



# FIRE CONSTRUCTION PERMIT SUBMITTAL CHECKLIST

SERVING THE CITIES OF LAKE STEVENS, MONROE AND SULTAN

## Energy Storage Systems

### PROJECT INFORMATION

<b>Site address:</b>	<b>Associated Permits:</b>
<b>Project Name / Tenant:</b>	<b>Property Owner:</b>

## Electronic file standards

File naming standard: Electronic plans and documents shall be named as specified in bold type under “permitting requirements”. For example, the seating plan must be named “Seating Plan”.

Acceptable file types: Plans, calculations, specifications and supporting documents shall be uploaded as a PDF file.

Document Orientation: All plans must be uploaded in “Landscape” format in the horizontal position. All other documents can be in “Portrait” format.

### CODE EDITIONS

- 2021 Washington State Fire and Building Code and as applicable -Lake Stevens Municipal Code 14.84, Monroe Municipal code 15.04.110 and Sultan Municipal Code 15.05.

### PERMITTING REQUIREMENTS

A Fire Construction Permit is required to install ***Energy storage systems*** regulated by Section 1207 and 105.6.5 of the 2021 Washington State Fire Code and local code amendments. **The following information is required at time of application for the Fire Construction Permit.**

- Completed Fire Construction permit submittal application.
- Completed “Energy storage systems submittal checklist.”
- Plans
- Manufacturer cut sheets for batteries, capacitors, battery rack, and all other equipment being proposed for installation.

**PLANS**

The following is a list of information required on all plan submittals for review of an “ Energy storage system” permit application. The plan shall be drawn to 1/8”=1’-0” minimum scale. The applicant is required to submit all of this information so an accurate and timely review may be done:

**Indicate the technology and capacity to be installed:**

**Table 1207.1.1 Energy Storage System (ESS) threshold quantities**

<b><u>TECHNOLOGY<sup>4</sup></u></b>	<b><u>CAPACITY INSTALLED</u></b>	<b><u>Permit threshold</u></b>	<b><u>Maximum quantity<sup>2,4,5</sup></u></b>
<b>Capacitor ESS</b>		<b><u>3 kWh</u></b>	<b><u>20 kWh</u></b>
<b>Flow Batteries – includes vanadium, zinc-bromine, polysulfide-bromide, other flowing electrolyte-types Technologies</b>		<b>20 kWh</b>	<b>600 kWh</b>
<b>Lead Acid, all types</b>		<b>70 kWh</b>	<b>Unlimited</b>
<b>Lithium-ion</b>		<b>20 kWh</b>	<b>600 kWh</b>
<b>Sodium nickel chloride</b>		<b>70 kWh</b>	<b>600 kWh</b>
<b>Nickel metal hydride (Ni-Mh)</b>		<b>70 kWh</b>	<b>Unlimited</b>
<b>Nickel cadmium (Ni-Cd)</b>		<b>70 kWh</b>	<b>Unlimited</b>
<b>Nickel Zinc (Ni-Zn)</b>		<b>70 kWh</b>	<b>Unlimited</b>
<b>Nonelectrochemical ESS (Flywheel and thermal ESS)</b>		<b>70 kWh</b>	<b>20 kWh</b>
<b>Other battery technologies</b>		<b>10 kWh</b>	<b>200 kWh</b>
<b>Other Electrochemical ESS Technologies</b>		<b>3 kWh</b>	<b>20kWh</b>
<b>Zinc manganese dioxide (Zn-MnO<sub>2</sub>)</b>		<b>70 kWh</b>	<b>Unlimited</b>

NOTE – for technologies not identified on the chart above, see page for additional permit requirements.

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## CONSTRUCTION DOCUMENTS

### The following information shall be provided with the permit application:

- Location and layout diagram of the room or area in which the ESS is to be installed.
- If located outside, show all setbacks from property lines, building openings, wall construction type, clearance to exposures.
- Provide the occupancy classification of the building ESS to be installed in.
- Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS.
- The quantities and types of ESS to be installed.
- Manufacturer's specifications, ratings and documentation of the listings of each ESS and associated equipment.
- Description of energy (battery) management systems and their operation.
- Location and content of required signage.
- Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and *deflagration* venting systems, if provided.
- Support arrangement associated with the installation, including any required seismic restraint.
- A commissioning plan complying with Section 1207.2.1.
- A decommissioning plan complying with Section 1207.2.3.
- A fire safety and evacuation plan in accordance with Section 404 of the fire code. **See page 6-7 of this document.**

## COMMISSIONING PLAN REQUIREMENTS

**Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been *approved* prior to initiating commissioning.**

### Commissioning plan requirements:

- A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
- A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
- Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
- Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
- Verification that required equipment and systems are installed in accordance with the *approved* plans and specifications.
- Integrated testing for all fire and safety systems.
- Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
- Preparation and delivery of operation and maintenance documentation.
- Training of facility operating and maintenance staff.
- Identification and documentation of the requirements for maintaining system performance to meet the original

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design intent during the operation phase.

- Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
- A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

### **Commissioning report required:**

During the commissioning process an ESS shall be evaluated for proper operation in accordance with the manufacturer's instructions and the commissioning plan prior to final approval. A report describing the results of the system commissioning, including the results of the initial acceptance shall be provided to the *fire code official* prior to final inspection and approval and maintained at an *approved* on-site location.

## **DECOMMISSIONING PLAN REQUIREMENTS**

The code official shall be notified prior to the decommissioning of an ESS. Decommissioning shall be performed in accordance with the decommissioning plan that includes the following:

- A narrative description of the activities to be accomplished for removing the ESS from service, and from the facility in which it is located.
- A listing of any contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.
- A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

## **EQUIPMENT REQUIREMENTS**

- ESS shall be listed in accordance with UL 9540
- Invertors shall be listed and labeled in accordance with UL 1741.
- Invertors listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply monitors and balances cell voltages, currents and temperatures within the manufacturers specifications it shall be provided.
- Enclosures of ESS shall be of noncombustible construction.

#### **ADDITIONAL REQUIREMENTS FOR ESS SYSTEMS MEETING ONE OF THE FOLLOWING CONDITIONS:**

A **Failure Modes Effects Analysis (FEMA)** or other approved **Hazard Mitigation Analysis** shall be provided in accordance with section 104.8.2 under any of the following conditions:

1. Where ESS technologies not specifically identified in ESS technology Table 1207.1.1 (page 1 of this submittal package) are provided.
2. More than one ESS technology is provided in a single control area where there is a potential for an adverse interaction between the technologies.
3. Where allowed as a basis for increasing maximum allowable quantities.
4. Where flammable gases can be produced under abnormal conditions.
5. Where required by the fire code official to address a potential hazard with an ESS installation that is not addressed by existing requirements.

#### **HAZARD MITIGATION ANALYSIS REQUIREMENTS:**

The Hazard Mitigation Analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered:

1. A thermal runaway condition in a single electrochemical ESS unit.
2. A mechanical failure of a nonelectrochemical ESS unit.
3. Failure of any battery (energy) management system or fire protection system within the ESS equipment that is not covered by the product listing failure modes analysis (FEMA).
4. Failure of any required fire protection system external to the ESS including, but not limited to, ventilation (HVAC), exhaust ventilation, smoke detection, fire detection, gas detection, or fire suppression.

## **FIRE EVACUATION PLAN REQUIREMENTS WSFC 404.2.1:**

**404.2.1 Fire evacuation plans.** Fire evacuation plans shall include the following:

1. Emergency egress or escape routes and whether evacuation of the building is to be complete by selected floors or areas only or with a defend-in-place response.
2. Procedures for employees who must remain to operate critical equipment before evacuating.
3. Procedures for the use of elevators to evacuate the building where occupant evacuation elevators complying with Section 3008 of the International Building Code are provided.
4. Procedures for assisted rescue for persons unable to use the general means of egress unassisted.
5. Procedures for accounting for employees and occupants after evacuation has been completed.
6. Identification and assignment of personnel responsible for rescue or emergency medical aid.
7. The preferred and any alternative means of notifying occupants of a fire or emergency.
8. The preferred and any alternative means of reporting fires and other emergencies to the fire department or designated emergency response organization.
9. Identification and assignment of personnel who can be contacted for further information or explanation of duties under the plan.
10. A description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages, where provided.

## **FIRE SAFETY PLANS PER WSFC 404.2.2**

**404.2.2 Fire safety plans.** Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy including the following:
  - 2.1. Procedures for notifying occupants, including areas with a private mode alarm system.
  - 2.2. Procedures for occupants under a defend-in-place response.
  - 2.3. Procedures for evacuating occupants, including those who need evacuation assistance.
3. Site plans indicating the following:
  - 3.1. The occupancy assembly point.
  - 3.2. The locations of fire hydrants.
  - 3.3. The normal routes of fire department vehicle access.
4. Floor plans identifying the locations of the following:
  - 4.1. Exits.
  - 4.2. Primary evacuation routes.
  - 4.3. Secondary evacuation routes.
  - 4.4. Accessible egress routes.
    - 4.4.1. Areas of refuge.
    - 4.4.2. Exterior areas for assisted rescue.
  - 4.5. Refuge areas associated with smoke barriers and horizontal exits.

- 4.6. Manual fire alarm boxes.
- 4.7. Portable fire extinguishers.
- 4.8. Occupant-use hose stations.
- 4.9. Fire alarm annunciators and controls.
5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.