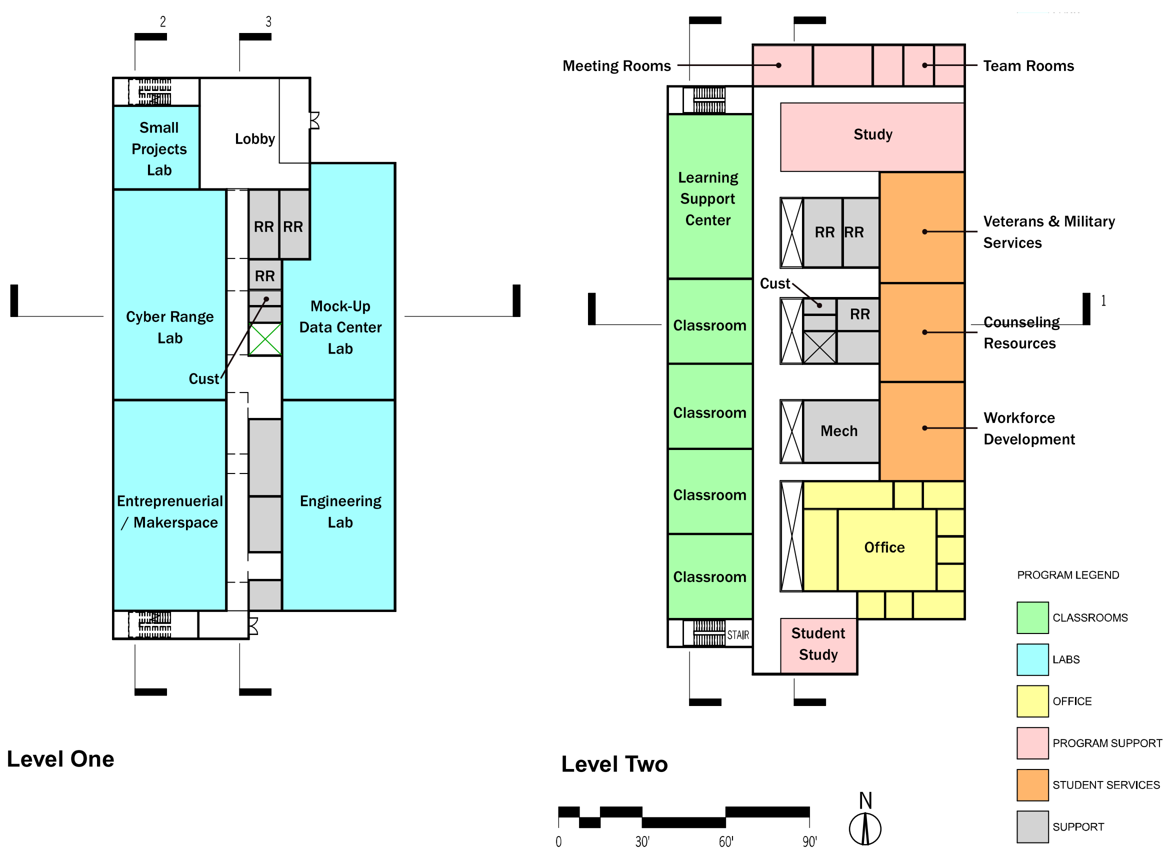
- Laboratories
- Classroom
- Mentoring Space
- Collaboration Space

E. PREVIOUS STUDIES

2019-2021 Project Request Report

A Project Request Report (PRR) was developed for the Washington State Board for Community and Technical Colleges in 2017/2018. The PRR outlined a 40,940 GSF building that included Active Learning Classrooms, a Student Study Zone, Student Support Centers, Offices, and an Innovation Center with various lab spaces. The PRR schedule proposed for design to begin in July 2019 and end in June 2021, then construction to start in July 2021 and end in April 2023. The current proposed start date for design is August 2022. This three-year delay combined with unprecedented inflation due to COVID-induced supply chain issues has dramatically reduced the buying power of the funding allocated for this project.

The gross square footage of the current proposed building is 21,760 GSF. Despite the size and scope reductions, the project retains the necessary core functions. The remaining Laboratories, Study Zone, and Faculty Offices in the Innovation Center are optimized to be efficient to the fullest extent. The laboratories, faculty presence, and spaces for students to gather are all key to the success of the building. The Active Learning Center is now one Active Learning Classroom, given the available classroom space elsewhere on campus. The dedicated Student Support spaces are no longer in the program; however, advising and tutoring will still be possible in Multifunctional Support Spaces like Conference Rooms, Team Rooms, Open Breakout, and Informal Student Study spaces.



Building Layout Studies from Project Request Report

2.4 PROGRAM AND RELATED SPACE TABLE

Program		ASF	GSF	New Workstations
CLASSROOMS				
ACTIVE LEARNING CENTER		11,780	18,124	
Active Learning Classrooms (4)	3,600			120
Classroom Program Storage	400			
STUDENT STUDY ZONE				
Informal Student Study	800			
Student/Faculty Interaction	200			
Open Breakout	600			
Meeting/Conference	600			
Team Rooms	480			
STUDENT SUPPORT CENTERS				
Learning Support Center	1,800			44
Veterans & Military Service Center	1,200			
Workforce Development Center	1,050			
Career Advising and Support Center	1,050			
LABS		12,900	19,847	
INNOVATION CENTER				
Cyber Range Lab	3,000			30
Mock-up Data Center Lab	3,000			30
Small Projects Lab	900			9
Entrepreneurial/Makerspace	3,000			30
Engineering Lab	3,000			30
OFFICES		1,930	2,969	
Faculty Offices and Support Spaces	1,930			
	Total	**26,610**	**40,940**	**293**
	Efficiency Ratio		65%	

There will be a total of 293 new student workstations including 129 lab stations and 164 classroom stations. Future utilization is calculated based on adding these new workstations.

	Contact Hours	Work Stations	Future Utilization (hours per week)
Classes	25,446.10	1,270	19.66
Labs	18,176.78	998	17.00
Campus	43,622.88	2,268	18.39

Program List from Previous Study: 2019-2021 Project Request Report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3. ANALYSIS OF ALTERNATIVES

View of Building 10 and new art installation

A. ALTERNATIVES CONSIDERED

The predesign effort considered No Action, Leased Space, and New Construction alternatives resulting in the selection of the Preferred Alternative: New Construction. Olympic College's need for a new STEM-focused facility, the Innovation & Technology Learning Center (ITLC), is the result of an inadequate amount of specialized STEM teaching space on the campus, demand for workers in STEM fields, and an opportunity to engage underserved populations in the region. The analysis of the alternatives factor in how well each solution functions as well as the expense of each solution.

Alternative 1: No Action - Current programming continues at its current capacity in existing facilities. No added cost is incurred for construction or operation and maintenance, but growth of Cybersecurity, Data Informatics, Digital Humanities, Virtual Reality programs and partnerships is constrained.

Alternative 2: Leased Space - Two existing buildings in Bremerton are leased and renovated. The location of available spaces for lease is disconnected from the core of the campus. Initial costs are less for a leasing alternative than new construction, but the long-term cost of leasing is higher than a new building.

Alternative 3: New Construction - A new building of increased size compared to current location is construction on campus across the street from Building 12, the current Business and Technology building. New construction entails temporary disruption of campus traffic flow, uncertainty associated with future post-pandemic enrollments, and uncertainty of new partnerships. However, the New Construction alternative is the most cost effective solution over the long term and the only solution that satisfies the need for space while providing the necessary functional adjacencies to existing departments on the Olympic College campus.

Alternative 1: No Action

Site Plan depicting No Action

A No Action Alternative does not provide new space for the College. Present-day space shortages at Olympic College combined with a 7% projected increase in future enrollment will result in increased space shortages in the future if a "No Action" approach is taken. Olympic College will be unable to provide the necessary classrooms, labs, offices, and social spaces to meet overall student demand. If no action is taken, the College will be unable to meet regional demand for STEM workers due to a lack of lab spaces tailored to these needs. In addition, the College's outreach to underserved populations will not be as effective. A No Action Alternative will have a negative impact on the College as well as the adjacent communities for years to come.

Alternative 2: Leased Space

Location of Leased Space Options

A Leased Space Alternative involves leasing two existing buildings in the greater Bremerton area and renovating the spaces to house the ITLC program. The closest leasable options with adequate square footage are across the Port Washington Narrows, requiring students and faculty to shuttle between the new facilities and existing spaces on Campus.

After accounting for the cost of renovation and ten years of lease payments plus expenses, this alternative would equal the cost of new construction. The ongoing annual payments would continue to be a burden for the College, resulting in a much higher long term cost. In additional to being more expensive over the long term, the Leased Space Alternative does not satisfy Olympic College's goals for the ITLC. This alternative would create an even more decentralized campus, when the goal is exactly the opposite; to create a centralized hub for STEM activity.

Alternative 3: New Construction

Site Plan depicting New Construction Option

A New Construction Alternative proposes a new 21,760 GSF building on a site across the street from Building 12, the current Business and Technology building. The two-story building would house new STEM-focused lab spaces, faculty offices, and collaboration spaces.

The predesign study has shown that a new construction approach is both the most functional and the most cost-effective solution to the space need problem at Olympic College. The ITLC building will be a showcase for STEM activity that not only meets the demand for needed specialized labs on campus, but also provides a STEM-focused hub for students and outreach to underserved populations in the surrounding community. The cost of the new building will be less than the Leased Space Alternative after only 10 years, resulting in a much less expensive project for the College in the long term. A new construction approach provides a necessary facility, on campus, that serves Olympic College and its neighboring community for the next 50 years and beyond.

Advantages/Disadvantages & Cost Estimates for Each Alternative

There is no provided estimate for the No Action Alternative. Cost Estimates for the Leased Space and New Construction Alternatives are below.

Leased Space

A Leased Space Alternative involves leasing space as close as possible to Olympic College that can accommodate the program. The leased space would need to be secured under contract and then renovated. The nearest available spaces for lease are two buildings on the other side of Port Washington Narrows that provide 24,423 SF of combined leasable space. Two buildings are necessary because there is no single building available that is close to campus and also large enough to accommodate the ITLC program. Because of the inefficiency of fitting the program into multiple existing floorplates, additional square footage will be needed to accommodate the same program.

The first two-level building at 1225 Campbell Way provides 8,342 SF of rentable space with an annual rate of $16/ SF, totaling $133,472 per year. The second location is a nearby three-level building at 2500 Cherry Pl with 16,081 SF of rentable space with an annual rate of $21/ SF, totaling $337,701 per year. These annual costs account for lease only, the estimated cost for utilities, insurance, tax, and maintenance is an additional $0.45/SF per month, totaling $131,884 per year for both properties. The total cost for Olympic College to lease both spaces plus the extra expenses would be $603,057 per year in 2022 dollars. If 3% inflation is assumed, the cost would be around $700,000 in five years and over $900,000 in ten years.

Renovation of the leased spaces is estimated to cost $435/ SF, totaling $10,624,000 for both locations. Renovation cost in addition to annual expenses will equal the same amount as the new construction option in approximately ten years. The transportation of students between the existing campus and the new facilities has not been included in the estimated cost, but a shuttle service would likely be needed, adding to the annual cost.

The lack of functionality is another reason the leased alternative is not a viable solution. This option would require students to travel between existing facilities on campus and the new leased buildings. In this case the new program

Map of driving route from building 12 to Leased Options

- - - - 1.6 mile drive to 1225 Campbell Way
- - - - 1.7 mile drive to 2500 Cherry Place

2500 Cherry Place

1225 Campbell Way

would be making the STEM departments at Olympic College even more decentralized instead of creating a central hub on campus. The leased space alternative is not a preferred option because it is not a functional solution plus it would cost the College more in after only ten years.

New Construction

The New Construction Alternative would provide a new 21,760 GSF building on the Olympic College campus directly across the street from Building 12, the existing Business and Technology building. The new ITLC is estimated to have a maximum allowable construction cost (MACC) of $16,866,537 escalated to the mid-point of construction.

OFM Life Cycle Cost Model

Analysis of life cycle cost issues is critical in any Predesign effort to ensure that the project will bring the best value in both initial and ongoing building costs. This Predesign used the Life Cycle Cost Analysis (LCCA) Model provided by OFM to create one Lease Option and one Ownership Option. The LCCA is in *Appendix C*.

The LCCA indicates that although the upfront cost of the leased space alternative is lower than the upfront cost of new construction, the ongoing costs would quickly equal that of the new construction and result in a future burden for the College. The LCCA shows that the New Construction Alternative is the best value option.

Schedule Estimates of Each Alternative

The preliminary schedule for the leased space alternative estimates that design could begin in August 2022 and construction could be complete by September 2024. The schedule assumes that leases are secured in July, and design would begin in August. The four month comprehensive design phase would be followed by a five month construction documents phase. Permitting and bidding would begin in May 2023, and construction would begin in March 2024 and be complete by September 2024.

The preliminary schedule for the new construction alternative estimates 16 weeks of schematic design beginning in August 2022, followed by 20 weeks of design development beginning in December of 2022. A 30 week construction documents and permitting phase would begin in May 2023 and bidding would be in June and July of 2024. A 16 month construction phase would begin in August of 2024 and be complete by December 31, 2025. The new construction alternative would take roughly a year longer to complete than the leased space alternative.

Alternatives	Advantages	Disadvantages	Anticipated Cost	Construction Schedule start | mid | end		
Alternative 1: **No Action**	No cost	Olympic College will be unable to meet current and projected increased demands of their STEM programs	$0	n/a	n/a	n/a
Alternative 2: **Leased Option**	Lower initial cost Project complete one year earlier	Continued annual expense of lease plus expenses Two additional facilities located far from campus; not a functional solution	$600,000 Annual Rent and expenses in 2022 dollars ($700,000 in 2027, $900,000 in 2032) + $10,600,000 first cost for renovation	Jul 01 2024	Feb 2025	Oct 31 2025
Alternative 3: **New Construction (Preferred)**	Less expensive for the College in the long term, as indicated in the LCCM Financial Analysis of Options. Close adjacency to Building 12 with current STEM classrooms Main location tied to campus that can fulfill university partnership commitments	Medium size building will occupy a prime lot on campus (which has a finite amount of space for future construction)	$16,806,097 Construction + $120,400 Annual Operating Costs (as calculated by OFM LCCM)	Aug 01 2024	April 2025	Dec 31 2025

Advantages and Disadvantages of each Alternative

LEASED SPACE ALTERNATIVE

Recurring Expenses	SF	$/SF/MONTH	ANNUAL COST ($/YEAR)
Lease Expenses			
1225 Campbell Way	8,342	16	133,472
2500 Cherry Pl	16,081	21	337,701
Additional Expenses (taxes, insurance, utilities, maintenance)			
	24,423	0.45	131,884
SUBTOTAL RECURRING COST (ANNUAL)			603,057

One-time Expenses	SF	$/SF	COST
Renovation Expenses			
Estimated cost to renovate leased spaces	24,423	435	10,624,005
SUBTOTAL ONE-TIME COST			10,624,005
TOTAL PROBABLE INITIAL PROJECT COST			**11,227,062**
PLUS ANNUAL COST (ANNUAL COST WILL ESCALATE)			**603,057**

Cost Estimate of Alternative: Leased Option

NEW CONSTRUCTION ALTERNATIVE

Item	Description		Total ($)
	Sitework		759,000
	Substructure		898,000
	Shell		4,555,000
	Interiors		1,771,000
	Services		3,652,000
	Equipment and Furnishings		357,000
SUBTOTAL DIRECT COST			11,992,000
Contingencies			
	Design & Estimating Contingency	10.00%	1,199,000
	Escalation Contingency	18.61%	2,231,000
SUBTOTAL SUBCONTRACT COST			15,423,000
General			
	General Conditions	11.08%	1,328,000
	Fee	2.75%	424,000
SUBTOTAL CONSTRUCTION COST			17,175,000
Permits, Insurances, Bonds, & Taxes			
	GC/CM P&P Bond	1.50%	258,000
	GL Insurance	1.25%	215,000
	Builder's Risk Insurance	0.50%	86,000
	B&O Tax, WA	0.47%	81,000
TOTAL PROBABLE CONSTRUCTION COST			**17,815,000**

Cost Estimate of (Preferred) Alternative: New Construction

4. DETAILED ANALYSIS OF PREFERRED ALTERNATIVE

View of Proposed Site from the Intersection of Ohio Ave and 15th Street, to the Northwest

A. NATURE OF THE SPACE

The Preferred Alternative is a new construction project providing a 21,760 GSF that is the Innovation and Technology Learning Center (ITLC) for the Olympic College campus. In an adjacent location to the existing Business & Technology (B&T) building, this alternative provides lab, office, and collaboration areas to students and faculty within STEM departments such as B&T, and Mathematics, Engineering, Sciences, & Health (MESH). The new spaces accommodate different learning and communication styles by supporting a cross-disciplinary environment. Additional partnerships with neighboring communities and universities create a new central hub for STEM-focused courses and activities.

The categories of spaces in the ITLC are Laboratories, Classrooms, Mentoring Spaces, & Collaboration Spaces, with the majority dedicated to Laboratories.

Laboratories

Multiple new laboratories address the needs of the B&T and MESH divisions as well as additional programs college wide. The combined Cybersecurity Range and Mockup Data Center Lab will be used primarily by the B&T division and is a requirement for the cybersecurity certification that the College is planning to pursue. The Small Projects Lab for AR/VR curriculum with be used by B&T and interdisciplinary projects throughout the College. The Electrical Engineering Lab will be used primarily by the MESH division. The two Makerspaces will be used by MESH, B&T and programs throughout the College. These additional laboratories are necessary for the projected growth of the College, as well as providing updated equipment and addressing space needs.

Classrooms

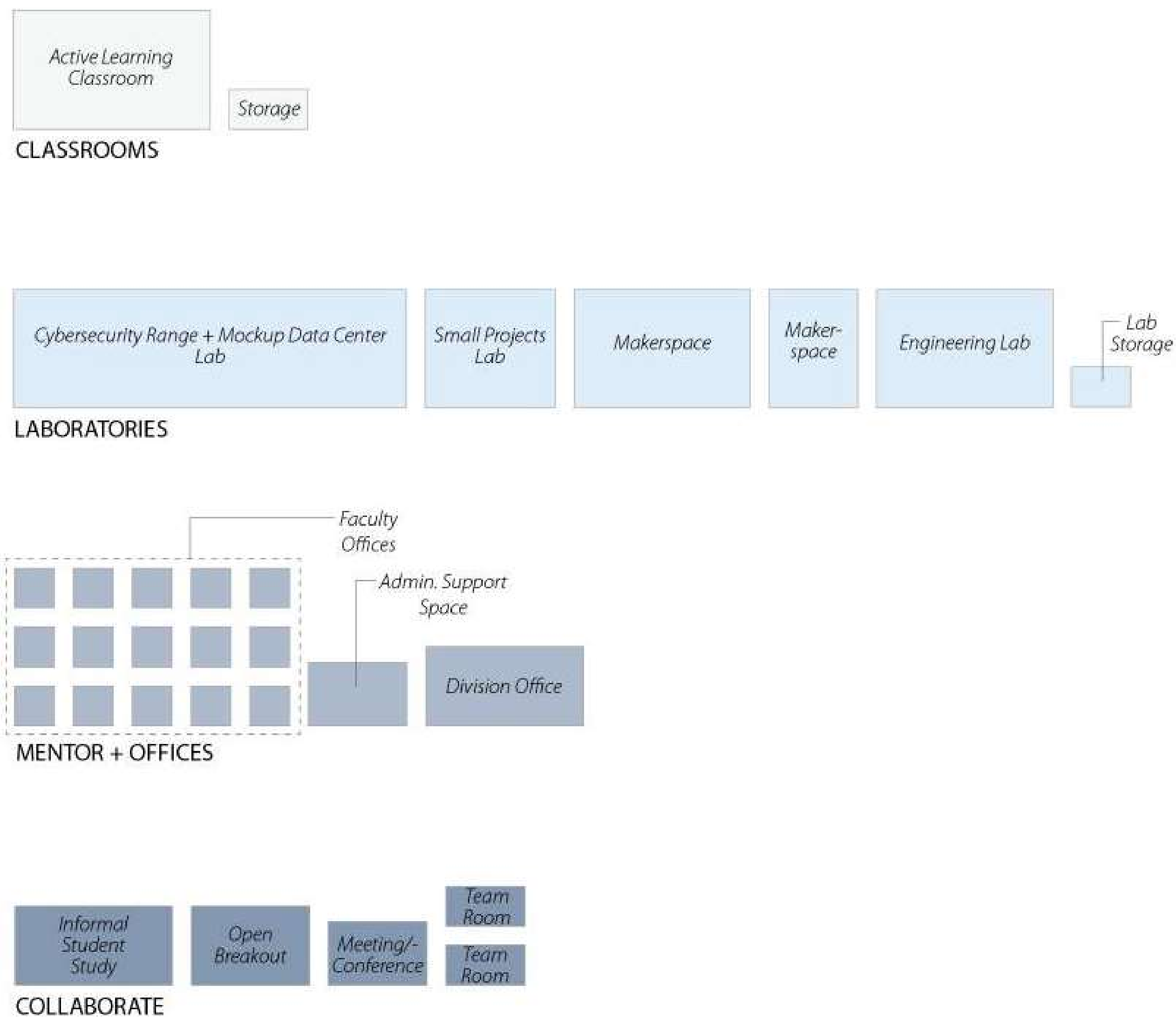
The new Active Learning Classroom is a multi-disciplinary space for up to 48 students and is accessible to many divisions and programs throughout the College. It is a flexible classroom set up as an active learning space and easily rearranges to allow for other teaching environments such as a forward-facing lecture space or a more collaborative environment. Currently, there is one Active Learning Classroom of comparable size on the Bremerton campus when there is a campus-wide need for more large-capacity classrooms. Contemporary learning spaces, like Active Learning Classrooms, facilitate different learning styles and environments necessary for specific courses and improved learning experiences.

Mentoring Spaces

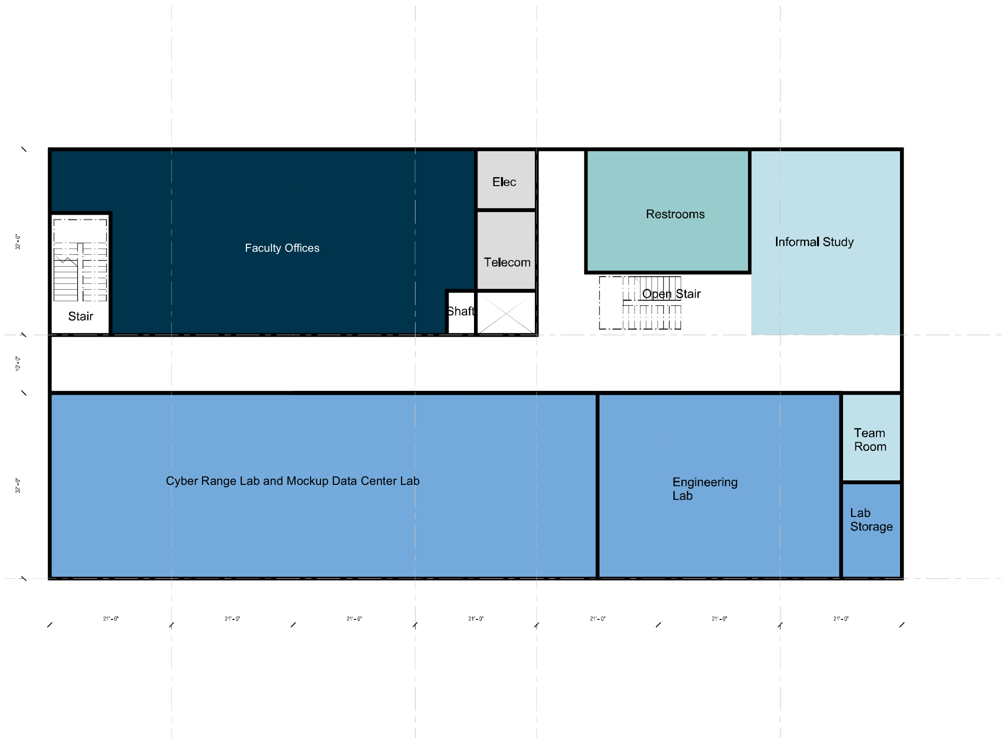
To help foster connections between students and faculty, private Faculty Offices, Multifunctional Support Space, and a Division Office exist in the ITLC. The Division Office is a welcoming and orienting area for people entering the building. New Faculty Offices create a closer adjacency to the new classrooms and accommodate the projected growth of the program in terms of FTEs. The Faculty Offices are arranged in an Office Suite to create a central location for staff to provide additional mentoring for students. Office Support Spaces, such as Kitchenettes and Copier Rooms, are available in the Office Suite and the Division Office.

Collaboration Spaces

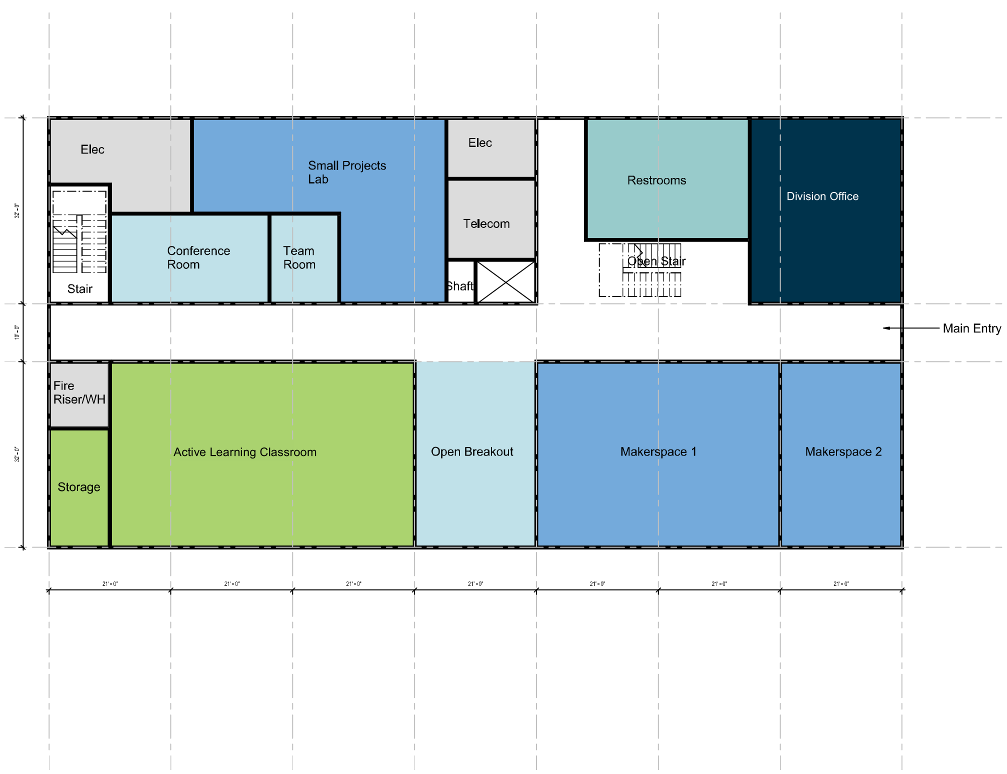
Both formal and informal study spaces will improve collaboration and socialization between students and faculty. Informal Student Study and Open Breakout Spaces throughout the building provide flexible areas for students and classes to gather and expand. Finally, Conference and Team Rooms will be used by both students and faculty, providing private areas for mentoring and meetings.



Program Blocking Diagram



Level 2 Diagram



Level 1 Diagram

Space						
	Space Name	NSF	No.	Total NSF	GSF (65% GF)	New Workstations
CLASSROOMS						
	Classroom	1,500	1	1,500	2,308	48
	Storage	200	1	200	308	
Subtotal Classroom				**1,700**	**2,615**	**48**
LABORATORIES						
	Cyber Range Lab + Mock Up Data Center Lab	3,024	1	3,024	4,652	64
	Small Projects Lab	1,008	1	1,008	1,551	18
	MakerSpace 1	1,344	1	1,344	2,068	24
	MakerSpace 2	672	1	672	1,034	6
	Engineering Lab 1	1,344	1	1,344	2,068	24
	Lab Storage	150	1	150	231	
Subtotal Laboratory Space				**7,542**	**11,603**	**136**
MENTOR + OFFICES						
	Faculty Office	100	15	1,500	2,308	15
	Multifunctional Support Space	400	1	400	615	
	Division Office	800	1	800	1,231	4
Subtotal Office Space				**2,700**	**4,154**	**19**
COLLABORATE						
	Informal Student Study	800	1	800	1,231	
	Open Breakout	600	1	600	923	
	Meeting/Conference	400	1	400	615	
	Team Rooms	200	2	400	615	
Subtotal Office Space				**2,200**	**3,385**	**-**
TOTAL				**14,142**	**21,757**	**203**

Program summary table

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B. OCCUPANCY NUMBERS

The ITLC building will include faculty from the Business & Technology (B&T), and Mathematics, Engineering, Sciences, & Health (MESH) divisions.

The B&T division currently includes 35 full-time faculty and is expecting one additional position, there are also 30 adjunct faculty, plus administrators. In the new building, 8 of the 15 faculty offices are dedicated to B&T faculty with two offices reserved for growth in this department. The B&T division office will move to the new building and will accommodate the B&T Dean, Assistant Dean, and two support staff.

The MESH division currently includes 35 full-time faculty, 45 adjunct faculty, plus administrators. In the new building, 4 of the 15 faculty offices will are dedicated to MESH faculty with one office reserved for growth in this department.

The growth offices for both departments will be used by adjunct faculty in the interim until they are filled. The most recent data on Olympic College shows that in the Fall of 2019 there were a total of 5,097 FTEs. That number is projected to grow to 5,437 by the Fall of 2029, which translates to 7% growth.

C. GENERAL BUILDING CONFIGURATION

The new ITLC is a two-story building with a total of 21,760 GSF. The Division Office is located on the ground floor near the main entry to help orient and welcome visitors. The Makerspaces have high visibility, showcasing the activities to people passing by. An Open Breakout area adjacent to the Makerspaces and Active Learning Classroom allows for either classroom to spill out into the space when needed. This flexible space is open to building circulation to help activate the first floor with collaboration between students, faculty, and outreach programs. The Active Learning Classroom, Small Projects Lab, Conference Room, and Team Room are also on the ground level for ease of access and functional adjacencies.

On level two, an Informal Study Area at the top of an open stair gives expansive views over the campus green space. This second type of open, flexible space is potentially quieter than the open breakout below but serves a similar function of welcoming multiple user groups and activating the building. The Cybersecurity Range and Mockup Data Center Lab, the Engineering Lab, a Team Room, and the Faculty Office Suite are also on level two. The Faculty Office Suite is in a quieter area of the building and includes a Multifunctional Support Space for tutoring, student advising, and faculty meetings.

Massing Diagram of Proposed ITLC Building on Site

D. SPACE NEEDS ASSESSMENT

Below is an outline of proposed space categories and their area-specific descriptions. The spaces include a Cybersecurity Range & Mockup Data Center Lab, Small Projects Lab for AR/VR, Electrical Engineering Lab, Active Learning Classroom, Faculty Office, Division Office, Conference Room, Team Rooms, Informal Student Study, and Breakout Spaces. During weekly calls, the final program and space allocations were developed in collaboration with a core user group. Refer to *Appendix B* for Room Data Sheets with additional information on each individual proposed program space.

Cybersecurity Range & Mockup Data Center Laboratory
A combined Cybersecurity Range and Mockup Data Center Lab accommodates the curriculum for both programs using one lab. Since there are no state guidelines for this type of space, the predesign team worked with the teaching faculty to determine the most efficient yet functional layout.

The lab consists of two defined spaces, one a lecture format with workstations at each seat and the other a more collaborative group work layout that includes equipment racks for hands-on learning inside the classroom. For the lecture format classroom, a 4' desk per student was determined to accommodate equipment such as computers and monitors for 32 students. The flexible design allows the labs to be used either for one class with students engaging in various activities or closed off to accommodate separate class sessions.

A dedicated server room for each lab contains necessary program-specific equipment such as four server racks and a network management workstation. It is critical to provide dedicated server rooms in order to keep required power and data connections separate.

On the right side of the page are images of the existing Mockup Data Center Lab illustrating the inadequacies of the existing classroom. The space is critically undersized for enrolled students and necessary collaboration. One of the two server racks is in the server room, while the other is in the primary classroom area, creating activity separation and muddled circulation. Olympic College currently does not have a classroom equipped for cybersecurity courses and enough dedicated space for an efficient server room.

In the Capital Analysis Model (CAM) this space falls into the "Computer Labs" category which was showing an overage in this type of space before adding the ITLC program. Despite

Existing Mockup Data Center Lab

Additional Server Rack in Existing Mockup Data Center Lab

Existing Adjacent Server Room for Mockup Data Center Lab making this overage higher, the team feels that this space is much needed by Olympic College. There is currently no space on campus where cybersecurity can be taught and the College cannot become certified in Cybersecurity without adding this space.

Small Projects Lab
Since there are no state guidelines for AR/VR classrooms, the predesign team reviewed AV/VR precedent spaces and worked with the teaching faculty to determine the most efficient and functional layout. The lab separates into three areas where the larger space is a VR Studio with computers and tables for collaborative group work. The two smaller rooms, the VR Room and Green Screen Room, open into the VR studio.

Currently, the single AR/VR space at Olympic College, in Building 12, is dysfunctional due to minimal open space, lack of storage, and a staircase blocking circulation into the room (refer to images on the right side of the page). A new adequately sized AR/VR space with proper equipment meets the needs of the curriculum and allows for larger class sizes.

Like the Cybersecurity Range, this space falls into the "Computer Labs" category of the CAM. Even though there is an overage in this category, it is clear from looking at the inadequate space where AV/VR classes are currently taught, that there is a need for a space equipped to teach this curriculum.

Engineering Lab
The design layout for the Electrical Engineering Laboratory applies best practices and industry standards for modular laboratory planning.

By utilizing the laboratory planning module as the basis for the structural grid design, it is possible to provide laboratory spaces unobstructed by columns. The laboratory planning module dimensions result from analyzing the laboratory bench space, equipment, and circulation space:

- The bench dimensions should accommodate technical workstations, instruments, and procedures.
- The spaces between benches are designed to allow people to work back-to-back at adjacent benches, allowing accessibility for disabled persons and movement of people and laboratory carts in the aisle.
- The module should provide adequate open space for floor standing equipment.

The recommended module is 10'-6" x 30' (or 32').

Existing AV/VR Space and Equipment

Existing AV/VR Space and Equipment

This lab falls into the "Science Lab" category of the CAM. Although there is an overage in this category of space, the team feels that an additional engineering lab is needed on campus and will be a key cross disciplinary element in the new building, helping to draw students from the MESH Division.

Active Learning Classroom

The Active Learning Classroom offers a flexible and modern learning environment. The moveable furniture and wall-mounted monitors create more options for collaboration depending on the class setup. The classroom accommodates up to 48 students at 44 SF/person. This new area helps meet a campus-wide need for large-capacity classrooms.

This space falls into the "General Classroom" category of the CAM which showed an overage of this type of space before the ITLC program was added. The CAM category does not take into account the capacity of each classroom and the team heard clearly from Olympic College faculty that there is a need for large capacity classrooms on campus.

Faculty Office + Support

Each new office is enclosed to accommodate one resident user, which is one faculty member. Each office is 100 SF to allow for necessary furniture and storage. The Faculty Offices are arranged in a suite to provide adjacency to a public collaborative environment, such as a Multifunctional Support Space, as well as office support spaces including a Kitchenette and Copier Room as per the OFM.

This space is categorized as "Faculty Office" in the CAM. There is a clear shortage of this type of space and the new building will help to reduce that shortage.

Division Office

The Division Office is an 800 NSF space to welcome and orient students and visitors. The suite includes a front waiting area with an open reception desk, two Faculty Offices, a kitchenette, and a copy area.

The current Division Office, as seen in the right side of the page, resides on the ground floor of Building 12 with an east-facing entrance toward campus. The entrance is located near a restroom in a covered corner of the building. There is vegetation blocking the view of the office entrance from the East. Inside the Division Office, is a small kitchenette that doubles as a janitor closet and storage. Access to improved natural daylight and wayfinding is in the new ITLC.

Entrance to Existing Division Office in Building 12

Existing Kitchenette and Janitor Closet in Division Office

Space Type	SF per User within the Space
Collaboration	20
Focus room/focus point	40
Conference	15
Training	25-35

OFM Workplace Strategies and Space Use Guidelines (RCW 43.82.055)

Space Type	SF per User
Office	100-150
Workstation	42-64
Mobile bench	24-36
Touchdown space	24

OFM Workplace Strategies and Space Use Guidelines (RCW 43.82.055)

The division office falls under the "Admin/Student Services" CAM category and the addition of this area is increasing a space overage in this category. Because of the poor quality and low visibility of the existing B&T division office and a desire to have an admin presence near the entry for orientation, the team feels that this program is needed. The increased overage in the CAM will also be temporary; the existing division office will be repurposed, likely as faculty offices (which still shows a shortage in the CAM), once the new building is completed.

Conference

A Conference Room provides a private area for any program with 405 NSF of space, allowing up to 27 people per the 15 SF/person requirement by OFM.

Informal Student Study

Informal Student Study allows students, visitors, and faculty to work and collaborate in a relaxed public environment making up a total of 800 NSF, helping activate public areas around classrooms and offices throughout the building.

Open Breakout Spaces

Open Breakout Spaces add 600 NSF of informal space to accommodate classroom spill-out and provide additional collaborative areas for students and faculty. Furniture could include a bench and flexible seating, moveable whiteboards, and wi-fi access will be available.

Both Open Informal Student Study and Open Breakout Spaces are categorized as Library/LRC in the CAM. The CAM shows a shortage of this type of space on campus, and these new spaces will help to reduce the shortage.

Project Narratives per Discipline

The project narratives below can be found in *Appendix D* and contain discipline-specific content:

- Civil
- Landscape
- Structural
- Lab Planning
- Mechanical
- Plumbing
- Telecommunications
- Electrical
- Acoustics

These narratives establish a benchmark for the scope of work of each discipline and correspond to the cost estimate. The future design team will validate the systems and approaches identified in this predesign with their design concept.

			2029 SPACE	2029 CAM	Before 40000103 SPACE DEFICITS		After 40000103 SPACE DEFICITS		Changes due to 40000103 SPACE DEFICITS		
TYPE OF SPACE	FAE CODING	FTE TYPE	AVAILABLE	ALLOWANCE	SHORTAGE	OVERAGE	SHORTAGE	OVERAGE	SHORTAGE	OVERAGE	COMPARISON
GEN. CLASSROOM	A1	1	59,206	26,255	0	32,951	0	34,651	0	1,700	Worse
BASIC SKILLS LABS (open)	A2	2	1,653	10,102	8,449	0	8,449	0	0	0	No Change
SCIENCE LABS.	B1	1	18,745	16,644	0	2,101	0	3,595	0	1,494	Worse
COMPUTER LABS. (open)	B2,B4,B5	2	26,526	23,923	0	2,603	0	8,651	0	6,048	Worse
ART	C1	2	9,112	6,000	0	3,112	0	3,112	0	0	No Change
MUSIC	C2	2	4,028	4,000	0	28	0	28	0	0	No Change
DRAMA	C3	2	4,514	5,000	486	0	486	0	0	0	No Change
VOCATIONAL SPACE	B3,D1,D2	N/A	0	0	0	0	0	0	0	0	No Change
Subtotal Instruction			**123,784**	**91,924**	**8,935**	**40,795**	**8,935**	**50,037**	**0**	**9,242**	**Worse**
AUDITORIUM	C4	2	5,965	9,000	3,035	0	3,035	0	0	0	No Change
LIBRARY/LRC	E1	2	28,081	51,120	23,039	0	21,639	0	(1,400)	0	Better
PHYS. EDUCATION	H3	2	30,160	32,920	2,760	0	2,760	0	0	0	No Change
FACULTY OFFICE	F1	2	23,456	33,107	9,651	0	7,751	0	(1,900)	0	Better
Subtotal Instructional Support			**87,662**	**126,148**	**38,485**	**0**	**35,185**	**0**	**(3,300)**	**0**	**Better**
Total Instructional Space			**211,446**	**218,071**	**47,420**	**40,795**	**44,120**	**50,037**	**(3,300)**	**9,242**	**Worse**
ADMIN./STU.SERV.	G1,G2	2	40,445	28,200	0	12,245	0	13,045	0	800	Worse
STU.CTR.& RELATED	H1,H2	2	28,095	42,070	13,975	0	13,975	0	0	0	No Change
C.STORES/MAINT.	I1	2	12,269	19,218	6,949	0	6,949	0	0	0	No Change
CHILD CARE	H4	2	3,440	12,852	9,412	0	9,412	0	0	0	No Change
MISCELLANEOUS	J,K,L,Z	N/A	0	0	0	0	0	0	0	0	No Change
Subtotal Student Service/Other			**84,249**	**102,340**	**30,336**	**12,245**	**30,336**	**13,045**	**0**	**800**	**Worse**
TOTAL CAM SPACE			**295,695**	**320,412**	**77,756**	**53,040**	**74,456**	**63,082**	**(3,300)**	**10,042**	**Worse**

CAM space needs comparison before and after ITLC

Innovation & Technology Learning Center

Legend:
2 - Sophia Bremer Child Development Center (SBCDC)
3 - Health Occupations (HOC)
4 - Humanities & Student Services (HSS)
5 - College Service Center (CSC)
6 - Haselwood Library (HL)
7 - College Instruction Center (CIC)
8 - Science & Technology (ST)
9 - Physical Education (PED)
10 - Bremer Student Center (BSC)
11 - Rotunda & Engineering (RO & ENG)
12 - Technical & Business (TEC & BUS)
14 - Weld Shop (SHP)
15 - Facilities Services (FSB)
16 - Residence Hall (RES)
17 - Roberts B. Stewart Engineering (RBS)
18 - Electrical Engineering (EE)

Campus Site Plan with ITLC

E. SITE ANALYSIS

Site Studies

A Site Survey is needed to understand the boundaries of the site and locations of services. A Geotechnical Report of the site is also needed to inform the type of foundation that would be appropriate as well as whether or not soil mitigation is necessary. This information is critical to accurately estimate the cost of the proposed building.

The existing structure on site will need to be demolished; however, the project budget does not cover the cost.

Location

The proposed site is on the western edge of Olympic College's Bremerton Campus in Kitsap County. The site area is north-bounded by 15th Street and Lincoln Ave is east with the existing Business and Technology (B&T) Building. The rest of the campus exists northeast of the site. The First Baptist Church-Bremerton is south and Ohio Avenue is west. The site is currently a surface parking area for faculty and staff of the College, with an existing small residential structure.
The site takes up three parcels and equals approximately 0.41 acres. The Kitsap County Parcel Numbers are 3797-002-016-0009, 3797-002-001-0006, and 3797-002-002-0005.

Topographically, there is a minimal slope from the south at a 191-foot height towards the northwest at 184 feet. The span of the site itself is relatively flat.

Kitsap County critical areas mapping claims no environmentally sensitive area exists on the designated site.

According to the USDA geological map data, the onsite soil primarily consists of Alderwood gravelly sandy loam, 0 to 8 percent slopes. It is moderately well-drained soil which indicates feasible infiltration exists on the site. A geotechnical investigation will be required to confirm existing conditions and the potential for onsite infiltration.

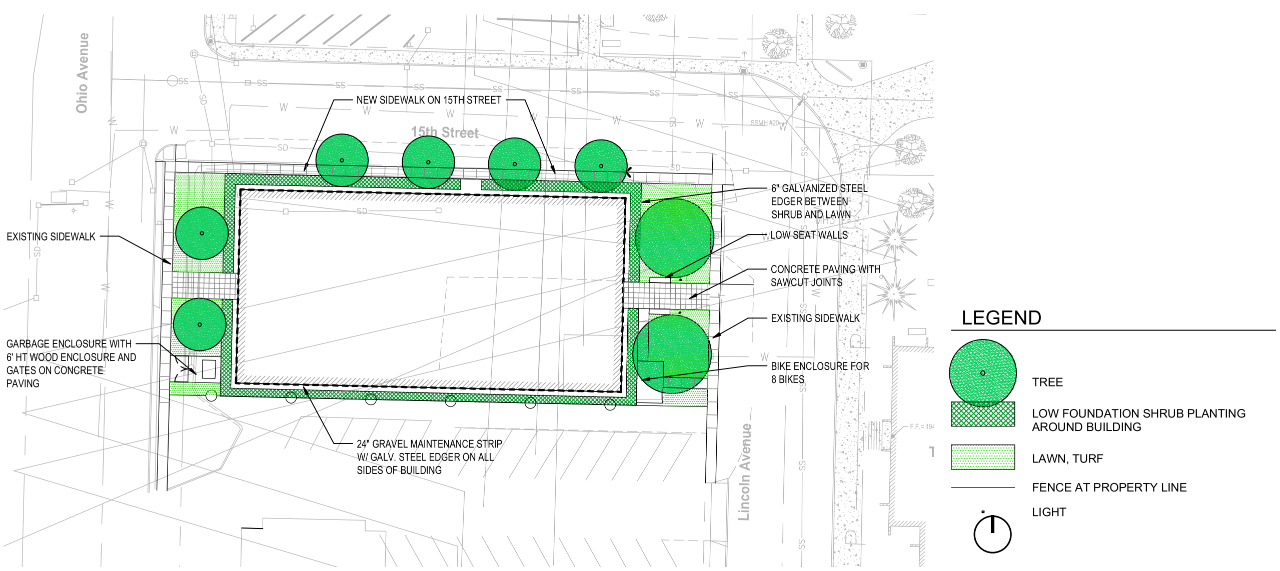
As per the City's municipal code, the institutional (INST) zone classification of both the campus and project area will support the continued operation and growth of Olympic College.

Building Footprint in Context

Existing Site Organization and Adjacencies

The proposed site provides a principal adjacency to the existing B&T building, which currently houses Faculty Offices and Computer Labs for the B&T division. By selecting a site across Lincoln Avenue, students and faculty will have easy access between both buildings and a communal hub on this edge of campus. Southeast of the site is a Makerspace in Building 14 that also creates a relationship with the new Makerspaces in the ITLC building. Towards the north is additional parking for faculty and staff, and the main campus green space to the northeast.

The site is currently a paved parking lot with an existing residential structure. There is full vehicle access around the site except to the south due to the First Baptist Church-Bremerton. One block further south is a Kitsap transit stop (on the corner of 13th Avenue and Lincoln Avenue). Allowing for the ITLC to have easy access by public transit. To the West, across Ohio Ave, is Bremerton High School.



Landscape Site Plan from Murase

Proposed Building Placement
The building placement needs additional study once schematic design begins; however, the building footprint will follow City requirements. Given the small, rectangular site, the building will likely have a long facade along 15th Street and a short facade along Lincoln Ave. The entry will be on the east side of the building facing the rest of campus.

