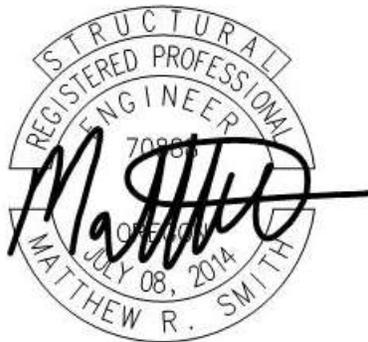


Structural Seismic Evaluation Report
for the
Umpqua Community College
Fine Arts & Classroom Building

Prepared for:
Umpqua Community College

November, 2018



EXPIRES: 06-30-20

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1.0 Executive Summary

The Umpqua Community College is located in Roseburg, Oregon in Douglas County. The District operates 1 facility located in the community, The Fine Arts and Classroom Building approximately 98 miles northwest of Medford, Oregon. The College has retained ZCS Engineering and Architecture (ZCS) to perform a seismic evaluation of The Fine Arts and Classroom Building that provides the College with an objective, comprehensive analysis of the condition of the building's seismic resisting systems. The purpose of the evaluation is to determine the seismic lateral resisting system deficiencies when compared to buildings designed using modern building codes. This evaluation was performed in accordance with the American Society of Civil Engineers "Seismic Rehabilitation of Existing Buildings ASCE/SEI 41-17".

The Fine Arts and Classroom Building is located at 1140 Umpqua College Road in Roseburg, Oregon (See Sheet G0.0 – Vicinity Map). ZCS was tasked with evaluating the lateral force resisting systems of the facility. The approximately 21,800 square foot Fine Arts and Classroom Building was built in 1977. The remaining Umpqua Community College campus was excluded from our analysis. The structure consists of conventional framed wood walls supporting glulam beams, wood trusses, and dimensional lumber joists under plywood at the roof. The elevated floor consists of dimensional lumber joists and the base floor consists of a reinforced concrete slab on grade. The foundation consists of conventional reinforced concrete spread footings.

The evaluation of the facility indicates, rehabilitation of existing lateral system components are necessary to meet the following requirements as outlined in ASCE 41-17:

- School buildings, other than areas which may be used as emergency shelters, shall be categorized as Risk Category III and evaluated to meet the Limited Safety structural performance and Hazards Reduced nonstructural performance level for BSE-2E loading.

See section 3.2 for performance level definitions.

The following is a brief list of seismic deficiencies encountered:

- The roof and floor diaphragms do not have adequate in-plane shear connections to the top of the existing shear walls.
- The roof diaphragm has a vertical roof step which creates a vertical discontinuity in the diaphragm. This prevents the diaphragm from transferring lateral forces to the perpendicular shear walls.
- The veneer walls are not properly supported for out-of-plane loading.

- The plywood shear walls below the roof and floor structure do not have adequate capacity to resist the prescribed seismic forces generated in the roof and floor diaphragms.
- The glulam beams are structurally inadequate to support gravity and seismic loading. The inadequacy to resist these loads can lead to catastrophic collapse of the roof.

Recommendations mitigating the known deficiencies determined by our analysis are outlined in section 4.0 of this report. In addition to the rehabilitation recommendations, we prepared schematic seismic retrofit drawings to convey the intent of the rehabilitation effort. These drawings are included in Appendix E.

To help the College understand the magnitude of the rehabilitation effort and secure funding sources for the seismic system rehabilitation of the building, a preliminary construction cost estimate was developed. Based on our extensive experience and with the assistance of past contractors a total construction cost of **\$1,800,630.00** including all soft costs associated with architecture/engineering, permitting, and District Project Management was developed. Refer to section 5.0 of the report body.

In addition to the construction cost estimation efforts we performed a “Benefit Cost Analysis” using the tool provided by the State of Oregon Infrastructure Finance Authority. The building has a benefit cost score of **0.602**. Refer to Appendix D for BCA worksheets.

It is our final recommendation that given the BCA score and the general condition of the seismic resisting systems, this building is an excellent candidate to be rehabilitated to meet the currently prescribed seismic demands for Limited Safety (BSE-2E) and Damage Control (BSE-1E) per ASCE 41-17. Once rehabilitated, this building will meet the needs of the College and community for future generations.

2.0 Project Introduction

Umpqua Community College is centrally located in Roseburg, Oregon in Douglas County. The Fine Arts and Classroom Building is located at 1140 Umpqua College Road in Roseburg, Oregon (See Sheet G0.0 – Vicinity Map).

The College has retained ZCS Engineering and Architecture (ZCS) to perform a seismic evaluation of The Fine Arts and Classroom Building. The purpose of the evaluation is to provide the College with an objective, comprehensive analysis of the condition of the existing seismic force resisting systems of the facility when compared to a building constructed using modern building codes. In addition to evaluating the building's seismic performance, schematic seismic retrofit plans have been developed. The rehabilitation plans have been developed using our extensive knowledge of seismic rehabilitation and are intended to meet the objectives and the level of performance of Limited Safety (BSE-2E) and Damage Control (BSE-1E) based on the ASCE 41-17 requirements. Based on the seismic evaluation and schematic rehabilitation design drawings, a preliminary construction cost estimate was developed. Based on the preliminary construction cost estimate, a benefit cost analysis was prepared to help the College determine whether or not the rehabilitation efforts outlined in this report are financially responsible.

This work was conducted at the request of Jess Miller, Director of Facilities and Security, under an engineering services contract between the College and ZCS.

2.1 Scope of Work

The following scope of work was developed to meet the objectives outlined above.

Seismic Evaluation & Preliminary Rehabilitation Services:

- Review original building construction drawings to determine existing structural systems and areas of concern.
- Perform site visits of the structure to observe structural systems and visually review structural condition and deficiencies.
- Observe lateral system (seismic) components and load path.
- Observe gravity system components and load path.
- Observe for damage and failing elements.
- Verify original building drawings for use in developing schematic level as-builts.
- Evaluate existing construction based on visual observations and available as-constructed documentation against ASCE 41 Tier 1 requirements.
- Collate findings and perform preliminary calculations to assist in the determination of each building's seismic deficiencies.

