NABIH YOUSSEF ASSOCIATES
STRUCTURAL ENGINEERS

UC Seismic Evaluation – Macgowan East

Date:	10/30/2020
UC Campus:	UCLA – on campus
Building Name:	Macgowan East Theatre Classrooms
Building Address:	243 Charles E Young Dr E, Los Angeles, CA 90024
CAAN ID:	4585
Auxiliary Building ID[1]:	N/A

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 Elevation Photo

Site location coordinates (decimal):
Latitude: 34.076160
Longitude: -118.439313

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: CFS2 – Cold-formed steel light-frame construction – strap braced wall system
Transverse Direction: CFS2 – Cold-formed steel light-frame construction – strap braced wall system

Number of stories:
Above grade: 1
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: 1997 Uniform Building Code
Retrofit Building Design Code and Year: N/A

Cost Range to Retrofit (if applicable)[4]: Low
"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:
As-built Structural drawings by Richard Meehan, "Macgowan East Theater Classrooms", dated 04/15/90

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

Brief description of structure:

The 1-story classroom and storage building has an area of approximately 2,300 square feet and was built in 1998. The building is L-shaped in-plan with a re-entrant corner.

Foundation System: The foundation system consists of shallow continuous spread footings supporting light-framed bearing walls. A 4" thick concrete slab forms the finished floor level.

Structural System for Vertical (gravity) loads: The roof framing consists of 18" deep plywood web wood joists at 24" on center with ¾" plywood sheathing deck. The roof framing is supported by Light-gauge Cold-formed steel stud bearing walls that are continuous from slab to top of parapet. Light-gauge box headers are used to span window and door openings.

Structural System for Lateral (seismic/wind) loads: The plywood roof deck acts as the diaphragm to transfer seismic forces to light-gauge cold-formed steel stud bearing walls that are diagonally strapped with 16-gauge straps in X-pattern layout. At the slab/floor, seismic forces are transferred from the base of the walls with ¾" diameter embedded bolts.

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

[4] Assume a complete retrofit conforming to the current UC Seismic Safety Policy. Note this range includes all construction costs, including code upgrades (e.g., ADA, fire and life safety, mechanical, electrical, plumbing) triggered by the seismic retrofit. No specific estimate is required to be supplied at this time (i.e., provide an approximate cost to retrofit using Low, Medium, High or Very High cost-range categories). It is acknowledged that such a cost range is assumed to be based only on the engineer's rough estimate and is not intended to require input from a professional cost estimator. For estimation purposes, CSEs may judgmentally determine an approximate cost range for seismic retrofits based on recent relevant experience, and then apply a multiplier to approximate total construction costs.

Site-specific Ground Motion Study? N

Site-modified Spectral Response (0.2s), Hazard Level BSE-1E, S_{XS}: 0.899

Site-modified Spectral Response (1.0s), Hazard Level BSE-1E, S_{X1}: 0.518

Estimated Fundamental Period (seconds):

- Longitudinal Direction: 0.129s
- Transverse Direction: 0.129s

Falling Hazards Assessment Summary: An Entry Canopy is cantilevered with tension struts as shown on the original plans. The struts are steel tubes with compression capacity and connections appear well detailed and robust. The building has a Parapet that is a continuous extension of the exterior bearing wall studs. Because of this and the light nature of finish materials the parapet should have a low probability of experiencing failure.

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 cold-formed steel strap bracing under high seismic demands

Comments and Additional Deficiencies: Average Strap tension stress came up short on the Tier 1 checklist calculation, however there is exterior sheathing and finishes that can absorb some lateral load as well as interior finish presumably drywall that also has some lateral capacity. Additionally there is an interior sound partition that also has the potential to resist some lateral load so the strap check alone taking all lateral force is a very conservative check.

Seismic Retrofit Concept Sketches/Description (only if above-listed rating is V or greater): Add wider strapping to achieve additional capacity or strap both sides of the wall. If exterior is strapped and interior side can be made accessible for strapping that would be the simplest form of remediation. Also replacing interior drywall with a sheathing and fastening that has a rated capacity could add enough capacity to the lateral system.

Appendices:

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