Water Rights and Water Availability
The site resides in the City of Bremerton water service area. Based on utility maps provided by the City, there are water mainlines in Ohio Avenue, Lincoln Avenue, and 15th Street. The size of these existing mainlines is currently unknown and will require further coordination with the City; however, there are two mapped existing domestic water service lines and meters for the site from the Lincoln Avenue mainline system.

As there is existing water system infrastructure in the site area, utility extensions for domestic water service for the proposed development will not be required. The condition and capacity of the existing water service lines, as mapped by the City, will require confirmation to determine suitable reuse for the new facility.

Stormwater Requirements
Existing
City of Bremerton stormwater system mapping indicates existing on- and off-site stormwater infrastructure. The existing on-site stormwater infrastructure for the parking area consists of catch basins, utility holes, and piped conveyance. This on-site drainage system conveys and discharges runoff to the stormwater mains in Ohio Avenue and 15th Street. No eastern stormwater infrastructure exists under Lincoln Avenue. Although the City's mapping displays conflicting data that indicates both a dedicated storm system and a combined sewer system, based upon coordination with the City of Bremerton, there is a dedicated storm main in Ohio Street. This pipe directly outfalls to the Puget Sound and is exempt from Minimum Requirement # 7 of the 2019 SWMMWW; however, the City Engineering Standards cite runoff from the development must match pre-development rates with the intent of not putting the City's conveyance system over capacity.

Proposed
It is assumed that the drainage design developed for the project requires compliance with the Department of Ecology's 2019 Stormwater Management Manual for Western Washington, as currently adopted by the City of Bremerton.

Per the DOE 2019 SWMMWW, since the existing site exceeds the 35% threshold for existing impervious surface coverage, the project is considered a "Redevelopment." Based on the established criteria for redevelopment projects, the proposed development is subject to meeting all Minimum Requirements (MR #1 – MR #9) for the new and replaced hard surfaces and converted vegetation areas. This includes requirements for flow control (detention), water quality treatment, and On-Site Stormwater Management.

The majority of the existing site is impervious. It is anticipated that there may be a slight increase in the overall impervious area that may be required to be mitigated. For budgeting purposes, it is assumed that approximately 6000 SF of new impervious surface will need to be mitigated for flow control.

Site Ownership
Olympic College owns the proposed site and the properties to the North, East, and South.

Easement and Setback Requirements
Right-of-Way fronts the site along the west, north, and east. Based on the available survey information, there are no existing easements in the vicinity of the site.

Acquisition Issues
No site acquisition is required for Olympic College. Please refer to the Title Report in *Appendix G* for further details.

Affects on Surrounding Areas During Construction
Erosion could potentially occur on the site during construction, specifically during excavation. TESC measures need to be designed to control disturbances on-site, to neighboring properties, and downstream systems. Basing design measures on Best Management Practices (BMP) requirements provide stabilization for the site and neighboring areas. For phased construction, if used, TESC measures must align with construction staging and phased development elements.

Stabilizing the site during construction is critical while campus operations remain in use during construction.

Utility Extension or Relocation Issues
Due to existing water and sewer utility infrastructure available in the site areas, no utility extensions or relocation of existing utilities are anticipated.

Water Utilities

Existing

The site is in the City of Bremerton water service area. As per City-provided utility maps, there are water mainlines in Ohio Avenue, Lincoln Ave, and 15th Street. There are two mapped existing domestic water service lines and meters for the site from the Lincoln Avenue mainline system.

The closest hydrant to the project site is located on the west side of Ohio Avenue, directly across from the northwest corner of the project site.

Proposed

Future coordination with the City is needed to help determine the mainline sizes. Utility extension for domestic water service is not required due to existing infrastructure. Future confirmation is required from the City on the existing condition and capacity of service lines to determine suitable reuse for the new facility.

Sanitary Sewer Utilities

Existing

The City of Bremerton provides the current sanitary sewer service. A combined sewer system serves the site, and according to City mapping and partial campus surveys, there are 12-inch sewer mainlines in Ohio Avenue, Lincoln Avenue, and 15th Street. No side sewers exist for the site area. Future coordination with the City is necessary to confirm existing sewer utilities in the site area.

Proposed

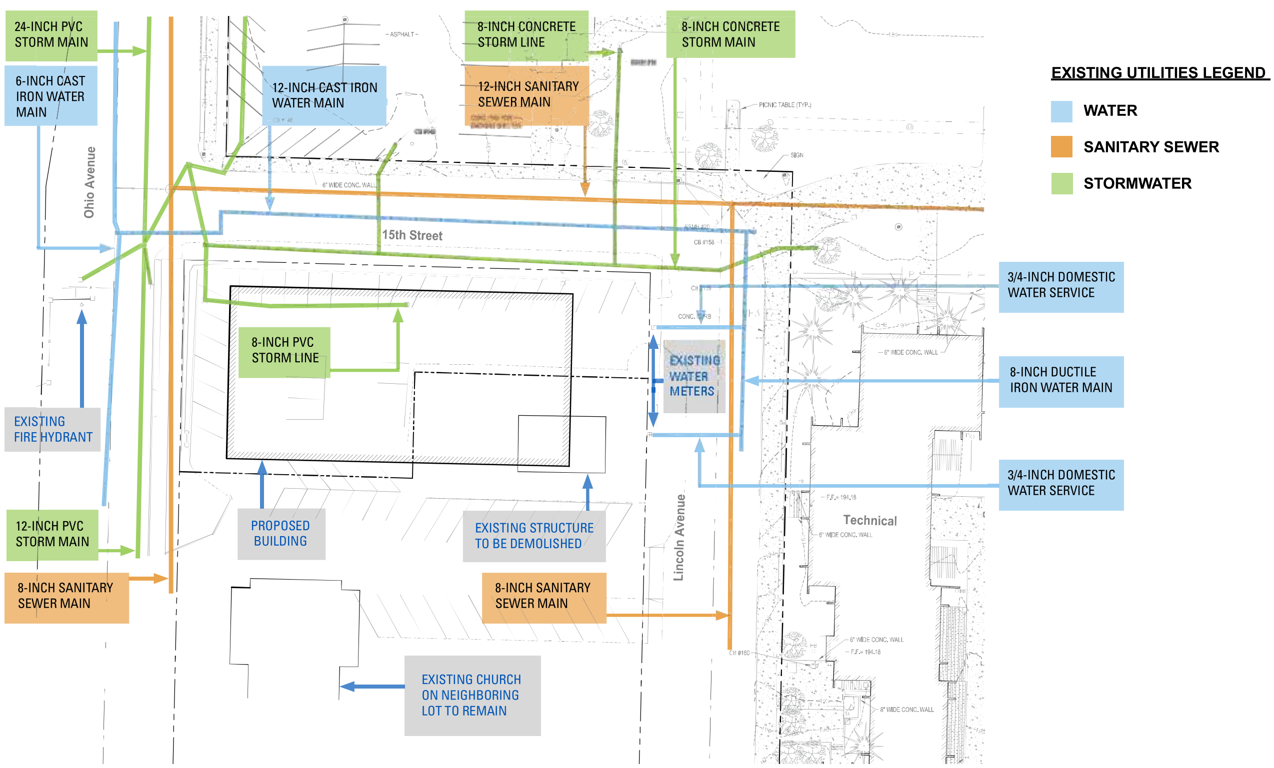
New side sewers are required and are likely from the mainline system in Ohio Avenue. The City needs to confirm standard requirements for sizing new side sewer connections.

Potential Environmental Impacts

As previously stated, there are no mapped ECAs that will impact the extent of the proposed new development.

Site Mitigation Issues

- No encounter of historical or archaeological content is expected. The site was previously disturbed for the construction of a theater demolished as part of another project. A review by the Department of Archaeology and Historic preservation does not apply to this project.
- See *Appendix F* for DAHP form and letter.



Existing Site Utilities

Parking and Access Issues

Vehicular Access

Existing vehicular ingress to the site is off Ohio Avenue, and existing vehicular egress is onto Lincoln Avenue. There are no additional vehicular access points for the existing site.

Parking

The majority of the existing parcel area is a surface parking lot with straight and angled standard parking spaces. Currently, accessible parking spaces appear to not be on the site.

The proposed development will displace a minimum of 36 parking spaces. This project is not anticipated to create parking and access issues or impact current road use.

According to the City of Bremerton Municipal Code, it is a requirement for the proposed project to have 2 spaces per 1,000 SF, which totals to approximately 40 parking spaces. This requirement includes handicap, bicycle, and motorcycle parking. In conversations with city code officials, it is possible to reduce the parking requirement; however, additional studies are necessary to determine the quantity of reduction or waive the parking requirement.

Pedestrian Circulation

Currently, pedestrian access to the site is from the southern edge along Ohio or east along Lincoln Avenue due to existing 6-inch concrete walls along the majority of the 15th Street and Ohio Avenue frontages.

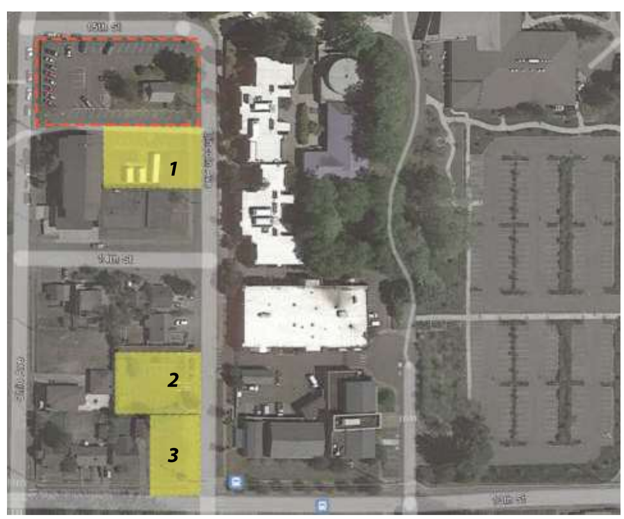
Fire and Emergency Access

Due to existing site conditions, there are no current fire services to the site. New fire services are anticipated to be required for the proposed facility. The new building footprint determines the capacity and sizing requirements for the system and is based on current City requirements.

Impacts on Surrounding and Existing Development (with construction lay-down areas)

Olympic College has identified three possible laydown areas (see diagram below). One potential area, is directly south of the site in the existing church parking lot (1). This space is currently storing large containers and loose objects. The other two sites (2 & 3) are a block south and these lots will be used as laydown areas for the welding shop construction that will be completed not long before construction on the ITLC building begins. There are no anticipated impacts on existing structures due to construction.

Diagram of Vehicular and Pedestrian Site Access



Three Lay-down Areas (in yellow) Near the Site

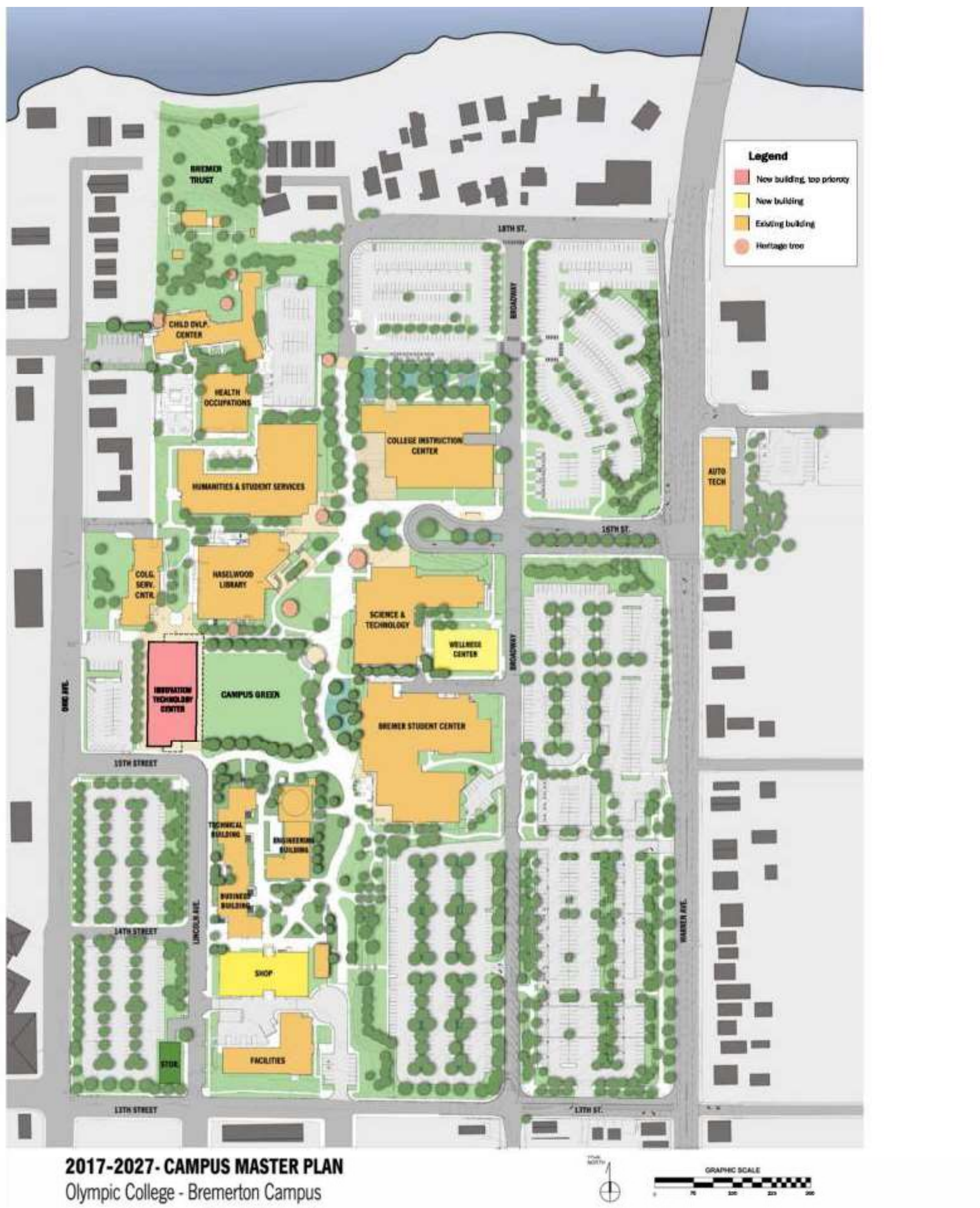
F. PROJECT CONSISTENCY WITH LONG-TERM PLANS

The proposed project is consistent with the 2017-2027 Facilities Master Plan by providing additional learning spaces for the ITLC. The proposed site has changed and moved south from the original master plan. The new site will displace existing/planned parking for the school, but it will create a better adjacency to Building 12 and help expand the campus further southwest.

G. CONSISTENCY WITH OTHER LAWS AND REGULATIONS

High Performance Public Buildings (Chapter 39.35D RCW)

The requirement for high-performance public buildings is for the proposed project to meet LEED Silver minimum requirement. For the approach, refer to the attached preliminary LEED scorecard using LEED v4 and suggested credit upgrades for v4.1. Refer to the LEED v4.1 scorecard in *Appendix E*.



2017-2027 Campus Master Plan from Project Request Report

State Efficiency and Environmental Performance (if applicable) (Executive Order 20-01)

Net Zero

Per Executive Order 20-01, the requirement for efficiency and performance is Net Zero Energy or Net Zero Energy Ready. The proposed project has best-in-class energy efficiency, is predominantly all-electric, and considers embodied carbon emissions. On-site renewables are utilized to the maximum extent possible, and identification of required off-site renewables, if applicable.

In order to meet these requirements, all-electric energy-consuming systems are used, except for lab gas needs and fossil fuel-fired emergency generators. The projected EUI is a higher value of 70 kBtu/SF due to an assumed hood in the Makerspace and ventilation requirements for the Electrical Engineering Lab, Cybersecurity Range, and Mockup Data Center Lab server rooms. Projected energy performance is 10% better than the current energy code. Further analysis is critical since energy modeling on the use of the lab/data center skews the benchmark data. The building is projected to achieve 55% betterment over the 2030 baseline.

Renewable Energy

Solar PVs are not in-scope for the roof of the building; however, the building will be PV-ready for future additions. Moving forward, solar PVs can be priced as a value add. In the future, on-site PV can provide an equivalent EUI of 19 kBtu/SF with an additional 330,000 kWh of renewable energy generation from off-site sources to achieve Net Zero Energy. If the rooftop is maximized with PV, 67% improvement over the 2030 baseline can be achieved.

A third-party agreement could provide renewables. Or the College could pursue grant funding or other means to implement renewables.

Embodied Carbon Emissions

Emissions reduction occurs through design strategies that focus on right-sizing the building to reduce overall material use. Steel-sourcing along with the possibility of wood for other structural purposes are being considered. Lastly, salvaged materials are used where appropriate.

State Energy Standards for Clean Buildings (RCW 19.27A.210)

The RCW 19.27A.210 is a standard for energy efficiency for existing buildings. In terms of the proposed project, any new building meeting 20-01 (above) already greatly exceeds this performance requirement if operated as intended. Documentation may be required in the future to show compliance with the standard.

Compliance with Required Vehicle Charging Capability for New Buildings (that provide on site parking) (RCW 19.27.540)

More study is needed to determine provided parking. The team is working with the City of Bremerton to determine if code requirements can be reduced or waived. If parking is required, then charging capability will be offered.

Greenhouse Gas Emissions Reduction Policy per RCW 70.235.070

Olympic College is consistently striving to achieve their stated climate and sustainability goals which aim to preserve and protect the environment. The College's internal Sustainability Advisory Council is composed of faculty, staff, and students who are passionate about improving the sustainability of Olympic College for current and future members of the community. The operational goals include:

- Reduce the College's carbon footprint.
- Expand and enhance recycling programs.
- Reduce the use of toxic chemicals on campuses.
- Purchase recycled, recyclable, and/or energy star supplies and equipment.
- Develop environmentally sustainable landscapes for the College's campuses.
- Encourage the use of public transportation, walking, and biking to school to reduce carbon emissions generated by student and employee commuting.

These goals align with WA state's limits on greenhouse gas emissions (RCW 70.235.020) and statewide goals to reduce vehicular travel (RCW 47.01.440).

Archeological and Cultural Resources (Executive Order 05-05) (If mitigation is anticipated, please note this in the predesign with narrative about how mitigation is worked into the project schedule and budget)

Olympic College consulted with the Department of Archeology and Historic Preservation (DAHP) to help meet the requirements for Executive Order 05-05. The DAHP reviewed plans for the Innovation and Technology Learning Center (ITLC) and determined that no historic properties impacted by the proposed development exist.

The project site spans three parcels and includes the demolition of the existing parking lot and a small residential structure built in 1935 on the SE corner of the property.

ADA Implementation per Executive Order 96-04
All accessibility improvements need to comply with current ADA codes and standards and the Executive Order 96-04, the Americans with Disabilities Act.

Compliance with Planning per Chapter 36.70A RCW as Required by RCW43.88.0301 and RCW 43.88.0301(1)
Olympic College provides the following information to document compliance.

a. Is your project in a county or city that is required to fully plan (according to RCW 36.70A.040) under the Growth Management Act? If the answer to this question is no, you do not have complete any more questions. **YES**

i. Is the proposed capital project identified in the host city or county comprehensive plan, including the capital facility plan, and implementing rules adopted under chapter 36.70A RCW? **YES**

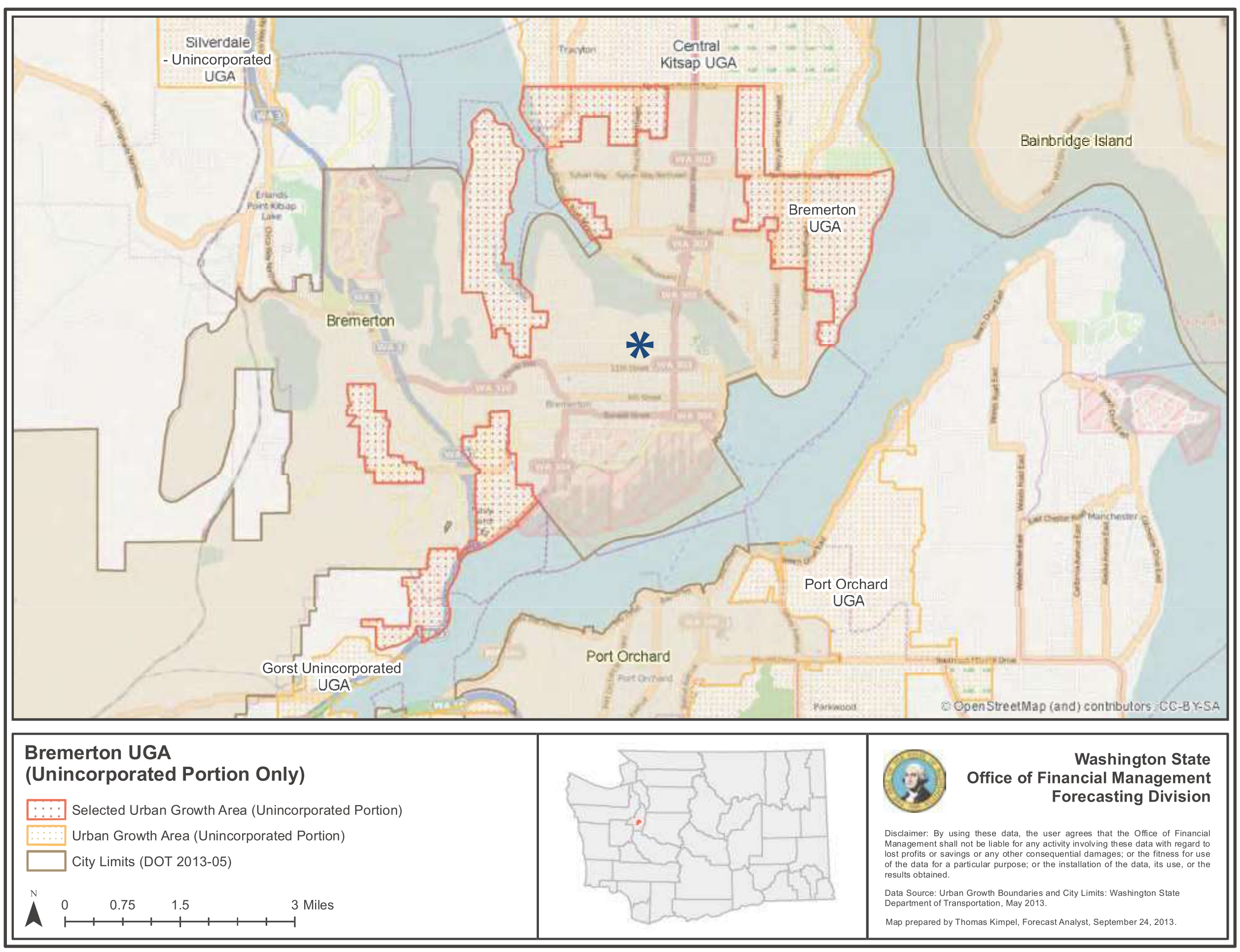
ii. Is the proposed capital project located in an adopted urban growth area? (See map below showing project location and location of urban growth area) **NO**

A. If at all located within an adopted urban growth area boundary, whether a project facilitates, accommodates, or attracts planned population and employment growth? **N/A**

B. If at all located outside an urban growth area boundary, whether the proposed capital project may create pressures for additional development? **N/A**

1. What entity has analyzed the impacts on planned for growth in the host city's or county's urban growth area (for example, your agency, the host jurisdiction, etc.)? **N/A**

2. Is there a document that contains this information? If so, indicate document and attach the appropriate pages from that document? If not, attach an explanation. **N/A**



* Project Location

OFM Map Displaying Urban Growth Area in Bremerton

b. For proposed capital projects identified in this subsection that are requesting state funding;

i. Whether there was regional coordination during project development? **YES**

ii. Whether local and additional funds were leveraged? **YES**

iii. Whether environmental outcomes and the reduction of adverse environmental impacts were examined? **YES**

Other Code and Regulations

Municipal Code

In addition, the project must adhere to the local authority with jurisdiction, the City of Bremerton, in which the following codes must be met:

- City of Bremerton Municipal Code
- Title 20 Land Use
- 2018 edition of the International Building Code (IBC) with Washington State amendment

The Department of Ecology's 2019 Stormwater Management Manual for Western Washington determines site improvements, which is the current stormwater code adopted by the City of Bremerton for drainage design for new development.

The extent of the new development is less than one acre of land disturbance and does not require a permit from the Department of Ecology Construction Stormwater (NPDES) for off-site discharge to the appropriate receiving water.

H. PROBLEMS THAT REQUIRE FURTHER STUDY AND IDENTIFY ASSOCIATED COST AND RISK

Site issues that require further investigation and coordination to confirm scoping and determine impacts on project costs and risks include:

- Frontage improvement requirements.
- New utility connections for water and sewer.
- Additional drainage infrastructure and facilities.
- Potential modification of private utilities to public utilities (specifically water/fire).

A geotechnical investigation of the existing soil conditions on the site is needed, along with a further evaluation of feasible stormwater mitigation approaches and facilities for the new development.

A Parking requirement to meet city code for the proposed project will need further investigation. The current city code requires 2 parking spaces per 1000 SF of building area; however, the municipality is willing to review the project and consider reducing the number of spots or granting an exception. If the project is required to provide the number of spaces mandated by code, it needs a larger site and could add substantial cost to the project.

The cost for demolition of the existing on-site structure is not in the project budget. Olympic College plans to obtain funding elsewhere and complete the demo before construction begins. There will be risk to the budget and schedule if funding is not promptly obtained.

I. MAJOR COMPONENTS IN EXCESS OF EXISTING CODE

Existing ADA code requirements will be acceptable for the proposed site development. No additional code requirements are anticipated for parking and accessible routes.

J. PLANNED TECHNOLOGY INFRASTRUCTURE AND OTHER RELATED IT INVESTMENTS

The ITLC technology infrastructure is designed to provide a flexible flow of information, dynamic content exchange, efficient end-user communications, and maximize building managers' oversight and support of building usage. The Cybersecurity Range and Mockup Data Center Labs will require more equipment, cooling, and infrastructure than a typical classroom or lab space. Refer to the Telecommunications section in *Appendix G* for more detail.

K. SITE RELATED AND/OR PHYSICAL SECURITY MEASURES

There are no planned site-related or physical security measures for the project.

L. PLANNED COMMISSIONING

Primarily, this project needs a separate commissioning agent who is brought on board partway through design documentation. The commissioning agent then works with the design team, provides a constructability review, and writes the commissioning plan. Once the commissioning agent is on board, the typical interaction with the commissioning agent includes:

- Respond to the commissioning agent's review of the basis of design (BOD) and design documents before the mid-construction documentation phase.
- Incorporate the commissioning agent's review comments into responses to contractor submittals related to commissioned equipment and systems.
- Review commissioning plan prepared by commissioning agent.
- Review commissioning specifications prepared by the commissioning agent and incorporate them into contract documents.
- Attend commissioning kickoff meeting.
- Support the commissioning agent during the commissioning process.

M. FUTURE PHASES OR OTHER FACILITIES THAT WILL AFFECT THIS PROJECT

There are no future phases planned for this project. Although the parcel to the south of the ITLC site currently hosts a church, this property belongs to Olympic College, who will demolish the church at a future date. The Olympic College Master Facilities Plan shows surface parking replacing the demolished church, which should have a minimal and temporary impact on the ITLC.

N. PROJECT DELIVERY METHODS CONSIDERED

The predesign team considered three project delivery methods: Design-build, general contractor/construction manager (GC/CM) and design-bid-build. The team, including representatives from DES, Olympic College and Miller Hull, met to discuss the various delivery methods on April 13th 2022 and the team decided that design-bid-build is the most appropriate delivery method for this project due to the simplicity and small scale of the project. In addition to modest size and complexity, there are no unique constraints on the site or construction, nor are there any special construction phasing issues or unique mechanical or electrical systems that would obviate the need for an alternative construction delivery method to design-bid-build. The team's conclusions about each delivery method are included in the paragraphs below.

Design-build is a project delivery method where DES would contract with a single architect/contractor team who would be responsible for both design and construction of the project. One of the main advantages of this delivery method is the potential for a compression of the project schedule, which results in more buying power with the allocated funds. The challenge with this method is the large amount of timely input needed from the client side. The client team would need to be involved in the project on a weekly if not daily basis and be ready to make key decisions quickly. This effort from the client side was discussed and the team felt that the client group is not well positioned to make this investment.

General contractor/construction manager (GC/CM) is a project delivery method where DES works with an architect/contractor team to establishes a maximum allowable construction cost for the project and the construction contract is awarded through a competitive bid process. This delivery method can help to streamline large, complex projects or projects with complex systems, but there is a significant time investment needed from the client and there is also a risk of establishing a higher maximum allowable cost relative to other delivery methods. Given the simplicity and small scale of this project, the team didn't see a compelling reason to pursue this delivery method.

Design-bid-build is a project delivery method where DES contracts with an architect for design of the project, then selects a contractor for the construction contract through a competitive bid process. A disadvantage of deign-bid-build is the project schedule; because the documents need to be almost complete before the project goes out for bid, the overall schedule can be longer than other delivery methods. An advantage is the straightforward process and the potential to have more competitive bids from contractors because of the reduced uncertainty (reduced risk) with completed construction drawings. Given the simplicity of the project in terms of program, site, anticipated structural systems, the team decided that design-bid-build is the delivery method that will likely result in the best outcome for this project.

O. PROJECT MANAGEMENT WITHIN AGENCY

Roles and Responsibilities

Project Management Team

Project management will primarily consist of one representative from the Department of Enterprise Services (DES) and one representative from Olympic College:

- Yelena Semenova, DES Project Manager, is responsible for managing contracts with DES and collaborating with the Olympic College Capital Projects Coordinator on the design process and budget.
- Jennifer Gemmill, PMP, Olympic College Capital Projects Manager (CPM), will manage and bring in faculty and administrators as needed for decision-making. She will be the primary point of contact for the design team.

Project Working Team

The Project Working Team primarily consists of the Olympic College (OC) CPM and the project Architectural Consultant. The Architectural Consultant will be responsible for the entire design consultant team and for providing the five basic design services for the project (schematic, design development, construction documents, bidding, and contract administration). The Architectural Consultant and consulting team will provide additional services, including but not limited to, laboratory planning, interior design, additional civil work beyond basic design, acoustical design, and enhanced CA service.

Identify In-house Staffing Requirements for the Proposed Project

The Olympic College CPM, identified above as Jennifer Gemmill, is responsible for overall organization management. The CPM procures and manages design and construction services for the Olympic College Bremerton campus and follows projects through construction, working closely with occupants, project architects, designers, consultants, and others related to servicing and maintaining facilities. In addition, the CPM ensures that projects are delivered on time, within budget and meet specified quality standards and programmatic needs.

Identify Consultant Services, DES Resources, or Additional Staff Needed to Manage the Project

The C-100 provided in *Section 5* includes provisions for all anticipated consultant services. No additional DES staff are anticipated to manage this project beyond the DES Project Manager, noted above.

P. SCHEDULE

High-level Milestone Schedule

The proposed project schedule is accelerated to meet the demands of the building's design needs and revised budget from the original PRR Report. Predesign services start in March of 2022 and end in July 2022. Schematic Design will begin in August 2022 and continue through November 2022. Design Development will begin in December 2022 and continue through April 2023, including Value Engineering then the Construction Document phase will begin in May 2023, incorporating the Constructability Review. Drawings will be submitted for permit in October 2023. Bidding will take place during June and July of 2024, and construction will begin in August 2024. Construction is anticipated to last 16 months and is scheduled to be complete in December 2025, ready for occupancy for the 2026 Spring Semester. (See Preliminary Project Schedule at the end of this chapter for more information)

Value Engineering Analysis and Constructability Review Schedule per RCW 43.88.110(5)(c)

Factors that May Cause Delay

- Obtaining an accurate site survey at the beginning of the project to ensure a comprehensive site analysis is critical.
- Preparation of a clear survey scope and early coordination with the surveyor produces a thorough outcome and survey.
- Survey documentation accurately locating existing utilities on and near the site is crucial. Insufficient data can cause delays during design and can impact construction.
- Obtaining a geotechnical investigation at the beginning of the project to evaluate feasible stormwater mitigation based on existing soil conditions is critical.
- Although stormwater mitigation requirements are determined during the initial design stages, continuous communication with the City of Bremerton will be necessary if the defined scope evolves to require an additional drainage approach to meet jurisdictional code requirements.
- Lack of coordination with the City of Bremerton can result in project schedule delays.
- The City of Bremerton may require frontage improvements outside of the current civil engineering scope.
- The extent and size of the site can cause the evolution of scope possibly from the perceived increase of vehicular trips or the proposed relocation of access to the site.
- Currently anticipated that frontage improvement will be along 15th Street and Ohio Avenue.
- Continuous coordination with the City of Bremerton will determine the range of requirements, and if not determined during the early design stages, this could cause a delay in the schedule.
- A traffic study should be conducted before schematic design to determine any changes and a possible increase in vehicular access to the proposed site. This study information can be used to coordinate additional requirements with the City of Bremerton.
- Potential disturbances of shared utility services will need evaluation in terms of system shutoffs, operational limitations, and scheduled utility impacts during the planning and design phases of the project.

Permitting or Other Government Ordinances that Could Delay Schedule

More study is needed to understand the parking requirement. The design team will try to acquire a written statement from the city that confirms the parking requirement for this specific project. Obtaining this statement during the early stages of schematic design is critical for the project to remain on schedule.

The duration of the permitting process in the City of Bremerton is unclear. The project team will endeavor to meet with the City of Bremerton early and periodically throughout the design and documentation phases to familiarize permit review staff with the proposed project. The project schedule allows nine months for the permitting process. A longer permitting timeline will impact the project schedule.

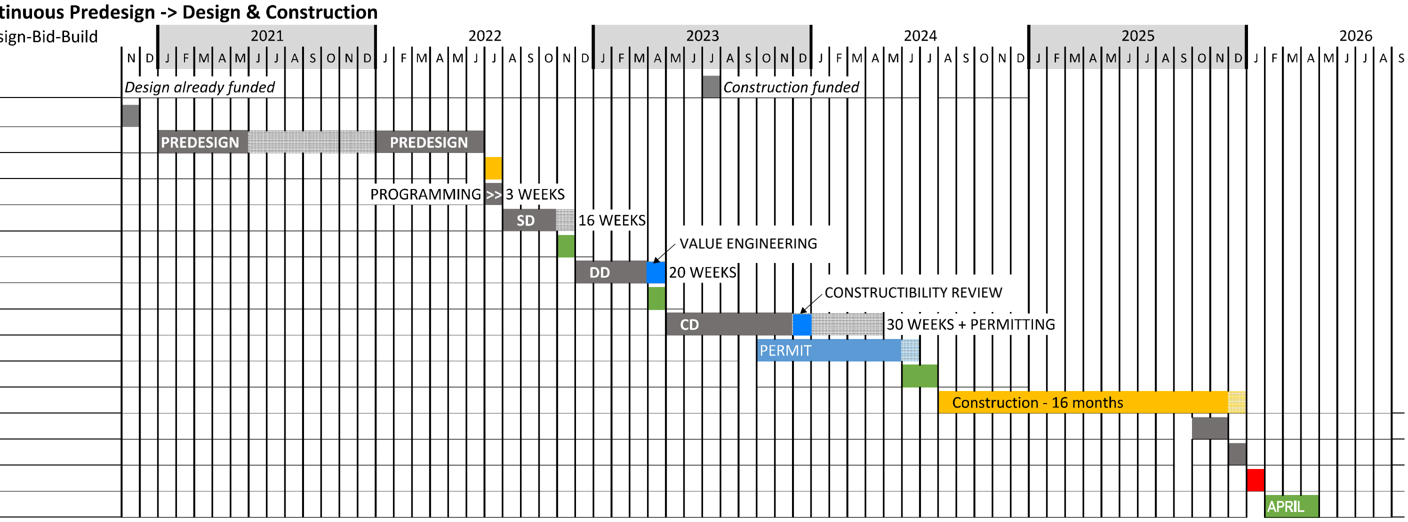
Local Jurisdictions to be Contacted and whether Community Stakeholder Meetings will be Part of the Process

The City of Bremerton will be contacted at the beginning of schematic design to schedule a pre-submittal meeting. At this time there are not plans to hold community stakeholder meetings during the design process.

EARNING CENTER

tinuous Predesign -> Design & Construction

sign-Bid-Build



2026

* Programming duration allocated above is for verification of remaining detailed requirements only. Building program spaces and sizes for design phases are assumed to be as indicated in the Predesign Report.

* Construction funding date indicated above is based on information provided by WA State Board for Community & Technical Colleges for authorization in the 2023-2025 biennium. Note that the funding request will occur prior to prior to Construction Documents and requires the funding request to be based on earlier phase Design Development.

* Permit duration indicated above represents best case scenario based on information provided by the City of Bremerton, assuming 12-16 weeks for initial permit intake and review.

* Construction duration indicated above is provided as an initial estimate and will be determined by the General Contractor awarded.

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5. PROJECT BUDGET ANALYSIS

View of Olympic College Bremerton Campus Looking North

A. COST ESTIMATE

Major Assumptions Used in Preparing the Cost Estimate

The cost estimate for the Preferred Alternative has been created using benchmark data, allowing for adjustments in location, scope, construction timeline, and other factors. The goal of the cost estimate is to determine budget feasibility. The estimate is prepared based on an assumed construction start date of August 2024.

The following assumptions were made in the preparation of the Predesign cost estimate:

Conditions of Construction

The pricing is based on the following general conditions of construction:

- A start date of August 2024
- A construction period of 16 months
- The project delivery method is Design/Bid/Build
- Pricing assumes a minimum of (3) bidders in all trades
- There is no small business set aside requirements
- The contractor is required to pay prevailing wages

Exclusions

- Off-site utilities or off-site work of any kind
- Allowance for Percent for Art
- Adjustments for workforce training/PLA/MWESB
- Owner supplied and installed furniture, fixtures, and equipment
- Hazardous material handling, disposal, and abatement except as identified
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Tap fees, street use fees, electrical consumption charges
- Design, testing, inspection, or construction management fees
- Architectural and design fees
- Third party commissioning
- Assessments, taxes, finance, legal and development charges
- Environmental impact mitigation
- Builder's risk, project wrap-up and other owner provided insurance program except as identified
- Land and easement acquisition
- Also see detail of each estimate

Summary Table of Uniformat Level II Cost Estimates

A Uniformat level II cost summary is provided at the end of this section.

The C-100

A completed C-100 form has been included at the end of this section.

B. PROPOSED FUNDING

Identify the Fund Sources and Expected Receipt of the Funds

The Innovation and Technology Learning Center project is requesting the amount of $24,255,000 in WA state capital funding. Design funding has already been approved and construction funding is expected to be available in July of 2023.

The total project cost of $25,038,000 is $783,000 more than the $24,255,000 that is anticipated to be funded by the state. This delta plus the funding for demolition of the existing structure is estimated to be $800,000. Martin Cavalluzzi, the president of Olympic College, has committed to securing this additional funding through private industry funding.

Other Funding Sources and Procedures Explained

Olympic College does not have a plan to alternatively finance the proposed project.

C. FACILITY OPERATIONS AND MAINTENANCE REQUIREMENTS

Impacts on Operating Budget Described

The ITLC project will receive Olympic College's standard level of campus operations and maintenance and three additional FTEs are anticipated. Olympic College is planning for one Grounds and Nursery FTE, one Maintenance Mechanic FTE, and one Custodial FTE. The annual salaries are anticipated as:

- Grounds and Nursery FTE salary: $55,441
- Maintenance Mechanic FTE salary: $73,661
- Custodial FTE salary: $55,441

The estimated annual cost to operate the Innovation and Technology Learning Center proposed long range costs in projected at $180,365.53 per year for 2026, based on an -projected average operating cost of $8.29/GSF of building area. This includes custodial FTEs, custodial supplies and materials, and maintenance and utility costs.

Five Biennia of Capital and Operating costs from Time of Occupancy

See the Five Biennia Table on the left for detailed annual breakdown of anticipated maintenance, operating and renewal costs over the five biennia after occupancy.

Identify Agency Responsible for Ongoing Maintenance and Operations

Olympic College will be responsible for ongoing maintenance and operations for the proposed project.

D. FURNITURE, FIXTURES, AND EQUIPMENT INCLUDED IN BUDGET. IF NOT INCLUDED, EXPLAIN WHY.

Furniture, fixtures, and equipment are included in the project budget. Refer to Cost Estimate report for a specific list of accounted items. The predesign team also established a budget for equipment in addition to what is covered in the cost estimate as well as a budget for furniture. These costs can be found in the *Equipment* section of the C-100.

