# SUSTAINABLE & RESILIENT BUILDINGS QUESTIONNAIRE

## Section 1: Proposal Information

| | |
|---|---|
| Proposal Name | Residences on Summer Street |
| Address | 73 Summer Street, Somerville MA |
| Developer | First Summer 73, LLC c/o Trax Development, LLC |
| Business Address | 20 Woodward Street Newton, MA 02451 |
| Designated Contact | Nick Ogonowsky |
| Telephone Number | 617.744.3339 |
| Contact's Email Address | Nick@traxboston.com |
| Date Submitted | June 14, 2021 |
| Filing Type (Development review application, Building Permit, or CoA) | Development Review Application |
| Is this a revised Questionnaire? | No |
| Is MEPA Approval Required? | Yes/No; Why? No, Thresholds Not Met |

## Section 2: Building & Site Details

### 2.1 Building Information

| | |
|---|---|
| Building Uses | Residential |
| Gross Floor Area | 30,832 SF – (38,563 GSF with parking, utilities, trash) |
| Expected Life of Building | 150 yrs+ |
| Expected Life of Building Systems: HVAC, electrical, boilers, plumbing, telecom, lighting, energy management. | Electric heating, cooling, ventilation, Domestic Hot Water (DHW), lighting |
| Type of Heating System(s) | Electric Heat Pumps |
| Type of Cooling System(s) | Electric Heat Pumps |

### 2.2. Green Building

| | |
|---|---|
| | |
| Green Building Professional(s): Name(s) and contact information | Mark Price, mark@pricesustainability.com, 978.760.2723 |
| Professional Credentials: Green Building Program Certification(s) | HERS Rater, LEED Green Rater, PHIUS+ Rater, ITC IR Thermographer |
| Building LEED Rating | Gold target |
| Building LEED Point Score | |

| | |
|---|---|
| Will you pursue LEED certification through the USGBC? | No, but LEED Building and diagnostic principles will be followed. |
| Are any other green building certifications being pursued? (Passive House, Enterprise Green Communities, etc.). Please describe. | No. |

**2.3. Electric Vehicle Parking**

The number of electric vehicles (EVs) in Somerville is expected to increase significantly over the next decade with more electric vehicles coming to market than ever before. Conservative estimates based on historical trends alone suggest 20% of personal vehicles in Somerville will be electric by 2040. Installing capacity for EV supply equipment (EVSE) has been shown to be more feasible and cost effective during construction than when retrofitting parking areas to support the installation of EVSE in the future[1]. Providing EVSE can increase the property value, become a future revenue source, and provide an amenity that more tenants and commuters will be looking for. It is recommended that parking facilities be designed to allow for the most flexibility to adapt to future needs of electric vehicles and changing mobility needs. The City of Somerville recommends 25% of spaces have installed charging access and up to 100% of spaces be "EV Ready" (everything but the station installed). Eversource currently has a program to pay the associated infrastructure costs of EV charging, including infrastructure needed to be "EV ready." Please consult with Eversource to determine if any installation costs could be covered through their Make Ready Program.

| | |
|---|---|
| Total # of Parking Spaces | 18 (2 of which are ADA). 7 are to be equipped with EV Charging |
| EVSE Plugs (number and voltage/ level of plugs) | 7 (all are level 2 charging @ 40Amps) |
| EV Ready Spaces (everything but station is installed) | 11 |
| Please share any other information on your EV strategy. Have you spoken with Eversource? Are you talking with EVSE providers? Have you considered EVSE needs in conjunction with your parking and mobility management plans? | The project team has not discussed the project with Eversource at this time, specific to our car charging integration. We are working with Chargepoint for our EVSE needs. |

[1] http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf; https://www.richmond.ca/__shared/assets/Residential_EV_Charging_Local_Government_Guide51732.pdf

**2.4 Key Building Efficiency Metrics**
The following should be provided for each building type (office, retail, multifamily, hotel, restaurant, etc.).

