COLLEGE OF THE ENVIRONMENT / UNIVERSITY of WASHINGTON

ANDERSON HALL

The School of Environmental and Forest Sciences is guided by a vision of providing world-class, internationally-recognized knowledge and leadership for environmental and natural resource issues to benefit Washington State, the nation, and the world.

ANDERSON HALL: A LANDMARK AND A LEGACY

Anderson Hall is the central hub for a community of more than 1000 students, faculty, postdocs, and staff from the University of Washington's School of Environmental and Forest Sciences. Since its construction in 1925, people have gathered in the walls of this landmark building, working together with state, federal, tribal, industry, and community partners to advance global understanding of:

- climate adaptation and mitigation
- renewable resource use
- ecological restoration
- wildfire management
- wildlife conservation
- rural economic development
- healthy urban ecosystems.

IMPACT: Anderson Hall serves as a historically significant building as well as an emblem of the University's rich history of world-leading research and teaching in forestry and forest resources. As the centenary of the building draws near, we have an opportunity to remodel the building to preserve its deep legacy while ensuring it continues to serve as an essential space for contemporary leadership, thoughtful learning, and scientific innovation for the University and State of Washington.

A SPACE TO COLLABORATE AND PUSH BOUNDARIES OF ENVIRONMENTAL SCIENCES

A hallmark of the School of Environmental and Forest Sciences is its vibrant and innovative academic community - one that supports and rewards collaboration. To sustain this deeply valued culture, the School must create convening spaces for the brightest minds in science to gather and work across disciplinary boundaries. The creation of formal and informal

collaboration spaces will disrupt the silos that the current configuration of the building reinforces.

IMPACT: Updated interiors will provide opportunities to bring UW students and faculty together with external partners, for active learning and an engaged student experience. Modernized office and collaborative spaces will ensure the School continues to produce impactful research which integrates increasing use of data science, while cultivating a sense of community to attract and retain excellent and diverse faculty, postdocs, staff, and students.

WORLD CLASS TECHNOLOGY FOR WORLD CLASS LEARNING

Anderson Hall serves as a place for innovation, engineering, and analysis in support of forest-dependent industries and livelihoods, and culturally significant uses by diverse Western and Indigenous populations. The School's engineering and market analyses have contributed to development and promotion of cross-laminated timber (CLT), biofuel and biomaterials, thermally modified wood products, and maple syrup industries, among others. The School currently offers the State's only accredited degree programs in Forestry and in Natural Resources and Ecosystem Management, and a highly regarded accredited engineering degree program. Between 2009 and 2020, we've doubled enrollment in our undergraduate programs, now supporting more than 500 undergraduate and graduate students. Unfortunately, in its current state, Anderson Hall does not provide adequate classroom and collaborative learning spaces for our highly accomplished science and engineering students.

IMPACT: Spaces suited to the current instructional needs of STEM disciplines will provide a high-quality educational environment for tomorrow's leaders. A renovation to Anderson Hall will allow us to create a more attractive and inclusive environment for potential students who would not have previously envisaged themselves pursuing a career in environmental or forest sciences or engineering.

STEWARDING ANDERSON'S HISTORY, SAFELY

Anderson Hall is one of the oldest buildings on the Seattle campus and has served as a widely-cherished base for one of the longest-running natural resource programs in the United States. While this building represents more than a century of the university's contributions to the State's environmental, societal, and economic well-being, it no longer promotes the health, safety, or welfare of its occupants.

IMPACT: Through a renovation that prioritizes collaborative spaces, enhances technological facilities, addresses long-standing accessibility and safety issues, and modernizes building systems, Anderson Hall will become a welcoming and inclusive space. The broader University community will benefit greatly from a learning space that embodies its core values of Innovation and Celebrating Place.

QUICK FACTS

OFM Project Number	20091002
Agency Code	360
Agency Contact	Jean Hushebeck. Director of Finance jhush@uw.edu | 206-616-3795
Total Building Sq. Ft.	35,923
Assignable Sq. Ft.	18,913

SCHEDULE

Design Funding	July 2021
Planning & Design	Jan 2022 - Jun 2023
Construction	Apr 2023 - Sep 2024
Supplemental Construction Funding	Jul 2023
Full Occupancy	Jan 2025

BUDGET

2021-23 Capital Budget Request for Design/Preconstruction	$3,000,000
2023-25 Capital Budget Request for Construction	$18,000,000
Unit Equity Contribution (College of the Environment)	$9,000,000
Total Project Cost	$30,000,000

2020 PROJECT PROPOSAL CHECKLIST

2021-23 Biennium Four-year Higher Education Scoring Process

INSTITUTION	CAMPUS LOCATION
360 - University of Washington	Seattle
PROJECT TITLE	**FPMT UNIQUE FACILITY ID # (OR NA)**
Anderson Hall Renovation (20091002)	A08725
PROJECT CATEGORY	**PROJECT SUBCATEGORY**
Renovation	Major
PROPOSAL IS	
New or Updated Proposal (for scoring)	Resubmitted Proposal (retain prior score)
☒ New proposal ☐ Resubmittal to be scored (more than 2 biennia old or significantly changed)	☐ Resubmittal from 2017-19 biennium ☐ Resubmittal from 2019-21 biennium
CONTACT	**PHONE NUMBER**
Jean Hushebeck, Director of Finance	206-616-3795

PROPOSAL CONTENT

- ☒ Project Proposal Checklist: this form; one for each proposal
- ☒ Project Proposal Form: Specific to category/subcategory (10-page limit)
- ☒ Appendices: templates, forms, exhibits and supporting/supplemental documentation for scoring.

INSTITUTIONAL PRIORITY

- ☒ Institutional Priority Form. Sent separately (not in this packet) to: Darrell Jennings.

Check the corresponding boxes below if the proposed project meets the minimum threshold or if the item listed is provided in the proposal submittal.

MINIMUM THRESHOLDS

- ☒ Project is not an exclusive enterprise function such as a bookstore, dormitory or contract food service.
- ☒ Project meets LEED Silver Standard requirements.
- ☒ Institution has a greenhouse gas emissions reduction policy in place in accordance with RCW 70.235.070 and vehicle emissions reduction policy in place per RCW 47.01.440 or RCW 43.160.020 as applicable.
- ☒ Design proposals: A complete predesign study was submitted to OFM by July 1, 2020 **(OFM revised to July 31, 2020 and the Anderson Hall design proposal was submitted.)**
- ☐ Growth proposals: Based on solid enrollment projections and is more cost-effectively providing enrollment access than alternatives such as university centers and distance learning.
- ☒ Renovation proposals: Project should cost between 60 – 80% of current replacement value and extend the useful life of the facility by at least 25 years.
- ☐ Acquisition proposals: Land acquisition is not related to a current facility funding request.
- ☐ Infrastructure proposals: Project is not a facility repair project.

☐ Stand-alone, infrastructure and acquisition proposals: is a single project requesting funds for one biennium.

REQUIRED APPENDICES

☒ Capital Project Report CBS 002 – **Appendix A**

☒ Project cost estimate:

- CBS 003 for projects between $2 million and $5 million
- Excel C-100 for projects greater than $5 million – **Appendix B**

☒ Degree Totals and Targets template to indicate the number of Bachelors, High Demand and Advanced degrees expected to be awarded in 2021. (Required for Overarching Criteria scoring criteria for Major Growth, Renovation, Replacement and Research proposals). – **Appendix C**

☒ Availability of Space/Campus Utilization template for the campus where the project is located. (Required for all categories/subcategories except Infrastructure and Acquisition proposals). – **Appendix D**

☒ Assignable Square Feet template to indicate program-related space allocation. (Required for Growth, Renovation and Replacement proposals, all categories/subcategories). – **Appendix E**

OPTIONAL APPENDICES

Attach supplemental and supporting project documentation, *limit to materials directly related to and needed for the evaluation criteria*, such as:

☐ Degree and enrollment growth projections

☐ Selected excerpts from institutional plans

☐ Data on instructional and/or research space utilization

☐ Additional documentation for selected cost comparable (acquisition)

☒ Selected materials on facility conditions**: 2016 Comparable Framework Study, 2019 Consolidated Building Audit, 2014 Resource Conservation Report – Appendix F**

☐ Selected materials on code compliance

☒ Tables supporting calculation of program space allocations, weighted average facility age, etc. **Appendix E (with Assignable Square Feet template)**

☐ Evidence of consistency of proposed research projects with state, regional, or local economic development plans

☐ Evidence of availability of non-state matching funds

☐ Selected documentation of prior facility failures, high cost maintenance, and/or system unreliability for infrastructure projects

☐ Documentation of professional assessment of costs for land acquisition, land cleanup, and infrastructure projects

☐ Selected documentation of engineering studies, site survey and recommendations, or opinion letters for infrastructure and land cleanup projects

☒ Other: **Anderson Hall Factsheet** (**included at the front of the project submittal package**)

2020 PROJECT PROPOSAL CHECKLIST

2021-23 Biennium Four-year Higher Education Scoring Process

I certify that the above checked items indicate either that the proposed project meets the minimum thresholds or the corresponding items have been included in this submittal.

Name: Jean Hushebeck Title: Director of Finance, UW Facilities

Signature: Jean Hushebeck Date: 8/14/2020

Institution
University of Washington
Project Title
College of the Environment - School of Environmental and Forest Sciences Anderson Hall Renovation (20091002)
Project Location (City)
Seattle

SUMMARY NARRATIVE

1. Problem Statement (short description of the project - the needs and the benefits):

Anderson Hall is the central hub for an interdisciplinary community of more than 1,000 students, faculty, and staff from the University of Washington's School of Environmental and Forest Sciences. The School works together with state, federal, tribal, industry, and community partners to advance understanding of natural resources and train the next generation of leaders in supporting:

- renewable resource use
- ecological restoration
- wildfire management
- wildlife conservation
- rural economic development
- climate adaptation and mitigation
- healthy urban ecosystems.

While this building represents more than a century of the University's contributions to the State's environmental, societal, and economic well-being, it no longer adequately promotes the health, safety, or welfare of its occupants, falling short of current standards related to occupant comfort, air quality, fire and life safety systems, and accessibility. The proposed renovation is an opportunity to preserve the buildings legacy, prioritize collaborative spaces, enhances technological facilities, address long-standing accessibility and safety issues, and modernize building systems.

2. History of the project or facility:

Anderson Hall serves as a historically significant building as well as an emblem of the University's rich history of world leading research and teaching in forestry and forest resources. As the centenary of the building draws near, we have an opportunity to preserve its deep legacy while ensuring it continues to serve as an essential space for contemporary leadership, thoughtful learning, and scientific innovation for the University and State of Washington.

Through a renovation that prioritizes collaborative spaces, Anderson Hall will become a welcoming and inclusive space. The broader university community will benefit greatly from learning spaces that embody core values of innovation and celebrating place.

The School of Forest Resources was established in 1907 as one of the first natural resource programs in the country, and it has occupied Anderson Hall since its construction in 1925. On

July 1, 2009, the College of Forest Resources became the School of Forest Resources within the University of Washington's new College of the Environment. In 2010, its forest science programs were rated to be among the top three in the US by the National Research Council, and on January 1, 2012, the School became the School of Environmental and Forest Sciences (SEFS). Its vision is to provide world class, internationally recognized knowledge and leadership for environmental and natural resource issues. SEFS programs focus on the integrating theme of sustainability, through ecological, economic, engineering, and societal assessments of forests and natural resource systems in support of multi-objective goals across diverse populations. The School educates the next generation of leaders and managers in natural resource and forest-dependent industries, agencies, and organizations throughout the state, the region, and the nation, and contributes to solutions of natural resources and environmental challenges throughout the world.

3. University programs addressed or encompassed by the project:

University Programs Served

The University of Washington (UW) provides education, research, and service at nationally and globally competitive levels. Anderson Hall serves as a place for innovation, engineering, and analysis in support of forest-dependent industries and livelihoods, and culturally significant uses by diverse Western and Indigenous populations. The School's engineering and market analyses have contributed to development and promotion of cross-laminated timber (CLT), biofuel and biomaterials, thermally modified wood products, and maple syrup industries, among others. The School currently offers the State's only accredited degree programs in Forestry and in Natural Resources and Ecosystem Management, and a highly regarded accredited engineering degree program. Between 2009 and 2020, enrollment in undergraduate programs has doubled, now supporting more than 500 undergraduate and graduate students. Consistent with the University of Washington Restoration and Renewal Study, renovation and modernization of the UW's existing facilities is crucial to the University's ability to maintain competitive excellence in instruction, research, and recruitment. Undertaking the renovation of Anderson Hall will also serve to preserve an historic facility of great importance to the University and the State of Washington. Reconfiguration and upgrades to general university classrooms will support the instructional and learning needs of the broader UW community.

Interdisciplinary Engagement

A hallmark of the School of Environmental and Forest Sciences is its vibrant and innovative academic community - one that supports and rewards interdisciplinary collaboration. To sustain this deeply valued culture, the School must create convening spaces for the brightest minds in science to gather and work across disciplinary boundaries. Modernized office and collaborative spaces will ensure the School continues to produce impactful research which integrates increasing use of data science, while cultivating a sense of community to attract and retain excellent and diverse faculty, postdocs, staff, and students.

External Partnerships

This project will create the environment necessary that promotes interconnectedness between the academic research and private/public implementation. The School's experience of successful engagement with industry, city, state, federal, and tribal partners lays the foundation for even greater impact. These partnerships, and the research and opportunities they foster, thrive in this type of supportive environment, one with an abundance of services, access, and flexibility. Updated interiors will provide opportunities to bring UW students and faculty together with external partners, for active learning and an engaged student experience.

OVERARCHING SCORING CRITERIA

4. Integral to Achieving Statewide Policy Goals:

Provide degree targets and describe how the project promotes improvement on 2018-19 degree production totals in the OFM Statewide Public Four-Year Dashboard (https://erdc.wa.gov/data-dashboards/public-four-year-dashboard#annual-enrollment). Include degree totals and target template in an appendix.

a. Indicate the number of bachelor's degrees awarded at the close of the 2018-19 academic year, and the number targeted for 2021.
b. Indicate the number of bachelor's degrees awarded in high-demand fields at the close of the 2018-19 academic year, and the number targeted for 2021.
c. Indicate the number of advanced degrees awarded at the close of the 2018-19 academic year, and the number targeted for 2021.

a.	**Bachelor's Degrees Awarded in 2018-19**	**Bachelor's Degrees Targeted for 2021**
	122	127
b.	**High Demand Bachelor's Degrees Awarded in 2018-19**	**High Demand Graduate Degrees Targeted for 2021**
	122	127
c.	**Advanced Degrees Awarded in 2018-19**	**Advanced Graduate Degrees Targeted for 2021**
	35	31

See Required Appendix (C): Degree Totals and Target Template

Degrees
The School of Environmental and Forest Sciences degree programs all serve to increase statewide capacity in high-demand STEM fields, associated with environmental sciences, forest resources management, wildlife management, materials and chemical engineering, natural resources conservation, natural resources economics, and others.

Diversity
Across all degree programs, our school enrolls approximately 30% underrepresented minority students, up from 20% ten years ago and defined as racial and ethnic groups underrepresented in natural resource disciplines, and 61% women. We employ best practices to actively recruit for diverse graduate student, staff, and faculty populations.

Pell Grants & External Partnerships
SEFS students, faculty, and staff maintain numerous active partnerships with industrial partners (e.g., through the Stand Management Cooperative, Precision Forestry Cooperative, and Washington Pulp and Paper Foundation), and city (e.g., Seattle Parks and Recreation and Seattle Public Utilities), state (e.g., Departments of Natural Resources, Fisheries and Wildlife, and Ecology), and federal (e.g., US Forest Service, US Park Service, US Bureau of Land Management) agencies.

5. Integral to Campus/Facilities Master Plan:

a. Describe the proposed project's relationship and relative importance to the institution's most recent Campus/Facilities Master Plan or other applicable strategic plan.

The Anderson Hall Renovation is consistent with and crucial to achieving the goals of the Central Campus Development outlined in the 2019 Campus Master Plan (CMP). The CMP serves as a long-term aspirational framework for future development, and is founded on five underlying guiding principles:

1. Flexible Framework
2. Learning Based Academic and Research Partnerships
3. Sustainable Development
4. Connectivity
5. Stewardship of Historic and Cultural Resource

This project adheres to those principles and helps to strengthen the fabric envisioned for Central Campus development.

b. Does the project follow the sequencing laid out in the Master Plan (if applicable)? If not, explain why it is being requested now.

The project is consistent with the Master Plan in its renovation of an existing significant building in the central portion of campus.

6. Integral to institution's Academic Programs Plan:

Describe the proposed project's relationship and relative importance to the institution's most recent Academic Programs Plan.

Must the project be initiated soon in order to:

a. Meet academic certification requirements?
b. Permit enrollment growth and/or specific quality improvements in current programs?
c. Permit initiation of new programs?

The UW Sustainable Academic Business Plan (https://www.washington.edu/strategicplanning/plan/) is the cornerstone of the UW's strategic framework to maintain excellence in teaching, scholarship and research in the light of financial realities. It outlines the goals and related activities that will keep the UW strong and well-positioned for the future. In relation to the UW Plan's mandate to Sustain, Compete and Transform:

a. YES. The Anderson Hall Renovation should be initiated as soon as possible to the meet academic certification requirements for the College of the Environment, especially considering the aging infrastructure and inaccessibility of the building. Quality facilities are as critical in meeting national academic certification and accreditation requirements as are esteemed faculties. This renovation will help meet certification requirements but also specifically address the following Sustainable Academic Business Plan initiatives: **SUSTAIN** academic excellence and mission; **COMPETE** to attract the best students, faculty and staff

and increase and diversify funding; **TRANSFORM** by embracing technology and interdisciplinary collaboration to meet the needs of a diverse and dispersed student body and by investing in people and infrastructure to meet 21st Century challenges.

b. YES. The Anderson Hall Renovation should be initiated as soon as possible to permit sustained enrollment growth and permit quality improvements the programs. High quality facilities, a necessity in attracting the best and brightest faculty and students to the UW, promote innovative and collaborative pedagogies, better accommodate and respond to rapidly evolving technologies. Beyond addressing the same Sustainable Academic Business Plan initiatives as the previous question, the project addresses these initiative specifics: **Husky Experience,** ensuring transformative educational experiences for our students; **Teaching & Learning in the 21st Century**, meeting the needs of an increasingly diverse and digitally savvy UW community; and **Fostering Collaboration**, facilitating collaborative research, teaching and learning within and across disciples and institutions to improve our ability to nimbly address society's complex challenges.

c. YES. The Anderson Hall Renovation should be initiated as soon as possible to permit the initiation of new programs. We are seeing a shift in the nature of the market for professional graduate degrees, and are actively exploring opportunities to expand professional graduate training for natural resource professionals across the full scope of fields in which we work. This would require expanding on our more narrowly targeted professional master's degrees (Masters in Environmental Horticulture and Masters in Forest Resources) to both deepen professional and technical skills training and address more of the professions in which we work, including ecological restoration, wildlife management, and bioresource engineering.

CATEGORY-SPECIFIC SCORING CRITERIA

7. Age of Building Since Last Remodel:

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

Anderson Hall is the same size and shape as when it was originally constructed in 1925, is a four-story concrete building clad in brick and stone with approximately 36,000 gross square feet (GSF). It is a historically significant building, designed by prominent Seattle architectural firm Bebb and Gould and exemplifying the Collegiate Gothic style that defines the built character of the University of Washington’s central campus. The structure has not had a major renovation since it was constructed and no significant modifications in over 50 years. Some of its systems are original, and the building is inaccessible to persons with disabilities, lacking both an accessible entrance and an elevator.

