Rating form completed by:

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Evaluator: CLP/EFA/BL
Date: 06/28/2019

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

DATE: 2019-06-28

UC Santa Cruz Building Seismic Ratings

Crown Administration Building

CAAN #7159
620 Crown Road, Santa Cruz, CA 95064
UCSC Campus: Main Campus

Southeast Corner (Looking Northwest)

Plan

Rating summary	Entry	Notes
UC Seismic Performance Level (rating)	V (Poor)	
Rating basis	Tier 1	ASCE 41-17[1]
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]	High ($200-$400/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	Clearly identify walls with plywood sheathing, connections, and load path to foundation. Address cross grain bending. Retrofit may include additional blocking, straps, clips, and hold downs.

[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 19 May 2017 *UC Seismic Safety Policy* and Method B of Section 321 of the 2016 *California Building Code*.

[2] Per Section III.A.4.i of the 26 March 2019 *UC Seismic Program Guidebook, Version 1.3*, 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 Ernest J. Kump Associates, "Residential College No. 3, University of California, Santa Cruz," dated variously in 1966, Sheets A1 to A63 (73 sheets). Drawings are for Buildings J, K, L, M & N; relevant sheets are for "Administration Building N."
- Structural drawings by Ernest J. Kump Associates, "Residential College No. 3, University of California, Santa Cruz," dated 24 February 1966, Sheets S1 to S48 (73 sheets). Drawings are for Buildings J, K, L, M & N; relevant sheets are for "Administration Building N."
- Architectural Drawings by Thomas R. Richmond, A.I.A. Architect, "Crown College Addition to Administration Area," dated 23 October 1972, Sheets 1 to 5.
- Structural Drawings by Steven H. Sassoon & Associates, Structural and Civil Engineers, "Crown College Addition to Administrative Area," dated 23 Oct 1972, Sheets S1 and S2.

Additional building information known to exist
None.

Scope for completing this form

Reviewed architectural and structural drawings for original construction and for 1972 addition, made brief site visit on 3 June 2019, and carried out ASCE 41-17 Tier 1 evaluation.

Brief description of structure

The Crown Administration Building is one of a cluster of five wood framed buildings that form the core of Crown College. These buildings were originally known as Buildings J, K, L, M and N of Residential College No. 3. The Crown Administration Building was Building "N" in the drawings. The adjacent buildings include the Crown Classroom Building ("J"), the Crown Gatehouse ("M"), the Crown Dining Commons ("L"), and the Crown Faculty Wing ("K"). The Crown complex was designed in 1966 by architects Ernest J. Kump Associates. The firm logo is also on the structural drawings and a signature for Peter Kump AIA No. 651 appears on both the architectural and structural sheets, so it appears there was no independent structural design professional involved. The construction completion date is unknown, but it is assumed to be 1967. An additional Library Building by the same designer was added to the south of the Classroom Building in about 1968. In 1972, a small addition was added to the west end of the Administration Building designed by Thomas Richmond, Architect and Steven Sassoon, Structural Engineer.

The building is a one-story wood structure with a small partial basement and contains approximately 3,210 square feet. The original building was 40' square in plan with a central corridor running the length of the building in the E-W direction. The site slopes to the west and the original building had a small basement at the northwest corner. The 1972 addition enlarged the basement area and extended the building by 14'-4 ½" to the west with an overhanging floor area that extends 7'-0" to the south out beyond the foundation wall. The building has a central corridor with a flat roof area and tall corridor walls with clerestory windows above and door openings below. The sloping roof areas extend from the top of the corridor walls above the clerestory windows down to the perimeter walls. The longitudinal perimeter walls are penetrated with many window openings. Roof and floor joists are spaced at 16" on center; roof and floor surfaces are a mix of ½" and 5/8" blocked plywood diaphragms. The corridor walls have plywood sheathing and resist longitudinal loading in the center of the building. The drawings state that walls are to have 3/8 plywood sheathing with nailing of 8d@4" at edges and 8d@12" at intermediate boundaries. None of the walls are designated as shear walls on the 1967 plans but it appears that all walls were supposed to be sheathed. Shear walls are marked clearly on the 1972 plans for the small addition.

The Crown Administration Building is linked by a one-story heavy timber pergola to the Gatehouse. A gap between the Pergola and the Administration Building appears on the drawings as 4", which is adequate to prevent pounding.

Building Condition: The building appeared to be well maintained for a structure of this vintage. We did not observe any signs of structural deterioration that would influence the rating, but most of the structural members are covered with architectural finishes.

Identification of levels: The building has one story above grade and a partial basement or half story at the west end. The basement walls and foundation stem walls at the perimeter come up to the level of the first floor framing in the original and within half a story in the addition. Grade around the building site gently slopes down to the west.

Foundation system: The perimeter and basement walls bear on a continuous 8" thick concrete stem wall on an 18" wide footing. The perimeter stem walls typically come up to the underside of the first floor framing but are set several feet below the framing at the west end at the 1972 addition. The interior bearing walls consist of wood cripple walls with 3/8" plywood sheathing on both sides supported on a shorter 8" stem wall on a 14" wide footing.

Structural system for vertical (gravity) load: All the vertical loads are carried by roof and floor joists that span to wood stud walls or posts and lintels at the exterior. One section of the 1972 addition has floor joists that extend out beyond the foundation wall on the south side of the addition. The building has one flat roof surface above the central corridor and two sloped roof surfaces on either side. 2x6 roof joists span across the flat portion of the roof between the corridor walls with ½" plywood sheathing. The sloped roof surfaces are comprised of 5/8-inch plywood sheathing spanning between 2x10 wood joists. Roof joists span to the stud walls or to 4x6 lintel above wood posts between exterior windows.

Structural system for lateral forces: Lateral forces are resisted by the corridor walls and the transverse end walls with plywood sheathing. The roof diaphragm consists of separate flat and sloped planes that must transfer loads to the corridor walls and perimeter walls. Lateral forces in the transverse (N-S) direction are resisted by the end walls of the original structure and the west end wall of the addition. Lateral forces in the longitudinal (E-W) direction are transferred from the plywood roof diaphragm through blocking and around clerestory windows to the corridor walls at the center of the building and to perimeter walls. Forces are transferred from the plywood roof diaphragms through blocking at the top of the transverse walls which are sheathed with 3/8" plywood. Plywood nailing is specified in the sheet notes on S1 as 8d@6" at margins and 8d@12" intermediate. Some details show additional nailing at eaves or connections and horizontal straps at the edges of the flat roof connection to the end walls. The walls typically have a 2x4 mud sill with 5/8" x 9" long anchor bolt spaced at 48" on centers. The first floor connection details have cross-grain bending in the ledgers at the perimeter walls both in the 1967 and 1972 drawings. Transverse sections show the corridor walls have some Simpson A-1 clips at the bottom of the first floor. Shear walls are not clearly marked on the 1967 drawings, and it is not clear which walls have single- or double-sided plywood; the cripple walls below the corridors only show one sided plywood sheathing. The load path from the split roof diaphragm to the foundation has a circuitous path and very few straps or clips and no hold downs in the short wall sections. The 1972 addition has improved wood details but still shows cross-grain bending in the connection details.