- Prepare an evaluation report for the facility identifying the structural integrity and seismic deficiencies stamped by a registered Structural Engineer licensed in the State of Oregon.

Preliminary Construction Cost Consulting Services:

- Develop project base sheets based on the College provided original drawings.
- Prepare conceptual rehabilitation drawings based on ASCE 41 guidelines to convey the intent of rehabilitation recommendations.
- Prepare a project cost estimate based on historic projects of similar scope and magnitude.
- Review constructability and cost estimate with a licensed contractor.
- Revise plans based on contractor input as required to optimize the efficiency of the rehabilitation plan and develop final construction cost recommendations.
- Prepare cost benefit analysis based on SRGP methodologies
*Financial and enrollment information has been provided by the College
- Summarize findings in final report package stamped by a registered Structural Engineer licensed in the State of Oregon.

3.0 Structural Evaluation

3.1 Introduction

ZCS was tasked with evaluating the lateral force resisting systems of the facility. The approximately 21,800 square foot Fine Arts and Classroom Building was built in 1977. The remaining Umpqua Community College campus was excluded from our analysis. The structure consists of conventional framed wood walls supporting glulam beams, wood trusses, and dimensional lumber joists under plywood at the roof. The elevated floor consists of dimensional lumber joists and the base floor consists of a reinforced concrete slab on grade. The foundation consists of conventional reinforced concrete spread footings.

3.2 Structural Evaluation

The following outlines the evaluation of the existing structural components of the building. The evaluation includes site observations of the existing structural elements and follows the guidelines outlined in the American Society of Civil Engineer's "Seismic Evaluation of Existing Buildings – ASCE 41-17". This manual is the recommended evaluation tool per the Seismic Rehabilitation Grant Program through Business Oregon Infrastructure Finance Authority. Per ASCE 41-17 a Tier 1 evaluation has been performed. The purpose of a Tier 1 evaluation is to provide "Quick Checks" to properly evaluate a building and determine deficiencies related to the lateral resisting elements.

It is the intent of the District, as part of this study, to determine the structural deficiencies of the building as compared to current prescribed loading and detailing requirements for lateral (wind/seismic) loading to a performance level of "Limited Safety (BSE-2E)" per ASCE 41-17. The level of performance is defined per ASCE 41-17 as:

"The Limited Safety Structural Performance Level is set forth as a midway point between Life Safety and Collapse Prevention. It is intended to provide a structure with a greater reliability of resisting collapse than a structure that only meets the Collapse Prevention Performance Level, but not to the full level of safety that the Life Safety Performance Level would imply."

"Structural Performance Level S-3, Life Safety, means the post-earthquake damage state in which significant damage to the structure has occurred but some margin against either partial or total structural collapse remains. Some structural elements and components are severely damaged, but this damage has not resulted in large falling debris hazards, either inside or outside the building. Injuries might occur during the earthquake; however, the overall risk of life-threatening injury as a result of structural damage is expected to be low. It should be possible to repair the structure; however, for economic reasons, this repair might not be

practical. Although the damaged structure is not an imminent collapse risk, it would be prudent to implement structural repairs or install temporary bracing before reoccupancy.”

“Structural Performance Level, Collapse Prevention, means the post-earthquake damage state in which the building is on the verge of partial or total collapse. Substantial damage to the structure has occurred, potentially including significant degradation in the stiffness and strength of the lateral-force-resisting system, large permanent lateral deformation of the structure, and - to a more limited extent - degradation in vertical-load-carrying capacity. However, all significant components of the gravity-load-resisting system must continue to carry their gravity loads. Significant risk of injury caused by falling hazards from structural debris might exist. The structure might not be technically practical to repair and is not safe for reoccupancy because after shock activity could induce collapse.”

Per ASCE 41-17 a seismic hazard level is required. In order to obtain a performance level of “Limited Safety” the seismic hazard shall be BSE-2E as defined in section 2.4.1.3 and C2.4.1.3. The BSE-2E hazard level earthquake has a probability of occurring once in every 975 years, or 5% chance in 50 years. This design level earthquake represents ground motions approximately 75% as large as those prescribed for new buildings. We feel this provides an appropriate level of performance for this facility.

Lateral resisting systems work in conjunction with gravity framing systems. As such, the existing gravity framing system was also reviewed for structural deficiencies during our site observations. Section 3.2.3 outlines the existing gravity system and its structural deficiencies found during the evaluation.

Geologic hazards were assessed as part of our engineering evaluation. The main hazards evaluated in our analysis included liquefaction, slope failure, and surface fault rupture potential. These potential hazards were evaluated using ASCE 41-17 guidelines, as well as information provided by the online Oregon HazVu: Statewide Geohazards Viewer, maintained by DOGAMI. Results from the HazVu analysis are included in Appendix B.

3.2.1 Lateral Resisting Systems

After reviewing the facility and the existing drawings we have determined the lateral system is defined as Wood Frames, Commercial and Industrial (W2). Per ASCE 41 a W2 lateral system is defined as:

Wood Frames, Commercial and Industrial (W2) – These buildings are commercial or industrial buildings with a floor area of 5,000 ft² or more. There are few, if any, interior walls. The floor and roof framing consists of wood or steel trusses, glulam or steel beams, and wood posts or steel columns. The foundation system may consist of a variety of elements. Seismic forces are

resisted by wood diaphragms and exterior stud walls sheathed with plywood, oriented strand board, stucco, plaster, or straight or diagonal wood sheathing, or they may be braced with rod bracing. Wall openings for storefronts and garages, where present, are framed by a post-and-beam framing.

3.2.2 Lateral Resisting Element Deficiencies

The following lateral resisting element deficiencies are based on visual observations of the existing structural elements and the structural analysis performed during the Tier 1 “Quick Checks” of the ASCE 41-17. The Tier 1 checklists are attached in Appendix B. The following outlines the deficiencies for each portion of the facility.

