NYC Buildings Department
280 Broadway, New York, NY 10007

Rick D. Chandler, P.E., Commissioner

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OTCR

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Director, Office of Technical Certification and Research

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Purpose: This document establishes filing and submittal requirements, and outlines the approval process for lithium-ion, flow batteries, lead acid, and valve regulated lead-acid battery energy storage systems listed to UL 9540.

Related Code/Zoning Section(s):	MC	502	NYC EC	Article 408
	BC	509	NYC EC	Article 685
	FC	608	NYC EC	Article 705

Subject(s): Battery energy storage systems (BESS); Stationary storage battery system; Facility standby power; Emergency power; Uninterrupted power supplies

Background: The NYC Construction Codes, NYC Electrical Code, and NYC Fire Code prescribe installation requirements for stationary storage battery systems used for facility standby power, emergency power or uninterrupted power supplies. Batteries used for facility standby power, emergency power or uninterrupted power supplies may be used as prescribed and do not need to comply with this bulletin. Battery energy storage systems (BESS), as described below, are not addressed in the aforementioned codes. This bulletin establishes filing and submittal requirements, and outlines the approval process for battery energy storage systems. Other bulletins will be published to establish criteria for specific battery chemistries and applications.

Description: Battery energy storage systems (BESS) store energy through electrochemical means and provide electrical energy for other uses. The systems' component may include equipment for charging, discharging, storage, communication, control and protection of the equipment, fuel, containment and other equipment used to properly operate the system.

Uses: The battery energy storage systems addressed in this bulletin are specifically used to store energy. BESS may be connected with renewable energy systems and energy management (e.g. peak shaving) applications.

Restriction: Lithium-ion and flow BESS shall not be installed indoors without the approval of the Commissioner.

Filing: Installation of BESS requires several permits. Additionally, pursuant to AC 28-113, the Office of

Submittal and Approval: Technical Certification and Research (OTCR) will evaluate battery energy storage systems on a site-specific basis. Permit requirements, required submittal information, and OTCR equipment evaluation and acceptance of the BESS shall be in accordance with the following:

Department filing and signoff requirements *(see Figure 1 below)*

File application for construction document approval

- PW1 for the battery energy storage system and ancillary work associated with the battery installation (e.g. dunnage, fire-resistant penetrations, etc.). Use 'OT' work type, and enter **Battery Energy Storage System**.
  - This PW1 may only be submitted under full plan examination. Filing under professional certification privileges is not permitted.
  - Plan examination must include a zoning analysis for outdoor installations, including rooftops. The DOB approved Zoning Analysis shall also be submitted to OTCR as part of the BESS Required Submittal Information *(see Attachment A)*.
  - The plan examiner shall establish a discretionary required item for final OTCR material acceptance. The discretionary required item must be established in accordance with the following:
    - The required item shall be named 'OTCR Final Acceptance Letter for BESS'
    - The required item shall be submitted and satisfied prior to signoff
    - DOB administrative staff may receive the OTCR Final Acceptance Letter to satisfy the discretionary required item.

File permit applications

- The installer must obtain all required permits after the receipt of the OTCR Conditional Acceptance Letter.
  - PW2 for the battery energy storage system and work associated with the battery installation.
  - ED16A for the electrical work permit.
- Obtain Letter of Completion

Submittal requirements for OTCR evaluation and acceptance of the BESS *(see Figure 1 below)*

Submit the following for site-specific evaluation of the proposed BESS:

