Green Building Design Standards Recommendations for WWU

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Executive Summary

According to the Intergovernmental Panel on Climate Change (IPCC) a “rapid and far-reaching” sustainable transition in land, energy, buildings, transport and cities is needed

to meet global carbon reduction goals. Buildings account for almost 40 percent of global energy-related CO2, therefore Green Building construction must play a major role in a sustainable transformation. As places dedicated to learning, universities have the unique opportunity to invest time and resources into building the best buildings possible for both the people who use them and the planet. Some universities have taken it upon themselves to lead by example by holding themselves to higher standards than those mandated by the building code. WWU brands itself as an institution committed to sustainability and should view its campus as more than a collection of buildings, rather an ever-improving cohesive system. How the university chooses to act on sustainability in practice will set a precedent for its student body and the culture for other institutions to follow suit.

Western has a set of building standards that ensure some aesthetic cohesion, but this does not outline the standards that its facilities should meet when it comes to sustainability. A Green Building Design Standard (GBDS) will set specific markers for building performance both in new construction as well as renovations on campus. The need for a GBDS (Green Building Design Standard) is not totally intrinsic, in order to comply with Washington State Clean Building Performance Standard, many of WWUs buildings are going to need to be upgraded and renovated. Laying out a set of standards for all construction and renovation projects will assist with prioritizing projects and is an opportunity to ensure that as an institution, WWU holds its new construction projects to a standard worthy of an institution of learning. Our team was tasked with making recommendations for implementing such standards. To build a set of recommendations for WWU's GBDS the project team compared four of the most popular green building certifications: LEED, ILFI, PHIUS and WELL. The team also read and evaluated GBDS from several universities, and conducted interviews with staff in charge of overseeing those standards that are adhered to at all those institutions. Based on the information gathered, the team wrote a set of recommendations for WWU to approach writing their own GBDS. LEED is the industry standard for green building certification, for that reason as well as cost of certification, LEED is the certification that WWU should base its own standard on. Some of the recommendations gathered from other institution's GBDS are:

- Develop a framework for tracking embodied carbon and set a project-specific target for all new construction
- Conduct a Life Cycle Cost Analysis (LCCA) for all new construction projects using one of the calculators created by a public university
- Implementing a project-based tiered approach with LEED Gold as a baseline.
- A Fitwell, WELL, or ILFI trial run that is appropriate and relevant should be chosen and piloted for each new construction project.
- WWU's first GBDS should be robust and concise
- A GBDS liaison should meet with design teams at the beginning and throughout a project to ensure compliance and identify opportunities to build sustainably
- No new fossil fuels

Introduction

The concept of sustainable development and green building has been around since the beginning of the environmental movement in the 1970s. The Environmental Protection

Agency (EPA) defined Green Building as “The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from sitting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a sustainable or high-performance building.” (EPA)

The importance of sustainable buildings has become more prevalent in recent decades, marked by the formation of the United States Green Building Council in 1993. Another marker of need is the United Nations Sustainable Development Goals(UN SDG’s).[1] Several of the UN SDG’s relate to Green Building, most directly related goals are: #11 *Sustainable Cities and Communities* and #12 *Responsible Consumption and Production.* Goals #8 *Decent Work and Economic Growth* and #9 *Industry, Innovation, and Infrastructure* are also closely related to Green Building Design because construction industry safety and job creation have been positively affected by the Green Building industry.

Green Building Certifications (GBC) certify that a building has been built using sustainably sourced materials such as SFI or FSC certified lumber, constructed using environmentally conscious practices such as sortation of waste materials, and features resource-efficient appliances and fixtures such as low-flow toilets and sinks. There are many GBCs today, so choosing the right one for a project can be challenging. This report includes a comparison of the four most popular GBCs used in the US: LEED, PHIUS, WELL and ILFI.

LEED was developed by the United States Green Building Council in 1994 and is the most widely adopted GBC. LEED utilizes a scorecard system with four levels: Certified, Silver, Gold and Platinum. Critics of LEED point out that the credit scorecard system has too much flexibility built in which allows builders to neglect certain aspects of sustainable building, only choosing those that are easily achieved. The simplicity of LEED makes it easier to adopt. Certifications such as ILFI mandate all requirements be met first, in order to achieve certification.

Certifying a project with any of these organizations can increase construction costs significantly. Depending on the certification and project size, project costs can increase to upwards of 40% in extreme cases.

