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Date: 2019-09-04

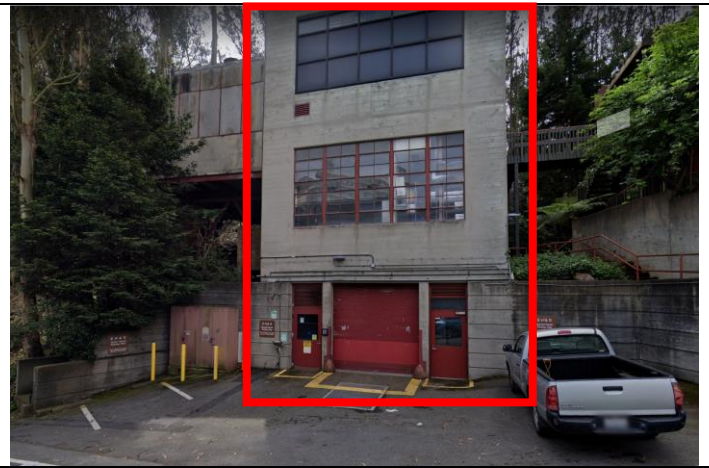
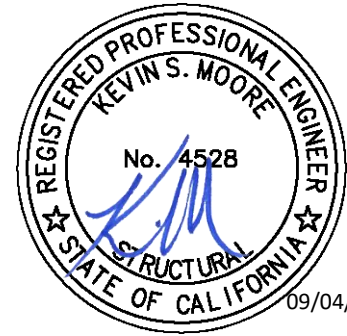
UCSF Building Seismic Ratings

EH&S Annex Building (West)

CAAN# 2234A

50 Medical Center Way, San Francisco, CA 94131

UCSF Campus Site: *Parnassus*



Rating summary	Entry	Notes
UC Seismic Performance Level (rating)	IV	Findings based on drawing review and ASCE 41-17 Tier 1 evaluation ¹
Rating basis	Tier 1	ASCE 41-17
Date of rating	2019	
Recommended UCSF priority category for retrofit	NA	Priority A=Retrofit ASAP Priority B=Retrofit at next permit application for modification
Ballpark total project cost to retrofit to IV rating	NA	Current rating is IV, no retrofit required.
Is 2018-2019 rating required by UCOP?	Yes	Building previously rated IV but does not have a fully documented previous review
Further evaluation recommended?	No	

¹ The evaluations at UCSF translate the Tier 1 evaluation to a Seismic Performance Level rating using professional judgment discussed among the Seismic Review Committee. Non-compliant items in the Tier 1 evaluation do not automatically put a building into a particular rating category, but such items are evaluated 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.

Building information used in this evaluation

- 1952 Incinerator – Architectural and Structural drawings issued July 1952, As-Built Revision 1 dated November 1953.
- Refuse Storage Structure – Architectural and Structural drawings issued 18 August 1964.

Additional building information known to exist

- *Performance of UCSF Buildings During the October 17, 1989 Loma Prieta Earthquake*, Impell Corporation, dated 17 November 1989.

Scope for completing this form

Reviewed original structural construction drawings and performed an ASCE 41-17 Tier 1 evaluation. Made a visit to the building and verified that structural configuration generally matched the drawings. Observed nonstructural life-safety hazards inside the building and verified anchorage but did not perform calculations to check adequacy of anchorage.

Brief description of structure

The EH&S Annex Building (West) is approximately 2,500 sq ft in a three-story structure. The building is adjacent to a small building directly to the east, with a 1-in. separation joint between them. The building was built circa 1952 and has a footprint of approximately 32 ft in the north-south direction and 20 ft in the east-west direction.

Identification of Levels: The building is sited on a significant slope, with grade at the third floor on the south side of the building, sloping down to the north approximately 20 ft below the third floor. The building is founded at the base (first floor), with a large set of door openings along the north elevation, flanked by large retaining walls that also serve as basement wall extensions for the building first level.

Foundation System: The concrete walls are supported on continuous concrete strip footings. Four interior concrete columns are founded on square concrete spread footings, two of which are tied to the wall footings. The north-south directional walls are continuous, without openings, as are the southernmost wall that serves as a foundation/basement wall and retaining wall.

Structural System for Vertical (Gravity) Loads: The typical floor framing comprises reinforced concrete slabs supported on reinforced concrete shear walls and reinforced concrete beams that span in the east-west direction. The beams are supported on steel reinforced concrete columns. Large openings along the north wall create a pier system to carry vertical forces to the base level at the north elevation.

Structural System for Lateral Loads: The lateral force resisting system is steel reinforced concrete walls in both north-south and east-west directions. The reinforced concrete walls are 12 in. thick in the lowest level and 8-in. thick in the upper levels. The building is rectangular in plan, with solid walls at the east and west elevations and pierced or open walls in at the north and south elevations. The partially buried first floor level is open at the north elevation, but wall extensions to the east and west of the large openings provide significant lengths of concrete wall to replace the wall missing at the large opening.

Brief description of seismic deficiencies and Expected Seismic Performance

Identified seismic deficiencies include the following:

- The north concrete walls are supported on two concrete columns at third points and small sections of retaining wall at the ends. No reinforcement details are provided at the connection between the upper walls and lower/supporting retaining walls. If reinforcing details are the same as the retaining wall or upper wall reinforcement, they may be not adequate to transfer seismic forces between the two walls (see comments below).
- Steel concrete wall reinforcement does not appear to be doweled into the slabs.
- Diaphragm openings occur at the first and second floor with lengths equal to approximately 30% of the wall length.

The building may perform adequately in an earthquake, but we anticipate some pounding damage from the eastern portion of the building, but without causing collapse of either building. Adequate behavior can be attributed to robust reinforced concrete walls on three sides of the building. Assuming no reinforcement is detailed between the slab and the walls (drawings unclear), the diaphragm shear strength may be inadequate because of relatively large openings along the walls in two locations. However, given the lack of diaphragm failures of concrete buildings in previous earthquakes, this is not expected to cause failure of this building.

