



### **Electrical Assessment Philosophy**

Electrical systems in historic houses are an example of an evolving technology. Electrical distribution was initially available in the 1880s and the Rural Electrification Act was signed in 1936. Thus, most houses built before 1900 will have been modified to support electrical use. The intervening 100+ years have seen significant advances in electrical technology. Historic houses are likely to have different generations of functional electric wiring. From a safety and efficiency perspective, these wiring systems should be assessed and any upgrades or changes performed in a thoughtful manner that is consistent with preservation philosophies but also provides required functionality in a safe and efficient manner.

### **Electrical Assessment Guidelines**

- Some electrical receptacles, equipment or wiring may be historically significant and should be treated as historic fabric.
- Ungrounded outlets are not necessarily “bad”, however their functionality and use should be carefully assessed.
- Older electrical systems may not support the amperage requirements of modern electrical devices.
- Often, simple outlet testers can safely evaluate the condition of electrical outlets.
- Electrical panels (including fuse boxes and circuit breakers) should be clearly labeled.
- Initial inventory and assessment can be performed by preservation staff.
- Any changes in electrical connectivity should be performed by a licensed electrician.

## Electric: Electrical Assessment

### Technical Information - Electrical Inventory and Inspection

In order to determine a proper scope of work for electric work there are two different levels of surveys staff should complete before an outside contractor is brought in for their assessment. This is the base line inventory and inspection that most staff are qualified to perform.

These surveys are for operational electrical only. The preservation manager should be sure to assess existing electrical work for historic integrity. This assessment may require leaving certain wiring in place as evidence of previous technology.

#### First Tier Inspection:

- Use a copy of the floor plans to start a working copy of a master plan for electrical utilities.
- Record the meter number(s) and note location(s) on the master plan.
- Identify the number of electrical panels on the site and indicate their location on a master plan. Note the feed source of the panel.
- Determine if the circuits in the electrical panel(s) are labeled.
- Search for exposed connections boxes without covers or boxes with exposed loose wires.
- Check to be sure there is a grounding wire bypassing the water meter.
  - There should be a copper wire clamped to copper piping before and after the water meter so that the wire bypasses the meter.
- Verify whether the building has lightning protection.
- Verify whether the site can be powered by a generator.

#### Second Tier Inspection:

This tier of inspection adds elements that are slightly more complex in nature. For that reason site staff or even project/preservation managers may not be qualified to do the assessment.

- Identify on the master plan all hard wired fixtures.
- Note how all fixtures are controlled.
- If the panels are not labeled correctly label them using the Historic New England “Electrical Labeling” guidelines.
- Check each circuit and verify that the labeling is correct or change the labeling to match conditions.
- Identify and test all receptacle locations on the master plan.
  - This is most effectively accomplished while using a three prong outlet tester. Outlet testers will verify grounding and whether the outlet is correctly wired.
  - Locate the receptacles which need work on the plan so that it is understood which outlets need maintenance.
  - If there is no ground or the tester shows a faulty wiring condition then the outlet is to be labeled using ¾” blue painters tape with the fault thereby blocking the outlet from use. Do not use tape on “historic” outlets with historic finishes.

# Property Care White Papers

## Electric: Electrical Assessment

- Review receptacle locations with site staff and discuss location changes. The goal is to avoid use of extension cords specifically in office locations and possibly in museum locations.
- Review phone and data jack locations and whether these are positioned efficiently for use.
- Determine if the electrical system has surge suppression. If it does not, make an assessment as to whether the system requires it.
- Determine what equipment and/or circuits should be powered by an emergency generator.
- Develop recommendations for all changes to existing services (receptacle locations, equipment to be powered by generator, etc.) for review by team leader of property care.

### Third Tier Inspection: Requires Licensed Electrician

- Assess all fixtures and determine if wiring hazards are present.
  - This may involve partial removal of the fixtures from the wall and resulting damage to the wall finishes. This should be considered before proceeding.
  - Determine whether museum fixtures will be included during this inspection. In many cases they will not but should be noted at this time as not having been inspected.
- Check for grounding at all panels and the service entrance.
- Determine whether the building has adequate surge protection.
- Open all electrical panels, assess condition and tighten all connections.
- Provide a professional assessment of the circuit under load.
- Assess the quality of power to the site.
- If the site has the ability to be powered by a generator assess the circuits powered and the labeling.
  - Verify that the labeled circuits indeed power what is specified.
- Provide an estimate of the system's life expectancy.
- Provide professional recommendations and estimates on the following items:
  - What has to be addressed for safety reasons?
  - What has to be addressed for code reasons?
  - What other upgrades or improvements are recommended?
  - Is the system efficient and are there ways to improve it?
  - Cost to provide generator backup capability or improvements to the existing system for the needs identified by staff.

### Fourth Tier Assessment: Requires Licensed Electrician

- Create simple line drawings of the distribution system.
- Use an infrared camera to document the electric panels before and after work with cover on and off.
- Use infrared camera to inspect fixtures, controls, and junction boxes