



LEBANON COMMUNITY SCHOOL DISTRICT  
SEVEN OAK MIDDLE SCHOOL GYM  
SEISMIC UPGRADE  
REQUEST FOR PROPOSAL (RFP)  
ADDENDUM 1

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This addendum forms a part of the Request for Proposal and modifies the original Documents dated **August 18, 2025** as noted below. Acknowledge receipt of this addendum in the space provided on Attachment B – Certifications / Residency Form. Failure to do so may subject the Proposer to disqualification.

**ADD ATTACHMENT J: SEVEN OAK MS GYM SEISMIC EVALUATION REPORT BY ZCS**

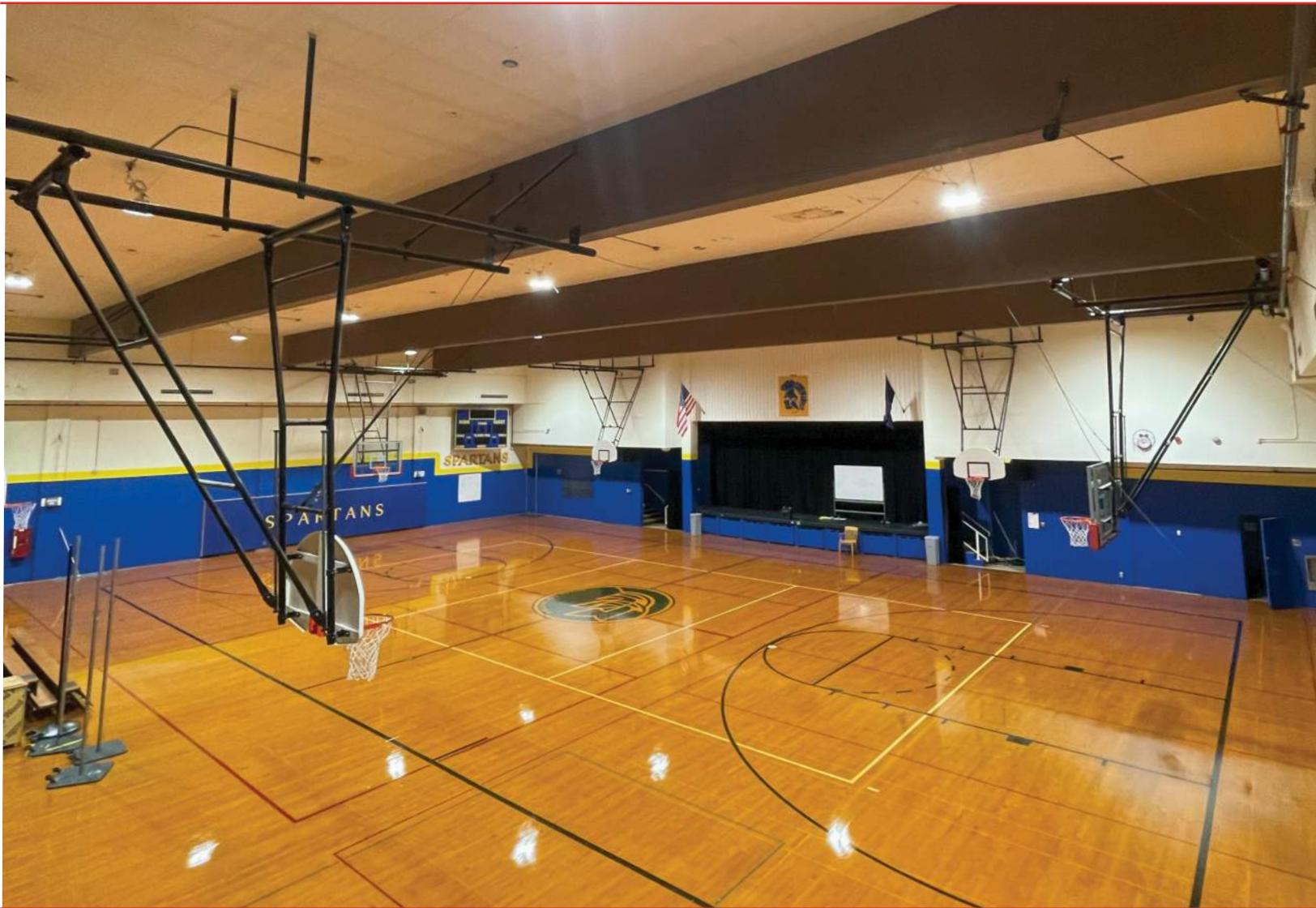
*Add Attachment J Seven Oak MS Gym Seismic Evaluation Report by ZCS in its entirety.*

**PRE-PROPOSAL MEETING SIGN IN SHEET**

Please review the attached sign in sheet; if corrections are required please send them to [courtney.fastenau@hmkco.org](mailto:courtney.fastenau@hmkco.org)

**END OF ADDENDUM 1**

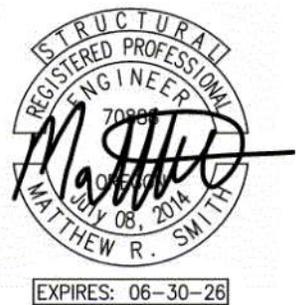
ADDENDUM 1



Seismic Evaluation Report For:

## SEVEN OAK MIDDLE SCHOOL GYMNASIUM

550 Cascade Dr, Lebanon, OR 97355  
Lebanon School District



Prepared By:

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## Attachment J

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Seven Oak Middle School Gymnasium

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Project Summary Information						
Building Part	Building Part Name	Included in Retrofit	Year Built	Building Type***	Nonstructural Retrofits Included in Scope Y/N***	Previous Seismic Retrofit Y/N*** (Year if Yes)
A	North Classroom Wing	No	1950's			
B	West Classroom Wing	No	1950's			
C	2001 Addition	No	2001			
D	Gymnasium	Yes	1950's	C2a URM	Yes	No
E	Locker Rooms	Yes	1950's	C2a URM	Yes	No
F	Gymnasium Addition	No	2001			
G	Steel Building	No	2023			
<p>*** Entries required <b>ONLY</b> for building parts included in proposed seismic retrofit. If building part was previously or is currently being retrofitted, please list the building part's Risk Category and retrofit design Performance Objective, if known.</p>						
<p>Nonstructural deficiencies posing life safety risk <b>MUST</b> be included in the scope of work and budget.</p>						
<p>Seismic fragility inputs for existing buildings with <b>previous seismic retrofits MUST</b> be adjusted to reflect previous seismic retrofit measures completed for a building part.</p>						
Total Retrofit Cost		\$ 2,493,400.00				
Retrofit Square Feet		19,500				
Retrofit Cost per Square Foot		\$ 127.87				
<p>Is the campus within a tsunami, FEMA flood zone, landslide/slope instability, liquefaction potential or other high hazard area? <b>If so, provide documentation (e.g. the Oregon Statewide Hazards Viewer by DOGAMI). ** Projects within the code defined Tsunami Design Zone require consultation with DOGAMI prior to application submittal. Applicant shall include such documentation with the application.</b></p>						<p>Yes per DOGAMI, ruled out per geotech report</p>

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Engineering Report Checklist		
<input checked="" type="checkbox"/>	Engineering Report Cover Page	
<input checked="" type="checkbox"/>	Project Summary Page	Page 1
<input checked="" type="checkbox"/>	Building Parts Identification	Page 7
<input checked="" type="checkbox"/>	Statement of the Performance Objective	Page 8
	<b>Summary of Deficiencies</b>	
<input checked="" type="checkbox"/>	Structural Seismic Deficiencies	Page 11
<input checked="" type="checkbox"/>	Nonstructural Seismic Deficiencies	Page 12
	<b>Summary of Mitigation/Retrofit</b>	
<input checked="" type="checkbox"/>	Structural Mitigation/Retrofit	Page 11
<input checked="" type="checkbox"/>	Nonstructural Mitigation/Retrofit	Page 12
	<b>Summary Construction Cost Estimate</b>	
<input checked="" type="checkbox"/>	Direct Cost	Page 14
<input checked="" type="checkbox"/>	Indirect Soft Cost	Page 14
<input checked="" type="checkbox"/>	Certification Statement by Engineer	Page 15
	<b>ASCE 41-17 Tier 1 Checklist</b>	
<input checked="" type="checkbox"/>	Basic Configuration Checklist	Appendix B
<input checked="" type="checkbox"/>	Building System Structural Checklist	Appendix B
<input checked="" type="checkbox"/>	Nonstructural Checklist	Appendix B
<input checked="" type="checkbox"/>	Retrofit Drawings & Sketches	Appendix C
<input checked="" type="checkbox"/>	DOGAMI or Geotechnical Report	Appendix D
<input checked="" type="checkbox"/>	Itemized Construction Cost Estimate	Appendix E
<input checked="" type="checkbox"/>	Rapid Visual Screening	Appendix F

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### 1.0 Project Introduction

Lebanon Community School District is located in Lebanon, Oregon in Linn County. The District operates ten schools located within the community including the property of interest, Seven Oak Middle School Gymnasium. The District has retained ZCS Engineering and Architecture (ZCS) to perform a seismic evaluation of Seven Oak Middle School Gymnasium that provides the District 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 11-17"

SEISMIC EVALUATION SNAPSHOT	
Street Address	550 Cascade Drive
Evaluation Standard	ASCE 41-17 (Tier 1 Analysis)
Building's Risk Category	IV
Target Building Performance Level	Immediate Occupancy for BSE-1E and Life Safety for BSE-2E
Target Non-Structural Performance Level	Position Retention for BSE-1E and Hazards Reduced for BSE-2E
ASCE 41 Building Type	C2 C2a URM
Cost Estimate	\$2,493,400.00
Cost/Square Foot	\$127.87

## 2.0 Building Description

The buildings being considered in this report include the parts listed in the Project Summary Information. ZCS has reviewed the buildings and their construction to classify their lateral systems as identified in ASCE 41-17. These lateral determinations will be used throughout this evaluation. The lateral systems present are noted below. These determinations were made after observing the subject facilities and reviewing the available existing drawings. Descriptions of these structure types are listed below and specifically identify the lateral load resisting systems. In addition to the lateral systems present, ZCS has summarized the gravity load carrying systems of the subject facilities included later in this section.