8. Condition of Building:

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

The 2016 comparable framework study scored Anderson Hall as a "3". (Appendix F)

Key structural and building systems impacting this score include: building foundation, roofing, exterior doors and windows, poor structural condition of interior stairs, interior finishes, plumbing, water intrusion, HVAC, electrical systems, lack of fire suppression, and storm/sanitary sewer.

See Appendix (F): 2014 Resource Conservation Report, 2016 Comparable Framework Study and 2019 Consolidated Building Audit.

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

Anderson Hall is not on the Washington Heritage Register. The University has prepared a Historic Resources Addendum to understand the historic significance and would be used to influence design decisions if improvements are funded. The University is in contact and coordination with DAHP and the Seattle City Historic Preservation Officer regarding renovation planning to potentially eligible buildings on campus. We engage on changes that have the potential to negatively affect features, and how to avoid or minimize effects. Priorities of campus building nominations are tied to the types of proposed building improvements and if/when the improvements would be funded by the state.

9. Significant Health, Safety, and Code Issues:

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

Accessibility. Anderson Hall does not currently meet accessibility standards as there is no accessible entry to the building and no elevator. Addressing this deficiency is a major goal of this renovation. University policy states that the primary building entrance shall be accessible where possible; however, given the configuration of the main entry sequence, it is infeasible to provide ADA access without significantly altering the historic nature of the north façade and landscape character. The design concept focuses on creating a new accessible entry sequence from the south courtyard of appropriate prominence and stature to comply with the spirit and intent of this policy. Building entries will be made accessible and an elevator will be added to this four-story building to fit within the existing roofline. Toilet rooms throughout the building will be improved and brought into current ADA compliance, and a Wellness Room will be added to better support occupant heath. The proposed renovation of Anderson Hall will comply with the Washington State Regulations for Barrier-free Facilities and the Americans with Disabilities Act (ADA).

Building Codes. Construction in the City of Seattle is currently governed by the 2015 Seattle Building Code. It is reasonable to expect a more current code will be adopted prior to design

and construction. The 2018 Seattle Energy Code will likely govern the design of Anderson Hall. RCW 39.35 requires a life cycle cost analysis of energy costs be conducted when designing a facility of this size, including analysis of building envelope, HVAC, power, and lighting.

To address deficiencies recorded in the 2019 Consolidated Building Audit for Anderson Hall (see Appendix F), envelope improvements shall include masonry, parapet, and roof repairs, and improved thermal insulation to mitigate infiltration, preserve the historic character of the building, and improve energy performance and occupant comfort. Exterior windows and doors will be repaired and upgraded as needed to correct code deficiencies and reduce operating costs. The building will be abated of hazardous materials at impacted work areas.

As recommended in the 2014 Resource Conservation Report for Anderson Hall (see Appendix F), a new mechanical ventilation system will be provided to improve occupant comfort and indoor air quality. Electrical, lighting, mechanical, and communications systems will be upgraded in impacted work areas.

Seismic Codes. The basis of the seismic evaluation is the American Society of Civil Engineers (ASCE) Standard 41-13, Seismic Evaluation of Existing Buildings, a consensus national standard whose seismic performance objective is life safety. In accordance with the Memo of Understanding signed between University of Washington and the City of Seattle in 2018, parapet bracing and stabilization of exterior non-bearing walls is required when work requiring a permit is being done at identified buildings – including Anderson Hall – on the University of Washington Seattle campus. Comprehensive vertical seismic resisting system, consisting of cast-in-place or shotcrete shear walls in combination with center core masonry piers should be considered and planned for as future phase of work.

Sustainability. The Anderson Hall renovation will incorporate sustainability and energy efficiency measures in order to comply with state and local energy and building codes, in alignment with UW policy, and to achieve a LEED Silver certification that will effectively reduce greenhouse gas emissions compared to existing conditions.

The requirements for net zero energy or net zero energy capable projects included in Executive Order 20-01 apply only to newly constructed buildings and are thus not applicable to the Anderson Hall Renovation project. The Anderson Hall Renovation project comprises less than 50,000 gross square feet of construction and is not a 'Covered Commercial Building' nor bound by the requirements of RCW 19.27A.210.

No wetlands or other environmentally sensitive areas will be affected by the project. No changes to drainage systems are anticipated with this project.

10. Reasonableness of Cost:

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

ADJUSTMENT OF EXPECTED COST RANGES	
Facility Type: Classrooms	
End: September 1, 2024	
Midpoint: Nov 1, 2024	
Construction Index for Midpoint: (interpolated from index table)	1.110283
Expected maximum allowable construction cost in $2019 dollars:	$405
Expected maximum allowable construction cost at midpoint:	$450
Projected Project maximum allowable construction cost:	$437
Percentage of OFM Cost Standard	97%

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

See Required Appendix (B): OFM C-100 Form

Construction Methodology

In accordance with RCW 39.10.300, the University will utilize the alternative public works contracting procedure for the procurement and delivery of the project using the Design-Build method. “Design-build" means a contract between a public body and another party in which the party agrees to both design and build the facility, portion of the facility, or other items specified in the contract.

11. Availability of Space/Utilization on Campus: from Nate

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

a. The utilization of classroom space
b. The utilization of class laboratory space

The current class laboratory space for the University of Washington in aggregate is approximately 3% above the HECB utilization standards.

See Required Appendix (D): Space Availability/Utilization Template

12. Efficiency of Space Allocation:

a. For each major function in the proposed facility (classroom, instructional labs, offices), identify whether space allocations will be consistent with Facility Evaluation and Planning Guide (FEPG) assignable square feet standards. To the extent any proposed allocations exceed FEPG standards, explain the alternative standard that has been used, and why. See Chapter 4.0 of the Project Evaluation Guidelines for an example. Supporting tables may be included in an appendix.
b. Identify the following on form CBS002**:**
    1. Usable square feet (USF) in the proposed facility,
    2. Gross square feet (GSF), and

3. Building efficiency (USF divided GSF).

The proposed program re-configures program spaces to meet or exceed Facilities Evaluation and Planning Guide (FEPG) standards, retains existing spaces that are generally in compliance, and prioritizes expanded Collaboration Areas towards a more balanced mix of shared and private spaces promoting interdisciplinarity and community. Please refer to the supporting table, Assignable Square Feet and Efficiency of Space Allocation – FEPG Standard in *Appendix E*.

Instructional Space. New classrooms are relocated and right-sized for improved access, flexibility, and functionality to support modern instructional methods and pedagogy. The existing General Assignment auditorium classroom is retained as an architecturally significant campus destination. With the addition of an elevator making this space accessible, updated furniture will ensure access for classroom users and modestly reduce the overall occupancy count.

Research Space. Existing Faculty offices are well positioned in the West wing on the First Floor and room sizes generally align with FEPG standards. Existing research spaces on the Ground Floor will be retained. Open office areas for graduate student and staff workstations and staff offices per FEPG standards are proposed for a repurposed third floor as a tenant improvement project outside of the scope of this renovation.

Program Administration and Student Advising. Staff offices and workstations sizes are standardized for improved efficiency and greater parity. The existing grain of the building – ie. window locations, structural bays – will likely limit strict modularization. Programming targets - Director's Office at 175 sf, Advising Directors Office at 150 SF, Staff offices at 120 sf, staff workstations at 80 sf, and clerical workstations at 60 SF - reflect FEPG standards, along with guidance from the OFM State Facilities Workplace Strategies and Space Guidelines (RCW 43.82.055), and current industry best practices. The dedicated SEFS Conference Room falls short of FEPG standards, in favor of expanded shared spaces located throughout the building.

Collaboration Areas. The creation of formal and informal collaboration spaces will disrupt the silos that the current configuration of the building reinforces. The sum of these expanded collaboration spaces both meets and exceeds the FEPG standard, providing 1.6 SF of collaborative space per FTE for the total SEFS population.

Compliance with FEPG Space Standards

The project is consistent with FEPG standards for defined space types.

Space Efficiency

Gross Square Feet	Usable Square Feet	Space Efficiency
35,923	18,913 proposed	52.65% proposed**

***Note efficiency ratio decreases with proposed renovation through the additional of an elevator, and improvements to circulation and restrooms to promote access.*

See Required Appendix (E): Efficiency of Space Allocation Table, and Assignable SF Table

13. Adequacy of Space:

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

Between 2009 and 2020 the School doubled enrollment in undergraduate programs critical to State needs in science and engineering for sustainable use of natural resources, now supporting more than 500 undergraduate and graduate students; significant long-term growth is not anticipated. Anderson Hall will continue to support the programs, functions, and occupants currently located within the building. A building renovation creates opportunity to do so more efficiently, effectively, and in ways that better support the mission, vision, and values of the School, College, and University.

- Spaces suited to the instructional needs of STEM disciplines will provide a high-quality educational environment for tomorrow's leaders. The renovation will result in a more attractive and inclusive environment for potential students who would not have previously envisioned themselves pursuing a career in environmental or forest sciences or engineering.
- A hallmark of the School of Environmental and Forest Sciences is its vibrant and innovative academic community – one that supports and rewards collaboration. To sustain this deeply valued culture, the School must create convening spaces for the brightest minds in science to gather and work across disciplinary boundaries. The creation of formal and informal collaboration spaces will disrupt the silos that the current configuration of the building reinforces. Updated interiors will provide opportunities to bring UW students and faculty together with external partners for active learning and an engaged student experience.
- Modernized office and collaboration spaces will ensure the School continues to produce impactful research integrating increasing use of data science while cultivating a sense of community to attract and retain excellent and diverse faculty, postdoctoral scholars, staff, students and industry partners.

Through a renovation that prioritizes collaborative spaces, enhances technological facilities, addresses long-standing accessibility and safety issues, and modernizes building systems, Anderson Hall will become a welcoming and inclusive space. The broader university community will benefit greatly from a learning space that embodies its core values of Innovation and Celebrating Place.

APPENDIX A

OFM

360 - University of Washington
Capital Project Request

2021-23 Biennium

*

Version: 01 21-23 Capital Request DRAFT

Report Number: CBS002
Date Run: 8/14/2020 9:58AM

Project Number: **20091002**
Project Title: **Anderson Hall Renovation**
Project Class: **Preservation**

Description

Starting Fiscal Year: 2022
Agency Priority: 2

Project Summary

The University of Washington requests $3M of funding in the 21-23 biennium for the design of the Anderson Hall Renovation. Funding for construction will be requested in the 23-25 biennium. The College of the Environment will be contributing a third ($9M) of the proposed overall project funding.

Project Description

Anderson Hall is the central hub for an interdisciplinary community of more than 1,000 students, faculty, and staff from the University of Washington's School of Environmental and Forest Sciences. The School works together with state, federal, tribal, industry, and community partners to advance understanding of natural resources and train the next generation of leaders in supporting;

- renewable resource use
- ecological restoration
- wildfire management
- wildlife conservation
- rural economic development
- climate adaptation and mitigation
- healthy urban ecosystems.

While this building represents more than a century of the University's contributions to the State's environmental, societal, and economic well-being, it no longer adequately promotes the health, safety, or welfare of its occupants, falling short of current standards related to occupant comfort, air quality, fire and life safety systems, and accessibility. The proposed renovation is an opportunity to preserve the buildings legacy, prioritize collaborative spaces, enhances technological facilities, address long-standing accessibility and safety issues, and modernize building systems.

Location

City: Seattle **County:** King **Legislative District:** 043

Project Type

Remodel/Renovate/Modernize (Major Projects)

Growth Management impacts

The 2019 Campus Master Plan (CMP) is the primary regulatory vehicle for the University's future development, defining both the square footage to be constructed and the geographic location of such development. The CMP applies to the Seattle campus and the University's property located within the Major Institution Overlay, or MIO, and is guided by the City-University Agreement between the University of Washington and the City of Seattle.

Funding

Acct Code	Account Title	Estimated Total	Expenditures Prior Biennium	Current Biennium	2021-23 Fiscal Period Reapprops	2021-23 Fiscal Period New Approps
057-1	State Bldg Constr-State	21,050,000	200,000			3,000,000
148-6	HE - Dedicated Locl-Non-Appropria	9,150,000				150,000
	Total	**30,200,000**	**200,000**	**0**	**0**	**3,150,000**

OFM

360 - University of Washington
Capital Project Request
2021-23 Biennium

*

Version: 01 21-23 Capital Request DRAFT

Report Number: CBS002
Date Run: 8/14/2020 9:58AM

Project Number: **20091002**
Project Title: **Anderson Hall Renovation**
Project Class: **Preservation**

Funding

		Future Fiscal Periods			
		2023-25	**2025-27**	**2027-29**	**2029-31**
057-1	State Bldg Constr-State	17,850,000			
148-6	HE - Dedicated Locl-Non-Appropria	9,000,000			
	Total	**26,850,000**	**0**	**0**	**0**

Schedule and Statistics

	Start Date	**End Date**
Predesign	03/01/2020	08/01/2020
Design	7/1/2022	6/1/2023
Construction	4/1/2023	8/1/2024

	Total
Gross Square Feet:	35,923
Usable Square Feet:	18,913
Efficiency:	52.6%
Escalated MACC Cost per Sq. Ft.:	437
Construction Type:	College Classroom Facilities
Is this a remodel?	Yes
A/E Fee Class:	B
A/E Fee Percentage:	10.54%

Cost Summary

		Escalated Cost	**% of Project**
Acquisition Costs Total		**0**	**0.0%**
Consultant Services			
Pre-Schematic Design Services		156,600	0.5%
Construction Documents		1,395,378	4.7%
Extra Services		0	0.0%
Other Services		642,505	2.1%
Design Services Contingency		544,692	1.8%
Consultant Services Total		**2,449,550**	**8.2%**
Maximum Allowable Construction Cost(MACC)	**15,681,637**		
Site work		990,450	3.3%
Related Project Costs		0	0.0%
Facility Construction		14,691,187	49.0%
GCCM Risk Contingency		952,031	3.2%
GCCM or Design Build Costs		5,204,867	17.4%
Construction Contingencies		1,172,132	3.9%

OFM

360 - University of Washington
Capital Project Request
2021-23 Biennium

*

Version: 01 21-23 Capital Request DRAFT

Report Number: CBS002
Date Run: 8/14/2020 9:58AM

Project Number: **20091002**
Project Title: **Anderson Hall Renovation**
Project Class: **Preservation**

Cost Summary

	Escalated Cost	% of Project
Construction Contracts		
Non Taxable Items	0	0.0%
Sales Tax	2,324,077	7.8%
Construction Contracts Total	**25,334,743**	**84.5%**
Equipment		
Equipment	755,580	2.5%
Non Taxable Items	0	0.0%
Sales Tax	76,314	0.3%
Equipment Total	**831,894**	**2.8%**
Art Work Total	**149,184**	**0.5%**
Other Costs Total	**516,803**	**1.7%**
Project Management Total	**703,718**	**2.4%**
Grand Total Escalated Costs	**29,985,892**	
Rounded Grand Total Escalated Costs	**29,986,000**	

Operating Impacts

No Operating Impact

Capital Project Request

2021-23 Biennium

*

Parameter	Entered As	Interpreted As
Biennium	2021-23	2021-23
Agency	360	360
Version	01-A	01-A
Project Classification	*	All Project Classifications
Capital Project Number	20091002	20091002
Sort Order	Project Class	Project Class
Include Page Numbers	Y	Yes
For Word or Excel	N	N
User Group	Agency Budget	Agency Budget
User Id	*	All User Ids

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2020

Agency	University of Washington
Project Name	Anderson Hall Renovation
OFM Project Number	20091002

Contact Information	
Name	Jean Husheback
Phone Number	(206) 616-3795
Email	jhush@uw.edu

Statistics			
Gross Square Feet	35,923	MACC per Square Foot	$405
Usable Square Feet	18,913	Escalated MACC per Square Foot	$437
Space Efficiency	52.6%	A/E Fee Class	B
Construction Type	College classroom facilit	A/E Fee Percentage	10.54%
Remodel	Yes	Projected Life of Asset (Years)	50
Additional Project Details			
Alternative Public Works Project	Yes	Art Requirement Applies	Yes
Inflation Rate	2.38%	Higher Ed Institution	Yes
Sales Tax Rate %	10.10%	Location Used for Tax Rate	WA State
Contingency Rate	7%		
Base Month	September-20	OFM UFI# (from FPMT, if available)	A08725
Project Administered By	Agency		

Schedule			
Predesign Start	March-20	Predesign End	August-20
Design Start	July-22	Design End	June-23
Construction Start	April-23	Construction End	August-24
Construction Duration	16 Months		

Green cells must be filled in by user

Project Cost Estimate

Total Project	**$27,855,923**	Total Project Escalated	**$29,997,723**
		Rounded Escalated Total	**$29,998,000**

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2020

Agency	University of Washington
Project Name	Anderson Hall Renovation
OFM Project Number	20091002

Cost Estimate Summary

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

Consultant Services			
Predesign Services	$150,000		
A/E Basic Design Services	$1,136,600		
Extra Services	$0		
Other Services	$510,646		
Design Services Contingency	$513,020		
Consultant Services Subtotal	**$2,310,266**	**Consultant Services Subtotal Escalated**	**$2,461,000**

Construction			
GC/CM Risk Contingency	$882,000		
GC/CM or D/B Costs	$4,822,000		
Construction Contingencies	$1,085,911	Construction Contingencies Escalated	$1,172,132
Maximum Allowable Construction Cost (MACC)	$14,542,612	Maximum Allowable Construction Cost (MACC) Escalated	$15,681,637
Sales Tax	$2,154,585	Sales Tax Escalated	$2,324,078
Construction Subtotal	**$23,487,107**	**Construction Subtotal Escalated**	**$25,334,745**

Equipment			
Equipment	$700,000		
Sales Tax	$70,700		
Non-Taxable Items	$0		
Equipment Subtotal	**$770,700**	**Equipment Subtotal Escalated**	**$831,894**

Artwork			
Artwork Subtotal	**$149,242**	**Artwork Subtotal Escalated**	**$149,242**

Agency Project Administration			
Agency Project Administration Subtotal	$652,250		
DES Additional Services Subtotal	$0		
Other Project Admin Costs	$0		
Project Administration Subtotal	**$652,250**	**Project Administation Subtotal Escalated**	**$704,039**

Other Costs			
Other Costs Subtotal	**$486,357**	**Other Costs Subtotal Escalated**	**$516,803**

Project Cost Estimate

Total Project	**$27,855,923**	Total Project Escalated	**$29,997,723**
		Rounded Escalated Total	**$29,998,000**

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	$150,000			
Other				
Insert Row Here				
Sub TOTAL	**$150,000**	**1.0440**	**$156,600**	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	$1,136,600			69% of A/E Basic Services
Other				
Insert Row Here				
Sub TOTAL	**$1,136,600**	**1.0553**	**$1,199,454**	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)				
Geotechnical Investigation				
Commissioning				
Site Survey				
Testing				
LEED Services				
Voice/Data Consultant				
Value Engineering				
Constructability Review				
Environmental Mitigation (EIS)				
Landscape Consultant				
Existing Conditions Laser Scan				
Sub TOTAL	**$0**	**1.0553**	**$0**	Escalated to Mid-Design
4) Other Services				
Bid/Construction/Closeout	$510,646			31% of A/E Basic Services
HVAC Balancing				
Staffing				
Other				
Insert Row Here				
Sub TOTAL	**$510,646**	**1.0794**	**$551,192**	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	$134,202			
Other	$378,818			
Insert Row Here				
Sub TOTAL	**$513,020**	**1.0794**	**$553,754**	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	**$2,310,266**		**$2,461,000**	