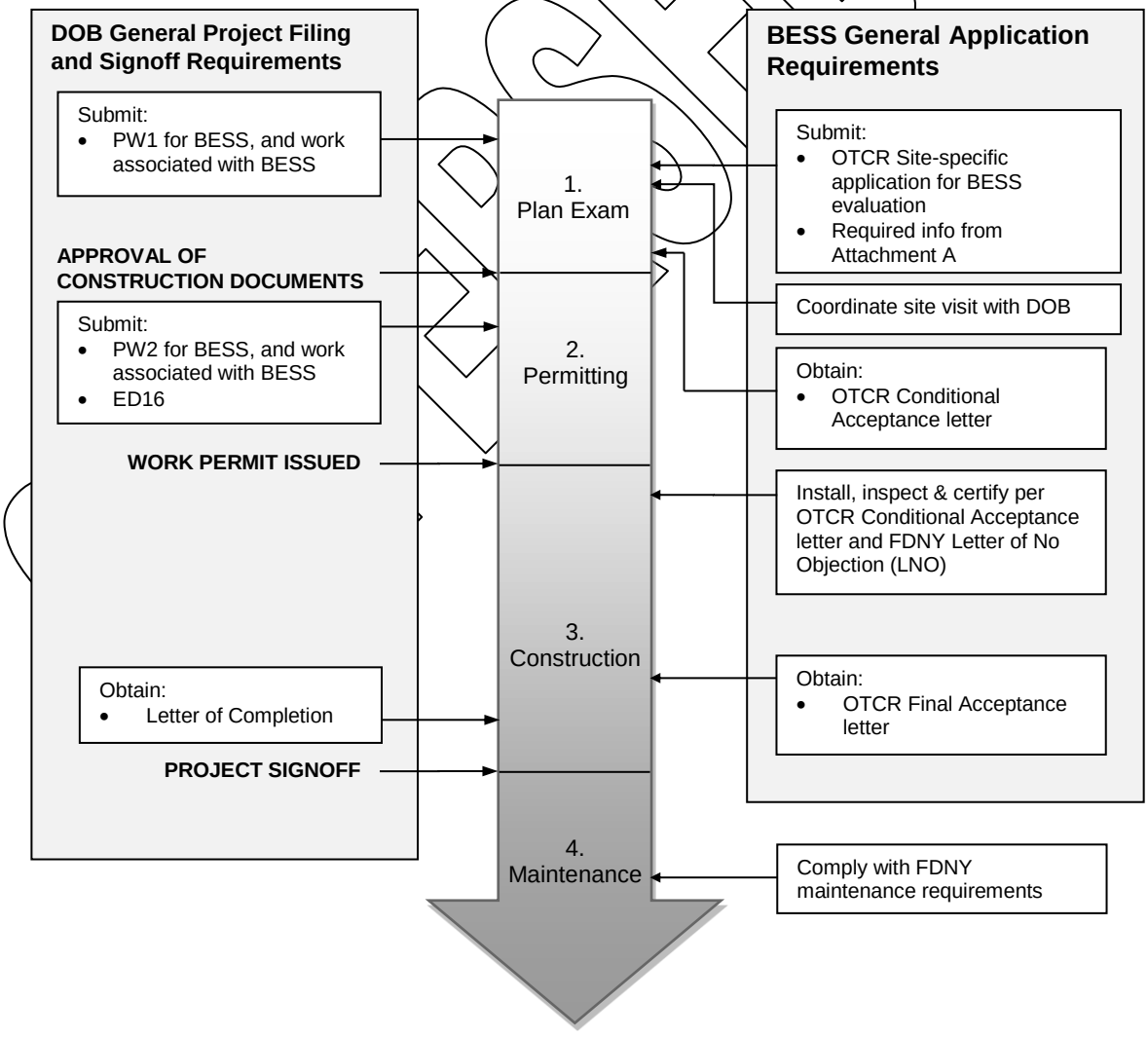
- OTCR2 site-specific application. This application will initiate the material acceptance evaluation for the proposed BESS. Include a $600 check, made payable to **NYC Department of Buildings**.
- Submit the BESS Required Submittal Information *(see Attachment A)*. Prior to preparing and compiling this information, contact OTCR at (212) 393-2626. The items under Section 4 (Plans and Statements), must be submitted prior to the site visit. All other information may be submitted after the site visit.
- Site visit. A site visit will be required for ALT applications. Please note, NB applications do not require a site visit. The site visit will be coordinated by DOB and requires the attendance of the applicant, and representatives of FDNY and DOB.
- Obtain OTCR Conditional Acceptance Letter.
  - OTCR must complete the evaluation of the site-specific application prior to issuing the OTCR Conditional Acceptance Letter.
  - The FDNY Letter of No Objection must be received by OTCR prior to the issuance of the Conditional Acceptance Letter.
- Install the BESS.
  - Installation of the battery energy storage system shall comply with the OTCR Conditional Acceptance letter and the FDNY Letter of No Objection.