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	N	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)	N	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	N		

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

A rigorous assessment of the nonstructural systems inside the building has not been performed but could be performed as part of a Tier 2 evaluation. For the accessible areas available during our site visit, we did not observe any life safety 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	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 seismic performance level rating

The building rating of IV can be attributed to the identified deficiencies.

Recommendations for further evaluation or retrofit

The building does not require further evaluation or retrofit.

Peer review comments on rating

The structural members of the UCSF Seismic Review Committee (SRC) reviewed the evaluation on 4 September 2019 and agree that the rating is IV.

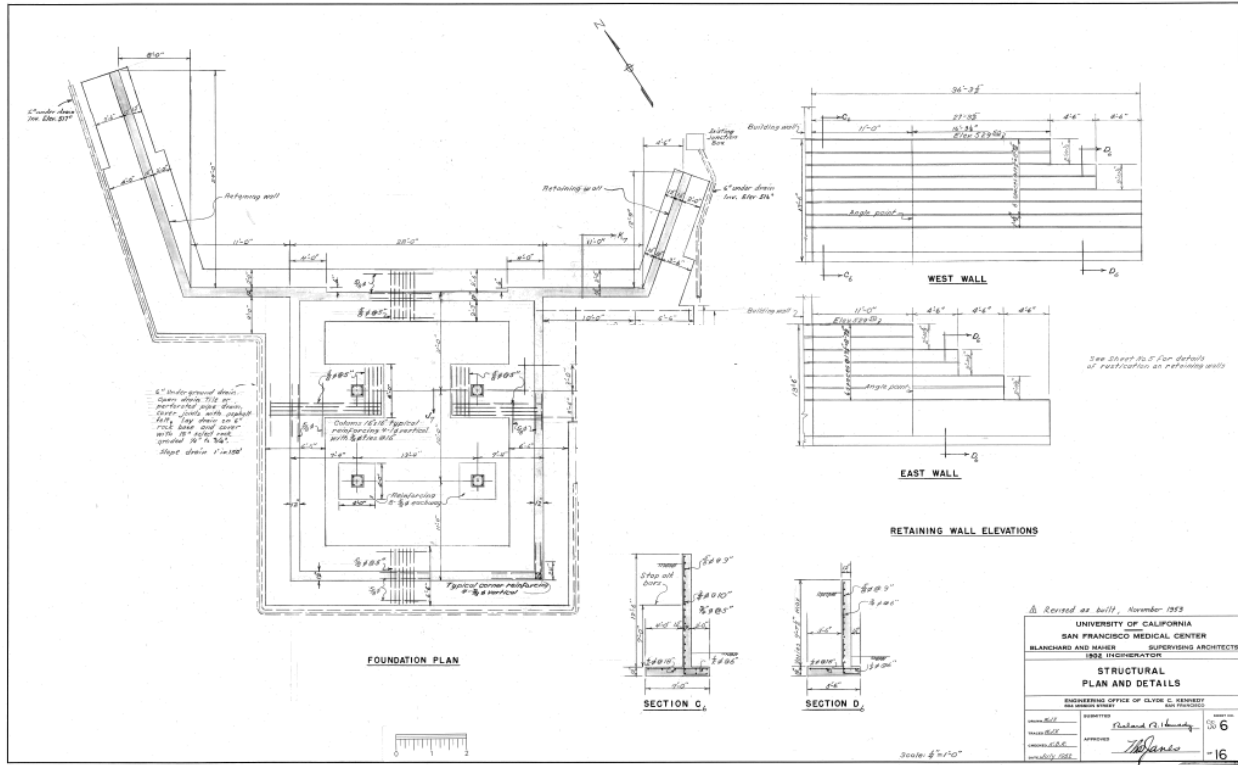
Additional building data	Entry	Notes
Latitude	37.76172°	
Longitude	-122.45888°	
Are there other structures besides this one under the same CAAN#	No	
Number of stories above lowest perimeter grade	3	
Number of stories (basements) below lowest perimeter grade	0	
Building occupiable area (OGSF)	2,500	Approximate from UCOP spreadsheet; 2/3 of original Annex (two buildings)
Risk Category per 2016 CBC 1604.5	II	
Building structural height, h_n	49 ft	As defined per ASCE 7-16 Section 11.2
Coefficient for period, C_t	0.02	ASCE 41-17 equation 4-4 and 7-18
Coefficient for period, ζ	0.75	ASCE 41-17 equation 4-4 and 7-18
Estimated fundamental period	0.37 sec	ASCE 41-17 equation 4-4 and 7-18

Additional building data	Entry	Notes
Site data		
975 yr hazard parameters S_s, S_1	1.551, 0.612	https://hazards.atcouncil.org/
Site class	C	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Site class basis	Estimated	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Site parameters F_a, F_v	1.2, 1.4	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Ground motion parameters S_{cs}, S_{c1}	1.861, 0.857	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
S_o at building period	1.861	Calculated
Site V_{s30}	730 m/s	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
V_{s30} basis	Estimated	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Liquefaction potential	No	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Liquefaction assessment basis	Estimated	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Landslide potential	No	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Landslide assessment basis	-	Rutherford + Chekene Study, 2006
Active fault-rupture hazard identified at site?	No	UCSF Group 3 Buildings, Geotechnical Characteristic and Geohazards (2019)
Site-specific ground motion study?	No	
Applicable code		
Applicable code or approx. date of original construction	As-built drawings dated 1952 & 1964	
Applicable code for partial retrofit	None	No partial retrofit known
Applicable code for full retrofit	None	No full retrofit known
Model building data		
Model building type North-South	C2	
Model building type East-West	C2	
FEMA P-154 score	N/A	Not included here because we performed ASCE 41 Tier 1 evaluation.
Previous ratings		
Most recent rating	None	
Date of most recent rating	-	
Appendices		
ASCE 41 Tier 1 checklist included here?	Yes	Refer to attached checklist file