Green cells must be filled in by user

Cost Estimate Details

Construction Contracts				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
1) Site Work				
G10 - Site Preparation	$121,440			
G20 - Site Improvements	$655,660			
G30 - Site Mechanical Utilities	$120,000			
G40 - Site Electrical Utilities	$35,000			
G60 - Other Site Construction				
Other				
Insert Row Here				
Sub TOTAL	**$932,100**	**1.0626**	**$990,450**	
2) Related Project Costs				
Offsite Improvements				
City Utilities Relocation				
Parking Mitigation				
Stormwater Retention/Detention				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0626**	**$0**	
3) Facility Construction				
A10 - Foundations	$109,500			
A20 - Basement Construction	$0			
B10 - Superstructure	$654,136			
B20 - Exterior Closure	$1,160,640			
B30 - Roofing	$142,216			
C10 - Interior Construction	$1,918,252			
C20 - Stairs	$300,000			
C30 - Interior Finishes	$2,710,000			
D10 - Conveying	$600,000			
D20 - Plumbing Systems	$555,268			
D30 - HVAC Systems	$1,602,000			
D40 - Fire Protection Systems	$258,000			
D50 - Electrical Systems	$1,530,000			
F10 - Special Construction	$0			
F20 - Selective Demolition	$820,000			
General Conditions				
E-20 - Furnishings	$353,000			Contractor provided, Contrator Installed
Estimating Contingency	$682,500			
Sub Bonds	$215,000			
Sub TOTAL	**$13,610,512**	**1.0794**	**$14,691,187**	
4) Maximum Allowable Construction Cost				
MACC Sub TOTAL	**$14,542,612**		**$15,681,637**	

5) GCCM Risk Contingency				
GCCM Risk Contingency	$382,000			
Risk Reward Incentive	$500,000			
Insert Row Here				
Sub TOTAL	**$882,000**	**1.0794**	**$952,031**	
6) GCCM or Design Build Costs				
GCCM Fee	$772,000			
Bid General Conditions	$2,800,000			
GCCM Preconstruction Services	$386,000			
DB Indirect	$386,000			
Permits and Bonds	$478,000			
Sub TOTAL	**$4,822,000**	**1.0794**	**$5,204,867**	
7) Construction Contingency				
Allowance for Change Orders	$1,085,911			
Other				
Insert Row Here				
Sub TOTAL	**$1,085,911**	**1.0794**	**$1,172,132**	
8) Non-Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0794**	**$0**	
Sales Tax				
Sub TOTAL	**$2,154,585**		**$2,324,078**	
CONSTRUCTION CONTRACTS TOTAL	**$23,487,107**		**$25,334,745**	

Green cells must be filled in by user

Cost Estimate Details

Equipment				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
E10 - Equipment	$200,000			
E20 - Furnishings	$500,000			
F10 - Special Construction				
Other				
Insert Row Here				
Sub TOTAL	**$700,000**	**1.0794**	**$755,580**	
1) Non Taxable Items				
Other				
Insert Row Here				
Sub TOTAL	**$0**	**1.0794**	**$0**	
Sales Tax				
Sub TOTAL	**$70,700**		**$76,314**	
EQUIPMENT TOTAL	**$770,700**		**$831,894**	

Green cells must be filled in by user

Cost Estimate Details

Artwork				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
Project Artwork	$0			0.5% of total project cost for new construction
Higher Ed Artwork	$149,242			0.5% of total project cost for new and renewal construction
Other				
Insert Row Here				
ARTWORK TOTAL	**$149,242**	**NA**	**$149,242**	

Green cells must be filled in by user

Cost Estimate Details

Project Management				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
Agency Project Management	$652,250			
Additional Services				
Insert Row Here				
PROJECT MANAGEMENT TOTAL	**$652,250**	**1.0794**	**$704,039**	

Green cells must be filled in by user

Cost Estimate Details

Other Costs				
Item	**Base Amount**	**Escalation Factor**	**Escalated Cost**	**Notes**
Mitigation Costs				
Hazardous Material Remediation/Removal				
Historic and Archeological Mitigation				
In Plant Services	$36,357			0.25% of escalated MACC
Surge Plan Condon Hall	$400,000			
T20	$50,000			
OTHER COSTS TOTAL	**$486,357**	**1.0626**	**$516,803**	

Green cells must be filled in by user

C-100(2020)
Additional Notes

Tab A. Acquisition

Tab B. Consultant Services
12% of MACC assumed for total consultant services

Tab C. Construction Contracts
line C-42: contractor provided furnishings (ie. roller shades) included
UW will utilize alternative works for procurement.

Tab D. Equipment
See note above Tab C about additional contractor supplied furnishings
Insert Row Here

Tab E. Artwork
Insert Row Here

Tab F. Project Management
Project Management fee automatically generated by C-100 form
Insert Row Here

Tab G. Other Costs
HAZMAT mitigation, remediation and removal, Historic & Archaeological included in Contingency
Insert Row Here

APPENDIX C

Degree Totals and Targets Template

Required for Overarching Criteria for Major Growth, Renovation, Replacement and Research Proposals

Institution:	University of Washington
Campus location:	Seattle, Washington
Project name:	Anderson Hall

	Increase in bachelor's degrees awarded	Increase in bachelor's degrees awarded in high-demand fields	Increase in advanced degrees awarded
2018-19 Statewide Public Four-Year Dashboard (a)	8,308	4,040	5,557
Number of degrees targeted in 2021 (b)	8,779	4,599	6,056
2018-19 totals/2021 target (a/b)	94.6%	87.8%	91.8%
Score:	**1.00**	**1.00**	**1.00**

Comments:

Targets for years 20-21 were estimated at : 2.8% for bachelors, 6.7% for bachelors in high demand and 4.4% for advanced degrees.

APPENDIX D

Availability of Space/Campus Utilization Template

2020 Four-year Higher Education Scoring Process

Required for all categories except Infrastructure and Acquisition.

Project Name:	Anderson Hall
Institution:	University of Washington
Campus Location:	Seattle, Washington

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

(a) General University Classroom Utilization		**(b) General University Lab Utilization**	
Fall 2019 Weekly Contact Hours	516,214	Fall 2019 Weekly Contact Hours	92,814
Multiply by % FTE Increase Budgeted	0.00%	Multiply by % FTE Increase Budgeted	0.00%
Expected Fall 2020 Contact Hours	516,214	Expected Fall 2020 Contact Hours	92,814
Expected Fall 2020 Classroom Seats	20,518	Expected Fall 2020 Class Lab Seats	5,098
Expected Hours per Week Utilization	**25.2**	**Expected Hours per Week Utilization**	**18.2**
HECB GUC Utilization Standard	22.0	HECB GUL Utilization Standard	16.0
Differrence in Utilization Standard	14%	Differrence in Utilization Standard	14%

If the campus does not meet the 22 hours per classroom seat and/or the 16 hours per class lab HECB utilization standards, describe any

institutional plans for achieving that level of utilization.

APPENDIX E (1 of 2 documents)

Program Related Space Allocation Template

Assignable Square Feet

Required for all Growth, Renovation and Replacement proposals.

Institution: UW

Campus location: Seattle

Project name: Anderson Hall

Input the assignable square feet for the proposed project under the applicable space types below:

Type of Space	Points	Assignable Square Feet	Percentage of total	Score [Points x Percentage]
Instructional space (classroom, laboratories)	10	5,777	30.55	3.05
Research space	2	3,613	19.10	0.38
Office space	4	4,817	25.47	1.02
Library and study collaborative space	10	4,035	21.33	2.13
Other non-residential space	8	-	0.00	0.00
Support and physical plant space	6	671	3.55	0.21
Total		**18,913**	**100.0**	**6.80**

APPENDIX E (2 of 2 documents)

University of Washington
Anderson Hall Renovation
Efficiency of Space Allocation - FEPG Standard

Project Space	FEPG room classification number	FEPG room classification type	Project ASF per station	FEPG standard	Meets standard (Y/N)	Comments
INSTRUCTIONAL SPACE						*Includes Classoom Service per FEPG
General Assignment Classroom, movable tables and chairs	110	Classroom	25	16-26	Y	Relocated, reconfigured, and right-sized for flexibility and modern pedagogy
General Assignment Classroom, movable tables and chairs	110	Classroom	25	16-26	Y	Relocated, reconfigured, and right-sized for flexibility and modern pedagogy
General Assignment Classroom, auditorium seating with tablet arms*	610	Auditorium/ Lecture Hall	14	14-15	Y	Existing space to remain; new accessible furniture layout will slightly reduce occupancy
SEFS Classroom / multi-purpose, movable tables and chairs*	110	Classroom	26	16-26	Y	Relocated, reconfigured, and right-sized for flexibility and modern pedagogy
SEFS Classroom, Seminar, movable tables and chairs	110	Classroom	25	16-26	Y	Relocated, reconfigured, and right-sized for flexibility and modern pedagogy
RESEARCH SPACE						** Includes Lab Service
Faculty Offices	311	Adademic	157	140	N	Existing spaces to remain
Open Office for Graduate Students and Staff**	313	Student Assistant	140	140 per 2 FTE min	N	Mix of new and existing spaces to remain; program target 60 sf per student workstation and 80 sf per staff workstation
Center Staff Offices	316	Student Assistant	120	120	Y	
Administrative Support Offices	316	Secretarial, Clerical	160	140 per 2 FTE min	N	Existing spaces to remain; program target 80 sf/ staff workstation
PROGRAM ADMINISTRATION AND ADVISING						
SEFS Director's Office	311	Chairs, Directors	175	175	Y	
SEFS Adminsistrator Office	312	Administrator	150	140	Y	Faculty and Equivilents
SEFS Staff Offices	316	Staff and Other	120	120	Y	
SEFS Staff Workstations	314	Secretarial, Clerical	167	140 per 2 FTE min	Y	Program targets 80 sf/staff and 60/SF clerical. OFM guidelines are 42-62 sf per workstation.
SEFS Conference Room	350	Conference Room	15	20 SF/ station	N	Below FEPG standard; complies with OFM Statewide Space Guidelines for 15sf/user for Conference. Collaboration areas expanded to encourage interdisciplinarity.
Advising Director's Office	312	Administrator	140	140	Y	Faculty and Equivilents
Advising Offices	316	Staff and Other	120	120	Y	
COLLABORATION AREAS			**1.6**	**1.5 SF / FTE**	**Y**	**per total SEFS FTE**
Forest Club Room	650	Public Lounge	included above			
The Commons	650	Public Lounge	included above			
Group Study	650	Public Lounge	included above			
Student Services Resource Room	650	Public Lounge	included above			

APPENDIX F

091-ER-6

Anderson Hall Resource Conservation Program Audit Report

Project np - No Project Number Given

ZONE:C

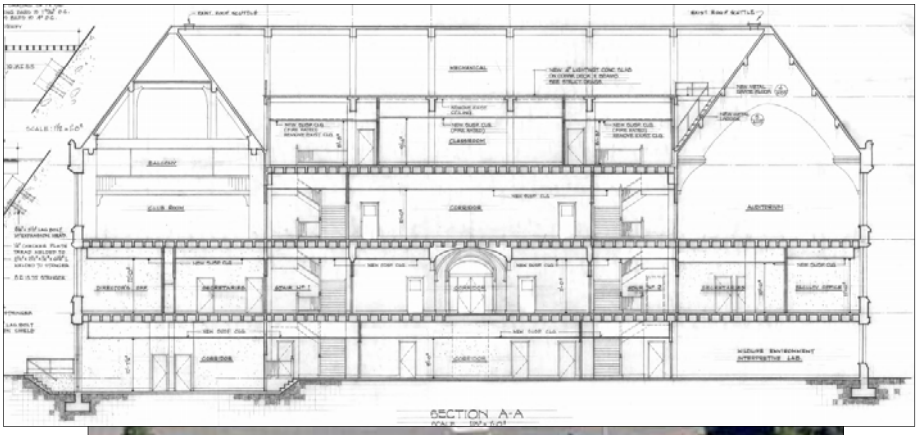
2014

FACILITIES SERVICES

UNIVERSITY of WASHINGTON

Resource Conservation Program Audit Report: Anderson Hall

Facility Number: 1351



UW Facilities Services

Resource Conservation Program

March 19, 2014

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List of Tables

Report Revisions

Date	Revision Description
3/19/2014	Draft report completed, lighting, envelope, plumbing, irrigation sections need review
7/23/2013	Updated language in envelope, lighting, plumbing, irrigation and transportation sections.

1 Executive Summary and Recommendations

In the winter of 2014 the Resource Conservation Program (RCP) conducted an audit of Anderson Hall. The RCP team's goal was to identify energy and resource conservation opportunities with good potential to recoup investment costs through operational savings. This report presents the findings and recommendations from the audit.

The audit yielded a number of promising measures that were evaluated in greater detail. Based on this analysis, a list of recommended measures was generated (see Table 1). Some resource conservation measures, including T-12 to T-8 lighting conversion and low flow plumbing fixtures, have already been implemented in this facility through previous conservation projects and are not included here.

The Anderson Hall HVAC system and pneumatic controls date back to the 1968 renovation. Although some occupant discomfort is reported, the system presents a low maintenance burden. Due to the extended payback a general system upgrade for efficiency is not feasible as an energy project. The building was part of the "restore the core" program and a predesign was funded but the renovation did not occur.

This assessment would not have been possible without the assistance of many individuals. The writers would especially like to thank Bill Earhart, Jamie Thompson, and Sally Morgan for sharing their knowledge, advice, and time.

Measure Description	Annual Electrical Savings		Annual Steam Savings		Total Utility Savings	Total Project Cost	Simple Payback	Estimated Incentive*	Net Project Cost ($)	Net Simple Payback	Useful Life	Calculation Certainty**
	kWh	$	klbs	$	$	$	Years	$	$	Years	Years	High/-
HVAC&R/Controls Measures												
Anderson DDC Controls (Scheduling Fans and Pumps)	54,517	$3,157	1,159	$12,754	$15,911	$20,014	1.3	$14,010	$6,004	0.4	15.0	High
Anderson Insulate Condensate Piping	0	$0	14	$154	$154	$701	4.5	$491	$210	1.4	30.0	-

*Incentives calculated at $0.27/kWh (electricity) and $5/therm (steam), assume 80% steam plant efficiency (incentives max out at 70% of cost)
**"High" certainty indicates calculations have supporting data equivalent to an Investment Grade ESCO audit

Table 1: Recommended Measure Summary

2 Introduction

The University of Washington is committed to environmental stewardship as a fundamental value and has been recognized for its leadership in sustainability. To that end the University published a Climate Action Plan. One of the primary goals of this plan is to reduce carbon emissions and work towards a climate-neutral university. The following five categories have been identified as strategies as part of the plan to reduce campus emissions: Campus Energy Supply, Campus Energy Demand, Information Technology, Commuting, and Professional Travel.

In an effort to fulfill those goals the Resource Conservation Program (RCP) was created to address the category of Campus Demand by tracking and planning projects to reduce campus energy (electrical power and gas) and resource (water, wastewater) use. RCP Energy Engineers develop and present measures to the Resource Conservation Investment (RCI) Team, a group made up of Facilities Services directors and senior staff, for their approval and funding. Measures recommended to the RCI Team include those that pay for themselves within the expected useful life of the measure.

This report documents the information discovered and developed by the RCP. It examines existing building systems and performance, identifies possible energy and resource conservation measures, and quantifies each measure's potential benefit. RCP reports will be annotated on a biennial basis with relevant facility improvement information.

2.1 Audit Methodology

The audits are carried out by an RCP energy engineer. They include:

- Reviewing facility design information (drawings, reports)
- Interviewing staff including campus engineers, controls technicians and building coordinators
- Conducting site inspections
- Gathering building submeter information
- Testing and Monitoring building systems

3 Facility Description

Anderson Hall houses the School of Environmental and Forest Sciences. It is a four story building. Table 2 summarizes essential building characteristics. The building's primary uses are offices and classrooms. The building has an economical amount of common space but is in line with the campus norm for non-assignable space (campus typically at ~28% common and ~15% non-assignable area). Table 3 presents a detailed breakdown of building space usage by UW room type code. Information in this table is from the OPB Sims database.

Facnum	Name	Tenant	Built	Area (GSF)	Floors
1351	Anderson Hall	School of Environmental and Forest Sciences	1925	33,543	4

Table 2: Building Characteristics

Type	%	Description
<100	18.94 %	Common Area
100	12.63 %	Classroom
200	2.70 %	Laboratory
300	39.37 %	Office
600	8.73 %	General Use
-	17.05 %	Non-Assignable

Table 3: Building Space Usage

3.1 Process Systems/Loads

The building supports mainly classroom and office functions. This includes the use of projectors and light audio visual equipment in the classrooms, computers and task lighting in the offices as well as copiers and other large office equipment in the admin areas.

No process cooling for communications or servers was found during the audit.

3.2 Building Hours

The building has scheduled hours of Monday to Friday 7:30 AM to 5:15 PM, closed on weekends and holidays. Administrative offices keep regular hours, M-F 8 AM to 5 PM. Classes tend to range from 8:30 AM to 5 PM but have been scheduled as late as 8 PM.

3.3 Building Systems

3.3.1 Metering

Anderson Hall's building-level metering systems are summarized in Table 4.

Utility	Metered	Meter Type	On EEM
Electrical	Yes	Nexus	Yes
Steam	No	-	-

Table 4: Building-Level Metering Systems

3.3.2 Envelope

The complete envelope analysis of this building will be a campus-wide initiative at a future date to be determined.

3.3.3 Lighting

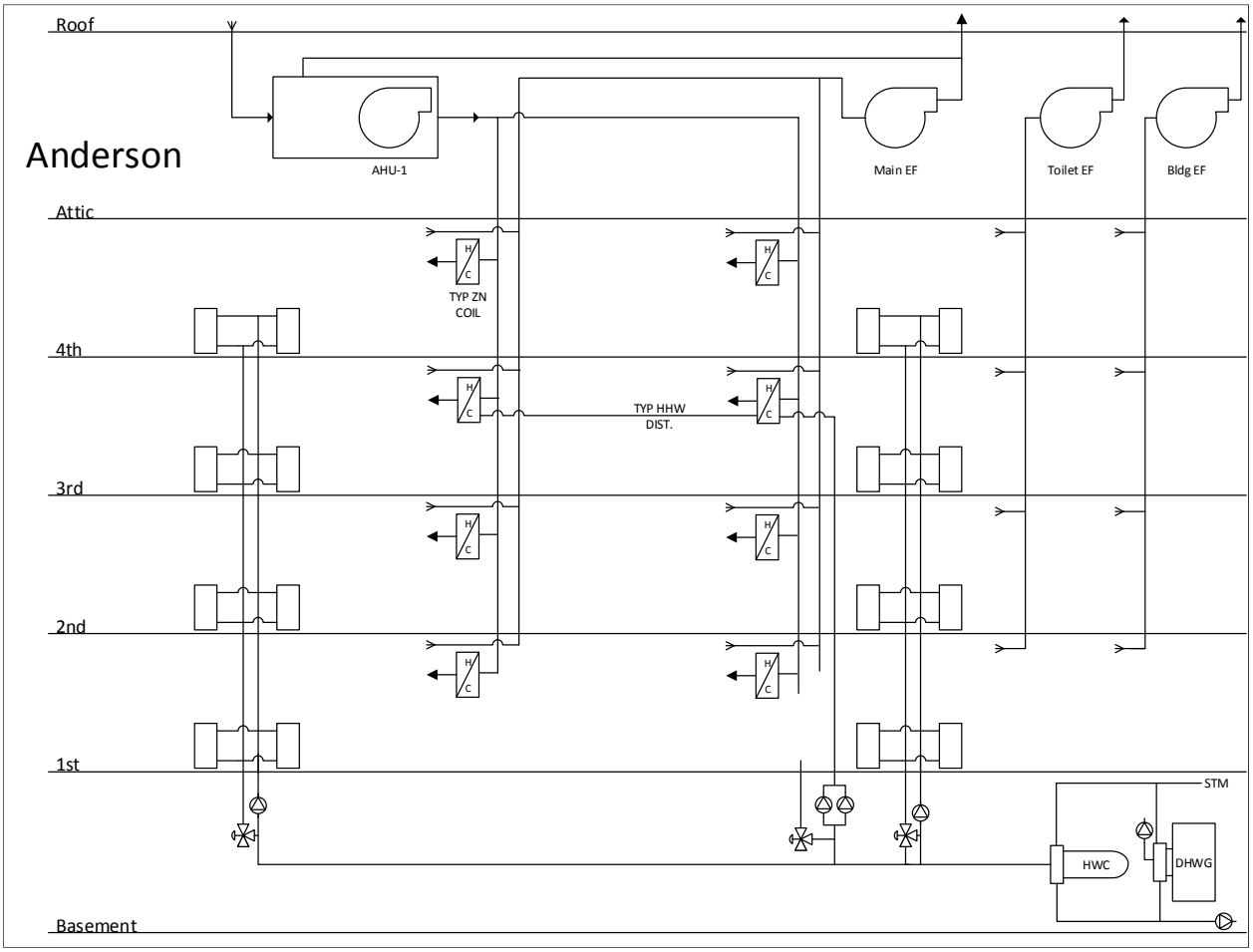
The complete lighting analysis of this building will be a campus-wide initiative at a future date to be determined.

