PRE-SUBMITTAL LOAD ASSESSMENT

Reducing heating loads is the single-most important step towards designing a cost-effective zero-carbon building in Somerville
This calculator provides an easy way to assess and reduce your building's loads

Instructions:

1 Fill in the blue cells with your project information: All user inputs in blue are required.
2 Review Pre-Submittal Dashboard tab.
3 Compare the Proposed heating load to the heating load of a MA Code Minimum design, and to a Low Load design.
4 For more details, review the 'Detailed Loads' tab. It provides a summary of the assumptions in the MA Code and Low Load options
5 Consider strategies to cost-effectively reduce the heating load and heating capacity of the Proposed design.

Project Name	32-44 White
Project Address	32-44 White Street, Somerville MA 02144
Submission date	4/14/2023
Filing	P&Z 22-054
Individual responsible of submission	SGL Development
Firm responsible for submission	

Project team

Owner	SGL Development	
Architect	Peter Quinn Architects	
MEP Consultant	Building Engineering Resources, Inc	
Energy Performance Consultant	enviENERGY Studio LLC	*if applicable*
Envelope Consultant	3iVE LLC	*if applicable*

Summary of submission

Sustainability is an important design and construction priority for the Project and the Project team will evaluate and implement measures to reduce energy and water consumption, to improve the efficiency and useful life of building systems and infrastructure, and to reduce the burdens imposed by buildings on city services, the environment, and the public health. Consistent with the Zoning requiremtns, the Project will use the Leadership in Energy and Environmental Design (LEED) v4 for Core and Shell to track the Project's approach to sustainability and its LEED Gold level certification target.

Outline key project goals, progress to date and major takeaways from this submission.

General Project Inputs			User Comments	Instructions
Number of Stories Above Grade	4			Do not include mechanical penthouse or unconditioned rooftop amenity spaces as a story.
Total Building Gross Floor Area	42,089	GSF		Automatically calculated, based on sum of individual building types input below. Confirm that the value correctly aligns with the total building value.
Total Building Net Occupiable Floor Area	38,410	NSF		Automatically calculated, based on sum of individual building types input below.
Total Building Vertical Façade Area	25,780	SF		Automatically calculated, based on sum of individual building types input below.
Roof Area	8,352	SF		Include total roof area as seen from above. Includes mechanical penthouse roofs and spaces throughout the building where ambient air is located outside of the ceiling plane (even if not on top of building).

Primary Building Type			User Comments	Instructions
Primary Building Type	Office or Laboratory Building (5000 to 50,000 ft2)			a single development includes multiple separate buildings, project teams are encouraged to use a separate CNBA calculator for each building. Otherwise, the daylight area and code-reference window area calculations will be
Gross Square Feet	42,089	GSF		fall under Secondary and Tertiary categories below.
Vertical Façade Area	25,780	SF		exterior. Exclude other areas, such as: screen walls, parapets, mechanical louvers, and areas that separate non-conditioned space from the exterior. If there are more than 3 building use types, input the total value that does
Window Area (SF)	6,223	SF		than 3 building use types, input the total value that does not fall under Secondary and Tertiary categories below.

Secondary Building Type			User Comments	Instructions
Secondary Building Type				Secondary building type is the use type representing the second greatest % of total building floor area.
Gross Square Feet		GSF		Provide inputs for the Secondary Building Type, similar to the process used for the Primary Building Type, defined above.
Vertical Façade Area		SF		Provide inputs for the Secondary Building Type, similar to the process used for the Primary Building Type, defined above.
Window Area (SF)		SF		Provide inputs for the Secondary Building Type, similar to the process used for the Primary Building Type, defined above.

Tertiary Building Type			User Comments	Instructions
Tertiary Building Type				Tertiary building type is the use type representing the third greatest % of total building floor area.
Gross Square Feet		GSF		Provide inputs for the Tertiary Building Type, similar to the process used for the Primary Building Type, defined above.
Vertical Façade Area		SF		Provide inputs for the Tertiary Building Type, similar to the process used for the Primary Building Type, defined above.
Window Area (SF)		SF		Provide inputs for the Tertiary Building Type, similar to the process used for the Primary Building Type, defined above.

Envelope Parameters			User Comments	Instructions
Window Assembly U-value	0.29	Btu/h-F-sf		U-value times Area (UxA) weighted average for all windows. [(U-value window type 1) x (Area window type 1) + (U-value window type 2) x (Area window type 2) ….] / [Total window area]
Wall Assembly U-value	0.055	Btu/h-F-sf		UxA weighted average for all walls. [(U-value wall type 1) x (Area wall type 1) + (U-value wall type 2) x (Area wall type 2) ….] / [Total wall area]. For assembly U-values see ASHRAE 90.1-2016 Normative Appendix A
Roof Assembly U-value	0.025	Btu/h-F-sf		UxA weighted average for all roofs. [(U-value roof type 1) x (Area roof type 1) + (U-value roof type 2) x (Area roof type 2) ….] / [Total roof area] For assembly U-values see ASHRAE 90.1-2016 Normative Appendix A
Infiltration - Maximum at Blower Door Test	0.1	cfm/sf at 75pa		IECC 2018 requires 0.25 cfm/sf @ 75 Pa

