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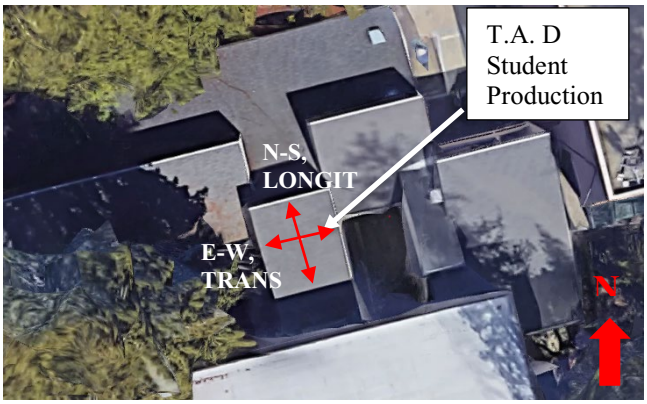
Text in green is to be part of UC Santa Cruz building database and may be part of UCOP database

UC Santa Cruz building seismic ratings

Theater Arts D Student Production

CAAN #7314
461 Kerr Road, Santa Cruz, CA 95064
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-154**[1]
Date of rating	2019	
Recommended UC Santa Cruz priority category for retrofit	Priority A	Priority A=Retrofit ASAP Priority B=Retrofit at next permit application
Ballpark total construction cost to retrofit to IV rating[2]	Medium ($50/sf-$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?	Yes	Focused on walkway and support of roof diaphragm

[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, "Performing Arts Building," dated 30 June 1969
- Structural drawings by Pregnoff and Matheu, "Performing Arts Building" dated 30 June 1969
- University of California Facilities Link building database information, "7314" provided by José Sanchez (UCSC) on 2019-05-30.

Additional building information known to exist

- None

Scope for completing this form

We reviewed the 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 D Student Production 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 has restrooms on Level 1 and a (currently unoccupied) student office on Level 2.

The exterior walkway at Level 2 connects this building to Theater Arts A (CAAN 7311), Theater Arts B (CAAN 7312), Theater Arts D (CAAN 7314), and Theater Arts E (CAAN 7315). The walkway consists of a concrete topping slab over wood framing, and is attached to each building with no seismic separation joints.

Identification of levels: Level 1 (elevation 696.0'), Level 2 (elevation 706.0'), Roof (718.0' at highest point)

Foundation system: The superstructure is founded on shallow strip footings located around the building perimeter.

Structural system for vertical (gravity) load: The roof and Level 2 floor is framed with wood joists spanning between wood bearing walls. At the west side of the building, the joists cantilever past the wood bearing walls to form an overhang over the west entrance of the building.

Structural system for lateral forces: Plywood sheathed floor and roof diaphragms transfer lateral inertial forces from floors (and roof) to plywood sheathed wood walls.

Structural system for walkway: The walkway is approximately 7' wide, constructed with wood joists spanning across the width of the walkway, topped with plywood sheathing, a waterproofing membrane, and a sloped concrete topping slab 2.75" thick on average. Gravity support for the joists is provided on one side by the building adjacent to the walkway, and on the other side by steel W-beams supported by wood posts. Where the walkway is perpendicular to the building, steel beams support the joists for the walkway, and the steel beams are supported by wood posts that are located within the exterior walls of the building. The walkway does not have its own lateral system and is supported for lateral demands by the adjacent buildings.

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:

- The Level 2 exterior walkway connects five buildings – CAAN 7311, 7312, 7313, 7314, and 7315. There are no seismic separations in the walkway between buildings, and differential movement between the buildings could cause damage in the walkway. At this building, the walkway joists are supported by a ledger that is nailed to the face of the south exterior wall of Building C (CAAN 7313) at one end of the joist, and to the face of the north exterior wall of this building at the other end of the joist. Differential movement between the buildings could cause the walkway joists to lose their support.

- There appears to be no vertical connection of the walls through the floors. Hold-downs are provided at short walls at foundation. For this building, the walls have a low height-to-length ratio and connected to perpendicular walls at their ends, so the lack of hold-downs at Level 2 does not impact the rating.
- The wall supporting the south edge of the roof diaphragm is horizontally offset at Level 2, making this wall discontinuous. In addition, it appears that the roof diaphragm is laterally supported only on three sides, with the wall supporting the north edge of the roof diaphragm being largely open.

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 – 0.6 – 0.7 = 0.8**																

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

We walked through the first floor of the building during our site visit on 13 June 2019. As shown in the table below, no non-structural hazards were observed inside the building. The exterior walkway is connected to multiple buildings at Level 2, with no seismic separation joints between buildings. Review of details of construction of the connection of the walkway to the building and locating seismic separation joints should be the focus of further review and retrofit for nonstructural hazards.

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 of the heavy exterior walkway. In addition, the roof diaphragm is supported by walls only on three sides, and one of the walls appears to be discontinuous to the foundation.

Recommendations for further evaluation or retrofit

We recommend that the Campus perform a more detailed review of the adequacy of the roof diaphragm support, such as with a Tier 2 evaluation. The evaluation should take into consideration that this building is connected to Building C (CAAN 7313) at Level 2 and roof. The campus should also check the condition of the exterior walkway and

[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.

provide separation joints between buildings. We put the building on Priority Category A, because the walkway modifications should be done as soon as possible.