3.3.4 Environmental Controls

The building HVAC system is pneumatically controlled. Currently none of the systems are scheduled. The HHW circulation systems are capable of hot water reset. The pneumatics controls are working although the system is at least 45 years old.

3.3.5 HVAC&R

System Diagram



HVAC Renovations

- 1924 New Building
- 1968 Major HVAC renovation

Helpful Drawings

- 1968 Anderson Hall Renovations
  - M108 Partial Attic Floor Plans and Sections
  - M109 Piping Diagrams

Central Services

Mechanical spaces include:

- Basement (HHW and DHW heat exchangers and pumps)
- Attic (Main SF, RF Toilet EF and Gen EF)

The building is connected to the central steam system by a 6” low pressure steam service and 1” condensate line. Pneumatic controls air is also provided from the power plant.

Heating
Environmental heating is by hot water from a shell and tube type steam to hot water converter. Steam condensate is pumped back to the plant via a condensate pump and receiver unit (F-2). The converter is controlled by a 1/3-2/3 valve arrangement and feeds three constant volume loops. Each loop is capable of temperature reset capability through a 3 way valve and feeds 2 way valves on the terminal devices.

- South Zone Convectors (A-18, 19)
- Reheat Coils (A-15, A-16)
- North Zone Convectors (A-17)

Water Heating
Domestic water heating is by a steam to hot water generator with the tube bundle directly in the hot water tank. It has a dedicated fractional horsepower circulator (A-20).

Cooling
There is no mechanical environmental or process mechanical cooling in the building.

Ventilation
The building has one air handler located in the attic which serves the whole building except perimeter offices. The unit is constant volume with no heating or cooling coils. It is paired with a return fan and a general and toilet exhaust. Zones have HHW reheat coils and convectors on local thermostats.

3.3.6 Plumbing
The complete plumbing analysis of this building will be a campus-wide initiative at a future date to be determined.

3.3.7 Irrigation
The complete irrigation analysis of this building will be a campus-wide initiative at a future date to be determined.

3.3.8 Transportation Systems
The building does not have an elevator.

4 Energy and Resource Use Analysis

4.1 Energy Use and Cost Intensity

The Energy Use Intensity (EUI) is a measurement of whole building annual energy use on an area-weighted basis. To develop this metric annual utility usage is converted to a common unit for comparison (thousands of Btu's per square foot per year). Energy Cost Intensity (ECI) is a similar measurement but weights the utility use by cost. ECI provides an alternative index that focuses on the economics of operating the building. The indices are simple bases for comparison for year over year usage or to compare buildings to each other.

EUI and ECI data for Anderson Hall is presented in Table 5. For this report utility data has been compiled from the building level sub meters (collected on EEM for electricity). Since the building steam is not metered the EUI/ECI data should be viewed as incomplete. For a more detailed breakdown by fuel see Appendix B Monthly Utility Usage Charts.

	Annual Usage					Annual Cost	
Electricity	299,144	kWh	1,020,980	kBtu	100%	$17,051	% unknown
Steam	unknown	lbs	unknown	kBtu	% unknown	unknown	% unknown
Total			1,020,980	kBtu		$17,051	

Conversions	Costs
3.413 kWh/kBtu	$0.057 /kWh
0.9521 lb/kBtu	$11.00 /klbs
0.001 btu/kBtu	$0.12 /ton-hr

EUI: **30.4** **kBtu/SqFt/Yr** **ECI:** **0.51** **$/SqFt/Yr**

Table 5: Building EUI and ECI Data

Steam usage data is required to generate a complete EUI, but the building's annual electricity consumption can be compared to other similar buildings. Anderson Hall's EUI of 30.4 is higher than that of two similar university buildings with similar programs Gowen at 22.2 and Smith at 20.7. All of the buildings are early 1900's vintage and run their ventilation fans 24/7.

4.2 End Use Consumption

Building loads have not been disaggregated due to lack of consumption data and monitoring constraints but certain conclusions can be drawn from the EUI and daily electrical demand data (see appendix B.2 Electrical Daily Demand Breakdown).

Electrical

Table 6 presents a summary of the building electrical load breakdown derived from the energy consumption data. The building Base Load represents the relatively constant rate of electrical energy consumption during unoccupied hours. Anderson's base load (25-30 kW) is attributable to fan systems, HHW pumps, plug loads such as computers and lighting left on. Because the HVAC electricity load is essentially constant, it is treated as part of the base load, and is not broken out separately for the purposes of this analysis.

Occupant loads represent the electrical consumption directly attributable to occupants in the building during operating hours. Anderson's daily occupant loads (10-15 kW) include lighting, computers, projectors, other plug loads and lighting.

Load	Power (kW)	Percent (%)
Base Load	25-30	66 %
Occupant Load	10-15	33 %
Total	35-45	100 %

Table 6: Building Electrical Load Breakdown

Steam

Building steam usage is divided between the Domestic HW generator and HHW converter.

5 Resource Conservation Measures

5.1 Measure Overview

Measures were generated through conversations with facilities staff, analysis of facility records and the audit process. The criteria for recommendation to the RCI Team is that the net simple payback of a measure is within the life of the equipment required to implement that measure. Measures that were deemed to not meet the criteria were eliminated as early as possible. Some measures require further development and coordination with campus stakeholders. Table 7 details the measures considered for the facility:

Anderson Full List of Measures	
Measure Title/Description	Analysis Notes
Metering Measures	
Steam Metering	Implement when feasible
Building Envelope Measures	
Envelope Improvements	TBD from RCP-Envelopes Team
Lighting Measures	
Lighting Improvements	TBD From RCP-Lighting Team
Ext ltg on separate circuit	
HVAC&R/Controls Measures	
DDC Controls (Scheduling Fans and Pumps)	See Detailed Analysis
Insulate Condensate Piping	See Detailed Analysis
Circulation Pumps to Variable Speed (Low HP)	TBD in future campus wide measure
Retro Commissioning	Pneumatic controls system, check valves and actuators for calibration.
VAV conversion/Rezone commons and auditorium onto dedicated systems	HVAC system conversion will not pay back because the systems will be scheduled less than 24/7
Plumbing Measures	
Plumbing Improvements	Restroom aerators

Further Action Required
See Details

Table 7: Measure Overview

5.2 Recommended Measures

An analysis of recommended measures is presented in Table 8.

Measure Description	Annual Electrical Savings		Annual Steam Savings		Total Utility Savings	Total Project Cost	Simple Payback	Estimated Incentive*	Net Project Cost ($)	Net Simple Payback	Useful Life	Calculation Certainty**
	kWh	$	klbs	$	$	$	Years	$	$	Years	Years	High/-
HVAC&R/Controls Measures												
Anderson DDC Controls (Scheduling Fans and Pumps)	54,517	$3,157	1,159	$12,754	$15,911	$20,014	1.3	$14,010	$6,004	0.4	15.0	High
Anderson Insulate Condensate Piping	0	$0	14	$154	$154	$701	4.5	$491	$210	1.4	30.0	-

*Incentives calculated at $0.27/kWh (electricity) and $5/therm (steam), assume 80% steam plant efficiency (incentives max out at 70% of cost)
**"High" certainty indicates calculations have supporting data equivalent to an Investment Grade ESCO audit

Table 8: Recommended Measure Detailed Analysis

Each recommended measure is discussed in greater detail below.

Measure	Anderson DDC Controls (Scheduling Fans and Pumps)
Existing	The HVAC systems are controlled by a pneumatic system that has no scheduling capabilities. Systems include an AHU that serves the whole building, recirc fan, toilet exhaust fan, general exhaust fan and 5 hydronic pumps.
Proposed	Install a DDC or other control system that will provide start/stop and status capability for the building. Reschedule the systems to run 7 AM to 7 PM 5 days a week with 1 hour or morning warm up.
Discussion	No energy savings is attributed to the pumps because the will probably run continuously due to poor envelope performance. Measure has 16% better payback with blended rate than time of use rate Assumptions - Airflow and Static Pressure data based on 2006 TAB report - Pricing based on new DDC system

Measure	Anderson Insulate Condensate Piping
Existing	Lengths of uninsulated condensate and domestic hot water were found in the mechanical room. In addition the condensate receiver and condensate meter were uninsulated.
Proposed	Insulate the uninsulated lengths of piping.
Discussion	Assumptions - Pipe temp is 180F for condensate 125F for DHW

5.3 Measures Considered but Not Recommended

An analysis of recommended measures is presented in Table 9.

Measure Description	Annual Electrical Savings		Annual Steam Savings		Total Utility Savings	Total Project Cost	Simple Payback	Estimated Incentive*	Net Project Cost ($)	Net Simple Payback	Useful Life	Calculation Certainty**
	kWh	$	klbs	$	$	$	Years	$	$	Years	Years	High/-
HVAC&R/Controls Measures												
Anderson VAV Conversion	17,699	$1,025	229	$2,518	$3,542	$341,553	96.4	$18,399	$323,154	91.2	15.0	High

*Incentives calculated at $0.27/kWh (electricity) and $5/therm (steam), assume 80% steam plant efficiency (incentives max out at 70% of cost)

** "High" certainty indicates calculations have supporting data equivalent to an Investment Grade ESCO audit

Table 9: Measures Not Recommended Measure Detailed Analysis

The following measures were considered, but are not recommended for implementation.

Measure	**Anderson VAV Conversion**
Existing	One Constant volume AHU serves building, excluding perimeter offices
Proposed	Convert the ventilation system to VAV by installing volume control dampers adjacent to each zone heating coil, installing VFD's on the supply and return fans and by upgrading the building controls to a DDC system.
Discussion	System includes ~ 21 heating coils of varying size, 5 zones where supply dampers will need to be retrofitted.

A Appendix: List of Acronyms

Acronym	Definition
AC	Air Conditioning
AHU	Air Handling Unit
BTU	British Thermal Unit
CV	Constant Volume
DHW	Domestic Hot Water
DWH	Domestic Water Heater
ECI	Energy Cost Intensity ($ / SF / year)
EEM	Enterprise Energy Management
EF	Exhaust Fan
EUI	Energy Use Intensity (kBtu / SF / year)
GPF	Gallons Per Flush
GPM	Gallons Per Minute
GSF	Gross Square Footage
HHW	Heating Hot Water
HPS	High Pressure Steam
HVAC(&R)	Heating, Ventilation and Air Conditioning (and Refrigeration)
I/P	Current / Pressure (Transducer)
IDF	Intermediate Distribution Frame
kBtu	1,000 BTUs
kW	Kilowatt
kWh	Kilowatt-hours
LPS	Low Pressure Steam
MBH	1,000 BTUs per hour
MDF	Main Distribution Frame
RCI	Resource Conservation Investment (Team)
RCP	Resource Conservation Program
RF	Return Fan
SF	Supply Fan
SF	Square Foot
VAV	Variable Air Volume
VFD	Variable Frequency Drive
W	Watt

B Appendix: Energy and Resource Use Information

B.1 Monthly Utility Usage Charts

Figure 1 shows the monthly electricity usage. The data is compiled from the building-level submeter.

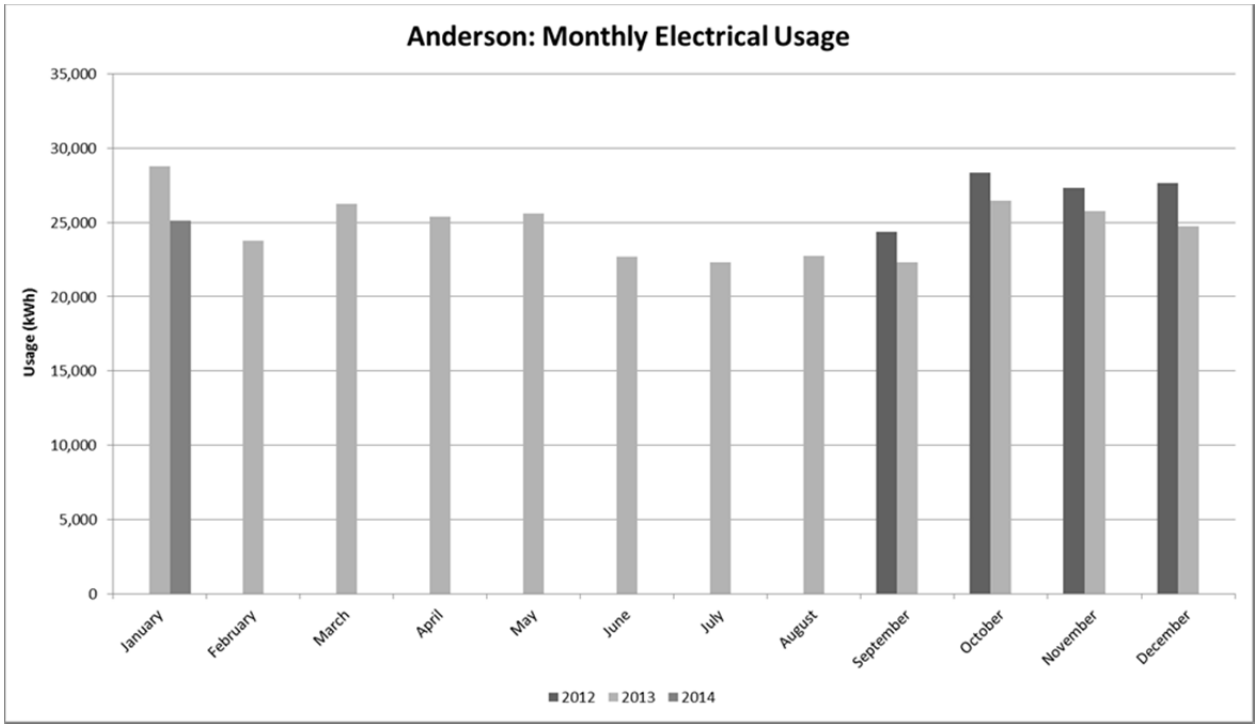


Figure 1: Monthly Electrical Usage

B.2 Electrical Daily Demand Breakdown

Figure 2, Figure 3, and Figure 4 show the daily electrical demand after adjustments to eliminate unexplained spikes in the data. The data comes from the building electrical meter via the Enterprise Energy Management (EEM) Suite. The time periods were selected to represent summer, winter and shoulder season loading.

NOTE: The counterintuitive trends on the demand chart indicate that the external lighting is probably fed off of the building.

Based on the charts the building base load appears to fluctuate between 25 and 30 kW. This includes the HVAC loads since the equipment is on continuously.

Weekday electrical demand due to occupants appears to begin around 6 AM and trend slowly down after 5 PM. Electrical demand reaches its evening steady state around 9:30 PM indicating that most occupants have probably gone home by this time. Rescheduling the building closer to 7 AM to 6:30 with optimum start should be considered in conjunction with quarterly class schedules.

Weekend loads tend to have a flat demand curve indicating no weekend occupancy. HVAC systems should be shut down during this period.

Some seasonal variation does occur with the lowest loads in August when the students are on break.