- S1. The roof and floor diaphragms do not have adequate in-plane shear connections to the top of the existing shear walls.
- S2. The roof diaphragm has a vertical roof step which creates a vertical discontinuity in the diaphragm. This prevents the diaphragm from transferring lateral forces to the perpendicular shear walls.
- S3. The veneer walls are not properly supported for out-of-plane loading.
- S4. The floor diaphragm does not meet the prescribed span length. The code limits the span length to minimize the shear demands and deflection.
- S5. The plywood shear walls below the roof and floor structure do not have adequate capacity to resist the prescribed seismic forces generated in the roof and floor diaphragms.
- S6. The glulam beams are structurally inadequate to support gravity and seismic loading. The inadequacy to resist these loads can lead to catastrophic collapse of the roof.
- S7. Holdown devices are not present to properly attach the second floor walls to the shear walls below, rendering them susceptible to overturning forces.

3.2.3 Gravity Resisting Systems and General Observations

The following gravity resisting deficiencies are based on visual observations of the existing structural elements. No formal structural analysis was performed during this evaluation of the gravity resisting elements.

- The gravity resisting system was found to be in good general condition based on the visual observations performed, with the exception of the deficiency listed in S6.

3.2.4 Evaluation of Incidental Items

Incidental, non-structural items can play a major role in the overall expense of rehabilitating an existing building. These costs can be significant, and can be very difficult to estimate prior to construction.

- N1. Proper attachment and bracing of storage racks/cabinets/books shelves over 4' tall or 3:1 (height: width) ratio.
- N2. Attachment of equipment over 20 lbs. and above 4', and all equipment over 100 lbs.
- N3. Attachment of all emergency lighting, power equipment and associated wiring.
- N4. Bracing of fluid piping, ducting, and any gas piping. Stair pressurization and smoke control ducts are not properly braced within the stairwell, including seismic joints.
- N5. Verification/installation of emergency shutoff valves for gas utilities.
- N6. Hazardous material mitigation (floor tiles, roofing, ceiling tiles, etc.).
- N7. Stone veneer attachment over the exit doors is not adequate.

Based upon ZCS's previous experience and discussions with site personnel the building contains some form of hazardous material. These materials will need to be dealt with on a case-by-case basis as they are encountered during the project.

4.0 Seismic Rehabilitation Recommendations

The following structural improvements are required to resolve the deficiencies noted in section 3.2.2. These improvements are detailed below and in the attached schematic seismic rehabilitation drawings found in Appendix E. These drawings were prepared to assist in defining the rehabilitation scope of work.

4.0.1 Rehabilitation Recommendations for Lateral Resisting Elements (See Section 3.2.2)

- S1. New in-plane shear connections will be added between the diaphragms and the shear walls.
- S2. Provide additional roof framing and sheathing to allow for adequate shear transfer within the roof diaphragm.
- S3. New out-of-plane connections between the top of wall and floor and roof diaphragms.
- S4. Provide blocking at panel edges and nailing to the existing floor sheathing diaphragm to increase the allowable span length and shear capacity of the diaphragm.
- S5. Where the existing plywood shear walls are not adequate either additional nailing will be provided or an additional layer of plywood will be added on the inside face to provide the necessary strength.
- S6. Given our extensive knowledge of glulam beams and their lack of structural redundancy, it is our recommendation that the existing roof structure be strengthened or replaced. Strengthening would consist of establishing properly detailed connections using steel side plates and additional through bolts. Additional structural elements maybe added.
- S7. New back-to-back holdown devices shall be added at the second floor to first floor levels.

4.0.2 Rehabilitation Recommendations for Gravity Resisting Systems and General Observations (See Section 3.2.3)

- Rehabilitation of the gravity resisting system is not required at this time, with the exception of the Rehabilitation Recommendation in S6.

4.0.3 Rehabilitation Recommendations for Incidental Items (See Section 3.2.4)

- N1. Storage racks, cabinets, and book shelves shall be adequately braced to structure.

- N2. Any mechanical equipment weighing over 20 lbs. and above 4', and all equipment over 100 lbs. shall be attached and properly braced.
- N3. Verify emergency lighting, power equipment, and associated wiring is properly braced.
- N4. Properly brace all existing fluid piping, ducting, and any gas piping as required.
- N5. Verify installation of emergency shut off valves for gas utilities.
- N6. Consult with hazardous material specialist to determine extent of hazardous material mitigation. Materials deemed hazardous and planned to be removed as part of seismic retrofit operations shall be abated by licensed professionals.
- N7. The stone veneer over all exit doors will be attached to the wood walls to minimize the falling hazard.

5.0 Preliminary Construction Cost Estimate

The attached engineer's opinion of probable cost has been developed by ZCS for The Fine Arts and Classroom Building. ZCS has a successful record of completing seismic rehabilitation projects within the State of Oregon. The prices provided in the attached cost estimate have been developed using the extensive list of past projects as a baseline for this project. These prices are based on Oregon BOLI wage rates. The cost estimate is broken down into multiple line items associated with each major task (general conditions, foundation, structural steel, MEP, etc) associated with the rehabilitation. Additional line items are included for design associated permit costs, and owner construction management.

The preliminary construction cost estimate, including line item costs, was generated based on our extensive experience with completing retrofit projects of similar scope and construction type. Detailed final costs to complete recent projects were reviewed to ensure the values presented in the attached cost estimate are up-to-date with industry standard. Contractors specializing in retrofit construction were also consulted periodically to confirm more complicated line item costs are constructible within the budget allotted. After final review, the preliminary opinion of probable cost is **\$1,800,630.00**.

6.0 Benefit Cost Analysis

The provided benefit-cost analysis (BCA) included in Appendix D, has been prepared by ZCS using the BCA tool as provided by the State of Oregon Infrastructure Finance Authority. The costs associated with the building replacement value, contents replacement value, and occupancy values have been developed by College staff using recent data.