### Concrete Shear Walls C2

These buildings have floor and roof framing that consists of cast-in-place concrete slabs, concrete beams, one-way joists, two-way waffle joists, or flat slabs. Buildings may also have steel beams, columns, and concrete slabs for the gravity framing. Floors are supported on concrete columns or bearing walls. Seismic forces are resisted by cast-in-place concrete shear walls. In older construction, shear walls are lightly reinforced but often extend throughout the building. In more recent construction, shear walls occur in isolated locations, are more heavily reinforced, and have concrete slabs that are stiff relative to the walls. The foundation system may consist of a variety of elements.

### C2a (with flexible diaphragms)

These buildings are similar to C2 buildings, except that diaphragms consist of wood sheathing, or have large aspect ratios, and are flexible relative to the walls.

### Unreinforced Masonry Bearing Walls URM

This building was initially reviewed as an RM1 construction type due to the presence of some reinforcing present in the wall construction. Through the RM1 Tier 1 evaluation it was determined that the walls are under reinforced. Accordingly, this building is classified as a URM.

These buildings have perimeter bearing walls that consist of unreinforced clay brick, stone, or concrete masonry. Interior bearing walls, where present, also consist of unreinforced clay brick, stone, or concrete masonry. In older construction, floor and roof framing consists of straight or diagonal lumber sheathing supported by wood joists, which, in turn, are supported on posts and timbers. In more recent construction, floors consist of structural panel or plywood sheathing rather than lumber sheathing. The diaphragms are flexible relative to the walls. Where they exist, ties between the walls and the diaphragms consist of anchors or bent steel plates embedded in the mortar joints and attached to framing. The foundation system may consist of a variety of elements.

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Below is a figure identifying the building parts on campus and listing applicable information. See below for descriptions of building parts included in the evaluation and applicable building types as noted above.

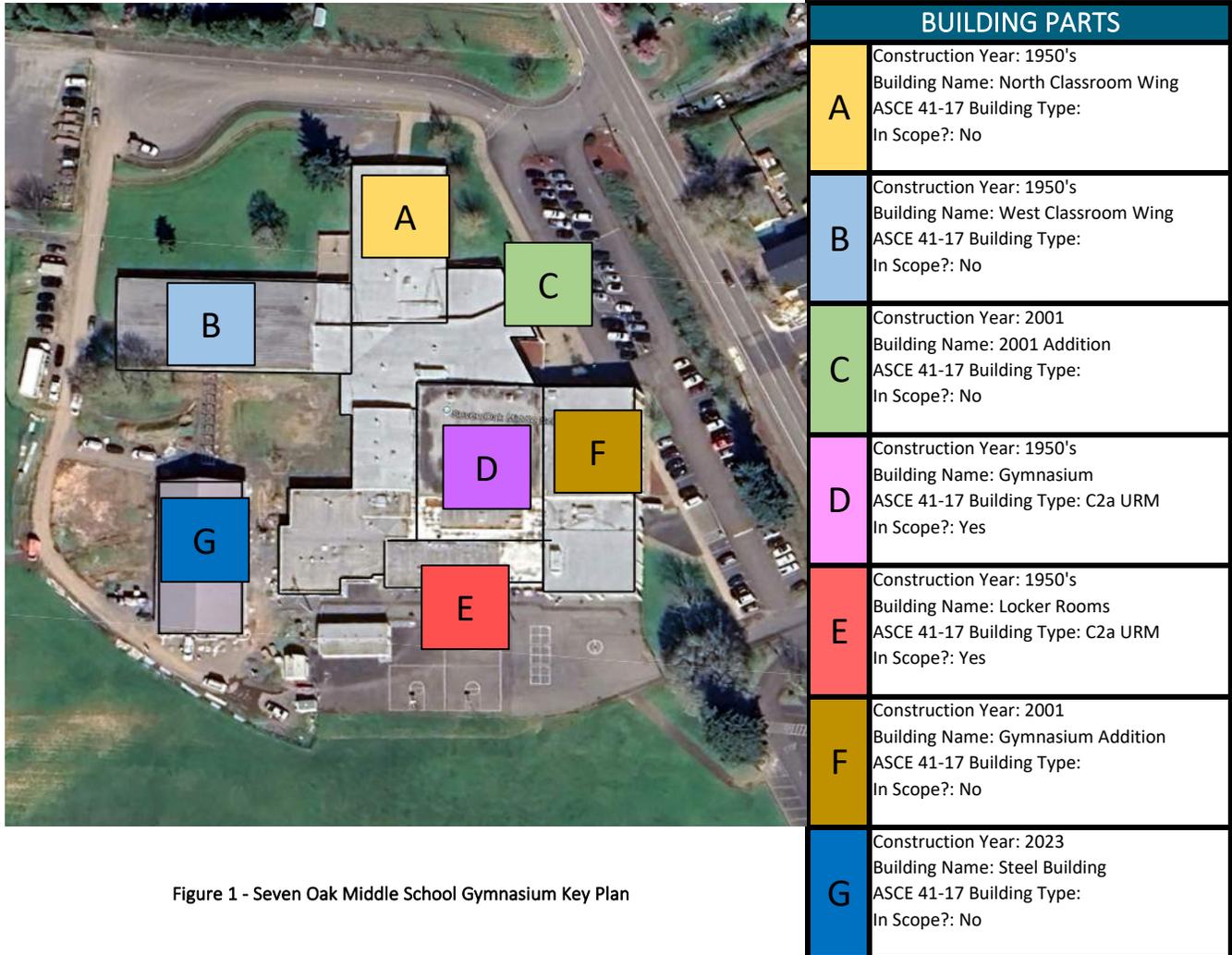


Figure 1 - Seven Oak Middle School Gymnasium Key Plan

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Seven Oak Middle School Gymnasium

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### **Building Part D Construction:**

- o ASCE 41-17 Building Types:
  - o C2a, URM
- o Roof Structure:
  - o The gymnasium roof consists of a plywood sheathed roof diaphragm supported by light timber purlins bearing on glue laminated beams
  - o The stage area's roof consists of a plywood sheathed diaphragm supported by light timber rafters spanning between interior and exterior bearing walls.
- o Walls:
  - o Reinforced cast-in-place concrete shear walls and reinforced concrete pilasters.
  - o Under-reinforced masonry bearing walls and under-reinforced heavy masonry partitions.
- o Mezzanine:
  - o Plywood sheathed floor diaphragm supported by light timber floor joists spanning to wood beams bearing on under-reinforced masonry walls.
- o Floor Structure and Foundation:
  - o Concrete slab-on-grade with concrete stem walls and strip footings

### **Building Part E Construction:**

- o ASCE 41-17 Building Types:
  - o C2a, URM
- o Roof Structure:
  - o The roof consists of a plywood sheathed diaphragm supported by light timber rafters spanning to perimeter bearing walls and an interior post and beam line.
- o Walls:
  - o Reinforced cast-in-place concrete walls and reinforced concrete pilasters.
  - o Under-reinforced masonry bearing walls and under-reinforced heavy masonry partitions.
- o Floor Structure and Foundation:
  - o Slab-on-grade with concrete stem walls and strip footings
- o Notable Structural Features/Concerns:
  - o The locker rooms' walls in the shower stalls are constructed with unreinforced 4" glazed multi-wythe tile.

### 3.0 Seismic Evaluation Methodology

The subject structure was evaluated using information gathered from site observations, available historic construction documents, and interviews with District staff. This information was then utilized to perform a structural evaluation as outlined in the American Society of Civil Engineer’s “Seismic Evaluation and Retrofit of Existing Buildings – ASCE 41-17” (ASCE 41-17). ASCE 41-17 is referenced as the standard for seismic evaluations of existing buildings by the International Existing Building Code (IEBC) which is referenced by the Oregon Structural Specialty Code (OSSC). Further, ASCE 41-17 is the evaluation tool required by the Seismic Rehabilitation Grant Program for grant applications.

ASCE 41-17 provides several levels of evaluation (Tiers 1-3) depending on the level of evaluation and/or retrofit being performed. The Tier 1 evaluation is a quick checklist selected based on the type of construction and the performance objective of the building and is the baseline tool for preliminary seismic evaluations. In the case of this evaluation, a Tier 1 was performed to identify the likely structural deficiencies requiring retrofit to meet the performance objective stated below.

The OSSC classifies buildings into risk categories based on the type of building and occupancy type. The building’s risk category informs the required performance objective post retrofit. Risk categories I and II cover low risk structures. Risk category III includes school buildings that are not required to be used as emergency shelters . Risk category IV includes emergency service buildings and school buildings that are required to be designed as emergency shelters. Figure 2, below, identifies the performance objective for each risk category.

For risk category IV structures, the intent is that the building can be inspected then immediately reoccupied following a seismic event to continue to function as an emergency service building or function as an emergency structure.

In accordance with the table below, building parts D and E are categorized as a risk category IV structure and were evaluated to meet the Life Safety structural performance and Hazards Reduced nonstructural performance level for BSE-2E loading and the Immediate Occupancy structural performance and Position Retention nonstructural performance level for BSE-1E loading.

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**Table 2-2. Scope of Assessment Required for Tier 1 and Tier 2 with the Basic Performance Objective for Existing Buildings (BPOE)**

Risk Category	Tier 1 and 2 <sup>a</sup>	
	BSE-1E	BSE-2E
I and II	Not evaluated	Collapse Prevention Structural Performance
	Life Safety Nonstructural Performance (3-C)	Hazards Reduced Nonstructural Performance <sup>b</sup> (5-D)
III	Not evaluated	Limited Safety Structural Performance <sup>c</sup>
	Position Retention Nonstructural Performance (2-B)	Hazards Reduced Nonstructural Performance <sup>b</sup> (4-D)
IV	Immediate Occupancy Structural Performance	Life Safety Structural Performance <sup>d</sup>
	Position Retention Nonstructural Performance (1-B)	Hazards Reduced Nonstructural Performance <sup>b</sup> (3-D)

<sup>a</sup> For Tier 1 and 2 assessments of Risk Categories I–III, Structural Performance for the BSE-1E is not explicitly evaluated.

<sup>b</sup> Compliance with ASCE 7 provisions for new construction is deemed to comply.

<sup>c</sup> For Risk Category III, the Tier 1 screening checklists shall be based on the Collapse Prevention Performance Level (S-5), except that checklist statements using the Quick Check procedures of Section 4.4.3 shall be based on  $M_s$  factors taken as the average of the values for Life Safety and Collapse Prevention.