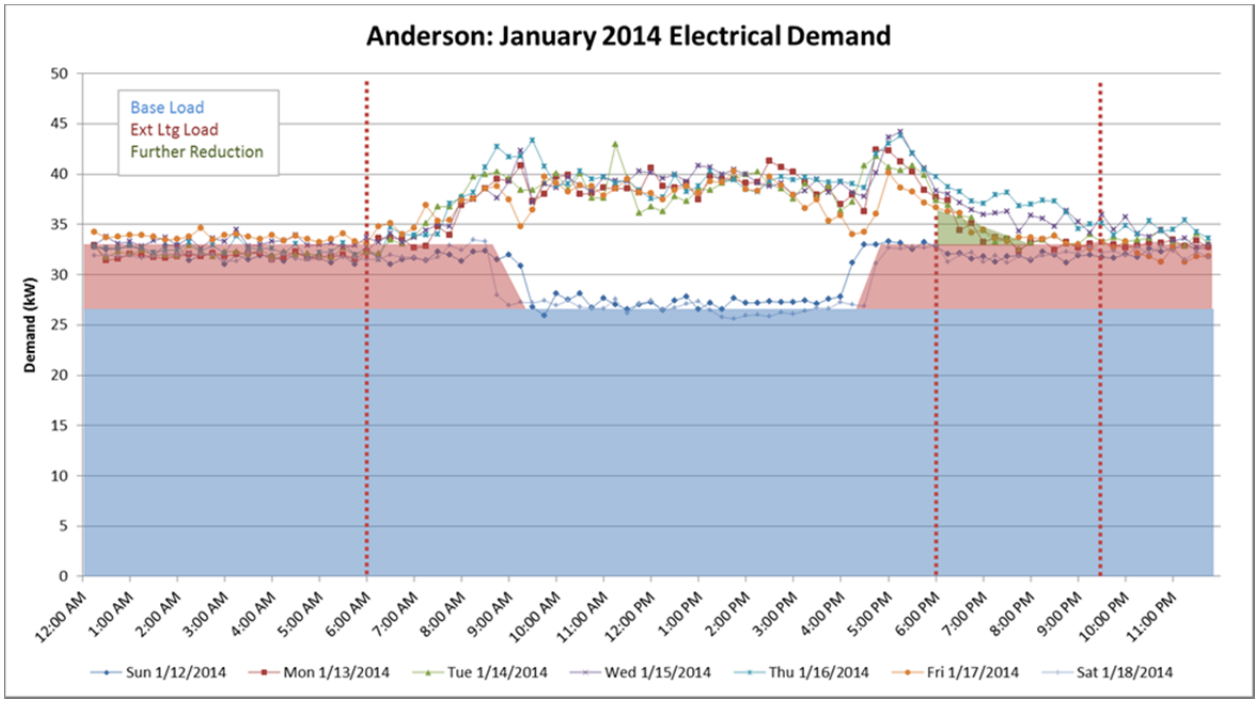


Figure 2: January 2014 Electrical Demand

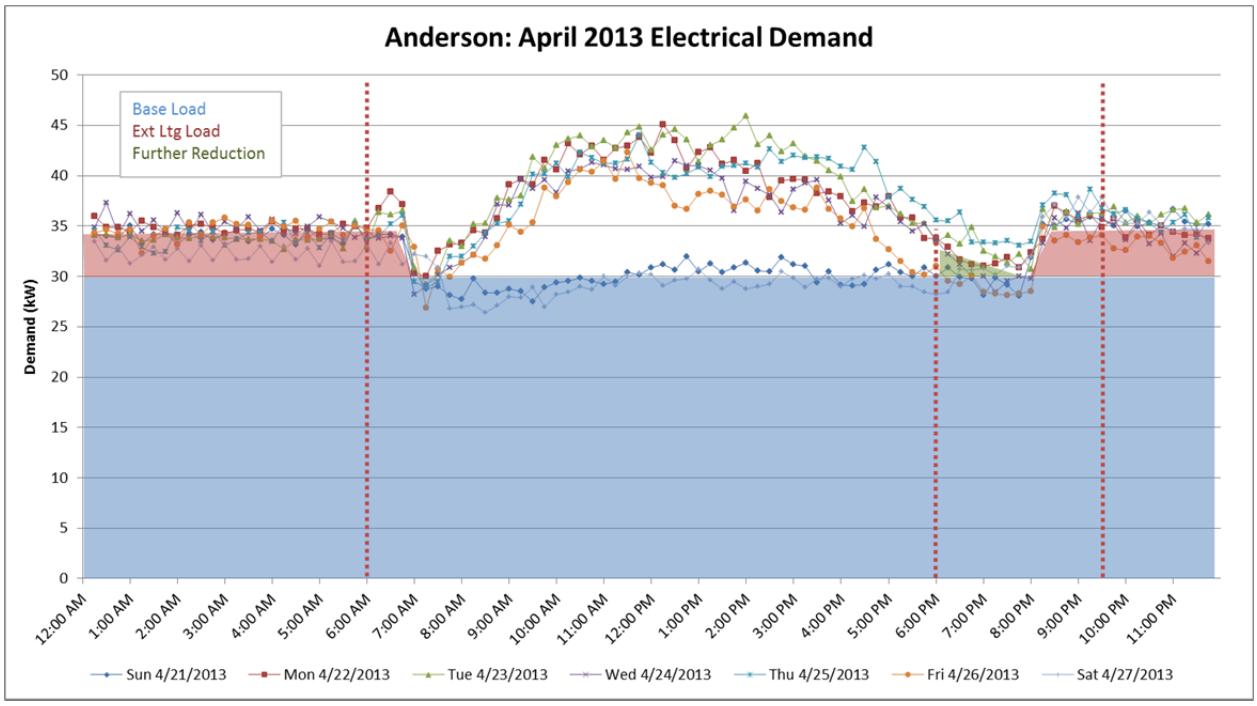


Figure 3: April 2013 Electrical Demand

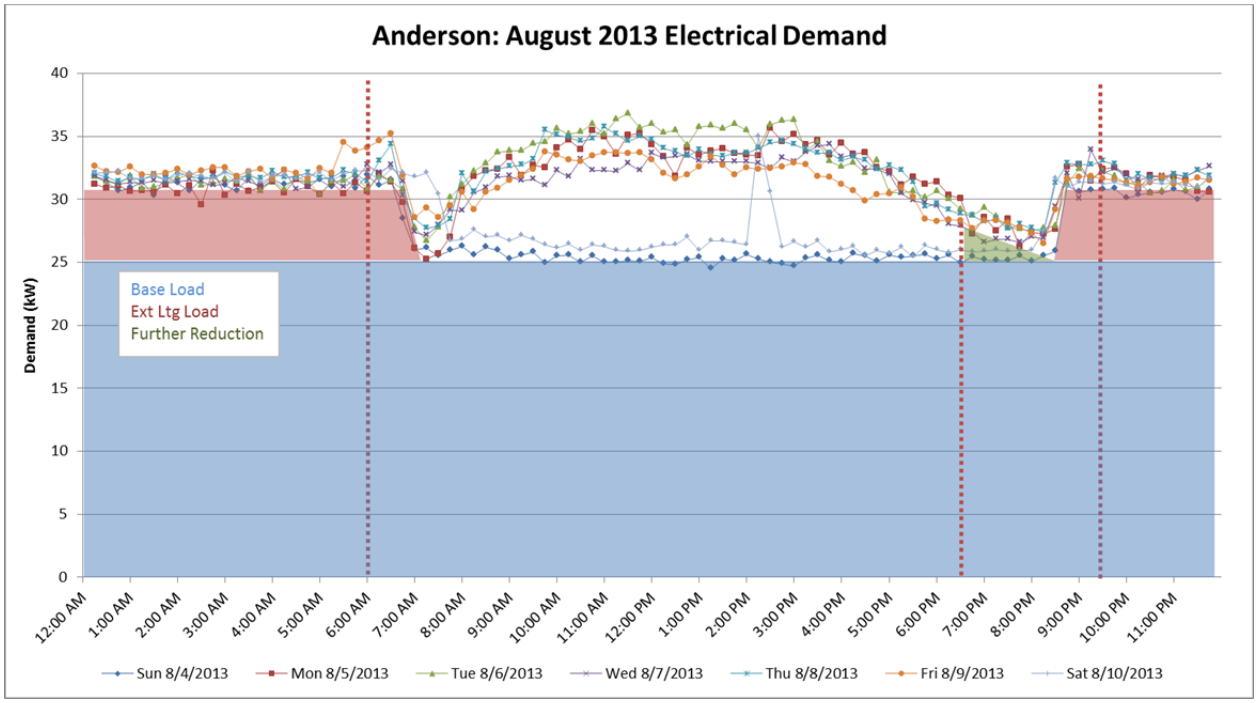


Figure 4: August 2013 Electrical Demand

C Facility Equipment List

Equipment Info					Motor					Airside			Water			Heating			Cooling		
Equipment Tag	Type	Serves	Notes	Location	NP Voltage	NP Phase	NP Motor HP	Calc kW	VFD (Y/N)	System Type	NP Total CFM	NP Min OA CFM	Flow (GPM)	Pres (Ft Hd)	Imp Dia (in)	Main Heat Type	Zone Heat Type	Capacity (kBtu)	Main Cool Type	Zone Cool Type	Capacity (kBtu)
G-9	Supply Fan	Bldg Supply		And Hall Attic	480	3	15	10.6		MZU CV	19,580					-	HHW-S		-	-	
G-10	Return Fan	Bldg Recirc		And Hall Attic	480	3	5	3.5			13,900										
G-11	Exhaust Fan	Bldg Exh		And Hall Attic	120	1	0.75	0.5			1,300										
G-12	Exhaust Fan	Toilet Exh		And Hall Attic	480	3	0.5	0.4			2,200										
B-2	converter	And Hall		And Mech Rm												STM	-	2,200			
E-3	Hot Water Generator	Dom HW, steam bundle in water tank		And Mech Rm												STM					
F-2	Cond Receiver + Pump	Conv, Tank		And Mech Rm	480	3	3	2.1													
A-15	Pump	Reheat Coils		And Mech Rm	480	3	2	1.4					105	35							
A-16	Pump	Reheat Coils		And Mech Rm	480	3	2	1.4					105	35							
A-17	Pump	N Zone Htg		And Mech Rm	480	3	1	0.7					60	35							
A-18	Pump	S Zone Htg		And Mech Rm	480	3	1	0.7					55	35							
A-19	Pump	N or S Zone Htg		And Mech Rm	480	3	1	0.7					60	35							
A-20	Pump	HW Circ		And Mech Rm	120	1	0.25	0.2					10	15							

Information written in red is based on record drawings but not field verified

Higher Education Facility Comparable Framework

2016 Update

April 2016

Prepared by MENG Analysis for the
Washington State Office of Financial Management

MENG ANALYSIS

Table of Contents

Summary Report

Appendix

Introduction

This report summarizes the Office of Financial Management (OFM) Higher Education Facility Comparable Framework 2016 update carried out for OFM by MENG Analysis. This summary provides an overview of the Comparable Framework and its original development, a description of the update methodology and an overview of the analysis and conclusions from the updated data. A more-detailed definition of the process, as well as definitions of technical terms, are included in the report appendix.

Office of Financial Management Comparable Framework Background

In 2003, the Joint Legislative Audit and Review Committee (JLARC) collected facility inventory and condition information for all facilities in the Washington state higher education system, encompassing the research universities, the regional universities, The Evergreen State College and the community and technical colleges. Using standard national accepted definitions, JLARC translated the information provided by the institutions to enable comparison across facilities and institutions. The study focused on facility preservation and produced a comparative estimate of maintenance and repair backlogs for each institution. The information was also organized in a relational database that presented not only facility conditions, but also basic facility inventory statistics such as amount of space, facility use type, construction type, age and funding source for each facility in the state inventory.

2006, 2008 and 2010 updates

In 2006, the Legislature requested that JLARC refresh the condition information so policymakers could use it to consider facility preservation when authorizing capital projects. Like the 2003 study, the 2006 update used existing building data from the institutions, with sample field surveys of system conditions for quality control in translating campus data into a statewide comparable framework.

The Legislature authorized another update of the comparable framework in 2008, but transferred study responsibility from JLARC to the Higher Education Coordinating Board (HECB). Then in 2010, management of the system passed from HECB to OFM with a mandate to use methodologies similar to previous versions to collect, translate and report institutional data.

2016 update

Section 1081 of the 2015–17 capital budget requires OFM to "*refresh preservation information that reside in the state's comparable framework for higher education buildings including any necessary revisions or adjustments that will enable more direct translation of information, updates for last renewal or replacement or major systems, and quality assurance field sampling."* MENG used similar methodologies as in previous versions to collect, translate and report the institutional data.

In the original (2003) study, reporting methodologies and the data provided by the institutions varied considerably. However, JLARC's work prompted some of the institutions to revise their methodology for reporting facility conditions. As a result, the current comparable framework is able to more consistently translate condition information across institutions. For each institution, this update provides:

- quantity and size of facilities
- construction type (heavy, medium, light, temporary) of facilities
- facility uses (e.g., classroom, research, office, etc.)

- capital funding source (state, mixed or nonstate)
- estimated current replacement values
- facility relative condition scores (superior, adequate, fair, limited functionality, marginal functionality)
- estimated backlog of maintenance and repair, presented in 2016 dollars. This estimate focuses on facility preservation and represents projects required to safely maintain facilities for the current intended facility use.

Methodology

As in the previous comparable framework, the higher education institutions use varying methods to report the conditions of their facilities. These methods are quantitative, qualitative or hybrid in character, as described below. The comparable framework first converts all existing institutional assessments to a common qualitative rating (condition index). It then uses that rating as a basis to parametrically estimate maintenance and repair backlog costs. The translation methods for 2016 include the following:

Quantitative

In previous updates, the University of Washington (UW) and Western Washington University (WWU) used a quantitative assessment, in which backlog deficiencies are itemized and cost estimates presented for correcting the deficiencies. The sum of these deficiency costs, known as backlog of maintenance and repair (BMAR) for each building is then compared to the current replacement value (CRV) of the building, resulting in a facility condition index (FCI) for each facility. CRVs are based on the type of construction, use type, size and geographic location. For the 2016 update, only WWU used a quantitative method, although the institution accompanied its reported data with a qualitative score for each facility.

Qualitative

For the 2016 update, OFM used a standardized qualitative translation method for UW, The Evergreen State College (TESC), Central Washington University (CWU) and Eastern Washington University (EWU); and, with some minor modifications, a similar method for the community and technical colleges (CTC). This methodology asked the institutions to rate the condition of each of the major building systems (e.g., roofing, plumbing, lighting, etc.) for every facility, on a qualitative scale of 1 to 5. Based on historical data, these scores then predict the cost of backlog deficiencies that can be expected for each of the building systems, which ultimately produces a total backlog estimate for the facility and for each institution. Having used this methodology in previous comparable framework updates, CWU, EWU and TESC began collecting facility data on this standardized systems basis prior to the 2016 update. UW has now transitioned fully to this method.

Community and Technical Colleges

The CTC facility condition assessment process includes a systems-based analysis and adds factors such as programmatic impact, building appearance and other nonpreservation issues that are typically not included in a "preservation" backlog analysis. For the 2016 update, CTC staff modified their system to exclude these factors and revised their weighting for the facility systems scoring. As in previous versions, the 2016 update used the CTC qualitative scores. However, it was still necessary to adjust the systems weighting to match the comparable framework so CTC scores can be translated into the same FCI developed for the four-year institutions.

The CTCs were unable to report condition data on approximately 35 facilities. This is a small number relative to the more than 700 facilities in its inventory of state-financed facilities over 2,000 square feet in size. For these 35 facilities, the comparable framework used estimated conditions based on age and type of facility and previously reported scores. It should be noted that the CTC inventory database has improved greatly from previous reports.

University of Washington

Previously, UW reported facility conditions in the form of a quantitative deficiency list, which was then adjusted to comply with the definition of deferred maintenance as outlined in the original JLARC Comparable Framework study. For the 2016 update, UW reported facility conditions using the comparable framework format, with scores 1 through 5 for each building system. The UW used the same building systems as the comparable framework and upgraded the UW condition assessment.

Intuitive - mixed

WSU previously recorded facility condition information in the form of detailed maintenance and repair deficiency lists. These lists were not all-inclusive in that they included estimates for only the most "at-risk" facilities. The original JLARC comparable framework translations used that information for the most-affected facilities and filled in data for other facilities using the intuitive (1 through 3 scale) overall building ratings reported to the state in the OFM Facility Information System (FIS) database.

WSU recently implemented a system that uses a combination of quantitative deficiency estimates and parametric predicted renewal modeling, which develops a WSU-specific FCI and qualitative 1–4 scores for each facility. Parametric-predicted renewals use historical industry standard time periods to estimate the expected remaining useful life for each building system. Similar historical cost data are used to estimate the renewal costs required when each system reaches the end of its useful life. The parameters used for this quantitative modeling and the manner in which they are combined are unique (in Washington) to WSU. Accordingly, the BMAR estimates produced by WSU and used for its own internal budgeting will differ from those generated by the comparable framework.

It is important to note that the methods used by WSU are accepted methods used by some institutions throughout the country. Although the WSU FCI's were not readily translatable, the qualitative scores (1 through 4) that WSU developed were valid for translation into the current comparable framework. While WSU completed assessments for facilities greater than 25,000 square feet on the Pullman campus, a large number of facilities were not rated through the WSU intuitive-mixed methodology. For those facilities, WSU used the 2010 Comparable Framework reported scores, adjusted for general condition and age.

Field surveys

As in previous updates to the comparable framework, the MENG Analysis team conducted facility condition surveys on behalf of OFM. These surveys included a standardized scoring and reporting methodology to compare the institution-provided condition data against a uniform standard, and to adjust any necessary translation for comparability. The field survey team, which included experienced architects and engineers, surveyed 33 representative facilities across the state inventory.

These included facilities that will likely require capital funding in the near future; facilities representing different use and construction types in varying geographic locations; and facilities randomly selected for statistical and quality control sampling. This sampling demonstrated that the institutions reported data in a manner generally consistent with their previous methods, and was used to make the fine adjustments needed for a comparable translation.

Current replacement value

The comparable framework produces a parametric estimate of the preservation backlog based on the CRV for each facility. It is therefore important to update base values to reflect current facility costs. CRV is the estimated cost to reconstruct, at current prices, an existing facility with utility equivalent to the existing facility, using modern materials in compliance with current codes and regulations. For the comparable framework, CRVs were derived using a formula based on predominant use, construction type, geographical location and facility size.

The original JLARC study used a number of local and national sources of historical cost data to define a CRV for each of the basic facility use types. The 2016 update adjusted basic CRVs to reflect cost escalation rates since 2010.

The study team reviewed regional and national cost indexes that track construction escalation. At the beginning of the study period, costs were highly volatile due to unusual economic impacts of the recession, but increased steadily over the next five years. Ultimately, the analysis team decided to use a 15.7 percent escalation factor from the RS Means construction cost index to update the CRVs from 2010 to 2016. The RS Means index represents the mid-level of the four larger nationally recognized cost indexes.

Findings and conclusions

A comparison of the Washington state higher institution facility inventory from 2010 to 2016 shows a fairly stable inventory with approximately 11 percent new total square footage added since 2010. With a steady inflation rate during this time and the added building square footage, the total replacement value increased by approximately 18 percent from 2010 to 2016. More than 90 percent of this increase is attributed to escalation.

The estimated preservation backlog increased 20 percent from 2010 to 2016, with 80 percent of this increase again attributed to escalation. The overall condition score for the state's building inventory diminished only slightly, from a 2.3 to 2.4. Both scores are solidly in the "adequate" category (lower scores represent improved conditions).

During this cycle, some facilities continued to deteriorate from "fair" to "needs improvement," but this deterioration was mostly offset by the number of facilities that moved into the "superior" and "adequate" categories. Approximately 1 million square feet of new construction was added from 2010 to 2016, all of which falls initially into the superior category and produces only a token amount of backlogged maintenance and repair.

The overall FCI for Washington state higher education facilities, at 14.9 percent, represents the amount of maintenance and repair backlog relative to the overall replacement value. This was only slightly higher (worse) than the previous update. Again, it is important to recognize that this overall average represents not only changes in individual facility conditions, but also changes in inventory

and escalation rates. In the previous JLARC study, this rating was compared to national average, with cautions about some of the "recommended goals" offered by these organizations relative to funding needed to accomplish those goals.

Several professional organizations, such the Association of Physical Plant Administrators (APPA), the National Association of College and University Business Officers (NACUBO) and the Society of College and University Planners (SCUP), have studied facility condition indexes and report the averages shown below. Most comprehensive national studies were conducted between 2000 and 2005. Some more recent individual state studies show consistent or slightly improving overall FCI scores (often due to large amounts of new inventory completed during the last decade). In general, the Washington state FCI for public higher education facilities falls below (better condition) than most of these nationally reported figures.

Source	Typical FCI
California Community Colleges	.33
American School and University Magazine National Survey (2010)	.29
University of Massachusetts	.26
University of California	.23
APPA Comparative Cost Data	.22
APPA/NACUBO Report (National Higher Ed Facilities)	.20
National Center for Education Statistics (National Average)	.18
Oregon University System	.18
Washington state Higher Education Facilities	.15
State of New Jersey Higher Education	.12
Minnesota University System	.12
California State University	.11
State University of New York (SUNY)	.11
Ontario University System	.10
University of Virginia	.10
University of Texas	.06

Findings and conclusions summary

- Total public higher education facilities inventory increased by 11 percent (1.1 million square feet) area over the past six years.
- Total inventory replacement value increased by 18 percent ($3.3 billion) over the past six years. When adjusted for inflation, this represents a 2 percent ($390 million) increase.
- Total maintenance and repair backlog increased by 23 percent ($613 million) over the past six years. When corrected for inflation, this represents an 8 percent ($200 million) increase.
- The overall backlog relative to replacement value worsened by about 5 percent over the past five years.
- The completeness of basic inventory and condition information tracked and reported by the institutions is improved in this database update, but discrepancies still exist in some institution's databases as well as in the state FIS system.

Recommendations

With the improvement in data captured by the institutions, the 2016 update to the comparable framework should be a useful tool for both the state and the institutions in the planning and budgeting process. For public higher education, the comparable framework is the most reliable statewide database for basic facility condition information.

In addition, the framework has improved overall from 2003 to this update as the institutions have adopted at least portions of the systems-based assessment offered by the framework. At the same time, the framework should be used only for a larger institution-by-institution comparison and not for individual building decisions.