The Fine Arts and Classroom Building was surveyed during the state wide assessment of emergency buildings performed by Department of Geology, Mineral and Industries' (DOGAMI) Rapid Visual Screening (RVS) process in 2005 as part of senate bill 2. The art building is part A of the RVS scoring provided by DOGAMI. The occupancy and budget data provided by the College is for the art building.

The BCA for this project is **0.602**. Although the BCA score of **0.602** is less than 1.0, we still recommend the proposed seismic retrofit and feel this building is a great candidate for the grant given its importance to the community it serves.

7.0 Conclusion and Recommendations

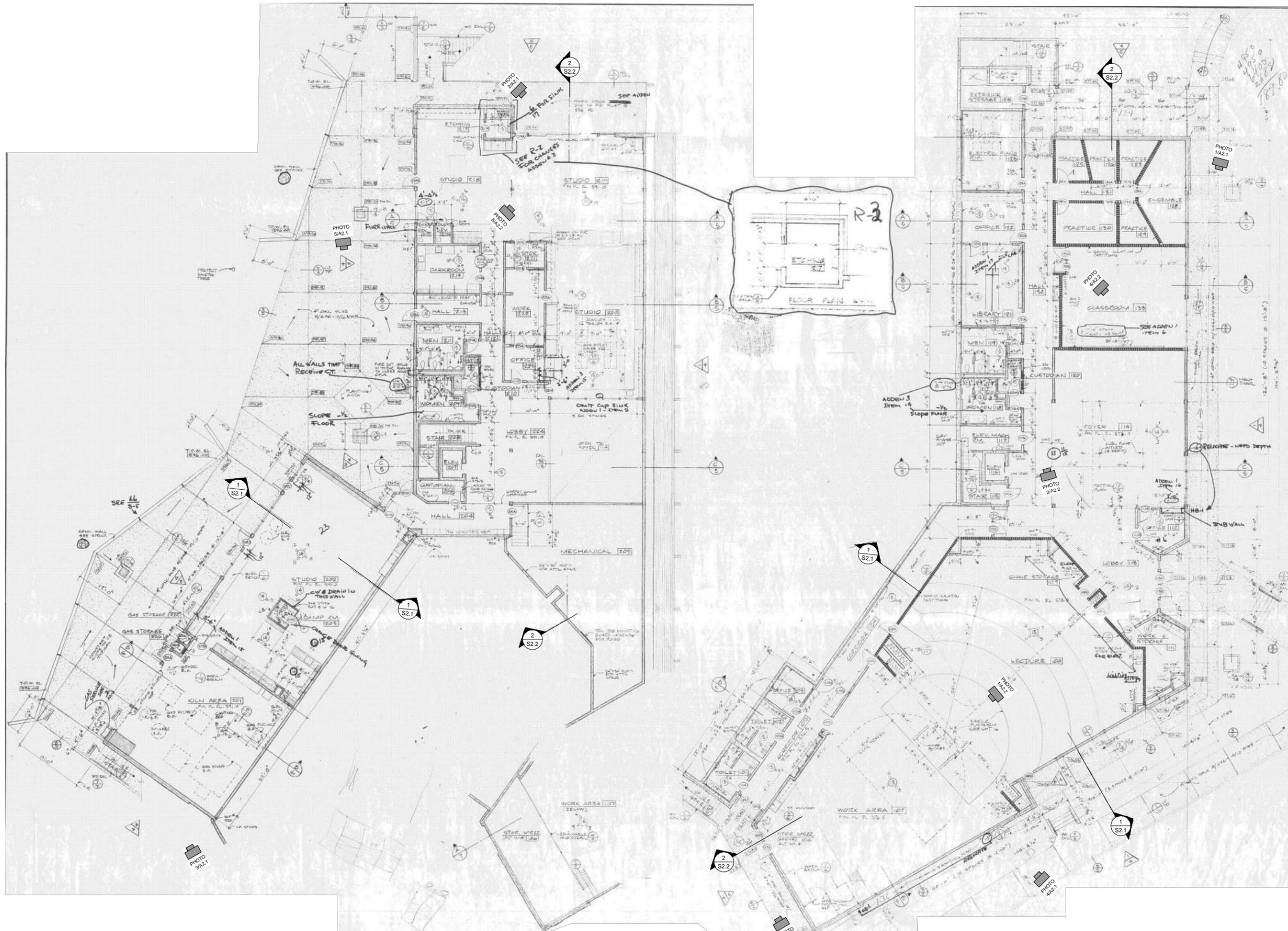
The findings described in this report have been limited to the lateral force-resisting structural system and general assessment of the gravity force-resisting elements. Based on our visual observations, we find the structure to be in good condition and generally safe for occupancy. No significant damage to the existing structural system was discovered.

Given the current condition of the structure, the current code section on existing buildings does not mandate that upgrades are required unless the building is scheduled for repairs, alterations, additions, or change in occupancy. However, it is our understanding the goal of the College is to continue utilizing the existing building as an arts building, and the College wants the seismic structural system to be compliant with the current code. To clarify, upgrades outlined in this report are strictly at the discretion of the College.

We have attempted to identify all areas requiring upgrades to achieve a scope of work for current code compliance, associated estimated costs and project schedule.

Please contact our office if you would like to discuss our findings. Please review the attached schematic drawings that can be used to refine a scope and budget.