<sup>d</sup> For Risk Category IV, the Tier 1 screening checklists shall be based on the Collapse Prevention Performance Level (S-5), except that checklist statements using the Quick Check procedures of Section 4.4.3 shall be based on  $M_s$  factors for Life Safety.

Figure 2 - Building Performance Objectives

Source: Table 2-2, ASCE 41-17: American Society of Civil Engineers – Seismic Evaluation and Retrofit of Existing Buildings

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### 4.0 Seismicity

Seismic design is based on site specific parameters that relate to the location of the building relative to faults and the soil that supports the building. The United States Geologic Survey has developed seismic design data that is utilized to perform the calculations specified in ASCE 41-17. The table below summarizes the factors appropriate for computing the seismic lateral loads for the design earthquake specified in ASCE 41-17.

SITE SPECIFIC SEISMICITY	
ASCE 7-16 Site Soil Classification	D
FEMA P-154 Seismicity Region (Table 2-2)	Moderately High
ASCE 41-17 Level of Seismicity (Table 2-4)	High
<b>BSE-2E:</b>	
$S_{xs}$	0.686
$S_{x1}$	0.533
Soil Condition Amplification Factors ( $f_a, f_v$ )	$f_a = 1.411 \mid f_v = 2.089$
<b>BSE-1E:</b>	
$S_{xs}$	0.239
$S_{x1}$	0.150
Soil Condition Amplification Factors ( $F_a, F_v$ )	$F_a = 1.6 \mid F_v = 2.4$

**Source:** SEAOC and OSHPD Seismic Design Maps, <https://seismicmaps.org/>

## 5.0 Site Specific Hazards

Site specific hazards were assessed as part of our engineering evaluation. The hazards evaluated in our analysis included liquefaction, slope failure/landslide, surface fault rupture, and tsunami 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 the Department of Geology and Mineral Industries (DOGAMI). Tsunami risk was evaluated using the ASCE Tsunami Hazard Tool. Results from the HazVu analysis are included in Appendix D. Unless noted below, the hazards listed above are not present at the site.

### Liquefaction

This project is located within a liquefaction hazard area as identified by the DOGAMI Oregon HazVu. To ensure that an acceptable level of due diligence was performed during the application phase of the project a geotechnical engineer was hired to perform a review of the hazard and make recommendations based on available information with respect to the severity. Per the geotechnical report, attached in Appendix D, liquefaction is considered a low risk for the site. Considering this information, it is our opinion that mitigation is not required to address the risk and is not included in the retrofit scheme.

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### 6.0 Deficiencies and Repairs

The table below summarizes both the structural and nonstructural deficiencies noted in the Tier 1 evaluation and states both the proposed retrofit methodology and the plan key note that corresponds to the scope items in the preliminary plans and the cost estimate. See Appendix B for complete Tier 1 check sheets. Drawings illustrating the proposed retrofit measures are attached in Appendix C.

Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
<b>IO BASIC CHECKLIST</b>			
ADJACENT BUILDINGS	The clear distance between the building being evaluated and any adjacent building is less than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity.	Provide seismic isolation joint to avoid pounding of the taller structure into the lower structure. Provide new gravity framing and lateral resisting elements as necessary to provide building separation. A. Cut existing framing from existing building to create a seismic isolation joint, provide new joint covers B. Bolting of existing walls to footings. C. Sheathing of existing walls. D. Provide a new steel angle with slotted holes to allow roof to move in-plane and resist out-of-plane loading. E. Diaphragm attachment for in-plane loading. F. Provide new load bearing 2x shear wall with footings to support lower roof structure for both gravity and lateral loads.	S1
MEZZANINES	Interior mezzanine levels are not braced independently from the main structure or are not anchored to the seismic-force-resisting elements of the main structure.	Anchor the mezzanine to the seismic-force-resisting elements of the main structure.	S2
<b>C2: IO CHECKLIST</b>			
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 or $\sqrt{f'c}$ .	Strengthen existing vertical lateral elements with fiber-reinforced polymer (FRP).	S3

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Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
WALL ANCHORAGE AT FLEXIBLE DIAPHRAGMS	Exterior concrete or masonry walls that are dependent on flexible diaphragms for lateral support are not 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.	Install new out-of-plane anchorage. Both Concrete (C2a) and URM.	S4
TRANSFER TO SHEAR WALLS	Diaphragms are not connected for transfer of loads to the shear walls, or the connections are not able to develop the lesser of the shear strength of the walls or diaphragms.	Install new hardware for transfer of seismic forces from diaphragm to shear walls. Both Concrete (C2a) and URM.	S5
CROSS TIES	There are not continuous cross ties between diaphragm chords.	Provide new continuous cross ties between diaphragm chords. Both Concrete (C2a) and URM.	S6
DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS	Not all diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft or aspect ratios less than or equal to 3-to-1.	Install new ceiling sheathing.	S7
<b>URM: IO CHECKLIST</b>			
SHEAR STRESS CHECK	The shear stress in the unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is greater than 30lb/in.2 for clay units and 70lb/in.2 for concrete units.	Strengthen existing vertical lateral elements with fiber-reinforced polymer (FRP).	S8
WOOD LEDGERS	The connection between the wall panels and the diaphragm induces cross-grain bending or tension in the wood ledgers.	Install new out-of-plane anchorage.	S9
<b>VERTICAL SEISMIC COMPONENT DEFICIENCIES</b>			
GLULAMS	Existing glue laminated beams built prior to 1970 were under designed based on inadequate material stress information available at the time. This results in beams that cannot be relied upon to support code prescribed vertical seismic loading.	Retrofit and strengthen beams to support code required vertical seismic loading.	S10
<b>NONSTRUCTURAL CHECKLIST</b>			
FIRE SUPPRESSION PIPING	Fire suppression piping is not anchored or braced in accordance with NFPA-13.	Anchor and brace the fire suppression piping in accordance with NFPA-13.	N1
UNREINFORCED MASONRY	Unreinforced masonry or hollow-clay tile partitions are not braced at a spacing of at most 10 ft in Low or Moderate Seismicity, or at most 6 ft in High Seismicity.	Brace unreinforced masonry or hollow-clay tile partitions.	N2
HEAVY PARTITIONS SUPPORTED BY CEILINGS	The tops of masonry or hollow-clay tile partitions are laterally supported by an integrated ceiling system.	Independently brace the tops of masonry or hollow-clay tile partitions.	N3

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Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
TOPS	The tops of ceiling-high framed or panelized partitions do not have lateral bracing to the structure at a spacing equal to or less than 6 ft.	Independently brace the tops of ceiling-high framed or panelized partitions.	N4
SUSPENDED LATH AND PLASTER	Suspended lath and plaster ceilings do not have attachments that resist seismic forces for every 12 ft <sup>2</sup> of area.	Install seismic bracing for suspended lath and plaster ceilings.	N5
INTEGRATED CEILINGS	Integrated suspended ceilings with continuous areas greater than 144 ft <sup>2</sup> and ceilings of smaller areas that are not surrounded by restraining partitions are not laterally restrained at a spacing less than 12ft with members attached to the structure above. Each restraint location does not have a minimum of four diagonal wires and compression struts, nor diagonal members capable of resisting compression.	Install seismic bracing for integrated suspended ceilings.	N6
EDGE CLEARANCE	The free edges of integrated suspended ceilings with continuous areas greater than 144ft. <sup>2</sup> does not have clearances from the enclosing wall or partition of at least the following: in Moderate Seismicity, 1/2 in.; in High Seismicity, 3/4 in.	Install free edge clearance for integrated suspended ceilings.	N7
EDGE SUPPORT	The free edges of integrated suspended ceilings with continuous areas greater than 144ft. <sup>2</sup> are not supported by closure angles or channels not less than 2 in. wide.	Install free edge support for integrated suspended ceilings.	N8
STAIR ENCLOSURES	Hollow-clay tile or unreinforced masonry walls around stair enclosures are not restrained out of plane or have height-to-thickness ratios 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.	Provide hardware to restrain walls around stair enclosures or remove and reinstall stair enclosure walls as needed.	N9
TALL NARROW CONTENTS	Contents more than 6 ft high with a height-to-depth or height-to-width ratio greater than 3-to-1 are not anchored to the structure or to each other.	Anchor contents to the structure.	N10
FALL-PRONE CONTENTS	Equipment, stored items, or other contents weighing more than 20lb whose center of mass is more than 4 ft above the adjacent floor level are not braced or otherwise restrained.	Brace equipment to structure.	N11
FALL-PRONE EQUIPMENT	Equipment weighing more than 20 lb whose center of mass is more than 4 ft above the adjacent floor level, and which is not in-line equipment, is not braced.	Brace and anchor equipment weighing more than 20 lb, whose center of mass is more than 4 ft above the adjacent floor level.	N12

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### 7.0 Preliminary Construction Cost Estimate

The attached engineer's opinion of probable cost has been developed by ZCS. 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. A complete breakdown of the cost estimate can be found in Appendix E. Based upon ZCS's previous experience and discussions with site personnel the buildings contain hazardous materials. These materials will need to be dealt with on a case-by-case basis as they are encountered during the project.

DIRECT COST	
Construction	\$ 1,850,400.00
Engineering	\$ 289,500.00
Construction Management	\$ 61,100.00
Relocation	\$ 26,600.00
Construction Contingency	\$ 265,800.00
TOTALS AND SUMMARY	
Total Cost Estimate	\$ 2,493,400.00
Match Funds	\$ -
Total Amount Requested from SRGP	\$ 2,493,400.00
Total Area	19,500
Cost/Square Foot	\$ 127.87

## 8.0 Conclusion and Certification Statement

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 relatively 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. To clarify, upgrades outlined in this report are strictly at the discretion of the District.

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.

### Certification Statement

ZCS Engineering & Architecture's professional staff has reviewed the subject building and the deficiencies noted in the Tier 1 evaluation, developed seismic retrofit solutions to rectify the deficiencies, and developed the engineering cost estimate. The project cost estimate was developed by ZCS based on unit costs from our extensive list of past seismic retrofit projects as a baseline. We certify to the best of our knowledge, based on known and readily identifiable existing conditions, that all the seismic deficiencies present in the building are included in the retrofit scope of work and that all the retrofit's scope of work elements are included in the cost estimate.



