NABIH YOUSSEF ASSOCIATES
STRUCTURAL ENGINEERS

UC Seismic Evaluation – Doris Stein Eye Research Center

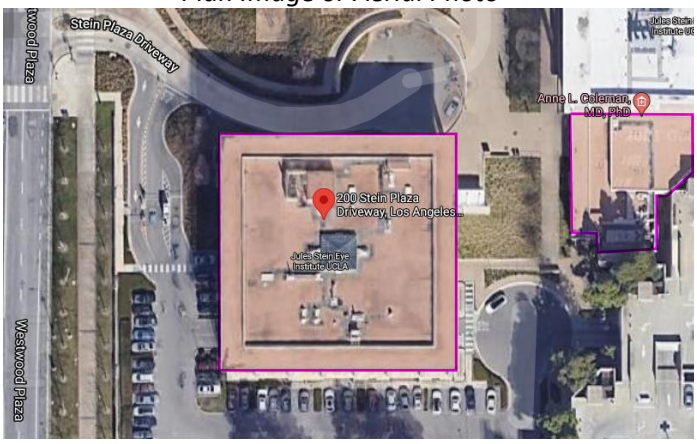
Date:	4/26/2021
UC Campus:	UCLA – on campus
Building Name:	Doris Stein Eye Research Center
Building Address:	200 Stein Plaza, Los Angeles, CA 90024
CAAN ID:	4325
Auxiliary Building ID[1]:	N/A

REGISTERED PROFESSIONAL ENGINEER
F. G. YOUSSEF
No. 2026
Exp. 3/30/21
STRUCTURAL
STATE OF CALIFORNIA

Summary of information provided by Evaluator:
Nabih Youssef Associates Structural Engineers

UCOP Seismic Performance Level[2] (or "Rating") based on ASCE 41-17 Tier 1 evaluation findings: V

Plan Image or Aerial Photo



Exterior Photo

Site location coordinates (decimal):
Latitude: 34.06456
Longitude: -118.44460

Is this a "Partial" Building (i.e., a single structure in a complex building? (Y or N): N

ASCE 41-17 Model Building Type[3]:
Longitudinal Direction: S1 – Steel Braced Frames (with stiff diaphragms)
Transverse Direction: S1 – Steel Braced Frames (with stiff diaphragms)

Number of stories:
Above grade: 4
Below grade: 0

[1] Applicable only for individual buildings that are structurally separate units within a building complex. Each auxiliary building shall be designated with the main building CAAN ID with a decimal number suffix (i.e. main building CAAN ID 5534; auxiliary building CAAN ID 5534.1). Auxiliary building ID is null for a single building or the main building in a building complex.
[1] The designated Seismic Performance Level shall be a Roman numeral associated with the most applicable performance description from Table A.1 in Appendix A of the UC Seismic Safety Policy.
[1] If a building has multiple building types in one story, the model building type should be designated based on engineering judgement as the lateral system that would have the most predominantly negative effect on the seismic behavior of the building in that respective direction.

Original Building Design Code and Year: 1979 Uniform Building Code
Retrofit Building Design Code and Year: N/A

Cost Range to Retrofit (if applicable)[4]: High
"Low" cost-range corresponds to a complete retrofit cost less than $50 per square foot (sf), "Medium" cost-range corresponds to a complete retrofit cost greater than $50 per sf and less than $200 per sf, "High" cost-range corresponds to a complete retrofit cost greater than $200 per sf and less than $400 per sf, and "Very High" cost-range corresponds to a complete retrofit cost greater than $400 per sf.

Building information used in this evaluation:
Structural drawings by Erkel, Greenfield and Associates, Inc., "Doris Stein Eye Research Center", dated 11/03/1987

Scope for completing this form:
Reviewed structural drawings for original construction and performed ASCE 41-17 Tier 1 Screening using Tier 1 Checklists.

Brief description of structure:

The eye research center building has a total area of approximately 82,000 square feet split between the main building, which is 4-stories and approximately 72,000 square feet, and a lecture hall annex, which is 2 stories and about 10,000 sf. The building was built in 1988. The main building is a roughly square in plan and the annex is attached via a below grade hallway is rectangular and two stories tall.