Appendix A: Figures



1
A1.1

FINE ARTS AND CLASSROOMS UPPER FLOOR PLAN

NTS

2
A1.1

MEZZANINE FLOOR PLAN

NTS

3
A1.1

FINE ARTS AND CLASSROOMS LOWER FLOOR PLAN

NTS



REVISION ID:	DATE:

PROJECT NO: P-2356-18
DRAWN: JCF, CID
CHECKED: LPE
DATE: 10-08-18

OVERALL
FLOOR PLAN

A1.1

FOR AGENCY REVIEW / NOT FOR CONSTRUCTION

ONE INCH EQUALS FULL SCALE

Appendix B: Structural Tier 1 Check Sheets

Tier 1 Deficiency Summary		
Noncompliant Item In Tier 1	Deficiency Number(s) Per Sections 3.2.2 - 3.2.4 & Retrofit Drawings	Comments
Load Path	S1, S2, S3, S6	
Vertical Irregularities	S2	
Shear Stress Check	S5	
Narrow Wood Shear Walls	S7	
Walls Connected Through Floors	S7	
Openings	S1	
Roof Chord Continuity	S1	
Unblocked Diaphragms	S4	
Emergency Lighting	N3	
Hazardous Material Distribution	N4, N6	
Shutoff Valves	N5	
Flexible Couplings	N4, N6	
Ties	N7	
Tall Narrow Contents	N1, N2	
Fall-Prone Contents	N1, N2	
Fall-Prone Equipment	N1, N2	
In-Line Equipment	N2	
Tall Narrow Equipment	N1, N2	

Appendix C: Summary Data Sheet

BUILDING DATA

Building Name: Umpqua Community College - Fine Arts Building Date: 9-26-18
 Building Address: 1140 Umpqua College Rd., Roseburg, OR 97470
 Latitude: _____ Longitude: _____ By: AAL
 Year Built: 1977 Year(s) Remodeled: Unknown Original Design Code: Unknown
 Area (sf): 21,800 Length (ft): 132 Width (ft): 123
 No. of Stories: 2 Story Height: 12 ft Total Height: 20 ft

USE Industrial Office Warehouse Hospital Residential Educational Other: _____

CONSTRUCTION DATA

Gravity Load Structural System: Timber walls, post and beam
 Exterior Transverse Walls: Timber walls Openings? yes
 Exterior Longitudinal Walls: Timber walls Openings? yes
 Roof Materials/Framing: Wood shingles
 Intermediate Floors/Framing: N/A
 Ground Floor: Slab on grade
 Columns: Timber Foundation: Concrete
 General Condition of Structure: Fair
 Levels Below Grade? None
 Special Features and Comments: N/A

LATERAL-FORCE-RESISTING SYSTEM

	Longitudinal	Transverse
System:	<u>Wood shear walls</u>	<u>Wood shear walls</u>
Vertical Elements:	<u>Walls, post and beam</u>	<u>Walls, post and beam</u>
Diaphragms:	<u>Plywood sheathing</u>	<u>Plywood sheathing</u>
Connections:	<u>Nails, hangers, anchor bolts</u>	<u>Nails, hangers, anchor bolts</u>

EVALUATION DATA

BSE-1N Spectral Response Accelerations: $S_{Ds} =$ 0.63 $S_{D1} =$ 0.563
 Soil Factors: Class = _____ $F_a =$ _____ $F_v =$ _____
 BSE-1E Spectral Response Accelerations: $S_{Xs} =$ 0.196 $S_{X1} =$ 0.147
 Level of Seismicity: High Performance Level: Collapse Prevention
 Building Period: $T =$ _____
 Spectral Acceleration: $S_a =$ _____
 Modification Factor: $C_m C_1 C_2 =$ _____ Building Weight: $W =$ Limited Safety
 Pseudo Lateral Force: $V =$ _____
 $C_m C_1 C_2 S_a W =$ _____

BUILDING CLASSIFICATION: W2, Wood walls with flexible diaphragms

REQUIRED TIER 1 CHECKLISTS

	Yes	No
Basic Configuration Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Building Type <u>W2</u> Structural Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Nonstructural Component Checklist	<input checked="" type="checkbox"/>	<input type="checkbox"/>

FURTHER EVALUATION REQUIREMENT: _____

Table 17-1. Very Low Seismicity Checklist

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
Structural Components			
C NC N/A U	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.	5.4.1.1	A.2.1.1
C NC NC N/A U	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm 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 adequate strength to resist the connection force calculated in the Quick Check procedure of Section 4.4.3.7.	5.7.1.1	A.5.1.1

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

Table 17-2. Collapse Prevention Basic Configuration Checklist

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
Low Seismicity			
Building System—General			
C NC N/A U	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.	5.4.1.1	A.2.1.1
C NC NC N/A U	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.	5.4.1.2	A.2.1.2
C NC NC N/A U	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure.	5.4.1.3	A.2.1.3
Building System—Building Configuration			
C NC NC N/A U	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.	5.4.2.1	A.2.2.2
C NC NC N/A U	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.	5.4.2.2	A.2.2.3
C NC N/A U	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation.	5.4.2.3	A.2.2.4
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.	5.4.2.4	A.2.2.5
C NC N/A U	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.	5.4.2.5	A.2.2.6
C NC N/A U	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.	5.4.2.6	A.2.2.7

continues

Table 17-2 (Continued). Collapse Prevention Basic Configuration Checklist

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
Moderate Seismicity (Complete the Following Items in Addition to the Items for Low Seismicity)			
Geologic Site Hazards			
C NC N/A U	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 (15.2 m) under the building.	5.4.3.1	A.6.1.1
C NC N/A U	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.	5.4.3.1	A.6.1.2
C NC N/A U	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated.	5.4.3.1	A.6.1.3
High Seismicity (Complete the Following Items in Addition to the Items for Moderate Seismicity)			
Foundation Configuration			
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 $0.6S_a$.	5.4.3.3	A.6.2.1
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.	5.4.3.4	A.6.2.2