Projects can meet sustainability goals without being certified, although there is value in the recognition of certifying. While GBCs are a great way to ensure a project is meeting some sustainability goals, every project is unique and in the case of a learning institution such as WWU, a GBC may not perfectly align with institutional goals. Many institutions have developed their own set of Green Building Design Standards to lay out a pathway for building sustainably, tailored to the institution.

As a medium-sized public university undergoing budget cuts, Western’s faculty and staff may not have the time, money, or resources to be able to focus on gathering and

[1] THE 17 GOALS | Sustainable Development. (n.d.). https://sdgs.un.org/goals

compiling information from other universities or certification programs. To address this need, our project team is doing some of the foundational research for developing a GBDS.

The need for a GBDS is underpinned by the Washington State Clean Buildings Performance Standard (CBPS) which was signed into law in 2019. This law mandates that by June 1 2026 buildings over 200,000 square feet and by 2028 buildings over 50,000 square feet comply to the following requirements:

- Benchmark by measuring and tracking energy use in a building over time.
- Implement an operations and maintenance (O&M) program in accordance with the standard.
- Create an energy management plan (EMP).
- Tier 1 covered buildings must meet an energy performance metric by either:
    1. Meeting an energy use intensity target (EUIt). This metric represents a site-based energy use intensity (EUI) average for similar building types, and does not represent achieving “net-zero” or other green building certifications;
    2. Utilizing the “investment criteria” pathway. This compliance route includes performing an energy audit and implementing all cost-effective efficiency measures (EEM).

These requirements do not necessarily mandate full building retrofits, but in order to meet the EUI targets and track resource consumption many of WWU’s facilities will need to undergo some retrofits. Anyone who owns a car has likely been upsold on some preventative maintenance by a mechanic by being told it saves time and money to fix something when they already have the car jacked up and taken apart. This logic holds true for buildings as well. It is often more efficient to make many upgrades at once then doing the bare minimum. For this reason, many institution’s GBDS include several tiers ranging from new construction, retrofits and at the lowest level non-energy projects. By setting standards for each level of a project, institutions can ensure a cohesive value of sustainability.

The purpose of this report is to do some of the foundational research necessary for developing a GBDS for WWU. The goal of the report is to form a set of recommendations based on examples from other institutions and interviews with sustainability directors from other schools. Additionally the report includes an evaluation of four of the most popular Green Building Certifications (GBC) used in the United States.

Methodology

WWU’s proposed Green Building Design Standard aims to set specific markers for building performance both in new construction as well as renovations.

Recommendations for process and implementation of this goal were developed using informational interviews and benchmarking data collection of exemplary institutions and Green Building Certifications (GBC's). These methods were chosen given the time and resources allotted for the scope of this project.

Interviews

In total, six informational interviews were conducted, four of which were with exemplary institutions leading the way in GBDS, the other two being with key informants within WWU. All interviews were conducted via Teams or Zoom virtual meeting platforms.

All of the institutions were chosen by of campus size, student population size, values, and similar legislation around sustainable building standards. The institutions chosen for interviews were University of Washington (UW), University of Virginia (UVA), Humber Polytechnic in Ontario Canada, and University of California Davis. All colleges were contacted via email, or through the Association for the Advancement of Sustainability in Higher Education (ASHEE), which is a communication platform dedicated to sustainability. See appendix A. for a comprehensive list of interview questions.

The other two interviews involved key informants within Facilities, Development and Operations (FDO) at WWU and the project's key stakeholder, Jeff Aslan Campus Utility Manager. The key informant interview included WWU's University Planner, Asset Manager and FDO Construction Project Coordinator. The goals of these interviews were to discuss capital funding for major builds, asset management for existing building standards, and quality assurance as well as a directive on what information would be most useful to obtain from future institutional interviews.

Benchmark Data Collection

Certifications

A general comparison of the existing green building certification programs was conducted. This included: Leadership in Energy and Environmental Design (LEED), Living Product Challenge Certification (ILFI), WELL, and Passive House Institute US (PHIUS). The standards of comparison included registration fee, pricing per square footage, water requirements (low rate of fixtures, showerheads and GPF of toilets), EUI requirements, renewable energy requirements, indoor environmental quality and material sourcing. See appendix B for full comparison chart and see appendix C. for Green Building Certification general summary.