It is important to note that this building survived the 1989 Loma Prieta Earthquake with ground motions on the order of 0.44g and 0.47g in the two horizontal directions and 0.4g vertical (UCSC Lick Observatory Station on campus). We are not aware of any significant structural damage to this building. As the exterior walls all have cement plaster finishes over the plywood, and all walls also have gypsum board fireproofing, it appears the building has more lateral capacity than indicated by this Tier 1 check, so we recommend this be reviewed as part of a Tier 2 evaluation.

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 building has wood detailing typical of the late 1960s and early 1970s that includes a few Simpson A-1 clips and straps but no hold downs at narrow wall piers. Details at the first floor framing to wall connection include cross-grain bending.
- A Tier 2 deficiency-based analysis of the shear walls, transfer of loads to walls, transfer to cripple walls, and foundation connections is needed to understand the capacity and performance of this lateral force-resisting system. We recommend conducting a field survey to confirm locations of plywood sheathing on original walls and cripple walls.

Structural deficiency	Affects rating?	Structural deficiency	Affects rating?
Lateral system stress check (wall shear, column shear or flexure, or brace axial as applicable)	N	Openings at shear walls (concrete or masonry)	N
Load path	Y	Liquefaction	N
Adjacent buildings	N	Slope failure	N
Weak story	N	Surface fault rupture	N
Soft story	N	Masonry or concrete wall anchorage at flexible diaphragm	N
Geometry (vertical irregularities)	Y	URM wall height-to-thickness ratio	N
Torsion	N	URM parapets or cornices	N
Mass – vertical irregularity	N	URM chimney	N
Cripple walls	N	Heavy partitions braced by ceilings	N
Wood sills (bolting)	N	Appendages	N
Diaphragm continuity	Y		

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

This building has what appears to be unrestrained Spanish tiles, including some adjacent to stairs and over adjacent footpaths. We recommend providing positive attachment for tiles (if not currently present) adjacent to stairs and walkways to preclude a life-safety concern.

UCOP nonstructural checklist item	Life safety hazard?	UCOP nonstructural 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	Unrestrained hazardous materials storage	None observed
Heavy masonry or stone veneer above exit ways and public access areas	None observed	Masonry chimneys	None observed
Unbraced masonry parapets, cornices or other ornamentation above exit ways and public access areas	None observed	Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.	None observed

Basis of rating

A Seismic Performance Level rating of V is assigned to the structure based on the structural deficiencies identified by the Tier 1 check, including limited detailing along the load path in some areas and detailing that will induce cross-grain bending at wall-to-diaphragm ties.

Recommendations for further evaluation or retrofit

We recommend the performance of a Tier 2 evaluation to review the lateral force-resisting capacity of the wood shear walls, internal connections, floor to floor connections, and connections to the footings. Since the drawings are not clear regarding the location of plywood, we recommend conducting a field survey to identify locations of plywood sheathing (single sided, double sided, or none). If the walls or connections are inadequate, connections could be strengthened, or additional lateral resistance could be added. Retrofits might include hold downs and straps. A clear load path should be provided. We assign the building to Priority Category B, as the retrofit of the building should be done when there are any plans for modifying or change of occupancy. Falling hazards reduction, such as the tile roofs adjacent to exits or footpaths, should be given a higher priority.

[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 if and where nonstructural hazards may occur.

Peer review of rating

The key issues and expected seismic performance of this building are similar to that for the Crown Classroom Building (CAAN #7155). The peer review of that building, carried out on 24 June 2019, can be applied to this building. Reviewers present were Joe Maffei of Maffei Structural Engineering and Jay Yin of Degenkolb Engineers.

Additional building data	Entry	Notes
Latitude	37.000267	
Longitude	-122.054779	
Are there other structures besides this one under the same CAAN#	No	
Number of stories above lowest perimeter grade	2	
Number of stories (basements) below lowest perimeter grade	1	Small partial basement
Building occupiable area (OGSF)	3,210	From UCSC facilities database.
Risk Category per 2016 CBC Table 1604.5	II	
Building structural height, h_n	13 ft	Structural height defined per ASCE 7-16 Section 11.2
Coefficient for period, C_t	0.020	Estimated using ASCE 41-17 equation 4-4 and 7-18
Coefficient for period, β	0.75	Estimated using ASCE 41-17 equation 4-4 and 7-18
Estimated fundamental period	0.14 sec	Estimated using ASCE 41-17 equation 4-4 and 7-18
Site data		
975-year hazard parameters S_s, S_1	1.289, 0.489	From OSHPD/SEAOC website
Site class	D	
Site class basis	Geotech[4]	See footnote below
Site parameters F_a, F_v	1.0, 1.811	From OSHPD/SEAOC website
Ground motion parameters S_{cs}, S_{c1}	1.289, 0.886	From OSHPD/SEAOC website
S_a at building period	1.29	
Site V_{s30}	900 ft/s	
V_{s30} basis	Estimated	Estimated based on site classification of D.
Liquefaction potential	Low	
Liquefaction assessment basis	County map	See footnote below
Landslide potential	Low	
Landslide assessment basis	County map	See footnote below

[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

Active fault rupture identified at site	No	
Fault rupture assessment basis	County map	See footnote below
Site-specific ground motion study?	No	
Applicable code		
Applicable code or approx. date of original construction	Built: 1967 Code: 1964 UBC	Dates inferred based on design year
Applicable code for partial retrofit	None	No partial retrofit.
Applicable code for full retrofit	None	No full retrofit
FEMA P-154 data		
Model building type – north-south	W2 Wood frame	
Model building type – east-west	W2 Wood frame	
FEMA P-154 score	N/A	Not included here because we performed ASCE 41 Tier 1 evaluation.
Previous ratings		
Most recent rating	-	Not evaluated before.
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	-	
Appendices		
ASCE 41 Tier 1 checklist included here?	Yes	Refer to attached checklist file.

1972 Architectural Floor Plan Marked with Assumed Locations of Plywood Sheathed Stud Walls

Plywood Notes 1966

D. PLYWOOD SHEATHING – DOUGLAS FIR CD WITH EXTERIOR GLUE. NO. 1 MINIMUM PLYWOOD SHEET DIMENSION SHALL BE 4'

LOCATION	THICKNESS	NAILING (BARBED PLYNAILS) MARGINS	INTERMEDIATE	SIDE JOINTS
FLOORS	5/8"	10d @ 6"	10d @ 8"	2x4 FLAT BLOCKING
WALLS	3/8"	8d @ 4"	8d @ 12"	2x4 FLAT BLOCKING
ROOF	* 1/2" & 5/8"	10d @ 6"	10d @ 12"	2x4 FLAT BLOCKING