As more institutions move toward a consistent reporting method, with assessments at the individual building level, it may be possible to use the database to better evaluate each facility (assuming that the higher education institutions have the resources to regularly update facility assessments).

Recommendations summary

- Encourage regular, approximately biennial, updates to the comparable framework.
- Encourage the use of a uniform qualitative, systems-based condition reporting method from the institutions that currently do not report in this manner. The original intent of the comparable framework was to allow the institutions to report conditions using their varying methodologies. Since then, most have moved to more uniform methodologies. Only minor changes would still be required from WSU, WWU and the CTCs to have a completely uniform systems-based qualitative methodology.

The 2016 comparable framework update reflects a step forward in establishing an equitable, responsible system for maintaining Washington state's investment in higher education facilities.

Appendix

2016 Update 2016 vs 2010 Summary Inventory and Condition Elements	2016	2010	Difference	% Difference	Significance of change 2010 Vs 2008
All Facilities, State and non State					
# of Facilities All State and Non State	2,443	2,654	(211)	-8.0%	Fewer non state Facilities reported to comparable Framework inventory
Total Area All State and Non State	67,567,218	60,908,960	6,658,258	10.9%	New area (State and Non State)
> 2000 SF, State or Mixed					
Total # of Facilities > 2000 SF, State or Mixed	1,478	1,371	107	7.8%	Additional facilities
Total Area >2000 SF, State or Mixed	51,346,046	46,365,720	4,980,326	10.7%	Additional net area
Total CRV >2000 SF, State or Mixed	$ 21,724,260,031	$ 18,438,603,828	$ 3,285,656,204	17.8%	Increased replacement value
Total BMAR >2000 SF, State or Mixed	$ 3,247,166,477	$ 2,634,617,635	$ 612,548,842	23.3%	Increased Preservation Backlog
Avg Facility Condition (Weighted by SF)	2.44	2.33	0.11	4.8%	Slightly worsened condition scores
Avg Age (Weighted By SF)	42.8	39.5	3.3	8.5%	Older overall facility age
Avg Years Since Renovation	17.9	15.4	2.5	16.2%	Longer time since major renovation
FCI Average	14.9%	14.3%	0.7%	4.6%	Less facility condition relative to replacement value
Average CRV per GSF	$ 423	$ 398	$ 25	6.4%	Increased replacement value per SF
Average BMAR per GSF	$ 63	$ 57	$ 6	11.3%	Increased preservation backlog per SF
Total GSF Condition 4 & 5	7,256,739	6,576,475	680,264	10.3%	Decreased facility area in poorest condition (offset by less in excellent condition)
Total CRV Condition 4 & 5	$ 3,110,110,192	$ 2,841,749,765	$ 268,360,427	9.4%	Decreased replacement value of facilities in worse conditions
Total BMAR Condition 4 & 5	$ 1,295,805,937	$ 1,178,343,938	$ 117,461,999	10.0%	Decreased preservation backlog for facilities

Summary 1, 2016 Update

OVERALL CONDITION OF HIGHER EDUCATION BUILDINGS

(State and Mixed Supported Buildings Over 1,999 GSF)

* *The OFM Comparable Framework uses cross-walks and translates building condition information created and maintained by each institution into a "common denominator" scoring system. Scores were field-tested to ensure accuracy and comparability across institutions.*

* *The "common denominator" scoring system uses 5 condition classes that describe the overall condition and functionality of major building systems (e.g. foundations, building structures, roofs, interior construction and finishes, HVAC systems, electrical systems, plumbing, etc.).*

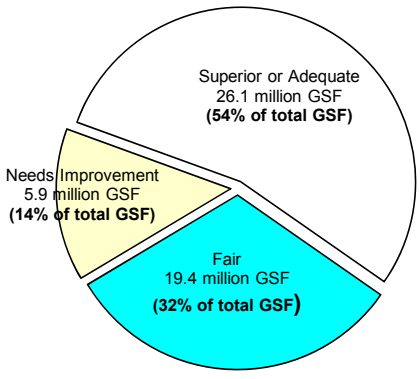
Condition Score	Condition Class	Description
1	Superior - Newer	A building with major systems that are in extremely good condition and functioning well.
2	Adequate	A building with major systems in good condition, functioning adequately, and within their expected life cycles.
3	Fair - Systems approaching end of expected life cycles	A building with some older major systems that, though still functional, are approaching the end of their expected life cycles.
4	Needs Improvement: Limited Functionality	A building with some major systems that are in poor condition, exceed expected life cycles, and require immediate attention to prevent or mitigate impacts on function.
5	Needs Improvement: Marginal Functionality	A building with some major systems that are failing and significantly restrict continued use of the building.

54% of higher education space is in superior or adequate condition, with condition scores of 1 or 2.

32% of higher education space is in fair condition (but systems approaching end of expected life cycles), with a condition score of 3.

14% of higher education space needs improvement, with condition scores of 4 or 5.

The Majority of Higher Education Space is in Superior or Adequate Condition



Summary 1 Difference

OVERALL CONDITION OF HIGHER EDUCATION BUILDINGS AS COMPARED TO 2008

(State and Mixed Supported Buildings Over 1,999 GSF)

The OFM Comparable Framework uses methods to cross-walk and translate building condition information created and maintained by each institution into a "common denominator" scoring system. Scores were field-tested to ensure accuracy and comparability across institutions.

The "common denominator" scoring system uses 5 condition classes that describe the overall condition and functionality of major building systems (e.g. foundations, building structures, roofs, interior construction and finishes, HVAC systems, electrical systems, plumbing, etc.).

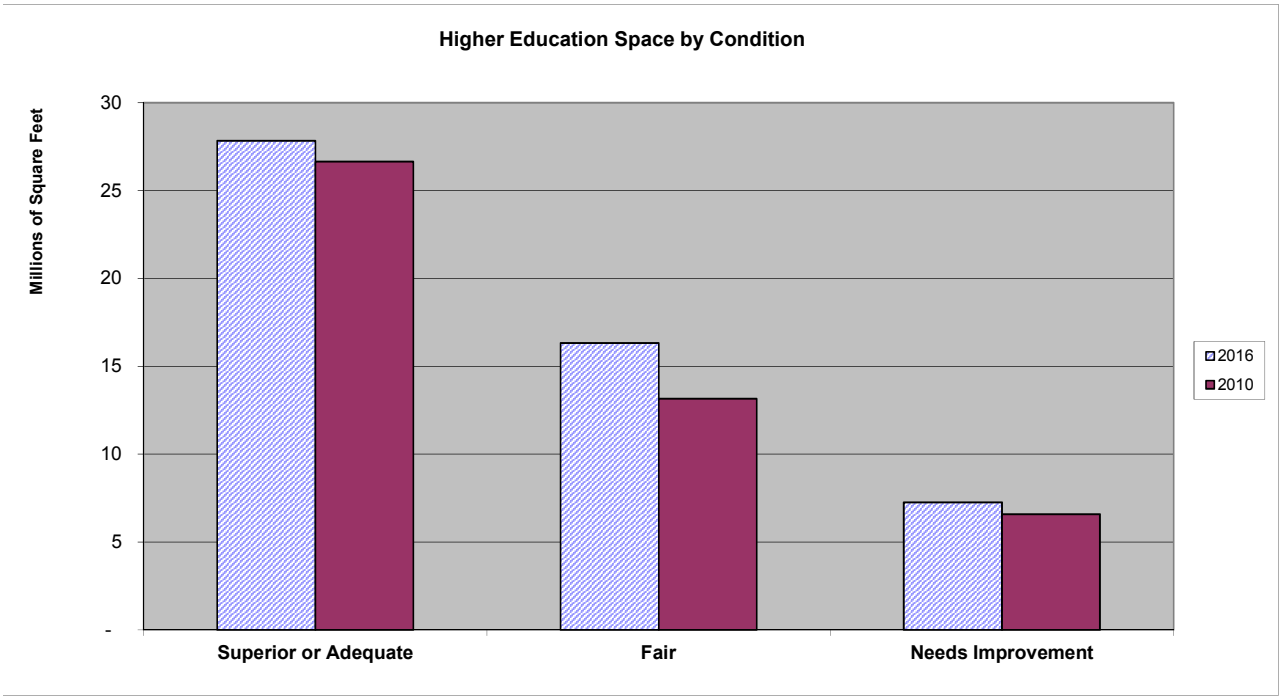
Condition Score	Condition Class	Description
1	Superior - Newer	A building with major systems that are in extremely good condition and functioning well.
2	Adequate	A building with major systems in good condition, functioning adequately, and within their expected life cycles.
3	Fair - Systems approaching end of expected life cycles	A building with some older major systems that, though still functional, are approaching the end of their expected life cycles.
4	Needs Improvement: Limited Functionality	A building with some major systems that are in poor condition, exceed expected life cycles, and require immediate attention to prevent or mitigate impacts on function.
5	Needs Improvement: Marginal Functionality	A building with some major systems that are failing and significantly restrict continued use of the building.

CHANGES TO 2016 FROM 2010

54% Vs 57% of higher education space is in superior or adequate condition, with condition scores of 1 or 2.

32% Vs. 28% of higher education space is in fair condition, with a condition score of 3.

14% Vs. 14% of higher education space needs improvement, with condition scores of 4 or 5.



Summary 2, 2016 Update

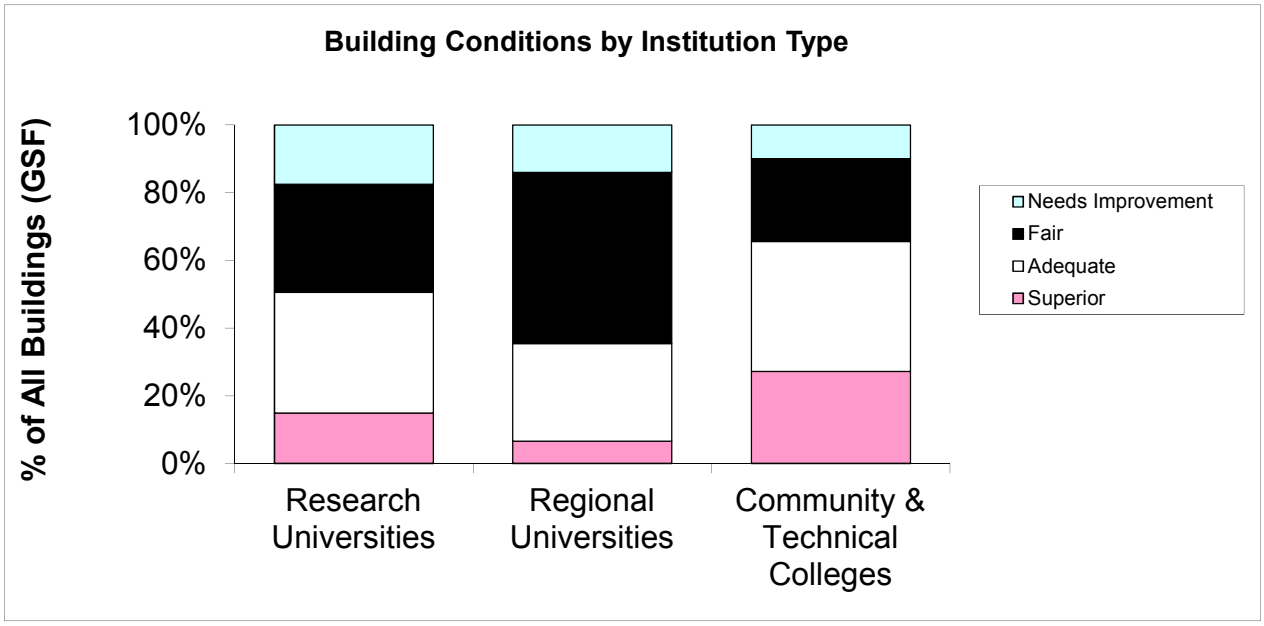
CONDITION OF BUILDINGS BY INSTITUTION

(State and Mixed Supported Buildings Over 1,999 GSF)

* ***The UW has the greatest amount of space needing immediate improvement (3.5million GSF), followed by the Community & Technical Colleges (2 million GSF), and WSU (1.7 million GSF).***

* ***Overall, the 4 Regional Universities have the smallest proportion of space in superior and adequate condition.***

* ***The average condition score of all higher education buildings, weighted by GSF, is 2.4***



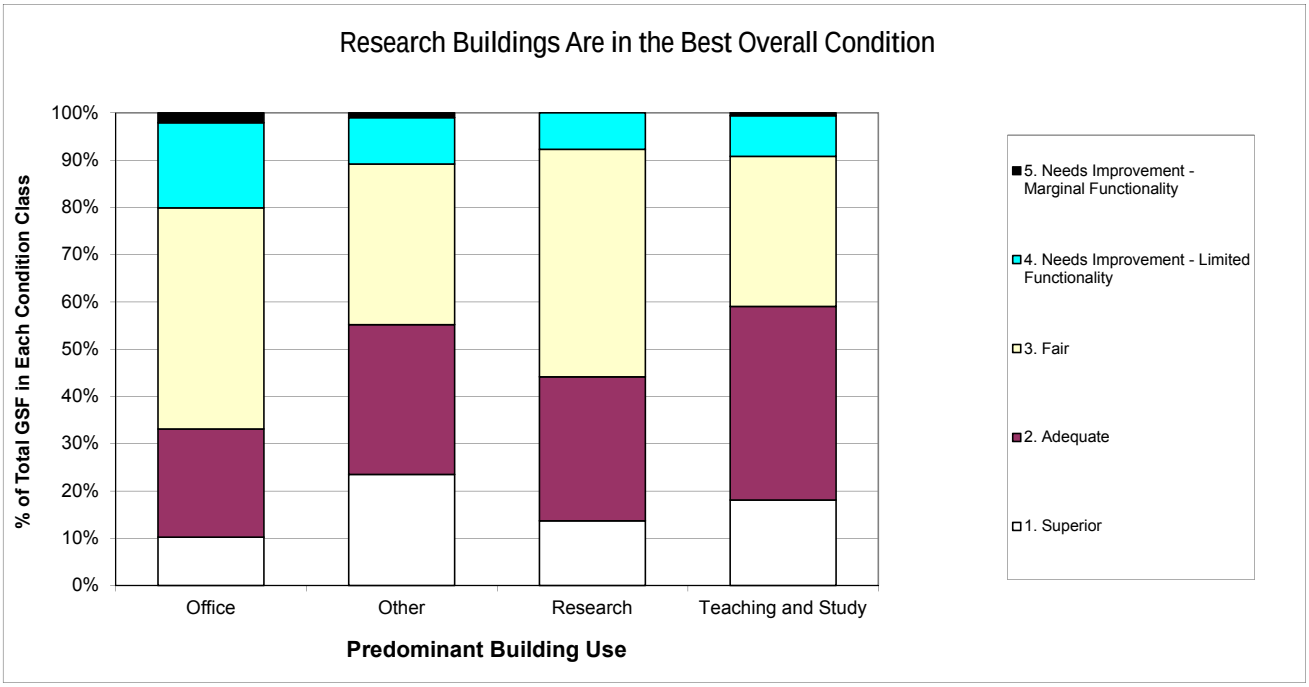
INSTITUTION	Average Condition Score - Weighted by	AMOUNT OF SPACE IN EACH CONDITION CLASS										
		1. SUPERIOR - NEWER		2. ADEQUATE		3. FAIR		4. NEEDS		5. NEEDS		TOTAL
		GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF
UW	2.66	1,062,719	8%	5,291,470	38%	4,926,314	36%	2,336,079	17%	184,618	1%	13,801,200
WSU	2.36	2,539,386	24%	3,328,087	32%	2,782,166	27%	1,713,718	17%	8,124	0%	10,371,481
EWU	2.92	4,802	0%	617,671	30%	964,881	47%	447,081	22%	7,163	0%	2,041,598
CWU	2.79	169,484	9%	355,217	19%	1,070,551	57%	296,911	16%	-	0%	1,892,163
TESC	2.57	26,271	2%	565,421	42%	699,746	53%	40,137	3%	-	0%	1,331,575
WWU	2.18	287,482	13%	619,334	28%	1,039,149	47%	191,621	9%	62,274	3%	2,199,860
CCTCs	2.44	5,379,032	27%	7,577,796	38%	4,840,696	24%	1,761,539	9%	207,474	1%	19,766,537
TOTAL	2.44	9,469,176	18%	18,354,996	36%	16,323,503	32%	6,787,086	13%	469,653	1%	51,404,414

Summary 3, 2016 Update

CONDITION OF PUBLIC HIGHER EDUCATION BUILDINGS BY BUILDING USE

(State and Mixed Supported Buildings Over 1,999 GSF)

* ***59% of teaching and study buildings are in superior or adequate condition.***
* ***44% of research buildings are in superior or adequate condition.***
* ***Of all space in condition classes 4 & 5, 30% is in teaching and study buildings, and 33% in office buildings.***



PREDOMINANT BUILDING USE	Average Condition Score (Not weighted for GSF)	AMOUNT OF SPACE IN EACH CONDITION CLASS										
		1. SUPERIOR - NEWER		2. ADEQUATE		3. FAIR		4. NEEDS IMPROVEMENT - LIMITED FUNCTIONALITY		5. NEEDS IMPROVEMENT - MARGINAL FUNCTIONALITY		TOTAL
		GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF	% of Total (GSF)	GSF
Office	2.86	994,751	10.3%	2,215,074	22.8%	4,539,389	46.8%	1,745,416	18.0%	200,947	2.1%	9,695,577
Other	2.66	3,432,100	23.5%	4,622,756	31.7%	4,958,309	34.0%	1,428,656	9.8%	149,264	1.0%	14,591,085
Research	2.71	1,078,254	13.7%	2,391,804	30.5%	3,779,438	48.1%	605,179	7.7%	-	0.0%	7,854,675
Teaching and Study	2.44	3,470,819	18.1%	7,868,911	41.0%	6,102,088	31.8%	1,651,573	8.6%	111,318	0.6%	19,204,709
TOTAL	2.67	8,975,924	17.5%	17,098,545	33.3%	19,379,224	37.7%	5,430,824	10.6%	461,529	0.9%	51,346,046

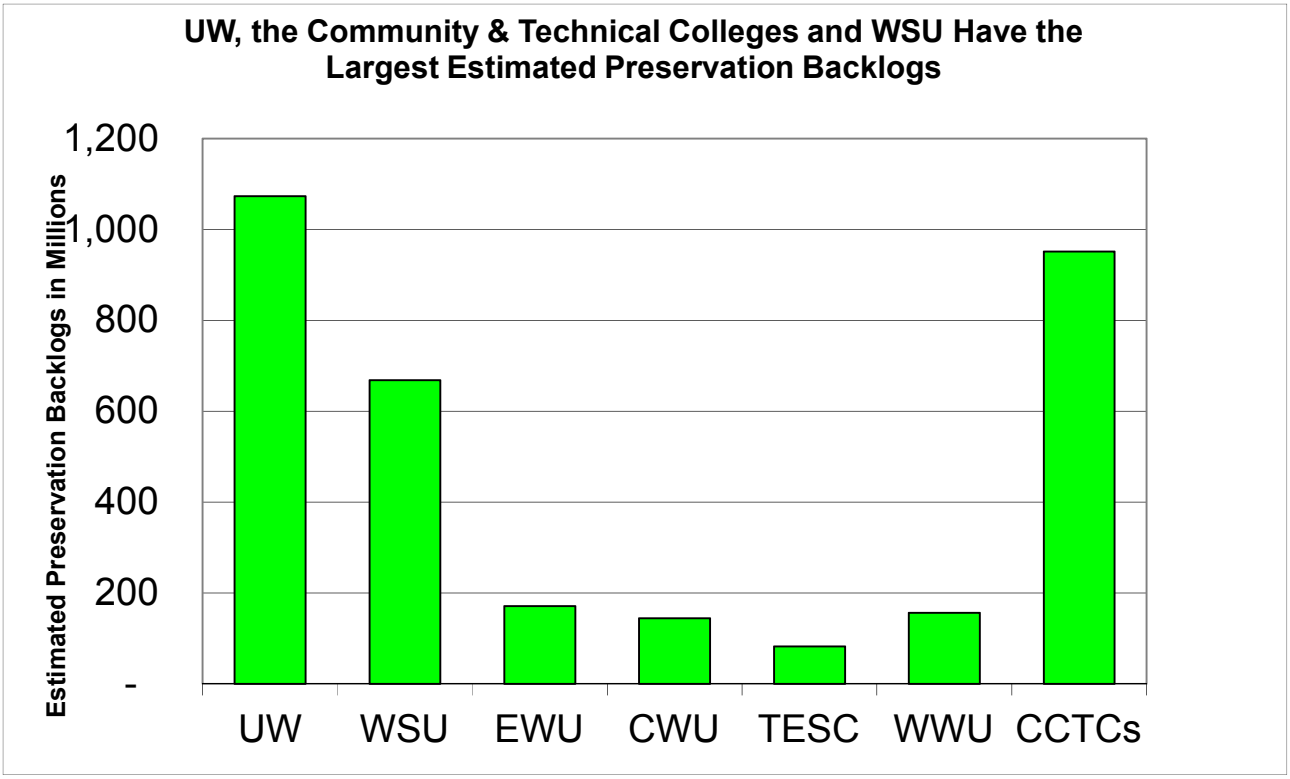
Summary 4, 2016 Update

PRESERVATION BACKLOGS IN PUBLIC HIGHER EDUCATION BUILDINGS

(State and Mixed Supported Buildings Over 1,999 GSF)

Estimated preservation backlogs for all buildings in all condition classes at all institutions total $3.2 billion.