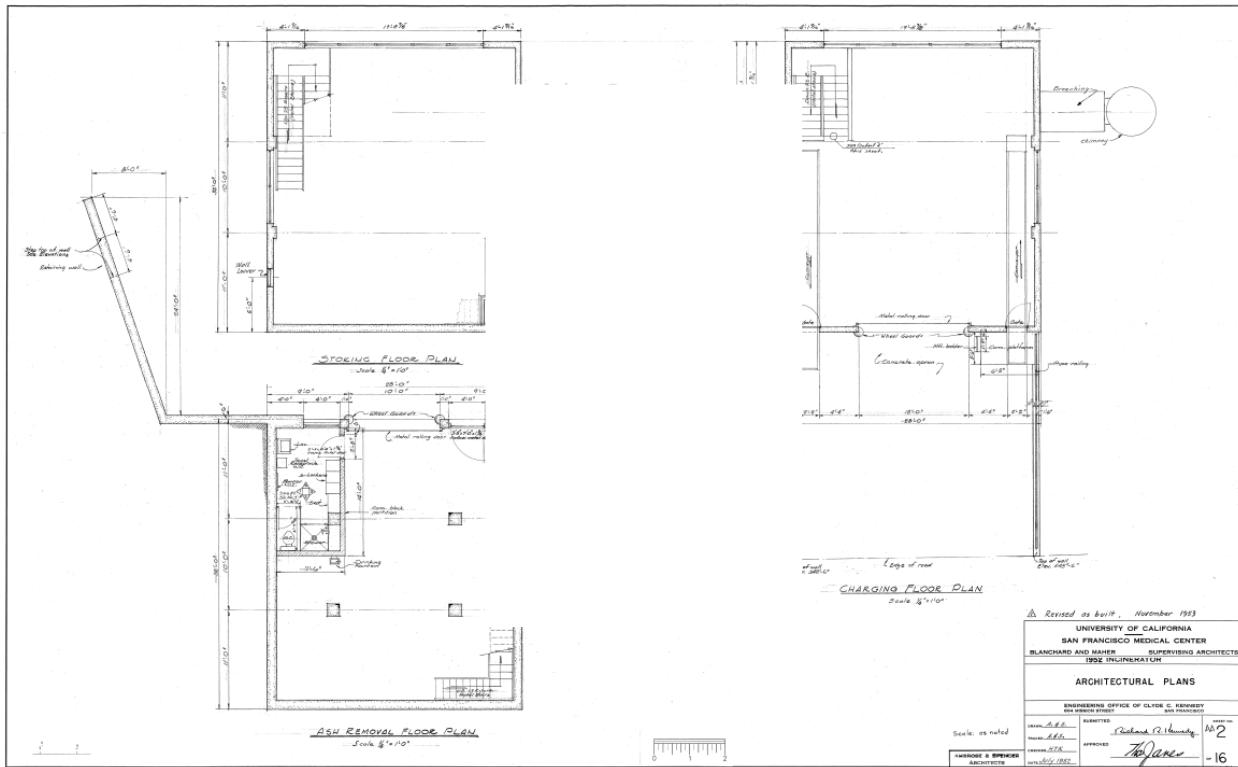


Appendix A

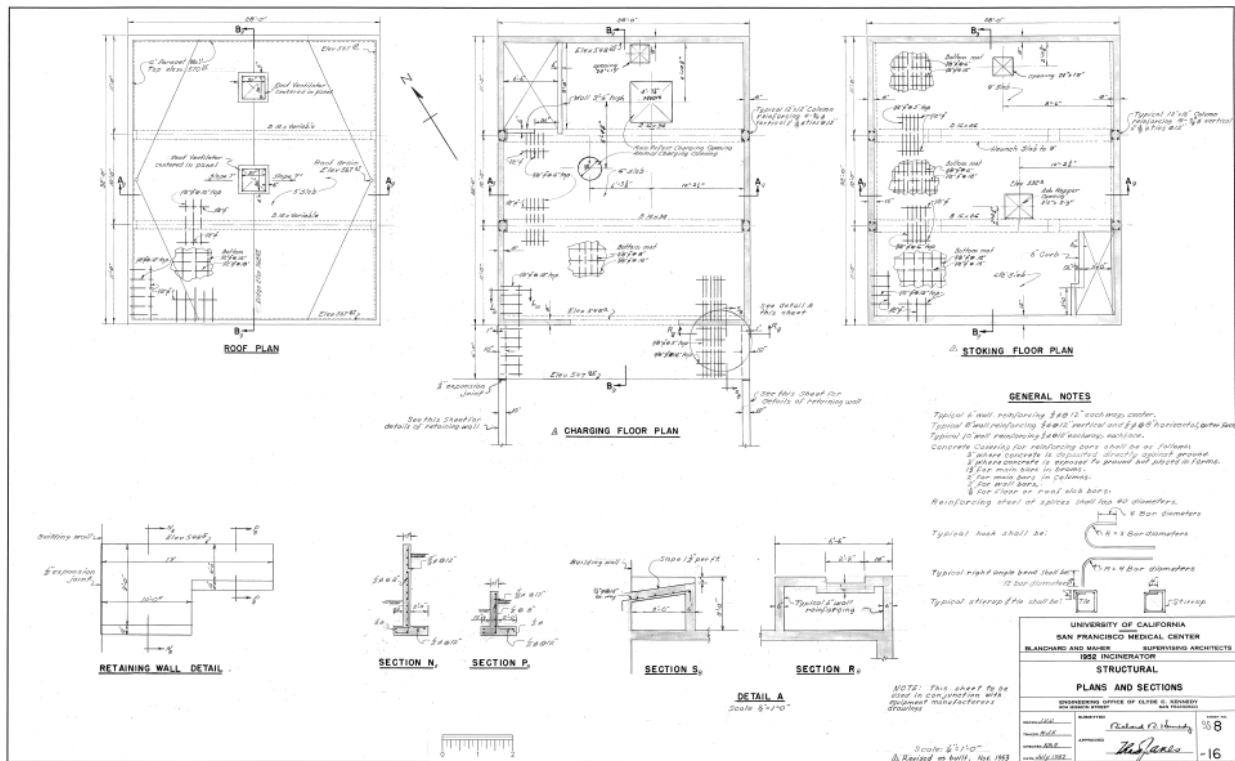
Drawing Images

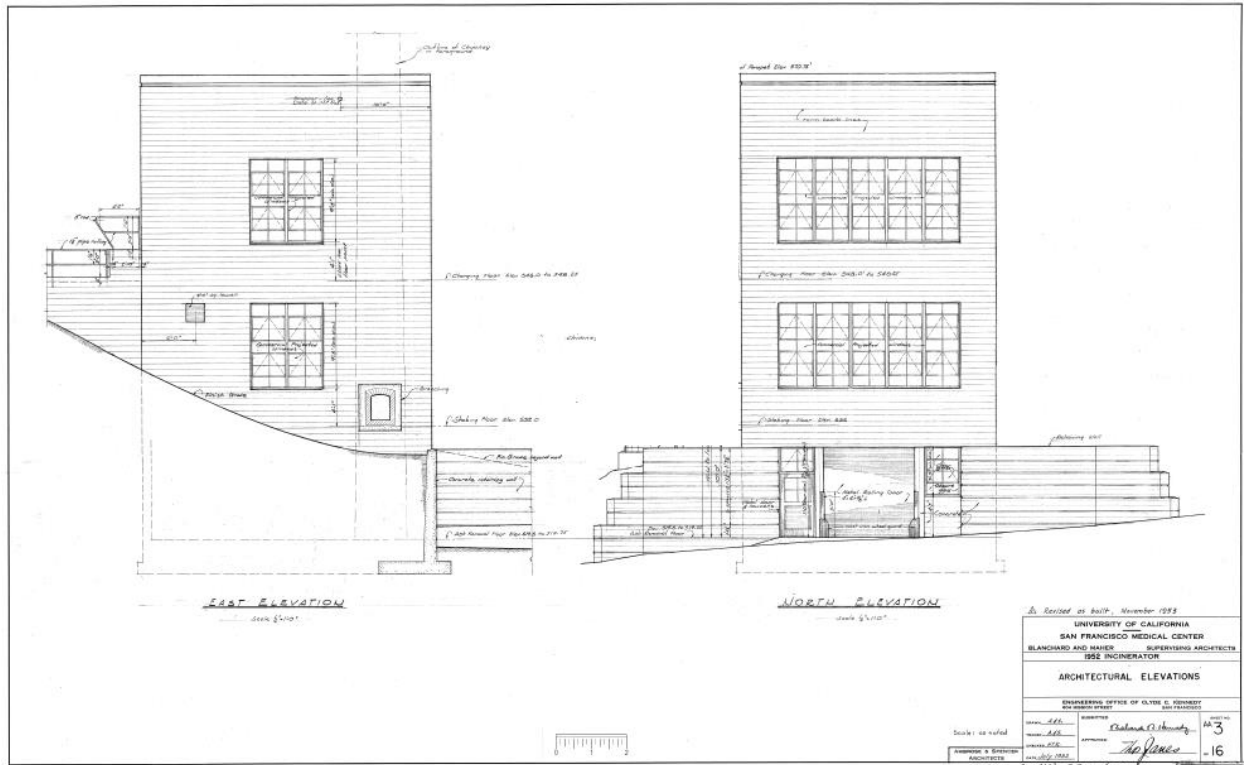


Building Foundation Plan

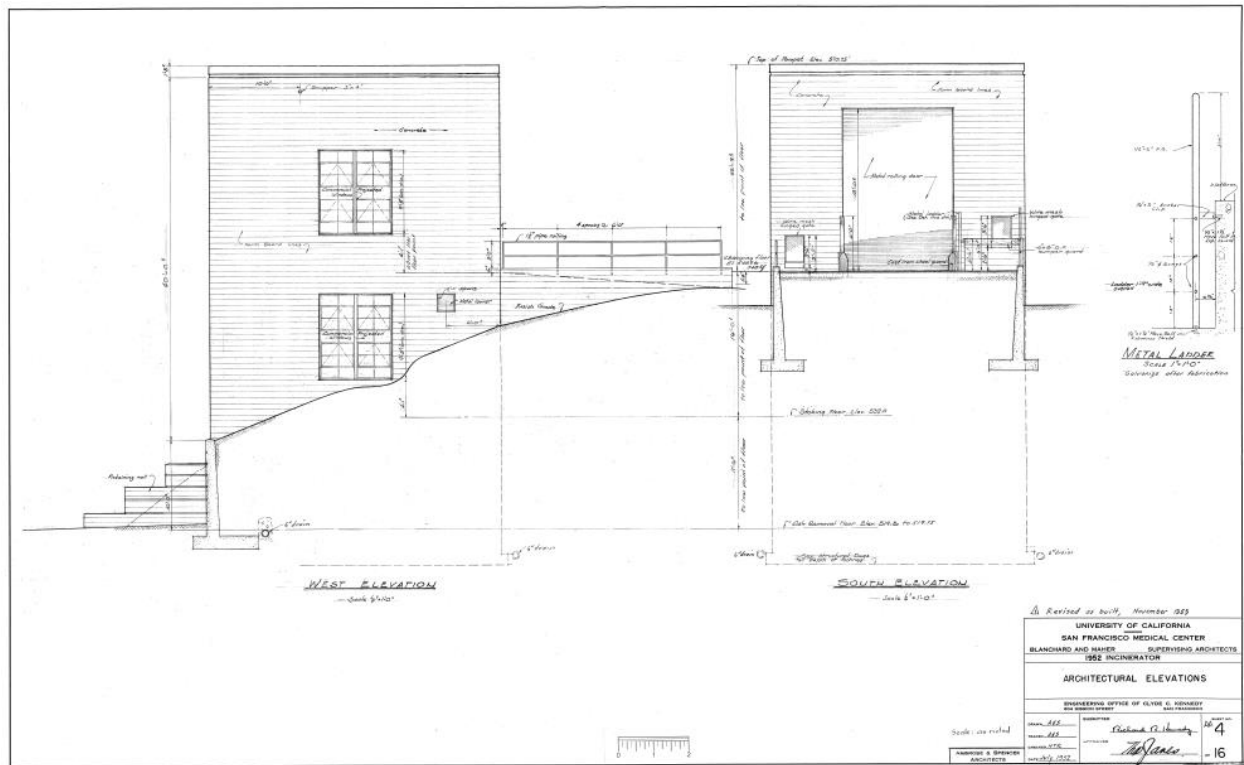


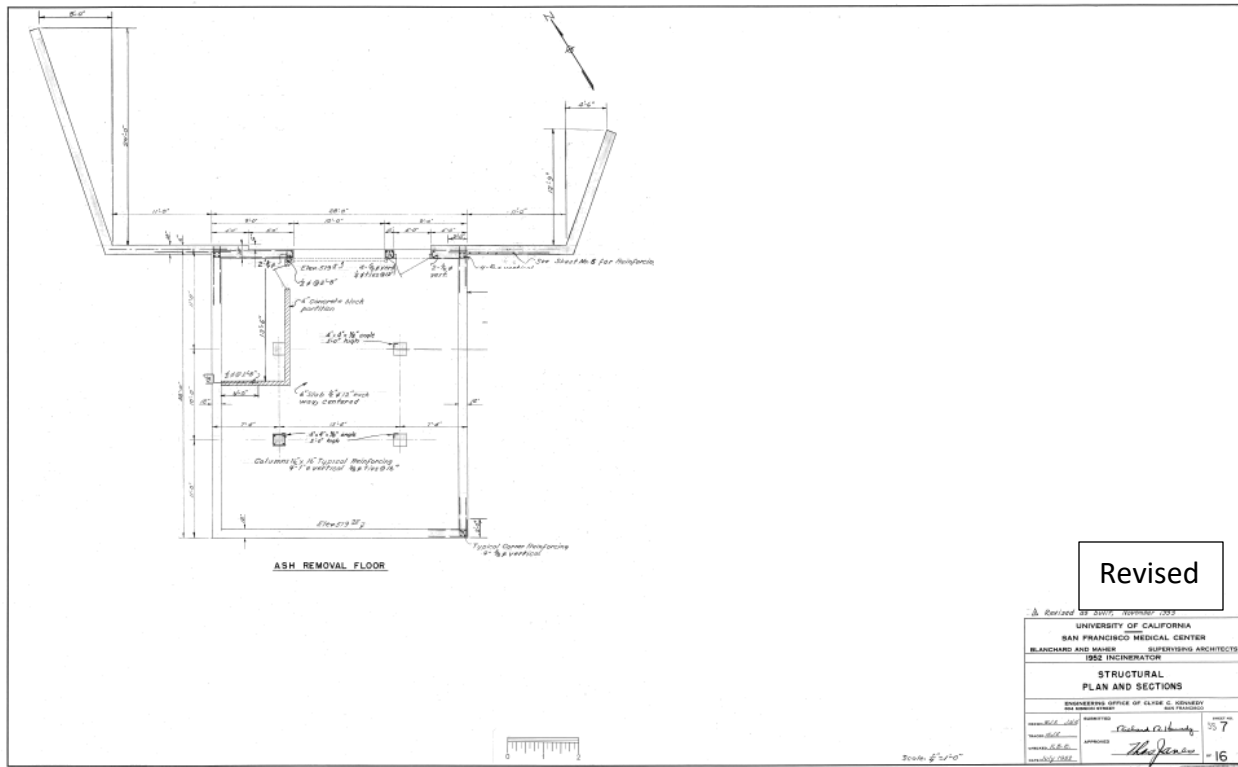
Building Plans



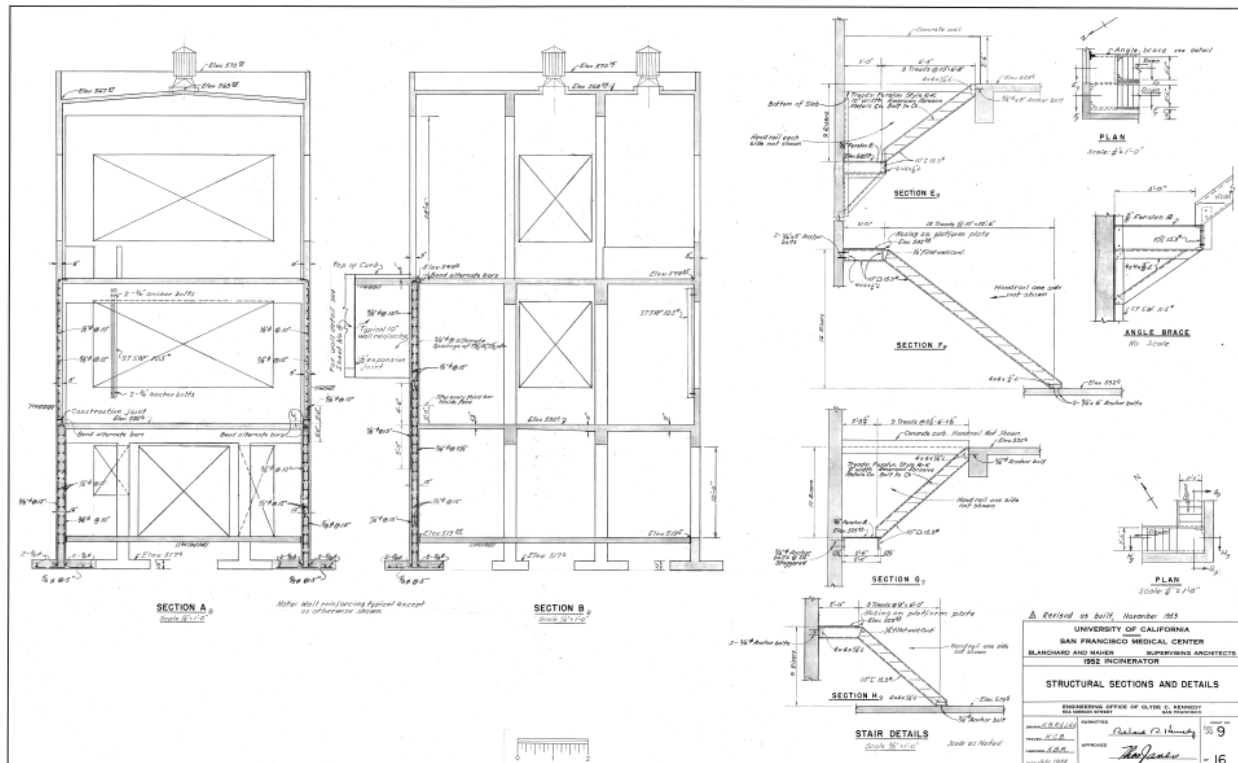


Building Elevation





Building Section



Appendix B

Checklists

UC Campus:	Parnassus			Date:	4 September 2019		
Building CAAN:	2234A	Auxiliary CAAN:		By Firm:	SGH		
Building Name:	EH&S Annex Building West			Initials:	CAO	Checked:	KDP
Building Address:	50 Medical Center Way, San Francisco, CA 94131			Page:	1	of	3

ASCE 41-17 Collapse Prevention Basic Configuration Checklist

LOW SEISMICITY

BUILDING SYSTEMS - GENERAL

	Description
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p>Comments:</p>
C NC N/A U <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p>Comments: The eastern and western buildings are separated by a one inch joint.</p>
C NC N/A U <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	<p>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)</p> <p>Comments: No mezzanines.</p>

BUILDING SYSTEMS - BUILDING CONFIGURATION

	Description
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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. A.2.2.2. Tier 2: Sec. 5.4.2.1)</p> <p>Comments: Building story strengths are similar.</p>
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p>Comments: Eastern building is single-story. Western building story strengths are similar.</p>