* 1/2" PLY IS FOR FLAT ROOF AREAS. 5/8 IS FOR SLOPED

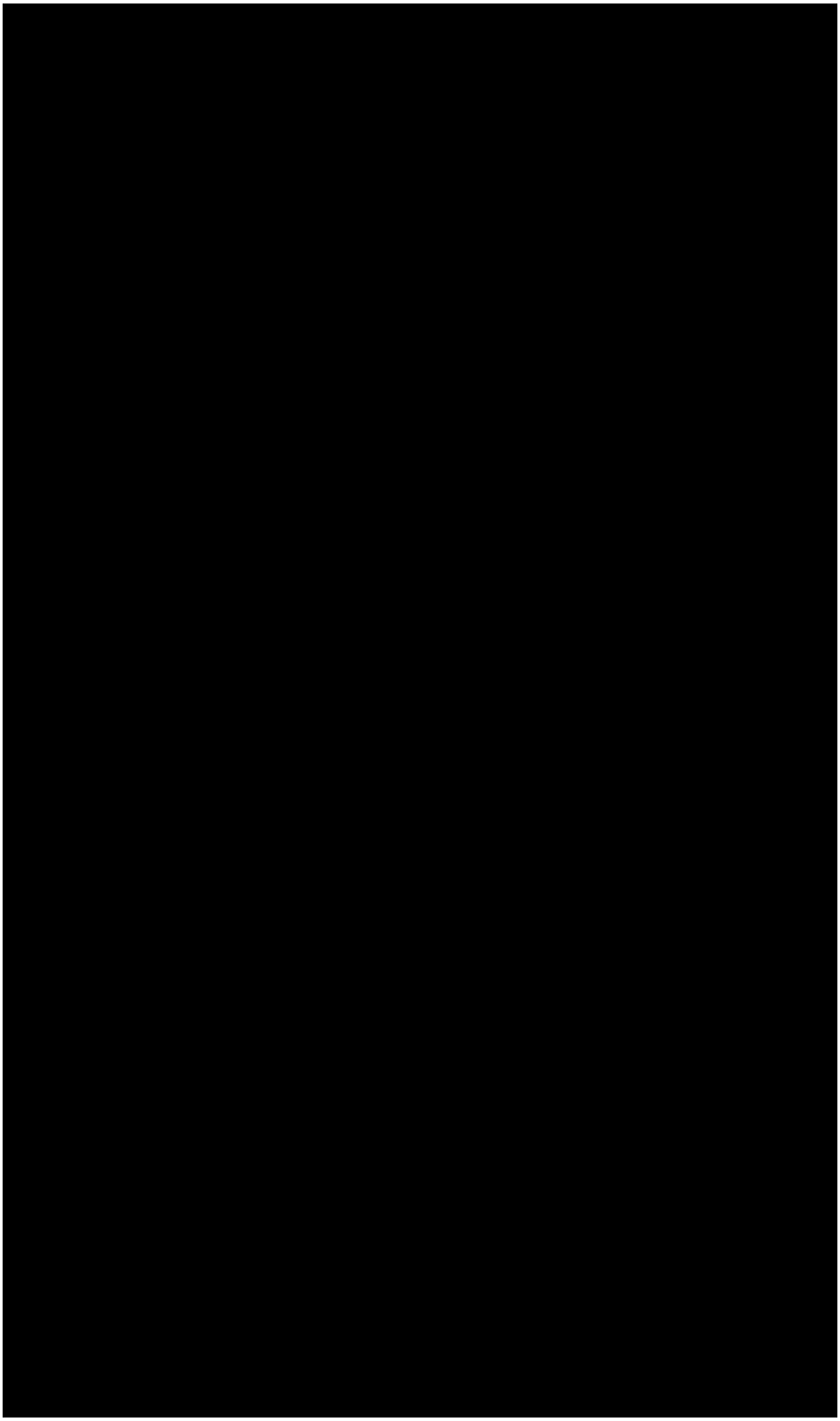
STAGGER END JOINTS IN HORIZONTAL DIAPHRAGMS CENTER EDGES ACCURATELY OVER SUPPORTING MEMBERS. DIRECTION OF FACE GRAIN PERPENDICULAR TO JOIST.

Plywood Schedule 1972 (Roof #1-2, Floor #4, Walls #3)

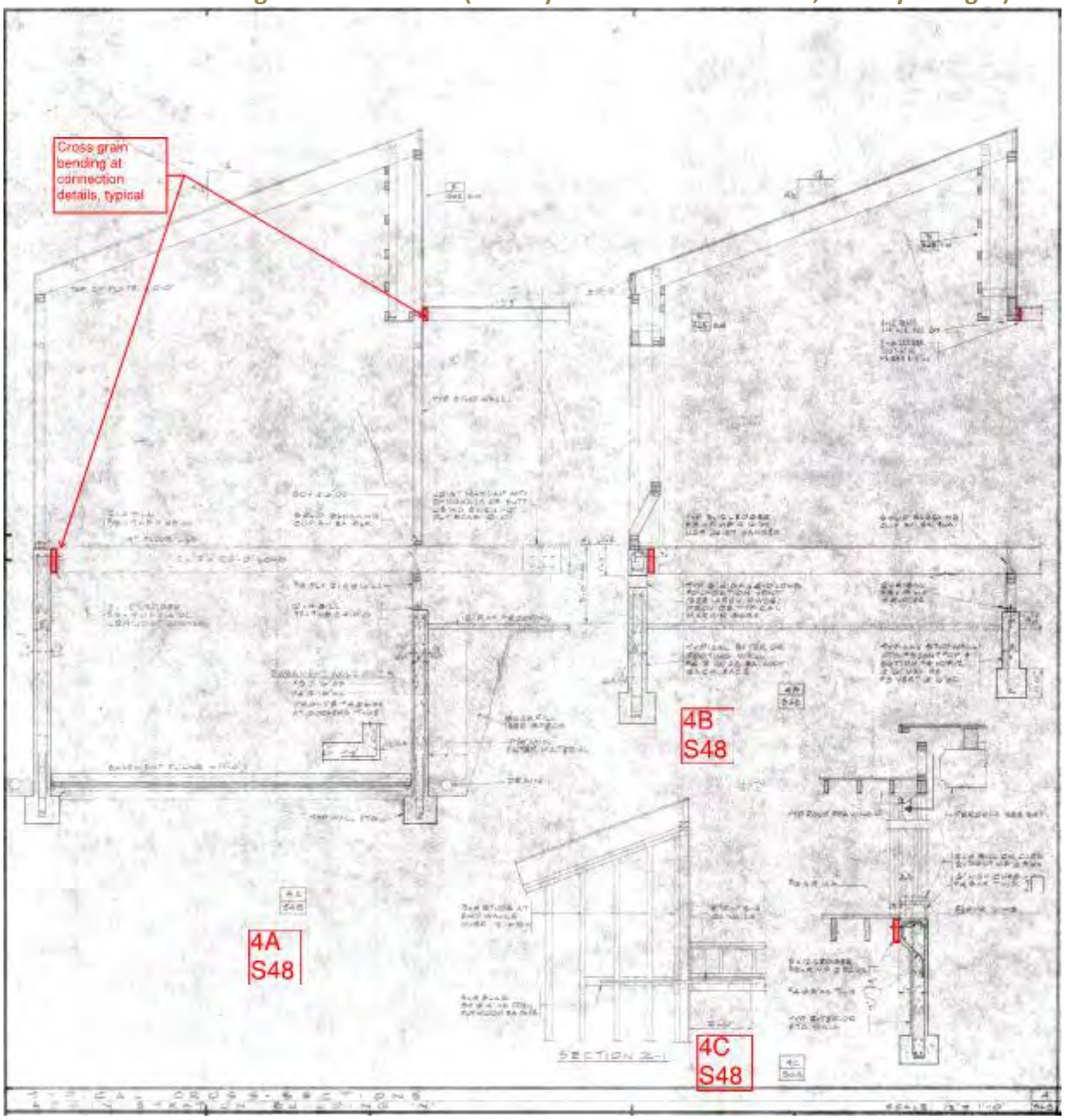
PLYWOOD SCHEDULE

NO.	THICKNESS	TYPE	EDGE NAIL D.F.	EDGE NAIL PWD.	INTERMEDIATE NAILS	ANCHOR BOLTS & SPACING	BLOCKING SEE (16)	SILL PL NAILING	REMARKS
1	5/8"	STRUC. II	10d @ 6"	—	10d @ 12"	—	YES	—	
2	1/2"	do	do	—	do	—	YES	—	
3	3/8"	do	8d @ 6"	8d @ 5"	8d @ 12"	5/8"ϕ @ 4'-0"	YES	20d @ 8"	
4	5/8"	do	10d @ 6"	—	10d @ 12"	—	YES	—	

