



Rating form completed by:

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Text in green is to be part of UC Santa Cruz building database and may be part of UCOP database

UC Santa Cruz building seismic ratings
Theater Arts – 2nd Stage Annex

CAAN #7319
 449 Kerr Road
 UCSC Campus: **Main Campus**



DATE: 2019-06-30



Rating summary	Entry	Notes
UC Seismic Performance Level (rating)	V (Poor)	
Rating basis	Level 1	FEMA P-154¹
Date of rating	2019	
Recommended UC Santa Cruz priority category for retrofit	Priority B	Priority A=Retrofit ASAP Priority B=Retrofit at next permit application
Ballpark total construction cost to retrofit to IV rating ²	Medium (\$50-\$200/sf)	See recommendations on further evaluation and retrofit.
Is 2018-2019 rating required by UCOP?	Yes	Building was not previously rated
Further evaluation recommended?	No	-

¹ We translate this Tier 1 evaluation to a Seismic Performance Level rating using professional judgment. Non-compliant items in the Tier 1 evaluation do not automatically put a building into a particular rating category, but we evaluate such items along with the combination of building features and potential deficiencies, focused on the potential for collapse or serious damage to the gravity supporting structure that may threaten occupant safety. See Section III B of the UC Seismic Policy and Method B of Section 321 of the 2016 California Existing Building Code.

² Per Section 3.A.4.i of the Seismic Program Guidebook, the cost includes all construction cost necessitated by the seismic retrofit, including restoration of finishes and any triggered work on utilities or accessibility. It does not include soft costs such as design fees or campus costs. The cost is in 2019 dollars.

Building information used in this evaluation

- Architectural drawings by Ralph Rapson and Associates Inc., “Performing Arts Building, University of California Santa Cruz,” as-built dated 30 June 1969
- Structural drawings by Pregnoff and Matheu, “Performing Arts Building, University of California Santa Cruz,” as-built dated 30 June 1969
- Architectural drawings by Sara Kane/Associates, “Choral Room Alterations” dated 27 April 1984
- University of California Facilities Link building database information, “7319” provided by José Sanchez (UCSC) on 2019-05-30.

Additional building information known to exist

- None

Scope for completing this form

Reviewed structural drawings for original construction and carried out a site visit to verify that the existing drawings matched the existing structure to the best of our knowledge. A FEMA P-154 Level 1 evaluation was completed.

Brief description of structure

Theater Arts H 2nd Stage is one of a cluster of eleven buildings that forms the Theater Arts complex. The complex was designed in 1969 by the architectural office of Ralph Rapson and Associates and the structural office of Pregnoff and Matheu.

The building is a theater, with a stage and seating located on the main level and a partial second floor level that holds the stage control room. The roof is sloped, with a steeply sloping roof overhanging the front side of the building.

A one-story corridor structure connects this Annex building to the adjacent Theater Arts – Stage 2 building (CAAN 7318). The corridor structure is structurally connected to both the Annex and the main Stage 2 building; there is no seismic separation between buildings.

Identification of levels: Level 1 (elevation 692’), Level 2 (elevation 701’ +/-), roof

Foundation system: The site is moderately sloping up from west to east. The superstructure is founded on shallow strip footings located under the exterior walls. The site is moderately sloping up from west to east. To accommodate the slope of the finished grade outside the building, a concrete foundation wall is provided at the north, east, and south perimeter walls to retain soil and support the perimeter walls. The Level 1 floor is slab on grade.

Structural system for vertical (gravity) load: Level 2 is a partial floor, and consists of wood joists spanning between steel beams cantilevering from steel columns. The roof is framed with wood joists spanning between steel beams which are supported by the steel columns at each end.

Structural system for lateral forces: Plywood sheathed floor and roof diaphragms transfer lateral inertial forces to plywood sheathed wood walls, which occur at the perimeter of the building.

Brief description of seismic deficiencies and expected seismic performance including mechanism of nonlinear response and structural behavior modes

Identified seismic deficiencies of the building include the following:

- A corridor structure is attached to the north side of this building and provides access to the 2nd Stage building. The corridor structure is one-story tall. Roof joists in the corridor structure span north-south, connected at one end to the wall of the 2nd Stage building and at the other end to the wall of the 2nd Stage Annex building, with no seismic separation joints at either end. The elevation of the corridor roof does not line up with the elevation of the floor of the adjoining buildings. Differential movement of the 2nd Stage and 2nd Stage Annex building in the north-south direction may result in pulling the roof joists away from their supports, creating a falling hazard.
- There is an out-of-plane setback in the front wall of the building, where the sloping near-vertical face of the roof bears on cantilevered steel beams, and does not align with the exterior walls below. We recommend that this condition be evaluated for adequacy, for instance with a Tier 2 analysis.

