

# Provo City Center Utah LDS Temple

Provo, UT



## Team

### Owner:

The Church of Jesus Christ of Latter-day Saints, Salt Lake City, UT

### Architect:

FFKR Architects, Salt Lake City, UT)

### Structural Engineer:

Reaveley Engineers + Associates  
Salt Lake City, UT

### General Contractor:

Jacobsen Construction Company  
West Valley City, UT

### Concrete Contractor:

Jacobsen Construction Company  
West Valley City, UT

### Construction Program Manager:

Jacobsen Construction Company  
West Valley City, UT

### Reinforcing Bar Fabricator:

Harris Rebar, Salt Lake City, UT  
Western States Rebar, Pleasant View, UT  
Pacific Coast Steel, Draper, UT

### Award:

2016 CRSI Award Winner—  
Cultural & Entertainment Facilities Category

### Photography:

Reaveley Engineers + Associates  
Salt Lake City, UT

The Provo City Center LDS Temple was built from the burned-out shell of this historic structure. The design goal was to restore and repurpose the building in the design language of the era the building was originally constructed. The first major challenge was to preserve the exterior masonry walls of the original structure and make them part of the new Temple. The walls were to remain in-place by the aid of temporary shoring until a permanent system could be installed. Since this was the first phase of the project to be designed and detailed, it had to take into account all future work that would take place that relates to the above grade walls (such as floor framing connections and roof connections and diaphragm tie-ins). Another major challenge was taking a 35,000sf historic structure to a modern 85,000sf house of worship without losing historic details. In order to double the size of the building, the project team knew excavation would be required to accommodate a basement, sub-basement and parking. Since the original building had only a crawlspace of a few feet below the main level, a system had to be engineered to support and reinforce the existing masonry walls while excavation could take place.

A substantial parking garage was needed to accommodate the large number of visitors expected to visit the temple. The owner requested the grounds have a beautiful, peaceful and meditative appearance for its patrons and visitors. To this end, the large parking area needed to be underground to allow for landscape creativity at grade. For this project site, the height of the groundwater was above the lowest levels. The owner requested that a permanent dewatering system not be used. Since the building was about 14' deep into the groundwater table it had to be designed to keep water out. The sub-grade structures and parking structure would be subject to hydrostatic pressures that are imposed on both the walls and bottom floor of the structures.

### STRUCTURAL FRAMING SYSTEM

Besides the need to use reinforced concrete for portions of the new structure that would be built below-grade, the ability to preserve intact the remaining historic brick walls with the use of reinforced concrete was the single most driving factor in the use of the material.

**SUSTAINABILITY OBJECTIVES.** Portions of the project were designed with a longer than standard design life to meet the long-term use requirements of the facility. These portions utilized reinforced concrete to meet those objectives. A concrete compressive strength of 5,000psi for footings, larger clear cover distances to rebar and the use of epoxy-coated reinforcing steel (rebar) are ways in which the long-term objectives were met.

### REASONS FOR CHOOSING REINFORCED CONCRETE

Reinforced concrete allowed underground requirements for the location of the parking garage to be met especially with the heavy soil and water fountain feature loads. The beams were designed with post-tension stresses higher than normal to reduce beam depth. The result was an increased number of post-tensioning tendons and steel reinforcing bars within the beams. Careful detailing of the tendon anchorage plates was required to verify the plates could fit within the profile of each of the beams. To reduce congestion of the steel reinforcing bars within the beams, grade #75 rebar was specified.

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