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Matthew R. Smith, PE, SE

# Appendix A: Figures

## Attachment J

Lebanon Community School District  
Seven Oak Middle School Gymnasium

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Figure 1: Gymnasium & Stage

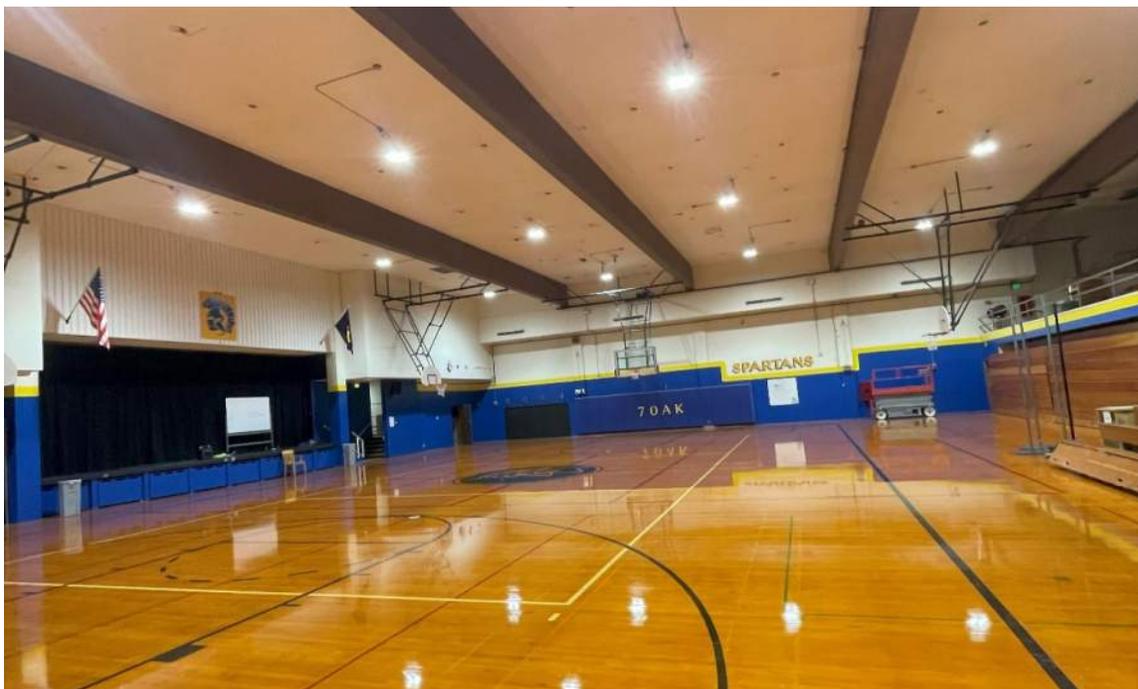


Figure 2: Gymnasium with mezzaine (right) and stage (left)

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Figure 3: Locker Room

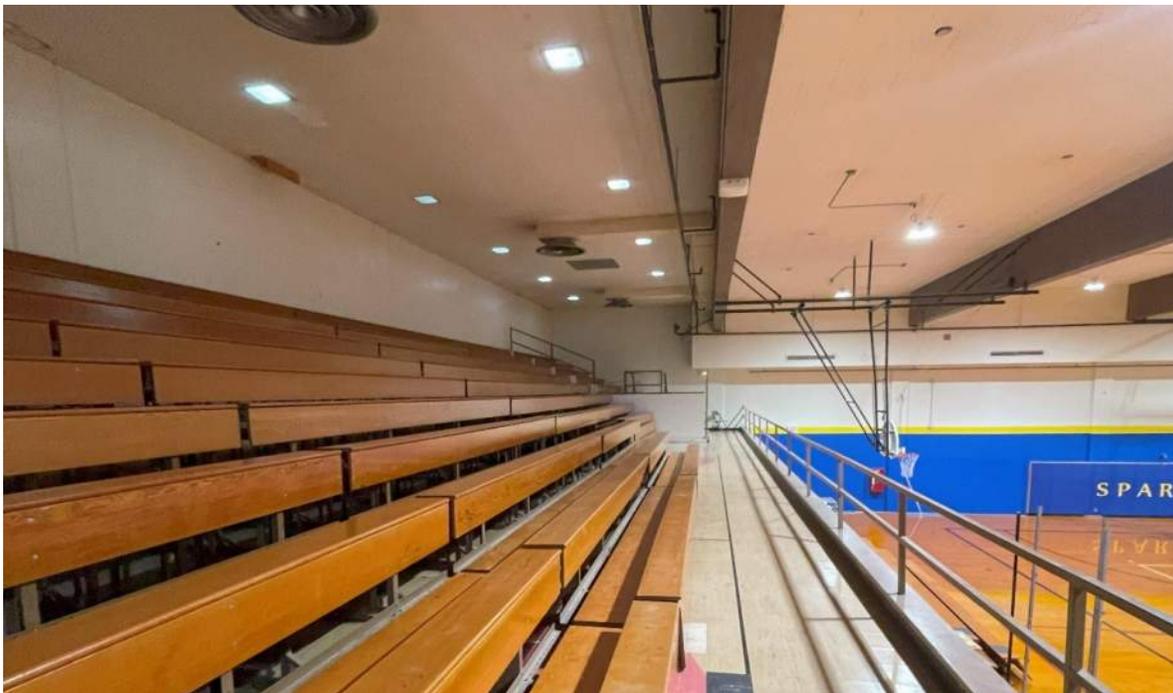


Figure 4: Bleachers on Mezzanine

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Figure 5: Clay tile restroom walls



Figure 6: Locker room

# Appendix B: Tier 1 Check Sheets

**17.1.2IO Basic Configuration Checklist****Table 17-3. Immediate Occupancy Basic Configuration Checklist**

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
<b>Very Low Seismicity</b>							
<b>Building System—General</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	Adjacent building parts do not have adequate separation.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	In-plane attachments not observed at mezzanine.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Building System—Building Configuration</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation.	5.4.2.3	A.2.2.4	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
<b>Low Seismicity (Complete the Following Items in Addition to the Items for Very Low Seismicity)</b>				
<b>Geologic Site Hazards</b>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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Status	Evaluation Statement				Tier 2 Reference	Commentary Reference	Comments
<b>Moderate and High Seismicity (Complete the Following Items in Addition to the Items for Low Seismicity)</b>							
<b>Foundation Configuration</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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### 17.12IO Structural Checklist for Building Types C2: Concrete Shear Walls with Stiff Diaphragms and C2a: Concrete Shear Walls with Flexible Diaphragms

**Table 17-25. Immediate Occupancy Structural Checklist for Building Types C2 and C2a**

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
<b>Very Low Seismicity</b>							
<b>Seismic-Force-Resisting System</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	COMPLETE FRAMES: Steel or concrete frames classified as secondary components form a complete vertical-load-carrying system.	5.5.2.5.1	A.3.1.6.1	Concrete pre-cast walls are identified as the primary system.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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. <sup>2</sup> (0.69 MPa) or $2\sqrt{f'_c}$ .	5.5.3.1.1	A.3.2.2.1	Concrete walls at Stage area exceed Quick check parameters, due to large duct openings.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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. The spacing of reinforcing steel is equal to or less than 18 in. (457 mm).	5.5.3.1.3	A.3.2.2.2	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Connections</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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.	5.7.1.1	A.5.1.1	No out-of-plane anchorage observed.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of loads to the shear walls, and the connections are able to develop the lesser of the shear strength of the walls or diaphragms.	5.7.2	A.5.2.1	No in-plane transfer devices or detailing observed.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	FOUNDATION DOWELS: Wall reinforcement is doweled into the foundation, and the dowels are able to develop the lesser of the strength of the walls or the uplift capacity of the foundation.	5.7.3.4	A.5.3.5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

**Foundation System**

<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil.	A.6.2.3	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story.	A.6.2.4	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
<b>Low, Moderate, and High Seismicity (Complete the Following Items in Addition to the Items for Very Low Seismicity)</b>							
<b>Seismic-Force-Resisting System</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	DEFLECTION COMPATIBILITY: Secondary components have the shear capacity to develop the flexural strength of the components and are compliant with the following items in Table 17-23: COLUMN-BAR SPLICES, BEAM-BAR SPLICES, COLUMN-TIE SPACING, STIRRUP SPACING, and STIRRUP AND TIE HOOKS.	5.5.2.5.2	A.3.1.6.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	FLAT SLABS: Flat slabs or plates not part of seismic-force-resisting system have continuous bottom steel through the column joints.	5.5.2.5.3	A.3.1.6.3	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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. Coupling beams have the capacity in shear to develop the uplift capacity of the adjacent wall.	5.5.3.2.1	A.3.2.2.3	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	OVERTURNING: All shear walls have aspect ratios less than 4-to-1. Wall piers need not be considered.	5.5.3.1.4	A.3.2.2.4	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	CONFINEMENT REINFORCING: For shear walls with aspect ratios greater than 2-to-1, the boundary elements are confined with spirals or ties with spacing less than $8d_b$ .	5.5.3.2.2	A.3.2.2.5	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	WALL REINFORCING AT OPENINGS: There is added trim reinforcement around all wall openings with a dimension greater than three times the thickness of the wall.	5.5.3.1.5	A.3.2.2.6	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	WALL THICKNESS: Thicknesses of bearing walls are not less than 1/25 the unsupported height or length, whichever is shorter, nor less than 4 in. (101 mm).	5.5.3.1.2	A.3.2.2.7	Walls pass out-of-plane wall strength Tier 2 checks.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Diaphragms (Stiff or Flexible)</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length.	5.6.1.3	A.4.1.4	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities.	5.6.1.4	A.4.1.7	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>Flexible Diaphragms</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	CROSS TIES: There are continuous cross ties between diaphragm chords.	5.6.1.2	A.4.1.2	No cross ties observed.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered.	5.6.2	A.4.2.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing.	5.6.2	A.4.2.2	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1.	5.6.2	A.4.2.3	Spans throughout the building exceed 30 ft.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	NONCONCRETE FILLED DIAPHRAGMS: Untopped metal deck diaphragms or metal deck diaphragms with fill other than concrete consist of horizontal spans of less than 40 ft (12.2 m) and have aspect ratios less than 4-to-1.	5.6.3	A.4.3.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing.	5.6.5	A.4.7.1	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Connections</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	UPLIFT AT PILE CAPS: Pile caps have top reinforcement, and piles are anchored to the pile caps; the pile cap reinforcement and pile anchorage are able to develop the tensile capacity of the piles.	5.7.3.5	A.5.3.8	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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### 17.18IO Structural Checklist for Building Types URM: Unreinforced Masonry Bearing Walls with Flexible Diaphragms and URMa: Unreinforced Masonry Bearing Walls with Stiff Diaphragms

