ENERGY STORAGE SYSTEMS

CITY OF Vancouver WASHINGTON

Fire Code Installation and / or Operational Permit Application

www.cityofvancouver.us/departments/fire-department

International Fire Code as adopted by VMC 16.04 (Washington State

PERMITTING REQUIREMENTS

A WSFC installation permit is required to install an Energy Storage system regulated by section 1207. A permit is required for installation of or modification to Capacitor Energy Storage systems and related equipment. A WSFC operational permit is required for stationary and mobile energy storage systems regulated by Section 1207.

Project Information

Site Address			Business Name		
Other			Building Occupancy Classification		
Contact Name			Building Use		
Office Phone		Cellular		Email	

APPLICANT INFORMATION

Company Name			Address		
Contact Name					
Office Phone		Cellular		Email	

CONTRACTOR

Company Name			Address		
Contact Name					
Office Phone		Cellular		Email	

BUILDING

Fire Sprinklers	☐Yes ☐No	Fire Alarm	☐Yes ☐No	Emergency Power	☐Yes ☐No
Automatic smoke or radiant heat detection per 907.2.23		☐Yes ☐No	☐To be installed under a separate permit.		

ENERGY STORAGE QUANTITIES (REF: TABLE 1207.1.1)

Technology		Energy Capacity in kWh	
Technology		Energy Capacity in kWh	

DESCRIPTION OF WORK

System Equipment is: ☐Stationary ☐Mobile

SUBMITTAL CHECKLIST

Electronic Plan Standards

File Naming Standards:
Electronic plans and documents shall be named as specified in the City of Vancouver ePLANS system:
https://www.cityofvancouver.us/business/permits-licenses-and-inspections/eplans/

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

Plan Sheet Standards:
All plans shall be drawn to scale, as identified in the checklist, and each sheet shall state the scale and show a measurable scale on the page for measurement calibrations. One page per upload in plans.

Document Orientation:
All plans must be uploaded in "Landscape" format in the horizontal position with a north indicator. All other documents can be in "Portrait" format. Multiple pages allowed per upload in documents.

Stamped:
Where documentation contains a code analysis or engineering calculations, such documents shall be stamped by the design professional.

MINIMUM SUBMITTAL CHECKLIST FOR UPLOAD TO EPLANS

	PLANS - Site plan to include a north directional indicator and adjacent street. Show building footprint with related accesses routes and fire protection equipment, such as fire hydrants and fire department connections.
	PLANS – Scale drawings showing the equipment location within the building. 1. Location and layout diagram of the room or area in which the ESS is to be installed. 2. Details on the hourly *fire-resistance ratings* of assemblies enclosing the ESS. 3. The quantities and types of ESS to be installed. 4. Manufacturer's specifications, ratings, and listings of each ESS. 5. Description of energy (battery) management systems and their operation. 6. Location and content of required signage. 7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust, and *deflagration* venting systems, if provided. 8. Support arrangement associated with the installation, including any required seismic restraint. 9. A commissioning plan complying with Section 1207.2.1. 10. A decommissioning plan complying with Section 1207.2.3.
	PLANS – Plan specific details listed below
	DOCUMENTS – Completed Energy Storage System Permit Application – (this document)
	DOCUMENTS – Narrative explaining the commissioning, decommissioning, operation and maintenance in accordance with 1207.2
	DOCUMENTS – Equipment UL listing documents (UL 9540, UL 1741, etc.)
	DOCUMENTS – Listed in Document Details Below

DOCUMENT DETAILS

The following is a list of information required on all plan submittals. The plan shall be drawn to 1/8"= 1'-0" minimum scale. If scale drawings are not possible, all measurements shall be called out in the drawings. The applicant is required to submit all this information so an accurate and timely review may be completed:

	Hazard mitigation analysis. A failure modes and effects analysis (FMEA) 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 Table 1207.1.1 are provided. 2. More than one ESS technology is provided in a room or enclosed area where there is a potential for adverse interaction between technologies. 3. Where allowed as a basis for increasing maximum allowable quantities. See Section 1207.5.2. 4. Where flammable gasses 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.

Fire Mitigation Personnel. List names and contact information for designation fire mitigation personnel in accordance with 12.07.1.6.1.