- Inspect the BESS and associated work.
  - The BESS and all associated work will be inspected in accordance with DOB approved construction documents, the OTCR Conditional Acceptance Letter, FDNY Letter of No Objection, NYC Construction Codes, NYC Electrical Codes, and rules and regulations of the Department.
  - For electrical and applicable construction inspections, the applicant must schedule and pass Department inspections.

- Certify the BESS.
  - A NYS registered design professional will certify, in a letter submitted to OTCR, that the installation complies with all conditions of the OTCR Conditional Acceptance Letter. The certification letter must be signed and sealed by the registered design professional.

- Obtain OTCR Final Acceptance Letter.
  - The OTCR Final Acceptance Letter will be issued after receipt of the BESS certification letter. OTCR will upload the Final Acceptance Letter to BIS.

Figure 1. Department Filing, Submittal and Approval Process for BESS



Attachment A: Battery Energy Storage System (BESS) Required Submittal Information

The following information is required for all BESS information submitted for evaluation by the Department of Buildings. Please contact OTCR (OTCR@buildings.nyc.gov) prior to assembling the required information.

1. Project Information

- Location/Address
- Contact Information (name, address, telephone number, and email)
  - Registered Design Professional
  - Integrator or Manufacturer
  - Building Owner
- Incentive program. Provide program name and number (if applicable)
- Construction Application for Permit. Provide NYC DOB Job# (required prior to issuance of OTCR Conditional Acceptance Letter)
- Electrical Permit - Provide NYC DOB Permit# (required prior to issuance of OTCR Conditional Acceptance Letter)
- Installation conditions:
  - Location / Indoor, outdoor, rooftop.
  - Application / Solar PV Storage, Load shedding;
  - Energy Source / Solar array, utility supplied, etc.)
- Building Information:
  - Construction classification and description of materials (steel frame, corrugated steel & Concrete, etc)
  - Occupancy Classification
  - Special flood hazard area
  - Fire district

2. ESS Properties and Characteristics

- Equipment and System Narrative:
- Battery Information:
  - General Information (Make/model#; Product literature; Cabinet, rack or container)
  - Chemistry (Lithium-Ion, VRLA, etc)
  - Physical Properties (length, height, width and weight for cells, modules, and cabinets/racks)
  - Electrical (electrical capacity in kWh)
  - Lifespan
- Inverter Information:
  - Make/model#
- Electrical Interconnection

3. Specific risks/concerns

- Corrosive spills/electrolyte leakage. Does the ESS have free electrolyte? If so, provide the electrolyte volume and containment volume (cu. Yd.).

4. Construction Documents

- Required information. Confirm the following information is provided on construction documents:
  1. Location and layout diagram of the room or area in which the ESS is to be installed (included distances to adjacent construction, nearby equipment, egress features, FDNY access to site, dunnage (if applicable), security features such as fencing, bollards, etc.)
  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.