Consultant Services	*$4,157,000*
Construction	*$19,340,000*
Equipment	*$1,385,000*
Artwork	*$84,000*
Other Costs	*$71,000*
Total Project Cost	***$25,038,000***
Occupancy Date	***January 2026***

Cost Summary

OLYMPIC COLLEGE ITLC

GSF:	21,757	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034	FY 2035	**5 Biennia Totals**
Occ. Date:	Jan. 1, 2026												
Operating cost projection*		$117,923	$126,248	$135,161	$144,704	$154,920	$165,857	$177,567	$190,103	$203,524	$217,893	$233,276	$1,749,255
Maintenance & Repair cost projection*		$62,443	$66,851	$71,571	$76,624	$82,034	$87,825	$94,026	$100,664	$107,771	$115,380	$123,525	$926,272
Totals		$180,366	$193,100	$206,733	$221,328	$236,954	$253,683	$271,593	$290,767	$311,295	$333,273	$356,802	**$2,675,527**

**Operating and Maintenance costs are escalated at 7.06% per annum*

Five Biennia Table Displaying Costs over Five Biennia

Olympic College	Concept Design Test Fit Cost Estimate R2
ITLC	May 24, 2022
Bremerton, WA	20-053.110

OVERALL SUMMARY

	Enclosed Area	$ / SF	$x1,000
Building & Sitework	21,756 SF	818.82	17,814
TOTAL Building & Sitework Construction	***21,756 SF***	***818.82***	***17,814***

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

BUILDING & SITEWORK AREAS

Areas	SF	
Enclosed Areas		
Level 1	10,878	
Level 2	10,878	
Roof Level/Penthouse		
SUBTOTAL, Enclosed Area	21,756	
Covered area		
Soffits		
Canopies		
Level 1	1,088	
SUBTOTAL, Covered Area @ ½ Value	544	
TOTAL GROSS FLOOR AREA		22,300

Olympic College ITLC | Concept Design Test Fit Cost Estimate R2
Building & Sitework | May 24, 2022
Bremerton, WA | 20-053.110

BUILDING & SITEWORK Construction Systems and Assemblies Summary

Enclosed Area **21,756 SF**

		Base Bid $/SF	Base Bid $x1,000
A	Substructure		
A10	Foundations	41.30	898
A20	Basement construction	-	-
A	**SUBSTRUCTURE**	**41.30**	**898**
B	Shell		
B10	Superstructure	76.07	1,655
B20	Exterior enclosure	115.30	2,508
B30	Roofing	18.00	392
B	**SHELL**	**209.36**	**4,555**
C	Interiors		
C10	Interior construction	45.47	989
C20	Stairs	3.45	75
C30	Interior finishes	32.50	707
C	**INTERIORS**	**81.42**	**1,771**
D	Services		
D10	Conveying systems	5.75	125
D20	Plumbing	16.55	360
D30	Heating, Ventilation and Air Conditioning (HVAC)	69.90	1,521
D40	Fire protection systems	6.40	139
D50	Electrical	69.26	1,507
D	**SERVICES**	**167.85**	**3,652**
E	Equipment and furnishings		
E10	Equipment	7.28	158
E20	Furnishings	9.11	198
E	**EQUIPMENT AND FURNISHINGS**	**16.39**	**357**
F	Special construction and demolition		
F10	Special construction	-	-
F20	Selective demolition	-	-
F	**SPECIAL CONSTRUCTION AND DEMOLITION**	**-**	**-**
G	Building sitework		
G10	Site preparation	3.91	85
G20	Site improvements	23.62	514
G30	Site civil/Mechanical utilities	4.37	95
G40	Site electrical utilities	2.99	65
G90	Other site construction	-	-
G	**BUILDING SITEWORK**	**34.88**	**759**

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

BUILDING & SITEWORK Construction Systems and Assemblies Summary

Enclosed Area 21,756 SF

		Base Bid	
SUBTOTAL DIRECT COST		**551.21**	**11,992**
Contingencies			
Design & Estimating Contingency	10.00%	55.12	1,199
Construction/Risk Contingency	0.00%	-	-
Escalation Contingency	18.61%	102.57	2,231
SUBTOTAL SUBCONTRACT COST		**708.89**	**15,423**
General			
NSS/Job Services/Site Logistics	0.00%	-	-
SUBTOTAL		**-**	**-**
General			
General Conditions	11.08%	61.06	1,328
Fee	2.75%	19.49	424
Preconstruction Fees	0.00%	-	-
SUBTOTAL		**80.55**	**1,753**
SUBTOTAL CONSTRUCTION COST		**789.45**	**17,175**
Permits, Insurances, Bonds & Taxes			
Bid Document Reproduction	0.00%	-	-
GC/CM P&P Bond	1.50%	11.84	258
GL Insurance	1.25%	9.87	215
Builder's Risk Insurance	0.50%	3.95	86
Plan Review - EXCLUDED	0.00%	-	-
Permit fees - EXCLUDED	0.00%	-	-
B&O Tax, WA	0.47%	3.72	81
B&O Tax, COS	0.00%	-	-
WSST EXCLUDED	EXCLUDED		
TOTAL PROBABLE CONSTRUCTION COST		**818.82**	**17,814**

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	*Quantity*	*Unit*	*Rate*	*Total*
A - Substructure					
A10	**Foundations**				
A1010	Standard foundations				
	Wall foundations	21,756	sf	2.40	52,214
	Stem wall foundations	21,756	sf	5.10	110,956
	Plinths/pilasters	21,756	sf	1.25	27,195
	Spread footings	21,756	sf	0.95	20,668
	Foundation drain				
	Perforated drain pipe @ perimeter	486	lf	25.00	12,150
	Underslab drain	1,197	lf	25.00	29,925
	Insulation				
	Insulation+dampproofing @ foundations	1,944	sf	7.00	13,608
	Structural excavation	10,878	sf	3.50	38,073
A1020	Special other foundations				
	Rammed agg piers incl spoils removal	10,878	sf	28.00	304,584
	Overex/haul/import	10,878	sf	3.25	35,354
A1030	Slabs on grade				
	Slab on grade	21,756	sf	10.80	234,965
	Trenches, pits & bases				
	Elevator pits, concrete	1	ea	12,500.00	12,500
	Elevator pits, waterproofing	1	ea	3,500.00	3,500
	Elevator pits, ladder	1	ea	750.00	750
	Allow for trenches/sumps	1	ea	2,000.00	2,000
					898,442
B - Shell					
B10	**Superstructure**				
B1010	Floor construction				
	Steel columns+beams	94	t	7,500.00	703,673
	BRBs	6	ea	10,000.00	60,000
	Steel decking	10,878	sf	8.00	87,024
	Concrete fill	10,878	sf	7.50	81,585
	Misc metals	14,141	lb	3.50	49,495
	Pads/curbs/misc concrete	21,756	gsf	0.20	4,351
B1020	Roof construction				
	Roof framing				
	Flat roof construction				

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	*Quantity*	*Unit*	*Rate*	*Total*
	Steel columns+beams	63	t	7,500.00	469,114
	BRBs	6	ea	10,000.00	60,000
	Steel decking	10,878	sf	7.75	84,305
	Fireproofing, sprayed cementitious	EXCLUDED			
	Canopy framing + decking	1,088	sf	50.88	55,342
	PV array framing	Assume ballasted			
B20	**Exterior enclosure**				
B2010	Exterior walls				
	Exterior wall construction				
	Opaque wall finish, 60% laid-up brick or equal	12,428	sf	56.00	695,968
	Rainscreen back-up wall section	12,428	sf	40.25	500,227
	Detailing	12,428	sf	11.50	142,922
	Mock-ups	EXCLUDED			
	Sealer/Graffiti coatings	12,428	sf	2.75	34,177
	Roof Screens				
	Perforated metal panel	EXCLUDED			
	Soffits				
	Allow for finish	1,088	sf	35.00	38,073
B2020	Exterior windows				
	Glass & glazing				
	Translucent wall finish, 40% assume 50% punched opngs/50% CW	7,294	sf	115.00	838,810
	Operables/shading systems/detailing	7,294	sf	25.00	182,350
B2030	Exterior doors				
	Solid exterior doors				
	HM frame+door+hardware, per leaf	21,756	sf	0.35	7,615
	OHDs	2	ea	14,000.00	28,000
	Glazed entrances				
	Per leaf	21,756	sf	1.85	40,249
B30	**Roofing**				
B3010	Roof coverings				
	Roofing system including insulation	10,878	sf	26.50	288,267
	Roofing system no insulation	1,088	sf	20.00	21,756
	Sheetmetal flashings & trims	10,878	sf	2.50	27,195

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	*Quantity*	*Unit*	*Rate*	*Total*
	Roof carpentry	10,878	sf	1.50	16,317
B3020	Roof openings				
	Skylights	10,878	sf	3.50	38,073
					4,554,886
C - Interiors					
C10	**Interior construction**				
C1010	Partitions				
	Fixed partitions				
	CMU		EXCLUDED		
	Metal stud+GWB	24,817	sf	26.25	651,446
	GWB to interior of exterior	12,428	sf	5.00	62,140
	Backing and blocking	21,756	gsf	0.65	14,141
	Sidelites/Transoms	21,756	sf	0.50	10,878
	Window wall/windows	21,756	sf	0.75	16,317
	Railings	28	lf	562.50	15,750
C1020	Interior doors				
	Interior doors, frames & hardware				
	HM/WD Frames+Doors+Hdwre, per leaf	21,756	sf	7.50	163,170
C1030	Fittings specialties				
	Fabricated toilet partitions				
	Toilet partitions, Plastic	21,756	sf	0.35	7,615
	Protective guards, barriers & bumpers	21,756	sf	0.25	5,439
	Identifying devices				
	Signage & Graphics	21,756	gsf	1.00	21,756
	Amenities and convenience items				
	Toilet & bath accessories				
	Toilet rooms	21,756	gsf	0.65	14,141
	Storage room shelving		EXCLUDED		
	Office shelving		EXCLUDED		
	Lockers				
	Day use incl. benches	21,756	sf	0.20	4,351
	Fire extinguishers & Cabinets	21,756	ea	0.10	2,176
C20	**Stairs**				
C2010	Stair construction				

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	*Quantity*	*Unit*	*Rate*	*Total*
	Exit stairs	1	flt	25,000.00	25,000
	Feature stair	1	flt	50,000.00	50,000
C30	**Interior finishes**				
C3010	Wall finishes				
	Allow	21,756	sf	8.50	184,926
C3020	Floor finishes				
	Flooring				
	Allow	21,756	sf	11.00	239,316
C3020	Ceiling finishes				
	Ceiling finishes				
	Allow	21,756	sf	13.00	282,828
					1,771,390
D - Services					
D10	**Conveying systems**				
D1010	Elevators and lifts				
	Elevators, 2-stop	1	ea	125,000.00	125,000
D20	**Plumbing**				
	Sanitary fixtures and connection piping	21,756	sf	3.60	78,322
	Sanitary waste, vent and service piping	21,756	sf	5.20	113,131
	Water treatment, storage and circulation	21,756	sf	0.95	20,668
	Laboratory water systems	21,756	sf	2.25	48,951
	Pure water systems		By others		
	Compressed/Laboratory air systems	21,756	sf	1.75	38,073
	Laboratory vacuum systems		Not required		
	Laboratory waste systems		Not required		
	Surface water drainage	21,756	sf	1.65	35,897
	Gas distribution	21,756	sf	0.75	16,317
	Testing	21,756	sf	0.40	8,702
D30	**Heating, Ventilation and Air Conditioning (HVAC)**				
	Heat generation and chilling	21,756	sf	14.50	315,462
	Thermal storage and circulation pumps	21,756	sf	4.35	94,639
	Piping, fittings, valves and insulation	21,756	sf	10.00	217,560
	Air handling equipment	21,756	sf	9.15	199,067

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	Quantity	Unit	Rate	Total
	Air distribution	21,756	sf	10.05	218,648
	Grilles, registers and diffusers	21,756	sf	1.50	32,634
	Controls	21,756	sf	9.15	199,067
	Independent exhaust ventilation	21,756	sf	2.70	58,741
	Ceiling fans	21,756	sf	2.50	54,390
	24/7 cooling systems	21,756	sf	2.00	43,512
	Radiant heating	21,756	sf	2.30	50,039
	Testing, adjusting and balancing	21,756	sf	1.70	36,985
D40	**Fire protection systems**				
D4010	Fire protection sprinkler systems				
	Fire sprinkler systems				
	Wet pipe sprinkler systems	21,756	sf	6.00	130,536
	Dry pipe sprinkler systems, to canopies and soffits ≥4'W	1,088	sf	8.00	8,702
D50	**Electrical**				
D5010	Electrical service and distribution				
	Main service and distribution etc.	21,756	sf	10.00	217,560
	Emergency or uninterrupted power	21,756	sf	8.45	183,838
	Photovoltaic system				
	PV system, conduit infrastructure only	1	ls	10,000.00	10,000
	Machine and equipment power	21,756	sf	3.50	76,146
	User convenience power	21,756	sf	5.00	108,780
	Grounding	21,756	sf	0.35	7,615
	Testing	21,756	sf	1.35	29,371
D5020	Lighting and branch wiring				
	Lighting fixtures including conduit and wire	21,756	sf	14.00	304,584
	Lighting controls	21,756	sf	3.75	81,585
D5030	Communications and security systems				
	Telephone and communications systems				
	Telephone/data systems	21,756	sf	10.00	217,560
	AV systems	4	ea	12,000.00	48,000
	DAS/ERRC	21,756	sf	2.00	43,512
	Area of refuge communication system	1	ls	15,000.00	15,000
	Alarm and security systems				
	Fire alarm system	21,756	sf	3.50	76,146

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	*Quantity*	*Unit*	*Rate*	*Total*
	Access control/intruder detection	21,756	sf	2.00	43,512
	CCTV systems	21,756	sf	2.00	43,512
					3,651,765
E - Equipment and Furnishings					
E10	**Equipment**				
E1010	Commercial equipment				
	Laundry & drycleaning equipment	EXCLUDED			
E1020	Institutional equipment				
	Writable surfaces	21,756	sf	1.00	21,756
	AV equipment, supports only	21,756	gsf	0.10	2,176
	Lab equipment				
	Fume hoods				
	4'	1	ea	12,000.00	12,000
	5'	EXCLUDED			
	Lab casework, fixtures & fittings	1,500	sf	70.00	105,000
E1030	Vehicular equipment				
	Loading dock equipment				
	Dock leveler+truck restraints+bumpers	EXCLUDED			
E1090	Other equipment				
	Food service equipment	EXCLUDED			
	Residential kitchen equipment	21,756	sf	0.30	6,527
	Allow for OFCI	21,756	sf	0.50	10,878
E20	**Furnishings**				
E2010	Fixed furnishings				
	Casework	21,756	sf	3.50	76,146
	Window treatments				
	Mechoshades	7,294	sf	16.00	116,704
	Interior shades/privacy film	21,756	sf	0.25	5,439
	Kiosks, carrels, etc	EXCLUDED			
					356,625
G - Building Sitework					
G10	**Site preparation**				
G1010	Site clearing				

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
Bremerton, WA	20-053.110

	Description	*Quantity*	*Unit*	*Rate*	*Total*
	Demolition of building & structures				
	Demolish buildings	Under separate contract			
	Hazmat abatement	EXCLUDED			
	Site protective construction				
	TESC				
	Set-up+Maintenance	20,038	sf	0.65	13,024
	Site clearing and grading				
	Site clearance	20,038	sf	0.60	12,023
	Mass ex	20,038	sf	2.50	50,094
	Contractor laydown	EXCLUDED			
	Overex @ paving	EXCLUDED			
	Demolish existing utilities	1	ls	10,000.00	10,000
G20	**Site improvements**				
G2010	Roadways				
	Restoration for utility tie-ins	1	ls	10,000.00	10,000
G2040	Site development				
	Allow for hardscape/softscape	9,160	sf	55.00	503,778
G30	**Site civil/Mechanical utilities**				
G3010	Water supply				
	Water piping and fittings - main and fire service	1	ls	20,000.00	20,000
G3020	Sanitary sewer				
	Sanitary sewer piping and fittings	1	ls	15,000.00	15,000
G3030	Storm sewer				
	Storm drainage piping and fittings	1	ls	50,000.00	50,000
G3060	Fuel distribution				
	Incoming gas service	1	ls	10,000.00	10,000
G40	**Site electrical utilities**				
G4010	Electrical distribution				
	Conduit for primary service feeders - allow	1	sl	25,000.00	25,000

Olympic College ITLC	Concept Design Test Fit Cost Estimate R2
Building & Sitework	May 24, 2022
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Description		*Quantity*	*Unit*	*Rate*	*Total*
G4020	Site lighting				
	Site lighting fixtures including conduit and wire	1	ls	25,000.00	25,000
G4030	Site communications and security				
	Allow	1	ls	15,000.00	15,000
					758,919

State of Washington
AGENCY / INSTITUTION PROJECT COST SUMMARY

Agency	Olympic College
Project Name	Innovation and Technology Learning Center
OFM Project Number	40000103

Contact Information

Name	Michelle Petersen
Phone Number	206-254-2034
Email	mpetersen@millerhull.com

Statistics

Gross Square Feet	21,757	MACC per Square Foot	$629
Usable Square Feet	14,142	Escalated MACC per Square Foot	$775
Space Efficiency	65.0%	A/E Fee Class	B
Construction Type	College classroom facilit	A/E Fee Percentage	7.64%
Remodel	No	Projected Life of Asset (Years)	50
Additional Project Details			
Alternative Public Works Project	No	Art Requirement Applies	Yes
Inflation Rate	3.12%	Higher Ed Institution	Yes
Sales Tax Rate %	9.20%	Location Used for Tax Rate	1600 Chester Ave. Bremerton, WA
Contingency Rate	5%		
Base Month	June-18		
Project Administered By	DES		

Schedule

Predesign Start	March-22	Predesign End	July-22
Design Start	August-22	Design End	June-24
Construction Start	August-24	Construction End	December-25
Construction Duration	16 Months		

Green cells must be filled in by user

Project Cost Estimate

Total Project	$20,447,910	Total Project Escalated	$25,037,577
		Rounded Escalated Total	$25,038,000

STATE OF WASHINGTON

AGENCY / INSTITUTION PROJECT COST SUMMARY

Agency	Olympic College
Project Name	Innovation and Technology Learning Center
OFM Project Number	40000103

Cost Estimate Summary

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

Consultant Services			
Predesign Services	$0		
A/E Basic Design Services	$757,545		
Extra Services	$1,546,600		
Other Services	$1,019,316		
Design Services Contingency	$166,173		
Consultant Services Subtotal	**$3,489,634**	**Consultant Services Subtotal Escalated**	**$4,156,665**

Construction			
Construction Contingencies	$684,300	Construction Contingencies Escalated	$844,290
Maximum Allowable Construction Cost (MACC)	$13,686,000	Maximum Allowable Construction Cost (MACC) Escalated	$16,866,537
Sales Tax	$1,322,068	Sales Tax Escalated	$1,629,397
Construction Subtotal	**$15,692,368**	**Construction Subtotal Escalated**	**$19,340,224**

Equipment			
Equipment	$1,028,000		
Sales Tax	$94,576		
Non-Taxable Items	$0		
Equipment Subtotal	**$1,122,576**	**Equipment Subtotal Escalated**	**$1,385,035**

Artwork			
Artwork Subtotal	**$84,333**	**Artwork Subtotal Escalated**	**$84,333**

Agency Project Administration			
Agency Project Administration Subtotal	$0		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$0**	**Project Administation Subtotal Escalated**	**$0**

Other Costs			
Other Costs Subtotal	**$59,000**	**Other Costs Subtotal Escalated**	**$71,320**

Project Cost Estimate			
Total Project	$20,447,910	Total Project Escalated	$25,037,577
		Rounded Escalated Total	$25,038,000

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**	

Green cells must be filled in by user

Cost Estimate Details

Consultant Services					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Pre-Schematic Design Services					
Programming/Site Analysis					
Environmental Analysis					
Predesign Study					
Other					
Insert Row Here					
Sub TOTAL	**$0**		**1.1367**	**$0**	Escalated to Design Start
2) Construction Documents					
A/E Basic Design Services	$757,545				69% of A/E Basic Services
Other					
Insert Row Here					
Sub TOTAL	**$757,545**		**1.1692**	**$885,722**	Escalated to Mid-Design
3) Extra Services					
Civil Design (Above Basic Svcs)	$133,700				
Geotechnical Investigation	$25,000				
Commissioning	$30,000				
Site Survey	$20,000				
Testing	$80,000				
LEED Services	$210,000				
Voice/Data Consultant	$23,870				
Value Engineering	$40,000				
Constructability Review	$40,000				
Environmental Mitigation (EIS)	$0				
Landscape Consultant	$132,000				
Security Consultant	$17,600				
DAHP - Historic Inventory Report	$0				
Lighting Consultant	$55,000				
Document Reproduction during design					
Acoustical Consultant	$45,900				
VE Participation of Design Team	$35,000				
Constructability Review Participation of Design Team	$32,100				
Document repro for VE and CR	$10,000				
Lab Equipment Planning Consultant	$157,150				
Audio/Visual Consultant	$12,650				
Site Electrical / Campus Primary Power					
Storm Drainage Analysis & Report	$12,230				
Street Frontage Improvements	$42,900				
Energy Conservation Report (ELCCA)	$0				Below 25,000 GSF threshold
Interior Design Consultant	$80,000				
Graphics and Signage Consultant	$38,500				
Art Work Design Coordination	$12,000				
Building Performance Analysis	$67,000				
Executive Order 13-03 (LCCA) for design	$30,000				

SEPA Services	$12,000			
NPDES Design Services	$0			
Programming Confirmation (prior to SD)	$20,000			
Enhanced CA	$100,000			Architect, Site Design, Lighting
Quality Assurance / Quality Control	$32,000			
Insert Row Here				
Sub TOTAL	**$1,546,600**	**1.1692**	**$1,808,285**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$340,346			31% of A/E Basic Services
HVAC Balancing	$30,000			
Staffing	$0			
Commissioning and Training A/E Participation	$100,000			
Record Documents	$55,000			
Roof/Building Envelope Inspection	$75,000			
Art Installation coordination	$6,000			
Advertising	$3,000			
Reimbursables - after bid	$7,000			
Geotechnical Construction Services	$30,000			
Testing and Inspection	$50,000			
Building Envelope (WAB) Testing	$50,000			
Haz Mat Monitoring and Inspections	$5,000			
Document Reproduction for base bid and construction	$33,000			
Executive Order 13-03 (LCCA) after construction	$25,000			
Arborist Inspection and Monitoring	$0			
Accessibility Review Consultant	$27,500			
Building Envelope Design Consultant	$16,900			
Sustainability Charrette Facilitation	$28,250			
Post-Occupancy Mech. & Elec.	$5,500			
Renderings and Models Allowance	$31,820			
Reimbursable Expense Allowance	$100,000			
Insert Row Here				
Sub TOTAL	**$1,019,316**	**1.2338**	**$1,257,633**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$166,173			
Other				
Insert Row Here				
Sub TOTAL	**$166,173**	**1.2338**	**$205,025**	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	**$3,489,634**		**$4,156,665**	

Cost Estimate Details

Construction Contracts					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Site Work					
G10 - Site Preparation	$81,000				
G20 - Site Improvements	$487,000				
G30 - Site Mechanical Utilities	$90,000				
G40 - Site Electrical Utilities	$62,000				
G60 - Other Site Construction					
Other					
Demolition	$50,000				
Sub TOTAL	**$770,000**		**1.2088**	**$930,776**	
2) Related Project Costs					
Offsite Improvements					
City Utilities Relocation					
Parking Mitigation					
Stormwater Retention/Detention					
Other					
Insert Row Here					
Sub TOTAL	**$0**		**1.2088**	**$0**	
3) Facility Construction					
A10 - Foundations	$852,000				
A20 - Basement Construction	$0				
B10 - Superstructure	$1,569,000				
B20 - Exterior Closure	$2,378,000				
B30 - Roofing	$371,000				
C10 - Interior Construction	$938,000				
C20 - Stairs	$71,000				
C30 - Interior Finishes	$670,000				
D10 - Conveying	$119,000				
D20 - Plumbing Systems	$341,000				
D30 - HVAC Systems	$1,442,000				
D40 - Fire Protection Systems	$132,000				
D50 - Electrical Systems	$1,428,000				
F10 - Special Construction	$0				
F20 - Selective Demolition	$0				
General Conditions	$1,259,000				
E10 - Equipment installed by contractor	$150,000				
E20 - Furnishings installed by contractor	$188,000				
Contractor's OH&P, Bond, Ins, B&O	$1,008,000				
Estimating contingency					
Escalation adjustment					
Sub TOTAL	**$12,916,000**		**1.2338**	**$15,935,761**	
4) Maximum Allowable Construction Cost					
MACC Sub TOTAL	**$13,686,000**			**$16,866,537**	

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7) Construction Contingency				
Allowance for Change Orders	$684,300			
Other				
Insert Row Here				
Sub TOTAL	**$684,300**	**1.2338**	**$844,290**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.2338**	**$0**	
Sales Tax				
Sub TOTAL	**$1,322,068**		**$1,629,397**	
CONSTRUCTION CONTRACTS TOTAL	**$15,692,368**		**$19,340,224**	

Cost Estimate Details

Equipment					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
E10 - Equipment	$650,000				
E20 - Furnishings	$378,000				
F10 - Special Construction					
Interior/Exterior Signage					
Insert Row Here					
Sub TOTAL	**$1,028,000**		**1.2338**	**$1,268,347**	
1) Non Taxable Items					
Other					
Insert Row Here					
Sub TOTAL	**$0**		**1.2338**	**$0**	
Sales Tax					
Sub TOTAL	**$94,576**			**$116,688**	
EQUIPMENT TOTAL	**$1,122,576**			**$1,385,035**	

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	$84,333				0.5% of Escalated MACC for new and renewal construction
Other					
Insert Row Here					
ARTWORK TOTAL	**$84,333**		**NA**	**$84,333**	

Cost Estimate Details

Project Management					
Item	**Base Amount**		**Escalation Factor**	**Escalated Cost**	**Notes**
Agency Project Management	$0				
Additional Services					
Construction Coordination					
Insert Row Here					
PROJECT MANAGEMENT TOTAL	**$0**		**1.2338**	**$0**	

Cost Estimate Details

Other Costs					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Mitigation Costs	$0				
Hazardous Material Remediation/Removal	$0				
Historic and Archeological Mitigation	$0				
LEED Registration / Certification fees	$5,000				
Permit Review Fees	$54,000				
Tree Mitigation Fees	$0				
City of BremertonTransportation Impact Fees					
Insert Row Here					
OTHER COSTS TOTAL	**$59,000**		**1.2088**	**$71,320**	

C-100(2018)
Additional Notes

Tab A. Acquisition
Insert Row Here

Tab B. Consultant Services
Insert Row Here

Tab C. Construction Contracts
Insert Row Here

Tab D. Equipment
Insert Row Here

Tab E. Artwork
Insert Row Here

Tab F. Project Management
Insert Row Here

Tab G. Other Costs
Insert Row Here

APPENDIX A: PREDESIGN CHECKLIST

OFM 2021-2023 PREDESIGN MANUAL

The Predesign checklist should be completed by the agency and submitted to OFM with the Predesign.

☑ **EXECUTIVE SUMMARY**

☑ **PROBLEM STATEMENT**

- ☑ Identify the problem, opportunity or program requirement that the project addresses and how it will be accomplished.
- ☑ Identify and explain the statutory or other requirements that drive the project's operational programs and how these affect the need for space, location or physical accommodations.
- ☑ Include anticipated case load projections (growth or decline) and assumptions, if applicable.
- ☑ Explain the connection between the agency's mission, goals and objectives; statutory requirements; and the problem, opportunity or program requirements.
- ☑ Describe in general terms what is needed to solve the problem.
- ☑ Include any relevant history of the project, including previous predesigns or budget funding requests that did not go forward to design or construction.

☑ **ANALYSIS OF ALTERNATIVES**

- ☑ Describe all alternatives that were considered, including the preferred alternative. Include:
  - ☑ A no action alternative.
  - ☑ Advantages and disadvantages of each alternative. Please include a high-level summary table with your analysis that compares the alternatives, including the anticipated cost for each alternative.
  - ☑ Cost estimates for each alternative:
    - ☑ Provide enough information so decision makers have a general understanding of the costs.
    - ☑ Complete OFM's Life Cycle Cost Model (RCW 39.35B.050).
  - ☑ Schedule estimates for each alternative. Estimate the start, midpoint and completion dates.

☑ **DETAILED ANALYSIS OF PREFERRED ALTERNATIVE**

- ☑ Nature of space – how much of the proposed space will be used for what purpose (i.e., office, lab, conference, classroom, etc.)
- ☑ Occupancy numbers.
- ☑ Basic configuration of the building, including square footage and the number of floors.
- ☑ Space needs assessment. Identify the guidelines used.
- ☑ Site analysis:
  - ☑ Identify site studies that are completed or under way and summarize their results.
  - ☑ Location.
  - ☑ Building footprint and its relationship to adjacent facilities and site features. Provide aerial view, sketches of the building site and basic floor plans.
  - ☑ Water rights and water availability.
  - ☑ Stormwater requirements.
  - ☑ Ownership of the site, easements, and any acquisition issues.
  - ☑ Property setback requirements.
  - ☑ Potential issues with the surrounding neighborhood, during construction and ongoing.
  - ☑ Utility extension or relocation issues.
  - ☑ Potential environmental impacts.
  - ☑ Parking and access issues, including improvements required by local ordinances, local road impacts and parking demand.
  - ☑ Impact on surroundings and existing development with construction lay-down areas and construction phasing.
- ☑ Consistency with applicable long-term plans (such as the Thurston County and Capitol campus master plans and agency or area master plans) as required by RCW 43.88.110.
- ☑ Consistency with other laws and regulations:
  - ☑ High-performance public buildings (Chapter 39.35D RCW).
  - ☑ State efficiency and environmental performance, if applicable (Executive Order 20-01).
  - ☑ State energy standards for clean buildings (RCW 19.27A.210).
  - ☑ Compliance with required vehicle charging capability for new buildings that provide on-site parking (RCW 19.27.540).
  - ☑ Greenhouse gas emissions reduction policy (RCW 70.235.070).
  - ☑ Archeological and cultural resources (Executive Order 05-05 and Section 106 of the National Historic Preservation Act of 1966). If mitigation is anticipated, please note this in the predesign with narrative about how mitigation is worked into the project schedule and budget.
  - ☑ Americans with Disabilities Act (ADA) implementation (Executive Order 96-04).

- ☑ Compliance with planning under Chapter 36.70A RCW, as required by RCW 43.88.0301.
- ☑ Information required by RCW 43.88.0301(1).
- ☑ Other codes or regulations.

- ☑ Identify problems that require further study. Evaluate identified problems to establish probable costs and risk.
- ☑ Identify significant or distinguishable components, including major equipment and ADA requirements in excess of existing code.
- ☑ Identify planned technology infrastructure and other related IT investments that affect the building plans.
- ☑ Identify any site-related and/or physical security measures for the project.
- ☑ Describe planned commissioning to ensure systems function as designed.
- ☑ Describe any future phases or other facilities that will affect this project.
- ☑ Provide a comparative discussion of the pros and cons of the project delivery methods considered for this project, and offer a recommendation of proposed procurement method for the preferred alternative. The proposed method of project delivery must be justified.
- ☑ Describe how the project will be managed within the agency.
- ☑ Schedule.
  - ☑ Provide a high-level milestone schedule for the project, including key dates for budget approval, design, bid, acquisition, construction, equipment installation, testing, occupancy and full operation.
  - ☑ Incorporate value-engineering analysis and constructability review into the project schedule, as required by RCW 43.88.110(5)(c).
    - ☑ Describe factors that may delay the project schedule.
    - ☑ Describe the permitting or local government ordinances or neighborhood issues (such as location or parking compatibility) that could affect the schedule.
    - ☑ Identify when the local jurisdiction will be contacted and whether community stakeholder meetings are a part of the process.

☑ **PROJECT BUDGET ANALYSIS FOR THE PREFERRED ALTERNATIVE**

- ☑ Cost estimate.
  - ☑ Major assumptions used in preparing the cost estimate.
  - ☑ Summary table of Uniformat Level II cost estimates.
  - ☑ The C-100.
- ☑ Proposed funding.
  - ☑ Identify the fund sources and expected receipt of the funds.
  - ☑ If alternatively financed, such as through a COP, provide the projected debt service and fund source. Include the assumptions used for calculating finance terms and interest rates.
- ☑ Facility operations and maintenance requirements.
  - ☑ Define the anticipated impact of the proposed project on the operating budget for the agency or institution. Include maintenance and operating assumptions (including FTEs) and moving costs.
  - ☑ Show five biennia of capital and operating costs from the time of occupancy, including an estimate of building repair, replacement and maintenance.
  - ☑ Identify the agency responsible for ongoing maintenance and operations, if not maintained by the owner.
- ☑ Clarify whether furniture, fixtures and equipment are included in the project budget. If not included, explain why.

☑ **PREDESIGN APPENDICES**

- ☑ Completed Life Cycle Cost Model.
- ☑ A letter from DAHP.
- ☑ Title report for projects including proposed acquisition.

APPENDIX B: PROGRAM SUMMARY

PROGRAM AND RELATED SPACE TABLE

Space						
	Space Name	NSF	No.	Total NSF	GSF (65% GF)	New Workstations
CLASSROOMS						
	Classroom	1,500	1	1,500	2,308	48
	Storage	200	1	200	308	
Subtotal Classroom				**1,700**	**2,615**	**48**
LABORATORIES						
	Cyber Range Lab + Mock Up Data Center Lab	3,024	1	3,024	4,652	64
	Small Projects Lab	1,008	1	1,008	1,551	18
	MakerSpace 1	1,344	1	1,344	2,068	24
	MakerSpace 2	672	1	672	1,034	6
	Engineering Lab 1	1,344	1	1,344	2,068	24
	Lab Storage	150	1	150	231	
Subtotal Laboratory Space				**7,542**	**11,603**	**136**
MENTOR + OFFICES						
	Faculty Office	100	15	1,500	2,308	15
	Multifunctional Support Space	400	1	400	615	
	Division Office	800	1	800	1,231	4
Subtotal Office Space				**2,700**	**4,154**	**19**
COLLABORATE						
	Informal Student Study	800	1	800	1,231	
	Open Breakout	600	1	600	923	
	Meeting/Conference	400	1	400	615	
	Team Rooms	200	2	400	615	
Subtotal Office Space				**2,200**	**3,385**	**-**
TOTAL				**14,142**	**21,757**	**203**

Grossing Factor	**65%**
Gross Area	**21,757**
Cost per ft2	**819**
Cost	**$ 17,818,920**

PROGRAM SUMMARY

CLASSROOMS 1,700 NSF

ACTIVE LEARNING CLASSROOM

(1) 1,500 NSF ACTIVE LEARNING CLASSROOM
(1) 200 NSF STORAGE

LABORATORIES 7,542 NSF

INNOVATION CENTER

(1) 3,024 NSF CYBERSECURITY RANGE + MOCK UP DATA CENTER LAB
(1) 1,008 NSF SMALL PROJECTS LAB
(1) 1,344 NSF MAKER SPACE
(1) 672 NSF MAKER SPACE
(1) 1,344 NSF ENGINEERING LAB
(1) 150 NSF LAB STORAGE

MENTOR 2,700 NSF

FACULTY OFFICES AND SUPPORT

(15) 100 NSF OFFICES
(1) 400 NSF MULTIFUNCTIONAL SUPPORT SPACE
(1) 800 NSF DIVISION OFFICE

COLLABORATE 2,200 NSF

(1) 800 NSF INFORMAL STUDENT STUDY
(1) 600 NSF OPEN BREAKOUT
(1) 400 NSF MEETING/CONFERENCE
(2) 200 NSF TEAM ROOMS

*Detailed space requirements provided; no sample room layout provided
**No detailed space requirements or sample room layout provided

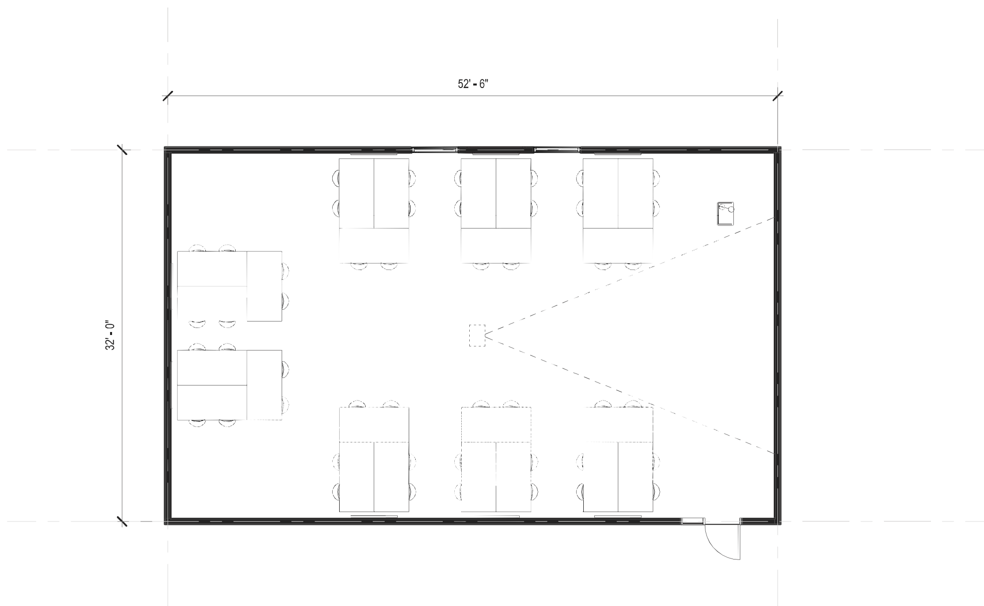
CLASSROOMS: ACTIVE LEARNING CLASSROOM

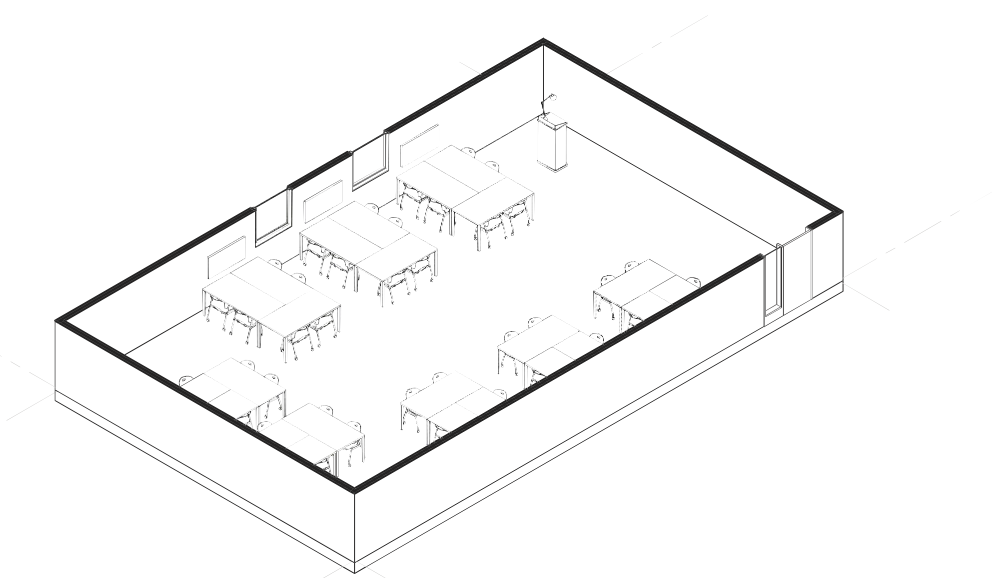
General Description

An active learning classroom provides an interactive hybrid learning environment. This active learning classroom has more flexibility with moveable furniture and monitors attached to each table group to help accommodate different collaboration styles. The active learning classroom has a capacity of up to 48 students.

Room size	1,680 NSF
Capacity	48 students
Height requirements	10’-0” minimum
Daylight Control	Access to daylight desirable, solar control needed
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Audio-Visual	Projector and screen Wall mounted flat screen monitor at each table AV floor box at instructor podium AV closet and technology support (in room or adjacent)
Lighting	Daylight and occupancy sensors
Furniture	Movable tables and chairs

Large Active Learning Classroom





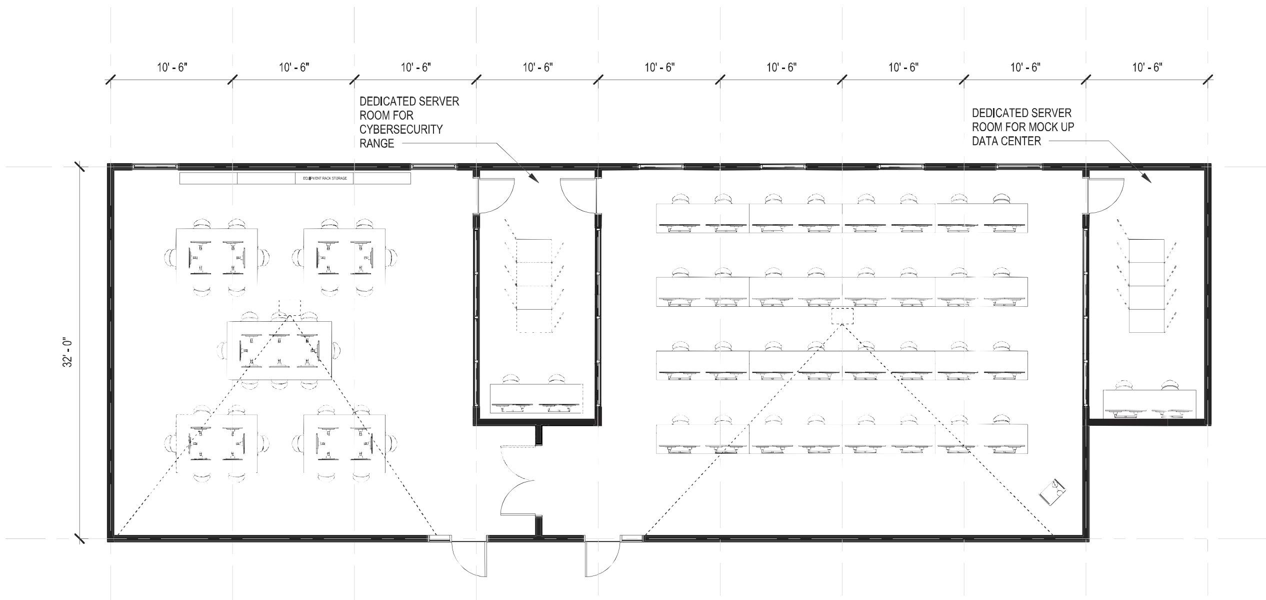
LABORATORIES: CYBERSECURITY RANGE + MOCKUP DATA CENTER LAB

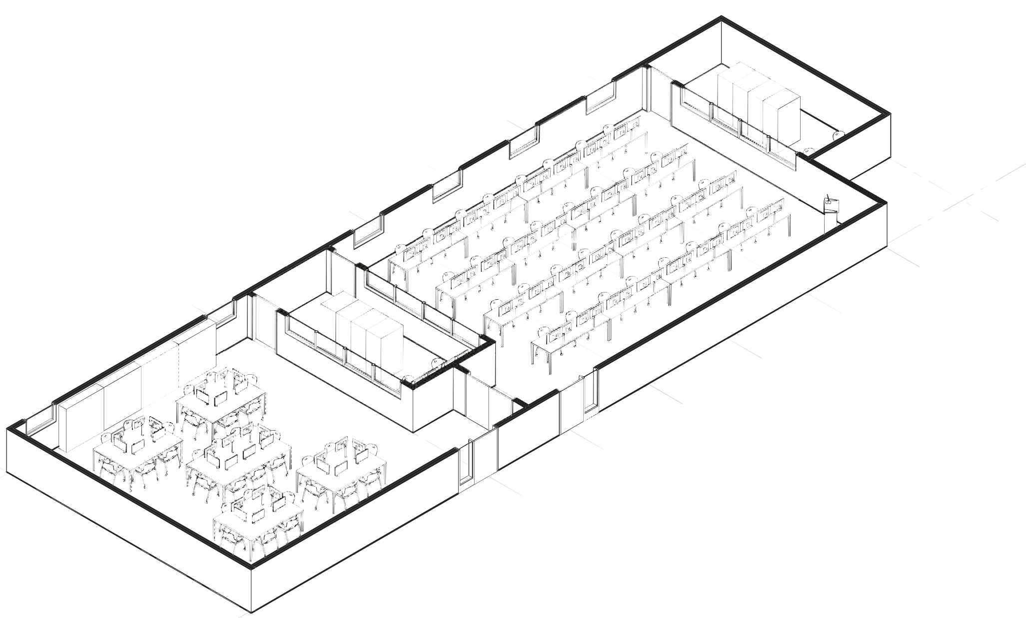
General Description

The space depicted is intended to be used for both the Cyber Range Lab and the Mock Up Data Center, each with a dedicated server room. The space is comprised of a standard forward facing classroom with one workstation per student. In the adjacent room is a collaboration style layout that can be utilized for multi-purpose use. The current capacity is 32 students per classroom.

Room size	3,024 NSF
Capacity	32 - 64 students
Height requirements	10’-0” minimum
Daylight Control	Access to daylight desirable, solar control needed
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Server/Equipment Racks One workstation per seat
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Audio-Visual	Projector and screen AV floor box at instructor podium AV closet and technology support (in room or adjacent)
Lighting	Daylight and occupancy sensors
Furniture	Movable tables and chairs

Cybersecurity Range + Mock up Data Center Lab





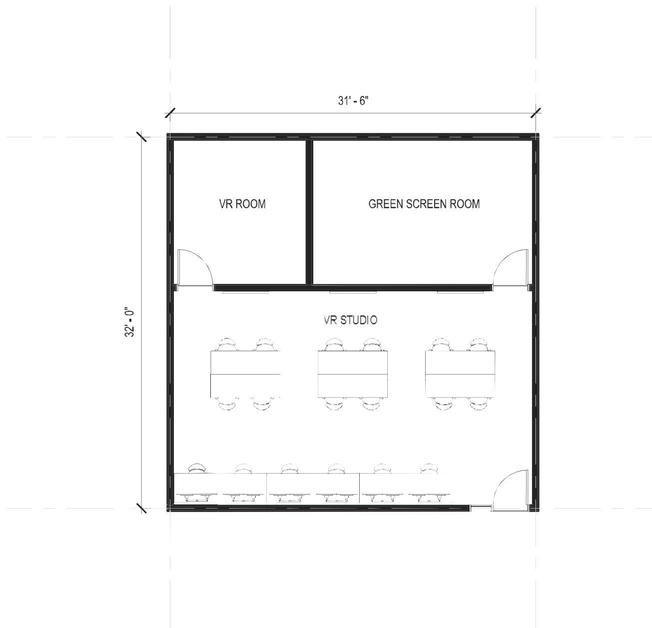
LABORATORIES: SMALL PROJECTS LAB

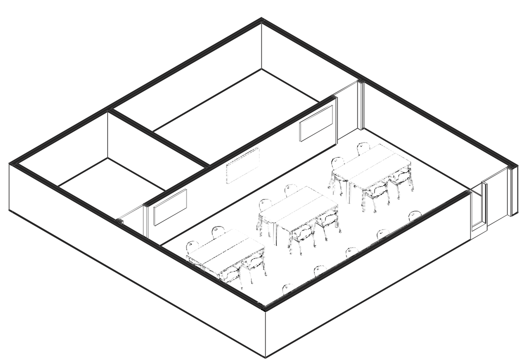
General Description

The small projects lab will accommodate AR/VR learning. The space provides a VR studio, a separate VR room, and a green screen room.

Room size	1,008 NSF
Capacity	12-18 students
Height requirements	10’-0” minimum
Daylight Control	Access to daylight desirable, solar control needed
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Server/Equipment Racks One workstation per seat
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Audio-Visual	Projector and screen AV floor box at instructor podium AV closet and technology support (in room or adjacent) VR Equipment Wall Monitors
Lighting	Daylight and occupancy sensors
Furniture	Movable tables and chairs

Small Projects Lab





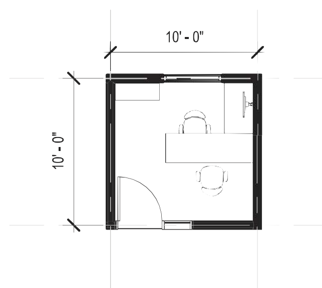
MENTOR: FACULTY OFFICE

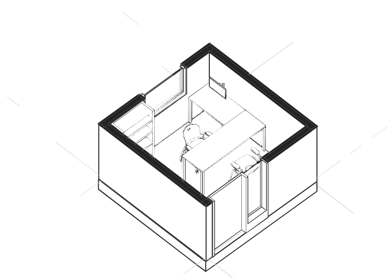
General Description

Layout for single occupancy faculty office that accommodates student advising.

Room size	100 NSF
Capacity	1 faculty member
Height requirements	10’-0” minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Monitors, computers
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Desk, table, and chairs

Faculty Office (x15)





MENTOR: MULTIFUNCTIONAL SUPPORT SPACE

General Description

Multifunctional Support Space will be located in close adjacency to the faculty offices. Creating extra public space for faculty to use for mentoring students or collaboration.

Room size	400 NSF
Capacity	16 people
Height requirements	10’-0” minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Monitors
Mechanical	Recirculated Air
Electrical	110v standard Phone data
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Tables and chairs

Multifunctional Support Space

** Suite layout to illustrate functionality or adjacencies - actual layout to be studied during schematic design*

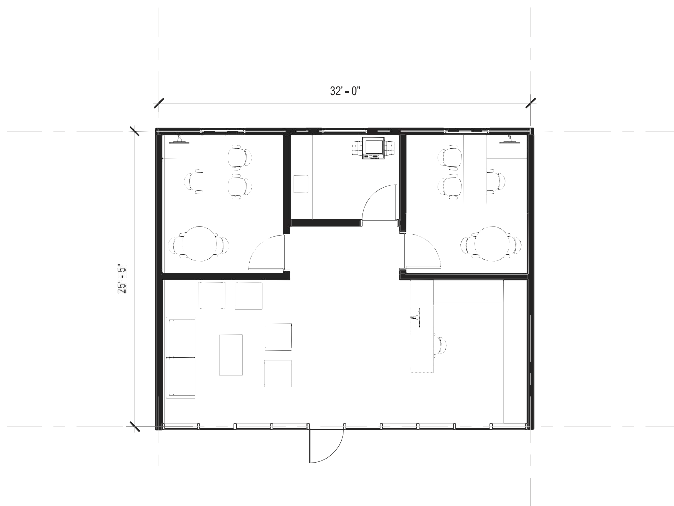
MENTOR: DIVISION OFFICE

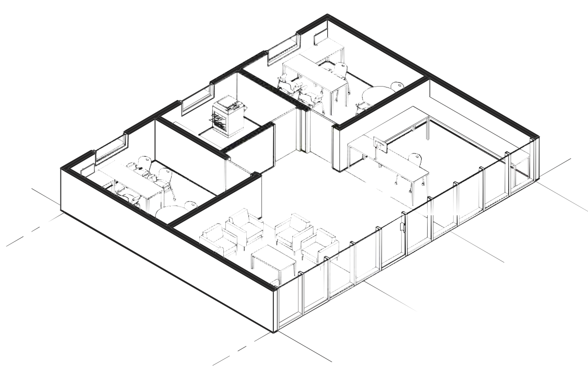
General Description

The division office provides two offices, a kitchenette/copy room, and a front public/reception area for guests to sit and wait.

Room size	800 NSF
Capacity	4 people
Height requirements	10’-0” minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Monitors, computers
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Desk, table, and chairs

Division Office





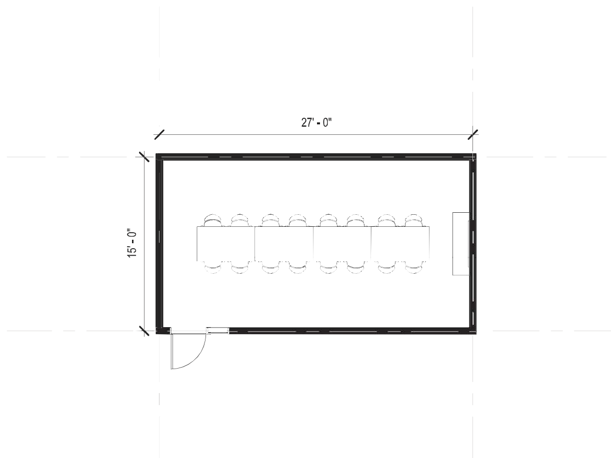
COLLABORATE: CONFERENCE ROOM

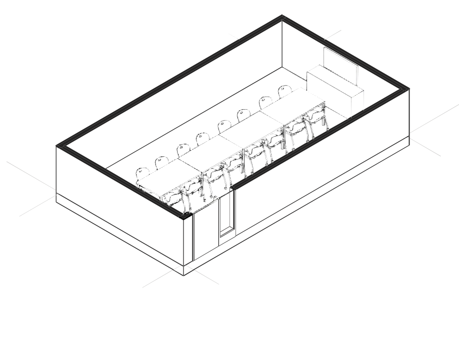
General Description

Conference Room to be utilized by faculty in larger staff meetings. The room contains a credenza and monitor at the front of the room with additional chairs at the back.