Institutional Comparison

Existing Green Building Design Standards (GBDS) from six institutions were compared. The Institutions studied included: University of Washington, University of Virginia, University of California Davis, Humber Polytechnic and UC Irvine. The measures of focus were whether the institution tracked embodied carbon, what green certification they used, if they included a process map, conducted a Life Cycle Cost Analysis, used a tiered approach to green standards (tier one for major construction, tier two for renovations, so on and so forth), whether they metered water and energy, if they had a phased roll out, and if health and well-being was included in the GBDS. See appendix D for the institution comparison chart.

Budget

Independent research was conducted for possible funding sources. This included a basic internet search of grants and tax deductions available for green building designs and upgrades as well as inner institutional grants posted on the WWU website.

Results

Interviews with other institutions allowed the group to glean some basic principles of Green Building Design Standards that may apply to Western. From the interview with the University of Virginia, it was found that there are LCCA calculators readily adaptable from other universities to Westerns' specific university needs. This saves time and resources, allowing staff to move forward with projects quickly. UC Davis reported having success with trialing parts of certifications from more wellness and inclusion-focused programs such as ILFI and WELL, without adopting the entire certification. This saves on the cost of getting certified while allowing Western to see what model fits best per project and experiment with going above the state mandated LEED. The interviews with Jeff Aslan and other WWU staff helped develop a set of questions to bring to other interviews with exemplary institutions, as well as frame the need for a Western specific GBDS and understand the gravity of the project.

The four GBCs evaluated each have their own merits, which are discussed in further detail in the appendix. For the purpose of choosing a GBC to use for WWU, it is clear based on the research that LEED is the most economic choice. Being the most well-known GBC it has been widely adopted throughout the industry. Most commercial builders, architects, and engineers are familiar with complying to LEED requirements. On average, design firms will charge 1-2% more for a LEED project because it requires more work than a building simply built to code, but that number will increase if they comply with a more stringent standard such as ILFI or WELL.

The upfront cost of construction is increased by choosing to get a GBC, but some of these costs can be offset by tax breaks and grants, a list of which can be found in the budget section. The upfront costs can also be offset by the money saved via resource conservation. For example, the cost of installing low-flow sinks may be greater upfront,

but in the long run the lower utility bills should offset that upfront cost. This tradeoff is often referred to as a Return On Investment (ROI) which can be calculated by conducting a Life Cycle Cost Analysis. A study conducted in the DC area found that buildings that were certified Net Zero by ILFI achieved significantly higher ROI than those simply built to code.

	Assumed Incremental Cost	ECM only			Net Zero with ECM			Net Zero without ECM		
		NPV	SPB	ROI	NPV	SPB	ROI	NPV	SPB	ROI
Office New Construction	$3,790,218	-$396,476	11 yrs	9.1%	$2,672,413	3.0 yrs	33.8%	$2,508,026	3.3 yrs	30.3%
Multifamily New Construction	$4,608,518	-$1,772,741	17.7 yrs	5.7%	$3,192,398	3.0 yrs	33.1%	$2,943,543	3.4 yrs	29.3%
Office Renovation	$3,464,015	-$137,039	8.1 yrs	12.3%	$1,260,704	2.7 yrs	36.8%	$3,008,046	3.4 yrs	29.2%

The institutions that were used as example case studies for this report all used LEED as a baseline for their own GBDS.

Costs of Green Building Certifications

Name of Certification	**Cost of registering project**	**Cost per sq ft of certification**	**Estimated Increase in building costs**
LEED	$1,350	$0.064-0.056/sf depending on project size	Silver… 2-2.5% Gold…1.4-8% Platinum…6-9.5%
ILFI	$5,000	$0.13/sf	11-18% above LEED Gold
PHIUS	Included with Certification	$2,500 for projects <4,500 sqft $54,000 for projects 500,000+ sf	No data available
WELL	$3,000	$0.16/sf	No data available

(*Sanksa & ILFI)*

While comparing existing GBDS, it was clear that none of Western peer institutions had a robust and developed example to pull from. Searching outside of the peer institution list was valuable as we discovered a range of solutions across the country and even into British Columbia.

The University of Washington proved to be the closest institution to Western in shared values and legislation. UW also has the most robust GBDS that exemplify a feasible path forward. Multiple aspects of their design standard make them the leading institution in this field. The most notable of which is the tiered approach to the implementation of GBDS. Below is a table depicting the breakdown of the tiered approach and what kind of construction/renovation falls within each tier.
UW's GBDS features an embodied carbon limit; 500 kgCO2/m^2

Tier	Description
1. New construction and major renovation	New ground up construction, major renovations of whole buildings and stand-alone additions.
2. Partial renovations and interiors projects	Projects that include multiple system upgrades or renovations (HVAC, plumbing, lighting, finishes).
3. System upgrades	Projects on energy or water consuming systems that don't include additional scope.
4. Non-energy projects	Non-energy projects involving materials but limited or no systems.

