The Earthquake Engineering Laboratory includes 24,500 sf of new laboratory, office, and auditorium space. It houses the University’s four earthquake simulators and is home to state-of-the-art control and instrumentation rooms. A 140-seat auditorium equipped with a video wall and broadband Internet technologies serves as a virtual window to the nation and world.

Sustainability Objectives
Sustainability was a secondary issue as there was only one material that could meet the requirements. However, fly ash was used in the concrete and there is a high-recycled steel content in rebar. Concrete aggregate and sand were provided locally.

STRUCTURAL FRAMING SYSTEM
The building test floor sits some 15’ below the adjacent street that could not be disturbed during or after construction. The end wall of the building at the street side is a reinforced 2-foot thick wall, is designed as both a retaining wall as well as a reaction wall to mount hydraulic cylinders for some test configurations. An additional reaction wall was built to provide a reaction wall for outdoor experiments, providing as much flexibility in experiment design as possible. These walls had no design criteria other than to make them as strong as possible with conventional rebar. These walls also had to be structurally combatable and integrated with the steel braces for the upper portion of the structure.

The test floor has unknown design criteria. The floor has a grid of sleeves on 2-foot centers that allow anchorage of concrete reaction blocks, the shake tables or other components to be anchored to the test floor as “fixed”. This anchorage is accomplished by using high-strength reinforcing bars to post tension the connection to the slab. The slab has short main spans of only 14’ and is 3’ thick with #14 bars @ 12 top and bottom. Many different experiments have been run in this lab and its older sister of similar design and no damage has occurred to the test floor structure.

Due to funding issues, the lab floor was constructed in two parts; the first 1/2 of the lab floor was constructed first and used for one summer as an outdoor test facility for static loading tests. When funding was secured for the remainder of the building, the remainder of the lab and the building to cover and support the testing was constructed.

REASONS FOR CHOOSING REINFORCED CONCRETE
• Reinforced concrete was the only way to achieve the massive and strong base for the shake tables. Reinforced concrete was the only way to get the durability, mass and strength needed for this test floor.
• Reinforcing steel (rebar) was to be extended from Phase 1 into Phase 2 using connectors. The 3-foot-thick main floor also had to be level and relatively smooth, thus the upper four inches were placed as a second pour. Only minor touch up grinding was needed to bring the floor into specification. Ordinary flatness criteria did not apply because of the large number of sleeves through the slab.