Campus: UCLA
Building Name: Fowler Museum
CAAN ID: 4374
Auxiliary Building ID:

UNIVERSITY OF CALIFORNIA

Date: Oct 28, 2020

FORM 1
CERTIFICATE OF SEISMIC PERFORMANCE LEVEL
☒ **UC-Designed & Constructed Facility**
☐ **Campus-Acquired or Leased Facility**

BUILDING DATA
Building Name: Fowler Museum
Address: 308 Charles E Young Dr N, Los Angeles, CA, 90024
Site location coordinates: Latitude 34.07293982 Longitudinal -118.44317091

UCOP SEISMIC PERFORMANCE LEVEL (OR "RATING"): V

ASCE 41-17 Model Building Type:
a. Longitudinal Direction: C2: Concrete Shear Walls With Stiff Diaphragms
b. Transverse Direction: C2: Concrete Shear Walls With Stiff Diaphragms

Gross Square Footage: 102,219
Number of stories *above* grade: 3
Number of basement stories *below* grade: 1

Year Original Building was Constructed: 1990
Original Building Design Code & Year: UBC-1982
Retrofit Building Design Code & Code (if applicable): N/A

SITE INFORMATION
Site Class: D Basis: Inferred
Geologic Hazards:
Fault Rupture: No Basis: Inferred
Liquefaction: No Basis: Inferred
Landslide: No Basis: Inferred

ATTACHMENT
Original Structural Drawings: (Fowler Museum of Cultural History, KPFF, 3/9/1987, S1.1) or
Seismic Evaluation: (Fowler Museum Seismic Evaluation Tier 1, KPFF, 10/28/2020, ASCE 41-17 Tier 1)
Retrofit Structural Drawings: (N/A, N/A, N/A, N/A)

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CERTIFICATION & PRESUMPTIVE RATING VERIFICATION STATEMENT

I, Mark Hershberg, a California-licensed structural engineer, am responsible for the completion of this certificate, and I have no ownership interest in the property identified above. My scope of review to support the completion of this certificate included both of the following ("No" responses must include an explanation):

a) the review of structural drawings indicating that they are as-built or record drawings, or that they otherwise are the basis for the construction of the building: ☑ Yes ☐ No
b) visiting the building to verify the observable existing conditions are reasonably consistent with those shown on the structural drawings: ☐ Yes ☑ No
Due to COVID-19 protocols, observations were performed for exterior of building only.

Based on my review, I have verified that the UCOP Seismic Performance Level (SPL) is presumptively permitted by the following UC Seismic Program Guidebook provision (choose one of the following):

☐ 1) Contract documents indicate that the original design and construction of the aforementioned building is in accordance with the benchmark design code year (or later) building code seismic design provisions for UBC or IBC listed in Table 1 below.

☑ 2) The existing SPL rating is based on an acceptable basis of seismic evaluation completed in 2006 or later.

☐ 3) Contract documents indicate that a comprehensive[1] building seismic retrofit design was fully-constructed with an engineered design based on the 1997 UBC/1998 ***or later*** CBC, and (choose one of the following):

☐ the retrofit project was completed by the UC campus. Further, the design was based on ground motion parameters, at a minimum, corresponding to BSE-1E (or BSE-R) and BSE-2E (or BSE-C) as defined in ASCE 41, or the full design basis ground motion required in the 1997 UBC/1998 CBC ***or later*** for EXISTING buildings, and is presumptively assigned an SPL rating of IV.

☐ the retrofit project was completed by the UC campus. Further, the design was based on ground motion parameters, at a minimum, corresponding to BSE-1 (or BSE-1N) and BSE-2 (or BSE-2N) as defined in ASCE 41, or the full design basis ground motion required in the 1997 UBC/1998 ***or later*** CBC for NEW buildings, and is presumptively assigned an SPL rating of III.

☐ the retrofit project was not completed by the UC campus following UC policies, and is presumptively assigned an SPL rating of IV.

[1] A comprehensive retrofit addresses the entire building structural system as indicated by the associated seismic evaluation, as opposed to addressing selective portions of the structural system.