Table 1: UW GBS Project Tiers
(University of Washington, n.d.)

Budget

Funding Opportunities to Offset Additional Cost of Adhering to the Green Building Design Standard

Grant Name	Description	Award Amount	Source
WA Dept of Commerce Energy Efficiency Retrofits Grant	For public entities including higher education in WA	$100,000-1,000,000	https://smartbuildingscenter.org/washington-state-dept-of-commerce-energy-efficiency-retrofits-grant/#:~:text=More%20than%20%2414%20million%20in,agency%2C%20port%20district%20or%20authority
State Projects Improvement	Funding for state agencies to redesign building projects to increase energy efficiency and environmental performance. Funding covers the additional costs of more efficient project options, such as	$200,000- 1.3M based on past awards, no award amount specified on commerce site	https://www.commerce.wa.gov/energy-incentives/spi/

	higher efficiency heating systems or windows, for projects at existing state-owned buildings.		
Energy Efficient Commercial Building Deduction (179D)	Provides a tax deduction for the cost of energy efficiency improvements to commercial buildings, installed as part of the building envelope; interior lighting systems; or the heating, cooling, ventilation, and hot water systems	Maximum deduction amount: $0.50- $1 per square foot depending on increase in efficiency	https://fundhub.wa.gov/funding/energy-efficient-commercial-buildings-deduction-179d/
Sustainability, Equity, & Justice Fund (SEJF)	SEJF Grant Program promotes sustainability by providing grants to create and implement projects that positively impact environmental, social, health, and economic practices on campus and in the Bellingham community.	Project based; rages between $500 and $35,000.	*Sustainability Engagement Institute, n.d.*

Cost

The construction of a green building standard has a range of costs associated with it including but not limited to capital expenses, operations, materials, and staff hours. Each one is tailored to the individual university based on size, surrounding legislation, funding, and more. Through our team's research, we have seen a range of executions and the development of these plans.

UW

The University of Washington is a leading institution when it comes to green building standards and implementation. Their design had a funding of fifty thousand dollars to meter all of the existing buildings and develop the tools to determine LCCA and other factors. With an additional budget of another hundred thousand dollars their development and execution of their design standards has been a quick endeavor and gained public attention because of it.

Humber

In our conversation with Humber College and their sustainability director, their plan of development of the green building design document was constructed by just one person. After putting it all together there were multiple workshops to proofread and

finalize the document. These workshops took place over the course of six months and an additional six months to work it through official channels to get it implemented. These workshops were two to three hours and happened around once to twice a month before being transitioned to execution.

Recommendations

Based on the research conducted, the most succinct and applicable set of recommendations are as follows:

- Develop a framework for tracking embodied carbon and set a project-specific target for all new construction
- Conduct a Life Cycle Cost Analysis (LCCA) for all new construction projects using one of the calculators created by a public university
- Implementing a project-based tiered approach with LEED Gold as a baseline.
- A Fitwell, WELL, or ILFI trial run that is appropriate and relevant should be chosen and piloted for each new construction project.
- WWU's first GBDS should be robust and concise
- A GBDS liaison should meet with design teams at the beginning and throughout a project to ensure compliance and identify opportunities to build sustainably
- No new fossil fuels

The tiered approach can be adapted from UW's GBDS as laid out in the results section, with tier one being new construction and major renovation, tier two being partial renovations and interior projects, tier three being system upgrades and tier four being non-energy/retrofitting projects. It would be up to the facilities manager to further calculate the nuanced parameters of these tiers.

All four of the standards consider water conservation, Energy Use Intensity (EUI), and material selection. After interviews and research, LEED was chosen as the primary certification due to its affordability, accessibility and notoriety. It is worth mentioning that LEED also retains the most publicity. The benefit of public appearance is of note if the aim is to set a broader culture around sustainability for WWU.

Developing a WWU GBDS and adopting a campus-wide Standard Certification will take much more time than a single quarter. It is hoped that the Facilities Development and Operations staff, the President's Sustainability Council, and a forthcoming sustainability studio class will continue this research.