The UW has the largest estimated preservation backlog ($1.1 billion), followed by the Community & Technical colleges ($950 million) and WSU ($627 million).



INSTITUTION	ESTIMATED PRESERVATION BACKLOG *
UW	$1,073,559,921
WSU	$668,270,054
EWU	$170,730,157
CWU	$144,182,542
TESC	$82,405,835
WWU	$156,352,783
CCTCs	$951,665,185
TOTAL	**$3,247,166,477**

Summary 5, 2010 Update

FACILITY CONDITION INDEX (FCI)

(State and Mixed Supported Buildings Over 1,999 GSF)

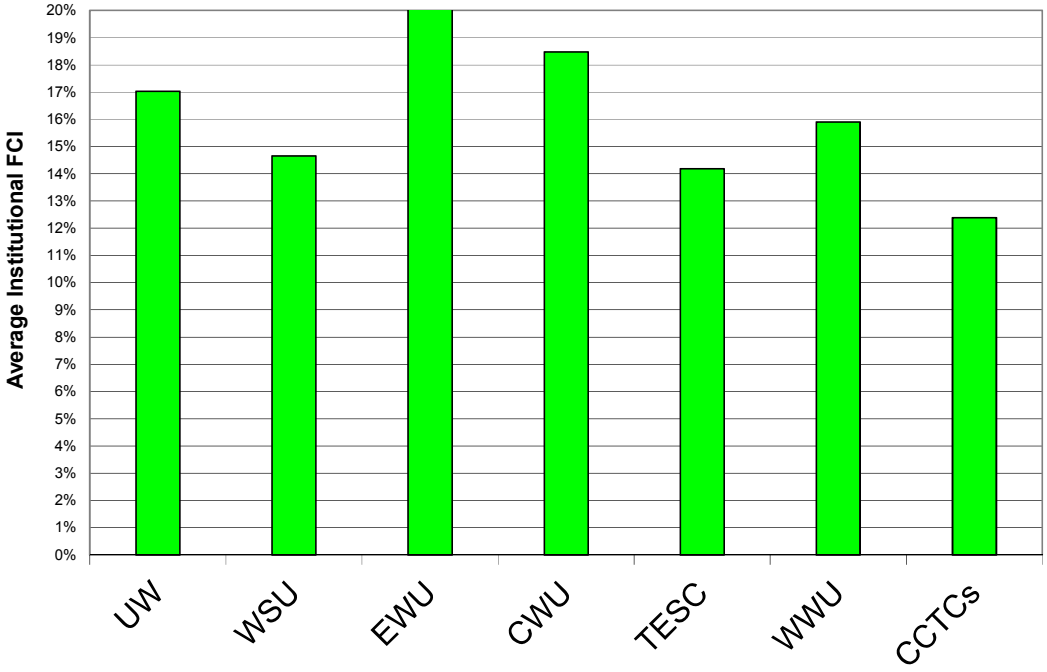
The Facility Condition Index (FCI) is a performance measure that accounts for differences in the type and quality of higher education buildings. The FCI can be monitored over time to track average building conditions at the institution level.

The FCI is calculated as the ratio of preservation backlogs over current replacement value, expressed as a percentage.

Lower FCI = Better Overall Condition ***Higher FCI = Worse Overall Condition***

Over time, effective preservation should result in decreasing FCI's.

EWU,CWU, and UW Currently Have the Highest FCI's.



INSTITUTION	ESTIMATED PRESERVATION BACKLOG *	CURRENT REPLACEMENT VALUE	FACILITY CONDITION INDEX
UW	$ 1,073,559,921	$ 6,304,565,397	17.0%
WSU	$ 668,270,054	$ 4,558,154,830	14.7%
EWU	$ 170,730,157	$ 836,445,325	20.4%
CWU	$ 144,182,542	$ 780,559,068	18.5%
TESC	$ 82,405,835	$ 580,762,328	14.2%
WWU	$ 156,352,783	$ 983,430,618	15.9%
CCTCs	$ 951,665,185	$ 7,680,342,465	12.4%
TOTAL	**$ 3,247,166,477**	**$ 21,724,260,031**	**14.9%**

Summary 5 Difference

FACILITY CONDITION INDEX (FCI)

(State and Mixed Supported Buildings Over 1,999 GSF)

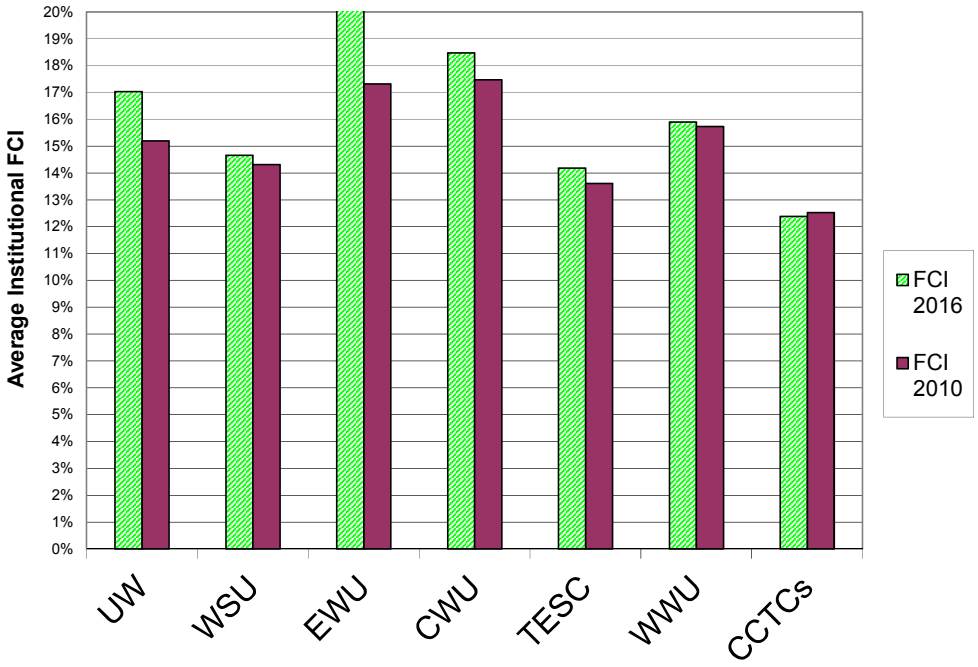
* ***The Facility Condition Index (FCI) is a performance measure that accounts for differences in the type and quality of higher education buildings. The FCI can be monitored over time to track average building conditions at the institution level.***

* ***The FCI is calculated as the ratio of preservation backlogs over current replacement value, expressed as a percentage.***

> ***Lower FCI = Better Overall Condition*** ***Higher FCI = Worse Overall Condition***

* ***Over time, effective preservation should result in decreasing FCI's.***

FCI 2016 Vs 2010



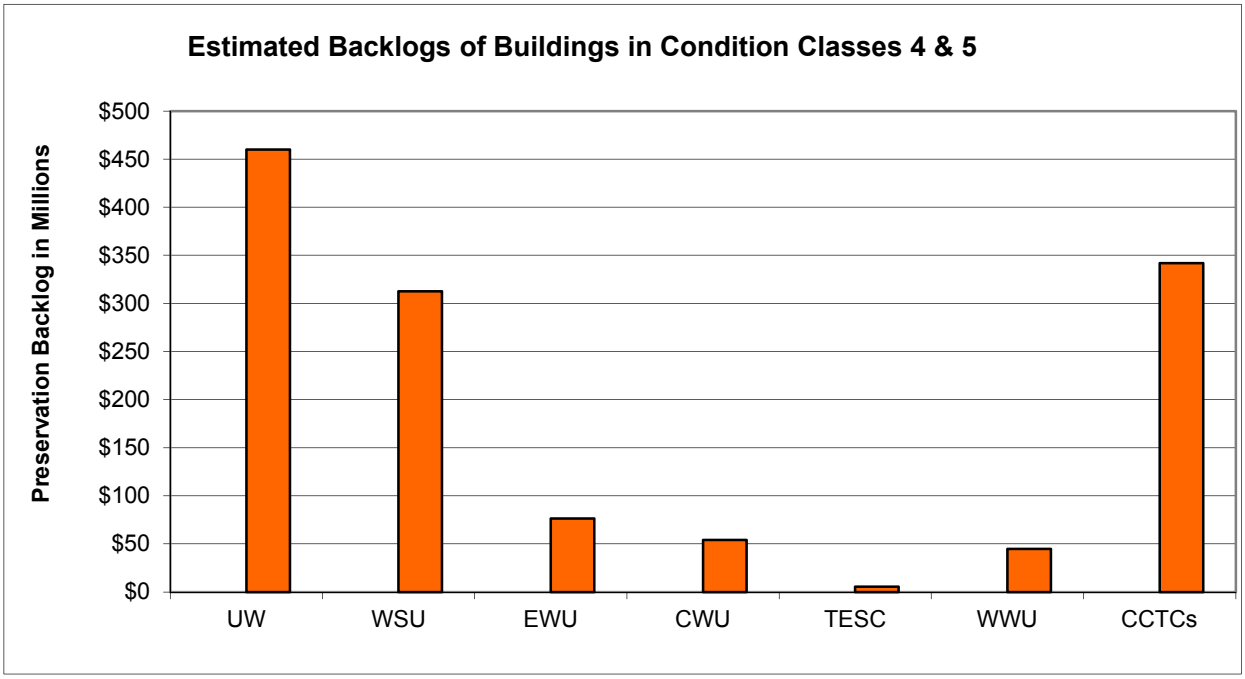
INSTITUTION	FACILITY CONDITION INDEX 2010	FACILITY CONDITION INDEX 2016
UW	15%	17%
WSU	14%	15%
EWU	17%	20%
CWU	17%	18%
TESC	14%	14%
WWU	16%	16%
CCTCs	13%	12%
TOTAL	14%	15%

Summary 6, 2016 Update

PRESERVATION BACKLOGS IN BUILDINGS NEEDING IMMEDIATE IMPROVEMENT

(State and Mixed Supported Buildings Over 1,999 GSF)

* ***The buildings in the worst condition often draw the most attention during the budgeting process.***
* ***About 14% of buildings GSF fall in Condition Classes 4 and 5, potentially impacting the functionality of the buildings.***
* ***Estimated preservation backlogs for these buildings total $1.3 billion out of the $ 3.2 billion total backlog.***



INSTITUTION	Estimated Preservation Backlog of Buildings in Condition Classes 4 & 5	
UW	$	459,858,720
WSU	$	312,661,405
EWU	$	76,537,903
CWU	$	54,220,977
TESC	$	5,593,332
WWU	$	44,955,549
CCTCs	$	341,978,052
TOTAL	$	1,295,805,937

Comparable framework methodology

The 2016 comparable framework update used the same methodology developed in the original (2003) JLARC study. The process first converts the institutions' varying assessments into a common qualitative rating, then uses that rating as a basis to parametrically estimate backlog of maintenance and repair project costs.

With a comparable qualitative score for every facility statewide, it is possible to project a total preservation project backlog (BMAR) for each facility using a parametric cost projection. This method is based on the recognized definition of FCI=BMAR/CRV. Since each of the qualitative scores (1−5) align with an FCI range, an FCI can be theoretically calculated for each facility. By multiplying that FCI times the facility CRV, a BMAR amount can then be projected for each facility. This Deferred Maintenance Parametric Estimating Model is a recognized method originally tested and defined by NASA. To reflect conditions in Washington, it was necessary to examine and adjust the parametric weighting factors based on Washington state data. This was completed in the original JLARC study, and the basic numbers have been adjusted for inflation in each of the subsequent updates.

The following are the translation steps used for the comparable framework:

1. Existing facility condition assessment data at each institution is translated into a standardized condition assessment index (referred to as Condition Index JLARC in the database and reports).
   - This index allows the condition of all buildings to be scored on a scale ranging from 1 to 5 (with 1 representing superior condition and 5 representing the poorest condition (referred to as Facility Condition Score JLARC in the database and reports).
2. Then a replacement index or factor is calculated, based on standardized typical building system proportions (i.e., how much of a building's cost is composed of its mechanical, electrical and structural systems) and the likely extent of system repair or replacement needed given the building's condition score.
3. This replacement factor for each building is then applied to a construction unit cost for higher education buildings (CRV unit cost) based on use type and construction type, producing a projected estimate of maintenance and repair backlog costs (BMAR). The CRV costs are based on typical replacement costs for typical types of building-use types (e.g., research, athletic, office, etc.). Those are also adjusted for types of construction (heavy, medium, light and temporary), size categories, geographic location and quality of finishes standards. Please see glossary of terms for further explanation of these factors.

Glossary of terms

The following are definitions most important to the comparable framework.

State-owned facility. Facilities owned outright by the state or leased with a certificate of participation in place from the institution.

Source of major capital funding. Classified as state, nonstate or mixed. The source of funding the institution uses for the facility's major capital projects. This is determined by each institution. State funding source means any appropriated funds or funding source in the state treasury.

Facility use type (function classification). JLARC originally assigned a function classification to each facility based on the predominant use of the facility, selected from a JLARC list of predefined functions. These classifications are still used in the updates. Facilities with more than one dominant use are classified based on the facility's major replacement cost drivers. For example, a facility with large amounts of both research lab space and office space would be classified in the "research" category, because the facility's major systems would generally be designed to support the research function. Classifications were determined from data in the HECB's Inventory and Utilization System, maintained by institutions and consultant fieldwork/verification.

Facility construction type classification. Construction type is the predominant facility structural system defining the construction cost. Categories are:

- Heavy – cast in place concrete
- Medium – masonry, protected steel frame, tilt up, heavy timber
- Light – wood or light steel stick frame or prefabricated steel
- Temporary – portable, modular or minimally constructed structures not intended for long-term use.

Infrastructure. Infrastructure includes campus site improvements outside of the building footprint. Infrastructure categories include site amenities, utilities, and roads and paving. These systems and their conditions are not reported in the comparable framework.

Current replacement value. The estimated cost to reconstruct, at current prices, an existing facility with utility equivalent to the existing facility, using modern materials in compliance with current codes and regulations. The CRV for each facility is based on the facility function classification and adjusted for the facility construction type, geographic location, size and level of finishes. CRV is not included for infrastructure.

Backlog of maintenance and repair. BMAR is defined as a comprehensive listing of projects needed to safely maintain facilities and related infrastructure for the current use that should have been accomplished, but for a variety of reasons has not. For this study, BMAR includes cyclical renewal items that will have exceeded their life cycle at the start of the next biennium. It includes minor seismic, Americans with Disabilities Act and fire protection items necessary to maintain current operations, but it does not include major work in those areas that would normally be accomplished in major building renovation for full code compliance.

Renewal. The replacement or renewal of a short-lived component or system at the end of serviceable life. The renewal cost includes the deconstruction of the existing system and replacement with a new system of equal capability and performance.

FCI. An index used to define relative facility condition. FCI = BMAR/CRV. To produce the standard accepted relationship, both the BMAR and the CRV factors must contain similar markups. In other words, the BMAR can be shown as either maximum allowable construction cost (MACC) or as total project cost as long as the CRV values have similar markups. MACC refers to the maximum allowable construction cost or the cost of construction paid to the contractors. The total project costs include "soft" costs such as design and engineering, supervision and management, taxes and permits. The comparable framework uses a 45 percent project cost markup included in the base CRVs.

JLARC translated relative condition score. The relative condition score (RCS) is a facility condition score derived by translating the institution's various evaluation methods into a comparable 1 through 5 (superior through marginally functional) rating.

JLARC (now OFM) field survey RCS. The facility relative condition score is derived by the comparable framework survey team during its visual inspection of a facility. The rating system evaluates each of the major building systems (as categorized by UniFormat II) and assigns a condition rating to each component. A total facility condition score is derived using the comparable 1–5 scale defined in the JLARC-translated RCS.

UniFormat II. An internationally recognized method of classifying facility systems. The method breaks down the facilities components into six level I (general) classifications such as shell, interiors and services; into 14 level II classifications such as roofing and exterior walls; and approximately 40 level III classifications such as roof openings, roof coverings and roof projections.

Consolidated Building Audit for:

By: Campus Engineering

Anderson Hall

General:

This audit reflects the status of existing building systems, components and infrastructure for **Anderson Hall** and includes known maintenance and/or operational issues related to those systems, along with a rating of their general condition. Also included are preliminary recommendations for addressing the issues noted.

This audit is the result of a "brief" site investigation and document search of University records. Please note that our audit does not replace the need for a detailed investigation and evaluation of the building and its components. Existing conditions and known problems are pointed out here for awareness and so that they are addressed early in future planning and scoping activity.

Description:

Anderson Hall was designed by Bebb & Gould Architects and was constructed in 1925-26 for the Forestry Department. It was funded by a gift from Agnes H. Anderson in memory of her husband Alfred H. Anderson. This building is a four-story concrete structure with brick and cast stone cladding. The building has 33,543 gross square feet. The interior was remodeled in 1968 by Grant Copeland Chervenak Architects.

Table of Contents:

Site:

General:

The site is heavily landscaped with mature plantings on all sides. Some of the trees are very close to the building and inhibit adequate drying of the masonry walls. The front entrance was recently re-planted and is in good condition. There is a courtyard that is shared with Bloedel and Winkenwerder Halls to the south. The courtyard surface is cast-in-place concrete pavers in good condition. These paver segments were once separated by wood strips which have long ago rotted away. These strips were replaced with concrete fill as rotten members were removed. There are several wood benches in good condition. The area is accessible via a ramp at the west parking area.