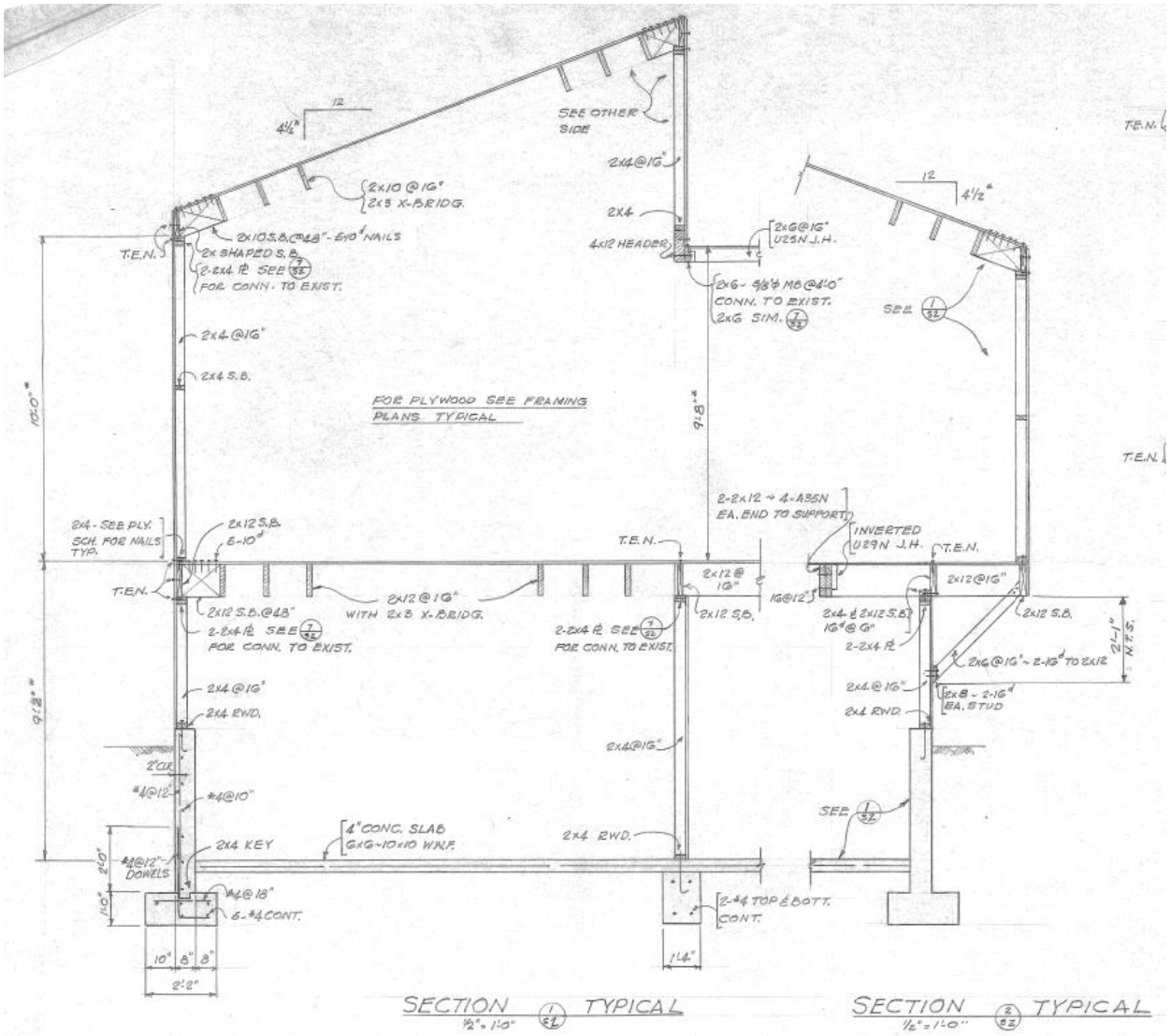
Structural Floor Plans (1972 Addition at Left, 1967 Structure at Right)



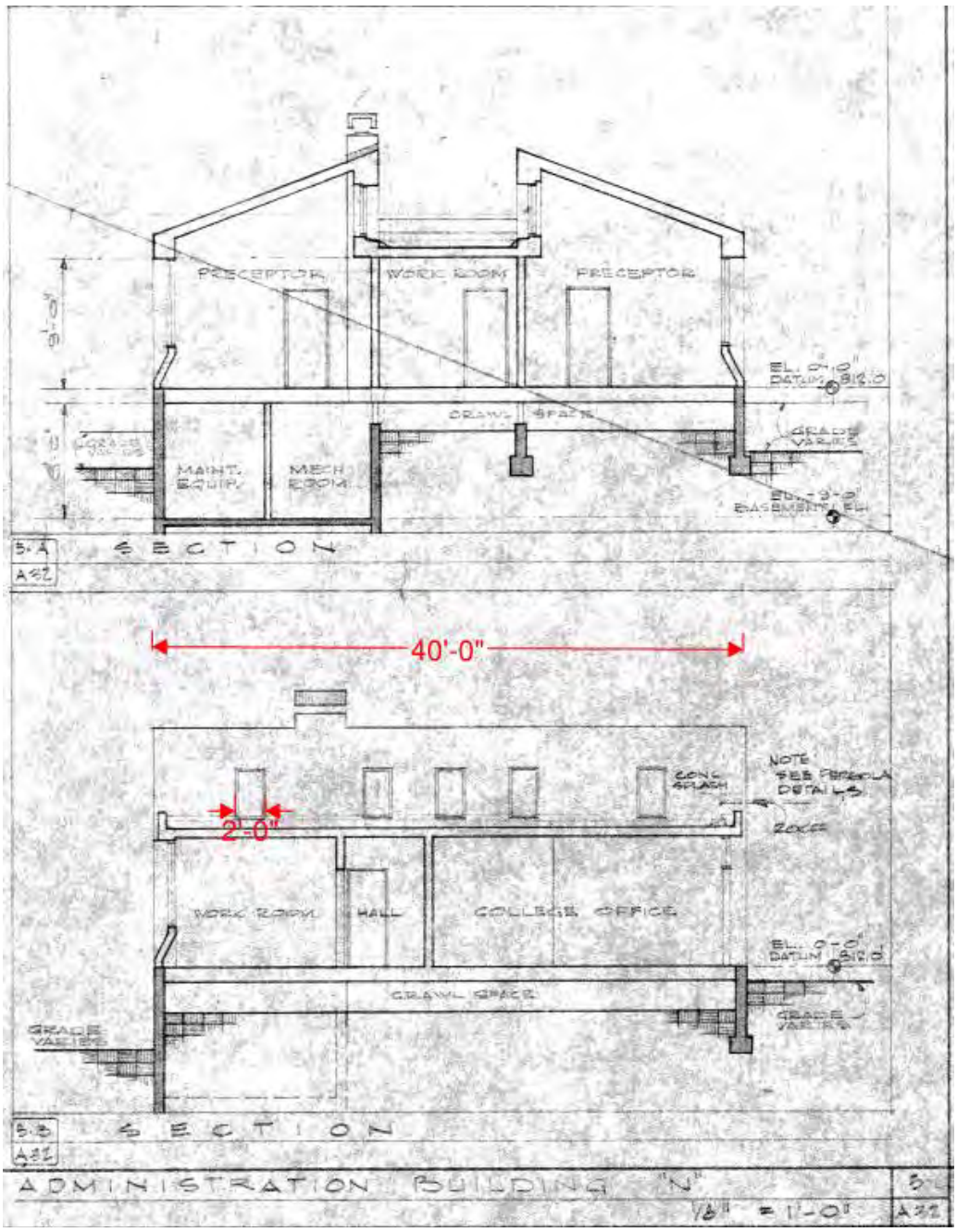
Partial Sections Through 1967 Structure (1-Story with Basement at Left, 1-story at Right)