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

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ASCE 41-17 Collapse Prevention Basic Configuration Checklist

C <input checked="" type="radio"/> NC <input type="radio"/> N/A <input type="radio"/> U <input type="radio"/>	<p>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)</p> <p>Comments: Western building north shear wall is discontinuous at first story, but supported by long wall segments running east and west of opening.</p>
C <input checked="" type="radio"/> NC <input type="radio"/> N/A <input type="radio"/> U <input type="radio"/>	<p>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)</p> <p>Comments: Lateral system elements align between stories.</p>
C <input checked="" type="radio"/> NC <input type="radio"/> N/A <input type="radio"/> U <input type="radio"/>	<p>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)</p> <p>Comments: Mass is similar between floors.</p>
C <input type="radio"/> NC <input checked="" type="radio"/> N/A <input type="radio"/> U <input type="radio"/>	<p>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)</p> <p>Comments: Western building center of rigidity is near the south wall.</p>

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

GEOLOGIC SITE HAZARD

	Description
C <input checked="" type="radio"/> NC <input type="radio"/> N/A <input type="radio"/> U <input type="radio"/>	<p>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)</p> <p>Comments: Liquefaction potential is negligible.</p>
C <input checked="" type="radio"/> NC <input type="radio"/> N/A <input type="radio"/> U <input type="radio"/>	<p>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)</p> <p>Comments: Slope failure unlikely.</p>

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ASCE 41-17 Collapse Prevention Basic Configuration Checklist

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

GEOLOGIC SITE HAZARD

C	NC	N/A	U	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)
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Comments: Faults are adequately distant and do not pose a risk at this site.				

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)
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments: The ratio exceeds $0.6S_a$ however, the strip footing are large and the bearing pressures ok by inspection.
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)
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments: Building foundations are compliant.

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ASCE 41-17 Collapse Prevention Structural Checklist For Building Type C2-C2A

Low And Moderate Seismicity

Seismic-Force-Resisting System

	Description
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>COMPLETE FRAMES: Steel or concrete frames classified as secondary components form a complete vertical-load-carrying system. (Commentary: Sec. A.3.1.6.1. Tier 2: Sec. 5.5.2.5.1)</p> <p>Comments: Walls carry part of the vertical load but are judged to be adequate for combined seismic shear and gravity load.</p>