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

Table 17-3. Immediate Occupancy Basic Configuration Checklist

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
Very Low Seismicity			
Building System—General			
C NC N/A U	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.	5.4.1.1	A.2.1.1
C NC N/A U	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity.	5.4.1.2	A.2.1.2
C NC N/A U	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure.	5.4.1.3	A.2.1.3
Building System—Building Configuration			
C NC N/A U	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.	5.4.2.1	A.2.2.2
C NC N/A U	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.	5.4.2.2	A.2.2.3
C NC N/A U	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation.	5.4.2.3	A.2.2.4
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.	5.4.2.4	A.2.2.5
C NC N/A U	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.	5.4.2.5	A.2.2.6

continues

Table 17-6. Collapse Prevention Structural Checklist for Building Type W2

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
Low and Moderate Seismicity			
Seismic-Force-Resisting System			
C NC N/A U	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	5.5.1.1	A.3.2.1.1
C NC N/A U	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: Structural panel sheathing 1,000 lb/ft Diagonal sheathing 700 lb/ft Straight sheathing 100 lb/ft All other conditions 100 lb/ft	5.5.3.1.1	A.3.2.7.1
C NC N/A U	STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system.	5.5.3.6.1	A.3.2.7.2
C NC N/A U	GYPHUM 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.	5.5.3.6.1	A.3.2.7.3
C NC N/A U	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces.	5.5.3.6.1	A.3.2.7.4
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.	5.5.3.6.2	A.3.2.7.5
C NC N/A U	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.	5.5.3.6.3	A.3.2.7.6
C NC N/A U	CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels.	5.5.3.6.4	A.3.2.7.7
C NC N/A U	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.	5.5.3.6.5	A.3.2.7.8
Connections			
C NC N/A U	WOOD POSTS: There is a positive connection of wood posts to the foundation.	5.7.3.3	A.5.3.3
C NC N/A U	WOOD SILLS: All wood sills are bolted to the foundation.	5.7.3.3	A.5.3.4
C NC N/A U	GIRDER–COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support.	5.7.4.1	A.5.4.1
High Seismicity (Complete the Following Items in Addition to the Items for Low and Moderate Seismicity)			
Connections			
C NC N/A U	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.	5.7.3.3	A.5.3.7
Diaphragms			
C NC N/A U	DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints.	5.6.1.1	A.4.1.1
C NC N/A U	ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation.	5.6.1.1	A.4.1.3
C NC N/A U	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension.	5.6.1.5	A.4.1.8
C NC N/A U	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 2-to-1 in the direction being considered.	5.6.2	A.4.2.1
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.	5.6.2	A.4.2.2

continues

Table 17-6 (Continued). Collapse Prevention Structural Checklist for Building Type W2

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
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.	5.6.2	A.4.2.3
C NC N/A U	OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing.	5.6.5	A.4.7.1

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

Table 17-7. Immediate Occupancy Checklist for Building Type W2

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference
Very Low Seismicity			
Seismic-Force-Resisting System			
C NC N/A U	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	5.5.1.1	A.3.2.1.1
C NC N/A U	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: Structural panel sheathing 1,000 lb/ft (14.6 kN/m) Diagonal sheathing 700 lb/ft (10.2 kN/m) Straight sheathing 100 lb/ft (1.5 kN/m) All other conditions 100 lb/ft (1.5 kN/m)	5.5.3.1.1	A.3.2.7.1
C NC N/A U	STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system.	5.5.3.6.1	A.3.2.7.2
C NC N/A U	GYPSON 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.	5.5.3.6.1	A.3.2.7.3
C NC N/A U	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces.	5.5.3.6.1	A.3.2.7.4
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.	5.5.3.6.2	A.3.2.7.5
C NC N/A U	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-2.	5.5.3.6.3	A.3.2.7.6
C NC N/A U	CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels.	5.5.3.6.4	A.3.2.7.7
C NC N/A U	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.	5.5.3.6.5	A.3.2.7.8
C NC N/A U	HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices.	5.5.3.6.6	A.3.2.7.9
Connections			
C NC N/A U	WOOD POSTS: There is a positive connection of wood posts to the foundation.	5.7.3.3	A.5.3.3
C NC N/A U	WOOD SILLS: All wood sills are bolted to the foundation.	5.7.3.3	A.5.3.4
C NC N/A U	GIRDER–COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support.	5.7.4.1	A.5.4.1

continues

Table 17-38. Nonstructural Checklist

Status	Evaluation Statement ^{a,b}	Tier 2 Reference	Commentary Reference
Life Safety Systems			
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. FIRE SUPPRESSION PIPING: Fire suppression piping is anchored and braced in accordance with NFPA-13.	13.7.4	A.7.13.1
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. FLEXIBLE COUPLINGS: Fire suppression piping has flexible couplings in accordance with NFPA-13.	13.7.4	A.7.13.2
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. EMERGENCY POWER: Equipment used to power or control Life Safety systems is anchored or braced.	13.7.7	A.7.12.1
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. STAIR AND SMOKE DUCTS: Stair pressurization and smoke control ducts are braced and have flexible connections at seismic joints.	13.7.6	A.7.14.1
C NC (N/A) U	HR—not required; LS—MH; PR—MH. SPRINKLER CEILING CLEARANCE: Penetrations through panelized ceilings for fire suppression devices provide clearances in accordance with NFPA-13.	13.7.4	A.7.13.3
C (NC) (N/A) U	HR—not required; LS—not required; PR—LMH. EMERGENCY LIGHTING: Emergency and egress lighting equipment is anchored or braced.	13.7.9	A.7.3.1
Hazardous Materials			
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. HAZARDOUS MATERIAL EQUIPMENT: Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers.	13.7.1	A.7.12.2
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. HAZARDOUS MATERIAL STORAGE: Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shelf lips, wires, or other methods.	13.8.3	A.7.15.1
C (NC) (N/A) U	HR—MH; LS—MH; PR—MH. HAZARDOUS MATERIAL DISTRIBUTION: Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release.	13.7.3 13.7.5	A.7.13.4
C (NC) (N/A) U	HR—MH; LS—MH; PR—MH. SHUTOFF VALVES: Piping containing hazardous material, including natural gas, has shutoff valves or other devices to limit spills or leaks.	13.7.3 13.7.5	A.7.13.3
C (NC) (N/A) U	HR—LMH; LS—LMH; PR—LMH. FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, have flexible couplings.	13.7.3 13.7.5	A.7.15.4
C NC (N/A) U	HR—MH; LS—MH; PR—MH. PIPING OR DUCTS CROSSING SEISMIC JOINTS: Piping or ductwork carrying hazardous material that either crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements.	13.7.3 13.7.5 13.7.6	A.7.13.6
Partitions			
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. UNREINFORCED MASONRY: Unreinforced masonry or hollow-clay tile partitions are braced at a spacing of at most 10 ft (3.0 m) in Low or Moderate Seismicity, or at most 6 ft (1.8 m) in High Seismicity.	13.6.2	A.7.1.1
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. HEAVY PARTITIONS SUPPORTED BY CEILINGS: The tops of masonry or hollow-clay tile partitions are not laterally supported by an integrated ceiling system.	13.6.2	A.7.2.1
C NC (N/A) U	HR—not required; LS—MH; PR—MH. DRIFT: Rigid cementitious partitions are detailed to accommodate the following drift ratios: in steel moment frame, concrete moment frame, and wood frame buildings, 0.02; in other buildings, 0.005.	13.6.2	A.7.1.2
C NC (N/A) U	HR—not required; LS—not required; PR—MH. LIGHT PARTITIONS SUPPORTED BY CEILINGS: The tops of gypsum board partitions are not laterally supported by an integrated ceiling system.	13.6.2	A.7.2.1
C NC (N/A) U	HR—not required; LS—not required; PR—MH. STRUCTURAL SEPARATIONS: Partitions that cross structural separations have seismic or control joints.	13.6.2	A.7.1.3

