

# Pharmaceutical Lab Design

SSS Builders | Team S-1

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## Project Description

SSS Builders is working with LPA Inc. to design a 3 story, V-shaped steel frame research and development center for pharmaceutical usage for University of California, Irvine on California Avenue. The 320,000 square feet facility will contain research labs, supporting offices, lecture halls, and conference rooms to maximize learning for a variety of majors that will be integrated as part of the UCI School of Pharmacy.

## Floor Plan and Layout

- Two wings oriented at 90° from another.
- Atrium in the central portion of structure, with bridges that span from wing to wing.
- Exterior patio for leisure.
- Exterior glass curtain walls for natural sunlight
- 3rd, 2nd floors: labs, support offices, clinical trial area, conference rooms, administrative offices, area for vibrational equipment
- Ground floor: lecture halls, faculty offices, conference rooms, warehouse

## Structural Design and Framing

- Bays of 30 feet with 10 feet beam spacing to maximize deck efficiency and load carrying capacity.
- Verco decking carries loads to beams. Beams carry loads to girders. Girders frame into columns that carry loads to the foundation.
- Special concern for seismic design, particularly where the two wings meet at a V-shape.

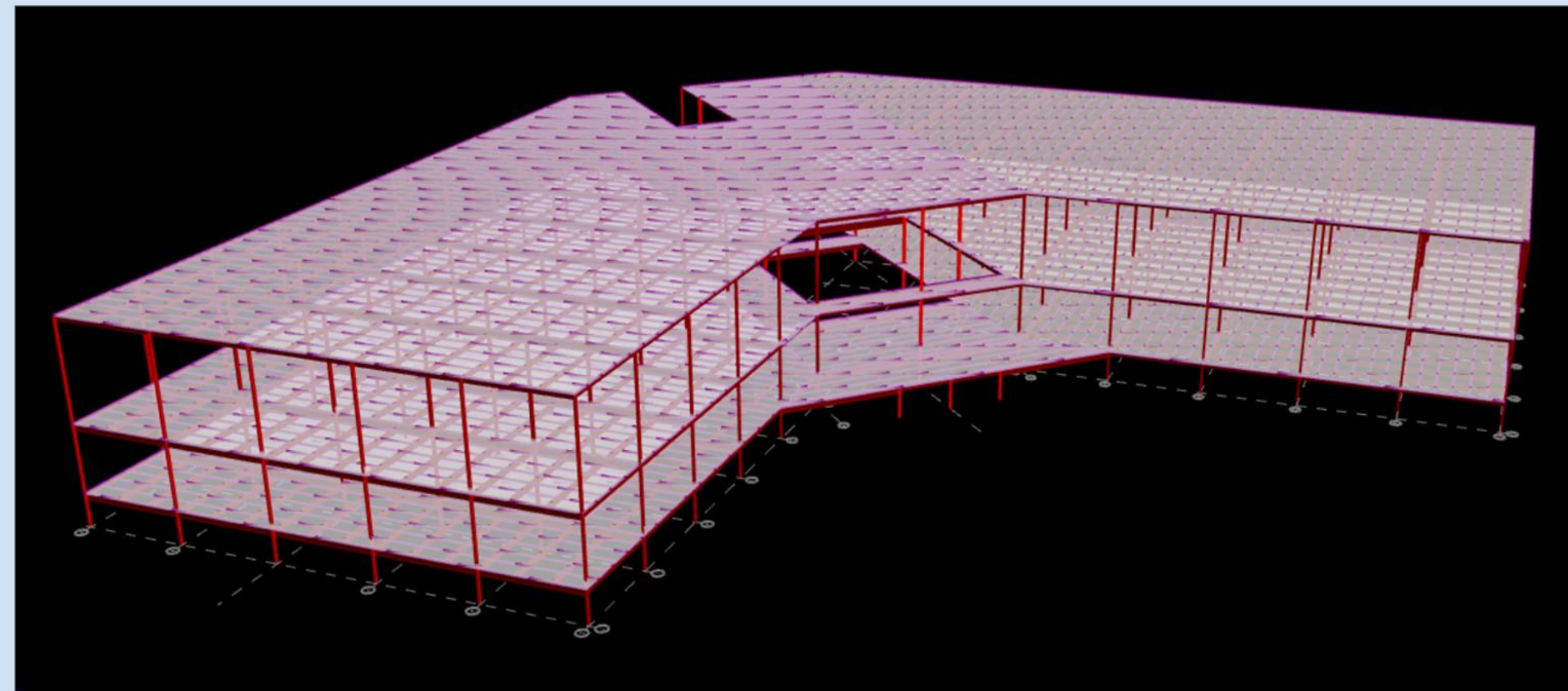


Figure 1. Floors and Framing Structural Model

## Cost Analysis

	Unit cost	Quantity	Total Cost
Structural Steel	\$1.08/lb.	1,813,377 lbs.	\$1,949,380
Lightweight Concrete Decking	\$135/cyd.	3820 cyds.	\$515,780
Metal Decking	\$5.33/sf.	226905 sf.	\$1,209,405
<b>Total</b>			<b>\$3,674,565</b>

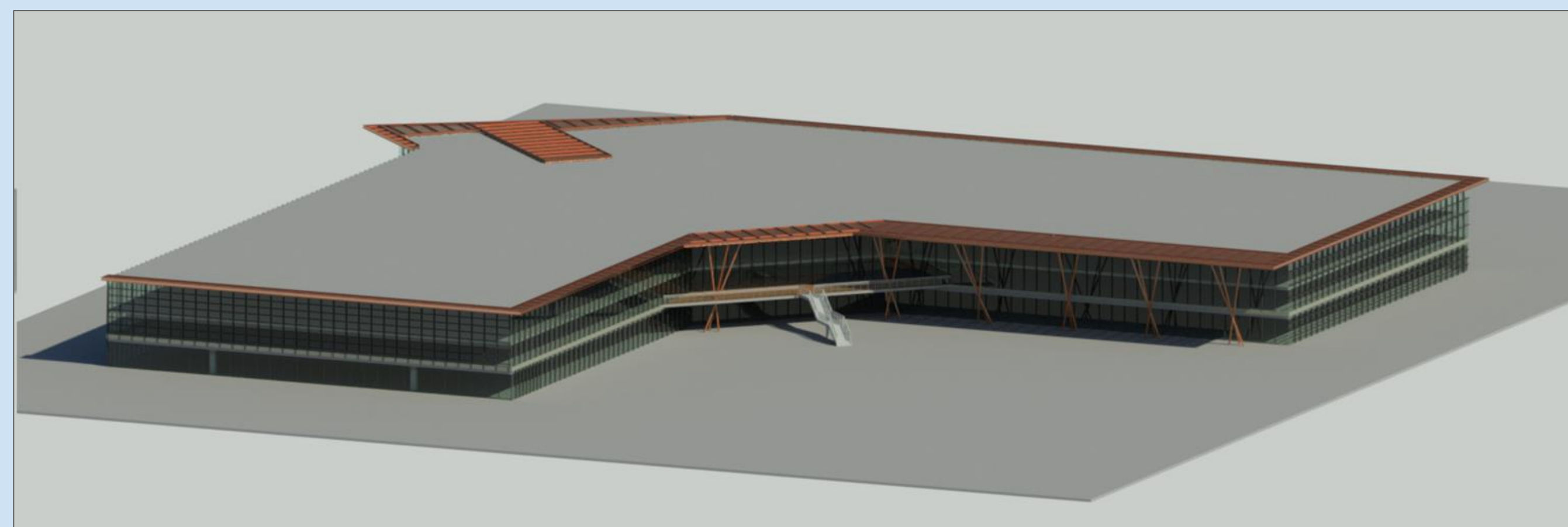


Figure 2. East Overview of Conceptual Model

## Load Design

	Dead	Live	Total Factored
Roof	69 psf	20 psf	114.8 psf
Floor	80 psf	100 psf	256 psf

## Structural Analysis

- RAM used to analyze loads that act upon all structural members and choose member sizes accordingly.
- Limit states considered: bending, shear, compression, buckling, and deflection.
- Live load reduction considered as per ASCE 7-16.

## Future Plans

- Parking Garage / Basement Design
- Foundation Design
- Lateral Force Resisting System
- Analysis for Vibration Requirements
- Seismic Analysis and Design

## Sources

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