Interior Transverse Building Section Through 1972 Addition



Architectural Sections 5A & 5B/A32 Showing Corridor Walls with Doors and Clerestory Windows Above, Small Basement at West End



APPENDIX A

Additional Photos

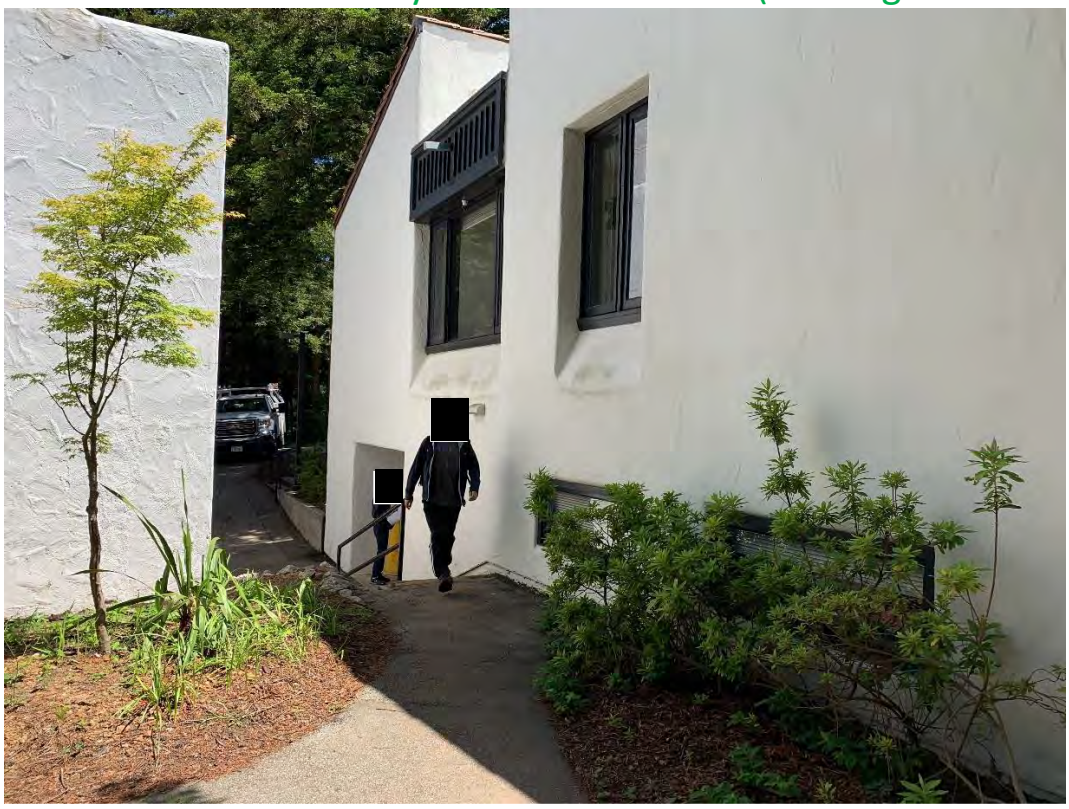
Northeast Corner at Crown College Entry Pergola (Looking Southwest)

Overview (Looking Northwest)

East Elevation (Looking Southwest)

North Elevation (Looking Southwest)

Northwest Corner at Entry to Basement Area (Looking Southeast)

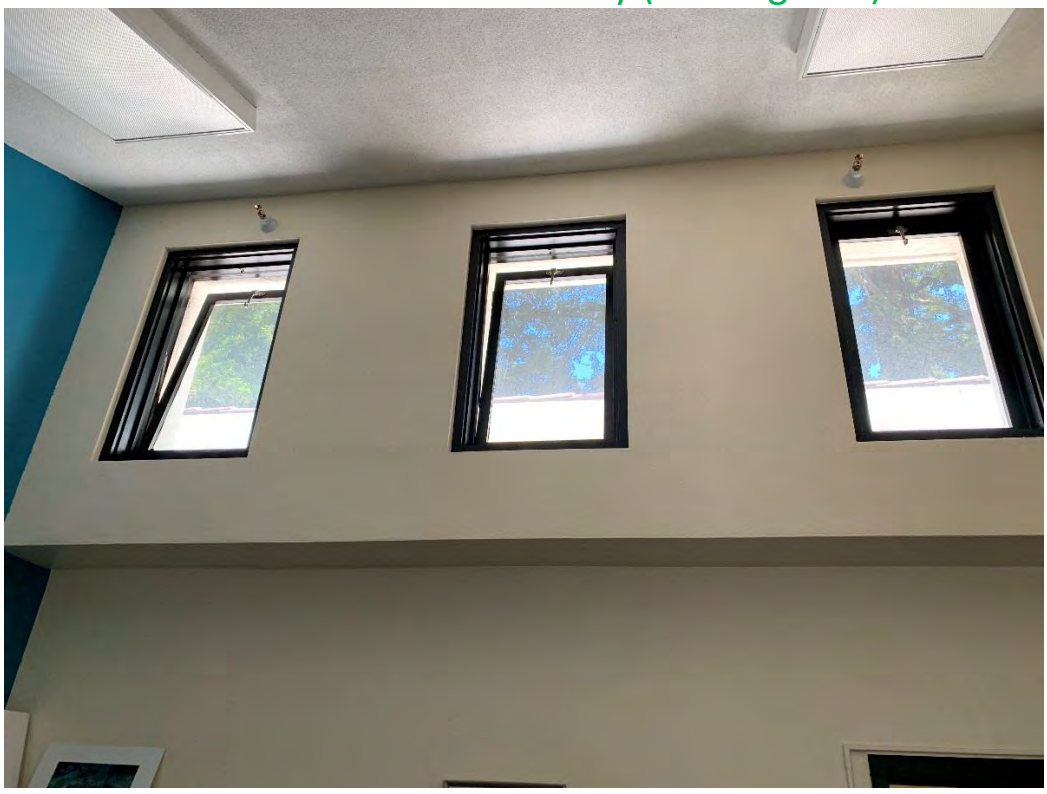


West Elevation (Looking Northeast)