continues

Table 17-38 (Continued). Nonstructural Checklist

Status	Evaluation Statement ^{a,b}	Tier 2 Reference	Commentary Reference
C NC (N/A) U	HR—not required; LS—not required; PR—MH. TOPS: The tops of ceiling-high framed or panelized partitions have lateral bracing to the structure at a spacing equal to or less than 6 ft (1.8 m).	13.6.2	A.7.1.4
Ceilings			
C NC (N/A) U	HR—H; LS—MH; PR—LMH. SUSPENDED LATH AND PLASTER: Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 ft ² (1.1 m ²) of area.	13.6.4	A.7.2.3
C NC (N/A) U	HR—not required; LS—MH; PR—LMH. SUSPENDED GYPSUM BOARD: Suspended gypsum board ceilings have attachments that resist seismic forces for every 12 ft ² (1.1 m ²) of area.	13.6.4	A.7.2.3
C NC (N/A) U	HR—not required; LS—not required; PR—MH. INTEGRATED CEILINGS: Integrated suspended ceilings with continuous areas greater than 144 ft ² (13.4 m ²) and ceilings of smaller areas that are not surrounded by restraining partitions are laterally restrained at a spacing no greater than 12 ft (3.6 m) with members attached to the structure above. Each restraint location has a minimum of four diagonal wires and compression struts, or diagonal members capable of resisting compression.	13.6.4	A.7.2.2
C NC (N/A) U	HR—not required; LS—not required; PR—MH. EDGE CLEARANCE: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft ² (13.4 m ²) have clearances from the enclosing wall or partition of at least the following: in Moderate Seismicity, 1/2 in. (13 mm); in High Seismicity, 3/4 in. (19 mm).	13.6.4	A.7.2.4
C NC (N/A) U	HR—not required; LS—not required; PR—MH. CONTINUITY ACROSS STRUCTURE JOINTS: The ceiling system does not cross any seismic joint and is not attached to multiple independent structures.	13.6.4	A.7.2.5
C NC (N/A) U	HR—not required; LS—not required; PR—H. EDGE SUPPORT: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft ² (13.4 m ²) are supported by closure angles or channels not less than 2 in. (51 mm) wide.	13.6.4	A.7.2.6
C NC (N/A) U	HR—not required; LS—not required; PR—H. SEISMIC JOINTS: Acoustical tile or lay-in panel ceilings have seismic separation joints such that each continuous portion of the ceiling is no more than 2,500 ft ² (232.3 m ²) and has a ratio of long-to-short dimension no more than 4-to-1.	13.6.4	A.7.2.7
Light Fixtures			
C NC (N/A) U	HR—not required; LS—MH; PR—MH. INDEPENDENT SUPPORT: Light fixtures that weigh more per square foot than the ceiling they penetrate are supported independent of the grid ceiling suspension system by a minimum of two wires at diagonally opposite corners of each fixture.	13.6.4 13.7.9	A.7.3.2
C NC (N/A) U	HR—not required; LS—not required; PR—H. PENDANT SUPPORTS: Light fixtures on pendant supports are attached at a spacing equal to or less than 6 ft. Unbraced suspended fixtures are free to allow a 360-degree range of motion at an angle not less than 45 degrees from horizontal without contacting adjacent components. Alternatively, if rigidly supported and/or braced, they are free to move with the structure to which they are attached without damaging adjoining components. Additionally, the connection to the structure is capable of accommodating the movement without failure.	13.7.9	A.7.3.3
C NC (N/A) U	HR—not required; LS—not required; PR—H. LENS COVERS: Lens covers on light fixtures are attached with safety devices.	13.7.9	A.7.3.4
Cladding and Glazing			
(C) NC (N/A) U	HR—MH; LS—MH; PR—MH. CLADDING ANCHORS: Cladding components weighing more than 10 lb/ft ² (0.48 kN/m ²) are mechanically anchored to the structure at a spacing equal to or less than the following: for Life Safety in Moderate Seismicity, 6 ft (1.8 m); for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 ft (1.2 m)	13.6.1	A.7.4.1