C NC N/A U <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	<p>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)</p> <p>Comments: Western building north shear wall is discontinuous at the first story.</p>
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the greater of 100 lb/in.² (0.69 MPa) or $2\sqrt{f'_c}$. (Commentary: Sec. A.3.2.2.1. Tier 2: Sec. 5.5.3.1.1)</p> <p>Comments: Maximum DCR for wall shear stress is 0.85.</p>
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area is not less than 0.0012 in the vertical direction and 0.0020 in the horizontal direction. (Commentary: Sec. A.3.2.2.2. Tier 2: Sec. 5.5.3.1.3)</p> <p>Comments: Ratios exceed allowables (min vert ratio = 0.0032 and min horiz ratio = 0.0025).</p>

Connections

	Description
C NC N/A U <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>	<p>WALL ANCHORAGE AT FLEXIBLE DIAPHRAGMS: Exterior concrete or masonry walls that are dependent on flexible diaphragms for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections have strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7. (Commentary: Sec. A.5.1.1. Tier 2: Sec. 5.7.1.1)</p> <p>Comments: Diaphragms are concrete.</p>
C NC N/A U <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<p>TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls. (Commentary: Sec. A.5.2.1. Tier 2: Sec. 5.7.2)</p> <p>Comments: Diaphragms are shown to be cast monolithically with the walls but reinforcement details not clear.</p>