Southwest Corner with Overhang (Looking Northeast)

Southeast Corner (Looking Northwest)

Interior View at Main Entry (Looking East)



Clerestory Windows above Corridor Walls (Looking North)

One Wall Anchor Visible at Tall Cabinet

Unanchored File Cabinets and Tall Shelving in Basement Office

APPENDIX B

ASCE 41-17 Tier 1 Checklists (Structural)

UC Campus:	Santa Cruz			Date:	06/28/2019		
Building CAAN:	7159	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
Building Name:	Crown Administration Building			Initials:	CLP, EFA	Checked:	WAL/BL
Building Address:	620 Crown Road, Santa Cruz, CA 95064			Page:	1	of	3

ASCE 41-17
Collapse Prevention Basic Configuration Checklist

LOW SEISMICITY

BUILDING SYSTEMS - *GENERAL*

C	NC	N/A	U	Description
○	◉	○	○	LOAD PATH: The structure contains a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation. (Commentary: Sec. A.2.1.1. Tier 2: Sec. 5.4.1.1) **Comments:** ½" and 5/8" plywood roof and floor diaphragms deliver loads to wood shear walls supported on strip footings. Load path from split roof diaphragm circuitous and few clips, straps, or hold downs.
◉	○	○	○	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.25% of the height of the shorter building in low seismicity, 0.5% in moderate seismicity, and 1.5% in high seismicity. (Commentary: Sec. A.2.1.2. Tier 2: Sec. 5.4.1.2) **Comments:** There are no adjacent building structures; gaps at 1-story heavy timber pergola show 4" gap.
○	○	◉	○	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure. (Commentary: Sec. A.2.1.3. Tier 2: Sec. 5.4.1.3) **Comments:** There are no mezzanine levels. There is a partial basement at the west end of the building supported by concrete stem walls.

BUILDING SYSTEMS - *BUILDING CONFIGURATION*

C	NC	N/A	U	Description
○	○	◉	○	WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above. (Commentary: Sec. A2.2.2. Tier 2: Sec. 5.4.2.1) **Comments:** Single story.
○	○	◉	○	SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above. (Commentary: Sec. A.2.2.3. Tier 2: Sec. 5.4.2.2) **Comments:** Single story .
○	◉	○	○	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation. (Commentary: Sec. A.2.2.4. Tier 2: Sec. 5.4.2.3) **Comments:** Small area on south wall extends beyond footing below.

Note: **C =** Compliant **NC =** Noncompliant **N/A =** Not Applicable **U =** Unknown

UC Campus:	Santa Cruz			Date:	06/28/2019		
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Building Address:	620 Crown Road, Santa Cruz, CA 95064			Page:	2	of	3

ASCE 41-17
Collapse Prevention Basic Configuration Checklist

C	NC	N/A	U	
○	○	◉	○	GEOMETRY: There are no changes in the net horizontal dimension of the seismic-force-resisting system of more than 30% in a story relative to adjacent stories, excluding one-story penthouses and mezzanines. (Commentary: Sec. A.2.2.5. Tier 2: Sec. 5.4.2.4) **Comments:** Single story
◉	○	○	○	MASS: There is no change in effective mass of more than 50% from one story to the next. Light roofs, penthouses, and mezzanines need not be considered. (Commentary: Sec. A.2.2.6. Tier 2: Sec. 5.4.2.5) **Comments:** Single story
◉	○	○	○	TORSION: The estimated distance between the story center of mass and the story center of rigidity is less than 20% of the building width in either plan dimension. (Commentary: Sec. A.2.2.7. Tier 2: Sec. 5.4.2.6) **Comments:** Flexible diaphragms.

MODERATE SEISMICITY (COMPLETE THE FOLLOWING ITEMS IN ADDITION TO THE ITEMS FOR LOW SEISMICITY)

GEOLOGIC SITE HAZARD

C	NC	N/A	U	Description
◉	○	○	○	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2m) under the building. (Commentary: Sec. A.6.1.1. Tier 2: 5.4.3.1) **Comments:** There is no mapped liquefaction on https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LiquifactionMap2009.pdf.
◉	○	○	○	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure. (Commentary: Sec. A.6.1.2. Tier 2: 5.4.3.1) **Comments:** There are no mapped landslides on https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/LandslideMap2009.pdf.
◉	○	○	○	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated. (Commentary: Sec. A.6.1.3. Tier 2: 5.4.3.1) **Comments:** There are no faults at the project site per https://gis.santacruzcounty.us/mapgallery/Emergency%20Management/Hazard%20Mitigation/FaultZoneMap2009.pdf.

Note: **C =** Compliant **NC =** Noncompliant **N/A =** Not Applicable **U =** Unknown

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Building CAAN:	7159	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
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ASCE 41-17
Collapse Prevention Basic Configuration Checklist

HIGH SEISMICITY (COMPLETE THE FOLLOWING ITEMS IN addition TO THE ITEMS FOR MODERATE SEISMICITY)

FOUNDATION CONFIGURATION

	Description
C ● NC ○ N/A ○ U ○	OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than $0.6S_a$. (Commentary: Sec. A.6.2.1. Tier 2: Sec. 5.4.3.3) **Comments:** Shear wall width B = 15', Building Height (avg) is H = 13', B/H = 1.15 Sa = 1.29g per ATC at BSE-2E 0.6 x Sa = 0.774 B/H > 0.6 Sa
C ○ NC ○ N/A ○ U ●	TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C. (Commentary: Sec. A.6.2.2. Tier 2: Sec. 5.4.3.4) **Comments:** Site Class D assumed. All foundation elements tied together with continuous strip footings. It is not clear if the slab on grade is positively tied to the strip footings.

Note: **C =** Compliant **NC =** Noncompliant **N/A =** Not Applicable **U =** Unknown

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ASCE 41-17
Collapse Prevention Structural Checklist For Building Type W2

LOW AND MODERATE SEISMICITY

SEISMIC-FORCE-RESISTING SYSTEM

C	NC	N/A	U	Description
◉	○	○	○	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2. (Commentary: Sec. A.3.2.1.1. Tier 2: Sec. 5.5.1.1) **Comments:** . There are more than two lines in each direction.
◉	○	○	○	SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: (Commentary: Sec. A.3.2.7.1. Tier 2: Sec. 5.5.3.1.1) Structural panel sheathing: 1,000 lb/ft Diagonal sheathing: 700 lb/ft Straight sheathing: 100 lb/ft All other conditions: 100 lb/ft **Comments:** Appears all walls single or double sided 3/8 ply; maximum shear stress at first floor in transverse direction is 324plf and in the longitudinal direction is 275 plf.
◉	○	○	○	STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system. (Commentary: Sec. A.3.2.7.2. Tier 2: Sec. 5.5.3.6.1) **Comments:** Exterior walls are stucco over 3/8 plywood; not relying on stucco. Single story
◉	○	○	○	GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building. (Commentary: Sec. A.3.2.7.3. Tier 2: Sec. 5.5.3.6.1) **Comments:** Single story and not relying on gypboard
○	◉	○	○	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces. (Commentary: Sec. A.3.2.7.4. Tier 2: Sec. 5.5.3.6.1) **Comments:** Many openings in longitudinal shear walls and individual piers between openings do not meet this aspect ratio.