**Table 17-37. Immediate Occupancy Structural Checklist for Building Types URM and URMa**

Status	Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments			
<b>Very Low Seismicity</b>							
<b>Seismic-Force-Resisting System</b>							
<b>C</b> <input checked="" type="checkbox"/>	<b>NC</b> <input type="checkbox"/>	<b>N/A</b> <input type="checkbox"/>	<b>U</b> <input type="checkbox"/>	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	
<b>C</b> <input type="checkbox"/>	<b>NC</b> <input checked="" type="checkbox"/>	<b>N/A</b> <input type="checkbox"/>	<b>U</b> <input type="checkbox"/>	SHEAR STRESS CHECK: The shear stress in the unreinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 30 lb/in. <sup>2</sup> (0.21 MPa) for clay units and 70 lb/in. <sup>2</sup> (0.48 MPa) for concrete units.	5.5.3.1.1	A.3.2.5.1	Does not pass shear stress check
<b>Connections</b>							
<b>C</b> <input type="checkbox"/>	<b>NC</b> <input type="checkbox"/>	<b>N/A</b> <input checked="" type="checkbox"/>	<b>U</b> <input type="checkbox"/>	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 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	See Primary Lateral System C2a Checklist, Wall Anchorage Deficiency. Same Solution.
<b>C</b> <input type="checkbox"/>	<b>NC</b> <input checked="" type="checkbox"/>	<b>N/A</b> <input type="checkbox"/>	<b>U</b> <input type="checkbox"/>	WOOD LEDGERS: The connection between the wall panels and the diaphragm does not induce cross-grain bending or tension in the wood ledgers.	5.7.1.3	A.5.1.2	Diaphragm will induce cross grain bending at bearing locations.
<b>C</b> <input type="checkbox"/>	<b>NC</b> <input type="checkbox"/>	<b>N/A</b> <input checked="" type="checkbox"/>	<b>U</b> <input type="checkbox"/>	TRANSFER TO SHEAR WALLS: Diaphragms are connected for transfer of seismic forces to the shear walls, and the connections are able to develop the lesser of the shear strength of the walls or diaphragms.	5.7.2	A.5.2.1	See Primary Lateral System C2a Checklist, Transfer to Shear Walls Deficiency. Same Solution.
<b>C</b> <input checked="" type="checkbox"/>	<b>NC</b> <input type="checkbox"/>	<b>N/A</b> <input type="checkbox"/>	<b>U</b> <input type="checkbox"/>	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	

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<b>Foundation System</b>					Tier 2 Reference	Commentary Reference	Comments
C	NC	N/A	U	Evaluation Statement			
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil.	A.6.2.3		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SLOPING SITES: The difference in foundation embedment depth from one side of the building to another does not exceed one story high.	A.6.2.4		
<b>Seismic-Force-Resisting System</b>					Tier 2 Reference	Commentary Reference	Comments
C	NC	N/A	U	Evaluation Statement			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than the following: Top story of multi-story building 9 First story of multi-story building 15 All other conditions 13	5.5.3.1.2	A.3.2.5.2	Walls pass out-of-plane wall strength Tier 2 checks.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MASONRY LAYUP: Filled collar joints of multi-wythe masonry walls have negligible voids.	5.5.3.4.1	A.3.2.5.3	
<b>Diaphragms (Stiff or Flexible)</b>					Tier 2 Reference	Commentary Reference	Comments
C	NC	N/A	U	Evaluation Statement			
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls are less than 15% of the wall length.	5.6.1.3	A.4.1.4	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OPENINGS AT EXTERIOR MASONRY SHEAR WALLS: Diaphragm openings immediately adjacent to exterior masonry shear walls are not greater than 4 ft (1.2 m) long.	5.6.1.3	A.4.1.6	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PLAN IRREGULARITIES: There is tensile capacity to develop the strength of the diaphragm at reentrant corners or other locations of plan irregularities.	5.6.1.4	A.4.1.7	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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	
<b>Flexible Diaphragms</b>					Tier 2 Reference	Commentary Reference	Comments
C	NC	N/A	U	Evaluation Statement			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	CROSS TIES: There are continuous cross ties between diaphragm chords.	5.6.1.2	A.4.1.2	See Primary Lateral System C2a Checklist, Cross Ties Deficiency. Similar Solution

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered.	5.6.2	A.4.2.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	SPANS: All wood diaphragms with spans greater than 12 ft (3.6 m) consist of wood structural panels or diagonal sheathing.	5.6.2	A.4.2.2	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1.	5.6.2	A.4.2.3	See Primary Lateral System C2a Checklist, Diagonally Sheathed and Unblocked Diaphragms, Similar Solution
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	NONCONCRETE FILLED DIAPHRAGMS: Untopped metal deck diaphragms or metal deck diaphragms with fill other than concrete consist of horizontal spans of less than 40 ft (12.2 m) and have aspect ratios less than 4-to-1.	5.6.3	A.4.3.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	OTHER DIAPHRAGMS: Diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing.	5.6.5	A.4.7.1	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Connections</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	STIFFNESS OF WALL ANCHORS: Anchors of concrete or masonry walls to wood structural elements are installed taut and are stiff enough to limit the relative movement between the wall and the diaphragm to no greater than 1/8 in. (3 mm) before engagement of the anchors.	5.7.1.2	A.5.1.4	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	BEAM, GIRDER, AND TRUSS SUPPORTS: Beams, girders, and trusses supported by unreinforced masonry walls or pilasters have independent secondary columns for support of vertical loads.	5.7.4.4	A.5.4.5	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

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## 17.19 Nonstructural Checklist

**Table 17-38. Nonstructural Checklist**

Status				Evaluation Statement <sup>a,b</sup>	Tier 2 Reference	Commentary Reference	Comments
<b>Life Safety Systems</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH.</b> FIRE SUPPRESSION PIPING: Fire suppression piping is anchored and braced in accordance with NFPA-13.	13.7.4	A.7.13.1	Fire suppression lines are not seismically braced
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH.</b> FLEXIBLE COUPLINGS: Fire suppression piping has flexible couplings in accordance with NFPA-13.	13.7.4	A.7.13.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH.</b> EMERGENCY POWER: Equipment used to power or control Life Safety systems is anchored or braced.	13.7.7	A.7.12.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—LMH.</b> EMERGENCY LIGHTING: Emergency and egress lighting equipment is anchored or braced.	13.7.9	A.7.3.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>Hazardous Materials</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—MH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—MH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH.</b> FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, have flexible couplings.	13.7.3 13.7.5	A.7.15.4	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—MH.</b> PIPING OR DUCTS	13.7.3	A.7.13.6	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.	13.7.5		
					13.7.6		
<b>Partitions</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH.</b> 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	Unreinforced hollow clay tile and masonry partition walls are not braced at 6 ft on center.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH.</b> 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	Masonry walls and clay tile partition walls are braced by ceiling finishes.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b> STRUCTURAL SEPARATIONS: Partitions that cross structural separations have seismic or control joints.	13.6.2	A.7.1.3	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b> 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	See Heavy Partitions Supported by Ceilings.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>Ceilings</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—H; LS—MH; PR—LMH.</b> SUSPENDED LATH AND PLASTER: Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 ft <sup>2</sup> (1.1 m <sup>2</sup> ) of area.	13.6.4	A.7.2.3	Suspended Lath & Plaster in Locker Rooms not braced.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—LMH.</b> SUSPENDED GYPSUM BOARD: Suspended gypsum board ceilings have attachments that resist seismic forces for every 12 ft <sup>2</sup> (1.1 m <sup>2</sup> ) of area.	13.6.4	A.7.2.3	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.4	A.7.2.2	No lateral bracing of integrated ceilings were observed or detailed in the available record documents.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	INTEGRATED CEILINGS: Integrated suspended ceilings with continuous areas greater than 144 ft <sup>2</sup> (13.4 m <sup>2</sup> ) 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.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.4	A.7.2.4	The free edge of the ceilings are less than 3/4-inches.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EDGE CLEARANCE: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft <sup>2</sup> (13.4 m <sup>2</sup> ) 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).			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.4	A.7.2.5	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CONTINUITY ACROSS STRUCTURE JOINTS: The ceiling system does not cross any seismic joint and is not attached to multiple independent structures.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.6.4	A.7.2.6	No closure angles were observed.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EDGE SUPPORT: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft <sup>2</sup> (13.4 m <sup>2</sup> ) are supported by closure angles or channels not less than 2 in. (51 mm) wide.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.6.4	A.7.2.7	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 <sup>2</sup> (232.3 m <sup>2</sup> ) and has a ratio of long-to-short dimension no more than 4-to-1.			
<b>Light Fixtures</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH.</b>	13.6.4	A.7.3.2	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.	13.7.9		

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C	NC	N/A	U			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—not required; PR—H.</b> 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
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—not required; PR—H.</b> LENS COVERS: Lens covers on light fixtures are attached with safety devices.	13.7.9	A.7.3.4
<b>Cladding and Glazing</b>						
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>HR—MH; LS—MH; PR—MH.</b> CLADDING ANCHORS: Cladding components weighing more than 10 lb/ft <sup>2</sup> (0.48 kN/m <sup>2</sup> ) 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
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—MH; PR—MH.</b> 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
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>HR—MH; LS—MH; PR—MH.</b> 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

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH. THREADED RODS:</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—MH. PANEL CONNECTIONS:</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—MH. BEARING CONNECTIONS:</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—MH. INSERTS:</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH. OVERHEAD GLAZING:</b> Glazing panes of any size in curtain walls and individual interior or exterior panes more than 16 ft <sup>2</sup> (1.5 m <sup>2</sup> ) 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>Masonry Veneer</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH. TIES:</b> Masonry veneer is connected to the backup with corrosion-resistant ties. There is a minimum of one tie for every 2-2/3 ft <sup>2</sup> (0.25 m <sup>2</sup> ), 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH. SHELF ANGLES:</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH. WEAKENED PLANES:</b> 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	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH. UNREINFORCED</b>	13.6.1.1	A.7.7.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MASONRY BACKUP: There is no unreinforced masonry backup.	13.6.1.2	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH. STUD</b>	13.6.1.1	A.7.6.1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.	13.6.1.2	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—MH; PR—MH. ANCHORAGE:</b>	13.6.1.1	A.7.7.1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.	13.6.1.2	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.1.2	A.7.5.6
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WEEP HOLES: In veneer anchored to stud walls, the veneer has functioning weep holes and base flashing.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.1.1	A.7.6.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	OPENINGS: For veneer with cold-formed-steel stud backup, steel studs frame window and door openings.	13.6.1.2	
<b>Parapets, Cornices, Ornamentation, and Appendages</b>						
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—LMH; LS—LMH; PR—LMH. URM PARAPETS OR</b>	13.6.5	A.7.8.1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—LMH; PR—LMH. CANOPIES:</b>	13.6.6	A.7.8.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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).		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—H; LS—MH; PR—LMH. CONCRETE PARAPETS:</b>	13.6.5	A.7.8.3
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—MH; LS—MH; PR—LMH. APPENDAGES:</b>	13.6.6	A.7.8.4
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.		