Emergency response plans. Provide the documented emergency response plans and procedures.

PLAN DETAILS

The following is a list of information required on all plan submittals. The plan shall be drawn to 1/8"= 1'-0" minimum scale. If scale drawings are not possible, all measurements shall be called out in the drawings. The applicant is required to submit all this information so an accurate and timely review may be completed:

Site plan/floor plan - indicating the location of the equipment.
High-voltage areas that could be hazardous to emergency responders.
Egress paths and doors, exit hardware, separation from other means of egress.
Portable fire extinguisher types, sizes, and locations
Electrical disconnects.
Working clearances
Fire-resistance-rated separations.
Seismic and structural design.
Vehicle impact protection.
Combustible storage.
Toxic and highly toxic gases. Hazardous exhaust systems.
Enclosure dimensions.
Explosion (deflagration) venting or explosion prevention systems where required by 911.1 and 1207.6.3
Egress doors including swing and hardware per 1010.2.9.2

Signage - The signage shall include the following or equivalent:
1. "ENERGY STORAGE SYSTEM," "BATTERY STORAGE SYSTEM," "CAPACITOR ENERGY STORAGE SYSTEM" or the equivalent.
2. The identification of the electrochemical ESS technology present.
3. "ENERGIZED ELECTRICAL CIRCUITS."
4. Where water-reactive electrochemical ESS are present, the signage shall include "APPLY NO WATER."
5. Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section 1207.1.6.1.

Security of installations. Method of securing installation from unauthorized personnel.

Maximum allowable quantities. List quantities.
Battery types.
Capacitors
kWh for each type and totals
Separations into groups not exceeding 50 kWh: 3 feet minimum clearances.

TABLE 1207.5
MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS

TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES [a]
STORAGE BATTERIES	
Flow batteries[b]	600 kWh
Lead-acid, all types	Unlimited
Lithium-ion	600 kWh
Nickel metal hydride (Ni-MH)	Unlimited
Nickel-cadmium (Ni-Cd)	Unlimited
Other battery technologies	200 kWh
CAPACITORS	
All types	20 kWh
OTHER ELECTROCHEMICAL ESS	
All types	20 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.
a. For electrochemical ESS units rated in amp-hours, kWh shall equal rated voltage times the amp-hour rating divided by 1,000.
b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

Electrochemical ESS technology-specific protection.
Indicate applicability of this section.

TABLE 1207.6
ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS

COMPLIANCE REQUIRED[b]		BATTERY TECHNOLOGY				OTHER ESS AND BATTERY TECHNOLOGIES[b]	CAPACITOR ESS[b]
Feature	Section	Lead-acid	Ni-Cd and Ni-MH	Lithium-ion	Flow		
Exhaust ventilation	1207.6.1	Yes	Yes	No	Yes	Yes	Yes
Explosion control	1207.6.3	Yes[a]	Yes[a]	Yes	No	Yes	Yes
Safety caps	1207.6.4	Yes	Yes	No	No	Yes	Yes
Spill control and neutralization	1207.6.2	Yes[c]	Yes[c]	No	Yes	Yes	Yes
Thermal runaway	1207.6.5	Yes[d]	Yes	Yes[e]	No	Yes[e]	Yes

a. Not required for lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
b. Protection shall be provided unless documentation acceptable to the fire code official is provided in accordance with Section 104.8.2 that provides justification why the protection is not necessary based on the technology used.
c. Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.
d. Not required for vented-type (i.e., flooded) lead-acid batteries.
e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.

Indoor installations.

Indicate applicability of this section.

TABLE 1207.7
INDOOR ESS INSTALLATIONS

COMPLIANCE REQUIRED		DEDICATED-USE BUILDINGS[a]	NONDEDICATED-USE BUILDINGS[b]
Feature	Section		
Dwelling units and sleeping units	1207.7.3	NA	Yes
Elevation	1207.5.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes[c]	Yes
Fire-resistance-rated separations	1207.7.4	Yes	Yes
General installation requirements	1207.4	Yes	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection[e]	1207.5.4	Yes[d]	Yes
Technology specific protection	1207.6	Yes	Yes

NA = Not Allowed.

a. See Section 1207.7.1.
b. See Section 1207.7.2.
c. Where approved by the fire code official, fire suppression systems are permitted to be omitted in dedicated-use buildings located more than 100 feet (30.5 m) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards.
d. Where approved by the fire code official, alarm signals are not required to be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or a constantly attended location where local fire alarm annunciation is provided and trained personnel are always present.
e. Lead-acid and nickel-cadmium battery systems installed in Group U buildings and structures less than 1,500 square feet (139 m^2) under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76, are not required to have an approved automatic smoke or fire detection system.