Room size	400 NSF
Capacity	16-20 people
Height requirements	10’-0” minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Credenza Monitor
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Tables and chairs

Conference Room





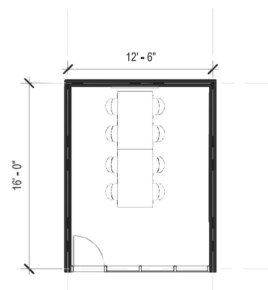
COLLABORATE: TEAM ROOM

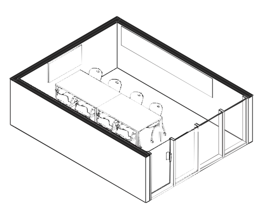
General Description

Team Room to be utilized by faculty and/or students in smaller meetings. The room contains a monitor and whiteboard for collaboration.

Room size	200 NSF
Capacity	8 people
Height requirements	10’-0” minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard Monitor
Mechanical	Recirculated Air
Electrical	110v standard Phone Data
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Tables and chairs

(x2) Team Room





COLLABORATE: INFORMAL STUDENT STUDY

General Description

Informal Student Study and Breakout Spaces will be located in open public areas of the building to provide additional study areas for students and the community. These spaces can also help accommodate additional spill-out from nearby classrooms and offices.

Room size	800 NSF
Capacity	28 people
Height requirements	10'-0" minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard
Mechanical	Recirculated Air
Electrical	110v standard Wifi
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Bench seating, tables, and chairs Flexible seating Moveable white boards

Informal Student Study

Example of informal Student Study Area at Alexandria Area High School, showing the possible activation of public space with different furniture types for collaboration and socializing.

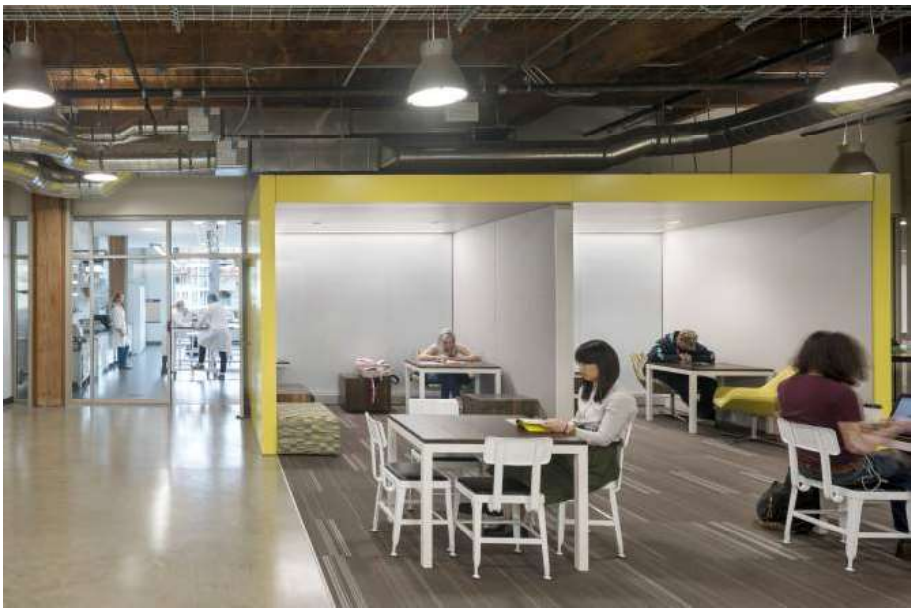
COLLABORATE: BREAKOUT SPACES

General Description

Informal Student Study and Breakout Spaces will be located in open public areas of the building to provide additional study areas for students and the community. These spaces can also help accommodate additional spill-out from nearby classrooms and offices.

Room size	600 NSF
Capacity	21 people
Height requirements	10'-0" minimum
Daylight Control	Sun Control and/or privacy screen
Flooring	Carpet
Base	Rubber
Walls	Gypsum Board, paint
Ceiling	Acoustic
Casework / Equipment	Whiteboard
Mechanical	Recirculated Air
Electrical	110v standard Wifi
Lighting	30fc at work surface Daylight and occupancy sensors
Furniture	Bench seating, tables, and chairs Flexible seating Moveable white boards

Breakout Spaces



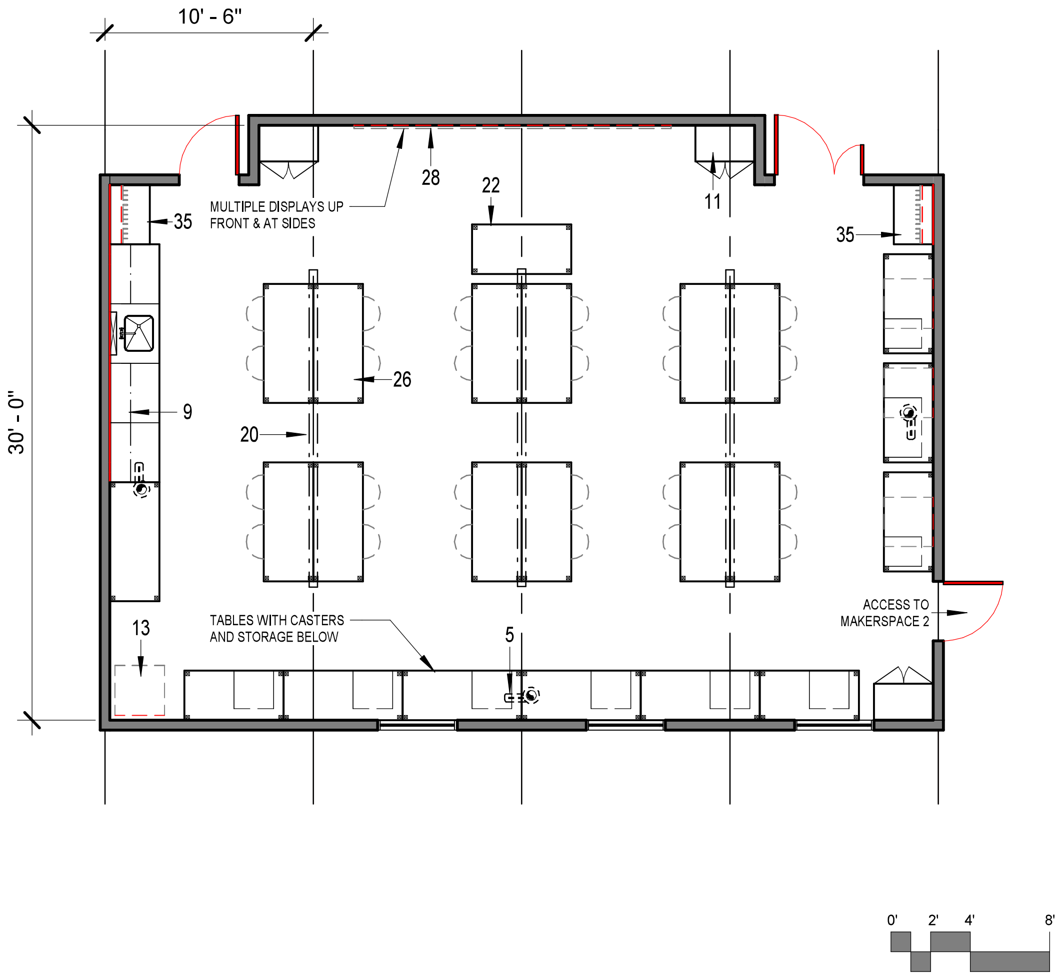
Breakout Space at UW Tacoma Urban Solutions Center containing nooks for privacy and acoustic dampening, but still visible. Different types of furniture is also featured in the space for different activities.

Breakout Spaces at University of Arizona Student Success District displaying flexible/movable furniture such as chairs, tables, and whiteboards.

SPACE DIAGRAMS | **The Miller Hull Partnership**
OLYMPIC COLLEGE, INNOVATION + TECHNOLOGY LEARNING CENTER | **Research Facilities Design**

DEPARTMENT: MESH/B&T DIVISIONS | **SPACE ID NO: 2.04**
SPACE NAME: MAKERSPACE 1 | **AREA (NSF): 1,260**

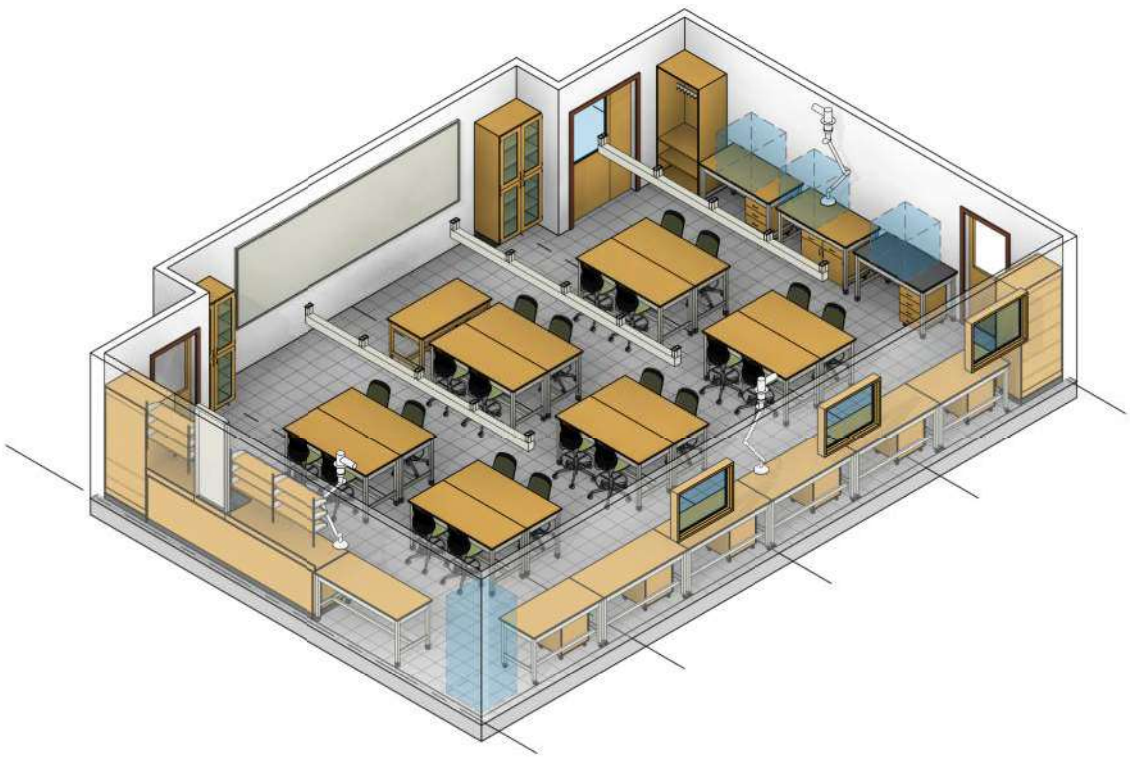
This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Wall Shelves
10. Island Bench Shelves
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Heavy Duty Adjustable Shelving
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Reagent Shelving
25. Autoclave
26. Movable Laboratory Table
27. Wire Shelving
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Mobile Bench Workstation
32. Balance Table
33. Writing Table
34. Multi-media Projector & Screen (Clg. Mtd.)
35. Coat/Book Bag Storage Unit

Maker Space 1



DETAILED SPACE REQUIREMENTS — **The Miller Hull Partnership**

OLYMPIC COLLEGE, INNOVATION + TECHNOLOGY LEARNING CENTER — **Research Facilities Design**

DEPARTMENT: MESH/B&T DIVISIONS — **SPACE ID NO: 2.04**

SPACE NAME: MAKER SPACE 1 — **OCCUPANTS: 24**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	

MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	4
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	

HOODS	
Chemical Fume Hood	
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
70 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	●
Other	
Base	
4" Topset Base	●
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	10'-0"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	●

EQUIPMENT / INSTRUMENTATION	
Computers	●
(TBD)	

REMARKS:

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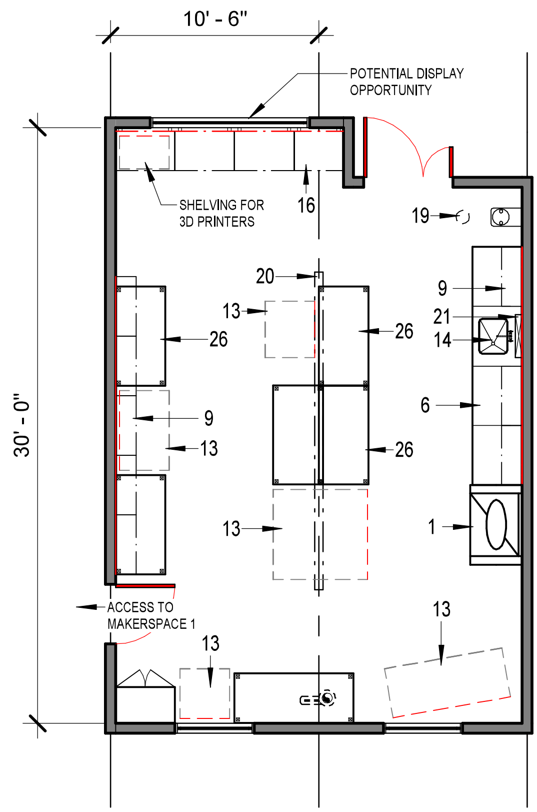
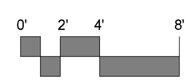
SPACE DIAGRAMS	The Miller Hull Partnership
OLYMPIC COLLEGE, INNOVATION + TECHNOLOGY LEARNING CENTER	Research Facilities Design

DEPARTMENT: MESH/B&T DIVISIONS **SPACE ID NO: 2.05**
SPACE NAME: MAKERSPACE 2 **AREA (NSF): 630**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.





FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Wall Shelves
10. Island Bench Shelves
11. Tall Storage Cabinet
12. Flammable Storage Cabinet
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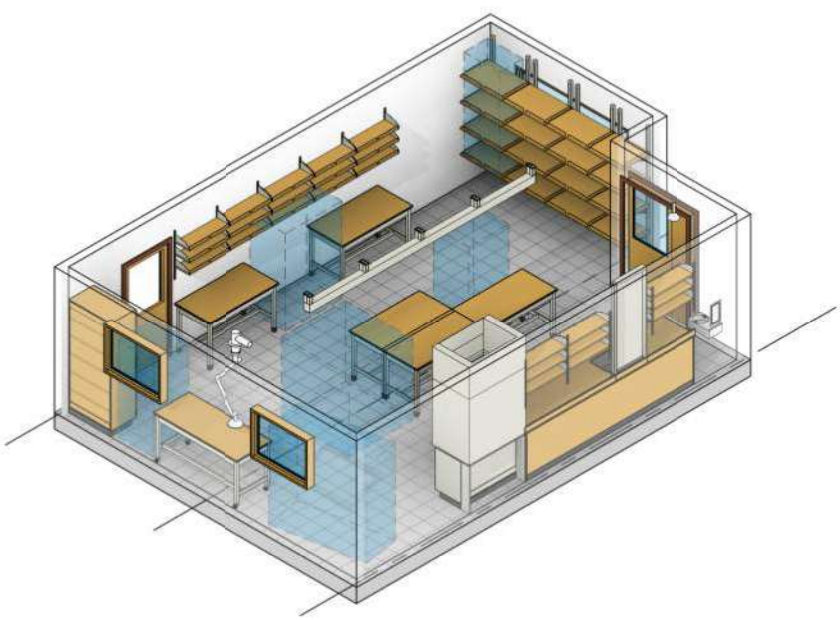
16. Heavy Duty Adjustable Shelving
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Reagent Shelving
25. Autoclave
26. Movable Laboratory Table
27. Wire Shelving
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Mobile Bench Workstation
32. Balance Table
33. Writing Table
34. Multi-media Projector & Screen (Clg. Mtd.)
35. Coat/Book Bag Storage Unit

Maker Space 2



DETAILED SPACE REQUIREMENTS

OLYMPIC COLLEGE, INNOVATION + TECHNOLOGY LEARNING CENTER

The Miller Hull Partnership
Research Facilities Design

DEPARTMENT: MESH/B&T DIVISIONS — **SPACE ID NO: 2.05**
SPACE NAME: MAKER SPACE 2 — **OCCUPANTS: 6**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	

MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	

HOODS	
Chemical Fume Hood	Note 1
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	●
Other	Note 2

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING	
Laboratory Gas (LG)	
Laboratory Vacuum (LV)	
Laboratory Air (LA)	
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
70 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	
Zoned Lighting	
Other	

CHEMICALS	
Bases	
Acids	
Solvents	
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	●
Other	
Base	
4" Topset Base	●
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	10'-0"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	

EQUIPMENT / INSTRUMENTATION	
3D Printer (4)	●
Laser Cutter	●

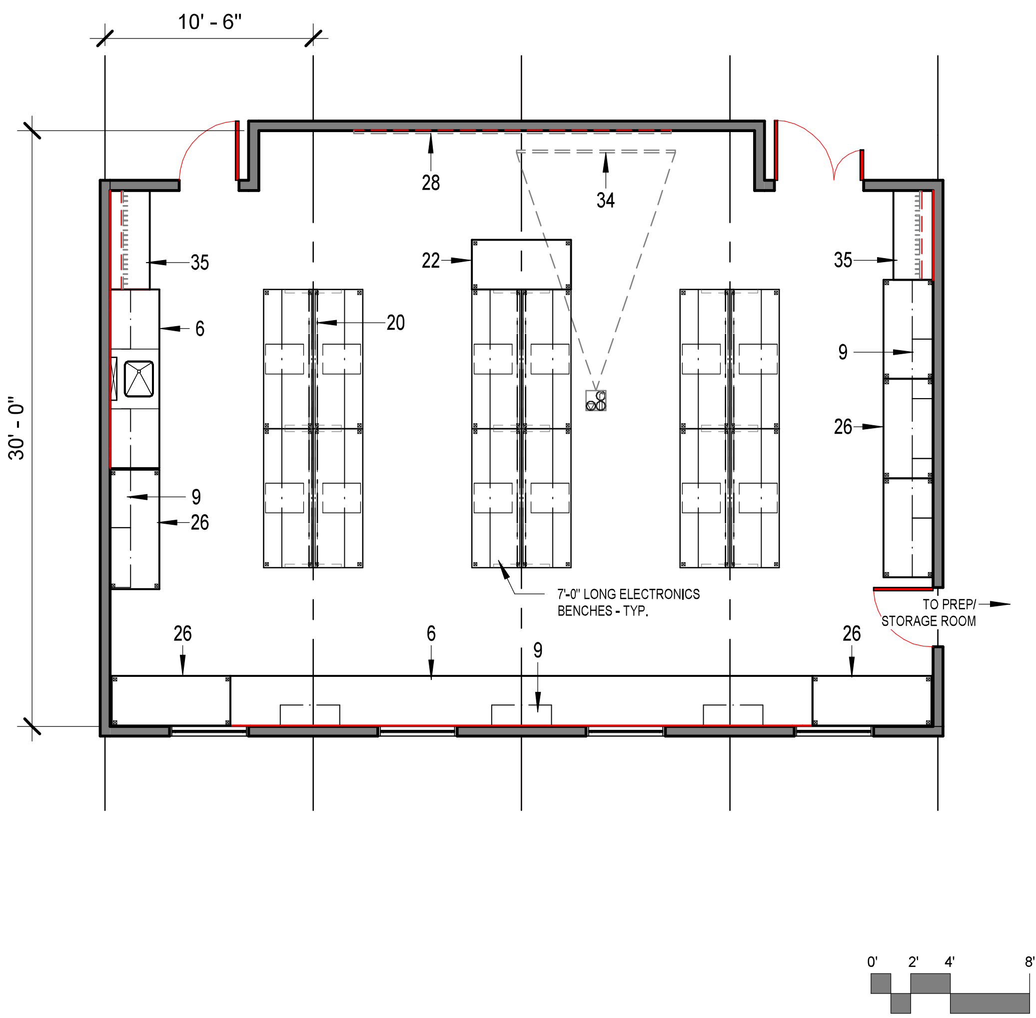
REMARKS:

1. (1) 4'-0" chemical fume hood
2. Review containment requirements for UFP from 3D printers.

SPACE DIAGRAMS | **The Miller Hull Partnership**
OLYMPIC COLLEGE, INNOVATION + TECHNOLOGY LEARNING CENTER | **Research Facilities Design**

DEPARTMENT: MESH DIVISION | **SPACE ID NO: 2.06**
SPACE NAME: ENGINEERING LAB 1 | **AREA (NSF): 1,260**

This diagram is conceptual and is provided only to indicate required furnishings, equipment, and general room proportions. The actual room design may change.



FURNISHINGS

1. Chemical Fume Hood
2. Biological Safety Cabinet
3. Radioisotope Hood
4. Vented Workstation
5. Snorkel Exhaust
6. Laboratory Bench, Standing Height
7. Laboratory Bench, Sitting Height
8. Wall Cabinet
9. Adjustable Wall Shelves
10. Island Bench Shelves
11. Tall Storage Cabinet
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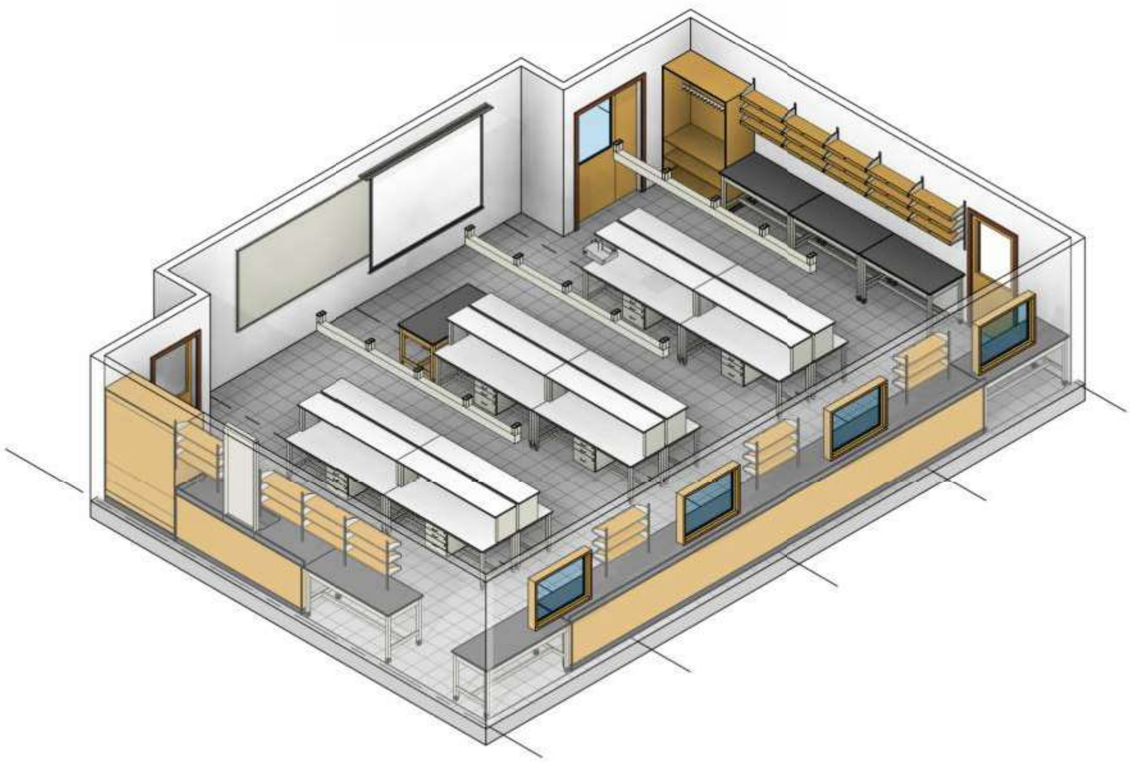
13. Equipment Space
14. Laboratory Sink
15. Cupsink
16. Heavy Duty Adjustable Shelving
17. Cylinder Rack
18. Gas Cabinet
19. Safety Shower/Eyewash
20. Overhead Service Carrier
21. Pipe Drop Enclosure
22. Movable Demonstration Bench
23. Glassware Washer
24. Reagent Shelving
25. Autoclave
26. Movable Laboratory Table
27. Wire Shelving
28. White Markerboard
29. Black Chalkboard
30. Tackboard
31. Mobile Bench Workstation
32. Balance Table
33. Writing Table
34. Multi-media Projector & Screen (Clg. Mtd.)
35. Coat/Book Bag Storage Unit

Engineering Lab



DETAILED SPACE REQUIREMENTS

OLYMPIC COLLEGE, INNOVATION + TECHNOLOGY LEARNING CENTER

The Miller Hull Partnership
Research Facilities Design

DEPARTMENT: MESH — **SPACE ID NO: 2.06**
SPACE NAME: ENGINEERING LAB 1 — **OCCUPANTS: 24**

UTILIZATION	
Hours of Use	
8 hours/day	
14 hours/day	●
24 hours/day	

MECHANICAL	
Temperature	
68°-75° ± 2°F	●
Other	
Humidity	
Uncontrolled	●
Other	
Minimum Air Changes/Hour	6
Air Recirculation	
Air Pressure Positive	
Air Pressure Negative	●
Additional Supply Air Filtr.	
Additional Exhaust Air Filtr.	

HOODS	
Chemical Fume Hood	●
Radioisotope Hood	
Laminar Flow Hood	
Biological Safety Cabinet	
Snorkel	●
Canopy Hood	
Low Slotted Exhaust	
Equipment Exhaust	
Other	

LABORATORY EQUIPMENT	
Vibration Sensitive	
Light Sensitive	
Vibration Producing	
Heat Producing	
Noise Producing	

PLUMBING	
Laboratory Gas (LG)	(?)
Laboratory Vacuum (LV)	
Laboratory Air (LA)	●
Compressed Air, 100 psi (A)	
Industrial Hot Water (IHW)	●
Industrial Cold Water (ICW)	●
Potable Hot Water (HW)	
Potable Cold Water (CW)	
Purified Water (DI/RO)	
Chilled Water (CHW S/R)	
Steam	
Condensate Return	
Carbon Dioxide ($C0_2$)	
Nitrogen Gas (N_2)	
Cylinder Gases	
Inert	
Flammable	
Toxic	
Floor Drain (FD)	
Floor Sink (FS)	
Safety Shower/Eyewash (SS)	●
Eyewash (EW)	●

ELECTRICAL	
110V, 20A, 1 Phase	●
208V, 30A, 1 Phase	●
208V, 30A, 3 Phase	●
480V, 100A, 3 Phase	
Isolated Ground Outlet	
Emergency Power	
UPS (OFOI)	
Phone	●
Data	●
In Use Light	
Task Lighting	
Lighting Level	
100 fc at bench/desk	
70 fc at bench/desk	●
Safe light	
Special Lighting	
Darkenable	●
Zoned Lighting	●
Other	

CHEMICALS	
Bases	
Acids	●
Solvents	●
Radioisotopes	
Carcinogens/Regulated	
Chemical Waste Storage	
Biological Storage	
Radioisotope Storage	
Chemical Storage	

ARCHITECTURAL	
Floor	
Resilient Tile	
Welded Seam Sheet Vinyl	
Epoxy	
Sealed Concrete	●
Other	
Base	
4" Topset Base	●
Integral w/floor	
Partitions	
Gyp Board, Epoxy Paint	
Gyp Board, Paint	●
Epoxy/Fiberglass System	
Other	
Ceiling	
Open	
Acoustic Tile	●
Gyp Board, Epoxy Paint	
Height	10'-0"
Doors	
3'-6" x 7'	
3' x 7'	●
1'-6" x 7'	●
Light Tight Rotating Door	
Vision Panel	●
Natural Daylight	●

EQUIPMENT / INSTRUMENTATION	
Electronics Benches	●

REMARKS:

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APPENDIX C: OFM LIFE CYCLE COST MODEL

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Life Cycle Cost Analysis - Project Summary

Agency	
Project Title	

Existing Description	

Lease Option 1 Description	1225 Campbell Way and 2500 Cherry Pl (Cost of lease has been averaged between the two properties)

Lease Option 2 Description	

Ownership Option 1 Description	Innovation and Learning Technology Center

Ownership Option 2 Description	

Ownership Option 3 Description	

Lease Options Information	**Existing Lease**	**Lease Option 1**	**Lease Option 2**
Total Rentable Square Feet	-	24,423	-
Annual Lease Cost (Initial Term of Lease)	$ -	$ 471,364	$ -
Full Service Cost/SF (Initial Term of Lease)	$ -	$ 19.30	$ -
Occupancy Date	n/a	8/1/2022	
Project Initial Costs	n/a	$ 10,624,000	$ -
Persons Relocating	-	-	-
RSF/Person Calculated			

Ownership Information	**Ownership 1**	**Ownership 2**	**Ownership 3**
Total Gross Square Feet	21,757	-	-
Total Rentable Square Feet	14,142	-	-
Occupancy Date	10/1/2025		
Initial Project Costs	$ -	$ -	$ -
Est Construction TPC ($/GSF)	$ 1,153	$ -	$ -
RSF/Person Calculated	-	-	-

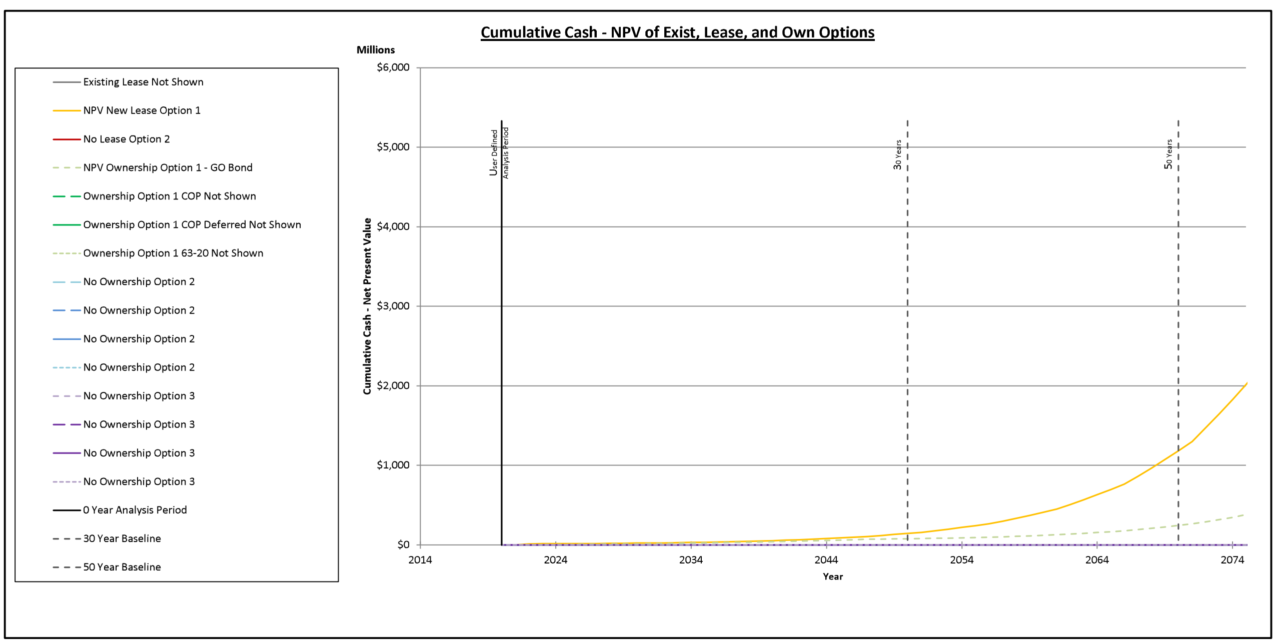
Financial Analysis of Options

Years		Existing Lease	Lease 1	Lease 2	Ownership 1			
	Display Option?	No	Yes	No	Yes	No	No	No
	Financial Comparisons	**Existing Lease**	**Lease 1**	**Lease 2**	**Ownership 1**			
Years	**Financing Means**	**Current**	**Current**	**Current**	**GO Bond**	**COP**	**COP Deferred ***	**63-20**
0	0 Year Cumulative Cash		$ -		$ -			
	0 Year Net Present Value		$ -		$ -			
	Lowest Cost Option (Analysis Period)							

	Financial Comparisons	**Existing Lease**	**Lease 1**	**Lease 2**	**Ownership 1**			
Years	**Financing Means**	**Current**	**Current**	**Current**	**GO Bond**	**COP**	**COP Deferred ***	**63-20**
30	30 Year Cumulative Cash		$ 62,871,509		$ 37,010,594			
	30 Year Net Present Value		$ 130,558,700		$ 74,923,343			
	Lowest Cost Option (30 Years)		2		1			

	Financial Comparisons	**Existing Lease**	**Lease 1**	**Lease 2**	**Ownership 1**			
Years	**Financing Means**	**Current**	**Current**	**Current**	**GO Bond**	**COP**	**COP Deferred ***	**63-20**
50	50 Year Cumulative Cash		$ 241,283,117		$ 65,515,877			
	50 Year Net Present Value		$ 1,072,355,101		$ 225,105,064			
	Lowest Cost Option (50 Years)		2		1			

** - Defers payment on principle for 2 years while the building is being constructed. See instructions on Capitalized Interest.*



Financial Assumptions

Date of Life Cycle Cost Analysis:	
Analysis Period Start Date	8/1/2020
User Input Years of Analysis	0

All assumptions subject to change to reflect updated costs and conditions.

	Lease Options			Ownership Option 1		
	Existing Lease	**Lease Option 1**	**Lease Option 2**	**GO Bond**	**COP**	**63-20**
Inflation / Interest Rate	7.064%	7.064%	7.064%	2.881%	2.981%	3.081%
Discount Rate	-3.814%	-3.814%	-3.814%	-3.814%	-3.814%	-3.814%
Length of Financing	N/A	N/A	N/A	25	25	25

See Financial Assumptions tab for more detailed information

COP Deferred and 63-20 Financing defer the payment on principle until construction completion.

New Lease Assumptions

Real Estate Transaction fees are 2.5% of the lease for the first 5 years and 1.25% for each year thereafter in the initial term of the lease.

Tenant Improvements are estimated at $435 per rentable square foot.

IT infrastructure is typically estimated at $1500 per person.

Furniture costs are typically estimated at $7000 per person and do not include new workstations.

Moving Vendor and Supplies are typically estimated at $300 per person.

Default Ownership Options Assumptions

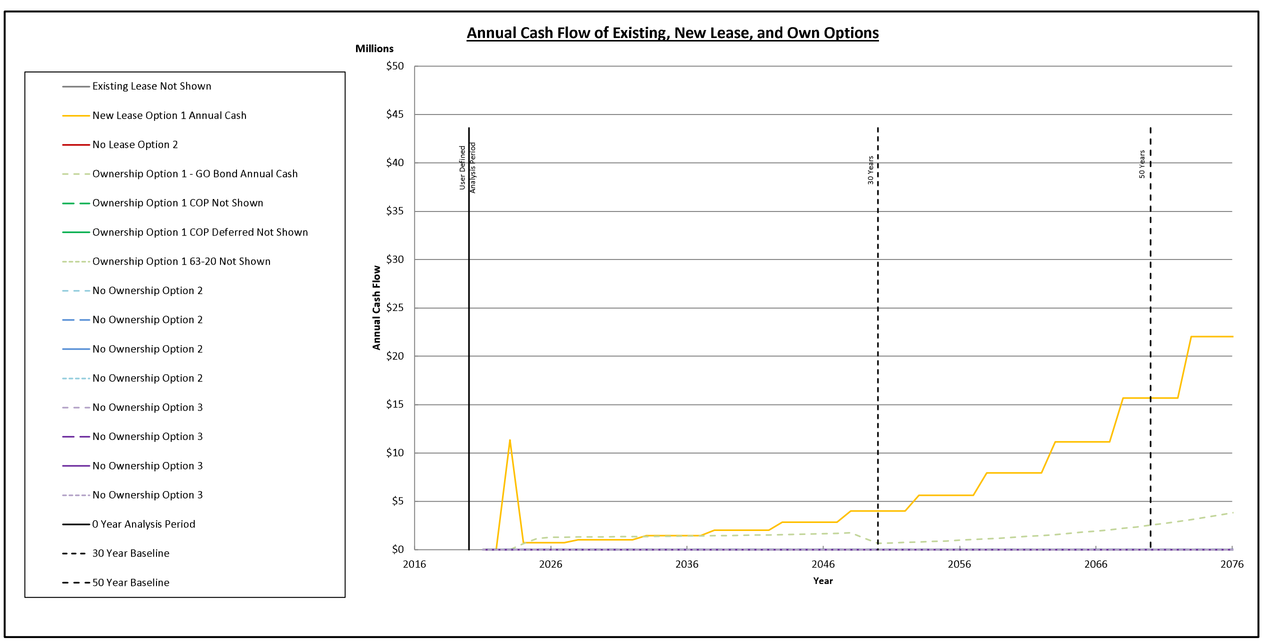
Assumes a 2 month lease to move-in overlap period for outfitting building and relocation.

Assumes surface parking.

The floor plate of the construction option office building is 25,000 gross square feet.

The estimated total project cost for construction is $506.63 per square foot.

See the Capital Construction Defaults tab for more construction assumptions.



Lease Option 1 Information Sheet

*	***Requires a user input***	*Green Cell*	*= Value can be entered by user.*	*Yellow Cell*	*= Calculated value.*

*	**New Lease Option 1 Description**	1225 Campbell Way and 2500 Cherry Pl (Cost of lease has been averaged between the two properties)

	New Lease Information			
*	Lease Location	Bremerton	Market Area:	Northwest Washington
*	Lease Square Feet Type	Rentable		
*	New Facility Square Feet	24,423		
*	New Lease Start Date	8/1/2022		
	SF per Person Calculated			

	New Lease Costs	**Years of Term**	**Rate / SF / Year**	**Rate / Month**	**Adjusted to FS Rate**	**Total FS Rate / Month**	**Estimated FSG Market Rate**	**Estimated FSG Rate / Month**	**Real Estate Transaction Fees for Term**
*	Years 1 - 5	5	$ 19.30	$ 39,280	$ 29.73	$ 60,504	$ 32.15	$ 65,429	$ 58,920
	Years								
	Years								
	Years								
	Years								
	Total Length of Lease	5							$ 58,920
	Transaction Fee for first 5 Years	2.50%	*of total rent for first 5 years of term*						
	Transaction Fee for Additional Years	1.25%	*of total rent for term beyond 5 years*						

Note: Real estate transaction fees calculated on base lease - not full service rate including added services and utilities.

Added Services	New Lease Operating Costs (Starting in current year)	Known Cost / SF / Year	Estimated Cost / SF / Year in 2022 - Rentable	Total Cost / Year	Cost / Month	Escalated to lease start date
☑	Energy (Electricity, Natural Gas)	$ -	$ 1.23	$ 30,071	$ 2,506	
☑	Janitorial Services	$ -	$ 1.50	$ 36,608	$ 3,051	
☑	Utilities (Water, Sewer, & Garbage)	$ -	$ 0.54	$ 13,074	$ 1,090	
☑	Grounds	$ -	$ 0.06	$ 1,569	$ 131	
☑	Pest Control	$ -	$ 0.11	$ 2,615	$ 218	
☑	Security	$ -	$ 0.10	$ 2,353	$ 196	
☑	Maintenance and Repair	$ -	$ 5.92	$ 144,600	$ 12,050	
☑	Management	$ -	$ 0.97	$ 23,795	$ 1,983	
☐	Road Clearance	$ -	$0.00	$ -	$ -	
☐	Telecom	$ -	$0.00	$ -	$ -	
	Additional Parking	$ -	$ -	$ -	$ -	
	Other	$ -	$ -	$ -	$ -	
	Total Operating Costs	**$ -**	**$ 10.43**	**$ 254,685**	**$ 21,224**	

	New Lease One Time Costs	Current Estimate	Calculated (for reference)	
*	Real Estate Transaction Fees		$ 58,920	*Per Std %*
*	Tenant Improvements	$ 10,624,000	$ 366,345	*$435 per SF*
*	IT Infrastructure		$ -	*$1500 per Person*
*	Furniture Costs		$ -	*$7000 per Person*
*	Building Security and Access Systems			*$450 per person*
*	Moving Vendor and Supplies		$ -	*$300 per Person*
	Other / Incentive			
	Total	$ 10,624,000	$ 425,265	

Biennium Budget Impacts for New Lease	Biennium Time Period Start	Finish	Existing Lease Option	New Lease Option 1	Biennium Impact:
19-21 Biennium Lease Expenditure	7/1/2019	6/30/2021	$ -	$ -	$ -
21-23 Biennium Lease Expenditure	7/1/2021	6/30/2023	$ -	$ 11,289,545	$ 11,289,545
23-25 Biennium Lease Expenditure	7/1/2023	6/30/2025	$ -	$ 1,452,098	$ 1,452,098
25-27 Biennium Lease Expenditure	7/1/2025	6/30/2027	$ -	$ 1,452,098	$ 1,452,098
27-29 Biennium Lease Expenditure	7/1/2027	6/30/2029	$ -	$ 2,018,171	$ 2,018,171

Ownership Option 1 Information Sheet

*	***Requires a user input***	*Green Cell*	*= Value can be entered by user.*	*Yellow Cell*	*= Calculated value.*

*	**Project Description**	Innovation and Learning Technology Center	
*	**Construction or Purchase/Remodel**	Construction	
*	**Project Location**	Bremerton	Market Area = Northwest Washington

	Statistics	
*	Gross Sq Ft	21,757
*	Usable Sq Ft	14,142
	Space Efficiency	65%
	Estimated Acres Needed	2.00
	MACC Cost per Sq Ft	$626.74
	Estimated Total Project Costs per Sq Ft	$939.29
	Escalated MACC Cost per Sq Ft	$769.17
	Escalated Total Project Costs per Sq Ft	$1,152.75

*	**Move In Date**	10/1/2025

Interim Lease Information	**Start Date**
Lease Start Date	
Length of Lease (in months)	
Square Feet (holdover/temp lease)	
Lease Rate- Full Serviced ($/SF/Year)	
One Time Costs (if double move)	

	Construction Cost Estimates (See Capital Budget System For Detail)			
		Known Costs	Estimated Costs	Cost to Use
	Acquisition Costs Total	$ 50,000	$ 500,000	$ 50,000
A & E	**Consultant Services**			
A & E	A & E Fee Percentage (if services not specified)		7.49% Std	7.49%
A & E	Pre-Schematic Design services			
A & E	Construction Documents	$ 754,777		
A & E	Extra Services	$ 1,546,600		
A & E	Other Services	$ 1,018,073		
A & E	Design Services Contingency	$ 165,972		
A & E	**Consultant Services Total**	$ 3,485,422	$ 1,704,500	$ 3,485,422
	Construction Contracts			
MACC	Site Work	$ 720,000		
MACC	Related Project Costs			
MACC	Facility Construction	$ 12,916,000		
	MACC SubTotal	$ 13,636,000	$ 7,873,423	$ 13,636,000
	Construction Contingency (5% default)	$ 681,800	$ 681,800	$ 681,800
	Non Taxable Items			$ -
	Sales Tax	$ 1,317,238	$ 1,227,240	$ 1,317,238
	Construction Additional Items Total	$ 1,999,038	$ 1,909,040	$ 1,999,038
	Equipment			
	Equipment	$ 1,028,000		
	Non Taxable Items			
	Sales Tax	$ 94,576		
	Equipment Total	$ 1,122,576		$ 1,122,576
	Art Work Total	$ 84,030	$ 68,180	$ 84,030
	Other Costs			
	LEED Registration/Certification	$ 5,000		
	Plan Review/Permit Fees	$ 54,000		
	Other Costs Total	$ 59,000		$ 59,000
	Project Management Total			$ -
	Grand Total Project Cost	**$ 20,436,066**	**$ 12,055,143**	**$ 20,436,066**

Construction One Time Project Costs			
One Time Costs	Estimate	Calculated	
Moving Vendor and Supplies		$ -	*$300 / Person in FY22*
Other (not covered in construction)			
Total	$ -	$ -	

	Ongoing Building Costs				
Added Services	New Building Operating Costs	Known Cost /GSF/ 2025	Estimated Cost /GSF/ 2025	Total Cost / Year	Cost / Month
☑	Energy (Electricity. Natural Gas)	$ -	$ 1.51	$ 32,876	$ 2,740
☑	Janitorial Services	$ -	$ 1.84	$ 40,023	$ 3,335
☑	Utilities (Water, Sewer, & Garbage)	$ -	$ 0.66	$ 14,294	$ 1,191
☑	Grounds	$ -	$ 0.08	$ 1,715	$ 143
☑	Pest Control	$ -	$ 0.13	$ 2,859	$ 238
☑	Security	$ -	$ 0.12	$ 2,573	$ 214
☐	Maintenance and Repair	$ -	$0.00	$ -	$ -
☑	Management	$ -	$ 1.20	$ 26,015	$ 2,168
☐	Road Clearance	$ -	$0.00	$ -	$ -
☐	Telecom	$ -	$0.00	$ -	$ -
	Additional Parking	$ -	$ -	$ -	$ -
	Other	$ -	$ -	$ -	$ -
	Total Operating Costs	**$ -**	**$ 5.53**	**$ 120,354**	**$ 10,030**

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APPENDIX D: PROJECT NARRATIVES BY DISCIPLINE

A. Civil
B. Landscape
C. Structural
D. Lab Planning
E. Mechanical
F. Plumbing
G. Telecommunications
H. Electrical
I. Acoustics

A. CIVIL ENGINEERING NARRATIVE

SITE OVERVIEW

The proposed site is located on the Bremerton Campus of Olympic College and consists of three parcels totaling approximately 0.41 acres (Kitsap County parcel numbers: 3797-002-016-0009, 3797-002-001-0006, and 3797-002-002-0005). The site area proposed for the new Innovation & Technology Learning Center (ITLC) sits at the western edge of the campus, and is currently developed with a surface parking area, as well as, a small residential structure. The proposed site area is bounded by Ohio Avenue to the west, 15th Street to the north, the existing First Baptist Church-Bremerton to the south, and Lincoln Avenue to the east with other existing campus facilities beyond.

Topographically, the site is relatively flat with only slight changes in elevation across the full span of the parcel. However, based on existing survey information, the site topography generally slopes down from the south to the northwest from a high elevation of approximately 191-feet. The lowest point on the site sits at approximately 184-feet.

According to Kitsap County critical areas mapping, there are no environmentally sensitive areas that have been designated on the site that will constrain or affect the extent of proposed new development.

USDA geological map data for the site area indicates that soils on the site primarily consists of Alderwood gravelly sandy loam, 0 to 8 percent slopes (Map Unit: #1). Hydrologically, this soil type is classified as a moderately well-drained soil, which indicates feasible infiltration on the site. However, a geotechnical investigation will be required to confirm existing subsurface soil conditions, as well as the potential for on-site infiltration. Based upon the two closest tests from information within the Hart Crowser Geotechnical Engineering Design Study for College Instruction Center dated July 16, 2013, there is some concern that there may be fill and or soils that have a high content of silt and sand.