HVAC Parameters			User Comments	Instructions
Minimum Outdoor Airflow + Make-Up Rate	21,700	CFM		change rates (such as laboratories) or make-up is required due to a dedicated exhaust system (such as fume hoods, kitchen exhaust, etc.).
Proposed Outdoor Airflow + Make-Up Rate	24,250	CFM		Input the as-designed outdoor airflow quantity.
IF LAB OR HEATHCARE Class 3 and 4 Exhaust (CFM)	24,250	CFM	Proposed design features headered general and hazardous exhaust with glycol energy recovery coils	Class 3 and 4 Exhaust is defined as exhaust meeting the definition of Class 3 and 4 air in ASHRAE/ASHE Standard 62.1-2019, including laboratory fume hood exhaust, laboratory general exhaust when combined with laboratory fume hood exhaust, exhaust where energy recovery is not allowed by ASHRAE/ASHE Standard 170 for use in energy recovery systems with leakage potential, and systems exhausting toxic, flammable, paint or corrosive fumes or dust. The Class 3 and 4 Exhaust system must be capable of reducing exhaust and makeup airflow rates to 50% of the zone design values or the minimum required to maintain pressurization relationship requirements. Excludes Exempt Exhaust. Excludes Class 2 Exhaust. Exludes Class 1 Exhaust: for example, exludes office exhaust, even when the Proposed design has a combined office and laboratory exhaust system.
KITCHENS INCLUDED Exempt Exhaust (CFM)		CFM		grease vapors and smoke. It also includes radioactive isotope exhaust. If exhaust heat recovery is included in the proposed design, the exhaust should not be classified as Exempt.
IF MECHANICALLY HUMIDIFIED Humidification Load		MBH	humidification will not be	If the building, or a portion of the building is humidified, input the humidification load here. This value is carried consistently across all options.
IF APPLICABLE Process Heating Load		MBH		loads supplied by systems other than the building heating plant. This value is carried consistently across all options.
Ventilation Heating Sensible Recovery Effectiveness	55%	%		exhaust air dry-bulb temperatures, at 0°F winter design condition, expressed as a percentage. For buildings with multiple types of exhaust heat recovery, this value shall be the cfm-weighted average value.
Ventilation Cooling Total Enthalpy Recovery Effectiveness	0%	%		enthalpy, at summer design condition, expressed as a percentage. For buildings with multiple types of exhaust heat recovery, this value shall be the cfm-weighted average value.
Class 3 and 4 Exhaust Sensible Recovery Effectiveness	55%	%		Sensible Energy Recovery Effectiveness is defined above. For buildings with multiple types of exhaust heat recovery, this value shall be the cfm-weighted average value.
(at 35°F ambient)	855	MBH		EXCLUDE the capacity of redundant equipment that is intended to operate only when heating equipment fails (commonly referred to as an N+1 configuration). Also EXCLUDE the capacity of redundant equipment that is
Non-Electric Space Heating Plant Capacity	2,400	MBH		operate only when heating equipment fails (commonly referred to as an N+1 configuration). Also EXCLUDE the capacity of redundant equipment that is intended to operate when ventilation heat recovery devices fail. This can
Total (Non-Redundant) Space Heating Plant Capacity	2,400	MBH		as an N+1 configuration). If there is redundancy between electric + non-electric heating systems, EXCLUDE redundant capacity. For example, if the non-electric heating plant is designed to handle the entire heating load, and

Will the building's heating system be 100% electric?	No			This does not align with the City of Somerville's goals for carbon neutral ready buildings
Will the building's DHW be 100% electric?	No			This does not align with the City of Somerville's goals for carbon neutral ready buildings
Cooling Plant Capacity	200	Tons		Input the proposed cooling system capacity. This may include capacity for all uses such as: space cooling, dehumidification, process cooling loads, etc.

Envelope Outputs			User Comments	Instructions
Window-to-wall ratio	24%			some envelope components, such as foundations and exposed floor areas.
Average Envelope U-value (UxA / A) - Design	0.091	Btu/h-F-sf		some envelope components, such as foundations and exposed floor areas.
Average Envelope U-value (UxA / A) - Maximum per Code	0.114	Btu/h-F-sf		components, such as foundations and exposed floor areas.
Average Envelope U-value (UxA / A) - Aligns with Code?	Yes	Btu/h-F-sf		not account for some envelope components, such as foundations and exposed floor areas. Therefore, it is not proof or equivalence of the envelope backstop code compliance.

Heating Capacity			User Comments	Instructions
Low Load Building - Heating Plant Capacity	31.9	Btu/h-sf		Automatically calculated value. Indicates a Low-Load target value, intended to optimize cost-effective electrification and procurement of renewable energy to achieve Zero Net Carbon (ZNC).
Proposed Building - Heating Plant Capacity	57.0	Btu/h-sf		Automatically calculated value. Indicates the Proposed Design value, per the inputs above. Design teams should pursue low-load, cost-effective solutions to meet the City of Somerville's Climate Action goals.
MA Code Minimum Building - Heating Plant Capacity	64.7	Btu/h-sf		Automatically calculated value. Indicates the value for a building that meets the MA Code Minimum envelope and exhaust heat recovery performance.

Heating Loads		
Low Load Building	25.5	Btu/h-sf
Proposed Building	25.4	Btu/h-sf
MA Code Minimum Building	51.7	Btu/h-sf

[JWK] LET'S DELETE THIS CHART