CERTIFICATION SIGNATURE

AFFIX SEAL HERE

Mark Hershberg	Principal
Print Name	Title
S5078	6/30/2021
CA Professional Registration No.	License Expiration Date
Signature	10/28/2020 Date

KPFF Inc., (213) 418-0201, 700 S. Flower St., Suite 2100, Los Angeles, CA 90017

Firm Name, Phone Number, and Address

Table 1: Benchmark Building Codes and Standards

Building Type[a,b]	Building Seismic Design Provisions	
	UBC	IBC
Wood frame, wood shear panels (Types W1 and W2)	1976	2000
Wood frame, wood shear panels (Type W1a)	1976	2000
Steel moment-resisting frame (Types S1 and S1a)	1997	2000
Steel concentrically braced frame (Types S2 and S2a)	1997	2000
Steel eccentrically braced frame (Types S2 and S2a)	1988[g]	2000
Buckling-restrained braced frame (Types S2 and S2a)	[f]	2006
Metal building frames (Type S3)	[f]	2000
Steel frame with concrete shear walls (Type S4)	1994	2000
Steel frame with URM infill (Types S5 and S5a)	[f]	2000
Steel plate shear wall (Type S6)	[f]	2006
Cold-formed steel light-frame construction—shear wall system (Type CFS1)	1997[h]	2000
Cold-formed steel light-frame construction—strap-braced wall system (Type CFS2)	[f]	2003
Reinforced concrete moment-resisting frame (Type C1)[i]	1994	2000
Reinforced concrete shear walls (Types C2 and C2a)	1994	2000
Concrete frame with URM infill (Types C3 and C3a)	[f]	[f]
Tilt-up concrete (Types PC1 and PC1a)	1997	2000
Precast concrete frame (Types PC2 and PC2a)	[f]	2000
Reinforced masonry (Type RM1)	1997	2000
Reinforced masonry (Type RM2)	1994	2000
Unreinforced masonry (Type URM)	[f]	[f]
Unreinforced masonry (Type URMa)	[f]	[f]
Seismic isolation or passive dissipation	1991	2000

Note: This table has been adapted from ASCE 41-17 Table 3-2. Benchmark Building Codes and Standards for Life Safety Structural Performed at BSE-1E.

Note: UBC = *Uniform Building Code*. IBC = *International Building Code*.

[a] Building type refers to one of the common building types defined in Table 3-1 of ASCE 41-17.

[b] Buildings on hillside sites shall not be considered Benchmark Buildings.

[c] not used

[d] not used

[e] not used

[f] No benchmark year; buildings shall be evaluated in accordance with Section III.J.

[g] Steel eccentrically braced frames with links adjacent to columns shall comply with the 1994 UBC Emergency Provisions, published September/October 1994, or subsequent requirements.

[h] Cold-formed steel shear walls with wood structural panels only.

[i] Flat slab concrete moment frames shall not be considered Benchmark Buildings.

700 S. Flower St., Suite 2100 Los Angeles, CA 90017 213.418.0201 kpff.com

UCLA – Fowler Museum

DATE: 10/28/2020
ASCE 41-17 Tier 1 Seismic Evaluation
Minimum Building Report Information

REGISTERED PROFESSIONAL ENGINEER
MARK A. HERSHBERG
S 5078
STRUCTURAL
STATE OF CALIFORNIA

BUILDING DATA

Campus: UCLA
Building Name: Fowler Museum
CAAN ID: 4374
Auxiliary Building ID:
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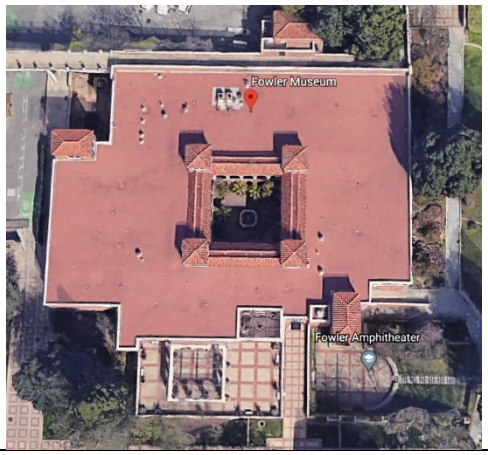