The campus and project site are located in an area classified as an Institutional (INST) zone. According to the City's municipal code, the purpose of this zoning classification is to support the continued operation and managed growth of Olympic College.

PERMITTING

The site resides in the governing jurisdiction of the City of Bremerton. As such, all permitting for the proposed development including for utilities, stormwater, drainage and right-of-way improvements will be through the City of Bremerton.

SITE ACCESS, CIRCULATION AND PARKING

Existing vehicular ingress to the site is provided off of Ohio Avenue and existing vehicular egress is onto Lincoln Avenue. There are no additional vehicular access points for the existing site. Currently pedestrian access to the site is from the very south edge along Ohio or east along Lincoln Avenue as there are existing 6-inch concrete walls along the majority of the 15th Street and Ohio Avenue frontages.

With the exception of the existing residential structure occupying the southeast corner of the site, the majority of the existing parcel areas are currently developed as a surface parking lot with both straight and angled standard parking spaces. There does not appear to be existing accessible parking spaces on the site.

FRONTAGE AND ACCESSIBILITY

The site is fronted to the west by Ohio Avenue, to the north by 15th Street, and to the east by Lincoln Avenue, which based on Kitsap County mapping are classified as local access roads. The existing frontage along Ohio Avenue is currently developed with standard curb, gutter, and sidewalk. The 15th Street and Lincoln Avenue frontages are not developed according to current road development standards.

There is an ADA ramp at the curb bulb located at the northwest corner of the site area. Overhead power lines reside along the Ohio Avenue frontage. Based on available street level images of the site area, the existing pavement around the site area show evidence of minor cracking and deterioration.

Based on the information available at this time, it is anticipated that the City will require improvements along all three frontages to meet current road development standards and accessibility requirements. Some of the adjacent frontages in the area have been improved with curb, gutter, landscape strip, and sidewalks.

WATER UTILITIES AND FIRE SERVICE

The site resides in the City of Bremerton water service area. Based on utility maps provided by the City, there are water mainlines in Ohio Avenue, Lincoln Avenue, and 15th Street. The size of these existing mainlines is unknown at this time, and will require further coordination with the City. There are two mapped existing domestic water service lines and meters for the site from the Lincoln Avenue mainline system.

The closest hydrant to the project site is located on the west side of Ohio Avenue directly across from the northwest corner of the project site.

As there is existing water system infrastructure in the site-area, utility extensions for domestic water service for the proposed development will not be required. The condition and capacity of the existing water service lines, as mapped by the City, will require confirmation to determine suitable reuse for the new facility.

There is no existing fire service to the site as it is currently developed as a surface parking area with an existing small residential structure. New fire service is anticipated to be required for the proposed facility. Capacity and sizing requirements for the system are dependent on the proposed building footprint of the new facility, and will be based on current City requirements.

SANITARY SEWER UTILITIES

Sanitary sewer service is provided by the City of Bremerton. The site is located in the Anderson Cove Sewer Basin, which is a combined system. Based upon City mapping and partial campus surveys, there are 12-inch sewer mainlines in Ohio Avenue, Lincoln Avenue and 15th Street. There is no indication of existing side sewers for the proposed site area. Additional coordination with the City of Bremerton will be required to confirm the existing sewer utility infrastructure site area. New side sewers will be required for the new development. Sewer service will likely be provided from the Ohio Avenue mainline system. Standard requirements for sizing new side sewer connections will require confirmation with the City of Bremerton.

STORMWATER INFRASTRUCTURE AND REQUIREMENTS

City of Bremerton stormwater system mapping indicates that there is existing on- and off-site stormwater infrastructure. The existing on-site stormwater infrastructure for the parking area consists of catch basins, manholes, and piped conveyance. This on-site drainage system conveys and discharges runoff to the stormwater mains in Ohio Avenue and 15th Street. There is no existing stormwater infrastructure on the east side of the site in Lincoln Avenue. Although there is conflicting information within the City's mapping that indicates both a dedicated storm system as well as a combined sewer system, based upon coordination with Robert Endsley with the City of Bremerton, there is a dedicated storm main in Ohio Street. This pipe directly outfalls to the Puget Sound and is exempt from Minimum Requirement # 7 of the 2019 SWMMWW; however, based on the City Engineering Standards site the runoff from development must match predevelopment rates with the intent of not putting the City's conveyance system over capacity. The majority of the existing site is impervious. It is anticipated that there may be a slight increase in overall impervious area that may be required to be mitigated. For budgeting purposes, it is assumed that approximately 6000 square feet of new impervious surface will need to be mitigated for flow control.

It is assumed that the drainage design developed for the project will require compliance with the Department of Ecology's 2019 Stormwater Management Manual for Western Washington, as currently adopted by the City of Bremerton.

Per the DOE 2019 SWMMWW, since the existing site exceeds the 35% threshold for existing impervious surface coverage, the project will be considered a "Redevelopment." Based on the established criteria for redevelopment projects, the proposed development will be subject to meeting all Minimum Requirements (MR #1 – MR #9) for the new and replaced hard surfaces and converted vegetation areas. This includes requirements for flow control (detention), water quality treatment, and On-Site Stormwater Management.

ADDITIONAL EXISTING SITE INFORMATION REQUIRED PER THE PREDESIGN CHECKLIST

1. Easements

Olympic College owns the proposed site, and most of the surrounding site area. Right-of-Way fronts the site along the west, north, and east. Based on the available survey information, there are no existing easements in the vicinity of the site.

2. Utility Extension or Relocation Issues

There is existing water and sewer utility infrastructure available in the site area to provide service to the proposed facility. No utility extensions or relocation of these existing utilities is anticipated to be required to accommodate the new development.

3. Potential Environmental Impacts

As previously stated, there are no mapped ECAs that will impact the extent of proposed new development.

4. Parking and access issues, including improvements required by local ordinances, local road impacts and parking demand.

The proposed development is anticipated to displace a minimum of 36 parking spaces. It is not anticipated that this project will create parking and access issues, or impact current road use.

5. Impact on surroundings and existing development with construction lay-down areas and construction phasing.

As there is the potential for erosion to occur on the site during construction activity, particularly coinciding with excavation processes, TESC measures will need to be designed to control erosive disturbances on the site, to neighboring properties, and downstream systems. A well-designed program of erosion control measures based on Best Management Practices (BMP) requirements, will provide stabilization for the site and prevent disturbances that can affect existing onsite conditions as well as, minimize impacts to surrounding properties located in the site areas and downstream systems. If phased construction is implemented for the development of the site, TESC measures will need to be designed in alignment with construction staging and phased development elements.

Since the campus will remain in operation during construction, stabilizing the site during construction will be essential to minimize impacts on campus operations.

6. Other codes or regulations (if applicable).

The primary code applicable to the design of site improvements for the proposed development is the Department of Ecology's 2019 Stormwater Management Manual for Western Washington. This is the current stormwater code adopted by the City of Bremerton for drainage design associated with new development in the jurisdiction.

All accessibility improvements will need to comply with current ADA codes and standards.

It is anticipated that the extent of proposed development will be under 1-acre of land disturbance. As such, a Department of Ecology Construction Stormwater NPDES permit will not be required to permit discharge off-site to the appropriate receiving water.

7. Identify problems that require further study. Evaluate identified problems to establish probable costs and risk.

Site issues that will require further investigation to confirm scoping to determine impacts on project costs and risks include:

- Frontage improvement requirements.
- New utility connections for water and sewer.
- Additional drainage infrastructure and facilities.
- Potential modification of private utilities to public utilities (specifically water/fire).

These site issues will all require additional analysis and coordination in order to clearly define the level of impacts on project costs and the identification of risks associated with the development of the site.

A geotechnical investigation will also need to be completed in order to determine existing soil conditions on the site, as well as further evaluation on feasible stormwater mitigation approaches and facilities for the new development.

8. Identify significant or distinguishable components, including major equipment and ADA requirements in excess of existing code.

Based on the proposed site development, the implementation of additional ADA requirements beyond that required by current codes are not anticipated. Existing code requirements will be suitable to apply to the design of ADA-compliant improvements necessary for parking and accessible routes.

9. Describe factors that may delay the project schedule.

Obtaining an accurate site survey at the onset of the project will be critical to conduct a comprehensive site analysis, and determine the necessary level of site work that will be required to accommodate the new development. The preparation of a clear survey scope and coordinating early with the surveyor prior to performing survey activities in the field can typically facilitate outcomes that result in acquiring a thorough and complete survey. Survey documentation of all utilities and associated easements on the site will be essential to this project, particularly, to accurately locate and evaluate needs to address the existing waterline that runs through the south region of the site. Insufficient survey information can cause delays in the civil design process as well as result in challenges during construction.

Obtaining a geotechnical investigation at the onset of the project will also be critical in order to determine existing soil conditions on the site, and to evaluate feasible stormwater mitigation approaches and facilities for the new development. It is anticipated that stormwater mitigation requirements for the project will be determined and confirmed during the initial stages of design. However, through continuous coordination with the City of Bremerton, it is possible that the defined scope of mitigation requirements for the project will evolve requiring an expanded drainage approach to meet jurisdictional code requirements. Continued coordination with the City throughout the development of the drainage design for the new development will be significant in maintaining the project schedule and facilitating design modifications to address expanded mitigation scope requirements.

The City of Bremerton may require frontage improvements associated with the new development that are outside of the initially defined scope of improvements identified by the civil engineering team. This enhanced scope could be triggered by the defined extent and size of the proposed development; the perceived increase of vehicular trips; or the proposed relocation of access to the site. At this early predesign study stage, based on street views of the existing frontage, it is anticipated that frontage improvements along Ohio Avenue and 15th Street will be required. However, early coordination with the City of Bremerton is recommended to confirm if frontage improvements are required, and to determine a scope of the extent of frontage improvements for the project. If the requirements for frontage improvements are not identified during the initial stages of design, it has the potential to impact the project schedule and push back the commencement of construction. A traffic study, if required, should be conducted prior to schematic design. The results of the study will identify changes in traffic patterns and anticipated increases in vehicular traffic accessing the proposed site. This information can be used to coordinate frontage improvement requirements with the City.

There are shared utilities in the site area, and the proposed development may result in disturbances to these shared systems. As such, understanding any operational limitations for shutting off existing systems, and coordinating requirements for scheduled utility impacts will be critical during the planning and design phases of the project.

10. Describe the permitting or local government ordinances or neighborhood issues (such as location or parking compatibility) that could affect the schedule.

Early coordination of offsite improvements as well as connections will be necessary as these improvements could also impact the project schedule.

B. LANDSCAPE NARRATIVE

APPROACH

The landscape will be designed to be as sustainable and low maintenance as possible, while providing an environment for the enjoyment and interaction of students and staff. All landscapes will be designed to meet the requirements of the Americans with Disabilities Act. Crime Prevention Through Environmental Design (CPTED) principles will be followed to create a safe space for all users. The character of the proposed landscape design will match the existing campus by following the current campus standards for materials and planting.

HARD LANDSCAPE MATERIALS

- The main building entrance on Lincoln Avenue will have a small plaza with concrete paving. The concrete paving will have a non-slip medium broom finish with 2' x 2' saw-cut joints.
- Low (18" ht.) cast in place concrete seat walls with natural wood (Ipe) tops will be located on both sides of the entry plaza (two, 10ft. length seat walls). The concrete seat walls will have a light sand-blast finish and integrated wall lights to illuminate the walking surface (2 lights / seat wall).
- The secondary building egresses on the west and north sides of the building will also have 2' x 2' saw-cut medium broom finished concrete to match the entry plaza.
- Site furnishings will include:

  A. One covered bike shelter that can accommodate 8 bikes to be located on the east side of the building.

  B. Two trash receptacles, to be located adjacent to building entries.

  C. Two recycling receptacles, to be located adjacent to building entries.
- The large garbage bins located on the west side of the building will be screened by a 6ft height enclosure with double gates for access. The enclosure will have 6" x 6" galvanized finished HSS corner and gate posts; 1.5" x 1.5" galvanized steel top and bottom rails and gate frames. The galvanized HSS structure will be surfaced in 1" x 4" vertical 'clear rough finished' Western Red Cedar with clear stain finish. The gates will have 3 heavy duty galvanized hinges and hasp & lock. The pavement under the bins will be 6" depth concrete. There will also be a single main gate to access the garbage bins. This type of screen wall will also be used to screen larger electrical transformers or any other large above ground utilities that are required.
- Gravel Maintenance Strip: A continuous 24" wide gravel maintenance strip will be located against all building facades where there is no pavement. The maintenance strip has a 3" depth of crushed ¼" minus granite on a filter fabric over compacted soil. The maintenance strip will have a continuous 1/8" x 6" galvanized steel edger with galvanized stakes located 2 feet on center.
- A galvanized steel edger (1/8" x 6") will be installed at the edges of planting beds where they meet lawns.
- A continuous 6ft. height Western Red Cedar fence will be located along the south property line. The Western Red Cedar will be 'Number 2 Fencing Quality' with rough finish and a clear stain application.

PLANTINGS

- Tree and plant species for this project will be selected for drought tolerance, durability, and low maintenance requirements. The majority of the plants will be native species that are inherently drought tolerant, having evolved for this environment. Pollinator species will also be selected to provide food and habitat for native birds and insects. All plant species within each irrigation zone will have matched water requirements.
- Trees will be planted to provide shade. The trees will be minimum 2.5" caliper size and will have 2 stakes for each tree. The stakes will be 2" diameter by 8ft. length pine poles painted black. Trees in lawns will have 6' diameter tree rings with galvanize metal edging and 3" depth of mulch. Tree rings will be surface graded with a shallow basin to hold irrigation water. The lower branches of the shade trees will be pruned to be a minimum of 5ft above finished grade to improve visibility across the site.
- Low foundation plantings will be planted around the perimeter of the building. The foundation plantings will be planted with 2 gallon pot size plants, planted 30" on center. The foundation plantings are kept low to improve site security.
- Lawns will be installed with rolled turf. The turf grass should match the preferred seed mix used on campus.
- Bio-swales will be planted with wetland plants (4" pots 12" on center). Please see the civil engineering narrative for bio-swale details and soils. Bio-swales have not yet been located in the landscape plan.
- After review of the existing on-site trees, we do not recommend saving any due to condition and location under power lines.

PLANTING SOILS AND MULCHES

- Existing soils found on-site can be stock-piled and amended to meet specified requirements before installation.
- Imported top soils meeting the specification and

tested by a soil scientist can be installed on-site.

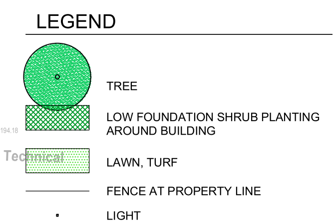
- Shrub planting beds will received 18" of imported top soil or amended on-soil (meeting the specification requirements).
- Lawn areas will receive 8" depth of imported top soil or amended on-site soil.
- All shrub beds and tree rings will receive 3'" depth of fine ground Douglas-fir mulch.
- All shrub beds and lawns will be graded to drain. Site grading and drainage is part of the civil engineers scope of work.
- There will be a 2 year warranty on all plants.

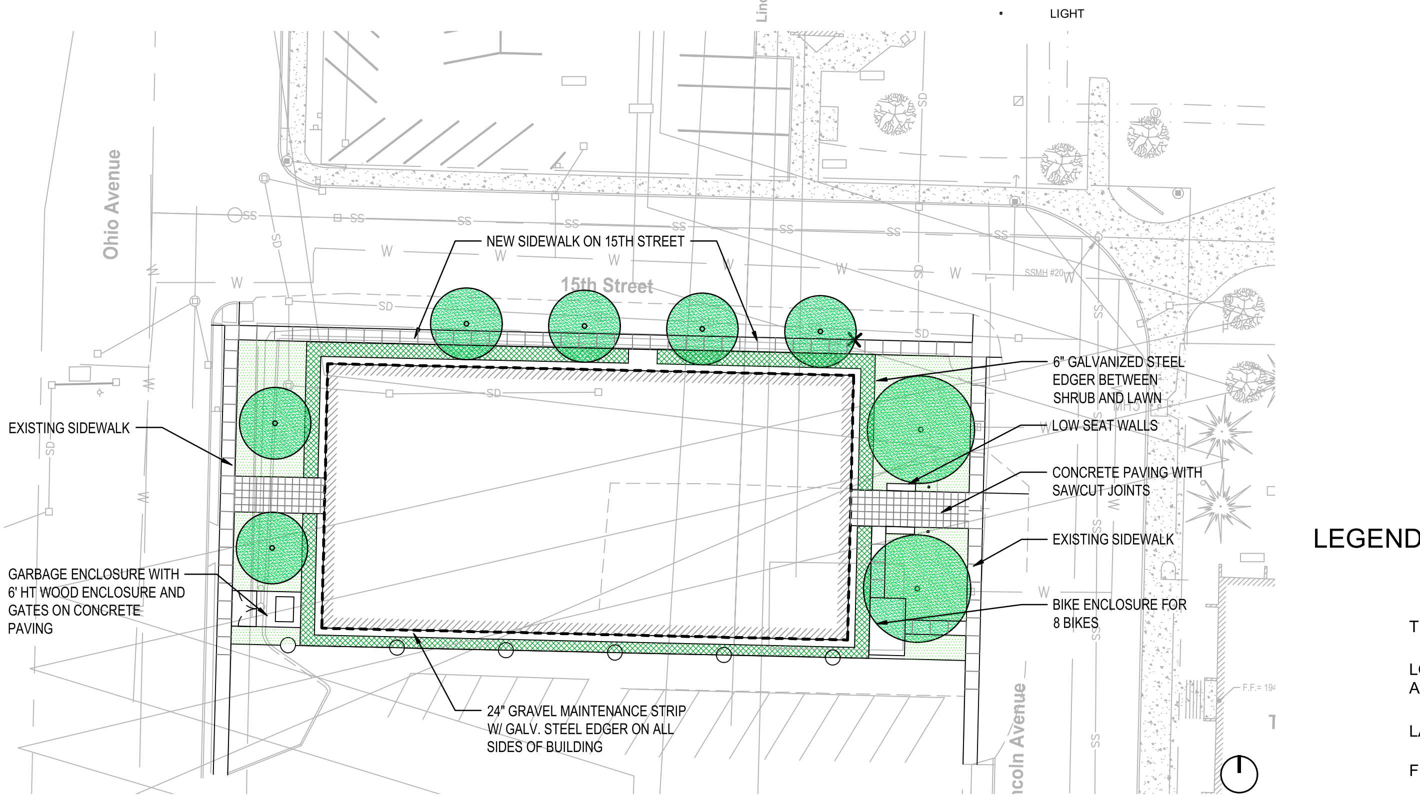
IRRIGATION SYSTEM

- The irrigation system will be designed to be water efficient, using high efficiency spray heads.
- This will be a permanent irrigation system that can be turned-off after the 3 year establishment period, but it can be turned on again, if necessary (to save the landscape) during a drought.
- All lawns, trees, and shrub beds will be irrigated.
- All landscapes on the project property and within the adjacent street Right of Way (ROW) landscape strips will be irrigated. The ROW strips will be on separate zones from the areas within the property lines.
- The irrigation system will have a separate Deduct Meter.
- Irrigation zones will be designed to have plants with similar water requirements in the same zones. Irrigation zones will also be separated by aspect to the sun (divided by sunny and shady areas).
- The irrigation controller selected for this project will shut-off the system if irrigation is not required due to natural precipitation or if leaks are detected.
- There will be a 2 year warranty on the irrigation system.

MAINTENANCE

- The landscape will be designed for low maintenance.
- Plants will be selected for compact growth habit and low requirements for pruning.
- There will be a 90 day landscape maintenance period (starting at substantial completion) completed by the contractor.





Landscape Site Plan from Murase

C. STRUCTURAL ENGINEERING NARRATIVE

SUMMARY

The structural descriptions in this report are based on conceptual building layouts and are for the purpose of budgetary pricing for the predesign phase. The structural systems and/or quantities may change as the design progresses depending on costs and material availability. The estimated quantities at the end of this report are based on a two-story structure with a composite structural steel system.

DESIGN CRITERIA

The City of Bremerton Municipal Code Chapter 17.04 designates the 2018 International Building Code with Washington State and City Amendments as the governing code. The building will be designed to meet the requirements of the code enforced at the time of permitting. The building is expected to be educational occupancy with a Structural Risk Category of II.

Special considerations for the design will include:

- Targeting LEED Silver or better
- Roof will be designed to support future PV array and mechanical equipment as needed

DESIGN CONSIDERATIONS

- The selection of the individual members of the structural system shall consider the overall structure depth of each floor level and the effect on ceiling cavity and other systems. Height limits may influence the selection of the structural system.
- Support classroom floor loadings for the STEM programs intended in the building.
- The roof will be designed for future photovoltaic panels.
- The lateral force-resisting system location shall have the least interference with the openness of the floor plate for future flexibility of the program layout. Walls around elevator lobbies, stairs, and utility rooms are likely to be used.
- Floor flatness shall meet industry standards for classrooms, labs and offices.
- Floor vibration control shall meet office and classroom standards so there is minimal perceptibility by occupants, however mass timber floor systems in open office and classroom spaces tend to have more perceptibility of vibrations than other systems.
- All materials shall consider the lowest possible embodied carbon. Additional sustainability considerations will include recycled steel content for steel members and cement replacement materials for reducing carbon in the concrete.
- Mass timber has been considered in the predesign process but is not the preferred system due to construction costs and availability in the current market.

Area	*Live Load*	*Superimposed Dead Load*	*Notes*
Offices, Classrooms, Labs, & Upper Floor Corridor	*80 psf throughout or offices at 50 psf + 20 psf for partitions*	*20 psf*	
Lobbies and Corridors on Ground Floor	*100 psf*	*30 psf*	
Stairs/Exits	*100 psf*	*10 psf*	
Mechanical/Electrical Rooms	*150 psf*	*20 psf*	*1*
Storage (light)	*125 psf*	*20 psf*	
Roof	*25 psf or Snow Drift Load*	*25 psf (includes future PV)*	

Table 1 Notes:
1. The live load for mechanical/electrical rooms will be 150psf, or the actual weight of the equipment plus 50psf for the surrounding space, whichever is greater.

Table 1. Floor and Roof Loads

LOADING CRITERIA

The following loads are in addition to the self-weight of the structure. The following live loads are recommended by the building code. Live loads are reduced where permitted.

In addition to these uniform loads, a perimeter dead load is applied to the structure to account for the weight of the cladding system. Exterior enclosure is expected to be a light-weight wall system supporting windows.

WIND AND SEISMIC LOADING

Lateral loads on the structure will be developed for site-specific criteria according to current building code requirements.

FLOOR VIBRATIONS

The perceptibility of vibrations of floor systems is often a concern for selection of a structural system. Vibrations are not an indication of a strength problem within a structure but can be uncomfortable to people using the facility. Vibrations may also be a concern for rooms utilizing vibration-sensitive equipment. The design of this facility will consider both of these issues. Reasonable criteria for the equipment sensitivity will need to be established in Schematic Design Phase. Vibrations of floor systems that are perceptible to humans are most often induced by someone walking nearby. All of the floor framing shall be checked for vibrations and they will be limited to levels that are considered acceptable to human perceptibility. The acceptable levels, measured by accelerations, are different depending on the activities in the areas. The general criteria for the upper floor in this building is an acceleration limit of 0.5% gravity, see Table 2.

Floors that support sensitive equipment need to be analyzed for special levels of vibrations. Criteria will be determined by the sensitivity of the intended equipment. Table 3 reprinted from the AISC - Design Guide 11, shows how the limits relate to industry standards. We assume that an 8,000 micro-inch/sec limit will be appropriate for the laboratories and computer rooms.

Transmission of mechanical equipment noise and vibration will be considered based on recommendations of the acoustical consultant in conjunction with the mechanical engineer.

Published Occupancy	***Acceleration Limit***	***Areas in this project***
Offices, residences, churches, schools, and quiet areas	*0.5%*	*All elevated floors except as noted below*
Indoor pedestrian bridges and shopping malls	*1.5%*	*Mechanical rooms, corridors*

(from American Institute of Steel Construction Design Guide 11 - Vibrations of Steel-Framed Structural Systems Due to Human Activity. 2nd Edition)

Table 2. Recommended and Acceleration Limit for Occupancies (expressed as % of gravity)

Designation	*Tolerance Limit[1] (micro-inch/sec)*	*Facility, Equipment or Use*
	32,000	*Ordinary workshops [2]*
	16,000	*Offices [2]*
	8,000	*Computer equipment, residences [2,3]*
	6,000	*Hospital patient rooms [4]*
	4,000	*Surgery facilities, laboratory robots, bench microscopes up to 100x, operating rooms [5]*
VC-A	*2,000*	*Microbalances, optical comparators, mass spectrometers, industrial metrology laboratories, spectrophotometers, Bench microscopes at up to 400x*
VC-B	*1,000*	*Microsurgery, microtomes and cryotomes for 5 to 10nm slices, tissue and cell cultures, optical equipment on isolation tables, Bench microscopes at greater than 400x; atomic force microscopes*
VC-C	*500*	*High-precision balances, spectrophotometers, magnetic resonance imagers, microtomes and cryotomes for <5 nm slices, chemotaxis, electron microscopes at up to 30,000x*
VC-D	*250*	*Cell implant equipment, micromanipulation, confocal microscopes, high resolution mass spectrometers, Electron microscopes at greater than 30,000x*
VC-E	*125*	*Un-isolated optical research systems, extraordinary sensitive systems*

Notes:

1. As measured in one-third octave bands over the frequency range 8 to 80 Hz (VC-A and VC-B) or 1 to 80 Hz (VC-C through VC-E)
2. Provided for reference only. Evaluate using Chapter 4 or Chapter 7. (Human perceptibility designs)
3. Corresponds to approximate average threshold of perception.
4. When required by FGI. Evaluate using Section 6.2.
5. Corresponds to approximate threshold of perception of most sensitive humans. Evaluate using Section 6.2.

(from American Institute of Steel Construction Design Guide 11 - Vibrations of Steel-Framed Structural Systems Due to Human Activity. 2nd Edition)

Table 3. Generic Vibration Criteria Tolerance Limits (for Sensitive Equipment

STRUCTURAL SYSTEMS

Foundations

The cost estimate for predesign is based on shallow spread footings supported on soil improvements, also called rammed aggregate piers. At this time, we do not have adequate information about the soil condition on this site to determine whether the soils can support spread footings without soil improvements.

This selection of foundation system is based on the information we have from two recent projects on campus. Although the proposed site is closer to Building #14 Shop Building, we cannot rule out soils concerns until we have a site-specific geotechnical report. It appears that the natural grade of the site has a slope from south to north and the existing parking lot has been leveled by adding fill soils.

Here are the current reviewed projects shown on the attached Campus Map:

- Building #14 Shop: Geotechnical report, dated June 1, 2021, indicates up to 9-feet of non-structural fill soils with native soils below this level that can support spread footings with a 3,000 PSF bearing pressure. No ground water was discovered in the 21.5' deep borings and liquefaction potential was low.
- Building #7 CIC: Geotechnical report, dated July 16, 2013, indicates fill soils of 26.5' to 36.5' deep. For this reason, they recommended pile supports for the building or ground improvements. We do not have information that shows what system was used and if there were concerns with the installation. Liquefaction potential was considered low, and no ground water was encountered.

Slab on Ground

The floor slab is expected to be a conventional 4" to 6" thick reinforced slab with underslab drainage, moisture barrier, and capillary break. We assume some areas of the building will have exposed, polished slabs and these will be the thicker dimension, with additional reinforcing, to reduce cracking. The use of a conventional slab is assuming that the soils at this site are suitable or has the soil improvement noted for the foundations.

Structural Framing System

The cost estimate for predesign carries a composite structural steel frame system. This structure was selected as least cost, however there are multiple options that can be considered during early design that meet the functionality of the building. Final selection of the structure will need to consider market conditions at the time of construction since recent years have had much market volatility and availability with all structural materials. The proposed system includes:

A. Composite Structural Steel Framing and Braced Frame lateral system

- Structural steel columns and beams
- Concrete on composite metal deck for a thickness of 5-1/2" and 1-1/2" metal deck at the roof
- Buckling restrained braced frames lateral system

Other options that have been considered:

A. Structural Steel Framing with CLT or DLT floor and roof panels

- Structural steel framing
- CLT or DLT floor and roof panels with acoustical mat and concrete topping at floor
- Buckling restrained braced frame lateral system

B. Cast-in-place (CIP) concrete

- CIP concrete floor columns and floor plates
- CIP shear walls for lateral system
- Mild -reinforced slabs (not post-tensioned)

C. Heavy Timber Structure with Structural Steel braced frame lateral system

- Glulam columns and beams with structural steel columns at frame locations
- CLT, NLT, DLT floor plate with concrete topping
- Buckling restrained braced frames lateral system

Lateral Framing System

Based on the size and shape of the structure, steel braced frames are proposed at interior wall locations to resist wind and seismic forces. The frames will rely on structural steel beams and columns and proprietary bracing. As an alternate, steel pipes or square tubes can be considered for the braces.

MATERIALS
Structural Steel Properties

Member	***Standard, Strength***
Wide Flange Shapes	*ASTM A992, Fy = 50 ksi ASTM A913, Fy = 50 ksi*
Tube Sections	*ASTM A500, Gr B, Fy = 46 ksi*
Angle and Channel Sections	*ASTM A36, Fy = 36 ksi*
Miscellaneous Plates	*ASTM A36, Fy = 36 ksi*
High-Strength Bolts	*ASTM A325*

Concrete Properties

Member	***Standard, Strength***
Slab on Ground, stem walls, and Footing	*f'c = 4,000 psi minimum*
Reinforcing Steel	*ASTM A615, Grade 60 ASTM A415, Grade 60*

STRUCTURAL SUMMARY

Item	*Quantity*	*Description*
Excavation	*Remove retaining walls and fill soils to native soil level or 2'-0" below proposed Level 1 slab*	*75'x150' footprint*
Soil improvements	*Same area as footprint of building*	*Rammed aggregate piers at 6' to 10'oc, estimated as 30' deep*
Foundations	*Reinforced concrete footings*	*Continuous foundations at perimeter & spread footings at columns. Large footings at braced frames*
Slab-on-ground	*4" to 6" thick reinforced slab*	*Heavier reinforcing than usual for soft soils and in exposed slab areas*
Stem walls	*8" wide concrete*	*Curbs and stem walls assumed around perimeter. Walls may be up to 4-foot high due to grade*
Upper Level Framing	*12 psf structural steel*	*Not including braces*
Upper Level Slab	*Concrete on metal deck*	*2-1/2" concrete over 3" composite metal deck*
Braced Frames	*6 Buckling Restrained Braces at each floor*	*Price separately, not in steel weight*
Roof Framing	*9 psf structural steel*	*plus elevator penthouse*
Roof Deck	*Metal Deck*	*1-1/2" metal roof deck*
Exterior Enclosure	*Wall enclosure with windows*	*Cold Formed Steel Framing*
Site Structures	*Concrete or rockery site walls*	*Site walls may be needed to manage the grade changes and for bioretention swales*

D. LAB PLANNING NARRATIVE

INTRODUCTION

This project will construct a new building for Olympic College in Bremerton, Washington. This project includes approximately 7,500 NSF of laboratory space for the Mathematics, Engineering, Science & Health Division. These laboratories include instructional laboratories as well as special purpose facilities including MakerSpace.

Research Facilities Design (RFD) is providing Laboratory Planning services for a Predesign Study, in collaboration with the Miller Hull Partnership and PAE Engineers.

This document outlines and establishes overall laboratory-related performance criteria for the project's structural, mechanical, piping, and electrical systems. It also describes other laboratory-related planning strategies and concepts. The criteria within this document should be understood in the context of system-related recommendations that may be contained within Architectural, Structural, and MEP Narratives

CODES AND STANDARDS

The design and construction of the Innovation + Technology Learning Center should comply with the most recent editions of the codes, standards, and references listed in this section. They should be considered minimum requirements and are not meant to prevent the architect, engineer, or consultant from exceeding the applicable requirements.

Washington-

Building	2015 IBC with amendments
Mechanical	2015 IMC with amendments
Plumbing	2012 UPC with amendments
Electrical	2017 NEC with amendments
Energy	2015 Washington State Energy Code (2015 IECC)
Gas	2015 IFGC, NFPA 58-2011, NFPA 54-2012
Fire	2015 IFC with amendments
Accessibility	ICC/ANSI A117.1-2009
Elevator	NAC 455C.400 to 455C.528

Document	Reference	Summary of Purpose
ADA Standards for Accessible Design	*(ADA 2010)*	*Furnishes special considerations that must be given to accommodate laboratory workers with physical impairments. This includes wheel chair accessibility, work bench height, and access to controls*
ANSI/ICC A117.1, Standard on Accessible and Usable Buildings and Facilities.	*(ANSI 2009)*	*Provides specs for elements used in making functional spaces accessible to allow persons with physical disability to independently get to, enter, and use a site, facility, building, or element.*
ANSI/AIHA Z9.5, Laboratory Ventilation	*(AIHA 2012)*	*Establishes minimum requirements and procedures for the design and operation of laboratory ventilation systems used to protect personnel from overexposure to harmful or potentially harmful contaminants.*
ANSI Z358.1, American National Standard for Emergency Eyewash and Shower Equipment	*(ANSI 2014)*	*Establishes minimum performance and use requirements for eye wash and shower equipment for the emergency treatment of the eye or body of a person who has been exposed to injurious materials.*
ANSI/ASHRAE Standard 110, Method of Testing Performance of Laboratory Fume Hoods	*(ASHRAE 2016)*	*Provides a method to quantify fume hood performance. It tests the competence of a fume hood at a given point in time to establish a baseline for quantifying a fume hood's performance.*
ANSI/ASHRAE Standard 55, Thermal Environmental	*(ASHRAE 2017)*	*Forms the basis for the indoor design temperature and humidity for most spaces.*
Conditions for Human Occupancy		

Document	Reference	Summary of Purpose
ANSI/ASHRAE Standard 62.1, Ventilation for Acceptable Indoor Air Quality	*(ASHRAE 2016)*	*Forms the basis for the minimum outside air requirements for most spaces and stipulates when treatment of outside air and exhaust air is necessary.*
ASHRAE 90.1, Standard for Energy Conservation in New Building Design	*(ASHRAE 2016)*	*Provides guidelines for designing energy efficient HVAC systems.*
ASHRAE Handbook, HVAC Applications, Chapter 16, Laboratories	*(ASHRAE 2019)*	*Provides guidelines for laboratory ventilation and applications to various laboratory facilities.*
Guidelines for Laboratory Design	*(DiBerardinis et al. 2013)*	*Provides reliable design information related to specific health and safety issues for new and renovated laboratories. Factors such as efficiency, economics, energy conservation, and design flexibility are considered.*
Operations Manual for Laboratories. SHEMP (Safety, Health and Environmental Management Program)	*(EPA 1998)*	*This document provides guidance on management and administration, hazard identification and evaluation, laboratory Safety, Health and Environmental Division programs, engineering controls, protective clothing and equipment, work practice controls and laboratory emergency situations.*
NFPA 30, Flammable and Combustible Liquids Code	*(NFPA 2018)*	*Provides the most up-to-date requirements for dealing with flammable and combustible liquids and is therefore useful to design engineers, enforcing officials, insurers, and laboratory workers.*
NFPA 45, Fire Protection for Laboratories using Chemicals	*(NFPA 2015)*	*Provides the minimum fire protection requirements for fire safe design and operation in educational and industrial laboratories using chemicals.*
NFPA 101, Life Safety Code	*(NFPA 2018)*	*Addresses the construction, protection, and occupancy features needed to minimize danger to life from fire, smoke, and panic. Forms the basis for law in many national jurisdictions.*
NFPA 801, Standard for Fire Protection for Facilities Handling Radioactive Materials	*(NFPA 2014)*	*Identifies guidelines for decreasing the risk of explosion or fire and the severity of contamination from a fire or explosion at facilities (except nuclear reactors) that handle radioactive materials.*
Guidelines for the Laboratory Use of Chemical Carcinogens	*NIH 81-2385*	*Provides guidelines for the laboratory use of chemical carcinogens.*
Prudent Practices in the Laboratory, Handling and Disposal of Chemicals	*(NRC 2011)*	*Recommends several prudent practices that stimulate a culture of safety for chemical laboratory operations. Provides information and cross-references on how to handle compounds that pose special hazardous risks.*
NSF/ANSI 49,Biosafety Cabinetry: Design, Construction, Performance, and Field Certification	*(NSF/ANSI 2008)*	*Provides comprehensive information and guidance on the principles and applications of air filtration, which supplies the level of particulate cleanliness required by HVAC systems.*
OSHA 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens	*(OSHA 1990c)*	*Provides worker protection from exposure to blood-borne pathogens.*
OSHA 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories	*(OSHA 1990b)*	*Provides protection for all laboratory workers engaged in the use of hazardous chemicals.*
OSHA 29 CFR 1990, Identification, Classification, and Regulation of Carcinogens	*(OSHA 1991b)*	*Determines various criteria and procedures for the identification, classification, and regulation of potential occupational carcinogens that exist in each workplace in the United States and that are regulated by the Occupational Safety and Health Act of 1970 (the Act).*

Document	Reference	Summary of Purpose
SEFA 1-2010, Laboratory Fume Hoods, Recommended Practices	*(SEFA 2010)*	*Provides information on design, materials of construction, use, and testing of laboratory fume hoods. These tests establish the average face velocity and adequacy of the airflow throughout the overall open face area of fume hoods.*
SEFA 2-2010, Installation of Scientific Furniture and Equipment, Recommended Practices	*(SEFA 2010)*	*Provides information for architects, specifying engineers, contractors, and other purchasers about the installation practices recommended by manufacturers of scientific laboratory furniture and equipment.*
SEFA 8, Laboratory Furniture, Recommended Practices	*(SEFA 2007)*	*Provides manufacturers, specifiers, and users with tools for evaluating the safety, durability, and structural integrity of laboratory casework and complementary items.*
Industrial Ventilation, A Manual of Recommended Practices, 30th Edition	*(ACGIH 2019)*	*Recommends best practices, including research data and information on the design, maintenance, and evaluation of industrial exhaust ventilation systems. Basic ventilation principles and sample calculations are also presented.*

In addition to the above standards, close coordination with the owner's representatives is required during the design and construction phases. The project team may need to incorporate additional requirements as laboratory and support spaces are more definitively outlined.

MODULAR PLANNING AND FLEXIBILITY

The Innovation + Technology Learning Center laboratory space should be organized based on modular planning principles. Modular Planning is used as an organizational tool to allocate space within a building. The module establishes a grid of standardized units or dimensions by which structural columns, walls, and partitions are located. Modular Planning provides flexibility of laboratory space allowing future modifications that may be required by changes in laboratory designation, equipment, or departmental organization.

The planning modules could be combined to produce large, open laboratories or could be subdivided to produce small instrument or special-use laboratories without requiring reconstruction of structural or mechanical building elements. The modular planning concept is illustrated in Figure M1.

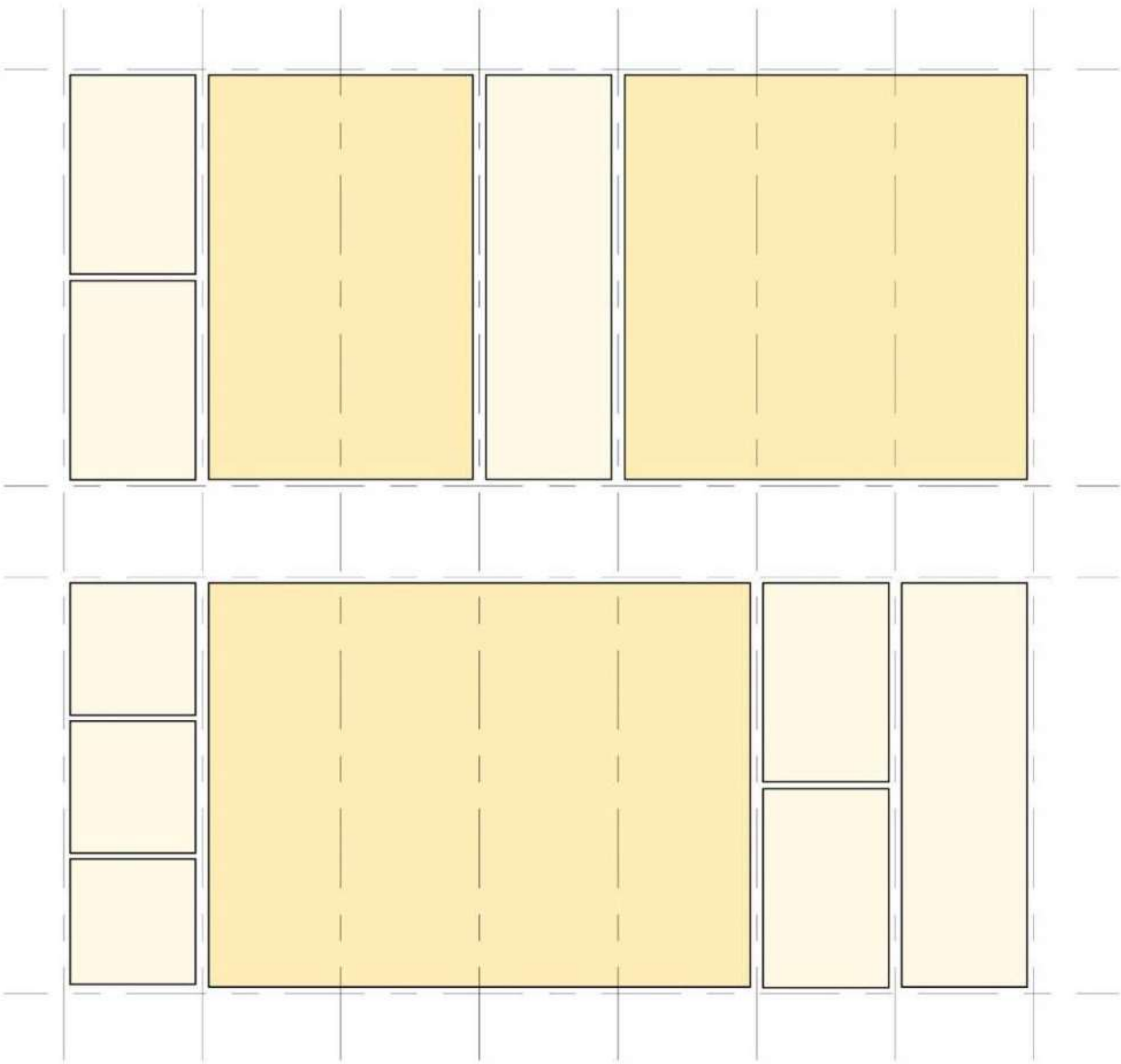


Figure M1 - Modular Planning of Laboratory Space

The planning module includes organized and systematic delivery of laboratory piped services, HVAC, power, and communication cables. The services are delivered to each laboratory unit in a consistent manner, facilitating additions or deletions that could be required by changes in laboratory use.

By utilizing the laboratory planning module as the basis for the structural grid design, it is possible to provide laboratory spaces which are not obstructed by columns.

The laboratory planning module dimensions should result from analyzing the laboratory bench space, equipment, and circulation space.

- The bench dimensions should accommodate technical work stations, instruments, and procedures.
- The space between benches is designed to allow people to work back-to-back at adjacent benches, allowing accessibility for disabled persons and movement of people and laboratory carts in the aisle.
- The module should provide adequate open space for floor standing equipment.

The laboratory planning module for the Innovation + Technology Learning Center is recommended to be 10’-6” wide by 30’-0” as shown in Figure M2.

Island benches are recommended to be 5’-0” deep. Wall benches should be 2’-6” deep.

5’-0” minimum aisle space between benches is recommended to minimize circulation conflicts and reduce potential safety hazards.

CIRCULATION

The design of the Innovation + Technology Learning Center should assure effective external circulation for people accessing the building, delivery of materials and equipment, and the removal of the laboratory waste on regular basis.

Internal building circulation should provide safe pedestrian egress from each individual laboratory and laboratory support space through an uncomplicated path of egress to the building exterior at grade. The circulation system should accommodate the preferred adjacencies identified for the relationships between laboratories and laboratory support spaces and between laboratories and offices.

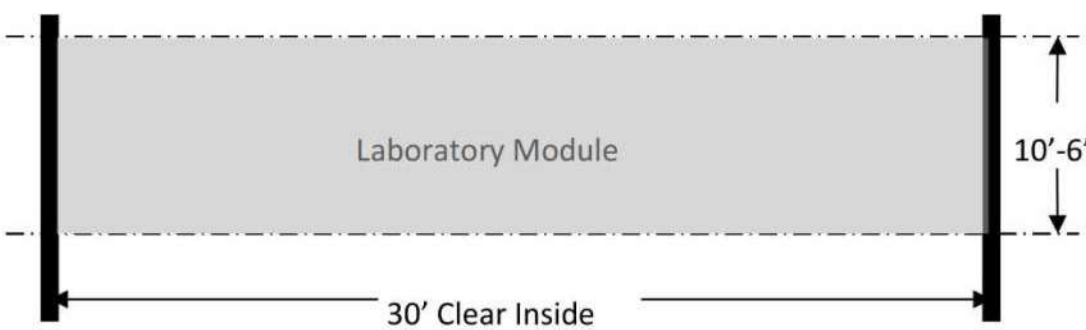


Figure M2 - Laboratory Planning Module

At least one door into each laboratory space should have a minimum 52” wide clear opening. This can be accomplished using doors with 3’-0” active leaf and one 1’-6” inactive leaf.

Equipment lists should be carefully reviewed to verify that individual pieces of equipment can be transported and maneuvered between spaces. Future equipment should be anticipated.

Interior circulation corridors are recommended to be 9’-0” width.

Doorways accessing corridors should open into recessed alcoves serving the corridor. The doors should swing out from laboratories, in the direction of exit.

Circulation and fume hood locations within laboratory spaces should be coordinated to preclude primary exiting in front of the fume hoods.

INTERACTION

The design of the Innovation + Technology Learning Center should explore concepts that would directly support interaction at different levels. Interaction areas should be linked to the circulation schemes.

Spaces should be assigned within laboratories, between laboratories and other spaces, on each floor and in public areas.

Formal interaction spaces such as Conference Rooms and Lecture Rooms can be remote.

Informal interaction spaces include:

- Casual meeting/interaction spaces for short duration interaction.
- Outdoor gathering spaces should be highly visible and inviting.
- Display/announcement boards serves as gathering places for informal contact.
- Connections to other campus facilities will facilitate interaction with staff in nearby buildings.

Provisions for informal interaction:

- Side-by-side connections of laboratories; cross corridor laboratory connections; and through laboratory support space connections.
- Shared support spaces (equipment and instrument rooms) close to laboratories.
- Visual and physical link between outdoor gathering spaces and interior interaction spaces.
- · Inviting and visible horizontal and vertical circulation systems can also serve as interaction spaces.
- Circulation systems should encourage sharing of support functions.