Peer review of rating

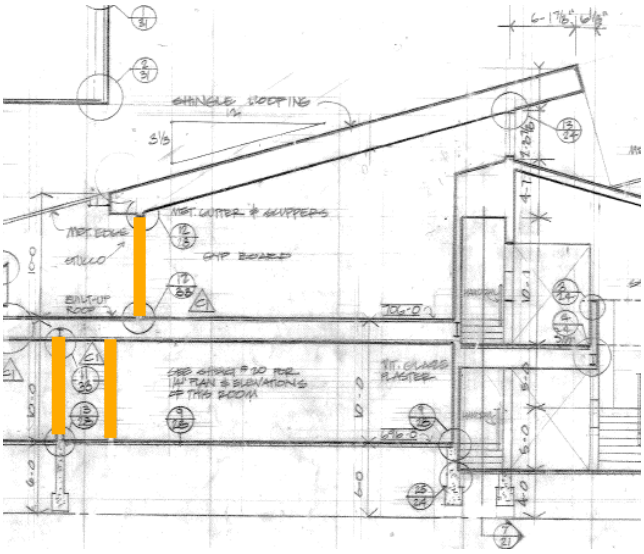
The key issues and expected seismic performance of this building are essentially the same as that for buildings 7312 and 7313. The peer review of those buildings, carried out 24 June 2019, applies to this building; reviewers present were Bret Lizundia of R+C and Jay Yin of Degenkolb.

Additional building data	Entry	Notes
Latitude	36.99510	
Longitude	-122.062352	
Are there other structures besides this one under the same CAAN#	Yes	Exterior walkway structure
Number of stories above lowest perimeter grade	2	
Number of stories (basements) below lowest perimeter grade	0	
Building occupiable area (OGSF)	1344 sq. ft.	
Risk Category per 2016 CBC Table 1604.5	II	Office occupancy
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	Designed: 1969 Code: 1967 UBC	Code inferred based on design year
Applicable code for partial retrofit	None	None
Applicable code for full retrofit	None	None
Model building data		
Model building type North-South	W1 – Wood light frame	
Model building type East-West	W1 – Wood light frame	

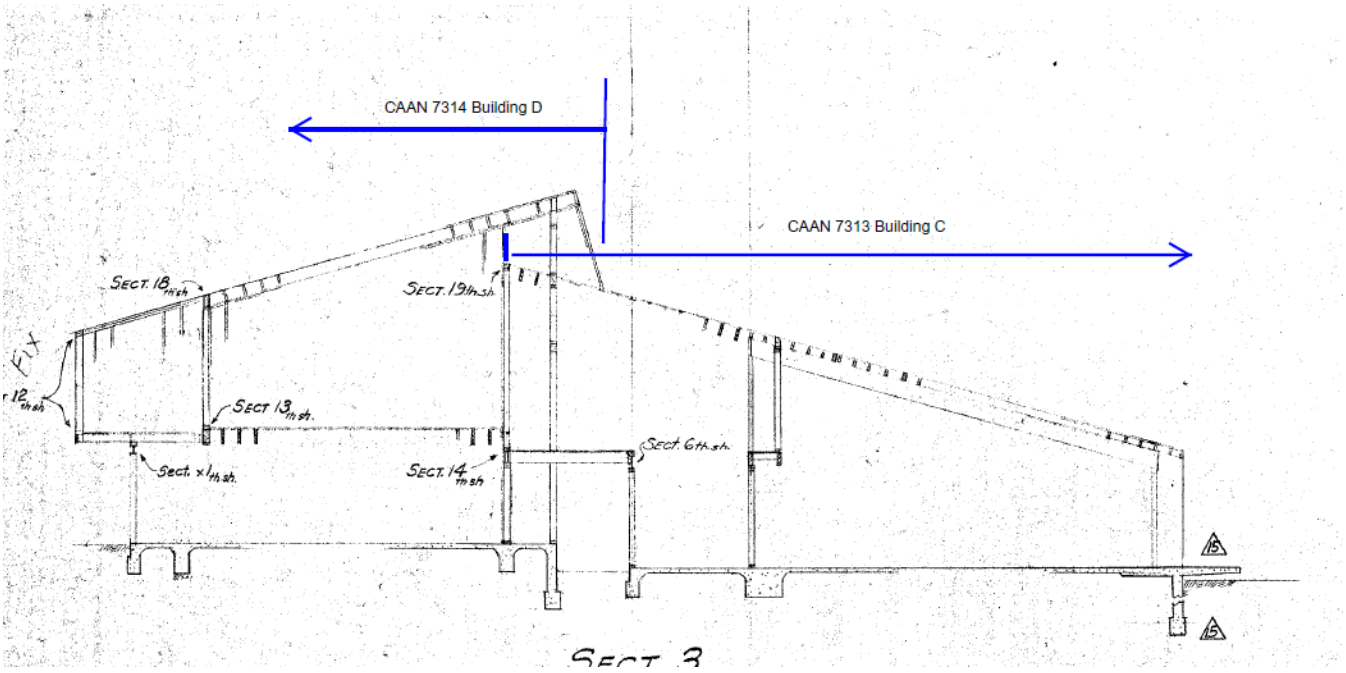
[4] Determination of site class and assessment of geotechnical hazards are based on correspondence with Pacific Crest Geotechnical Engineers and Nolan, Zinn, and Associates Geologists. [*Revised Geology and Geologic Hazards, Santa Cruz Campus, University of California*, Job # 04003-SC 13 May 2005]. Site 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

FEMA P-154 score	0.8
Previous ratings	
Most recent rating	None
Date of most recent rating	-
2nd most recent rating	-
Date of 2nd most recent rating	-
3rd most recent rating	-
Date of 3rd most recent rating	-
Report attachments	
	None

Building section (looking west) showing discontinuous wall at south side of building



Building section (looking west) showing assumed delineation between Building C (CAAN 7313) and D (CAAN 7314) for the purposes of this evaluation



Elevation at west wall

Elevation at east wall