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

## Attachment J

Project Name Seven Oak Middle School  
Project Number P-2940-24

### **Masonry Chimneys**

C	NC	N/A	U		13.6.7	A.7.9.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>HR—LMH; LS—LMH; PR—LMH.</b> 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.			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>HR—LMH; LS—LMH; PR—LMH.</b> 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		13.6.2	A.7.10.1	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—LMH; PR—LMH.</b> 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.	13.6.8	A.7.10.1	Stairs have no out-of-plane support.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—LMH; PR—LMH.</b> 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		13.8.1	A.7.11.1	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<b>HR—LMH; LS—MH; PR—MH.</b> 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.			
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—H; PR—MH.</b> TALL NARROW CONTENTS: Contents more than 6 ft (1.8 m) high with a height-to-depth or height-to-width ratio greater than 3-to-1 are anchored to the structure or to each other.	13.8.2	A.7.11.2	Shelving exceeds a 3-to-1 aspect ratio.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HR—not required; LS—H; PR—H.</b> FALL-PRONE CONTENTS: Equipment, stored items, or other contents weighing more than 20 lb (9.1 kg) whose center of mass is more than 4 ft (1.2 m) above the adjacent floor level are braced or otherwise restrained.	13.8.2	A.7.11.3	Objects greater than 20 lbs, and 4 feet from finish floor are not braced against falling.

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

## Attachment J

Project Name Seven Oak Middle School  
Project Number P-2940-24

<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.10	A.7.11.4	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ACCESS FLOORS: Access floors more than 9 in. (229 mm) high are braced.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.7.7	A.7.11.5	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EQUIPMENT ON ACCESS FLOORS: Equipment and other contents supported by access floor systems are anchored or braced to the structure independent of the access floor.	13.6.10		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.8.2	A.7.11.6	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SUSPENDED CONTENTS: Items suspended without lateral bracing are free to swing from or move with the structure from which they are suspended without damaging themselves or adjoining components.			
<b>Mechanical and Electrical Equipment</b>							
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—H; PR—H. FALL-PRONE</b>	13.7.1	A.7.12.4	Heavy equipment with a high center of mass are not anchored to structure.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	EQUIPMENT: Equipment weighing more than 20 lb (9.1 kg) whose center of mass is more than 4 ft (1.2 m) above the adjacent floor level, and which is not in-line equipment, is braced.	13.7.7		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—H; PR—H. IN-LINE</b>	13.7.1	A.7.12.5	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EQUIPMENT: Equipment installed in line with a duct or piping system, with an operating weight more than 75 lb (34.0 kg), is supported and laterally braced independent of the duct or piping system.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—H; PR—MH. TALL NARROW</b>	13.7.1	A.7.12.6	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EQUIPMENT: Equipment more than 6 ft (1.8 m) high with a height-to-depth or height-to-width ratio greater than 3-to-1 is anchored to the floor slab or adjacent structural walls.	13.7.7		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—MH.</b>	13.6.9	A.7.12.7	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MECHANICAL DOORS: Mechanically operated doors are detailed to operate at a story drift ratio of 0.01.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.1	A.7.12.8	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	SUSPENDED EQUIPMENT: Equipment suspended without lateral bracing is free to swing from or move with the structure from which it is suspended without damaging itself or adjoining components.	13.7.7		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.1	A.7.12.9	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	VIBRATION ISOLATORS: Equipment mounted on vibration isolators is equipped with horizontal restraints or snubbers and with vertical restraints to resist overturning.			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.1	A.7.12.10	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	HEAVY EQUIPMENT: Floor-supported or platform-supported equipment weighing more than 400 lb (181.4 kg) is anchored to the structure.	13.7.7		

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## Attachment J

Project Name Seven Oak Middle School  
Project Number P-2940-24

<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.7	A.7.12.11
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ELECTRICAL EQUIPMENT: Electrical equipment is laterally braced to the structure.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.8	A.7.12.12
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CONDUIT COUPLINGS: Conduit greater than 2.5 in. (64 mm) trade size that is attached to panels, cabinets, or other equipment and is subject to relative seismic displacement has flexible couplings or connections.		
<b>Piping</b>						
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.3	A.7.13.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FLEXIBLE COUPLINGS: Fluid and gas piping has flexible couplings.	13.7.5	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b> FLUID AND GAS PIPING: Fluid and gas piping is anchored and braced to the structure to limit spills or leaks.	13.7.3	A.7.13.4
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		13.7.5	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b> C-CLAMPS: One-sided C-clamps that support piping larger than 2.5 in. (64 mm) in diameter are restrained.	13.7.3	A.7.13.5
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		13.7.5	
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b> PIPING CROSSING SEISMIC JOINTS: Piping that 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	A.7.13.6
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		13.7.5	
<b>Ducts</b>						
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b> DUCT BRACING: Rectangular ductwork larger than 6 ft <sup>2</sup> (0.56 m <sup>2</sup> ) in cross-sectional area and round ducts larger than 28 in. (711 mm) in diameter are braced. The maximum spacing of transverse bracing does not exceed 30 ft (9.2 m). The maximum spacing of longitudinal bracing does not exceed 60 ft (18.3 m).	13.7.6	A.7.14.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b> DUCT SUPPORT: Ducts are not supported by piping or electrical conduit.	13.7.6	A.7.14.3
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b> DUCTS CROSSING SEISMIC JOINTS: Ducts that cross seismic joints or isolation planes or are connected to independent structures have couplings or other details to accommodate the relative seismic displacements.	13.7.6	A.7.14.4
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
<b>Elevators</b>						
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—H; PR—H.</b> RETAINER GUARDS: Sheaves and drums have cable retainer guards.	13.7.11	A.7.16.1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—H; PR—H.</b> RETAINER PLATE: A retainer plate is present at the top and bottom of both car and counterweight.	13.7.11	A.7.16.2
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

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## Attachment J

Project Name Seven Oak Middle School  
Project Number P-2940-24

<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.11	A.7.16.3
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ELEVATOR EQUIPMENT: Equipment, piping, and other components that are part of the elevator system are anchored.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.11	A.7.16.4
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SEISMIC SWITCH: Elevators capable of operating at speeds of 150 ft/min (0.30 m/min) or faster are equipped with seismic switches that meet the requirements of ASME A17.1 or have trigger levels set to 20% of the acceleration of gravity at the base of the structure and 50% of the acceleration of gravity in other locations.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.11	A.7.16.5
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SHAFT WALLS: Elevator shaft walls are anchored and reinforced to prevent toppling into the shaft during strong shaking.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.11	A.7.16.6
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	COUNTERWEIGHT RAILS: All counterweight rails and divider beams are sized in accordance with ASME A17.1.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.11	A.7.16.7
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	BRACKETS: The brackets that tie the car rails and the counterweight rail to the structure are sized in accordance with ASME A17.1.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H.</b>	13.7.11	A.7.16.8
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SPREADER BRACKET: Spreader brackets are not used to resist seismic forces.		
<b>C</b>	<b>NC</b>	<b>N/A</b>	<b>U</b>	<b>HR—not required; LS—not required; PR—H. GO-</b>	13.7.11	A.7.16.9
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	SLOW ELEVATORS: The building has a go-slow elevator system.		

<sup>a</sup> Performance Level: HR = Hazards Reduced, LS = Life Safety, and PR = Position Retention.

<sup>b</sup> Level of Seismicity: L = Low, M = Moderate, and H = High.