ACCESSIBILITY

The Innovation + Technology Learning Center facility must conform to applicable local, state, and federal regulations for providing universal access to persons with disabilities. Early considerations should be given to the following accessibility aspects:

- All parts of the building should be accessible by persons with disabilities.
- All faculty lecture or demonstration positions should be accessible to persons with disabilities.
- All staff preparation areas should be accessible by persons with disabilities.
- Accessible workstations, sinks, fittings, and fume hoods should be provided in the laboratories, faculty demonstration areas, and staff prep areas, based on the Department of the State Architect’s requirements in response to the Americans with Disabilities Act.
- Location of accessible workstations should be near eyewash stations and safety showers.
- 18” clearance on the pull side and 12” clearance on the push side of the strike side of doors is required for interior doors.

General criteria and guidelines for accessible workstations in laboratories are as follows:

- Work surfaces 30” - 34” above floor with 27” minimum vertical wheelchair clearance below. Adjustable work surfaces can provide a range of possible height adjustments.
- Laboratory service controls and equipment controls should be placed within easy reach for persons with limited mobility. Controls should have single-action levers or blade handles for easy operation.
- Aisle widths and clearances adequate for maneuvers of wheelchair bound individuals. Aisles 5’-0” wide are recommended with turnaround areas.

NOISE CONTROL

The design of the structural, mechanical, and electrical systems should address and mitigate the airborne and structure-borne transmission of noise from building sources. The most significant sources of noise are:

- Elevator equipment: motor/winch lifting assemblies and motor/generator sets of traction elevators or motor/tank/pump assemblies of the hydraulic elevators.

- Rotating and reciprocating equipment such as fans, compressors, pumps, and chillers.
- Fan noise transmitted through the building structure or through the duct systems.
- Duct noise generated by pressure fluctuations caused by fan instability or turbulence resulting from abrupt changes of direction in the duct systems.
- Noise generated by air flowing past dampers, turning vanes, and terminal device louvers.
- Water circulation system noise caused by high velocities or sudden pressure changes.
- Magnetostrictive hum associated with the operation of electric motors, transformers, switchgear, lighting ballasts and dimmers.

The noise reduction methods should include:

- Sound absorption partitions
- Selection quiet equipment
- Selection of adequate velocities in piping and duct systems
- Flexible pipe, duct, or conduit paths or connections
- Sound absorption and vibration isolating equipment
- Isolated pipe and duct supports

The recommended NC levels for various spaces in non-occupied rooms with laboratory equipment off are presented in Table N1.

Area	***NC Level***
Teaching Laboratories	*45*
36 inches in front of fume hoods	*50*
Classrooms	*30-35*
Offices	*35*
Conference rooms	*25-30*
Corridors and support areas	*45*

Table N1 - Recommended NC Levels in Laboratory Facilities

VIBRATION AND STRUCTURAL CONSIDERATIONS

Common sources of vibration that would be anticipated in the Innovation + Technology Learning Center building include adjacent road traffic, footfall traffic on supported floors and mechanical equipment. Minimizing vibration from these sources should be considered in the structural, and mechanical design. Special structural consideration may be required for specific areas of the building.

The uniform live load should not be less than the minimum uniformly distributed loads required by structural code. For vibration considerations, laboratory areas should be designed for 100 psf uniform live load. Concentrated loads may produce a greater load effect.

Human activities and operating machines are the most significant sources of vibration at above-grade building levels. Footfall-induced vibrations and steady-state operating machine vibrations should be alleviated by:

- Increasing the stiffness of the floor by combinations of floor mass and depth
- Confining heavily traveled areas to regions near column lines
- Placing sensitive equipment near columns
- Placing the equipment away from heavily traveled areas
- Minimizing the length of spans
- Cast-in-place concrete floor solutions

Equipment and instruments that are extremely sensitive to vibration should be identified during the early stages of design and located on slab-on-grade to minimize the transient structure-borne vibration, if possible. Provisions of an isolated slab should be considered. Pneumatic and piezoelectric isolations should be used, as required, on specified highly sensitive equipment.

Building mechanical systems are a major source of vibration. Air handling equipment and ductwork should be selected and installed to minimize vibration. Supply and exhaust air fans, compressors, pumps, and other noise and vibration producing equipment should be located in mechanical rooms with protective wall construction. Equipment should be isolated from supporting structure with resilient mounts. Vibration isolators should be selected based on floor stiffness, span extension, equipment power and operating speed.

Vibration criteria for areas intended to accommodate sensitive equipment are based on the root mean squared (rms) Velocity Level as measured in one-third octave bands of frequency over the range of 8-100 Hz. Generic Vibration Criterion (VC) curves have been developed for different types of equipment. These are shown in Table V1. Criterion curves VC-A through VC-E are generally applicable to laboratory areas. International Standards Organization (ISO) criteria for human exposure to vibration are also shown.

It is recommended that the structural floor system of the laboratory areas in the Innovation + Technology Learning Center be designed to meet or exceed the VC-A criterion. The design should follow the AISC Guidelines of Design for Sensitive Equipment.

Seismic stabilization of the structure should be addressed. The natural frequency of the floor and building structure should be determined as a function of the Seismic Zone of the site. A building natural frequency below 8 Hz is recommended. Seismic, or other criteria, may require a lower natural frequency.

Design of structured floor slabs should account for walking pace criteria as follows:

- Walking pace for a closed corridor (a corridor with walls on both sides and doors on either or both walls): 90 steps/minute
- Walking pace for open or "ghost" corridor within a laboratory (a primary aisle with a wall on one side, with or without doors, and the ends of laboratory benches or other laboratory paraphernalia on the opposite side): 75 steps/minute
- Walking pace for cross aisles within a laboratory (walkways/aisles between laboratory benches): 60 steps/minute

Criterion Curve	**Amplitude[1]**		**Detail Size[2] (microns)**	**Description of Use**
	(µin/s)	**(µm/s)**		
Workshop (ISO)	*32,000*	*800*	*N/A*	*Distinctly felt vibration. Appropriate to workshops and non-sensitive areas.*
Office (ISO)	*16,000*	*400*	*N/A*	*Felt vibration. Appropriate to offices and non-sensitive areas.*
Residential Day (ISO)	*8,000*	*200*	*75*	*Barely perceptible vibration. Appropriate for sleep areas. Usually adequate for computer equipment, probe test equipment and microscopes less than 40x.*
Op.Theatre (ISO)	*4,000*	*100*	*25*	*Vibration not felt. Suitable for sensitive sleeping areas. Suitable in most instances for microscopes to l00X and for other equipment of low sensitivity.*
VC-A	***2,000***	***50***	***8***	***Adequate in most instances for optical microscopes to 400X, micro-balances, optical balances, proximity and projection aligners, etc.***
VC-B	*1,000*	*25*	*3*	*Appropriate for inspection and lithography equipment (including steppers) to 3 micron line widths.*
VC-C	*500*	*12.5*	*1-3*	*Appropriate standard for optical microscopes to l000x, lithography and inspection equipment (including moderately sensitive electron microscopes) to 1 micron-meter detail size*
VC-D	*250*	*6.3*	*0.1-0.3*	*Suitable in most instances for demanding equipment including many electron microscopes (TEMs and SEMs) and E-Beam systems.*
VC-E	*125*	*3.12*	*<0.1*	*A challenging criterion to achieve. Assumed to be adequate for the most demanding of sensitive systems including long path, laser-based, small target systems, electron-beam lithography systems working at nanometer scale, and other systems requiring extraordinary dynamic stability.*
VC-F	*62.5*	*1.56*	*N/A*	*Appropriate for extremely quiet research spaces; generally difficult to achieve in most instances, especially cleanrooms. Not recommended for use as a design criterion, only for characterization.*
VC-G	*31.3*	*0.78*	*N/A*	*Appropriate for extremely quiet research spaces; generally difficult to achieve in most instances, especially cleanrooms. Not recommended for use as a design criterion, only for characterization.*

Notes
1. As measured in one-third octave bands of frequency over the frequency range 8 to 80 Hz (VC-A and VC-B) or 1 to 80 Hz (VC-C through VC-G).
2. The detail size refers to the line widths for microelectronics fabrication, particle (cell) size for medical and pharmaceutical research, etc. Detail size is not relevant to imaging associated with probe technologies, AFMs, and nanotechnology.

Table V1 - Design Criteria for Sensitive Instrumentation and Equipment not otherwise Vibration-Isolated

HVAC

Safety

The laboratory HVAC system should promote the safe operation of the building, health and comfort of the occupants, and safe outdoor environment. The laboratory environment must be free of airborne hazardous materials exposed to the occupants. Harmful vapors, gases, particulates or biological agents must be contained at the source and continuously removed from the laboratory.

The HVAC design will be based on regulatory requirements and guidelines along with good engineering practices. Code requirements should be considered a minimum standard.

The promulgated standards discuss laboratory safety in terms of primary and secondary containment as discussed below.

Primary Containment

The primary containment in laboratory ventilation consists of Laboratory Fume Hoods and Biological Safety Cabinets which operate under negative pressurization with respect to the laboratory, preventing the personnel exposure to hazardous materials.

Laboratory Fume Hoods

Laboratory fume hoods are exhausted containment devices that protect users from exposure to inhalation of hazardous materials such as chemical vapors, gases, and particulates.

Laboratory fume hoods should be designed for effective capture of airborne vapors, gases, and particulates at the design values for average face velocity and sash openings. The design operating conditions for sash openings should be an average face velocity of 100 feet per minute ±10%. For energy saving considerations, the design sash position should be 60% of maximum hood opening. Vertical sash stops should be provided at design sash position and its locations labeled. This operating position should be labeled. The sash should be fully open only during set-up or take-down operations.

Constant volume fume hoods will develop face velocities below 100 feet per minute when the sash is raised above the design operating position of 18". Under no circumstances should face velocities drop below 60 fpm. Variable air volume fume hoods maintain constant face velocities by controlling the exhaust flow relative to the sash position.

Consideration can be given to "low flow" or "low face velocity" fume hoods operating at face velocities less than 80 feet per minute. The use of this equipment should be a common decision of the design team and Owner's Environmental Health and Safety Authority.

Each fume hood should be equipped with a flow measuring device monitored locally to allow convenient confirmation of adequate hood performance. All laboratory fume hoods must be equipped with visual and audible alarms warning of unsafe airflow.

Fume hoods should be located away from interfering drafts, airflow disturbances, supply and exhaust air openings, and pressure differentials created by the swing of doors. Cross-draft velocities higher than 50% of the average fume hood face velocity should be identified and alleviated. Ideally, cross-draft velocities should be less than 30%.

Personnel circulation in front of the hood's face should be minimized. The fume hoods should be located more than 10 feet from any door or doorway, with the exception of secondary exits, and should not be located on a main traffic aisle.

Laboratory fume hoods must be factory certified. Field certification "As Installed" (AI) is required prior to fume hood use in the laboratory.

Fume hood sash movement may be vertical, horizontal, or a combination of both.

Fume hoods designated to handle highly hazardous products or processes should have a dedicated exhaust duct system, fan, and treatment system. Fume hoods in this category include radioisotope hoods and perchloric acid hoods, none of which are anticipated for this facility.

Biological Safety Cabinets

The primary containment for the hazardous agents generated by microbiological procedures is provided by biological safety cabinets. The cabinets protect the user and the product through high efficiency HEPA filters.

Other Exhaust Equipment:

- Canopy Hoods – Hoods over work areas or equipment used to capture heat or steam.
- Snorkels – Small capturing cones attached to an adjustable exhaust arm, suspended from the wall or ceiling, used to capture heat or fumes from equipment or processes.
- Vented Cabinets – Cabinets used to store hazardous, corrosive, toxic, and other health hazard substances. If vented, the cabinets should be connected to the laboratory exhaust system, providing a negative pressurization of the enclosure. Venting of flammable liquid storage cabinets should be reviewed with the Authority Having Jurisdiction.
- Vacuum Pump Cabinets Exhaust – Used for exhaust of vacuum pump discharge and cabinet ventilation.

- Down Draft Exhaust Units – Exhausted bench-top working stations.
- Equipment Vent Connections – Exhaust ports provided for connection of the equipment requiring direct exhaust.
- Gas Cylinder Cabinets – Cabinets used to store gas cylinders containing gases that present a physical or health hazard. Ventilation rates are in the range of 15-20 cabinet air changes per hour.

Secondary Containment
Secondary containment is provided by the negative pressurization of the laboratory space relative to corridors and adjacent spaces. Negative pressurization is achieved by controlling the ratio of exhaust to supply air at minimum 110%.

Some laboratory spaces may require positive or neutral pressurization.

Provision of operable windows or doors to the exterior should be avoided.

Doors to laboratories should be equipped with closers and must not be held open.

If the direction of airflow is deemed critical, monitoring air flow devices should be used to monitor and alert the inadequate pressure relationship of adjacent spaces.
The laboratory spaces should be continuously ventilated 24 hours per day.

Air from spaces identified as using hazardous materials should be exhausted outdoors and not recirculated or transferred into other spaces.

Air from offices and laboratories that do not generate odors, chemical, biological, or other type of hazard may be recirculated. Refer to the detailed Space Requirements documents for identification of 100% outside air versus recirculated air laboratories.

Supply air should be effectively distributed into all portions of the laboratory space. Supply air distribution should not create drafts in front of laboratory hoods. The maximum supply air velocity 6 feet above the floor, in front of fume hoods or biological safety cabinets, should be less than 50% of the face velocity.

Emergency and Standby Power Considerations
Measures involving emergency and standby power should be approved by the Authority Having Jurisdiction.

Emergency power supply should be implemented if a definite potential for catastrophe such as explosion, fire, violent ejection of chemicals or other life-threatening situations is present. Fire detection and alarm systems, elevators, fire pumps, public safety, communication and monitoring systems, and processes where current interruption would produce serious life safety or health hazard should be on emergency power.

Standby power should be provided to serve loads such as heating, ventilating and refrigerating systems, smoke removal, sewage disposal systems, lighting systems, data processing, communication systems, and processes that, when stopped, could create a hazard, discomfort, significant interruption, or damage to product or process.

Standby power should be provided to exhaust fans of the manifolded system serving laboratory areas.

Momentary or extended losses of power should not change or affect any of the control system setpoints, calibration settings, or emergency status.

Specific standby power requirements will be identified in the design development project phase.

Adaptability and Flexibility
Laboratory ventilation systems should be designed to be adaptable to changes of teaching protocols and building operation.

Modularity is the key concept to an adaptable laboratory HVAC system. The laboratory module may support various functions in time.

If at all possible, the HVAC laboratory system should be designed as an assembly of repetitive modules. Each laboratory planning module should have supply air diffusers, exhaust grilles, terminal air flow control devices, with capability for individual temperature control based on zoning.

The laboratory ventilation system should be flexible, allowing timely and cost effective changes over time without negatively affecting the performance and operation of the building HVAC system.

The HVAC system should be flexible to cover future capacity that may occur from changes of the laboratory space allocation or laboratory designation.

The HVAC system design should have the capability of supporting additional future fume hoods and other exhausted equipment.

Design Criteria

Outdoor Design Conditions

Heat gains and losses to the exterior will be evaluated using the following ASHRAE outdoor design conditions:

Cooling: 0.4% frequency of occurrence for dry-bulb temperature and mean coincident wet-bulb temperature.

Heating: 99.6% frequency for mean coincident dry-bulb temperature.

Indoor Design Conditions

	Summer		*Winter*	
Space	***Temp (°F)***	***RH (%)***	***Temp (°F)***	***RH (%)***
Laboratory	*72*	*50*	*68*	*30*
Laboratory Support	*72*	*50*	*68*	*30*
Equipment Rooms	*75*	*50*	*68*	*30*
Office	*74*	*50*	*68*	*30*
Conference, Lounge	*74*	*50*	*68*	*30*
Computer server rooms	*72*	*50*	*72*	*30*
Mechanical Spaces	*80*	*n/n*	*65*	*n/n*

Note: The operating/comfort conditions for each laboratory space are presented in Detailed Space Requirements documents. These conditions may be different than the above design conditions used for sizing the HVAC systems.

Table H1- Indoor Design Conditions

Filtration
Laboratory air handling units should be provided with pre-filters and final filters. Pre-filters should have minimum performance efficiencies of MERV 8 (30 – 35%). Final filters should have minimum performance efficiencies of MERV 13 (80 – 90%). Laboratories with special environmental requirements may require higher performance efficiencies such as MERV 14 (90 – 95%) or MERV 17 (99.97% HEPA) or other application specific filtration. Further filtration may be required for some spaces as listed on the Detailed Space Requirements sheets.

Laboratory supply and exhaust systems should be designed for adequate static pressure for maintaining air flow capacity with fully loaded filters.

Ventilation Rates
The air flow rate for each laboratory space should result from the uppermost of the following criteria:

- Minimum air changes per hour
- Laboratory heat gain
- Exhaust requirements from fume hoods and other exhaust equipment

Minimum Air Changes per Hour
Minimum outdoor air in laboratory facility spaces should comply with ASHRAE Standard 62.1 requirements.

Laboratories generating odors or chemical, biological or other type of hazard should be 100% exhausted to the outdoors. Air from offices and laboratories that do not present any risk of hazard may be recirculated. Supply air could consequently be 100% outdoor air or mixture of outdoor and recirculated air.

In laboratories exhausting 100% air to the outdoors, OSHA 29 CFR Part 1910 recommends 4 to 12 air changes per hour if local exhaust hoods are used as the primary method of control. The owner may have additional minimum air change requirements. A detailed discussion with the owner and the Environmental Health and Safety Authority/Risk Management should occur to discuss the exhaust air and minimum air exchange rates. The exhaust air and the minimum design air exchange rates are recommended in Table H2.

Space	***Exhausted Air***		***Minimum Air Changes per Hour***	
	Minimum	***Maximum***	***Occupied***	***Unoccupied***
Laboratory	*100%*	*100%*	*6*	*4*
Laboratory Support	*100%*	*100%*	*6*	*4*
Office	*10%*	*100%*	*4*	*2*
Conference, Lounge	*20%*	*100%*	*6*	*2*
Computer server rooms	*10%*	*10%*	*15*	*15*
Mechanical Spaces	*10%*	*100%*	*2*	*2*

Note: Some laboratory spaces may require higher air exchange rates. Refer to Detailed Space Requirements documents

Table H2 - Exhaust Ratios and Minimum Air Change

Heat Gain from Laboratory Equipment, Laboratory Occupants and Lighting
Heat gain depends on the type and specifics of the laboratory. Detailed heat gain from laboratory equipment will be provided during the design development phase for each laboratory space. Preliminary heat gain estimated as an average per net laboratory area is shown in Table H3.

Space	**Heat Gain per net area**					
	BTUH/ft²	**W/ft²**	**BTUH/ft²**	**W/ft²**	**BTUH/ft²**	**W/ft²**
Laboratory	*20*	*6*	*2.4*	*0.7*	*4.4*	*1.3*
Laboratory Support	*35*	*10*	*1.0*	*0.3*	*5.1*	*1.5*
Computer Server Rooms	*850*	*242*	*1.0*	*0.3*	*0.4*	*1.5*

Table H3 - Laboratory Heat Gain

Exhaust Equipment Requirements
The design exhaust flow from typical laboratory equipment is shown in Table H4. A complete schedule of exhaust equipment will be issued during the design development phase.

Equipment	**Design Flow (cfm)**	
Laboratory Fume Hoods	**Bench type hood**	**Floor mounted hood**
4' Laboratory Fume Hood	*500*	*850*
5' Laboratory Fume Hood	*650*	*1,150*
6' Laboratory Fume Hood	*800*	*1,400*
8' Laboratory Fume Hood	*1,100*	*1,950*
Biological Safety Cabinets	**Class II Type A2**	**Class II Type B2**
4' BSC	*400*	*800*
6' BSC	*600*	*1,200*
Canopy hoods	*75 per linear foot of open perimeter*	
Equipment vent/Snorkels	*60 (min)*	*200 (max)*

Table H4 - Typical Exhaust Equipment Flow rates

Building Automation Systems and Controls

Basic Criteria

The laboratory facilities should be provided with a microprocessor based, direct digital control building automation and energy management system. This system should provide energy management, controls in all spaces, and monitoring of the laboratory controls.

A personal computer should be provided as an operator interface. The PC will record and store data, provide analysis and reporting functions, and act as a graphical user interface with the networked controllers.

Unsafe levels of operation of the exhaust system should be indicated by local alarms in the rooms affected, and should be capable of initiating a central alarm monitored by building maintenance personnel. Local codes may require certain emergency or fire detection, monitoring, and alarming which may affect the design of the laboratory ventilation system.

Monitoring of critical parameters of the ventilation system is important for the safe operation, effective maintenance, and management of the building. HVAC operational parameters of laboratories, cold and warm rooms, and other critical spaces should be recorded, reported, and alarmed.

A high level of control and functionality should be provided by an integrated laboratory and building control system. The monitoring of the complete system should be performed by the centralized facility management system providing graphical displays and analysis tools, centralized alarm reporting, real time status and custom reports, automatic system-wide emergency responses and maximized energy savings. The Building Automation System should utilize distributed processing for speed, stability, and system reliability. The distributed controllers should be networked to share information.

Minimum Laboratory HVAC Requirements

The laboratory HVAC systems should be controlled to ensure operational safety, regulatory compliance, satisfy process constraints, and occupant comfort. The HVAC control system should provide flexibility and minimize the operational cost of the building.

A Laboratory HVAC control system should provide the following minimal safety requirements:

- Annunciate HVAC equipment failures to a monitoring center and energize the standby equipment.
- Maintain relative levels of pressurization in the laboratories.
- De-energize the supply air handling units serving laboratory areas in case of fire or smoke detection. The exhaust fans should continue to operate at a level that facilitates a safe evacuation of the building through doors between pressurized spaces. Reducing the level of exhaust to a desired pressurization could be obtained by ramping down the exhaust fans or by activation of bypass dampers on the exhaust plenum. Capability of operating doors under fire alarm conditions must be tested and documented as part of the commissioning process.
- HVAC control systems should be direct digital control with electric actuators.
- The supply and exhaust air flow terminal valves should be specifically designed for laboratory applications. They should be capable of regulating air flow with pressure independent operation to within ± 5% accuracy of design setpoint. The products should have a minimum of five years of installed field operating history in laboratory use.
- Commercial air terminal boxes with rotational dampers and low-accuracy air flow measurement devices should not be used.

Selection of Laboratory Building Air Flow Control System

Laboratory buildings are complex facilities comprising a variety of spaces and equipment subject to diversified teaching programs.

Laboratories are characterized by variable cooling loads and relatively inconsistent usage. The most common airflow control system is the variable air volume (VAV) system, which is capable of responding to changes of internal loads and occupancy in the space.

Teaching laboratory cooling loads vary considerably between occupied and non-occupied periods. The laboratory equipment heat load component of the cooling load may not be significant. The airflow driver may be minimum air changes. In such a scenario, a two-position constant air volume (CAV) system may be adequate.

Fume hoods in teaching laboratories are recommended to be VAV, providing stable operation of the hood at constant face velocity at varying sash positions. In some situations of low density fume hoods, it may be suitable to operate the hood with CAV, providing minimum air changes per hour required for the space. However, this will result in consistently higher noise levels, which may not be desirable – especially in instructional laboratories.

The laboratory VAV control system should perform the following functions:

- Control the hood volumetric flow rate to maintain the constant face velocity,

- Monitor room temperature to provide adequate air flow for removing the room heat gain.
- Monitor room occupancy to provide 100% of operational supply air when space is occupied.
- Reduce the air flow at scheduled level for unoccupied mode of operation,
- Control the fume hood exhaust, the general exhaust and the supply airflow to maintain the laboratory pressurization.
- Provide time delay in changing room air supply and exhaust flow to unoccupied mode based on room occupancy sensor.
- Provide time delay in changing the fume hood flow to standby mode based on fume hood motion sensor.

Building Exhaust Stacks and Air Intake

Supply Air Ductwork

Supply air duct system should be constructed of galvanized steel of minimum 4-inch water gauge pressure class for mains, and 2-inch water gauge pressure class for branches. Sealing, reinforcing, and supporting of duct systems should be according to SMACNA standards.

Lining the supply duct in laboratory spaces is not advised.

Exhaust Air Ductwork

Fume exhaust ducts should be constructed of materials compatible with chemicals to be carried in the air stream. Typical selection of exhaust ductwork materials, based on effectiveness and cost criteria, is shown in Table H5.

Exhaust ductwork	*First option*	*Second option*
Fume hood branch	*Stainless steel*	*PVC coated galvanized steel*
Exhaust mains[1]	*Galvanized steel*	
Laboratory general exhaust	*Galvanized stee*	
Radioisotope hood exhaust	*Stainless steel*	
Perchloric acid hood exhaust	*Stainless steel*	
Hydrofluoric acid hood	*Polypropylene*	*Teflon coated stainless steel*
Hydrofluoric acid hood	*Polypropylene*	*Teflon coated stainless steel*
Nitric acid hood	*Stainless steel*	*Teflon coated stainless steel*
Sulfuric acid	*Polypropylene*	*Teflon coated stainless steel*
Multi acid hood	*Polypropylene*	*PVDF/Hylar coated stainless steel*
Biological safety cabinets	*Galvanized steel*	

Notes
1. In manifolded exhaust systems where significant dilution of fume exhaust occurs with general exhaust.

Table H5 - Exhaust Ductwork Materials

Longitudinal sections of exhaust ducts should be continuous seamless tube or continuously welded formed sheet. Horizontal ducting from fume hoods should be sloped down towards the fume hood at 1/8 inch per foot.

Sound absorbing liner or other sound absorbing devices should not be used in the exhaust ductwork.

Airflow velocity in fume exhaust duct systems should range from 1,600 to 2,000 feet per minute.

Fume hood exhaust ductwork within the building should be under negative pressure.

Balancing and control dampers of the exhaust system should fail open.

Fire dampers should not be placed in manifolded fume exhaust ducts.

Exhaust air filtration is not required for manifolded exhaust systems. Dedicated exhaust systems from radioisotope or acid handling hoods may require HEPA and carbon filters. Acid hood exhaust may be subject to chemical scrubbing. Sufficient space and enclosure provisions should be allocated for filtration and scrubbing equipment. Access ports upstream of fume hood should be provided for exhaust air sampling.

Manifolding the Exhaust Systems
Exhaust ducts from chemical fume hoods and other special exhaust systems within the same laboratory unit may be combined into one common system. A manifold system has the advantage of diluting the effluents inside a combined exhaust system, improving the system flexibility, and reducing the initial and operating costs. Compatibility of effluents, as defined in ANSI/AIHA Z9.5, should be considered in manifolding the fume hood exhaust.

A Laboratory unit is defined in NFPA 45 and could extend to the area of an entire floor. NFPA 45 classifies the laboratory units as Class A (high fire hazard), Class B (moderate fire hazard), Class C (low fire hazard), or Class D (minimal fire hazard), according to the quantities of flammable and combustible liquids.

Exhaust air from each laboratory unit, which may include fume hood and other exhaust systems, should be separately ducted to outside the building or to a mechanical shaft.

Connection to a common chemical fume hood exhaust duct system should be permitted to occur only in any of the following locations:

- Fire protected mechanical room within the building
- Fire protected shaft within the building
- A point outside the building

Exhaust Fans
Fume exhaust fans should be constructed of materials compatible with chemicals present in the exhausted air. They should be located in a separate room under negative pressure with respect to the surrounding spaces, and should be provided with direct access to the outside for fan discharge ducts.

Fume hood exhaust fans of manifolded exhaust systems should have a degree of redundancy such that the failure of a single fan does not render the operation of the ventilation system unsafe.

Manifolded fume hood exhaust system fans should be provided with emergency power.

Air exhausted from chemical fume hoods and dedicated exhaust systems should be discharged above the roof at a location, height, and velocity sufficient to prevent re-entry of chemicals, and to prevent exposures to personnel.

The fume exhaust stacks must be above the highest point of the building, including mechanical penthouses and roof parapets. The height of the fume exhaust stacks will be determined in conjunction with local codes and regulations. The key parameters that affect stack design and location are:

- Stack height
- Discharge velocity
- Volumetric flow rate
- Intake locations

The height of the stacks and their location on the roof are critical to safe building operation and the safety of neighboring sites. Fume exhaust stacks must be minimum 10 feet above the adjacent roof line to avoid exposing the maintenance personnel to the direct upward blast of the fume exhaust.

The design discharge velocity from exhaust stacks should be 3,500 to 4,000 feet per minute to counteract any entrainment due to varying wind direction or environmental features.

Volumetric flow rates of VAV systems should maintain a discharge velocity above a minimum level. This can be accomplished by sizing the stack for the minimum velocity at minimum exhaust flow or by inducing outdoor air into the exhaust stream prior or after the exhaust fan.

Exhaust stacks should not be located within enclosures or architectural screens. Architectural masking structures may be used as long as they do not create recirculating zones of the exhaust discharge, and the stack extends at least one diameter above the masking structure.

Entrainment of the harmful fumes from exhaust stacks on the roof into the outside air intakes of building ventilation systems should be prevented. The location and height of the exhaust discharge relative to the building air intakes should be correlated with prevailing wind directions. Outside conditions, surrounding buildings, hills, trees, and other obstacles which can cause turbulent flow around the laboratory building should be considered.

It is recommended that building air intake be located on the lower one-third of the building and high enough above the ground to avoid dust or vehicle exhaust. If located on the roof, air intakes should not be placed near the edges of a wall or roof.

Manifolding the building exhaust system provides a high degree of dilution at stack discharge.

In the cases of high concentrations of harmful chemicals at stack discharge, specialized dispersion evaluation techniques, such as wind tunnel modeling or numerical simulations, may be considered by the Owner.

Energy Recovery

Energy recovery in laboratory buildings exhausting 100% of intake air can substantially contribute to lifetime energy cost savings and short payback periods. The following technologies of heat recovery from exhaust air stream are available and should be evaluated based on the local climatic conditions and energy costs.

Runaround Loop – A heat recovery system where the heat is exchanged between the exhaust and the supply air system through a circulated water-based medium (glycol mixture) using coil heat exchangers. Runaround loops are simple, and the separate airstreams prevent any cross-contamination. The system recovers only sensible heat, and requires periodic cleaning to keep deposits from accumulating on the exterior of the finned coil.

Heat Pipe Heat Exchanger – The heat pipe transfers heat from one airstream to the other by evaporating a refrigerant at the hot side of the tube heat exchanger and condensing it at the cold side. The heat pipe system requires the two airstreams to be located adjacent to each other. The excellent heat transfer on the inside the tube is not matched outside on the air side diminishing the overall heat transfer. The effectiveness of sensible heat transfer for heat pipes is 45% to 65%. The physical separation of supply and exhaust ducts prevents any cross-contamination.

Heat Wheel Heat Exchanger – Rotary air-to-air heat exchanger filled with media of various small geometric configurations coated with desiccant, providing a large internal surface for heat and mass transfer. One half of the wheel is in contact with the exhaust stream and the other half with the supply air. Both sensible and latent heat is transferred between the two sides, resulting in a high efficiency. The inevitable cross-contamination resulted from carryover or leakage is substantially reduced to 0.1% by using a purge section between the two sides. Note that the heat wheel heat exchanger is not allowed per ASHRAE 62.1-2010 Interpretation IC 62.1-2010-1 for systems transporting Class 4 air (air with objectionable fume or gases, or potentially harmful levels of particles, fume or gases).

Plate Heat Exchanger – Plate-type air-to-air heat exchangers transfer heat from one airstream to another through alternating layers of exhaust and supply airstreams separated by metal plates. The system has no cross-flow but requires the installation of supply and exhaust ducts side by side. The plate heat exchanger system requires the two airstreams to be located adjacent to each other. The separate airstreams prevent any cross-contamination.

Gravity Flow Systems or Thermosiphon – A gravity circulating system of a heat and mass transfer medium using either heat pipe or coil heat exchangers. The thermosiphon system does not require any pumping. No moving parts and separate air stream are the advantages of these systems.

Table ER1 shows a performance comparison of energy recovery systems.

	Runaround	*Heat Pipe*	*Heat Wheel*	*Fixed Plate*	*Thermosiphon*
Efficiency	*55% to 65%*	*45% to 65%*	*50% to 85%*	*50% to 80%*	*40% to 60%*
Size (cfm)	*100 and up*	*100 and up*	*50 to 80,000*	*50 and up*	*100 and up*
Pressure drop (inch of water)	*0.6 to 2*	*0.6 to 2*	*0.4 to 0.7*	*0.4 to 1.2*	*0.4 to 2*
Temperature	*–45°F to 500°F*	*–40°F to 105°F*	*–65°F to 900°F*	*-75°F to 900°F*	*–40°F to 105°F*

Table ER1 - Energy Recovery Systems

LABORATORY PIPED SYSTEMS

Systems Description

Laboratory piped systems distributed throughout the building include: domestic potable water, industrial non-potable water, laboratory waste and vent, purified water, process cooling water, compressed air, vacuum, natural gas and specialty gases.

Laboratory piped systems should be flexible and adaptable to changes. The system design should consist of horizontal mains with assemblies of repetitive points of connection to each laboratory space. The systems should be distributed in utility corridors in horizontal loops through each floor of the building.

The location of the point of connections should be consistent throughout the building for simple identification and maintenance access. Each laboratory space should have dedicated shut-off valves for all piping services. The point of connection isolation valves should be readily accessible. All piping components subject to condensation, heat loss, or freezing should be insulated. The piping systems should be labeled for identification.

The design of the laboratory piping systems should include appropriate diversities and capacity allowance for future expansion. Laboratory piping systems and equipment should not be subject to the requirements of NFPA 99 Standard for Health Care Facilities.

Water Supply Systems

Industrial Cold Water and Hot Water (ICW, IHW)

Laboratories will be supplied with separate industrial cold and hot water systems protected by central backflow preventers. Industrial water is supplied to laboratory sinks and cupsinks, fume hoods, washing and sterilizing equipment, hose stations, laboratory ice machines, and laboratory equipment. All fixtures utilizing industrial water should have a sign stating "NON-POTABLE WATER, DO NOT DRINK". Maximum water pressure at service outlet should be limited to 80 psi. A minimum of 35 psi should be provided at the most hydraulically remote fixture or equipment. Industrial hot water should be recirculated and distributed at or below 120°F.

Potable Cold Water and Hot Water (CW, HW)

The building potable cold and hot water systems should be protected by central backflow prevention equipment and distributed through each floor of the building, and may be connected to laboratories for drench hoses and safety shower/emergency eyewash fixtures. Approved backflow prevention devices should be provided at each outlet to meet local code requirements. Maximum water pressure at the service outlet should be limited to 80 psi. A minimum of 35 psi should be provided at the most hydraulically remote fixture or equipment. Potable hot water should be recirculated and distributed at 120°F.

Tempered (Tepid) water system (TW)

Tempered (Tepid) water supplying drench hoses and safety shower/emergency eyewash fixtures is potable water at tempered temperature and distributed in a separate loop to each floor. The tempering mixing water valves should be located at the connection of potable water systems to the riser. Usually the tempered water is not recirculated. The frequent use of drench hoses and the scheduled testing of eye washing and safety shower equipment prevent tempered water stagnation.

Purified Water (PW)

Local water polishing/purification systems should be considered for the limited laboratory requirements. These systems are typically part of the Furnishings, Fixtures and Equipment budget, and locations will be identified during Design.

Cooling Water Systems

Process Cooling Water (PCWS, PCWR)

A dedicated recirculating process cooling water system should be provided for cooling the laboratory equipment. The process cooling water system should be decoupled from the central building chilled water system and conditioned in a plate and frame heat exchanger using the building chilled water system as the cooling source. A supply water temperature of 60°F – 65°F with a differential temperature of 10°F is recommended. The system pumps should be selected to accommodate laboratory equipment with up to a 25 PSIG pressure drop.

Chilled Water (CHWS, CHWR)

The building chilled water system may be used to provide the cooling requirements of controlled environmental room refrigerating systems and limited laboratory equipment.

Compressed Air (CA) and Laboratory Compressed Air (LA)

Oil-free and dried instrument grade compressed air (CA), ISO 8573.1 class 1.2.1 quality should be supplied through floor distribution piping at 100 psig. Pressure reducing valves should be provided downstream of the laboratory point of connection for delivering laboratory compressed air (LA) at 15 – 30 psig to services. Other pressure requirements will be satisfied by local pressure regulator fixtures at the service fitting. The compressed air system should be flexible with redundant compressors in duplex or triplex arrangement.

Table P1 shows the air quality specifications for the compressed air quality classes.

Class	ISO 8573.1 Class Limits			Water Pressure Dewpoint (°F)	Oil (mg/m 3)
	Solid Particulate (maximum number of particles per m³)				
	0.1-0.5 micron	0.5-1.0 micron	1.0-5.0 micron		
1	20,000	400	10	-94.0	0.01
2	400,000	6,000	100	-40.0	0.1
3	-	90,000	1,000	-4.0	1.0
4	-	-	10,000	37.4	5.0
5	-	-	-	44.6	-
6	-	-	-	50.0	-

Table P1 – Compressed Air Quality Specifications

Laboratory Vacuum (LV)
If required, laboratories should be provided with a centralized vacuum system. The system should be designed to provide 19 to 23 inch Hg negative pressure at the most remote location of vacuum service. The system should include duplex or triplex vacuum pumps, storage tank, controls, and distribution piping.

Laboratory Vacuum Pump Discharge
Deeper vacuum requirements should be covered by local vacuum pumps, serving one or multiple services. The local vacuum pumps should discharge into laboratory exhaust system. Oil-ring vacuum pumps should be provided with an oil collector at the lowest end of the vertical pipe. When the discharge from multiple pumps is manifolded, a check valve should be provided on each pump discharge.

Laboratory Natural Gas (LG)
Natural gas should be supplied at low pressure of 4 to 7 inches of water. Propane may be used in remote locations where natural gas is not available. Each floor and laboratory space should have an isolation valve that is quickly accessible for emergency shutoff. Additional shutoff valves should be provided downstream of the point of connection in accessible locations for controlling the usage of natural gas in teaching laboratories.

Specialty Laboratory Gases (CO2), (N2), (O2), (He), (Ar), (H2), etc.
Most specialty gases will be supplied from gas cylinders placed within laboratories, or gas cylinder stations located in designated areas serving adjacent laboratories. The gas cylinders may be manifolded providing redundancy and alarmed switch-over capabilities to ensure uninterrupted gas supply. Toxic, corrosive, and flammable gas cylinders will be placed in ventilated gas safety cabinets.

Laboratory Waste System (LW)
The laboratories should be provided with chemical resistant waste and vent system. Laboratory waste and vent systems should be separate from the general use sanitary system. The two systems should be connected to the site sanitary waste system outside the building footprint.

The release of chemicals is strictly regulated by the Laboratory Protocols that do not permit discharging acids, bases or other chemicals into the laboratory waste system. As a result, the dilution of the effluents in the laboratory waste is significant. Combining laboratory waste with sanitary waste outside of the building provides further dilution. The expected concentration levels are normally below the limits imposed by the Authority Having Jurisdiction, making neutralization of the laboratory waste unnecessary. A sampling pit, in a designated location prior to discharging into the city sewer system, is a common approach for monitoring the concentration of chemicals. The proposed design should be discussed with and approved by the Authority Having Jurisdiction.

Small quantities of chemicals from glass washing activities, accidental spills, or improper usage may be discharged through sinks or cupsinks prior to dilution. The sinks, cupsinks and piping materials should be constructed of chemical resistant materials for these residual chemicals in the waste stream.

Piping Materials

The laboratory piping materials should be high quality, resistant to chemical or erosive effects of the conveying fluids. The materials recommended for piped services are shown in Table P2.

Piping System	*Designation*	*Material and Joints*
Industrial Cold Water and Hot Water	*ICW/IHW*	*Type L copper with soldered or brazed joints*
Potable Cold Water and Hot Water	*CW/HW*	*Type L copper with soldered or brazed joints*
Purified Water	*PW*	*Unpigmented or homopolymer polypropylene (PP) pipe, valves and fittings with electro-fusion joints*
Process Cooling Water	*PCWS/PCWR*	*Type L copper with soldered or brazed joints*
Chilled Water	*CHWS/CHWR*	*Type L copper with soldered or brazed joints*
Compressed Air	*CA, LA*	*Type L copper certified for "Oxygen Service" with brazed joints*
Laboratory Vacuum	*LV*	*Type L copper with soldered or brazed joints*
Natural Gas	*NG*	*Black steel with welded or threaded joints*
Specialty gases, general purity	N_2, CO_2, He, Ar	*Type L hard-drawn, tempered copper tubing certified for "Oxygen Service" with silver brazed joints*
Specialty gases, general or high purity from local cylinders	N_2, CO_2, O_2, He, Ar	*Type L soft, annealed copper tubing certified for "Oxygen Service" with silver brazed joints or compression brass fittings*
Specialty gases, research or ultra high purity from local cylinders	N_2, CO_2, O_2, He, Ar	*High purity stainless steel tubing with orbital weld joints*
Flammable gases	H_2, CH_4, C_2H_2	*High purity stainless steel tubing with orbital weld joints*
Laboratory Waste and Vent System	*LW, LWV*	*Flame retardant polypropylene pipe with mechanical joints above grade in accessible spaces. Thermally welded joints below grade, behind walls or inaccessible spaces*

Table P2 - Piping Materials

ELECTRICAL SYSTEMS

Systems Description

Electrical Service and Distribution

Normal Service

A 480Y/277V 3PH 4W service from the exterior pad-mounted service transformer shall be supplied to the building main service switchboard located in the main electrical room within the building. The main service switchboard shall be fully-rated, include copper-bussing, and a main circuit breaker (100%-rated, insulated case, LSIG trip functions). The main service switchboard shall feed large mechanical loads, elevators, 480Y/277 volt distribution panels, and dry type 480V-208Y/120V copper transformers. The 208Y/120V power from these transformers shall be distributed via secondary distribution switchboards located in building electrical rooms on each floor. A surge protection device (SPD) shall be provided at the 208Y/120V secondary distribution switchboards.

All power distribution equipment shall be provided with copper bussing and copper conductors. The main service switchboard and all secondary distribution switchboards shall include NEMA 1 construction mounted on concrete housekeeping pads. Panelboards for laboratory spaces shall be flush mounted, with NEMA 1 construction, and locking covers. Panelboards for non-laboratory loads shall be surface mounted, NEMA 1 construction with locking covers. All electrical power distribution components shall be fully rated, having a short circuit withstand rating that exceeds the available fault duty at that point in the system. Interior dry-type transformers shall be copper-wound, NEMA 1 construction, with 80°C rise construction and sound levels that are 3db below NEMA standards. Conductors shall be copper, single conductor, 600V-rated,color coded, and installed in conduit. Feeders shall be type XHHW or XHHW-2 insulation. Branch circuit conductors shall be type THHN or THWN insulation. Raceway type shall be EMT with compression fittings.

208Y/120V power from the secondary distribution switchboards shall be distributed to laboratory spaces via dedicated panelboards (typical 42 pole), mounted outside individual laboratory spaces, with one panelboard per 2-4 laboratory modules. Panelboards serving laboratory areas shall be recessed, door-in-door type, provided with a 225A copper bus, served with a 225A copper feeder, and provided with a 250AF/150AT main circuit breaker. A minimum of 20% spare capacity shall be provided in each laboratory panelboard.

Lighting and non-laboratory area electrical loads shall be served by panelboards that do not supply laboratory loads. All non-laboratory electrical panelboards shall be located in building electrical rooms on each floor, and shall be supplied by feeders sized to match the panelboard bus.

Emergency Power System

The building electrical systems shall be provided with a diesel-engine emergency generator system. Generator voltage shall be 480Y/277V 3PH 4W. The generator system shall consist of an engine generator and controls, UL listed sub-base fuel tank, exhaust system, radiator, batteries, starting system, block heater, and generator output circuit breakers all located outdoors in a common sound-attenuated weatherproof enclosure. The generator fuel supply shall have the capacity to operate the generator at full load rating as required by state and local codes, for a minimum of (8) hours. The emergency generator system shall be sized for simultaneous operation of Life-Safety loads (LS - NEC 700), Legally-Required Standby loads (LRSB – NEC 701), and Optional Standby loads (OPT – NEC 702).

Automatic transfer switches shall connect emergency loads to the emergency generator system. Segregated wiring, equipment, and automatic transfer controls shall be provided for LS, LRSB, and OPT loads as required by code.

Life-Safety (LS) emergency power loads are code-mandated and typically include egress lighting and exit signs, fire detection and alarm systems. Legally-Required Standby (LRSB) emergency power loads are code-mandated and typically include fire pumps, smoke control systems, elevators, public safety communication systems, and some environmental control equipment. LRSB emergency power shall be provided to laboratory equipment where a definite potential for catastrophe such as explosion, fire, violent ejection of chemicals or other life-threatening situation would occur during a power outage.

Optional Standby (OPT) emergency power loads are not code mandated. Optional Standby power is provided for continuity of instruction, production, or testing operations. These loads typically include critical equipment, refrigerators, freezers, vacuum pumps, incubators, monitoring equipment, controlled environmental rooms, and select room ventilation systems. Specific equipment-related standby power requirements shall be further refined during the design development project phase.

All elements of the emergency power shall be approved by the Authority Having Jurisdiction.

HVAC Emergency Power Considerations

Legally-Required Standby power shall be supplied to laboratory HVAC systems, where a loss of ventilation or temperature control would result in definite potential for catastrophe such as explosion, fire, violent ejection of chemicals or other life-threatening situations. This is not a typical scenario, and any such loads shall be specifically identified in the Design phase.

It is common practice to provide Optional Standby power to exhaust fans of manifolded exhaust systems serving laboratory areas. Optional Standby power shall be provided for the full capacity of the exhaust system, or in selected cases it shall serve only partial exhaust capacity to maintain negative pressure inside fume hoods and similar devices.

Optional Standby power shall be provided to serve HVAC loads that, if interrupted, would create significant loss of research work; or damage to products, equipment, or processes. If applicable, these loads shall be specifically identified in the schematic design or design development phase.

Momentary or extended losses of power shall not change or affect any of the HVAC control system setpoints, calibration settings, or emergency status. All HVAC control systems shall be connected to uninterruptable power supply units as well as to the generator system.

Laboratory Electrical Service and Distribution

Power Distribution Equipment

208Y/120V power from the secondary distribution switchboards shall be distributed to laboratory spaces via dedicated panelboards (typical 42 pole), mounted outside individual laboratory spaces, with one panelboard per 2-4 laboratory modules. Panelboards serving laboratory areas shall be recessed, door-in-door type, provided with a 225A copper bus, served with a 225A copper feeder, and provided with a 250AF/150AT main circuit breaker. A minimum of 20% spare capacity shall be provided in each laboratory panelboard.

Conductors shall be copper, single conductor, 600V-rated, color coded, and installed in conduit. Branch circuit conductors shall be type THHN or THWN insulation. Raceway type shall be EMT with compression fittings. Type MC, type AC, and type NM cable shall not be used in laboratory spaces. All laboratory branch circuits shall include dedicated neutral conductors. No shared neutral conductors shall be used in laboratory spaces.