Note: **C** = Compliant **NC** = Noncompliant **N/A** = Not Applicable **U** = Unknown

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Building CAAN:	7159	Auxiliary CAAN:		By Firm:	Rutherford + Chekene		
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Collapse Prevention Structural Checklist For Building Type W2

C	NC	N/A	U	
○	◉	○	○	WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor. (Commentary: Sec. A.3.2.7.5. Tier 2: Sec. 5.5.3.6.2) **Comments:** Drawings show Simpson clips (A-1) at base of corridor walls but no straps where transvers wall wider above than below at south side.
◉	○	○	○	HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-1. (Commentary: Sec. A.3.2.7.6. Tier 2: Sec. 5.5.3.6.3) **Comments:** Addition has small lower basement level; but concrete stem walls come up to at least half the wall height so appears ok.
◉	○	○	○	CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels. (Commentary: Sec. A.3.2.7.7. Tier 2: Sec. 5.5.3.6.4) **Comments:** Interior cripple walls, full height walls at addition, and perimeter partial height cripple walls have plywood sheathing. Original perimeter wall connected to concrete stem wall.
○	○	◉	○	OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces. (Commentary: Sec. A.3.2.7.8. Tier 2: Sec. 5.5.3.6.5) **Comments:**

CONNECTIONS

C	NC	N/A	U	Description
○	○	◉	○	WOOD POSTS: There is a positive connection of wood posts to the foundation. (Commentary: Sec. A.5.3.3. Tier 2: Sec. 5.7.3.3) **Comments:**
◉	○	○	○	WOOD SILLS: All wood sills are bolted to the foundation. (Commentary: Sec. A.5.3.4. Tier 2: Sec. 5.7.3.3) **Comments:** 5/8" x9" MB at 48" typical.
○	○	◉	○	GIRDER/COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support. (Commentary: Sec. A.5.4.1. Tier 2: Sec. 5.7.4.1) **Comments:**

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HIGH SEISMICITY (COMPLETE THE FOLLOWING ITEMS IN ADDITION TO THE ITEMS FOR LOW AND MODERATE SEISMICITY)

CONNECTIONS

C	NC	N/A	U	Description
●	○	○	○	WOOD SILL BOLTS: Sill bolts are spaced at 6 ft (1.8 m) or less with acceptable edge and end distance provided for wood and concrete. (Commentary: A.5.3.7. Tier 2: Sec. 5.7.3.3) **Comments:** 5/8" bolts typically at 48"; no end or edge distance indicated on dwgs.

DIAPHRAGMS

C	NC	N/A	U	Description
○	●	○	○	DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints. (Commentary: Sec. A.4.1.1. Tier 2: Sec. 5.6.1.1) **Comments:** Roof diaphragm split between flat portion and two sloping portions
○	○	○	●	ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation. (Commentary: Sec. A.4.1.3. Tier 2: Sec. 5.6.1.1) **Comments:**
○	○	●	○	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. (Commentary: Sec. A.4.1.8. Tier 2: Sec. 5.6.1.5) **Comments:**
○	○	●	○	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered. (Commentary: Sec. A.4.2.1. Tier 2: Sec. 5.6.2) **Comments:** Roof diaphragm is plywood.
●	○	○	○	SPANS: All wood diaphragms with spans greater than 24 ft (7.3 m) consist of wood structural panels or diagonal sheathing. (Commentary: Sec. A.4.2.2. Tier 2: Sec. 5.6.2) **Comments:** Roof diaphragm is blocked plywood.

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C	NC	N/A	U	
○	○	◉	○	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 40 ft (12.2 m) and have aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2) **Comments:** Roof diaphragm is blocked plywood.
◉	○	○	○	OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing. (Commentary: Sec. A.4.7.1. Tier 2: Sec. 5.6.5) **Comments:** Roof diaphragm is plywood.

APPENDIX C

UCOP Seismic Safety Policy Falling Hazards Assessment Summary

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UCOP SEISMIC SAFETY POLICY
Falling Hazard Assessment Summary

	Description
P ☐ N/A ☒	**Heavy ceilings, features or ornamentation above large lecture halls, auditoriums, lobbies, or other areas where large numbers of people congregate (50 ppl or more)** **Comments:** There are no heavy ceilings, features, or ornamentation.
P ☐ N/A ☒	**Heavy masonry or stone veneer above exit ways or public access areas** **Comments:** There is no masonry or stone veneer.
P ☐ N/A ☒	**Unbraced masonry parapets, cornices, or other ornamentation above exit ways or public access areas** **Comments:** There are no masonry parapets, cornices or other ornamentation.
P ☐ N/A ☒	**Unrestrained hazardous material storage** **Comments:**
P ☐ N/A ☒	**Masonry chimneys** **Comments:** There are no masonry chimneys.
P ☐ N/A ☐	**Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc.** **Comments:**
P ☒ N/A ☐	**Other:** Unanchored or poorly anchored file cabinets that could block egress. **Comments:** Observed in offices at first floor and at basement level.
P ☒ N/A ☐	**Other:** Spanish roof tiles with steep slope along all longitudinal walls. Entries in transverse end walls so less of an issue at entries but footpath along rear of building. **Comments:** Do not know if tiles secured with nails or if nails still intact after many years. Check especially adjacent to entrances and along footpaths.
P ☐ N/A ☐	**Other:** **Comments:**

Falling Hazards Risk: Low

Note: P= Present, N/A = Not Applicable

APPENDIX D

Quick Check Calculations

Unit Weights:

Building 7159 Crown Administration

	Seismic Weight	Dead Load	
Sloping Tile roofs			
Spanish clay tile	19.0	19.0	
5/8" plywood	1.8	1.8	at 36 pcf
membrane	1.0	1.0	
rafters	3.5	3.5	2x12 @ 16" o.c.
MEP+misc+lighting	2.0	2.0	sprinklers, lighting, projectors etc.
ceiling	2.0	2.0	typ. gypboard ceiling panels
subtotal on slope	31.4	31.4	scale this by 1.07 to account for slope
partition including shear walls	15.1	15.1	see below
Total weight per unit area	46.5	46.5	psf
Projected area under sloping roof	2324.0		ft^2
Total Seismic weight at roof	113095.7		lbs
	48.66		equivalent psf

level	weight per level lb	
roof	113095.7	

1st floor			
estimate partition/wall weights	**ft**		**Remarks**
lineal feet exterior stucco walls	147.3	5.0	height avg trib to 1st
weight ext walls		20.5	2x4 @ 16 plus two layers 3/8 plywood plus exterior cement plaster plus insulation +misc+ 2 layers 5/8 gyp
		8.0	glazing plus sash etc longitudinal walls only about 25% glazing
		20.5	use heavier value to account for numerous stucco surfaces around windows
lineal feet interior wall at 1st floor	135.9	8.5	height avg trib to roof
		10.5	2x4 @ 16 plus two layers 3/8 plywood plus insulation +misc+ 2 layers 5/8 gyp
Area at 1st	1801.0	1801.0	ft^2
total ext plus int at 1st floor	2324.0		
Weight, 1st		27228.7	lbs
Weight per unit area at 1st		15.1	psf actual trib to roof

Story Weights

Level	Seismic Weight (kips)
Roof	113.10

Note:
1- Roof area is projected on horizontal plane; not surface area of roof.