FEMA P-154 Score

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{L1}																		
FEMA BUILDING TYPE	Do Not Know	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score		2.1	1.9	1.8	1.5	1.4	1.6	1.4	1.2	1.0	1.2	0.9	1.1	1.0	1.1	1.1	0.9	1.1
Severe Vertical Irregularity, V_{L1}		-0.9	-0.9	-0.9	-0.8	-0.7	-0.8	-0.7	-0.7	-0.7	-0.8	-0.6	-0.7	-0.7	-0.7	-0.7	-0.6	NA
Moderate Vertical Irregularity, V_{L1}		-0.6	-0.5	-0.5	-0.4	-0.4	-0.5	-0.4	-0.3	-0.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4	-0.3	NA
Plan Irregularity, P_{L1}		-0.7	-0.7	-0.6	-0.5	-0.5	-0.6	-0.4	-0.4	-0.4	-0.5	-0.3	-0.5	-0.4	-0.4	-0.4	-0.3	NA
Pre-Code		-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.2	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	0.0
Post-Benchmark		1.9	1.9	2.0	1.0	1.1	1.1	1.5	NA	1.4	1.7	NA	1.5	1.7	1.6	1.6	NA	0.5
Soil Type A or B		0.5	0.5	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.1	0.3	0.2	0.3	0.3	0.1	0.1
Soil Type E (1-3 stories)		0.0	-0.2	-0.4	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	0.0	-0.2	-0.1	-0.2	-0.2	0.0	-0.1
Soil Type E (> 3 stories)		-0.4	-0.4	-0.4	-0.3	-0.3	NA	-0.3	-0.1	-0.1	-0.3	-0.1	NA	-0.1	-0.2	-0.2	0.0	NA
Minimum Score, S_{MIN}		0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.2	1.0
FINAL LEVEL 1 SCORE, $S_{L1} \geq S_{MIN}$:		2.1 - 0.9 = 1.2																

Summary of review of non-structural life-safety concerns, including at exit routes.³

We walked through the building and we looked for potentially hazardous nonstructural components during our site visit on 13 June 2019. As shown in the table below, no non-structural hazards were observed inside the building. The corridor structure outside the building is a potential life safety concern, because it is connected to both the 2nd Stage and the 2nd Stage Annex buildings, with no seismic separation joints.

UCOP non-structural checklist item	Life safety hazard?	UCOP non-structural checklist item	Life safety hazard?
Heavy ceilings, feature or ornamentation above large lecture halls, auditoriums, lobbies or other areas where large numbers of people congregate	None observed	Heavy partitions braced by ceilings	None observed
Heavy masonry or stone veneer above exit ways and public access areas	None observed	Appendages	None observed
Unbraced masonry parapets, cornices or other ornamentation above exit ways and public access areas	None observed	Unrestrained hazardous materials storage	None observed
Masonry chimneys	None observed	Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.	None observed

Discussion of rating

The rating of V (Poor) is because of the potential life safety hazard posed by the corridor structure. The building itself could be rated IV (Fair) if the corridor is fixed.

Recommendations for further evaluation or retrofit

We recommend that the Campus perform a more detailed review of the connection of the corridor structure and consider providing separation joints in the corridor roof between buildings.

Peer review of rating

This seismic evaluation was discussed in a peer review meeting on 17 June 2019. Reviewers present were Bret Lizundia of R+C and Robert Graf of Degenkolb. Comments from the reviewers have been incorporated into this report. The reviewers agreed with the assigned rating.

Additional building data	Entry	Notes
Latitude	36.9948	
Longitude	-122.0622	

³ For these Tier 1 evaluations, we do not visit all spaces of the building; we rely on campus staff to report to us their understanding of the type and location of potential non-structural hazards.