Monitoring and Evaluation

Monitoring success of implementation involves follow-up with pertinent stakeholders. This will take some leg work on the sponsor's side of things with coordination and time. These meetings will take place with the Facilities Development and Operations staff. These meetings will serve as a platform for assessing progress and development with this method of monitoring. Workshops for the green building design document would take place over the course of the next six to eight months to be able to check in and add to the standards effectively. Once the project is finalized, there will be some variation of how long it will take to implement but we estimate another six to eight months to get it into effect.

There will be a more thorough evaluation of if the project has been successful by the status of how far along the design standards are implemented. Along with a pulse check on how our recommendations are being received, follow-up surveys are also a good way to monitor if we hit every box needed. This way we can measure the ways our contributions were helpful or places where we could have had more information to further our contributions.

Conclusion

The goals of this report are to (1) provide an overview of how other institutions have gone about setting, measuring and enforcing their own GBDS, (2) compile a list of recommendations, (3) develop a comparison of the four leading third-party green building standards (LEED, ILFI, PHIUS, and WELL).

Based on the research conducted, we recommend that Western needs to develop a dynamic, and mutable set of Green Building Design Standards tailored to its unique needs. This includes implementing a tier system that assigns requirements based on a project's size with LEED as the baseline,no new fossil fuels, developing an embodied carbon tracking system, a required Life Cycle Cost Analysis (LCCA), a resource consumption limit for water and electricity, and LEED v4.1 as the baseline certification.

LEED was discovered to be the most applicable to Westerns' needs, given its cost efficiency compared to other certifications, notoriety, and simplicity.

Achieving these goals within the scope and budget of WWU would mean allocation of funds between the process and implementation. Process would include further research and discovery conducted by WWU specialists or potentially continuing this research in a future sustainability studio class. Implementation would involve piloting credits from certifications that meet the unique needs of the situation(such as a WELL, ILFI or Fitwell), implementing conservation practices, trial and error and consistent monitoring and reevaluation.

For future continuation and accountability of this project, follow up meetings with a liaison such as Jeff Aslan is recommended to assure completion of a version of the GBDS has been or is being developed at that time.

As stated previously, green building construction must play a major role in a sustainable transformation. Washington State Clean Buildings Performance Standards law is a requirement but does not have to be the minimum action taken. Centering green building standards as a baseline and creating a uniform and intuitive guide to best practices must be the next step. It's not longer enough to do the bare minimum. Western Washington University is a pillar in the community and in the state as a sustainably focused institution. The actions taken to ensure that these values are met are pivotal to setting cultural standards.

Appendix

A. Interview Questions

1. How do you navigate and balance state compliance with institutional goals?
2. What was your process for choosing a green building certification that aligns with your institutional values?
3. How do you address peak demands?
4. What standards do you use for smaller builds/ renovations vs. major construction projects?
5. How do you address equity and inclusion when developing a GBDS?
6. Do you track embodied carbon on your new construction projects, if so, how?
7. What has the process of implementation and accountability for GBDS looked like for you?

8. Do you pursue grants related to green building/clean energy for new construction projects?
9. Do you conduct a Life Cycle Cost Analysis (LCCA) on new construction projects? What tools do you use for that?
10. What general advice do you have for a small institution working towards a goal of setting and implementing green building design standards?
11. How much is your design standard process built on research? Who does this research? How many intern and staff hours went into research? Were external contractors hired and what was the related cost?

B. Green Building Certifications Summary

	LEED	WELL	PHIUS	ILFI
Registration fee	$1,350	$3,000	$2,500	$5,000
Price per sq foot	$0.064-0.056/sf depending on project size	$0.16/sf	not specified, price bundled with regirstion	$0.13/sf
Water requirements - Flow rate of fixtures, showerheads and GPF of toilets	LEED baseline	Water quality testing	N/A	25% reduction from EPA 2005 baseline
EUI requirement	ASHRAE	N/A	EPA Energy Star	20% improvement from ASHRAE
Renewable Energy Requirement	1-5 credits, onsite 5 cred, offsite new, or offsite existing	N/A	Not credited	Net Positive- 105% of energy needs from onsite renewables
Indoor Environmental Quality	Airsealing with blowerdoor test	PM2.5: 15 µg/m3 or lower, PM10: 50 µg/m3 or lower	EPA Indoor airPLUS	ASHRAE 62.1, sunlight at 75% of regularly occupied space
Material Sourcing	Multple points available	Material restrictions, transparency, optimization.	Certified Materials List	Red List, Responsible Sourcing, Living Economy

C. Green Building Certifications Summary

LEED Credit Categories

- Sustainable Cities
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Integrative Process
- Innovation
- Regional Priority

Summary: Since LEED has been around since 1994, there is a robust infrastructure for certification. LEED is run by the US Green Building Council and is nationally well known. Industry professionals (architects, inspectors and builders) are familiar with LEED requirements.