Period

C_t=	0.02
h_n (ft)=	13 avg
B=	0.75

T=	0.14 sec

BSE-2E Response Spectrum

ATC Hazards by Location

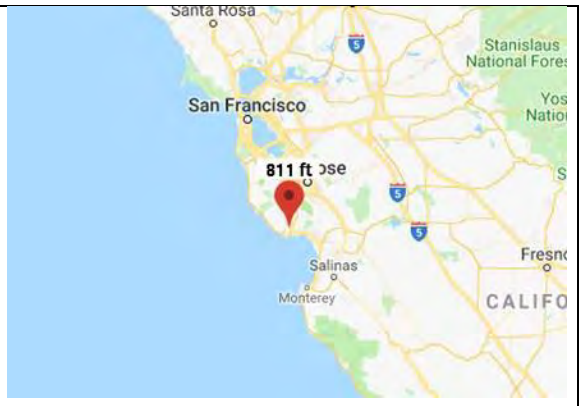
Search by Address | Search by Coordinate

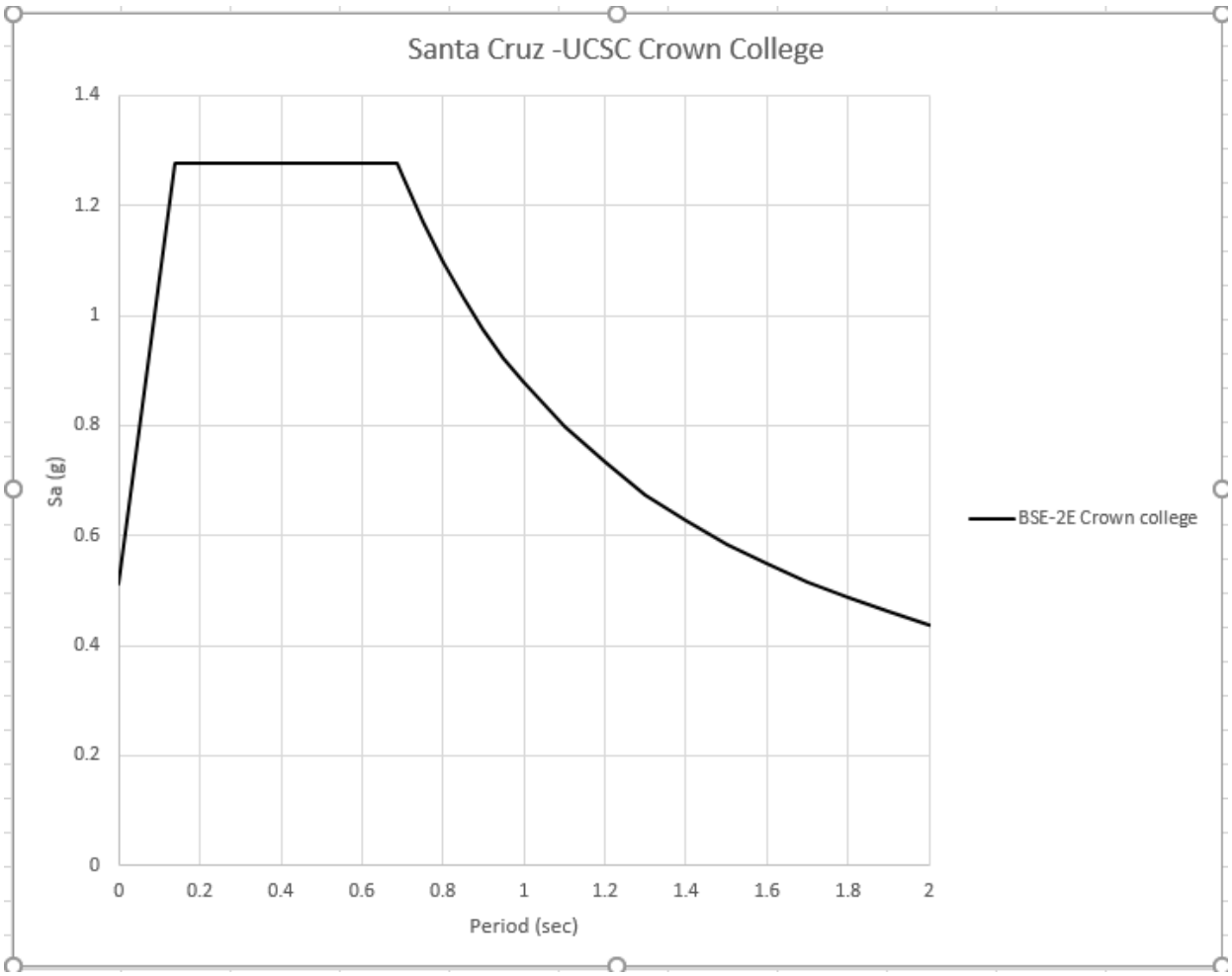
37.000267 -122.054779 Search

Wind | Snow | Tornado | Seismic

Hazard Level BSE-2E

Name	Value	Description
S_S	1.289	MCE_R ground motion (period=0.2s)
F_a	1	Site amplification factor at 0.2s
S_{XS}	1.289	Site modified spectral response (0.2s)
S_1	0.489	MCE_R ground motion (period=1.0s)
F_v	1.811	Site amplification factor at 1.0s
S_{X1}	0.886	Site modified spectral response (1.0s)




Santa Cruz -UCSC Crown College
Sa (g)
Period (sec)
BSE-2E Crown college
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

Rating form completed by:

RUTHERFORD + CHEKENE
ruthchek.com

Evaluator: CLP/EFA/BL

Date: 06/30/2018

Story Shears

Sa=	1.29			Sx1	T	Sxs	
W=	113	kips		0.886	0.14	1.289	
C=	1.3	Per ASCE 41-17 Table 4-7					
V=	190	kips					
k=	1.00		Per ASCE 41-17 Section 4.4.2.2, K = 1.0 for periods less than 0.5 sec and K = 2.0 for T >2.5 sec. It varies linearly				

Floor Leve	Story Height (ft)	Total Height, H (ft)	Weight, W (kips)	W x H^k	coeff	Fx (kips)	Story Shear, V (kips)
Roof	13.00	13.00	113.10	1,470	1.00	190	190
				1,470	1	190	

Notes:
1- The base of building is assumed to be at the 1st floor.
Neglect tiny partial basement since concrete stem walls at perimeter come up to first floor.
2- Use an average for roof height of 13 feet.
3- Modification Factor, C, per ASCE 41-17, Table 4-7.

Average Stress:

Ms=	4.5	CP of wood shear wall from Table 4-8

N-S direction (Longitudinal) Y dir			
Level	Force (kips)	length of wall (ft)	average shear stress (plf)
1st flr Level	190	153.06	**275**

E-W direction (Transverse) X dir			
Level	Force (kips)	length of wall (ft)	average shear stress (plf)
1st flr Level	190	130.15	**324**