Vertical Envelope Performance

***this project will not use ASHRAE 90.1 whole-building modeling. REM-Rate v16.1 hourly simulations will be run for each unit.**

| **Vertical Envelope** | ***ASHRAE Reference Building** | | | **Proposed Building** | | |
|---|---|---|---|---|---|---|
| | **Percent of Vertical Area** | **R value** *(see note 1)* | **U value** *(see note 2)* | **Percent of Vertical Area** | **R value** *(see note 1)* | **U value** *(note 2)* |
| Framed, insulated Wall | | R27+R1c.i. | U-value | 75% (estimate) | R27+R1c.i | |
| Opaque glass, curtain wall, shadowbox, spandrel | NA – ASHRAE reference building has no spandrel | | | N/A | N/A | N/A |
| Vision glass | % | R-value | U-value *(note 3)* | 25% (estimate) | | U=.28, SHGC=.28 (proposed) |
| | | | | | | |
| | ***100%*** | | ***Aggregate U*** *(note 4)* | ***N/A*** | | ***N/A*** |
| | | | ***Aggregate R*** | | | ***N/A*** |

Notes:
1. Show in format of R+R c.i. where first R is amount of discontinuous insulation and second R is amount of continuous insulation.

2. U values shall be based on indicated R+R c.i. and shall conform to Appendix A of ASHRAE 90.1 2013.

3. U value includes frame, per NRFC standard methods.

4. Aggregate U is calculated as: ($U_1\%_1 + U_2\%_2 + U_3\%_3$) where U is the respective thermal transmittance values and $\%_1$ is the percent area of framed insulated wall; $\%_2$ is the percent area of opaque glass, curtain, or shadowbox; and $\%_3$ is the percent area of vision glass. Only areas adjacent to conditioned space are counted, areas adjacent to unconditioned spaces (e.g. parking garages, mechanical penthouses) are not counted. Aggregate R is the inverse of aggregate U. For percent areas for ASHRAE reference building, see Table G3.1.1-1 in ASHRAE 90.1 2013.

Other Performance Metrics

| | ASHRAE Reference Building | Proposed Building |
|---|---|---|
| Air Infiltration (ACH 50) | | 3.0 ACH50 (each unit) |
| Aggregate Vertical Envelope R | | R28 |
| Roof R | | R45 |
| Lowest level conditioned floor above unconditioned space (if any) R | | N/A |
| Cooling End Use (kBtu/sf-yr) | | TBD through unit energy model |
| Heating End Use (kBtu/sf-yr) | | TBD through unit energy model |
| Peak Heating (kBtu/hr-sf) | | TBD through unit energy model |
| Peak Cooling (kBtu/hr-sf) | | TBD through unit energy model |
| Site EUI (kBtu/hr-sf) | | |

## Section 3. Planning for Net Zero Emissions and Energy Resilience

**3.1. How is the building currently designed to reduce energy usage? Please describe the key design features of the building including:**

A) Building envelope performance (including roof, foundation, walls, and window assemblies)
B) How has the design team integrated energy performance into the building and site design and engineering (orientation, massing, mechanical systems, envelope, etc.)?
C) Efficiency of heating and cooling systems. Will these systems be electric? Provide reasoning for selection of heating and cooling systems.

A. The building envelope is designed to exceed local codes in an effort to reduce energy consumption. Only select spaces within the basement level will be 'conditioned', otherwise the parking area will not be tempered, nor will utility rooms. Foundation and slab edge conditions will be detailed such that exterior insulation mitigates any thermal bridging. Above grade walls will have closed cell cellulose spray foam to approx. R-28 and rim joist conditions to meet R-30. The roof R value will be met with R-45 continuous roof poly-iso insulation. Window/Door assemblies will be specified to have U and SHGC values which exceed code performance, 0.28 respectively.

B. In terms of massing, the residential courtyard was deliberately located on the eastern portion of the site such that it receives morning light but is shaded by the building in harsh summer, afternoon sun. A green roof surrounding the amenity courtyard is designed to slow run-off from this area. The roof is designed for the future integration of PV and the development team has made a commitment that the building be 100% electric. On-site plantings are designed to be native and drought resistant therefore reducing water consumption on site.

C. The heating/cooling system within the residential units will be ductless 'mini-split'. We are working with our consulting Mechanical Engineer and likely each unit will have an individual ERV (energy recovery ventilator). All systems are designed to be electric. The mini-split systems were selected to reduce ductwork, simplify installation as compared to traditional heating/cooling methods, and increase energy efficiency as single rooms/spaces within a dwelling unit can be individually controlled.