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

# Appendix C: Preliminary Seismic Retrofit Drawings

# SEVEN OAK MIDDLE SCHOOL GYMNASIUM SEISMIC RETROFIT

Attachment J

PRELIMINARY DESIGN  
550 CASCADE DR.  
LEBANON, OR 97355



524 Main Street, Suite 2  
Oregon City, OR 97045  
503.659.2205

LEBANON COMMUNITY  
SCHOOL DISTRICT  
485 SOUTH 5TH ST.  
LEBANON, OR 97355

SEVEN OAK  
MIDDLE SCHOOL  
GYMNASIUM  
SEISMIC RETROFIT



## REPAIR KEYNOTES

### STRUCTURAL REPAIRS:

- S1. PROVIDE SEISMIC ISOLATION JOINT TO AVOID POUNDING OF THE TALLER STRUCTURE INTO THE LOWER STRUCTURE. PROVIDE NEW GRAVITY FRAMING AND LATERAL RESISTING ELEMENTS AS NECESSARY TO PROVIDE BUILDING SEPARATION. A. CUT EXISTING FRAMING FROM EXISTING BUILDING TO CREATE A SEISMIC ISOLATION JOINT. PROVIDE NEW JOINT COVERS B. BOLTING OF EXISTING WALLS TO FOOTINGS C. SHEATHING OF EXISTING WALLS D. PROVIDE A NEW STEEL ANGLE WITH SLOTTED HOLES TO ALIGN ROOF TO MOVE IN-PLANE OF GYM WALL IN OUT-OF-PLANE LOADING E. DIAPHRAGM ATTACHMENT - IN-PLANE SHEAR F. PROVIDE NEW LOAD BEARING 2X SHEAR WALL WITH FOOTINGS TO SUPPORT LOWER ROOF STRUCTURE FOR BOTH GRAVITY AND LATERAL LOADS
- S2. ANCHOR THE MEZZANINE TO THE SEISMIC-FORCE-RESISTING ELEMENTS OF THE MAIN STRUCTURE. A. DIAPHRAGM ATTACHMENTS - OUT-OF-PLANE B. DIAPHRAGM ATTACHMENTS - IN-PLANE C. NEW DRAG BEAM D. BLOCKING AND STRAPPING LINE
- S3. STRENGTHEN EXISTING VERTICAL LATERAL ELEMENTS WITH FIBER-REINFORCED POLYMER (FRP).
- S4. INSTALL NEW OUT-OF-PLANE ANCHORAGE. BOTH CONCRETE (C2a) AND URM.
- S5. INSTALL NEW HARDWARE FOR TRANSFER OF SEISMIC FORCES FROM DIAPHRAGM TO SHEAR WALLS. BOTH CONCRETE (C2a) AND URM.
- S6. PROVIDE NEW CONTINUOUS CROSS TIES BETWEEN DIAPHRAGM CHORDS. BOTH CONCRETE (C2a) AND URM.
- S7. INSTALL NEW CEILING SHEATHING. A. NEW CEILING SHEATHING. B. NEW WOOD BEAM.
- S8. STRENGTHEN EXISTING VERTICAL LATERAL ELEMENTS WITH FIBER-REINFORCED POLYMER (FRP).
- S9. INSTALL NEW OUT-OF-PLANE ANCHORAGE.
- S10. RETROFIT AND STRENGTHEN BEAMS TO SUPPORT CODE REQUIRED VERTICAL SEISMIC LOADING.

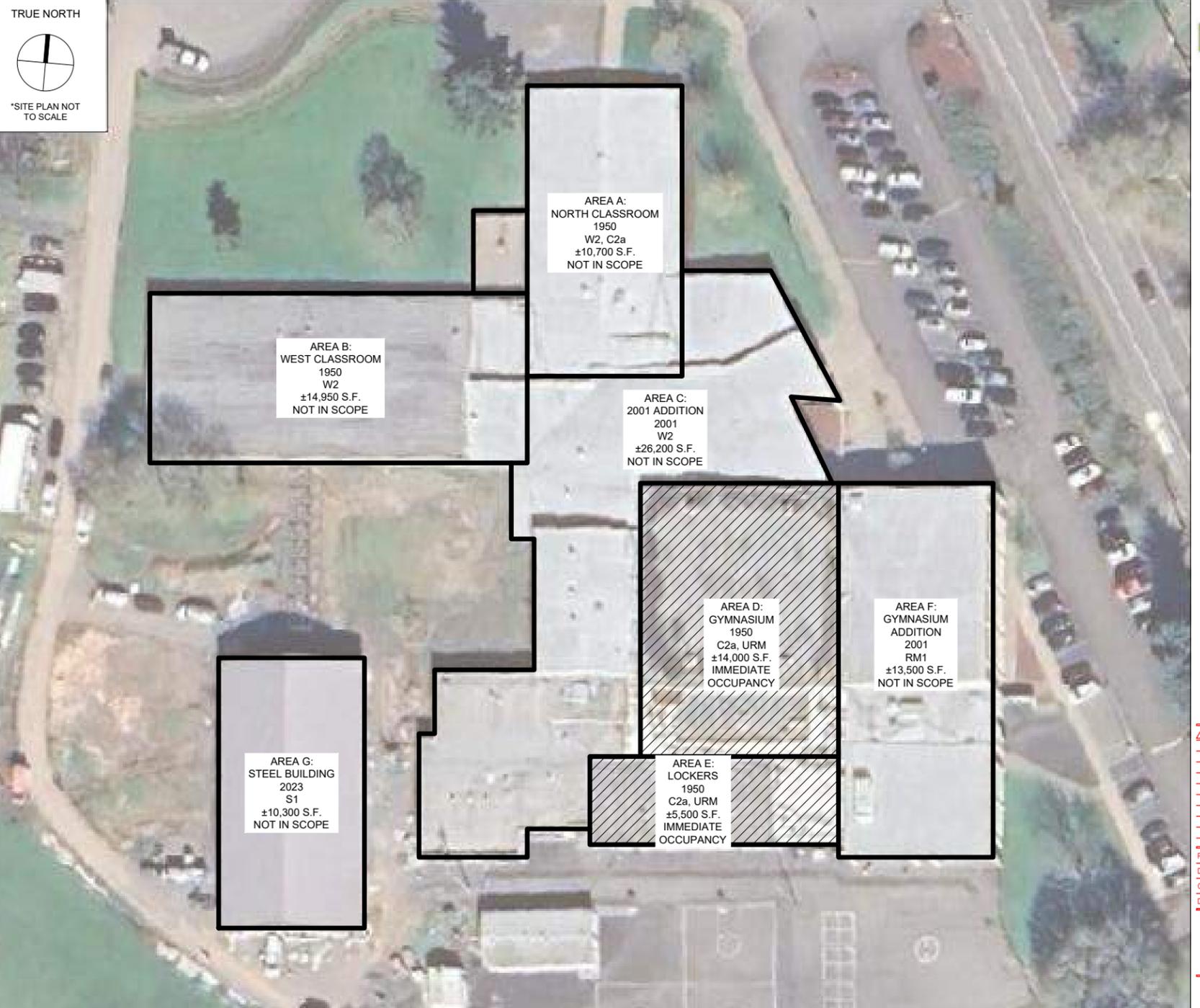
### NON-STRUCTURAL REPAIRS:

- N1. ANCHOR AND BRACE THE FIRE SUPPRESSION PIPING IN ACCORDANCE WITH NFPA-13.
- N2. BRACE UNREINFORCED MASONRY OR HOLLOW-CLAY TILE PARTITIONS.
- N3. INDEPENDENTLY BRACE THE TOPS OF MASONRY OR HOLLOW-CLAY TILE PARTITIONS.
- N4. INDEPENDENTLY BRACE THE TOPS OF CEILING-HIGH FRAMED OR PANELIZED PARTITIONS.
- N5. INSTALL SEISMIC BRACING FOR SUSPENDED LATH AND PLASTER CEILINGS.
- N6. INSTALL SEISMIC BRACING FOR INTEGRATED SUSPENDED CEILINGS.
- N7. INSTALL FREE EDGE CLEARANCE FOR INTEGRATED SUSPENDED CEILINGS.
- N8. INSTALL FREE EDGE SUPPORT FOR INTEGRATED SUSPENDED CEILINGS.
- N9. PROVIDE HARDWARE TO RESTRAIN WALLS AROUND STAIR ENCLOSURES OR REMOVE AND REINSTALL STAIR ENCLOSURE WALLS AS NEEDED.
- N10. ANCHOR CONTENTS TO THE STRUCTURE.
- N11. BRACE EQUIPMENT TO STRUCTURE.
- N12. BRACE AND ANCHOR EQUIPMENT WEIGHING MORE THAN 20 LB. WHOSE CENTER OF MASS IS MORE THAN 4 FT ABOVE THE ADJACENT FLOOR LEVEL.

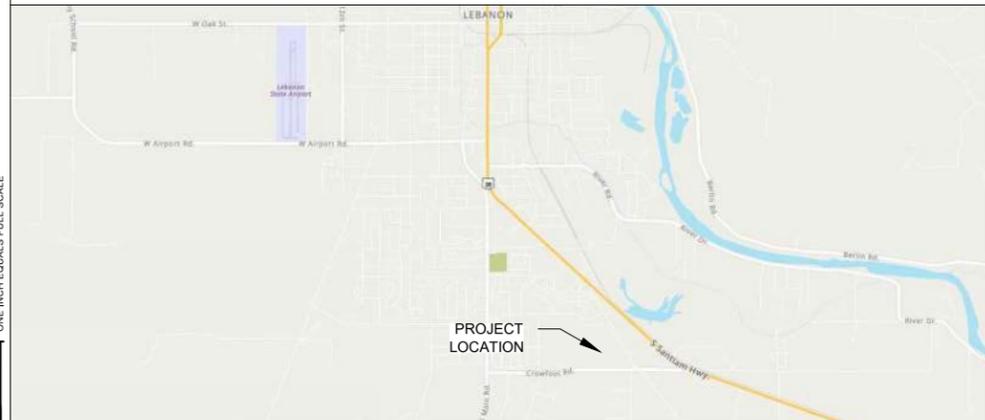
## SHEET INDEX

- G0.0 COVER SHEET
- S1.1 AREA D & E FOUNDATION PLAN
- S1.2 MEZZANINE FRAMING PLAN
- S1.3 AREA D & E ROOF FRAMING PLAN

## BUILDING KEY PLAN



## VICINITY MAP



DESCRIPTION	DATE

PROJECT NO: P-2940-24  
DRAWN: PWR  
CHECKED: MRS  
DATE: DECEMBER 2024

COVER SHEET

G0.0

PRELIMINARY DESIGN







# Appendix D: Geotechnical Information

## Attachment J

USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.  
USGS web services are now operational so this tool should work as expected.