continues

Table 17-38 (Continued). Nonstructural Checklist

Status	Evaluation Statement ^{a,b}	Tier 2 Reference	Commentary Reference
C NC (N/A) U	HR—not required; LS—MH; PR—MH. CLADDING ISOLATION: For steel or concrete moment-frame buildings, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less.	13.6.1	A.7.4.3
C NC (N/A) U	HR—MH; LS—MH; PR—MH. MULTI-STORY PANELS: For multi-story panels attached at more than one floor level, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less.	13.6.1	A.7.4.4
C NC (N/A) U	HR—not required; LS—MH; PR—MH. THREADED RODS: Threaded rods for panel connections detailed to accommodate drift by bending of the rod have a length-to-diameter ratio greater than 0.06 times the story height in inches for Life Safety in Moderate Seismicity and 0.12 times the story height in inches for Life Safety in High Seismicity and Position Retention in any seismicity.	13.6.1	A.7.4.9
C NC (N/A) U	HR—MH; LS—MH; PR—MH. PANEL CONNECTIONS: Cladding panels are anchored out of plane with a minimum number of connections for each wall panel, as follows: for Life Safety in Moderate Seismicity, 2 connections; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 connections.	13.6.1.4	A.7.4.5
C NC (N/A) U	HR—MH; LS—MH; PR—MH. BEARING CONNECTIONS: Where bearing connections are used, there is a minimum of two bearing connections for each cladding panel.	13.6.1.4	A.7.4.6
C NC (N/A) U	HR—MH; LS—MH; PR—MH. INSERTS: Where concrete cladding components use inserts, the inserts have positive anchorage or are anchored to reinforcing steel.	13.6.1.4	A.7.4.7
C NC (N/A) U	HR—not required; LS—MH; PR—MH. OVERHEAD GLAZING: Glazing panes of any size in curtain walls and individual interior or exterior panes more than 16 ft ² (1.5 m ²) in area are laminated annealed or laminated heat-strengthened glass and are detailed to remain in the frame when cracked.	13.6.1.5	A.7.4.8
Masonry Veneer			
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. TIES: Masonry veneer is connected to the backup with corrosion-resistant ties. There is a minimum of one tie for every 2-2/3 ft ² (0.25 m ²), and the ties have spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 36 in. (914 mm); for Life Safety in High Seismicity and for Position Retention in any seismicity, 24 in. (610 mm).	13.6.1.2	A.7.5.1
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. SHELF ANGLES: Masonry veneer is supported by shelf angles or other elements at each floor above the ground floor.	13.6.1.2	A.7.5.2
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. WEAKENED PLANES: Masonry veneer is anchored to the backup adjacent to weakened planes, such as at the locations of flashing.	13.6.1.2	A.7.5.3
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. UNREINFORCED MASONRY BACKUP: There is no unreinforced masonry backup.	13.6.1.1 13.6.1.2	A.7.7.2
C NC (N/A) U	HR—not required; LS—MH; PR—MH. STUD TRACKS: For veneer with cold-formed steel stud backup, stud tracks are fastened to the structure at a spacing equal to or less than 24 in. (610 mm) on center.	13.6.1.1 13.6.1.2	A.7.6.1

continues

Table 17-38 (Continued). Nonstructural Checklist

Status	Evaluation Statement ^{a,b}	Tier 2 Reference	Commentary Reference
C NC (N/A) U	HR—not required; LS—MH; PR—MH. ANCHORAGE: For veneer with concrete block or masonry backup, the backup is positively anchored to the structure at a horizontal spacing equal to or less than 4 ft along the floors and roof.	13.6.1.1 13.6.1.2	A.7.7.1
C NC (N/A) U	HR—not required; LS—not required; PR—MH. WEEP HOLES: In veneer anchored to stud walls, the veneer has functioning weep holes and base flashing.	13.6.1.2	A.7.5.6
C NC (N/A) U	HR—not required; LS—not required; PR—MH. OPENINGS: For veneer with cold-formed-steel stud backup, steel studs frame window and door openings.	13.6.1.1 13.6.1.2	A.7.6.2
Parapets, Cornices, Ornamentation, and Appendages			
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. URM PARAPETS OR CORNICES: Laterally unsupported unreinforced masonry parapets or cornices have height-to-thickness ratios no greater than the following: for Life Safety in Low or Moderate Seismicity, 2.5; for Life Safety in High Seismicity and for Position Retention in any seismicity, 1.5.	13.6.5	A.7.8.1
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. CANOPIES: Canopies at building exits are anchored to the structure at a spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 10 ft (3.0 m); for Life Safety in High Seismicity and for Position Retention in any seismicity, 6 ft (1.8 m).	13.6.6	A.7.8.2
C NC (N/A) U	HR—H; LS—MH; PR—LMH. CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement.	13.6.5	A.7.8.3
C NC (N/A) U	HR—MH; LS—MH; PR—LMH. APPENDAGES: Cornices, parapets, signs, and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are reinforced and anchored to the structural system at a spacing equal to or less than 6 ft (1.8 m). This evaluation statement item does not apply to parapets or cornices covered by other evaluation statements.	13.6.6	A.7.8.4
Masonry Chimneys			
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. URM CHIMNEYS: Unreinforced masonry chimneys extend above the roof surface no more than the following: for Life Safety in Low or Moderate Seismicity, 3 times the least dimension of the chimney; for Life Safety in High Seismicity and for Position Retention in any seismicity, 2 times the least dimension of the chimney.	13.6.7	A.7.9.1
C NC (N/A) U	HR—LMH; LS—LMH; PR—LMH. ANCHORAGE: Masonry chimneys are anchored at each floor level, at the topmost ceiling level, and at the roof.	13.6.7	A.7.9.2
Stairs			
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. STAIR ENCLOSURES: Hollow-clay tile or unreinforced masonry walls around stair enclosures are restrained out of plane and have height-to-thickness ratios not greater than the following: for Life Safety in Low or Moderate Seismicity, 15-to-1; for Life Safety in High Seismicity and for Position Retention in any seismicity, 12-to-1.	13.6.2 13.6.8	A.7.10.1
C NC (N/A) U	HR—not required; LS—LMH; PR—LMH. STAIR DETAILS: The connection between the stairs and the structure does not rely on post-installed anchors in concrete or masonry, and the stair details are capable of accommodating the drift calculated using the Quick Check procedure of Section 4.4.3.1 for moment-frame structures or 0.5 in. for all other structures without including any lateral stiffness contribution from the stairs.	13.6.8	A.7.10.2
Contents and Furnishings			
C NC (N/A) U	HR—LMH; LS—MH; PR—MH. INDUSTRIAL STORAGE RACKS: Industrial storage racks or pallet racks more than 12 ft high meet the requirements of ANSI/RMI MH 16.1 as modified by ASCE 7, Chapter 15.	13.8.1	A.7.11.1

continues