**3.2 Will the building be a net zero carbon building?** A net zero carbon building is a highly energy efficient building that does not burn fossil fuels and either produces or procures enough carbon-free electricity to meet the building's total energy demand. If the building will not be a net zero carbon building, provide a technical description of how the building's systems will be transitioned over time to achieve net zero carbon emissions, including how and when systems can be transitioned in the future to carbon-free alternatives (provide timeline including 2030, 2040, and 2050 targets). Description must include whether any remaining emissions will be offset with on-site or off-site renewables and at what quantity. Changes could include, but are not limited to, addition of on-site renewable energy generation, energy storage, additional energy efficiency measures, building electrification, or other measures that would further reduce greenhouse gas emissions.

The building being delivered 'day one' is not intended to be a net zero carbon building, however, given the design of the high-performance envelope, the commitment to all electric systems, and the provision for future solar on the building's roof, the Project Team anticipates the viability of conversion to Net Zero by 2040. Conversions to net zero would include the addition of solar panels to the roof at high exposure areas which we anticipate to be roughly 2,500 SF of roof area at this time. Additionally, spatial provisions have been made within the garage level for future battery/energy storage integration.

**3.3 Describe any and all incentives, rebates, grants provided by utilities, government organizations, and other organizations being pursued to maximize building efficiency and to reduce emissions.** Description must include any incentives that were considered but are not being pursued, including reasoning for each decision.

The Project team is working with a HERS Rater and exploring participation in either the MassSave New Construction Program, or the Equipment-only Incentive Offerings to facilitate high-efficiency systems.

**3.4 Evaluate feasibility of on-site renewable generation.** Please describe your analysis and findings. Analysis should consider incentives available. Will any renewable energy generation be incorporated into the project? If so, please describe (system type and capacity). If no, could it be added in the future? And will any off-site renewable energy be purchased?

No on-site systems are intended to be incorporated at this time; however, infrastructure is being placed for the integration of rooftop solar PV. No off-site renewable energy is intended to be purchased at this time.

**3.5. Are any on-site energy storage systems planned? Please describe.**

None are planned at this time; however, dedicated space is designed into the basement level for future storage of such systems.

**3.6 Does the electric utility's infrastructure have enough capacity to support the addition of your building's energy load?** Please provide confirmation from utility.

Three phase power is assumed to feed the building from the overhead wires/poles running up Summer Street with a primary service buried underground and running from the nearest pole to a private, pad mounted Transformer. Provisions have been made in the design for the private transformer to be located entirely on private property, but serviceable from the sidewalk by the utility company along Summer Street.
Preliminary discussions have been held with Eversource, attached for record, however; exact power distribution design will come after a load letter has been submitted to the utility company during the project's construction document phase. In summary, based on our initial communication with the utility provider, load capacity will not be an issue on this project site.

**3.7 Will the building's roof include any sustainability features?** These may include, but are not limited to, high albedo roof materials, solar panels, or vegetation. Please describe what features could be added in the future (i.e. roof will be designed to support solar or green roof installation of X size).

The roof will be comprised of high-albedo material such as white/tan TPO and is designed to support the future integration of rooftop PV panels. Additionally, the roof supporting the amenity courtyard is designed as a mix of hardscape surfaces (wood pavers) and green roof capable of supporting 10" of growth medium and is intended to be planted with a variety of vegetation.

## Section 4: Climate Change Risk and Vulnerability

| **4.1 Climate Vulnerability Exposure** (check all that apply) | ☐ Sea Level Rise & Storm Surge<br>☐ Precipitation Induced Flooding<br>☐ Heat<br>☐ Other(s): |
|---|---|

**4.2 How is your site vulnerable to projected climate change impacts?**

Little impact from flooding is anticipated due to the project's high elevation and passive cooling strategies include vegetation in courtyard and reflective roofing materials.
Groundwater is relatively high on the project site and the project team is aware of this condition based on our Geotechnical Report and will be designing a waterproofing system around the entirety of the garage level.

The next two sections ask specific questions about how the project is designed to manage climate-related risks from heat, coastal and inland flooding.

## Section 5: Managing Heat Risks

**5.1 Describe all building features that will keep building occupants safe and comfortable during extreme heat,** including mechanical systems and non-mechanical design elements to cool building (orientation, envelope, operable windows, etc.).

High performance operable windows, air-tight construction, and a robust building envelope all contribute to occupant comfort in extreme heat events. Additionally, split system cooling coupled with individual ERVs for each unit will mechanically temper each occupiable space.