The structure of LEEDs rating scorecard allows projects to achieve leed certification without fulfilling critical sustainability targets.

PHIUS Credit Categories

- Passive Conservation (building design)
- Airtightness
- Active Conservation (end-use ei. Appliances and fixtures)
- Renewable Energy

- Appropriate Moisture Design for Assemblies and Details
- Window Comfort
- Electric Vehicle Charging Infrastructure
- Combustion & Fireplace Safety
- 3rd Party On-Site Inspection and Quality Assurance
- Electrification Readiness

Summary : Emphasis on energy/resource efficiency and passive building design with clear requirements. PHIUS boasts only 3-5% increase in costs to adhere to their standards with an 85% improvement in building performance. PHIUS has certifications for projects, products and professionals.

WELL Credit Categories

- Air
- Water
- Nourishment
- Light
- Movement
- Thermal Comfort
- Sound
- Materials
- Mind
- Community
- Innovation

Summary: As indicated by the name WELL has focused their design standards on the creation of a healthy and safe environment. Wellbeing of building occupants/users is built into the standards, and sustainability features are also considered. In addition to the WELL Building Standard, WELL ratings include Health and Safety Rating , Performance Rating, Equity Rating and WELL Community Standard which is applicable to a campus.

ILFI Credit Categories

- Place
- Water
- Energy
- Health and Happiness
- Materials
- Equity
- Beauty

Summary: ILFI is broken up into seven “petals” which add up to a holistic approach to designing a space for sustainability, health, equity and beauty. ILFI also features a Zero Energy certification, and a Living Community Challenge that is very applicable to a campus.

D. Institution Comparison Chart

	UC Davis	UVA	UW	Humber	Irvine
embodied carbon standard	not now, but will. Buy Clean CA Act	considered	exceed 500 kgCO2e/m^2	Yes	considered in new builds
teird approach	yes; divided into 1.new/major buildings(LEED silver) , 2. acute care/hospitals (ASHRAE by at least 30%) 3.exisiting buildings(LEED-O+M or higher)(green lab assesment program) 4.	n/a	4 teirs; 1. new contruct. 2.partial reno and interiors 3. system upgrades 4. non-energy	4 Tiers: 1. New buildings, Major 2.New building, Minor. 3.Interior reno, Large 4.Interior reno, Small	No
certification used	Design+Contstruction Silver, stiving for Gold, Labs21 (see teired approach)	LEED v4 minimum for all projects req. a permit	LEED v5 and pilot credits; Envison for non-occupied buildings	LEED v4 platinum	Baseline LEED silver, LEED Platinum v3
process mapping	check ins with research	Checkpoints monitored by one person	yes. guidance on expectations, timing and best practices	Preset checkpoints	Regular check points and feedback loops
metering					
research and development	research team	Done by one person with experience	research team	Done by one person with experience	research team
LCCA used or other	dashboard, benchmarking 2 years and 5 years later	UVA LCCA for major systems	UW LCCA required for all projects	No, has known cost benefit. No longer measures	Yes
water standard	available credits in LEED BD+C Water catergory	reduce water use by 30% to 2010 levels	yes; 40% below LEED baseline	LEED v4 platinum and Toronto Green Standard	Baseline LEED silver, LEED Platinum v3
energy standard (EUI)	Davis: outperform UCOP by 20%. UCOP: Reduce each location's eui by an avg. of 2% annually, 100% clean energy by 2025, increase biogas to 20%by 2025	fossil free fuel goal(on site combustion only for emergency) (energy permormance listed per type of building)	no fossil fuels/connect to district energy systems	Meet Torontos Green Standard. Academic spaces TEUI is 75 kWh/m^2	Outperform Californias Title 24 Energy Efficiency standards by 50%
phased roll out	n/a		2: piolet projects*	yes but already executed	no
institutional goals	yes	yes	yes (list in appendix?)	Yes	yes
health and well-being inclusion	yes	yes	yes. showers and changing facilites, etc.	Yes	Yes

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