Within laboratory spaces, power, and data at perimeter locations and on overhead service carriers shall be distributed within dual-compartment extruded-aluminum raceway. This raceway shall be fed from overhead using rigid conduits concealed within walls or in pipe drops. At individual devices in laboratories, faceplates shall be stainless steel.

Design Criteria

Laboratory Utilization Voltages

480V, 3PH, 3W – Large lab equipment.
208Y/120V, 3PH, 4W – Receptacles, specialized lights, small laboratory equipment.

Equipment Sizing Criteria

The equipment sizing criteria are presented in Tables E1-E2.

Branch Circuit	***Load***
Lighting	*Actual installed wattage*
Receptacles	*180 VA per outlet*
Surface wireway	*250 VA per outlet*
Equipment outlets	*Actual VA of equipment served*
Motors	*125% of motor wattage*

Table E1 - Branch Circuit Load Calculations

Electrical panel	***Current***
208Y/120V Lab Equipment Panels	*225A*

Table E2 - Minimum Panelboard Bus Sizes

Load Calculation Criteria

Preliminary Design Loads

The preliminary overall connected Volt-Ampere per Square Foot is shown in Table E3.

Space	***Overall connected load (Volt-Amp/Sq Ft)***	
	Lighting	***Receptacles***
Classroom and Conference Room	*1.2*	*2.0*
Office	*1.0*	*5.0*
Laboratory	*2.0*	*20-35*
Laboratory Support	*2.0*	*60-100*
Storage	*0.8*	*-*
Corridor	*0.8*	*0.5*
Mechanical/Electrical Areas	*0.5*	*0.2 (plus actual mechanical equipment load ratings)*

Table E3 - Preliminary Connected Loads

Grounding System

A complete equipment grounding system shall be provided, per NEC 250. A separate insulated green grounding conductor shall be provided for each branch circuit. Research-specific and process-specific grounding connections shall be provided in selected laboratory areas. These include grounding of flammable cabinets, grounding connections for bulking chemicals into drums, and grounding connections for research equipment such as electrophysiology rigs. These ground connections shall be specifically identified in the design development phase.

Interior Lighting Systems

Classroom and conference rooms:

- Recessed LED direct fixtures or direct/indirect LED pendant fixtures for area lighting.
- Recessed LED wall-wash fixtures for whiteboard illumination.

Office:

- 2' x 4', recessed LED volumetric direct fixtures.

Laboratory, Technical, and Support Areas:

- 2' x 4' recessed LED volumetric direct or direct/indirect LED pendant fixtures for area lighting.
- LED under-cabinet task lighting where required at benches.
- Specialized fixtures shall be required in certain spaces. For example, explosion-proof fixtures in chemical storage rooms, and sealed-lens fixtures in autoclave rooms. These specialized requirements shall be further refined in the detailed design phase.

Exit Signs:

- State Fire Marshal approved LED fixtures in all paths of egress in accordance with code and all local requirements.

LED Light Engines and Drivers:

- LED light engines shall be long life, 4000°K, 85CRI.
- Dimming drivers shall be provided where required.

Lighting Control:

Low voltage lighting controls with occupancy sensors for office, classroom, and laboratory spaces shall be provided. Wall-mounted sensors with integrated light switches shall be utilized in office spaces. Ceiling-mounted sensors with separate wall-mounted light switches for manual control shall be utilized in classrooms, laboratories, technical, and support areas. Occupancy sensors shall be passive infrared type.

The lighting control system shall be integrated through the BMS system, and shall function to turn corridor and common area lighting off during after-hours and non-use periods. However, the systems in non-occupancy sensor controlled areas shall remain 'on' during normal operating hours typically, so as not to create a nuisance for the users. Automatic lighting control of task lights via local occupancy sensors at each station or fixture shall be evaluated during detailed design.

Lighting Criteria Design Levels:
Light levels listed here (Table E5) are generalized maintained values at the task location. Within many laboratory spaces, localized task lighting can play a large role in meeting the recommended lighting levels. However, within instructional laboratories where upper-level shelving is not common – overhead lighting is generally utilized to meet the recommended levels. Specific laboratory space lighting level recommendations are identified in the Laboratory Detailed Space Requirements document.

Alarm and Security Systems

Fire Alarm System

Provide fire alarm system design to match campus standards.

Telecommunications Systems

Provide telecommunications system design to match campus standards. Wireless internet service should be available throughout all laboratory spaces. Note that, due to the data-intensive nature of scientific equipment, hard-wired teledata outlets are required in higher densities than would be seen in other areas of typical buildings. Specific outlet locations, types and quantities will be determined to meet user needs during detailed design.

Security and Access Control System

Provide security system design to match campus standards. The system design should include monitoring, access control, and alarm functions. Note that, due to the complexity of operational-hour and after-hour access to laboratory spaces – it is common to have fairly high densities of access control devices within laboratory buildings.

Space	***Maintained Foot-Candle***
Classroom	*40-50 footcandles*
Conference Rooms	*50-75 footcandles*
Office	*30-40 footcandles*
Laboratory, Support, Technical Area: Bench and table top	*75-100 footcandles (including task lighting)*
Storage	*10-20 footcandles*
Corridor	*15-20 footcandles*
Mechanical/Electrical	*10-20 footcandles*

Table E5 - Lighting Design Criteria

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E. MECHANICAL NARRATIVE

DESIGN CRITERIA

The following tables illustrate the design criteria that will be utilized to design the facility systems.

Operation	**Reference**	**Temperature**
Cooling	*ASHRAE 0.4% (Dry Bulb/Mean Coincident Wet Bulb)*	*86°F/65°F*
Heating	*ASHRAE 99.6% (Dry Bulb)*	*24°F*

Table 2: Outdoor Conditions – Bremerton, WA

Occupancy	**Relative Humidity**	**Cooling**	**Heating**
Offices	*0% – 65%*	*75°F ±2°F*	*70°F ±2°F*
Conference Rooms	*0% – 65%*	*75°F ±2°F*	*70°F ±2°F*
Classrooms	*0% – 65%*	*75°F ±2°F*	*70°F ±2°F*
Engineering Lab	*0% – 65%*	*75°F ±2°F*	*70°F ±2°F*
Cyber Security Labs	*0% – 65%*	*75°F ±2°F*	*70°F ±2°F*
Corridors	*n/a*	*78°F ±2°F*	*68°F ±2°F*
Restrooms	*n/a*	*78°F ±2°F*	*68°F ±2°F*
Vestibules	*n/a*	*n/a*	*50°F ±2°F*
Storage	*n/a*	*80°F ±2°F*	*60°F ±2°F*
Mechanical Spaces	*n/a*	*80°F ±2°F*	*60°F ±2°F*
Electrical Spaces	*n/a*	*80°F ±2°F*	*60°F ±2°F*
MDF Spaces	*30% – 60%*	*80°F ±2°F*	*60°F ±2°F*
IDF Spaces	*30% – 60%*	*80°F ±2°F*	*60°F ±2°F*
Passive Conditioned Spaces	*n/a*	*80°F ±2°F*	*70°F ±2°F*

Table 3: Indoor Climate Conditions

Occupancy	Outdoor Air	Supply Air	Exhaust Air
Offices	17 CFM/person	varies	n/a
Conference Rooms	7 CFM/person	varies	n/a
Classroom	15 CFM/person	varies	n/a
Engineering Lab	4 ACH	4 ACH	4 ACH
Cyber Security Labs	17 CFM/Person	varies	n/a
Corridors	0.06 CFM/SF	varies	n/a
Restrooms	n/a	n/a	2 CFM/SF
Vestibules	n/a	n/a	n/a
Storage	0.06 CFM/SF	varies	n/a
Mechanical Spaces	0.06 CFM/SF	varies	n/a
Electrical Spaces	0.06 CFM/SF	varies	n/a
MDF Spaces	0.06 CFM/SF	varies	n/a
IDF Spaces	0.06 CFM/SF	varies	n/a

Table 4: Minimum Airflow Rates

Low-Pressure Ductwork	
Static Pressure Loss	*Maximum 0.10 inches water column per 100 feet*
Main Velocity	*Maximum 1,500 feet per minute*
Branch Velocity	*Maximum 1,200 feet per minute*
Flexible Ducts	*Maximum length 8 feet, minimize total 90 degree bends*

Medium-Pressure Ductwork	
Static Pressure Loss	*Maximum 0.28 inches water column per 100 feet*
Main Velocity	*Maximum 2,400 feet per minute*
Branch Velocity	*Maximum 2,000 feet per minute*

Hydronic Piping	
Static Pressure Loss	*Maximum 4 feet water column per 100 feet*
Velocity	*Maximum 7 feet per second*

Table 5: Duct and Pipe Sizing Criteria

HVAC SYSTEMS - BASE OPTION

The HVAC systems recommended to be carried forward on this project have been reduced to the following option.

Central Heating System - Air to Water Heat Pump

A multi-module (minimum three modules) air to water heat pump on the roof will provide heating water for the building. N+1 redundancy will be provided and is reflected into the quantity and capacity noted below. Heat pump selection shall be capable of operating down to 10F. The system will be piped in a Primary/Secondary pumping arrangement with a hydraulicly separating buffer tank separating the two loops. No Glycol is anticipated. Heat trace will be provided on piping exposed to outside air conditions.

Heating Delivery

Heating will be provided to the Engineering lab and via a single variable volume rooftop air handling unit. As the Engineering lab is only space in the building with fume hood exhaust requirements, the air handling unit will only serve this zone as the space will require 24/7 conditioning.

Heating will be provided to the office spaces, classrooms, and general support spaces via floor mounted hydronic radiators. Floor mounted hydronic radiators to be Runtal or equivalent. Window contact switches will be provided on all operable windows that shut the heating system off when windows are open.

Hydronic Cabinet unit heaters will be provided in all building vestibules, exit stairs with exterior walls, and other spaces requiring heating but not cooling.

Hydronic Unit heaters will be provided in mechanical rooms and back of house spaces for freeze protection.

Central Cooling System - Air Cooled Chiller

Air cooled chillers will generate chilled water for building cooling. Variable speed pumps will distribute the chilled water to air handling equipment within the building.

Cooling Delivery

Cooling will be provided to the Engineering lab and via a single variable volume rooftop air handling unit. As the Engineering lab is only space in the building with fume hood exhaust requirements, the air handling unit will only serve this zone as the space will require 24/7 conditioning.

A passive cooling approach will be applied to all office spaces, classrooms, and general support spaces that have exterior exposures and access to windows. Minimum ventilation will be provided at a low temperature (52-55 deg F) to trim the peak cooling loads while operable windows and ceiling fans will provide the primary method for occupant comfort. A passive house level envelope or equivalent is required for the passive cooling approach.

Interior zones that require cooling or exterior zones that have cooling loads exceeding the passive approach capacity will be conditioned by 4 pipe fan coil units.

100% Outside Air Lab VAV Air Handling Unit - Semi Custom Hydronic

Air for ventilation and dehumidification will be distributed to the engineering lab by a central, semi-custom, factory fabricated, variable air volume dedicated outdoor air handling unit.

Unit will be equipped with the following components:

- Outside air damper
- Relief air damper
- Pre-filters (MERV 8) – supply air
- Final filters (MERV 13) – supply air
- Pre-filters (MERV 8) – return air
- Hydronic heating coils with circulation pumps
- Hydronic cooling coils
- Variable speed supply fans
- Variable speed return fans

During economizer mode face/bypass dampers will position for free cooling.

Supply and Return fan speeds will vary speed to maintain the minimum airflow required to maintain ventilation and dehumidification requirements.

No heat recovery is provided

Heating coil valves will modulate to maintain supply air temperature between 65 and 85 degrees F.

Cooling coil valves will modulate to maintain supply air temperature between 55 and 65 degrees F.

Dedicated Outdoor Air System (DOAS) - Custom Hydronic

Air for ventilation and dehumidification will be distributed to all non-lab spaces by a central, custom, factory fabricated, variable air volume dedicated outdoor air handling unit.

Units will be equipped with the following components:

- Outside air damper
- Relief air damper
- Pre-filters (MERV 8) – supply air
- Final filters (MERV 13) – supply air
- Pre-filters (MERV 8) – return air
- Heat recovery fixed plate with face/bypass dampers
- Hydronic heating coils with circulation pumps
- Hydronic cooling coils
- Variable speed supply fans
- Variable speed return fans

The heat recovery fixed plate is sized for full airflow rate will transfer energy from the return airstream to the supply air stream when the unit is operating outside the airside economizer mode.

During economizer mode face/bypass dampers will position for free cooling.

Supply and Return fan speeds will vary speed to maintain the minimum airflow required to maintain ventilation and dehumidification requirements.

Heating coil valves will modulate to maintain supply air temperature between 65 and 75 degrees F.

Cooling coil valves will modulate to maintain supply air temperature between 55 and 65 degrees F.

Central Heating Equipment

- Air to Water Heat Pumps: three modules at 375 MBH each, Aermec
- Primary Heating Water Pumps: Two at 80 GPM, 2 HP, Taco Comfort Solutions
- Secondary Heating Water Pumps: Two at 60 GPM, 3 HP, Taco Comfort Solutions
- Buffer Tank: One at 360 Gallons, Taco Comfort Solutions

Central Cooling Equipment

- Air Cooled Chillers: One scroll type at 75 Tons, York
- Pumps: Three at 75 GPM, 3 HP, Taco Comfort Solutions

Terminal Equipment

- Variable volume terminal units: Ten at 500 CFM, Price Industries
- Ceiling Fans: Twenty, Haiku
- Baseboard Unit heaters: 400,000 MBH, Runtal Radiators
- Cabinet unit heaters: Three at 1,200 MBH, Trane

Central Air System Equipment

- 100% outdoor air VAV Air Handling Unit (Lab): One at 2,000 CFM, semi-custom Aaon
- Dedicated outdoor air handling unit (Office): One at 5,000 CFM, Aaon

HVAC SYSTEMS - ALTERNATE 1, PACKAGED HEAT PUMPS

The HVAC system described below is an alternate Mechanical system under review by the design team.

Central Heating System - N/A

In this mechanical system alternate, there is no central heating water plant. All heating will be through packaged heat pumps on the roof, electric resistance reheat, and electric baseboard heat.

Heating Delivery

Heating will be provided to the lab spaces via single zone packaged rooftop heat pumps. Packaged rooftop heat pumps will be 100% outside air while providing heating, cooling, and all ventilation requirements. One heat pump per thermal zone.

Heating will be provided to the office spaces, classrooms, and general support spaces via floor mounted electric radiators.

Electric Cabinet unit heaters will be provided in all building vestibules, exit stairs with exterior walls, and other spaces requiring heating but not cooling.

Electric Unit heaters will be provided in mechanical rooms and back of house spaces for freeze protection.

Central Cooling System - N/A

In this mechanical system alternate, there is no central chilled water plant. All cooling will be through packaged heat pumps on the roof and passive strategies

Cooling Delivery

Cooling will be provided to the lab spaces via single zone packaged rooftop heat pumps. Packaged rooftop heat pumps will be 100% outside air while providing heating, cooling, and all ventilation requirements. One heat pump per thermal zone.

A passive cooling approach will be applied to all office spaces, classrooms, and general support spaces that have exterior exposures and access to windows. Minimum ventilation will be provided at a low temperature (52-55 deg F) during peak cooling demand to trim the cooling loads while operable windows and ceiling fans will provide the primary method for occupant comfort. A passive house level envelope or equivalent is required for the passive cooling approach.

Interior zones that require cooling or exterior zones that have cooling loads exceeding the passive approach capacity will be provided by the packaged air source heat pump. The packaged air source heat pumps will be sized to handle interior cooling loads in addition to minimum ventilation.

Dedicated Outdoor Air System (DOAS) - Air Source Heat Pump

Air for ventilation and dehumidification will be distributed to all occupied spaces by central packaged variable air volume dedicated outdoor air handling units.

Units will be equipped with the following components:

- Outside air damper
- Relief air damper
- Pre-filters (MERV 8) – supply air
- Final filters (MERV 13) – supply air
- Pre-filters (MERV 8) – return air
- Heat recovery plate with face/bypass dampers
- Direct expansion heating/cooling coil
- Air cooled condensing unit
- Variable speed supply fan
- Variable speed return fan

Zoning of air handling units will be based on environmental requirements and operating schedules.

The heat recovery plate sized for full airflow rate will transfer energy from the return airstream to the supply air stream when the unit is operating outside the airside economizer mode.

During economizer mode face/bypass dampers will position for free cooling.

Supply and return fan speeds will vary speed to maintain the minimum airflow required to maintain ventilation and dehumidification requirements.

Direct expansion heat pump system will modulate to maintain supply air temperature between 55 and 90 degrees F.

Central Heating Equipment

N/A

Central Cooling Equipment

N/A

Terminal Equipment

- Variable volume terminal units: Ten at 1,000 CFM, Price Industries
- Ceiling Fans: Twenty, Haiku
- Electric Unit heaters: 400,000 MBH, Runtal Radiators
- Cabinet unit heaters: Three at 1,200 MBH, Trane

Central Air System Equipment

- Packaged 100% Outdoor Air Heat Pump (Lab): One at 2,000 CFM, Aaon
- Packaged DOAS Heat Pump (Office): One at 10,000 CFM, Aaon

HVAC SYSTEMS - ALTERNATE 2, VRF

Central Heating/Cooling System - VRF

All spaces in the building will be heated and cooled by an air source variable refrigerant volume (VRF) system. The outdoor units will be located on the roof in the mechanical yard. The VRF refrigerant piping will be routed vertically through the building in accessible shafts to allow for access to the refrigerant pipe. Rooftop equipment to be mounted on dunnage coordinated with the structural engineers. All refrigerant piping to be roof mounted from the rooftop equipment to the refrigerant shafts.

Heating/Cooling Delivery

A combination of ducted, cassette, and wall mounted VRF fan coil units are anticipated to provide all heating and cooling requirements.

All spaces will be provided with terminal units to control the amount of outside air brought into the space. Air will be delivered at a neutral temperature. Outside air ductwork shall be
separate from the VRF ductwork per current energy code.

Electric Cabinet unit heaters will be provided in all building vestibules, exit stairs with exterior walls, and other spaces requiring heating but not cooling.

Electric Unit heaters will be provided in mechanical rooms and back of house spaces for freeze protection.

Dedicated Outdoor Air System (DOAS) - Air Source Heat Pump

Air for ventilation and dehumidification will be distributed to all occupied spaces by central packaged variable air volume dedicated outdoor air handling units.

- Units will be equipped with the following components:
- Outside air damper
- Relief air damper
- Pre-filters (MERV 8) – supply air
- Final filters (MERV 13) – supply air
- Pre-filters (MERV 8) – return air
- Heat recovery plate with face/bypass dampers
- Direct expansion heating/cooling coil
- Air cooled condensing unit
- Variable speed supply fan
- Variable speed return fan

Zoning of air handling units will be based on environmental requirements and operating schedules.

The heat recovery plate sized for full airflow rate will transfer energy from the return airstream to the supply air stream when the unit is operating outside the airside economizer mode.

During economizer mode face/bypass dampers will position for free cooling.

Supply and return fan speeds will vary speed to maintain the minimum airflow required to maintain ventilation and dehumidification requirements.
Direct expansion heat pump system will modulate to maintain supply air temperature between 55 and 90 degrees F.

Central Heating/Cooling Equipment

- VRF Condensing Units: 50 tons, LG

Terminal Equipment

- VRF Fan Coil units: Twenty at 36,000 MBH
- Variable volume terminal units: Ten at 1,200 CFM, Price Industries
- Cabinet unit heaters: Three at 1,200 MBH, Trane

Central Air System Equipment

- Packaged DOAS Heat Pump (Lab): One at 2,000 CFM, Aaon
- Packaged DOAS Heat Pump (Office): One at 5,000 CFM, Aaon

COMMON MECHANICAL SYSTEMS

Elevator Pressurization

Due to building height, elevator pressurization fans are not anticipated to be required.

Stairwell Pressurization

Due to building height, stairwell pressurization fans are not anticipated to be required.

Fume Hood Exhaust Fan (FEF) - Variable Volume

Variable speed laboratory exhaust fans will be provided to serve hazardous exhaust from fume hoods and other laboratory exhaust requirements such as snorkels or bio safety cabinets.

Exhaust fans will be high plume, dilution type units, or will be provided with suitable discharge stacks to avoid re-entrainment of exhaust air by building outside air intakes. Exhaust fan speed to modulate to maintain constant hood sash face velocity and will be located at roof level.

Exhaust fans will be on emergency power and have N+1 redundancy.

A dedicated constant airflow valve integrated into the building BMS system will be provided for each fume hood or terminal device.

- Exhaust fan: Two at 1,100 CFM, Cook
- Air Valves: One at 700 CFM, one at 400 CFM Antec

Split Systems

Split systems will be provided for all 24/7 cooling loads in spaces such as IDF, MDF, or electrical rooms.

Split systems will be provided for all teaching data center/server racks, or any other teaching application as required. Indoor units to be wall mount.

All split systems are to be on emergency power.

Split Systems: 5 at 2.5 tons, LG

NATURAL VENTILATION

The team will discuss ASHRAE standard 55 extended temperature and humidity ranges for naturally ventilated systems to help establish the users comfort zone.

This system can be combined with a mechanical system and operate in "mixed mode" if required. Operable windows will be provided with window contact switches to shut-off the HVAC systems to spaces that have their windows open.

The natural ventilation system can operate when outside temperatures permit. The mechanical heating and cooling system will operate when the outside air temperatures are at their extremes and the windows are closed.

Approximate number of window contacts: Thirty

CONTROLS

A direct digital control (DDC) system will be provided to control and monitor all HVAC equipment and systems. Valve and damper actuation will be electric type. The control system will be integrated into the existing campus system to allow full control and monitoring from the existing operator's terminal. The control system will perform all required control functions, including optimization of equipment and system performance, reliability, equipment life and energy consumption.

MEASUREMENT AND VERIFICATION

An extensive measurement and verification system is anticipated to carefully monitor the building's energy use. Data on rainfall and incoming solar energy will be collected and displayed on flat screen monitors in the lobby. The building's energy and water use will be compared to these natural budgets and the building's CO2 emissions can also be tracked.

This system can be used to share several different trends with the building's occupants.

LEED Measurement and Verification Requirements

Separate monitoring of the following end use loads:

- Lighting
- Receptacles
- Heating
- HVAC Fans and Pumps
- Cooling
- Elevator
- Water – total building use
- Domestic hot water

F. PLUMBING NARRATIVE

DESIGN CRITERIA

Domestic and Non-Potable Water Piping	
Minimum Pressure	35 PSI at most remote outlet
Maximum Pressure	70 PSI
Friction Loss	Maximum 3 PSI per 100 feet
Velocity	Maximum 6 feet per second (Cold & Non-potable Water) Maximum 5 feet per second (Hot Water) Maximum 3 feet per second (Hot Water Return)
Sizing	Per Code (CPC 2016 – Appendix A)
Below Grade Material	3 inch and smaller, Type K, Hard drawn copper tubing, Soldered\brazed fittings
Domestic Hot Water Supply/Return, Above Grade Insulation	3/4 inch and smaller, 1 inch thick fiberglass, all-purpose jacket or elastomeric 1 inch and larger, 1-1/2 inch thick fiberglass or all-purpose jacket

Storm Drainage Piping	
Rainfall Rate	1.0 inches per hour 2.0 inches per hour (combined)
Piping Slope	Minimum 1/8 inch per foot
Sizing	Per Code
Material	Service weight cast iron with no-hub couplings
Insulation	Drain bodies and first 10 feet of pipe connected to the drain body 1/2 inch, Fiberglass, All-purpose jacket

Waste and Vent Piping	
Piping Slope	Minimum 1/4 inch per foot for piping less than 4 inches, 1/8 inch per foot for 4 inches and larger
Sizing	Per Code (CPC 2016)
Material	Service weight cast iron with no-hub couplings

Natural Gas Piping	
Pressure	2 PSI
Sizing	Per Code
Material	Above Grade, Interior 2 inch and smaller, Black steel, Schedule 40, Screwed fittings 2-1/2 inch and larger, Black steel, Schedule 40, Welded fittings
	Above Grade, Exterior (or exposed to corrosive environment) 2 inch and smaller, Hot-dipped zinc galvanized steel, Schedule 40, Screwed fittings

Table 6: Plumbing Piping Sizing Criteria

PLUMBING FIXTURES

Commercial grade low-flow fixtures will be provided where indicated on the architectural drawings. Refer to table below for representative flow rates for each type of fixture.

Fixture	Location	Type	Control	Flow*	Basis of Design	Notes
WC-1 Water Closet	*Restrooms*	*Wall hung, vitreous china*	*Sensor Operated flush valve*	*1.28 GPF*	*Kohler water closets with Sloan flush valve*	
WC-2 Water Closet	*Restrooms (ADA wheel chair and ambulatory stalls)*	*Wall hung, vitreous china*	*Sensor Operated flush valve*	*1.28 GPF*	*Kohler water closets with Sloan flush valve*	*Seat at 18 inches above floor, centerline at 17 inches from wall*
L-1 Lavatory	*Restrooms*	*Counter mounted, vitreous china*	*Sensor Operated*	*0.5 GPM*	*Kohler sink basin with Delta faucet*	*All locations are ADA accessible*
U-1 Urinal	*Restrooms*	*Wall Hung, vitreous china*	*Sensor Operated flush valve*	*0.5 GPF*	*Kohler Urinal with Sloan flush valve*	
U-2 Urinal	*Restrooms (ADA)*	*Wall Hung, vitreous china*	*Senor Operated flush valve*	*0.5 GPF*	*Kohler Urinal with Sloan flush valve*	*Rim mounted at 17inches above floor*
S-1 Sink	*Kitchenettes*	*Self rimming, counter mounted, Stainless steel*	*Single lever faucet, swing spout*	*1.5 GPM*	*Elkay sink basin with Delta faucet*	*ADA faucet*
DF-1 Drinking fountain with bottle filler	*Varies*	*Dual height with bottle filling station, stainless steel*	*Front push pad operation for drinking fountains and sensor operation at bottle filler*	*1.5 GPM at bottle filler*	*Elkay*	*Non-refrigerated*

**Code minimum flush/flow rates.*

DOMESTIC COLD-WATER SYSTEM

New water services will be provided from the city water main to serve the building. A new meter and a backflow preventer assembly will be provided for the domestic water system. Backflow device and meter shall be located in a dedicated water entry room located on level 1. Additional reduced pressure backflow preventers will be provided for other potential contamination sources:

- Cold water will be distributed to the plumbing fixtures and other areas requiring water such as emergency shower/eye wash stations. Refer to Architectural Drawings for plumbing fixtures and room locations. Freeze-proof hose bibs to be distributed around perimeter of building at every 100 feet.
- No booster pump is anticipated at this time.

Irrigation

A backflow device will be provided for the irrigation system within the water service room. Irrigation piping will be stubbed out of the building for the landscape use.

HVAC Make up

A backflow device will be provided for the HVAC make up water system within the mechanical room. HVAC make up is dependent upon the selected HVAC system.

Industrial Cold Water (Lab)

A backflow device will be provided for the lab industrial water system within the water service room. Industrial cold water piping will serve the industrial hot water system and all laboratory cold water requirements.

DOMESTIC HOT WATER SYSTEM

New high efficiency heat pump water heaters will provide domestic hot water to the building. The domestic hot water system components will be controlled by the building management system.

A recirculating hot water loop and hot water circulation pump will be provided.

The water heaters will produce 140 degrees F for health and equipment efficiency purposes.

A master thermostatic mixing valve will temper the hot water to 120 degrees F for general use.

An additional thermostatic mixing valve will provide tepid water to emergency fixtures per ANSI/ISEA Z358.1. Tepid water will be supplied no less than 60 degrees F and no greater than 100 degrees F.

Expansion tanks will be provided on hot water systems at water heaters to eliminate pressure buildup when the system is not being used.

Emergency showers and Emergency Eyewashes will be provided in the Engineering Lab, local thermostatic mixing valve will be provided with each emergency fixture.

Heat Pump Water Heater: 120 gallon, AO Smith

Storage Tank: 100 Gallon (for emergency fixture load)

Industrial Cold and Hot Water System

Industrial cold and hot water piping will be routed to labs and classrooms as required. Industrial water systems will be isolated from the domestic water system by means of a reduced pressure backflow preventer.

A separate heat pump water heater (similar to the domestic hot water system) will be provided for the industrial hot water demand. All components of the domestic hot water system will be provided for the industrial hot water system.

Each lab and classroom will be provided with a sink served from the industrial cold and hot water system.

Heat Pump Water Heater: 120 gallon, AO Smith

RO/DI WATER SYSTEM

RO and DI water systems will not be provided by the central building system. All RO/DI water requirements for the lab will be provided by the owner via a local RO/DI system complete with appropriate filtration, deionizing beds, polishers, sterilizers, storage tank, and pumps.

STORM DRAIN SYSTEM

A roof and overflow drain system will be provided as required by code. Overflow storm drain system will daylight utilizing downspout nozzles at the ground level above grade. The storm water piping will be routed to Civil.

SANITARY SEWER SYSTEM

Sanitary waste and vent piping will be provided in toilet rooms and other spaces as required.

Separate acid resisting waste and vent piping systems will be provided for labs and classrooms, as required. The acid resisting waste piping system will be piped to a sampling manhole located outside the building where it will connect to the sanitary sewer system. There are no provisions intended for an acid waste neutralization system.

Sanitary waste piping leaving the site will connect to the Civil connection within 5' of the building exterior.

Sump pumps will be provided for elevator shafts and connected to the gravity sanitary system within the building.

RAINWATER RECLAMATION SYSTEM
A rainwater reclamation system will not be provided due to the building size.

FUEL OIL SYSTEM
A fuel oil fill port will be provided for the life safety emergency generator. The generator is assumed to be located outside the building footprint. No fuel oil pump is anticipated.

NATURAL GAS SYSTEM
A new natural gas service will be provided from the local gas main. Gas piping up to and including the gas meters will be by the local AHJ.

Natural gas will be extended to serve the lab equipment as required. No other gas connection is anticipated.

Connection to the gas meter and installation of the house gas piping will be per local gas company and state requirements.

COMPRESSED AIR SYSTEM
Compressed air will be produced by a packaged system, which includes duplex air compressors, receiver tank, and air dryer. Compressed air will be delivered at 100 PSI to all required labs or classrooms. Pressure will be reduced by means of a pressure regulator for those spaces requiring 15 PSI compressed air.

G. TELECOMMUNICATIONS NARRATIVE

DESIGN CRITERIA
Technology systems provide flexible flow of information, dynamic content exchange, efficient end user communications, and maximizes building managers' oversight and support of building usage.

STRUCTURED CABLING
Telecommunications Spaces
Because the new building will require communications services throughout, several telecom rooms will be programmed for construction throughout the project. As outlined by communications industry best practices, one telecom room will be provided for every 10,000 SF of usable floor area.

Spaces will be established in the following locations:

- One Main Telecom Room on Level 1, which will also act as the building's Telecommunications Entrance Facility for Service Providers.
- Additional Telecom Rooms: a minimum of one on each level
- Total quantity of Telecom Rooms will be provided to ensure all areas of the building are within 295 cabling feet or less from a Telecom Room due to distance limitations of category cabling.
- Wherever practical, Telecom Rooms on different levels will stack/align vertically.

PAE has communicated a need for Main Telecom Rooms to be 10' x 15' and additional telecom rooms to be 8' x 10'. Exact size and location of Telecom Rooms will be coordinated with the Architect, meeting industry, and/or owner standards.

Equipment
- Telecom Rooms will be fitted with fire-rated plywood backboards on three walls.
- Third party (wireless carriers, access providers, etc.) equipment will also be installed in the Main Telecom Room.
- Wire management rings will be utilized to route cabling from different pieces of wall mounted equipment.
- Rack-mounted patch panels will be provided for cross-connecting copper cabling.
- 2-post racks, floor enclosures, and wall-mounted telecom enclosures will be provided where required for the installation of copper patch panels and fiber optic distribution units.

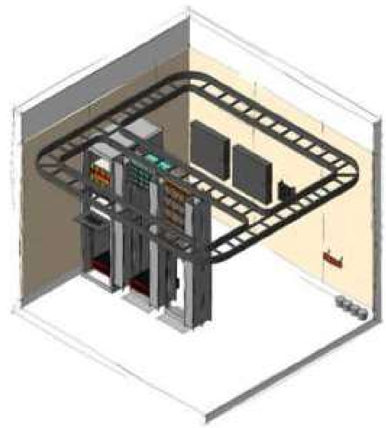


Figure 1: Example Main Telecom Room

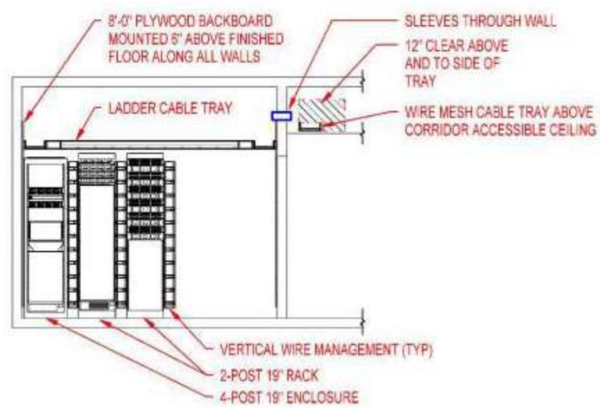


Figure 2: Example Section with Equipment

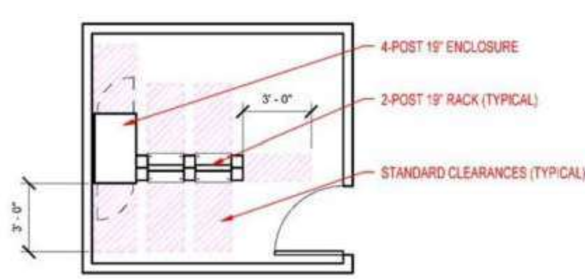


Figure 3: Typical Equipment Clearance

- Racks/enclosures will have standard 19 inch compliant mounting rails, with vertical and horizontal cable management systems.
- Where telecom racks and enclosures are provided, cable runways will be provided above and around the walls of the Telecom Room to route cabling to/from racks.

Clearances

To maintain proper working clearances to the front and back of equipment, gross square footage alone as a guideline is insufficient for the proper space allocation of telecom rooms. Telecom Rooms will be designed such that angled walls and other configurations that limit usable floor area are avoided.

Typical dimensions and equipment types are shown below for reference, with final equipment layouts and room sizes to be detailed later in the contract documents, independent of this narrative.

Outside Plant

Service to the building will be provided via new underground pathways from existing infrastructure located at the nearby right-of-way. Existing Singlemode fiber strands will need to be terminated at the existing Building 4 on campus. 25-pairs of UTP copper cabling will be terminated at Building 4 and routed to the new ITLC building using new 4" underground conduit. Owner provided systems will be brought to the building using this underground pathway.

A total of three 4 inch conduits will be provided:

- One 4 inch for existing Single mode fiber cabling – 12 strand
- One 4 inch for new UTP copper cabling – 25 pair
- One 4 inch for future/spare

Pathways

To provide a flexible and scalable communications system, the design of the pathways which transport, protect and support the cables must be designed with easy access and growth in mind. Telecom pathways will be designed and constructed in accordance with the most current ANSI/TIA standard, including minimum bend radii on telecom conduits.

Dedicated conduit for structured cabling, backbone cabling, and distributed antenna system (DAS) cabling will be provided from the Main Telecom Room to each Telecom Room.

- Two 4 inch for Structured Cabling and Backbone cabling
- One 4 inch to support future cabling needs
- One 2 inch for Emergency Responder DAS backbone cabling

For stacked Telecom Rooms, fire-rated sleeves will be provided in the slab between rooms in lieu of conduits.

A 2 inch conduit will be provided from a Telecom Room on the top level to a weather head on the roof for a DAS antenna and to support future services (SMATV, P-to-P Microwave, etc.).
In areas with no accessible ceiling and when cabling is routed below-grade, conduits and duct banks will be used for cable distribution.

Conduits will be sized for 40 percent fill, with cable trays sized for 25 percent fill. In areas with greater accessibility and those which may need frequent cable changes the preferred method of cabling support will be wire-mesh cable tray.

Conduit Organization	*OSP*	*MDF*	*IDF*	*Rooftop*
OSP	*(3) 4 inch*	-	-	-
MDF	-	*(2) 4 inch*	*(2) 4 inch*	-
IDF	-	-	*(2) 4 inch*	*(1) 2 inch*

Table 12: Backbone Pathways

Where accessible ceilings are available, J-hooks will be provided for supporting and routing smaller amounts of cables (under 50 total quantity) from the cable tray or Telecom Room to the work area outlets.

Fire-rated sleeves will be provided through any fire-rated walls where cabling needs to be routed.

Backbone Cabling - Main Telecom Room to Telecom Rooms

Fiber optic and balanced twisted pair backbone cabling will be provided between the main telecom rooms to telecom rooms/enclosures. Fiber optic distribution units and 110 punch down blocks will be provided for cross connecting services between rooms. The cabling will consist of the following types:

- Backbone Optical – Single Mode (OS2), 12 strands
- Backbone Copper – 25 pair

Horizontal Cabling

Horizontal cabling will be provided from patch panels in Telecom Rooms, to work are outlets and other devices throughout the building. Cabling will be installed, terminated, labeled, tested, and administered by the contractor. The cabling plant will consist of the following cable types:

- Horizontal Data/Voice – Category 6A
- Horizontal Data (for WAPs) – Category 6A
- A minimum number of two cables will be extended to each telecom outlet location.

Wireless access points (WAPs) and other active equipment will be owner furnished, owner installed. Approximate spacing between adjacent WAPs will be in a grid pattern approximately 25-35 feet, unless alternate locations are dictated by the owner.

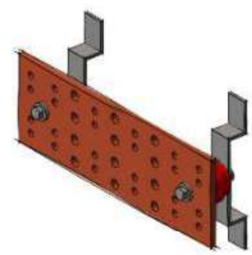
Where PoE (Power over Ethernet) endpoint devices require power exceeding 60W, CAT6A cabling will be provided at a minimum, with LP rated cables being used where design conditions require large bundles of cables servicing high powered PoE devices.

Grounding and Bonding

A telecom grounding and bonding system will be provided for all telecom rooms and spaces throughout the building.

Dedicated Telecom Bonding Backbone

This system is separate from the electrical grounding system in that an electrical grounding system is required for safety, but telecom grounding and bonding systems are required to protect active equipment in the system from disruptions due to either outside interference or unbalanced voltage potentials to ground. They are integral in that telecom system must be bonded to the electrical system so that they may function as a single cabling system.



A Primary Bonding Busbar (PBB, formerly TMGB) will be provided in the Main Telecom Room. The PBB will be connected (bonded) to the electrical system's main panel board's (sometimes referred to as the main switch board, or main distribution board) ground via the Telecommunications Bonding Conductor (TBC).

Secondary Bonding Busbars (SBB) will be provided in every Telecom Room to provide a bonding point for all equipment in that room.

Rack Bonding Busbars (RBB) will be provided in every telecom enclosure.

Racks, cable trays, conduits, and other telecom system equipment will be bonded to the PBB/SBB.

CODE REQUIRED TWO-WAY COMMUNICATIONS SYSTEMS

Emergency Responder Radio Coverage (ERRC) Distributed Antenna System (DAS)

A code-compliant Emergency Responder Radio Coverage Distributed Antenna System will be provided.

A dedicated system will include a donor antenna mounted on the roof to receive/transmit these signals to a Master Control Unit (MCS) in the Main Telecom Room. The MCS will then provide fiber-optic cabling to remote units in an IDF on each level. Remote units are transceivers that convert the signal to coaxial cabling. The coaxial cabling is attached to amplifiers to extend signal out to small passive antennas distributed throughout the building.

The system will support the current radio frequencies of all Emergency Responder entities that may respond to the building.

Predictive modeling of RF propagation will be provided by the system installer (contractor) to verify the following code-requirements are met:

- Signal strength of end-point devices (emergency responder radios) is adequate and meets the performance requirements outlined by the AHJ.
- 90 percent coverage for general floor area.
- 97 percent coverage for critical areas including but not limited to: fire command center, security operations, fire pump room, egress stairs, egress passageways, elevator lobbies, standpipe cabinets, sprinkler section valve locations and all mechanical and communication spaces.

After installation the system installer (contractor) will be responsible to test the building per NFPA 72 to ensure the above coverage requirements have been met.

At the conclusion of the project, software will be provided to the owner for managing the ERRC DAS.

The system will meet the following code requirements, as coordinated with the AHJ:

- Pathway Survivability for DAS cabling and power circuits supporting DAS equipment.
- Integral battery-backup power.
- Integration and monitoring of the system through the Fire Alarm Control Panel. With relay notification panel located in fire command center in high-rise classified buildings.

Area of Refuge/Elevator Lobby Two-Way Communications Systems

For code-required Areas of Refuge, a Two-Way Communication System will be provided as a means of communicating with emergency responders in the event of an alarm condition and/or fire. The system will consist of a call station in each Area of Refuge (and associated signage) and a Control Station near the main entry/vestibule. This system will be equipped with an analog phone line that will call the owner's security office.

Where the architect has not indicated dedicated area of refuge locations in the building, these devices will be provided in each elevator lobby above or below the level of discharge/egress.

The system will meet the following code requirements, as coordinated with the AHJ:

- Pathway Survivability for cabling and power circuits supporting the equipment.
- Integral battery-backup power.
- Location of the Control Station coordinated with responding Fire Department, or as directed by the AHJ. This control station can be located in the fire command center for high-rise classified buildings with this room. Otherwise it is typically located in the main entry vestibule adjacent to the fire alarm remote annunciator.

AUDIO-VIDEO SYSTEMS

General

Audio-video (AV) systems are operationally driven systems which require individual consideration and specialized design attention. Unlike other building systems which for all intents and purposes are "invisible" to the building occupants – care must be taken when coordinating AV systems.

Spaces

Labs and Classrooms will be outfitted with multi-media presentation systems. The spaces will feature a form of video display, audio program and voice reinforcement, source input, and system control. Exact quantity and size of displays in other spaces to be determined based on final room size and specific function/use. For larger rooms, projection systems are to be considered to accommodate legibility/image size requirements. To date, PAE understands that a campus standard audiovisual for classrooms and labs will be deployed across six (6) spaces. In addition, some rooms will feature unique equipment and functionality.

Typical classrooms will include a dedicated podium/lectern for instruction with integrated AV cable input/outputs and system control panel. The podium/lectern will be mobile and powered. Data infrastructure will be designed to accommodate maximum flexibility.

Mobile AV system equipment will also be provided for large labs in the form of a rolling enclosure with dedicated rack rails for mounting AV equipment.

Room Type 1 - Small Projects Lab
The small projects lab will feature a unique Augmented Reality (AR) and Virtual Reality (VR) development lab and showcase. PAE has assumed the following technology will be required at the Small Projects Lab :

- Desktop computers for AR/VR development – Requires hardwired connected data ports and video extension to heads-up-display
- Power receptacles in floor and on-ceiling structure
- Wireless sharing for smart devices (tablets/mobile devices) for AR application viewing
- High-speed WiFi connection in-room on main campus network

Room Type 2 - Makerspaces (Qty. 2)
Makerspaces will be technologically advanced and able to allow students to utilize in-room equipment such as 3D printers, computer workstations, and laser cutting systems. A campus standard AV system will be integrated to the Makerspaces consisting of a custom lectern with video switchers, a single display endpoint, touch panel controller and video sources including but not limited to; PC, document camera, HDMI input.

Room Type 3 - Engineering Lab
The Engineering Lab will feature integrated audiovisual solutions based on Olympic College's standards. A campus standard AV system will be integrated to the Engineering Lab consisting of a custom lectern with video switchers, a single display endpoint, touch panel controller and video sources including but not limited to; PC, document camera, HDMI input.

Hybrid Learning - Typical for all spaces
Classrooms and Labs will host both local and hybrid students. A lecture capture system consisting of a high-definition, pan-tilt-zoom (PTZ) camera, microphone and speakers will be integrated to the larger AV system for recording and live streaming of sessions.

Control Systems - Typical for all spaces
Integrated control systems will be part of all audiovisual spaces and will control AV systems. Room lighting and shade scene and preset controls are to be integrated at each classroom and lab space. All control systems user interfaces will be network-based, and either by wall mounted, or integrated into countertop presentation workstations and other presentation devices. Interfaces with identical functions to other existing presentation spaces are to mimic existing control interfaces.

ELECTRONIC SECURITY SYSTEMS
Electronic Security systems provided in this project will be an integrated system of video surveillance, intrusion detection and electronic access control system, and will be an expansion of the owner's existing systems.

Video Surveillance
The system is IP-based and utilizes the Owner's Power-over-Ethernet switches and Local Area Network to route signals to an existing video management system and network video recorder/server located in main telecom room.

Cameras
All cameras will be IP-based and ONVIF compliant, allowing them to be used with a variety of Video Management System (VMS) software platforms and accessible through the local network and remotely. Cameras will include Wide Dynamic Range (WDR) capabilities to allow more detailed capture of images in areas where natural or artificial lighting presents scenes with high contrast. The cameras will also include automatic day-night functionality, allowing full color capture during daylight hours, and blank-and-white capture during the night. The resolution will be 2 Megapixels at a minimum, allowing greater detail image capture. Higher resolution and specialty 360-degree and multi-sensor cameras will be provided where appropriate.

Coverage
Surveillance Cameras will be placed where necessary to provide the best safety coverage for the building occupants. Typical locations include:

- Entry vestibules
- Service entrances
- Stairwells

Integration
Camera, cabling, licenses, network video recorders (with additional storage servers), graphical mapping of camera locations, integration with access control system, and integration with the existing system will be included in the project under the General Contractor's scope.

Access Control
Electronic Access Control system will be provided based on owner's existing system to control access to the building during off-hours, or between back-of-house and secured spaces where the public or non-credentialed personnel are not allowed.

Devices
A variety of devices are required for an effective electronic access control system. These include, but are not limited to:

- Credential readers
- Door position switches
- Request to exit sensors
- Request to exit manual push buttons
- Electronic locks (specified by Division 08, Doors and Windows)
- Electronic strikes (specified by Division 08, Doors and Windows)
- Electromagnetic locks (specified by Division 08, Doors and Windows)
- Panic hardware (specified by Division 08, Doors and Windows)
- Power transfer hinges (specified by Division 08, Doors and Windows)
- Automatic door operators and buttons (specified by Division 08, Doors and Windows)

Credential readers will be provided at appropriate and coordinated locations and will be multi-technology readers capable of 125kHz and 13.56MHz frequencies

Each access-controlled door will include a door contact, which reports the position (propped open, forced, closed etc.) of the door back to the Access Control management system. Unauthorized openings will report an alarm.

Request-to-exit sensors and buttons (or integral to panic hardware) will report an approved opening of the controlled door. These devices are typically located on the secure side of the door to allow free egress to the non-secure side of the door.

Automatic door operators will integrate with the system so that the door motor will not activate without an approved opening credential.