Hardscape: *Parking, Streets, Walks, Curbs.*

Background/ Problem:

The asphalt concrete sidewalk along the south side of Stevens Way at the entrance to Anderson has subsided behind the back of curb. The grades are also very flat in this area. The resulting "bird bath" covers more than half the sidewalk width at most rain events.

Recommendations:

Replace/grade asphalt sidewalk along the frontage with Stevens Way to restore positive drainage across sidewalk.

Background/ Problem:

The concrete paving in the court yard at the south of the building is beginning to settle in an uneven manner, and wooden dividers are being replaced with concrete fill. The result is some tripping hazard and an aesthetic that is beginning to look bad.

Recommendations:

Consider replacing the entire plaza paving at time of major building renewal.

Accessibility:

Background/ Problem:

All building entrances are inaccessible to persons in wheelchairs because of steps.

Recommendations:

Study alternatives and implement an ADA accessible route for this building. This may also require additional ADA parking stalls to be constructed in the C10 parking lot.

Landscape: *Planting, Edging.*

Background/ Problem:

Landscaping close to the building is mature, and in some cases are too close to the building. This prevents masonry walls from drying out efficiently.

Recommendations:

Remove or trim existing planting to a distance of at least 2-feet from the building.

Civil:

General:

Tunnel

This building is located on the lower campus (LC) tunnel system. Access to the tunnel is by way of a door in the basement mechanical room on the south side of the building. The 7-foot high 6-foot wide tunnel passage runs south from Anderson across the courtyard to Bloedel and then east to LC-8-1 which is near Winkenwerder. From LC-8-1 the tunnel extents northward to LC-8 which is the main lower campus branch. Most of this main LC tunnel was built in 1947 with the extension to Anderson /Bloedel/Winkenwerder built around 1970 with the construction of Bloedel Hall. (See Structural sections for more information on tunnels under the building footprint)

Utilities

Background:

Most of the utilities serving Anderson Hall were updated with the construction of Bloedel Hall in 1970 and Winkenwerder Hall in 1963.

Storm Drain:

The existing roof leaders are on the outside walls of the building and connect directly to a 6-inch storm pipe which circles the building and directs this storm water to the south and then to an 8-inch conveyance. At a location south of the forestry buildings the storm pipe connects to the sanitary sewer.

Footing Drains:

The 4-inch footing drains are original construction of Anderson Hall. In 1970 a new connection was made from the existing footdrain to a new storm drain pipe. The footing drains were only constructed along the outside of the north face of the foundation and adjoing walls.

Natural Gas:

This building no longer has Natural Gas service.

Fire:

The building does not have a separate dedicated fire service.

Water:

There is an 8-inch water main on the northside of Anderson between the building and Stevens Way. A 6-inch water main loop was added during the construction of Winkenwerder and Bloedel Halls. This 6-inch main completes a loop around Anderson. The 6-inch loop was mostly completed in 1970.

Sanitary Sewer:

There is an existing 6-inch sewer service which exits the building on the south side. The service passes directly under Bloedel Hall to the south were it changes to 8-inch. This sewer service was constructed with Bloedel Hall in 1970. The sewer connects directly to the Metro Sewer Trunk in NE Pacific Street.

Utilities: *Sewer/Water/Gas/Fire*

Background/ Problem:

Storm/ Footing Drains –The building has a long history of storm water related problems due to plugged downspouts and water next to the foundation.

Recommendations:

Replace old downspouts and provide cleanouts at all changes in pipe direction. Complete the perimeter footing drain system and replace the old tile pipe with slotted plastic pipe. Add cleanouts to the footing drain system. Video inspect the 6 and 8-inch pipe out to the first manhole in the courtyard. Clean pipe or replace if damaged and broken. Construct 250 feet of pipe and one storm manhole to separate this storm system from the combined sewer near the triangle garage / pedestrian bridge. Regrade around building to provide positive drainage away from the foundation.

Background/ Problem:

Sanitary Sewer – Directing sewage flow from Anderson Hall to the sewer conveyance under Bloedel Hall is not a desirable design. This facility should have its own sewer service not within Bloedel.

Recommendations:

Construct one sanitary sewer manhole and approximately 340 feet of 6-inch sewer pipe to reroute the side sewer around Bloedel Hall connecting to a manhole just down steam. A stub was provided at this manhole just for this purpose.

Background/ Problem:

Water - The water service is old and is easy to replace back to the 6-inch main.

Recommendations:

Replace building water service back to the 6-inch main. Add water meter.

Background/ Problem:

Fire - There is no separate fire service to this building.

Recommendations:

Provide a separate fire service. A pressure test will need to be performed on the surrounding water mains to assure there is enough fire flow available per current code and based on the age of the surrounding pipes. This test may discover that the fire service will need to connect to the 8-inch main in Stevens Way and not the close 6-inch main looping the building. Discuss with UW Department of Environmental Health and Safety.

Architectural:

General:

This building is a three-story over crawl space, concrete structure with brick and cast stone cladding. Windows are single glazed and leaded, framed in steel sash, all set in cast stone surrounds. There is a steep-sloped roof with slate shingles, and a narrow flat area that was once a skylight now covered with a built-up roof. Roof ridges are still trimmed with ornamental copper cresting.

Foundation Drainage & Vertical Waterproofing:

Background/ Problem:

In the tunnels\trenches below the Ground Floor there is an ongoing issue with water infiltration and mold\mildew. A fan was added on the east side of the building to ventilate the areas and reduce the moisture. Some remedial cleaning was done however the entire area was not addressed.

Recommendations:

Determine the source of water infiltration and mitigate. Clean and seal the tunnel\trench system.

Exterior Walls & Windows:

Background/ Problem:

Exterior walls are of multi-wythe masonry consisting of a brick veneer with grey to pink cast stone window surrounds, tracery and decorative elements all built around a concrete frame. There is a history of water leaks from the roof gutter at the upper story east wall. This leak has resulted in damage to interior walls and finishes. This problem was partially corrected in the winter of 1999-00 by University masons and roofers.

Recommendations:

Monitor the location of this historic leak and make additional repairs until the building renewal program is begun. At that time, determine the exact source of the leak and make permanent repairs.

Background/ Problem:

During the repairs of 1990, the masons also performed a masonry renewal consisting of cleaning, tuck pointing and sealing of the entire building façade. During that renewal, temporary repairs were made to rusty ledger angles and to cast stone elements where damage was severe.

Recommendations:

Continue scheduled maintenance. The 99-00 masonry renewal did not attempt to restore the all elements of the façade and additional restoration can be expected. Perform detailed survey to determine extent of deterioration of the façade elements and design remedial measures.

Background/ Problem:

Windows are original, leaded single glazed, steel sash units set into cast stone tracery and surrounds. Operating sash are casement type with brass latches and restraining arms. These windows are generally in good condition, but are not weather tight or insulated.

Recommendations:

Continue scheduled maintenance and replace windows at time of building renewal.

Background/ Problem:

The main north entry doors are the original clear finish double solid core wood with leaded glass inserts. The arched transom is clear finished wood with ornate leaded glass and bronze or brass medallions. Door hardware is bronze or brass pulls and hinges. All components are original and are worn but in overall fair condition.

Recommendations:

Continue scheduled maintenance. Refurbish front entry doors as required or when renovated. Refurbish auxiliary doors as required and replace when renovated.

Roofs and Horizontal Waterproofing:

Background/ Problem:

The main roof consists of a steep slope section covered with slate shingles, a top flat portion covered with built-up and gravel roofing, and copper gutters coated with an aluminum emulsion. The flat BUR is in fair to poor condition. The slate roof is in good condition with some atmospheric dirt. There is no fall protection system in place.

Recommendations:

Continue scheduled maintenance and replace roof systems in a major building renovation. In the meantime, the slate roof may be cleaned to improve appearance.

Interior Finishes:

Background/ Problem:

The corridor floor finish is typically terrazzo in fair condition. Some corridor sections are concrete or VCT/VAT in fair condition. The classrooms are typically VCT in fair condition. There is carpet in some offices and in the large seminar rooms and is in fair to poor condition. Restrooms have ceramic tile in fair condition.

Recommendations:

Continue scheduled maintenance and replace floor finishes in a major or partial building renovation.

Background/ Problem:

Original walls and partitions are masonry, likely clay tile, with plaster and paint finish. Walls added during alterations in 1968 are painted GWB. These walls and partitions are in good condition. Restrooms have tile wainscots in fair condition.

Recommendations:

Continue scheduled maintenance and replace when renovated.

Background/ Problem:

Ceilings are a combination of painted concrete, glued on ACT and suspended ACP. All are in generally good to fair condition. The large seminar rooms have vaulted ornate carved wood ceilings in good condition.

Recommendations:

Continue scheduled maintenance and replace most ceilings in a major renovation. The vaulted ornate carved wood ceilings may be historically significant. They are recommended to be retained and refinished.

Background/ Problem:

Doors are solid core wood with a transparent finish. Most doors have knob type hardware and some have lever hardware. All doors and hardware are in generally good condition.

Recommendations:

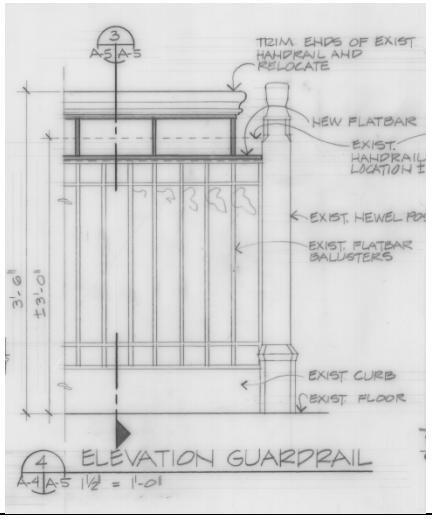
Continue schedule maintenance. Consider retaining and refinishing doors in a major renovation and provide ADA compliant hardware.

Background/ Problem:

Interior stairs have decorative terrazzo treads and concrete risers. Stair mounted handrails are clear finished wood with cast iron decorative newel posts and balustrades. Stair railings were extended in 1988 to bring them up to guard rail height of 42-inches. Wall mounted handrails are clear finished wood and is ADA compliant.

Recommendations:

Continue scheduled maintenance. Consider retaining and refinishing in a major renovation.



Elevators:

Background/Problems:

There is not an elevator in this building.

Recommendations:

To provide accessibility and conform to the law, current codes and UW policy provide accessibility to all programs and services. Provide either an elevator, wheelchair lift(s) or administrative program management to meet accessibility requirements.

Accessibility:

Background/ Problem:

This building is not accessible to people in wheelchairs. All entrances have stairs. There is no elevator. Toilet rooms are not accessible.

Recommendations:

Provide accessibility to the building, essential facilities and programs when renovated.

Structural:

General:

Anderson Hall is an "I" shape building approximately 38'x70' at east and west wings and 52'x80' at the middle section. Anderson Hall is a 4-story building.

There is 470' of tunnel and 130' of trenches below the building. In 1968, a new 6' wide by 7' high tunnel was added to the south of Anderson.

Along the ridge of Anderson in the east-west direction, there are ten 4'-8" x 14'-4" sky light openings and two other openings at 2'x8' and two others at 2'x2'-6". The roof is pitched at 8.5" horizontal and 12" vertical, the slab is 4" to 5" thick reinforced concrete. The middle portion of the roof is supported on reinforced concrete frames at 15'-8" oc. The east and west wings are supported on steel frames at 10'-11" oc and steel joists at 4'-6" oc.

Typical floors on first, second and third story are reinforced concrete pan joists and beams on square columns. There are two interior stair wells which are constructed of 6" reinforced concrete walls on three sides of the stairs. A concrete slab was poured at the attic in 1969.

The exterior walls are un-reinforced brick and cast stone. The original interior walls are 4" hollow clay tile. The 1969 installation of interior walls was metal stud with gypsum wall board.

The skylights were boarded up sometime after 1969. There is no record of the exact date.

Codes:

Background/Problems:

The building was designed and constructed prior to the adoption of modern seismic codes.

Recommendations:

Evaluate seismic load-resisting ability of the existing lateral system base on ASCE 31-03 to determine if it meets a "Life Safety" performance level (as defined by ASCE 31).

Structure:

Background/ Problem:

In the 1925 construction, there were ten 4'-8"x14'-4" sky light plus four smaller openings on the roof which weaken the roof diaphragm considerably.

Recommendations:

Currently, the openings are covered with wood deck, it is recommended to install cross bracing or cast concrete slab at the openings.

Background/ Problem:

There is no record of reinforcing steel in the masonry wall.

Recommendations:

Conduct in-place shear tests and out-of-plane load evaluation of masonry wall. All deteriorated mortar joints should be pointed.

Background/ Problem:

The concrete slab at attic is under-reinforced; shrinkage crack is noticed in both directions at less than 5'-0" apart.

Recommendations:

Epoxy grout all cracks in excess of 1/16" wide...

Background/ Problem:

The tunnel walls are 6" thick, the top and bottom slabs are 4" thick and they are lightly reinforced. The column foundations are higher than the bottom of tunnels which impose surcharge load on the walls. This area is in the asbestos exposure area which is out of limits for my walk-through evaluation. (See Civil section for more discussion of tunnels)

Recommendations:

The tunnel walls and slabs need inspection and evaluation.

Background/ Problem:

The form-work for reinforced roof beams was poorly done. The bars were placed too low in certain areas which left some rebar exposed.

Recommendations:

The rebar needs minimum concrete coverage for fire protection and bonding.

Background/ Problem:

Due to inaccessibility and lack of detail drawings, it is unclear how steel beams are connected to reinforced concrete beams or walls.

Recommendations:

Steel to concrete connection needs to be inspected and evaluated as required.

General: Mechanical:

General:

Besides regular maintenance, which has been keeping the mechanical equipment in good operating conditions, there has been no major modification to the system since the facility was built. Some failed equipment and others that exceeded their expected service life were replaced.

Utilities:

Background/ Problem:

Anderson Hall is served by the central utilities: 6" low pressure steam (12 psi), 1-1/4" pumped condensate return and 1" compressed air (120 psi). The compressed air piping is galvanized. These utilities are run in the tunnel from the Lower Campus Manhole LC 8-1 and enter Anderson Hall in the basement on the south side.

The steam, condensate, and compressed air piping is beyond its life service.

Recommendations:

Provide a meter connected to building DDC control system for the condensate system. Abate insulation and replace steam, condensate and compressed air piping.

Plumbing:

Background/ Problem:

The 2-1/2" domestic water system is galvanized. A steam to water converter provides domestic hot water for the building. The sanitary sewer pipe is 6" and storm drain main pipe is 6".

The water main has no strainer, backflow preventer, or meter. The plumbing fixtures are old and flush valves are not low flow. Sanitary sewer and storm drain pipes have exceeded their expected service life.

Recommendations:

Replace sanitary sewer and storm drain piping. Abate insulation and provide new water piping with strainer, backflow prevention, steam to water converter and a water meter connected to DDC control system. Replace existing fixtures with low flow toilets and urinals.

Provide separate sub-meter for irrigation and HVAC system makeup.

Ventilation:

Background/ Problem:

A 13,900 cubic feet per minute (cfm) central supply fan with heating coil and a 11,540 cfm return fan serve the Auditorium and interior spaces. All perimeter spaces have operable windows for natural ventilation. An exhaust fan serves the toilet rooms.

Recommendations:

Although being kept in good operating condition, the ventilating system, including ductwork and accessories, has reached its service life and should be replaced along with other mechanical components in the building.

Heating:

Background/ Problem:

A shell and tube steam-to-hot water heat exchangers located in the basement mechanical room provides heating hot water for finned tube baseboard radiant heaters throughout the building perimeter. The tube of heat exchanger was replaced within 4 years prior to this report.

The heating system with its hot water recirculation pumps has exceeded its expected service life.

Recommendations:

Replace the heating system with a more efficient system.

Cooling:

Background/ Problem:

No air condition is provided for the building.

Recommendations:

Not Applicable.

Controls:

Background/ Problem:

The control system has been problematic with many older Johnson Controls T9000 series controllers. There are approximately 6 JCI T9010 controllers per floor. Reverse acting thermostats send a signal to the T9010 which then opens or closes reheat valves. Controllers were recently replaced in the basement mechanical room for the heat exchanger and zone hot water.

Recommendations:

The control lines should be replaced. Older zone controllers should be replaced. All control valves should be replaced. Upgrade to a Direct Digital Control system.

Electrical:

General:

The major components of the Electrical system were manufactured by General Electric and appear to be in relatively good physical condition considering their age. The Main Distribution panels and the branch circuit panels have spares and/or spaces. The electrical system is marginally satisfactory for the current building function and should need no major work until the next major building renovation.

Building occupants have issues with comfort during the winter and in several areas the added load of foot warmers and heaters have caused circuit breakers to trip.

The only recent significant addition to the building electrical system is the connection to the central campus Emergency Standby Power System (ESPS) with an Automatic Transfer Switch (ATS) providing for more reliable "Life Safety" emergency power. The inverter system has been removed.

Utilities:

Background/ Problem:

The normal power meter is defective and not operational.

The main emergency power meter is operational.

Recommendations:

The normal power meter should be replaced and the emergency power meter should be re-configured to meet the Smart Grid Technology goals of the University.

Service Entrance Equipment:

Background/ Problem:

The existing Service Entrance Equipment is quite old and replacement parts are not available.

Recommendations:

There are no repair recommendations at this time but the Service Entrance Equipment should be replaced in a major building renovation.

Background/ Problem:

The building is fed from 233TR1 Via Bloedel Hall at 480 Volts to MDP-1. MDP-2 is fed from a CB located in MDP-1 via an 112.5kVA transformer of Tierney manufacture. All service equipment is located in room 16 at the lower level. The maximum demand recorded was 57kVA in December of 2003.

Recommendations:

Continue scheduled maintenance but in a major building renovation, it is recommended for Anderson Hall to have its own building transformer directly connected o the 13.8kV system. The low-voltage sub-feed from Bloedel Hall shall be removed.

Emergency Power:

Background/ Problem:

The building is connected to Central Campus.

The ATS is new and will be reused in any future renovation efforts.

Recommendations:

None.

Distribution System:

Background/ Problem:

The existing electrical distribution equipment is quite old but should serve until the next renovation

The existing conduit & wiring is quite old but should serve until the next renovation.

Recommendations:

Continue scheduled maintenance and replace at the end of life cycle or when renovated. The entire electrical distribution system must be replaced during the next major renovation. All panel boards must also be replaced.

There are no repair recommendations at this time.

Lighting:

Background/ Problem:

The majority of the lighting fixtures in the building are surface mounted 2x4.

The existing switching and lighting control system does not meet current codes

Existing emergency lighting is via the old 'X' panel which is fed by the new connection to the campus EPSS.

There are decorative fixtures at the entries that may have historical significance.

Recommendations:

Continue scheduled maintenance and replace at the end of life cycle or when renovated.

All light fixtures and controls must be replaced in the next renovation to meet current performance standards and the current codes.

In a major building renovation the historical decorative fixtures in the auditorium, large meeting rooms and at the entries should be renovated and retrofit with efficient and modern sources, if they are re-used.

Systems and Communications:

Background/ Problem:

The building is equipped with a Simplex 4100 that meets EH&S standards.

The detectors and pull stations are of the old style.

Recommendations:

Continue scheduled maintenance and replace detectors and pull stations at the end of life cycle or when the building is renovated. In a major renovation, the entire fire alarm system must be upgraded to meet current codes and that it is compatible with the "Campus Safe" system that is currently being deployed on campus. The existing Simplex Fire Alarm panel, if it is less than 5 years old, may be considered for re-use.

Background/ Problem:

The Master Clock System is of the old style.

Recommendations:

Replace when the building is renovated.