Are there other structures besides this one under the same CAAN#	No	
Number of stories above lowest perimeter grade	2	2 nd floor partial story
Number of stories (basements) below lowest perimeter grade	0	
Building occupiable area (OGSF)	1542 sq. ft.	
Risk Category per 2016 CBC Table 1604.5	II	Assembly occupancy (theater).
Site data		
Site class	D	
Site class basis ⁴	Geotech	See footnote below
Liquefaction potential	Low	
Liquefaction assessment basis	County map	See footnote below
Landslide potential	Low	
Landslide assessment basis	County map	See footnote below
Active fault-rupture identified at site?	No	
Fault rupture assessment basis	County map	See footnote below
Applicable code		
Applicable code or approx. date of original construction	Built: 1971 Code: 1964 UBC	Code inferred based on design year
Applicable code for partial retrofit	None	-
Applicable code for full retrofit	None	-
Model building data		
Model building type North-South	W1	
Model building type East-West	W1	
FEMA P-154 score	1.2	
Previous ratings		
Most recent rating	-	None known
Date of most recent rating	-	

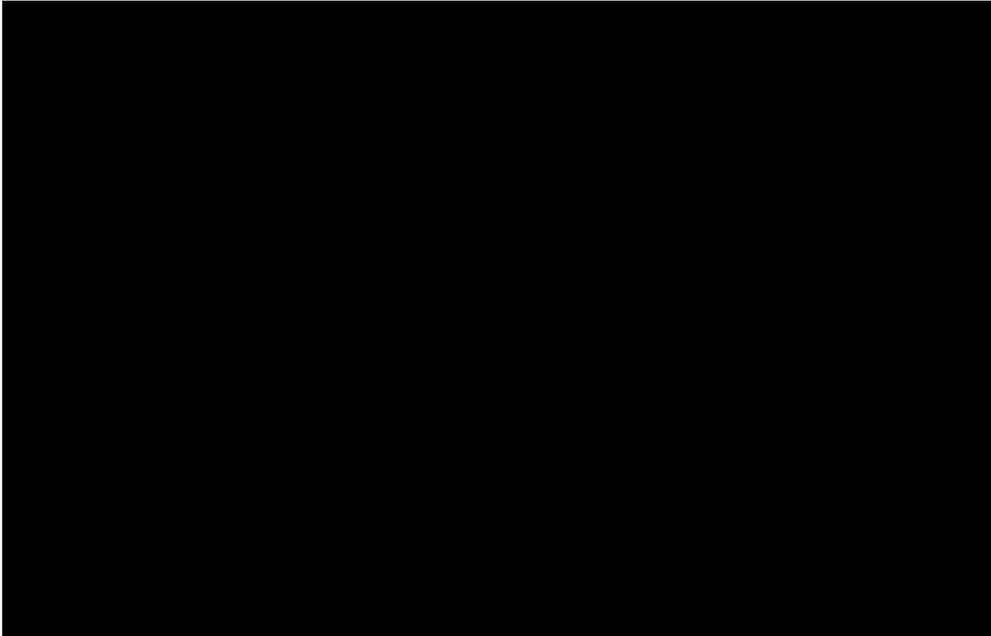
⁴ Determination of site class and assessment of geotechnical hazards are based on correspondence with Pacific Crest Geotechnical Engineers and Nolan, Zinn, and Associates Geologists. [*Revised Geology and Geologic Hazards, Santa Cruz Campus, University of California*, Job # 04003-SC 13 May 2005]. Site class is taken as D throughout the main campus of UC Santa Cruz. The following links provide hazard maps for liquefaction, landslide, and fault rupture:

<https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LiquifactionMap2009.pdf>

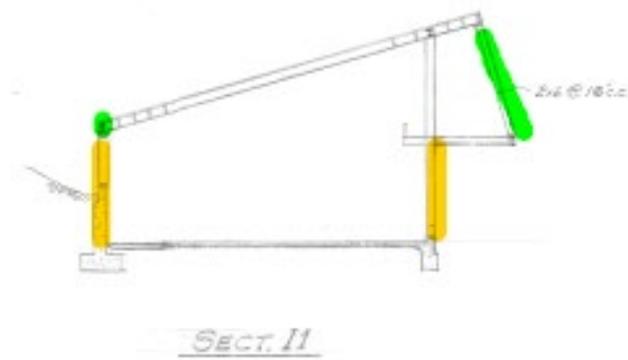
<https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LandslideMap2009.pdf>

<https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/FaultZoneMap2009.pdf>

Annotated floor plan (2nd floor shown)



Building section (looking north)



East elevation



West elevation



West elevation at corridor structure