Aerial Photo


Exterior Elevation

ASCE 41-17 Model Building Type:

a. Longitudinal Direction: C2: Concrete Shear Walls With Stiff Diaphragms
b. Transverse Direction: C2: Concrete Shear Walls With Stiff Diaphragms

Site-specific Ground Motion Study? No
Seismic Design Acceleration Parameters of Interest:

a. For BSE-1E S_{XS}=0.898g and S_{X1}=0.517g
b. For BSE-2E S_{XS}=1.857g and S_{X1}=0.947g

Estimated Fundamental Period (seconds)

a. Longitudinal: 0.26s
b. Transverse: 0.26s

Gross Square Footage: 102,219
Number of stories *above* grade: 3
Number of basement stories *below* grade: 1

Year Original Building was Constructed: 1990
Original Building Design Code & Year: UBC-1982
Retrofit Building Design Code & Code (if applicable): N/A

SITE INFORMATION

Site Class: D Basis: GeoCon West, Inc., July 24, 2024, Pg. 7
Geologic Hazards:
Fault Rupture: No Basis: Referenced Geotechnical Report
Liquefaction: No Basis: Referenced Geotechnical Report
Landslide: No Basis: Referenced Geotechnical Report

UCOP SEISMIC PERFORMANCE RATING (OR "RATING"): V

"BALLPARK" RETROFIT COST (if applicable)

- ☒ Minor (<$50/sf)
- ☐ Moderate (~$50-$200/sf)
- ☐ Major (>$200/sf)

SUMMARY 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)
- ☒ Lateral System Detailing (reinforcement ratio, confinement, aspect ratio, etc)
- ☐ 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 Diaphragm
☐ URM wall height to thickness ratio
☐ URM Parapets or Cornices
☐ URM Chimney
☐ Heavy Partitions Braced by Ceilings
☐ Appendages

POTENTIAL FALLING HAZARDS

☐ Heavy ceilings, features or ornamentation above large lecture halls, auditoriums, lobbies or other areas where large numbers of people congregate.
☐ Heavy masonry or stone veneer above exit ways.
☐ Unbraced masonry parapets, cornices or other ornamentation above exit ways.
☐ Unrestrained hazardous materials storage.
☐ Masonry chimneys.
☐ Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.
☒ None of the above.

Due to current COVID-19 protocols, we did not verify in field that as-built documentation match current conditions or perform any condition assessment of the existing structure to identify falling hazards as required by the UCOP SSP.

BRIEF DESCRIPTION OF ANTICIPATED FAILURE MECHANISM

Due to limited wall length length, the concrete shear walls may be overstressed in a seismic event. Additionally, there is a long diaphragm opening along Gridline B at Level 3 that exists directly adjacent to a shear wall. This location could be subject to local diapragm failure in a seismic event.

There is also a pedestrian bridge that is connected to the primary structure and spans to adjacent Parking Structure 5. The pedestrian bridge has a moment frame lateral system in transverse direction, and is connected to the Fowler Museum for lateral support in the longitudnial direction. The moment frame system has nonconforming moment connections and panel zones based on the Tier 1 checks. The existing moment connections and panel zones lack sufficient strength to allow the frame beam to yield and may be subject to failure in a seismic event. There is also a 1" seismic gap between the true north end of the pedestrian bridge and the adjacent parking

structure. Based on the Tier 1 seismic separation checks, this gap is insufficient to avoid contact between the pedestrian bridge and the adjacent structure during a seismic event. This would likely result in slab-to-slab pounding (the slabs are well aligned) during a seismic event.

COMMENTS AND RECOMMENDATIONS

It is recommended for a Tier 2 evaluation to be performed. A Tier 2 evaluation may mitigate the various lateral system deficiencies indicated in the Tier 1 evaluation, such as the stresses in the primary structure lateral system, and the inadequacies associated with the moment connections at the pedestrian bridge.

Appendices

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