Foundation System: The foundation system consists of shallow spread footings supporting columns and shallow continuous footings supporting walls. Grade beams connecting footings are used at isolated locations. A typical 4" thick concrete slab-on-grade, with select locations of 6" slab-on-grade forms the finished ground floor level.

Structural System for Vertical (gravity) loads: The typical floor and roof framing consists of steel W-shape beams and girders with concrete filled metal deck spanning between beams. Steel columns take vertical loads directly to the spread foundations or to Concrete walls that then transfer loads to shallow foundations.

Structural System for Lateral (seismic/wind) loads: For the main building, the concrete filled metal deck roof and floor decks act as the diaphragms to transfer seismic forces to perimeter steel moment frames. Below the first floor, concrete walls between ground and level 1 are also present to assist in transferring seismic forces to the foundation system. The annex building primarily uses concrete walls as the lateral system with some supplemental Steel moment frames in the north-south direction only.

BACKGROUND INFORMATION

Site Information:
Site Class (A-F): D; Default

Geologic Hazards (Y or N):

- Fault Rupture: N; EZRIM Beverly Hills
- Liquefaction: N; USGS
- Landslide: N; EZRIM Beverly Hills

Site-specific Ground Motion Study? N
Site-modified Spectral Response (0.2s), Hazard Level BSE-1E, S_{XS}: 0.896
Site-modified Spectral Response (1.0s), Hazard Level BSE-1E, S_{X1}: 0.516
Estimated Fundamental Period (seconds):

- Longitudinal Direction: 0.957s (main building), 0.217s (lecture annex)
- Transverse Direction: 0.957s (main building), 0.217s (lecture annex)

Falling Hazards Assessment Summary: No egregious falling hazards are present at the exterior of the building. There is a covered colonnade at the perimeter of the main building with a soffit at the overhang and column architectural covers, but these would pose no greater risk than typical building cladding.

Summary of Tier 1 Seismic Evaluation Structural Non-compliances/Findings Significantly Affecting Rating Determination:

Significant Structural Deficiencies, Potentially Affecting *Seismic Performance Level* Designation:

- ☐ Lateral System Stress Check (wall shear, column shear or flexure, or brace axial as applicable)
- ☐ Load Path
- ☒ Adjacent Buildings
- ☐ Weak Story
- ☐ Soft Story
- ☐ Geometry (vertical irregularities)
- ☐ Torsion
- ☐ Mass – Vertical Irregularity
- ☐ Cripple Walls
- ☐ Wood Sills (bolting)
- ☐ Diaphragm Continuity
- ☐ Openings at Shear Walls (concrete or masonry)
- ☐ Liquefaction
- ☐ Slope Failure
- ☐ Surface Fault Rupture
- ☐ Masonry or Concrete Wall Anchorage at Flexible Diaphragm
- ☐ URM wall height to thickness ratio
- ☐ URM Parapets or Cornices
- ☐ URM Chimney
- ☐ Heavy Partitions Braced by Ceilings
- ☐ Appendages

Brief Description of Anticipated Failure Mechanism: Yielding of Moment frame beam connections is the desired mechanism for the main building, however the existing frames have an undesirable strong beam - weak column situation that could lead to yielding of the columns rather than the beams should inelastic behavior occur during a strong seismic event and the beam connections are pre-Northridge type connections that could have fracture occur in strong seismic events. The Annex has robust concrete walls which may see cracking in larger seismic events.

Comments and Additional Deficiencies: The lecture annex is very close to the Jules Stein building to the north and pounding could occur based on the Tier 1 checks. A tier 2 investigation could help better determine if this would occur. The frames, in addition to the connection type and strong column-weak beam deficiencies, have beams that do not meet the tier 1 compactness check or the tier 1 drift check . NYA suggests a detailed Tier 2 evaluation be performed to more accurately assess these non-compliant Tier 1 check issues.

Seismic Retrofit Concept Sketches/Description (only if above-listed rating is V or greater): To alleviate the adjacency issue at the Lecture annex the corbel from Jules Stein could be removed, if possible, allowing increased clearance. The Main building steel moment frame could be supplemented with additional frames or braces to ensure lower demands, supplemented with a damping system to decrease demands, or moment connections and columns could be strengthened to ensure frame ductility during a strong seismic event.

Appendices:

A. ASCE 41-17 Tier 1 Checklists
B. Quick Check Calculations