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ASCE 41-17 Collapse Prevention Structural Checklist For Building Type C2-C2A

C	NC	N/A	U	<p>FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation with vertical bars equal in size and spacing to the vertical wall reinforcing directly above the foundation. (Commentary: Sec. A.5.3.5. Tier 2: Sec. 5.7.3.4)</p> <p>Comments: Dowels equal to wall reinforcement.</p>
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

High Seismicity (Complete The Following Items In Addition To The Items For Low And Moderate Seismicity)

Seismic-Force-Resisting System				Description
C	NC	N/A	U	<p>DEFLECTION COMPATIBILITY: Secondary components have the shear capacity to develop the flexural strength of the components. (Commentary: Sec. A.3.1.6.2. Tier 2: Sec. 5.5.2.5.2)</p> <p>Comments: Concrete column shear strength can develop the flexural strength of the columns.</p>
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<p>FLAT SLABS: Flat slabs or plates not part of the seismic-force-resisting system have continuous bottom steel through the column joints. (Commentary: Sec. A.3.1.6.3. Tier 2: Sec. 5.5.2.5.3)</p> <p>Comments: Floors are one-way slab supported on one-way beams.</p>
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<p>COUPLING BEAMS: The ends of both walls to which the coupling beam is attached are supported at each end to resist vertical loads caused by overturning. (Commentary: Sec. A.3.2.2.3. Tier 2: Sec. 5.5.3.2.1)</p> <p>Comments: No coupling beams.</p>
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	

Diaphragms (Stiff Or Flexible)

Diaphragms (Stiff Or Flexible)				Description
C	NC	N/A	U	<p>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)</p> <p>Comments: Diaphragms are continuous and connected to walls.</p>
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<p>OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 25% of the wall length. (Commentary: Sec. A.4.1.4. Tier 2: Sec. 5.6.1.3)</p> <p>Comments: Western building has an opening on the east wall at the first floor approximately 30% of the wall length, and an opening on west wall at the second floor approximately 30% of the wall length. The first floor diaphragm is a nine inch concrete diaphragm and the second floor is a six inch concrete diaphragm, both cast monolithically with the walls (construction joint slightly above the floor line per the drawings).</p>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

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ASCE 41-17 Collapse Prevention Structural Checklist For Building Type C2-C2A

Flexible Diaphragms							
				Description			
C	NC	N/A	U	CROSS TIES: There are continuous cross ties between diaphragm chords. (Commentary: Sec. A.4.1.2. Tier 2: Sec. 5.6.1.2)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Comments: Diaphragms are concrete slabs.			
C	NC	N/A	U	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)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Comments: Diaphragms are concrete slabs.			
C	NC	N/A	U	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)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Comments: Diaphragms are concrete slabs.			
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 aspect ratios less than or equal to 4-to-1. (Commentary: Sec. A.4.2.3. Tier 2: Sec. 5.6.2)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Comments: Diaphragms are concrete slabs.			
C	NC	N/A	U	OTHER DIAPHRAGMS: 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)			
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Comments: Diaphragms are concrete slabs.			
Connections							
				Description			
C	NC	N/A	U	UPLIFT AT PILE CAPS: Pile caps have top reinforcement, and piles are anchored to the pile caps. (Commentary: Sec. A.5.3.8. Tier 2: Sec. 5.7.3.5)			
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Comments: Foundations are shallow.			

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

Appendix C

UCOP Seismic Safety Policy Falling Hazards Assessment Summary

UC Campus:	UCSF – Parnassus		Date:	04 September 2019		
Building CAAN:	2234A	Auxiliary CAAN:	By Firm:	Simpson Gumpertz & Heger		
Building Name:	EH&S Annex Building West		Initials:	KDP	Checked:	KSM
Building Address:	50 Medical Center Way, San Francisco		Page:	1	of	1

UCOP SEISMIC SAFETY POLICY Falling Hazard Assessment Summary

		Description
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	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: No areas of congregation of over 50 people are located within the building.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Heavy masonry or stone veneer above exit ways or public access areas Comments: No masonry or stone veneer is located near exit ways or public access areas.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	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 <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Unrestrained hazardous material storage Comments: No hazardous materials stored in the building.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Masonry chimneys Comments: No chimney in building.
P <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Unrestrained natural gas-fueled equipment such as water heaters, boilers, emergency generators, etc. Comments: No unrestrained equipment in the building.
P <input type="checkbox"/>	N/A <input type="checkbox"/>	Other: Comments:
P <input type="checkbox"/>	N/A <input type="checkbox"/>	Other: Comments:
P <input type="checkbox"/>	N/A <input type="checkbox"/>	Other: Comments:

Falling Hazards Risk: *Low*

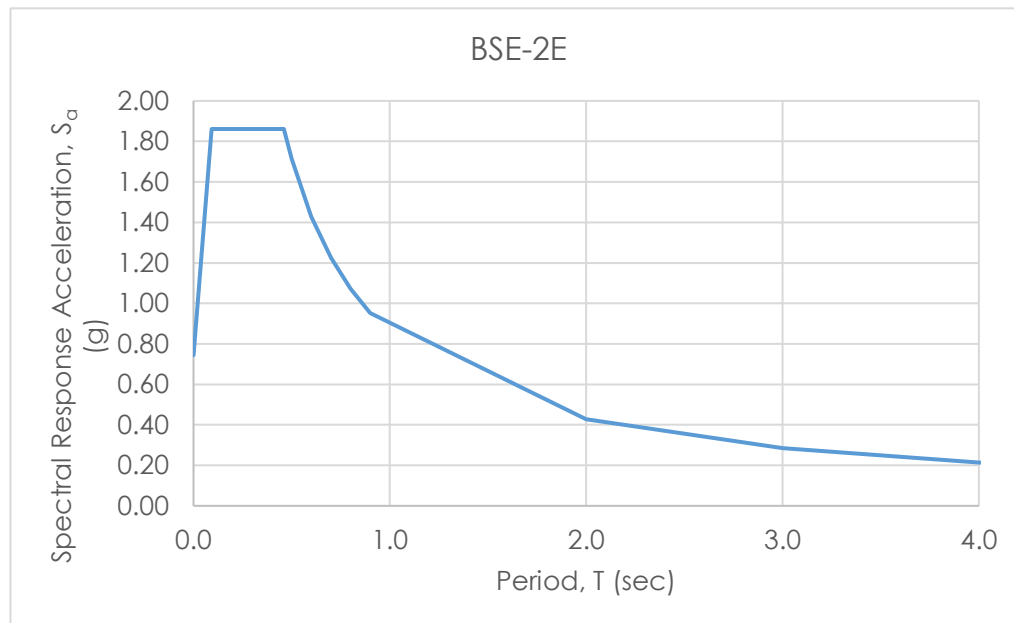
Appendix D

Tier 1 Calculations

Hazard Level BSE-2E

MCE _R ground motion (period=0.2s)	S _S	1.551 g
MCE _R ground motion (period=1.0s)	S ₁	0.612 g
Site amplification factor at 0.2s	F _a	1.2
Site amplification factor at 1.0s	F _v	1.4
Site modified spectral response (0.2s)	S _{X5}	1.861 g
Site modified spectral response (1.0s)	S _{X1}	0.857 g
Long-period transition period (s)	T _L	12 sec
	T ₀	0.092 sec
	T _S	0.460 sec

T	S _a
sec	g
0.0	0.744
0.092	1.861
0.460	1.861
0.50	1.714
0.60	1.428
0.70	1.224
0.80	1.071
0.9	0.952
2.0	0.428
3.0	0.286
4.0	0.214
6.0	0.143
8.0	0.107
10.0	0.086
12.0	0.071



Masses

γ **150** pcf

Other weight (superimposed dead load)
10 psf

Unit: lbs

Floor	Height (ft)	W _{column}	W _{wall}	W _{beam}	W _{slab}	W _{equip}	W _{other}
Roof	20.0	18667	69333	15334	56000	3000	8960
Charging	16.3	33833	125666	30223	56000	3000	8960
Stoking	12.5	26833	149499	23111	86800	3000	8960
Ash Removal		11667	65000				

Unit: kip

W
171
258
298
77
804

Floor	W_i [kip]	h_i [ft]	$(h_i)^k$ [ft]	$W_i(h_i)^k$ [kip-ft]	C_{vi}	F_i [kip]	V_i [kip]
Roof	171	48.8	48.8	8351	0.429	705	705
Charging	258	28.8	28.8	7408	0.380	626	1331
Stoking	298	12.5	12.5	3728	0.191	315	1646
Ash Removal	77		0.0	0	0.000	0	1646
	804			19486	1.00	1646	

T 0.369 sec
k 1.00

W 804 kip
C 1.1 [Modification factor, buildings 3 stories]
 S_a 1.861 g
V 1646 kip

Approximate Period of Structure

System // Reinforced Concrete Shear Wall

h_n 48.75 ft
 β 0.75 [All other framing systems]
 C_t 0.02 [All other framing systems]

T 0.369 sec
 S_a 1.861 g

SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the greater of 100 lb/in.² (0.69 MPa) or $2\sqrt{f'_c}$.

M_s 4.5 ASCE 41-17 Table 4-8
 f_c 2500 psi
 $\sqrt{f_c}$ 50.0 psi

	[kip]	[kip]
Floor	V_i	V_i/M_s
Roof	705	157
Charging	1331	296
Stoking	1646	366
Ash Removal	1646	

N-S

	[in ²]	[psi]		
A_w	σ	$\sigma/\sqrt{f_c}$	DCR	
4608	34.0	0.68	0.34	OK
4168	71.0	1.42	0.71	OK
4608	79.4	1.59	0.79	OK

	[kip]	[kip]
Floor	V_i	V_i/M_s
Roof	705	157
Charging	1331	296
Stoking	1646	366
Ash Removal	1646	

E-W

	[in ²]	[psi]		
A_w	σ	$\sigma/\sqrt{f_c}$		
2288	68.5	1.37	0.68	OK
4800	61.6	1.23	0.62	OK
4308	84.9	1.70	0.85	OK

Check shear friction for #5 @ 9"

A_s 1.65 in²
 f_y 40000 psi
 μ 1.4 [Concrete placed monolithically]
 V_n 92.6 kip [ACI 318-11 Eq. 11-25]
 V_u 182.9 kip
DCR 1.98 **Not OK**

REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area is not less than 0.0012 in the vertical direction and 0.0020 in the horizontal direction.

Vertical direction limit 0.0012
Horizontal direction limit 0.0020

Floor	Vert A_s		Hor A_s	
Roof	0.0032	OK	0.0025	OK
Charging	0.0058	OK	0.0027	OK
Stoking	0.0058	OK	0.0027	OK
	0.0082	OK		

CLIENT UCSF
 SUBJECT Tier 1 - Quick Checks - EHS West

SHEET NO. 6
 PROJECT NO. 197042.00
 DATE 09/04/2019
 BY CAO
 CHECKED KDP

DEFLECTION COMPATIBILITY: Secondary components have the shear capacity to develop the flexural strength of the components.

	[kip-ft]	[kip]	[ft]			
Floor	M_p	V_n	L_c	$2M_p/L_c$	DCR	Check
Typ 12"x12"	49.0	16.5	20.0	4.90	0.30	OK
Typ 12"x16"	64.6	20.7	16.3	7.95	0.39	OK
Typ 16"x16"	129.4	27.2	20.0	12.94	0.48	OK