- Provide the following plans applicable to the BESS installation:
  - General Notes
  - Site
  - Architectural
  - Fire suppression
  - Electrical (Provide single line diagram of the BESS including connection to renewal energy system and premises' electrical system)
  - Structural

5. Proposed Design Features

- Fire separation (provide hourly rating for indoor installations)
- Rooftop construction (Confirm minimum Class B per BC 1505, identify roofing material)
- Fire suppression (NFPA 13 and commodity class, wet/dry)
- Venting (confirm room complies with MC 502.4 (rooms) and MC 502.5 (cabinet enclosures) where applicable)
- Structural (Confirm dunnage complies with BC Chapter 16 and Chapter 22, Confirm concrete pad complies with BC Chapter 16 and 19)
- Electrical (Confirm compliance with 2011 NYC Electrical Code)
- Fire Protection (Indicate if automatic fire alarm is provided, indicate if central station monitoring is provided)
- Peer review (Indicate if peer review is suggested)
- Storage of hazardous material report. For storage systems with hazardous materials, a copy of the report filed in accordance with BC 414.1.3 shall be provided.

6. Certification and Testing

- BESS
  - UL 9540. Provide copy of listing and web link from listing agencies certification database.
  - UL 9540A Testing. Provide a copy of the report.

7. System Monitoring

- Report if 24/7 remote monitoring is provided. Provide identification for service provider and submit monitoring contract.
- Battery management system (BMS). Literature must detail communication protocols, auxiliary outputs (for controlling/signaling output), auxiliary inputs (for fire alarm connection/emergency power off), capability of disconnecting individual battery/string of batteries under emergency shutdown, 24/7 remote monitoring for early warning.

8. Operating manuals

- Incident Training Manual including:
  - Material Safety Data Sheet (MSDS), Safety Data Sheet (SDS)
  - OSHA HCS
  - Emergency shutdown procedures
  - Emergency first-aid requirements
  - Emergency Response Plan

- Operation and training program and manual
- Safety and Handling Guidelines
- Safety and Warning Signage

- Maintenance plan including:
  - Details for replacement
  - Compatibility of replacement parts

- Recycling plan including:
  - Recycling details
  - Decommissioning plan

9. Additional Requirements

- Zoning Analysis prepared by NYS PE/RA. For outdoor installations, including rooftop. Must submit for plan review. Submit DOB-approved Zoning Analysis prior to permit.
- Code Analysis (prepared and signed by NYS PE/RA). A code analysis shall be presented in tabular format. Supporting documentation shall be provided to substantiate the analysis. This analysis should include, but not be limited to comparison of requirements for standby power, emergency power or uninterrupted power supplies and hazardous classifications.
  - MC 502.4 & MC 502.5 (Exhaust Requirements)
  - BC 509 (Separation of incidental use areas)
  - BC 903 (Automatic sprinkler detection)
  - BC 904 (Alternative automatic fire-extinguishing systems)
  - BC 907. 2 (Fire alarm and detection systems)
  - FC 608 (Requirements for battery storage systems)
  - BC 307 (High-hazard Group H occupancy)
- Risk Analysis (prepared and signed by NYS PE). The Risk Analysis shall include a tabulated summary of hazards as indicated below and detailed mitigation measures used to lower the severity level of the hazard.

  The analysis shall include the following:
  - Identification of Hazards. A table shall be provided that identifies Hazard Modes as it pertains to the battery technology proposed and shall include, but not limited to, the following:
    - Electrical; External Short-Circuit, Internal Cell Fault, Abnormal Charge, Overcharge, Over-Discharge, Soft Short
    - Thermal; External and Internal Fire, Elevated Temperature, Energetic Failures (Thermal Runaway), Thermal Abuse
    - Mechanical; Crush, Nail Intrusion, Shock, Drop, Poor Cell Design, Vibration
    - System; Contactors Fail Closed, Loss of HV Continuity, Chassis Fault, BMS Fault
  - Severity Levels of Hazards (EUAR)
  - Likelihood Levels
  - Hazard Modes and Risk Mitigation Analysis
  - Battery Safety Gap Analysis

  The Risk Analysis shall be prepared in accordance with ISO.IEC 31010 **Risk Management – Risk Assessment Techniques**. The risk analysis is prepared on a site-specific basis.