Outdoor installations.

Indicate applicability of this section.

TABLE 1207.8
OUTDOOR ESS INSTALLATIONS[a]

COMPLIANCE REQUIRED		REMOTE INSTALLATIONS[a]	INSTALLATIONS NEAR EXPOSURES[b]
Feature	Section		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.8.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes[c]	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Size and separation	1207.5.1	No	Yes[d]
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes
Vegetation control	1207.5.7	Yes	Yes

a. See Section 1207.8.1.
b. See Section 1207.8.2.
c. Where approved by the fire code official, fire suppression systems are permitted to be omitted.
d. In outdoor walk-in units, spacing is not required between ESS units and the walls of the enclosure.

Special installations.

Indicate applicability of this section.

TABLE 1207.9
SPECIAL ESS INSTALLATIONS

COMPLIANCE REQUIRED		ROOFTOPS[a]	OPEN PARKING GARAGES[b]
Feature	Section		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.9.3	Yes	Yes
Fire suppression systems	1207.9.4	Yes	Yes
Maximum allowable quantities	1207.5.2	Yes	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Open parking garage installations	1207.9.6	No	Yes
Rooftop installations	1207.9.5	Yes	No
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes

a. See Section 1207.9.1.
b. See Section 1207.9.2.

Deployment.
Indicate applicability of this section.

TABLE 1207.10
MOBILE ENERGY STORAGE SYSTEMS (ESS)

COMPLIANCE REQUIRED		DEPLOYMENT[a]
Feature	Section	
All ESS installations	1207.4	Yes[b]
Fire suppression systems	1207.5.5	Yes[c]
Maximum allowable quantities	1207.5.2	Yes
Maximum enclosure size	1207.5.6	Yes
Means of egress separation	1207.5.8	Yes
Size and separation	1207.5.1	Yes[d]
Smoke and automatic fire detection	1207.5.4	Yes[e]
Technology-specific protection	1207.6	Yes
Vegetation control	1207.5.7	Yes

a. See Section 1207.10.2.
b. Mobile operations on wheeled vehicles and trailers shall not be required to comply with Section 1207.4.4 seismic and structural load requirements.
c. Fire suppression system connections to the water supply shall be permitted to use approved temporary connections.
d. In walk-in units, spacing is not required between ESS units and the walls of the enclosure.
e. Alarm signals are not required to be transmitted to an approved location for mobile ESS deployed 30 days or less.

Fire detection system. An approved automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. An approved radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where approved, to a constantly attended location.

Fire suppression systems. Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:
1. An *automatic sprinkler system* designed and installed in accordance with Section 903.3.1.1 with a minimum density of 0.3 gpm/ft$_2$ (1.14 L/min) based on the *fire area* or 2,500 square-foot (232 m$_2$) design area, whichever is smaller.
2. Where *approved*, an *automatic sprinkler system* designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification based on large-scale fire testing complying with Section 1207.1.5.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5:
3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.
3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.
3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.
3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.
3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.
Exception: Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
1207.5.5.1 Water-reactive systems. Electrochemical ESS that utilize water-reactive materials shall be protected by an *approved* alternative automatic fire extinguishing system in accordance with Section 904, where the installation is *approved* by the *fire code official* based on large-scale fire testing complying with Section 1207.1.5.

NOTE: *This is not intended to be an all-inclusive list. The WSFC requirements listed are intended to ensure that we have adequate information to begin a review of the application. Additional information may be required.*

I understand that all applicable codes apply and that other regulatory codes may also apply. Errors and/or omissions on the plans and corrections from field inspections are the responsibility of the owner/contractor. All work is subject to compliance with City of Vancouver ordinances and laws of the State of Washington.

APPLICANT NAME: _____ APPLICATION DATE: _____

APPLICANT SIGNAGTURE: _____