**5.2 How has increased demand for indoor cooling been factored into the building design and energy management strategy?**

The building is anticipated to have very low unit cooling loads by virtue of constructing a high-performance envelope with exceptional insulation values and minimal air leakage. Additionally, the design decision to utilize 'mini-split' system technology for heating/cooling allows for individual rooms to be set to the occupant's comfort rather than mass heating/cooling entire apartment units.

**5.3 List any indoor spaces without cooling and their uses.**

Within the basement level, the following areas are designed without cooling:

1. Parking Areas
2. Bike Room
3. Electrical Room
4. Water Service/Utility Room

**5.4 What design features will be implemented on site to minimize the site's contribution to the urban heat island effect?** Please describe any and all design elements. Strategies could include, but are not be limited to, the following:

- High albedo pavement or roof materials
- Passive cooling or increased ventilation capacity
- Green roofs or walls
- Heat resistant trees and plants
- Additional landscaped areas

The building's upper main roof will utilize high albedo membrane roofing, while the roof supporting the amenity courtyard will be planted as a green roof. All plants/trees selected for the site's landscaping strategy are considered native and drought resistant. Lastly, the proposal seeks to construct a small 'parklet' on the Eastern corner of the lot where a substantial planting bed will provide some setback relief from the sidewalk to the building's edge and a large shade tree will be planted.

## Section 6: Managing Flood Risks

**6.1 Is the site susceptible to flooding from sea level rise and storm surge and/or rain events now or during the building's expected lifetime?** Please refer to the Somerville Climate Change Vulnerability Assessment and the updated stormwater flooding maps provided in the Background section of this Questionnaire. Additional maps and data are available by request (email hpayne@somervillema.gov)

No

**If you answered YES to the previous question, please complete the remainder of Section 6.** Otherwise, you have completed the Questionnaire. Thank you.

**6.2 Flooding Design Considerations**

| Proposed Site Elevation - Low | (ft) | Proposed Site Elevation - High | (ft) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Lowest elevation of life-safety systems | (ft) | Proposed First Floor Elevation | (ft) |
| Nearest flood elevation for the 2070 10-year storm | | Nearest flood elevation for the 2070 100-year storm | |

**6.3 What are the first floor uses of the building? Are there any below ground stories of the building? If so, what uses are located below ground?**

**6.4 Are there any flood-sensitive assets, utilities, mechanical equipment, or life-safety systems located in areas of the building that are at risk of flooding?** What measures will protect building systems during a flood or severe storm? These might include, but may not be limited to, the following:

- Elevation of utilities and mechanical systems
- Water tight utility conduits
- Waste water back flow prevention
- Storm water back flow prevention
- Systems located above the ground floor
- Securing objects at risk of becoming dislodged

**6.5.** Residential and commercial buildings should be designed to maintain regular operations during a 10-year storm in 2070. **Describe how the site and building have been designed to maintain regular operations--meaning all systems will remain operational and all occupied spaces are protected from flooding--during the 2070 10-year storm.** Please refer to both the 2070 coastal flood probability map and the 2070 10-year storm and 1-year sea level rise scenario (pages 3 and 6). Resilience measures might include, but may not be limited to, the following:

- Elevation of the site
- Structural elevation of the building
- Non-structural elevation of the ground floor
- Energy storage and backup generation
- Wet flood-proofing (allowing water to flow through building envelope)
- Dry flood-proofing (preventing water from entering building)

**6.6** Residential buildings should be designed to allow occupants to shelter in place during a catastrophic storm (100-year event) today and in the future, this means all life-safety systems should be above the 2070 100-year flood elevation. **How will your site and building be impacted by the 2070 100-year, 24-hour storm and how will your site and building be designed to protect against those impacts?** Please evaluate impact based on both the 2070 coastal flood depth model for the 100-year storm and the 2070 100-year, 100-year sea level rise model (pages 4 and 7). Summarize anticipated pre- and post-event policies, strategies, and actions necessary to facilitate post-flood recovery.

**6.7 Will hazardous or toxic material be stored on site? Where will it be stored? How will you protect hazardous or toxic material from flooding?**

**6.8 Will the site be accessible by a typical vehicle during a 10-year event (up to 6 inches of water) and by emergency vehicles (up to 12 inches of water) during a 100-year event?**