Other components of designated doors work in conjunction with the access control systems and are included as part of the Division 08 Door Hardware groups.

Integration
Cabling, devices, panels, integration (including graphical mapping of device locations), and new credentials (cards/fobs) will be included in the project as part of the Contractor's scope.

H. ELECTRICAL NARRATIVE

DESIGN CRITERIA

The following table indicates allowances that will be used to calculate the service size and distribution service for the ITLC. Lighting allowances are in conjunction with the current Washington State Energy Code (WSEC); power allowances are based on past experience with buildings of similar use. Power as noted for labs includes an allowance for equipment loads such as 3D printers, laser cutters, soldering stations, etc. that are expected to be installed in those spaces.

Area	**Lighting Systems (VA/SF)**	**Power Systems (VA/SF)**	**System Totals**
Offices	1.0 – 1.1	4.5	15kVA
Lab Spaces	1.5	15	125kVA
MEP Spaces	.6	.5	1kVA
Classrooms	1.0	3.5	10kVA
HVAC Equipment		20	500kVA
Elevator			10kVA
Corridor/Core	0.6	0,5	4kVA
Student Services	1.2	4	6kVA
Total Connected Load			671kVA
+Design Contingency (+20%)			806kVA
Total Amps (@480V, 3-phase)			970A
Recommended Service Size (@480V,3-phase)			**1200A**

Table 9: Lighting and Power Load Densities

SERVICE AND DISTRIBUTION

The building will be served via a PSE power pole located on Ohio Avenue and brought to a roof mounted weather head. Conductors will be routed to the building main switchboard located in the main electrical room of the building located on the ground floor of the building. The preliminary size of the MDP is 1,200A, 480/277V, 3-phase, 4wire. Lower voltage 208/120V will be established with the use of a 300kVA transformer feeding a 1,000A 208/120V switchboard. Both switchboards will be free standing and floor mounted while the transformer is mounted on a vibration isolation pad. The switchboards shall be braced to exceed the available fault current at the main lugs of the equipment.

Electrical feeders from the switchboard to downstream distribution panelboards will be copper conductors routed in conduit.

The MDP, and branch panels serving sensitive loads, will each be provided with an integral surge protective device (SPD).

METERING, MEASUREMENT, AND VERIFICATION SYSTEMS

Metering for the building will be in conjunction with standards set forth by Olympic College. It is understood that the campus power loop utilizes a master meter. The master meter shall meter the new building, assuming capacity of the master meter is adequate. Verification with the College will be required to ensure capacity. Because the building is less than 50,000 square feet, metering provisions per WSEC C409 do not apply.

GROUNDING SYSTEM

Two grounding criteria will be addressed: safety and performance. A safe grounded power system will be provided in compliance with the National Electric Code (NEC). This ground system consists of the building service grounding and bonding (multiple ground rods, UFER ground, and bonding to the water service and structural steel). A building main ground bus bar will be provided in the main electrical room. The safe grounding system will be extended throughout all electrical systems in the building. All branch circuits and feeders will carry a grounding conductor. All metallic systems will be grounded to the building grid.

Performance grounding includes a system of grounding conductors and busses to be used for the telecommunication rooms throughout the building. The performance ground system will tie into the code required safety grounding system at the building main ground bus bar.

BRANCH CIRCUITS

Branch circuit wiring shall be copper and will be routed in conduit from the panel to a junction box in the accessible ceiling space in area served, then extended to devices utilizing cable in conduit.

Branch circuits sharing a neutral will be fed from multi-pole breakers. Branch circuit neutrals will be oversized on shared circuits with high harmonic loads.

Ground fault circuit interrupter receptacles will be provided at sinks, kitchens, toilet rooms, and all other wet areas. Weatherproof-in-use hoods and outdoor-rated ground fault circuit interrupter receptacles will be provided at all roofs and outdoor areas.

Labs and maker spaces will utilize surface metal raceway (Wiremold) to locate power and data outlets adjacent to the tasks in a flexible method. The surface metal raceway permits ease of reconfiguration of power and data cabling within a space without disturbing building walls and finishes. Overhead cord reels may also be provided in these spaces to provide a flexible means of power to equipment.

Electrical power connections will be made to all mechanical equipment, to include providing all electrically associated devices such as disconnect switches, contactors, magnetic or manual starters, lock-out switches, etc., not furnished under Division 23. Variable frequency drives (VFDs) will be furnished under Division 23 and installed under Division 26. Receptacles will be provided within 25 feet of all mechanical equipment.

Electrical power connections will be made to support miscellaneous equipment. Connections include disconnect safety switches and wiring to support interlocks to remote devices.

Equipment Connections

Electrical power connections will be made to all mechanical equipment, to include providing all electrically associated devices such as disconnect switches, contactors, magnetic or manual starters, lock-out switches, etc., not furnished under Division 23. VFDs furnished under Division 23 and installed under Division 26.

Electrical power connections will be made to support miscellaneous equipment. Connections include disconnect safety switches and wiring to support interlocks to remote devices.

Electromechanical Interference (EMI): Provisions in layout of the electrical power system will be made to minimize the impact of electric fields on sensitive lab spaces. Equipment producing fields (transformers and motors) are to be located remote from sensitive labs. Large ampere feeds will be routed around labs or contained within rigid steel conduits.

Grounding System

Grounding busses will be provided in the electrical and telecom network rooms. All metallic systems will be grounded to the building grid. An equipment grounding conductor will be provided in all feeder and branch wiring runs. Separate isolated ground conductors will be provided for branch circuits with sensitive loads.

ON-SITE POWER SYSTEMS

Emergency Generator

Emergency and Optional Standby power will be provided by a 150KW diesel fired generator. The generator will be exterior mounted with a weatherproof, sound attenuated housing and built in base fuel tank. A single feeder from the generator will be brought into the building to a generator main power distribution panel. Separate transfer switches are provided for emergency loads and standby loads. Fuel storage will be provided in a sub-base tank and will provide for 12-hours power source operation at full load.

Emergency loads will be those designated as life safety meeting the criteria of NEC 700 and will include egress lighting, alarm systems, and smoke control systems.

Optional Standby loads will include the network room loads, UPS system, selected cooling, designated lab loads, security systems and will meet the criteria of NEC 702. Generator power will also provide backup to the mock data lab and fume hoods in the lab spaces.

A manual transfer switch with camlocks will be provided between the generator feed to the ATS to allow for a roll-up generator to provide power to the building when generator maintenance is required to comply with NEC 700.3.

Uninterruptible Power Supply (UPS)

The Mock up Data Center and Cyber Security Range Labs are backed up by UPS's (uninterruptible power supply) to provide a real-world application for students. Interruptions of power service cause severe impact to ongoing experiments and data processing function. A reliable power source and supporting infrastructure is required to meet the building goal. Based on required service loads, redundancy in the distribution system configuration is proposed to maximize facility uptime. Both UPS will have a capacity to run the loads for 8 minutes at full loads which will cover generator startup time until it reaches synchronous speed. The UPS unit will be provided with a generator power feeder and will provide ride through power, during the failure of the normal power source, and while the generator power source is coming online.

The UPS system will consist of the UPS (double conversion) unit cabinet, battery storage cabinet, and external by-pass. A branch panelboard will be provided for the UPS unit output.

The use of battery source UPS will provide the transition time from loss of utility power to start and transfer of load to the generator and, the return to the utility upon confirmed stability of the source.

Battery Technology to be used: Lithium

RENEWABLE POWER SYSTEM (PV)

While a photovoltaic (PV) system will not be installed at the time of construction, the building will include provisions for a future PV system. In addition to having area at the roof reserved for the PV system, the following items will also need to be provided:

- Spare breaker at MDP that includes ground fault provisions for future connection
- Empty conduit from MDP to roof for future connection
- Emergency power-off (EPO) switch at main electrical room for future connection

ELECTRIC VEHICLE CHARGING

Electric vehicle (EV) charging stations are not required as there are no currently parking stalls as part of the project.

LIGHTING AND LIGHTING CONTROLS

The electrical lighting system will be designed in compliance with all applicable codes and ordinances. Efficient sources and automatic control technologies will be implemented to provide the most efficient and effective electric lighting system for the building occupants and tasks. Controls will provide switching and dimming of the lighting to permit maximum use of the available natural light.

Daylighting will provide the first level of illumination for most interior spaces. In spaces with adequate daylight, daylight harvesting shall be implemented in the appropriate daylight control zones. Skylights at the second floor will help provide top lighting strategies and will allow a lower lighting energy load throughout the day. Side lighting strategies will be used for the lower floor and upper perimeter floor.

Energy efficient local task lighting may be implemented where appropriate including the labs and offices.

Lecture halls will have at minimum (3) scenes, one for lecture with all lights on, one for presentation that would dim lighting in the room, and one for all lights away from the front off for formal presentation.

Control of lighting will be provided by the following methods for the respective areas shown in Table 10.

Task/Area	Control Method*
Classrooms/Labs	*Room scene controller, vacancy sensor*
Student Services/Program Support Spaces	*Room scene controller, vacancy sensor*
Office Spaces	*Vacancy sensor, local dimming switch*
Circulation/Transition	*Timeclock control, local override switch*
Restrooms	*Occupancy sensors with manual on*
Storage	*Vacancy sensors, local switch*
Mech/Elec Rooms	*Local switch (no automatic control)*
**Photocells will be used for daylight harvesting for all spaces with daylighting zones*	

Table 10: Lighting Areas

FIRE ALARM

The building fire alarm system will consist of a fully addressable system. The main fire alarm control panel will reside in the main electrical room at the ground floor. A remote fire alarm annunciator panel will be located in the main entry vestibule, or in an area designated by the local fire marshal. The annunciator will provide the fire department with a summary of the fire alarm system status and events once they arrive.

The following table summarizes the fire alarm system components for the project:

Device	Coverage
Manual pull stations	*Located at each exit and each exit leaving an elevated floor*
Smoke detectors	*Air handlers (>2000 CFM), elevator lobbies, elevator control rooms, elevator hoistways, electrical rooms, mechanical rooms*
Fire sprinkler	*Tamper and flow*
Annunciation	*Remote annunciation at fire department entry*
Building annunciation	*Horn and strobe annunciation thru out the facility*
System output	*Relay interface for mechanical system shut-down and elevator recall, fire department dialer*
Monitoring	*Fire department station monitoring via dedicated telephone line*

Table 11: Fire Alarm Devices

I. ACOUSTICS

This report presents acoustical recommendations for the Olympic College ITLC project. The purpose of the recommendations is to identify preliminary acoustical requirements and to provide initial acoustical design concepts.

The recommendations are based on the detailed space requirements and Room Data Sheets from *Appendix B* of the Program Summary and the updated Room List/Space Tabulation.

GENERAL NOTES

- Acoustic ceiling tile is noted for all classroom and lab spaces in the project. The ceiling tile should have a minimum Noise Reduction Coefficient (NRC) of 0.70.
- The upper level finish floor should be a resilient-backed vinyl or other padded flooring as a minimum. Polished concrete floors in spaces above other classrooms or labs may require additional ceiling material in the space below.
- Acoustical wall panels should be a minimum 1"-thick with a minimum NRC 0.80 rating.

RECOMMENDATIONS

Large Active Learning Classroom

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) - Locate AWP on minimum one wall opposite the video monitor wall. Locate panels at +3' AFF up to +8' AFF or ceiling.
- Ceiling: Acoustical Tile Ceiling

Cyber Range & Mockup Data Center Labs

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) - Locate AWP on minimum one wall opposite the video monitor wall in both rooms. Locate panels at +3' AFF up to +8' AFF or ceiling.
- Doors: Connecting doors should have acoustical perimeter seals and automatic door bottom seals.
- Ceiling: Acoustical Tile Ceiling

Small Projects Lab

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) –
  - o VR Studio - Locate AWP on three walls from +3' AFF up to +8' AFF or ceiling.
  - o Green Room - Locate AWP on two adjacent walls from +3' AFF up to +8' AFF or ceiling.
  - o VR Room - Locate AWP on three walls from +3' AFF up to +8' AFF or ceiling.
  - o If sound isolation is required, the demising walls between the VR Room, Green Room, and VR Studio should be STC 55 or higher depending on the level of isolation required.
- Doors: VR Room and Green Room doors should have acoustical perimeter seals and automatic door bottom seals.
- Ceiling: Acoustical Tile Ceiling

Faculty Office

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) - Locate AWP on minimum one wall between +3' AFF and +8' AFF or ceiling.
- Ceiling: Acoustical Tile Ceiling

Division Office

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) - Locate AWP on minimum one wall between +3' AFF and +8' AFF or ceiling.
  - o If sound isolation is required between offices, the demising walls should be STC 50 or higher depending on the level of isolation required. If standard/ minimal privacy is required, the walls should be STC 45.
- Ceiling: Acoustical Tile Ceiling

Conference Room

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) - Locate AWP on minimum one long wall between +3' AFF and +8' AFF or ceiling.
- Ceiling: Acoustical Tile Ceiling

Informal Study/Breakout Spaces

- Floor: Carpet
- Walls: Acoustical Wall Panels (AWP) - Locate AWP on minimum one long wall between +3' AFF and +8' AFF or ceiling.
- Ceiling: Ceilings in large open areas should have acoustical treatment such as surface-applied panels, spray-on material, or other sound absorbent material covering a minimum 80% of the ceiling area.

Small Open Rooms

- The small open rooms in the program Summary appear to be conceptual and are representative of the type of space that may be in the project. Such spaces should have acoustical treatment on the ceiling and one wall as shown below.

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APPENDIX E: PRELIMINARY LEED SCORECARD

MILLER HULL

LEED v4.1 BD+C

Preliminary Project Checklist

Project Name: Olympic College ITLC

Date:

Building GSF:

Site Area:

FTE:

Y	?	N			
1			Credit	Integrative Process	**1**
7	**8**	**1**		**Location and Transportation**	**16**
		-	Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
	1	1	Credit	High Priority Site and Equitable Development	2
2	3		Credit	Surrounding Density and Diverse Uses	5
2	3		Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
	1		Credit	Electric Vehicles	1
7	**3**	**0**		**Sustainable Sites**	**10**
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
1	1		Credit	Protect or Restore Habitat	2
1			Credit	Open Space	1
2	1		Credit	Rainwater Management	3
1	1		Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
4	**7**	**0**		**Water Efficiency**	**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1	1		Credit	Outdoor Water Use Reduction	2
3	3		Credit	Indoor Water Use Reduction	6
	2		Credit	Optimize Process Water Use	2
	1		Credit	Water Metering	1
19	**12**	**2**		**Energy and Atmosphere**	**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
	1		Credit	Advanced Energy Metering	1
Y			Prereq	Building-Level Energy Metering	Required
		2	Credit	Grid Harmonization	2
Y			Prereq	Fundamental Refrigerant Management	Required
5			Credit	Renewable Energy	5
4 (4)			Credit	Enhanced Commissioning	6
	1		Credit	Enhanced Refrigerant Management	1
10	8		Credit	Optimize Energy Performance	18

Materials and Resources

Storage and Collection of R

Building Life-Cycle Impact R

Environmental Product Dec

Sourcing of Raw Materials

Construction and Demolition

Minimum Indoor Air Quality

Environmental Tobacco Sm

Enhanced Indoor Air Quality

Low-Emitting Materials

Indoor Air Quality Assessm

Thermal Comfort

Interior Lighting

Daylight

Quality Views

Acoustic Performance

Innovation

LEED Accredited Professio

Certified: 40 to 49 points, **Silver:** 50

Project Name: Olympic College ITLC
Date: 6/3/2022
Building GSF: 22,265
Site Area: TBD
FTE: TBD

6	**4**	**3**	**Materials and Resources**		**13**
Y			Prereq	Storage and Collection of Recyclables	Required
1	1	3	Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Environmental Product Declarations	2
1	1		Credit	Sourcing of Raw Materials	2
1	1		Credit	Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2
10	**6**	**0**	**Indoor Environmental Quality**		**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1	1		Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
	3		Credit	Daylight	3
1			Credit	Quality Views	1
1			Credit	Acoustic Performance	1
4	**2**	**0**	**Innovation**		**6**
3	2		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1
3	**1**	**0**	**Regional Priority**		**4**
1			Credit	Regional Priority: Specific Credit	1
1			Credit	Regional Priority: Specific Credit	1
1			Credit	Regional Priority: Specific Credit	1
	1		Credit	Regional Priority: Specific Credit	1
61	**43**	**6**	**TOTALS**	Possible Points:	**110**

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

APPENDIX F: DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION (DAHP) FORM + LETTER

DAHP USE ONLY
Date Received: 3/23/2022
DAHP Log #: 2022-04-02018
Reviewer(s): H Borth
☐ ARCHY ☒ BEU

dahp protect the past, shape the future
DEPT OF ARCHAEOLOGY + HISTORIC PRESERVATION

EZ-1 FORM

Request to initiate consultation for Governor's Executive Order 21-02 (GEO 21-02) projects

GEO 21-02

New Consultation? ☐ YES ☒ NO ☐ ADDITIONAL INFORMATION PROVIDED PER REQUEST

Questions? *Contact DAHP at 2102@dahp.wa.gov or (360) 586-3065. You may also find answers to your questions online at www.dahp.wa.gov/2102.*

Please be aware that this form may only initiate consultation. For some projects, DAHP may require additional information to complete our review. A historic property inventory form or archaeological survey may need to be completed by a qualified cultural resource professional.

NOTE: To save this fillable form you must fill it out in Adobe Acrobat or use the PRINT to PDF function in Acrobat Reader. In Reader choose File > Print and choose Adobe PDF as the printer. The file will save to your computer.
NOTE: The form will automatically adjust to fit all your information.

SECTION 1: PROJECT INFORMATION

Project Title: Olympic College Weld Shop Renovations

Property Name: *if applicable*

Project Address: 1360 Lincoln Avenue

Provide 1-2 sentence summary of the project.
The scope of work includes renovation to the existing Olympic College Shop Building, located at 1600 Chester Ave, Bremerton, WA 98337. The scope of work consists of demolition of interior finishes and systems, new construction of interior partitions, and fit out for multiple program areas including the shop floor, classrooms, offices, restrooms, and storage areas.

City / State / Zip: Bremerton, WA 98337 County: Kitsap Township / Range / Section: *leave blank if unsure*

SECTION 2: PROJECT DESCRIPTION

Project includes (check all that apply): ☐ NEW CONSTRUCTION ☐ DEMOLITION ☑ GROUND DISTURBANCE ☑ REHABILITATION / RENOVATION ☐ ACQUISITION

Are any buildings 45 years or older going to be impacted in any of the above ways by this project? ◉ YES ○ NO ○ NOT SURE

☐ Check here if the project involves multiple resources. If so, attach a table including all information in Sections 1 and 2 for each resource.

If you do not know the age of the building(s) this is usually available through the county assessor web parcel search. To find this page put in the name of the county, Washington assessor property search into your web search engine of choice. I.e.. Adams county Washington assessor property search.

Are there any Federal funds, lands, permits, or licenses involved in/required by this project? ○ YES ○ NO ◉ NOT SURE If Yes, what Federal Agency?

Have you already received a grant? ◉ YES ○ NO, WE ARE APPLYING NOW ○ NO, WE HAVE NOT APPLIED YET ○ NOT SURE

SECTION 3: STATE AGENCY INFORMATION

Leave blank if unknown

State Agency: SBCTC Grant / Loan Program Name: Capital Projects Direct Appropriation? ☑

Contact Person: Cheryl Bivens Phone: (360) 704-4386 e-mail: cbivens@sbctc.edu

Funding biennium? 2021-2023 Requested grant / loan amount: 9,441,097 Total project amount: 8,373,563

SECTION 4: CONTACT INFORMATION

If different from State Agency contact person.

Submitter Name: Jennifer Gemmill Submitter Organization: Olympic College

Submitter Address: 1600 Chester Avenue City / State / Zip: Bremerton, WA 98337

Submitter Phone: (360)475-7819 Submitter e-mail: jgemmill@Olympic.edu

DAHP DETERMINATION (DAHP USE ONLY)

☐ **EXEMPT** from GEO 21-02 review.

☐ There are **NO HISTORIC PROPERTIES IMPACTED** by the proposed project.

☒ The project will have **NO ADVERSE IMPACT** on historic properties.

☐ The project will have an **ADVERSE IMPACT** on historic properties.

☐ DAHP requires **ADDITIONAL INFORMATION** in order to complete review (see attached).

☐ SURVEY REQUIRED

☐ MONITORING REQUIRED

☐ INADVERTENT DISCOVERY PLAN REQUIRED

Holly Borth
DAHP REVIEWER

4/1/2022
DATE

revised April 2021

GEO 21-02 **EZ-1 FORM** 2

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DEPT OF ARCHAEOLOGY + HISTORIC PRESERVATION

Instructions: **Please describe the type of work to be completed. Be as detailed as possible to avoid a request for additional information. Be sure to describe all ground disturbing activities in the appropriate box below and provide photos of areas of work.**

SECTION 5: ATTACHMENTS

Please email completed form and all attachments to:
2102@dahp.wa.gov

- [x] MAP - Be sure to show the project boundary and location of property(ies). *See Section 7 on Page 3 for optional template. May also submit online through WISAARD using eAPE.*
- [ ] DESCRIPTION / SCOPE OF WORK - Describe the project, including any ground disturbance. *See Section 6 for an optional template.*
- [ ] SITE PLAN / DRAWINGS - Indicate location and dates of resources, proposed improvements and ground disturbance, etc.
- [ ] PHOTOGRAPHS - Attach digital photographs showing the project site, including images of all resources. *Photos submitted through WISAARD may suffice.*

SECTION 6: ADD'L PROJECT INFORMATION

Provide a detailed description of the proposed project:

This project includes a renovation of the existing Shop building on the Bremerton campus. The programs impacted will be Welding, CNC Precision Machining, and technical design. The building will undergo infrastructure improvements to make it compliant with current codes. The interior will be renovated to support program needs and the HVAC system, plumbing and electrical will be updated.

Describe the existing project site conditions (include building age, if applicable):

Built in 1967, the existing OC Shops Building at Olympic College does not allow for the collocation of high demand technical programs including Welding, Precision Machining and Technical Design. The building systems are outdated, and the spaces poorly arranged to meet growing student program needs or to accommodate modern technology. The limited amount of space and poor configuration does not facilitate collaboration or provide peer-to-peer learning opportunities for students. In 2018, a Pre-design Study was commissioned that envisioned a partial renovation and 3,500-sf addition to the existing Shops Building to bring the off-site CNC/Precision Machining program to the main campus, resolve safety and instructional deficiencies in the existing Weld Shop, resolve safety issues in the existing Composites Shop, provide accessibility to the existing second floor, and allow four related Workforce Development programs to operate in a combined, synergic manner for students and faculty.

If there are ground disturbing activities proposed, describe them *including the approximate depth of ground disturbance*:

Working closely with the faculty and administration, a revised scope and project plan was developed that fully renovates the existing building and provides an increase in usable area by recovering the outside stair tower areas as public entry space and expanding and opening the building toward the north courtyard and pedestrian areas with a very small addition. The area reduction was also possible with the closing of the Composites Program in 2020. The approved design emphasizes a new public entry at the primary access on the northeast side. Roadway and sidewalk access will remain but landscaping improvements as well as an improved connection to the entry plaza and primary pedestrian pathway tie the new entry to campus. It will connect to the service roadway, the parking area and the pedestrian walkway to the primary circulation leading to the heart of campus. The building's existing heavy mass will be broken by new glazing and the open, human scale entry and visual connection to the shared program workspace offering a natural connection and intuitive wayfinding from the plaza and pedestrian corridor.

revised February 2022

GEO 21-02 **EZ-1 FORM**

3

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DEPT OF ARCHAEOLOGY + HISTORIC PRESERVATION

Instructions: **Please attach a MAP clearly showing the project area. Please click here for tutorial on creating a map if you don't have one clearly showing the project area.**

SECTION 7: MAP / Area of Potential Effect

CLICK IN THE BOX ABOVE TO ADD A MAP
MAP MUST BE IN JPG FORMAT

revised February 2022

From: DAHP 2102 (DAHP) <2102@dahp.wa.gov>
Sent: Tuesday, April 26, 2022 11:15 AM
To: Gemmill, Jennifer <jgemmill@olympic.edu>
Subject: [EXTERNAL] - RE: EZ-1 Form Olympic College Innovation and Technology Learning Center

CAUTION: This email came from a non-OC system or external source. Beware of phishing and social engineering!

Hi Jennifer,

Please see the attached and let me know if you have any questions.

Best,
Holly

Holly Borth, M.S. | Built Environment Compliance Reviewer
360.890.0174 (c) | holly.borth@dahp.wa.gov
[*she/her/hers*]

Department of Archaeology & Historic Preservation | www.dahp.wa.gov
1110 Capitol Way S, Suite 30 | Olympia WA 98501
PO Box 48343 | Olympia WA 98504-8343
P please consider the environment before printing this email

My weekly hours are 8am – 4:30pm, Mon-Fri

From: Gemmill, Jennifer <jgemmill@olympic.edu>
Sent: Monday, April 18, 2022 12:44 PM
To: DAHP 2102 (DAHP) <2102@dahp.wa.gov>
Cc: Gemmill, Jennifer <jgemmill@olympic.edu>
Subject: EZ-1 Form Olympic College Innovation and Technology Learning Center

External Email

Good afternoon,

Please accept the forms and additional documents as the first step for review for a new construction project. Please let me know if you need additional information.

Many thanks,

OLYMPIC COLLEGE

Jennifer Gemmill, PMP | Capital Projects Manager
Facilities Services
1600 Chester Ave | Bremerton, WA 98337
M 360-328-4677| O 360-475-7819
jgemmill@olympic.edu

1

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Allyson Brooks Ph.D., Director
State Historic Preservation Officer

January 28, 2019

Mr. Steve Lewandowski
Chief Architect
WA State Board for Community and Technical Colleges

In future correspondence please refer to:
Project Tracking Code: 2019-01-00566
Property: Olympic College Shops Building Renovation project
Re: Review Comments

Dear Mr. Lewandowski:

The Washington State Department of Archaeology and Historic Preservation (DAHP) is in receipt of a request for comments from Rice Fergus Miller Architects. The above referenced project has been reviewed on behalf of the State Historic Preservation Officer (SHPO) under provisions of Governor's Executive Order 05-05 (GEO 05-05). Our review is based upon documentation contained in your communication.

Pre-design and design phases of projects are exempt from review under GEO 05-05. However, should the construction of the project become obligated with State Capitol funding, any ground disturbing activities, such as proposed for this project to renovate the Shop Building, will require the preparation of an EZ-1 form to be submitted to the State Archaeologist, Dr. Rob Whitlam, for review. In addition, as the building is more than 45 years in age, should the project become obligated with State Capitol funding, it will also require the submittal of an EZ-2 form for the building to be reviewed by DAHP Historic Compliance Reviewer, Holly Borth.

Also, we appreciate receiving copies of any correspondence or comments from concerned tribes and other parties that you receive as you consult under the requirements of GEO 05-05. Should additional information become available, our assessment may be revised.

Finally, please note that in order to streamline our responses, DAHP requires that Resource documentation (HPI, Archaeology sites, TCP) and reports be submitted electronically. Correspondence must be emailed in PDF format to the appropriate compliance email address. For more information about how to submit documents to DAHP please visit: https://dahp.wa.gov/project-review. To assist you in conducting a cultural resource survey and inventory effort, DAHP has developed Guidelines for Cultural Resources Reporting. You can view or download a copy from our website.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. If you have any questions, please feel free to contact me.

Sincerely,

Holly Borth

State of Washington • **Department of Archaeology & Historic Preservation**
P.O. Box 48343 • Olympia, Washington 98504-8343 • (360) 586-3065
www.dahp.wa.gov

Holly Borth
Project Compliance Reviewer
(360) 586-3533
holly.borth@dahp.wa.gov

cc: Jack Mukavetz (Rice Fergus Miller Architects)

OLYMPIC COLLEGE

Office of the President, Marty Cavalluzzi, Ph.D.

Aug. 9, 2022

The Honorable Jeromy Sullivan, Chairman
Port Gamble S'Klallam Tribe
31912 Little Boston Rd
Kingston, WA 98346

Subject: Olympic College Bremerton Campus Weld Shop Renovations

Dear Chairman Sullivan,

Out of respect for our local tribal communities, and in accordance with Governor Inslee's Executive Order 21-02, and I am writing to inform you of Olympic College's intent to renovate the existing weld shop building located 1360 Lincoln Ave., Bremerton, WA 98337. The College has received capital funding to begin the building renovation in the Weld Shop in August of 2022.

The following pages include the campus map showing the location of Weld Shop Building 14. Please note our plan is to fully renovate the interior of the building; there is no additional ground disturbance anticipated or planned for this project. All activity will be within the existing building envelope.

We have contacted the Washington State Department of Archaeology and Historic Preservation (DAHP) and have submitted all relevant forms for consideration. We will provide any and all information to DAHP should a further review be required.

In addition, Olympic College is committed to the immediate stoppage of work if any archaeological resources are discovered during construction.

If you have any comments or concerns regarding this matter, please direct them to me by phone at 360-475-7100, or by e-mail at mcavalluzzi@olympic.edu.

Respectfully,

Marty Cavalluzzi
President, Olympic College

OLYMPIC COLLEGE

Office of the President, Marty Cavalluzzi, Ph.D.

1600 Chester Ave. | Bremerton, WA 98337-1699
Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100 Page 2

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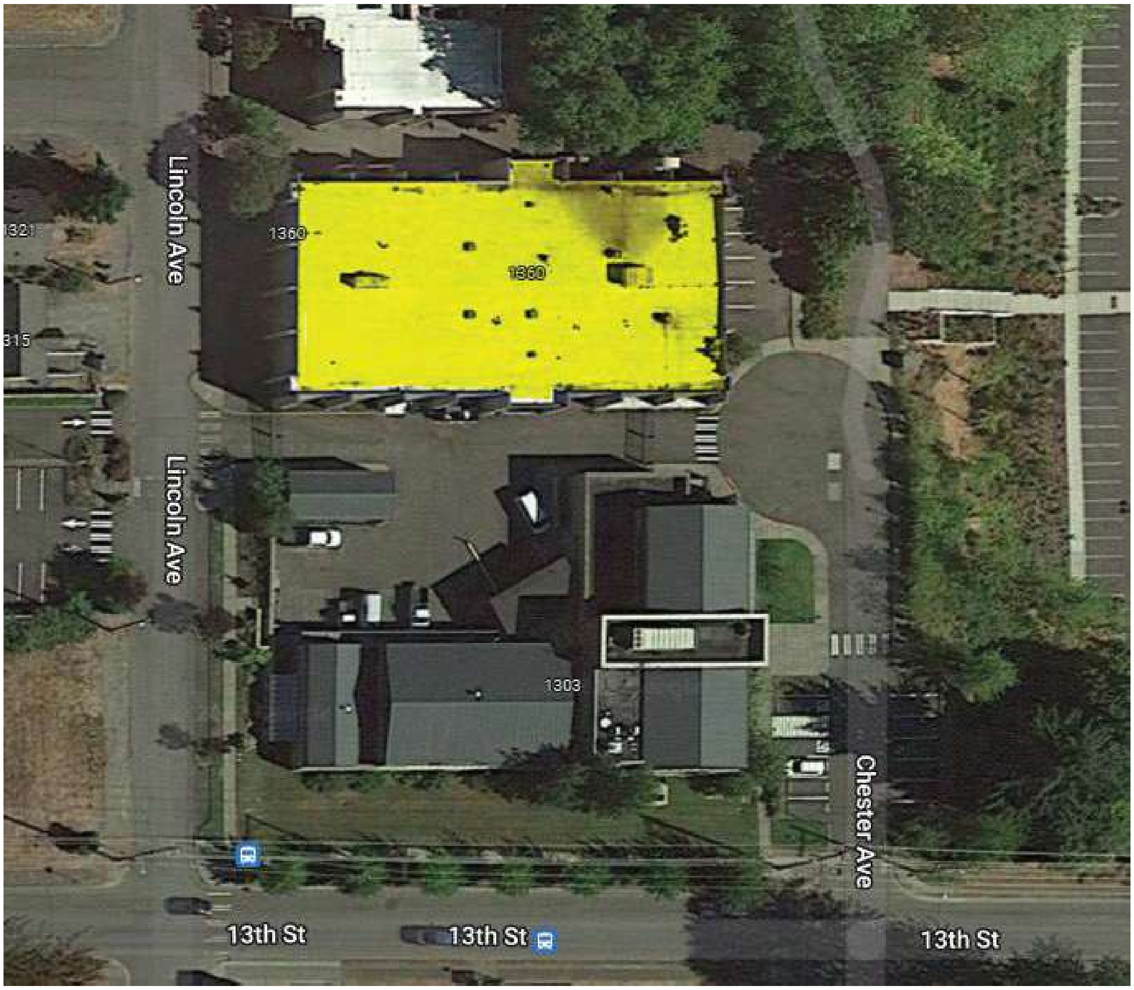
Office of the President, Marty Cavalluzzi, Ph.D.



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Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100

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OLYMPIC COLLEGE

Office of the President, Marty Cavalluzzi, Ph.D.

Aug. 9, 2022

The Honorable Robert de los Angeles, Chairperson
Snoqualmie Indian Tribe
PO Box 969
Snoqualmie, WA 98065

Subject: Olympic College Bremerton Campus Weld Shop Renovations

Dear Chairperson de los Angeles,

Out of respect for our local tribal communities, and in accordance with Governor Inslee's Executive Order 21-02, and I am writing to inform you of Olympic College's intent to renovate the existing weld shop building located 1360 Lincoln Ave., Bremerton, WA 98337. The College has received capital funding to begin the building renovation in the Weld Shop in August of 2022.

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If you have any comments or concerns regarding this matter, please direct them to me by phone at 360-475-7100, or by e-mail at mcavalluzzi@olympic.edu.

Respectfully,

Marty Cavalluzzi
President, Olympic College

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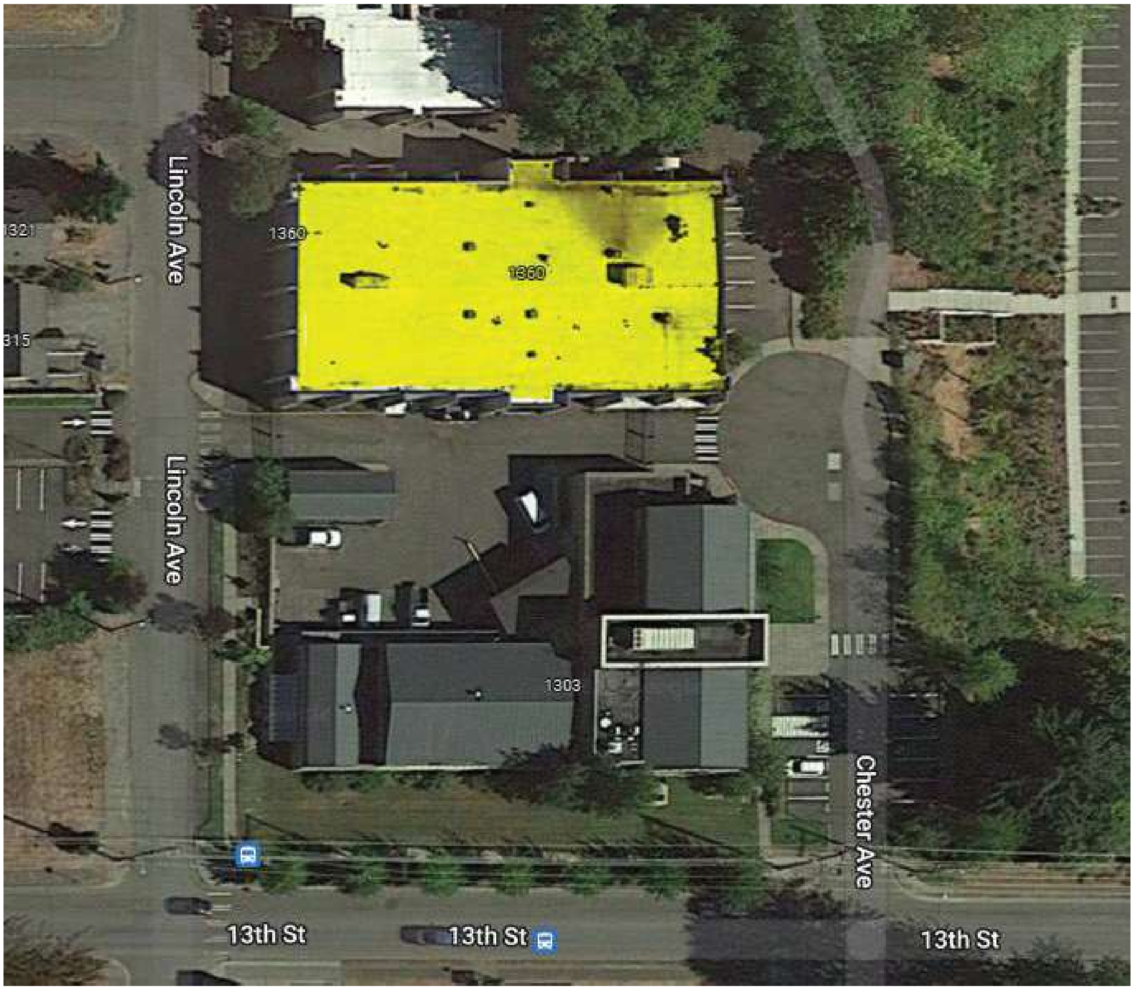

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Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100

OLYMPIC COLLEGE

Office of the President, Marty Cavalluzzi, Ph.D.

Aug. 9, 2022

The Honorable Kristopher Peters, Chairman
Squaxin Island Tribe
200 SE Billy Frank Jr. Way
Shelton, WA 98584-9200

Subject: Olympic College Bremerton Campus Weld Shop Renovations

Dear Chairperson Peters,

Out of respect for our local tribal communities, and in accordance with Governor Inslee's Executive Order 21-02, and I am writing to inform you of Olympic College's intent to renovate the existing weld shop building located 1360 Lincoln Ave., Bremerton, WA 98337. The College has received capital funding to begin the building renovation in the Weld Shop in August of 2022.

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If you have any comments or concerns regarding this matter, please direct them to me by phone at 360-475-7100, or by e-mail at mcavalluzzi@olympic.edu.

Respectfully,

Marty Cavalluzzi
President, Olympic College

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Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100

Page 1

OLYMPIC COLLEGE

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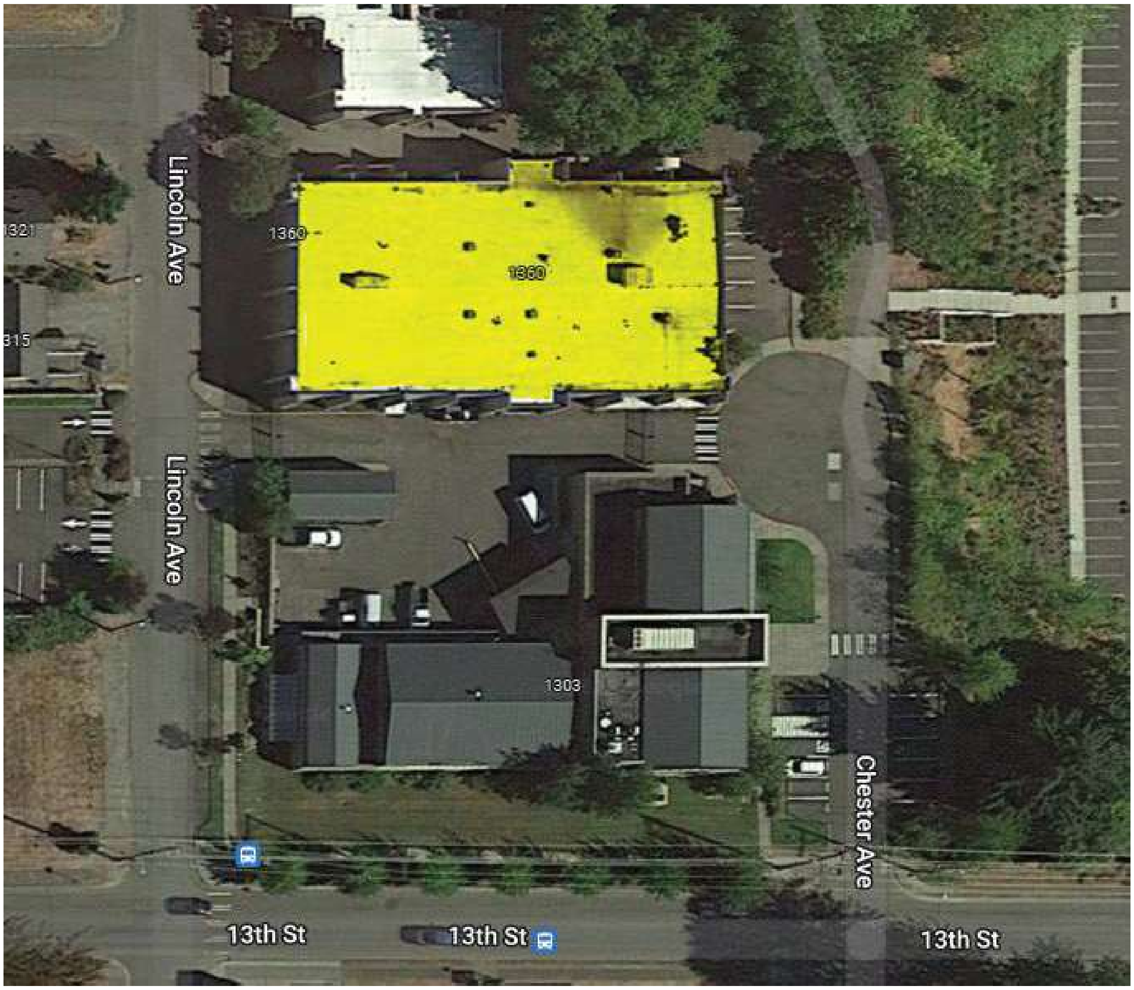

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OLYMPIC COLLEGE

Office of the President, Marty Cavalluzzi, Ph.D.

Aug. 9, 2022

The Honorable Leonard Forsman, Chairman
Suquamish Tribe
PO Box 498
Suquamish, WA 98392-0498

Subject: Olympic College Bremerton Campus Weld Shop Renovations

Dear Chairman Forsman,

Out of respect for our local tribal communities, and in accordance with Governor Inslee's Executive Order 21-02, and I am writing to inform you of Olympic College's intent to renovate the existing weld shop building located 1360 Lincoln Ave., Bremerton, WA 98337. The College has received capital funding to begin the building renovation in the Weld Shop in August of 2022.

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In addition, Olympic College is committed to the immediate stoppage of work if any archaeological resources are discovered during construction.

If you have any comments or concerns regarding this matter, please direct them to me by phone at 360-475-7100, or by e-mail at mcavalluzzi@olympic.edu.

Respectfully,

Marty Cavalluzzi
President, Olympic College

1600 Chester Ave. | Bremerton, WA 98337-1699 Page 1
Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100

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Office of the President, Marty Cavalluzzi, Ph.D.

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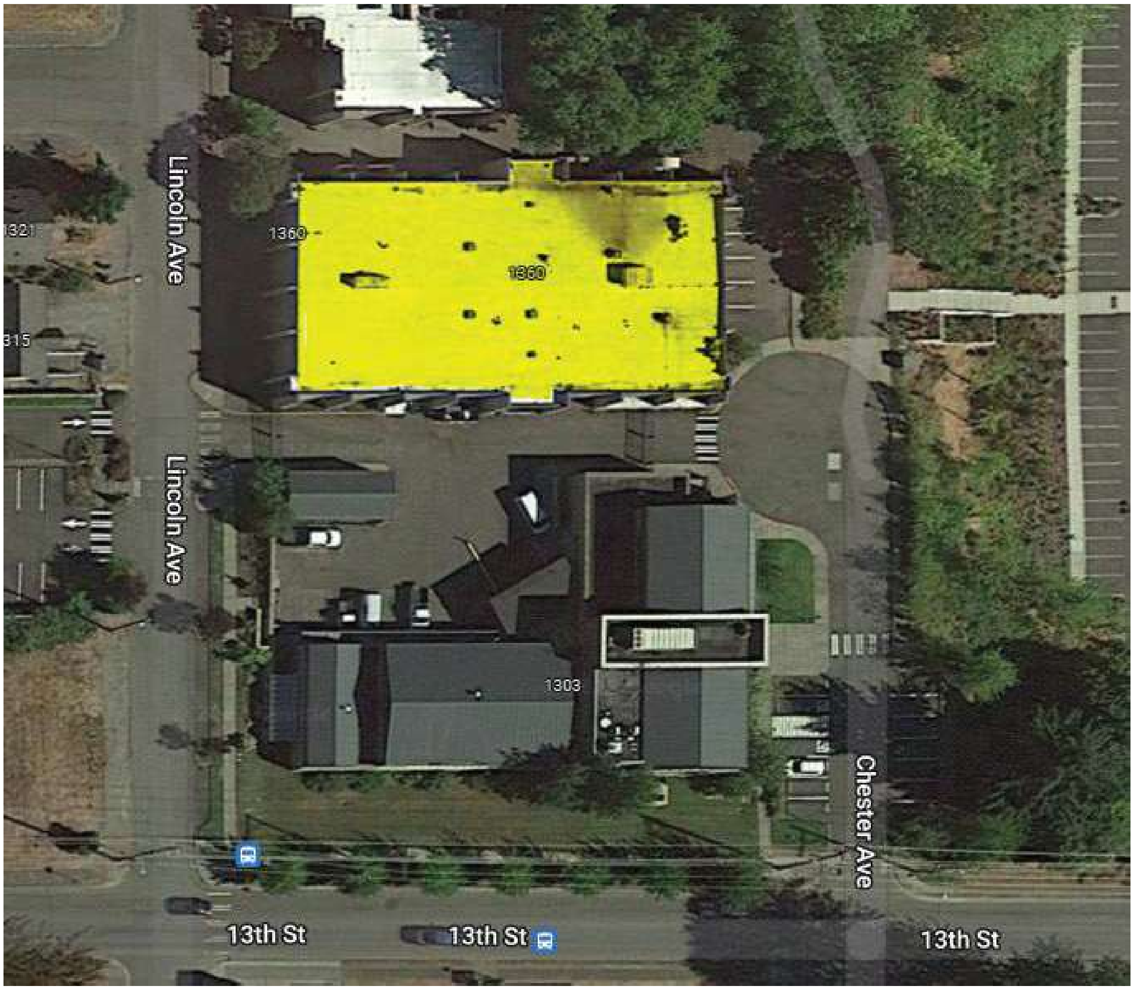
Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100 Page 2

OLYMPIC COLLEGE

Office of the President, Marty Cavalluzzi, Ph.D.



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Olympic.edu | Email: mcavalluzzi@olympic.edu | Phone: 360-475-7100

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APPENDIX G: TITLE REPORT

TITLE REPORTS HAVE BEEN REQUESTED

TITLE REPORTS HAVE BEEN REQUESTED

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