# Seven Oaks Middle School

## 550 Cascade Dr, Lebanon, OR 97355, USA

Latitude, Longitude: 44.5104639, -122.8930091



<b>Date</b>	10/3/2024, 4:07:57 PM
<b>Design Code Reference Document</b>	ASCE41-17
<b>Custom Probability</b>	
<b>Site Class</b>	D - Default (See Section 11.4.3)

Type	Description	Value
Hazard Level		BSE-2N
$S_S$	spectral response (0.2 s)	0.688
$S_1$	spectral response (1.0 s)	0.373
$S_{XS}$	site-modified spectral response (0.2 s)	0.86
$S_{X1}$	site-modified spectral response (1.0 s)	0.718
$F_a$	site amplification factor (0.2 s)	1.249
$F_v$	site amplification factor (1.0 s)	1.927
ssuh	max direction uniform hazard (0.2 s)	0.787
crs	coefficient of risk (0.2 s)	0.875
ssrt	risk-targeted hazard (0.2 s)	0.688
ssd	deterministic hazard (0.2 s)	1.5
s1uh	max direction uniform hazard (1.0 s)	0.434
cr1	coefficient of risk (1.0 s)	0.859
s1rt	risk-targeted hazard (1.0 s)	0.373
s1d	deterministic hazard (1.0 s)	0.6

Type	Description	Value
Hazard Level		BSE-1N
$S_{XS}$	site-modified spectral response (0.2 s)	0.573
$S_{X1}$	site-modified spectral response (1.0 s)	0.479

## Attachment J

Type	Description	Value
Hazard Level		BSE-2E
$S_S$	spectral response (0.2 s)	0.486
$S_1$	spectral response (1.0 s)	0.255
$S_{XS}$	site-modified spectral response (0.2 s)	0.686
$S_{X1}$	site-modified spectral response (1.0 s)	0.533
$f_a$	site amplification factor (0.2 s)	1.411
$f_v$	site amplification factor (1.0 s)	2.089

Type	Description	Value
Hazard Level		BSE-1E
$S_S$	spectral response (0.2 s)	0.149
$S_1$	spectral response (1.0 s)	0.063
$S_{XS}$	site-modified spectral response (0.2 s)	0.239
$S_{X1}$	site-modified spectral response (1.0 s)	0.15
$F_a$	site amplification factor (0.2 s)	1.6
$F_v$	site amplification factor (1.0 s)	2.4

Type	Description	Value
Hazard Level		TL Data
T-Sub-L	Long-period transition period in seconds	16

### DISCLAIMER

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# National Flood Hazard Layer FIRMette

122°53'53"W 44°30'50"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**

- Without Base Flood Elevation (BFE)  
*Zone A, V, A99*
- With BFE or Depth  
*Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile  
*Zone X*

**OTHER AREAS OF FLOOD HAZARD**

- Future Conditions 1% Annual Chance Flood Hazard  
*Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes.  
*Zone X*
- Area with Flood Risk due to Levee  
*Zone D*

**OTHER AREAS**

- Area of Minimal Flood Hazard  
*Zone X*
- Effective LOMR
- Area of Undetermined Flood Hazard  
*Zone D*

**GENERAL STRUCTURES**

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**

- Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/3/2024 at 7:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



122°53'16"W 44°30'25"N  
 Feet  
 0 250 500 1,000 1,500 2,000 1:6,000  
 Basemap Imagery Source: USGS National Map 2023

# Landslide Hazard

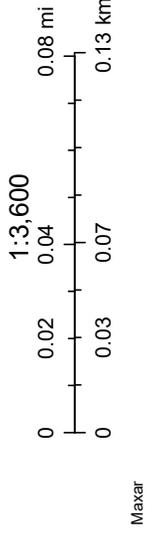


October 3, 2024

- Detailed Susceptibility Reference Maps
- Deep Susceptibility
- Low susceptibility to deep landslides
- Moderate susceptibility to deep landslides
- High susceptibility to deep landslides

- Shallow Susceptibility
- Low susceptibility to shallow landslides
- Moderate susceptibility to shallow landslides
- High susceptibility to shallow landslides

- Statewide Landslide Susceptibility Overview Map
- Low
- Moderate
- High
- Very High



Active Faults



October 3, 2024

— Active\_Faults

1:3,600

0 0.02 0.04 0.08 mi

0 0.03 0.07 0.13 km

Maxar

# Liquefaction Hazard

Attachment J



October 3, 2024

Liquefaction\_Susceptibility\_Map

None

Very Low

Low

Moderate

High

Very High

1:6,000

0 0.04 0.07 0.1 0.14 mi

0 0.05 0.1 0.2 km

Maxar



02-6451-01  
September 13, 2024

Kristofer Toning  
ZCS Engineering & Architecture  
524 Main Street, Suite 2  
Oregon City, OR 97045

**SUBJECT: PRELIMINARY SEISMIC HAZARD EVALUATION  
LEBANON COMMUNITY SCHOOL DISTRICT #9  
SEVEN OAK MIDDLE SCHOOL  
550 CASCADE DRIVE  
LEBANON, OREGON**

Mr. Toning:

This letter presents the results of our preliminary, planning level (office study) seismic risk assessment of Seven Oak Middle School for a potential Seismic Retrofit of the school structures. The subject school is located at 550 Cascade Drive, on the west side of Cascade Drive, between Pearson Street to the north and Crowfoot Road to the south, in Lebanon, Oregon.

This assessment was accomplished in order to provide preliminary geotechnical and geologic information and evaluate the likelihood and consequences of geotechnical/geologic related seismic failures, including liquefaction and landslide potential during the design seismic event, for consideration regarding the potential seismic retrofit.

This assessment was prepared under the direct supervision of Dennis Duru, PE, CEG, RG, who is a registered professional engineer in the state of Oregon and licensed as a certified engineering geologist by the Oregon State Board of Geologist Examiners (OSBGE). Two geotechnical borings were conducted for subsurface exploration of the site. This study was also based on the review of readily available data. Some of the data reviewed included: online DOGAMI Interactive Maps, Open-file sourced OGDC-7 Geology Mapping (loaded in ArcGIS), Google Earth 2024, NRCS Web Soil Survey, well log and geotechnical boring log data from Oregon Water Resources Department Well Report Query, and geotechnical and geologic reports previously prepared by The Galli Group on nearby sites with similar geologic conditions.

This preliminary evaluation has been provided for consideration by the school district and their design team, for preliminary project planning and design purposes.

#### **SITE AND PROJECT DESCRIPTION**

The site is currently occupied by a functioning middle school campus located on a large parcel of property, totaling over 35 acres. The school campus contains a large, interconnected school building structure with a footprint of over 90,000 square feet, located on the northeast portion of

the parcel. The campus also contains a few smaller auxiliary/maintenance buildings. These structures are surrounded by lawn/landscaping areas, access roads, parking lots and walkways. The central portion of the parcel is primarily occupied by sports field/track facilities and the west side of the parcel is currently undeveloped.

The project area is at the far eastern margins of the Willamette Valley, in a valley formed by the South Santiam River along the western edge of the Cascade Range. The project site is fairly flat, with the primary structure situated near the highest elevation on the property. There are slopes of less than 1% descending from the structure to the south, west and northwest. North and southeast of the structure, the slopes begin to increase from 2% to as much as 20% down to the drainage area along the west side of Cascade Drive.

We understand the School District and their consulting design team are conducting preliminary facilities review to determine the level and extent of seismic retrofit necessary for the structures on this campus. Their review will be based, in part, on the evaluation of the potential geologic hazards (such as liquefaction) provided in this letter, and an evaluation of the potential structural damage to these facilities associated with the design seismic event. This evaluation and the findings and conclusions of the facilities review will also likely be used to pursue grant funding should seismic retrofit work be necessary.

## **SUBSURFACE CONDITIONS**

**Soil.** On August 8, 2024, our Engineering Associate, Kristen S. Pierce, E.I.T., and our drilling crew, visited the site to conduct the subsurface investigation. A total of two (2) exploratory borings were drilled at the project site. The drilling was accomplished with our ATV-mounted, solid stem auger, drill rig. Borings were advanced with sample collection and testing being accomplished at various depths. Standard Penetration Testing (SPT) was accomplished in each boring. This entails driving a 1½ inch I.D, 2-inch O.D., steel split spoon sampler by dropping a 140-pound weight for a 30-inch drop. The total number of blows it takes to drive the sampler the last 12 inches of an 18-inch drive is called the SPT N-value. These can be correlated with soil strength and density parameters from testing on thousands of other projects. The borings penetrated to depths of 9.0 and 11.5 feet, terminating in the dense, coarse-grained soils. All holes were backfilled with site spoils after drilling, leaving the surface minimally disturbed. The geotechnical logs for these borings are attached with this letter, and their locations are shown on *Figure 1, Project Map*.

The two borings encountered medium stiff to very stiff, silty, clayey soils, containing sand and gravel, in the upper 7.5 feet of the subsurface. Below 7.5 feet, both borings encountered coarse-grained sands and gravels, with less fine-grained, cohesive sediments. According to the *Custom Soil Resource Report* for this area, provided by the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey website, the soils found in the upper 5 feet of the project site subsurface are mapped as follows (NRCS, 2024):

- The Clackamas Variant Silt Loam (location of B-1): This soil unit is under the majority of the structure. The upper 5 feet of the subsurface consists of approximately one foot of silt loam, underlain by a foot of gravelly, silty clay loam, underlain by 3 or more feet of very gravelly clay.
- The Clackamas Gravelly Silt Loam (location of B-2): This soil unit is mapped to cover a portion of the northern and northeastern extent of structure. The upper 5 feet of the subsurface consists of approximately one foot of silt loam, underlain by less than a foot of gravelly, silty clay loam, underlain by 3 or more feet of extremely gravelly clay loam.

Review of well and geotechnical boring log data in the immediate vicinity of the project site indicates that the unconsolidated, interlayered, mixed-grained sediments continue to depths greater than 100 feet and contain primarily gravel and clay, with some sand layers. Some of the sediment layers in these deeper wells are described as cemented, very dense or tightly packed (OWRD, 2024).

**Groundwater.** Free groundwater was not encountered during our field investigation. Cheadle Lake, an oxbow lake of the South Santiam River, is located just over 800 feet to the northeast of the project site. During the wet season, the shoreline of this lake is approximately 20 feet below the ground elevation of the project site structure.

The geotechnical and well log data reviewed show the groundwater is in a confined aquifer, with groundwater levels typically first encountered at depths of 20 feet, or more, rising to static water levels between 10 to 20 feet post-drilling (OWRD, 2024). Groundwater levels do change due to seasonal precipitation variations and other climatic occurrences.

## LABORATORY TESTING

All soil samples collected were tested for natural moisture content. Moisture contents of each collected sample are listed on the attached *Boring Logs*. Two washed sieves with hydrometer analyses (ASTM C1140 and ASTM D7928-17) and one Atterberg Limits test (ASTM D3418) were performed on the soil samples collected from the geotechnical borings. The individual *Laboratory Test* result sheets are attached. Table 1 summarizes the laboratory testing results.

**TABLE 1 – LABORATORY TESTING**

Boring, Sample (depth, in feet bgs)	Test Results			
Soil Description				
B-1, S-3 (5.0 – 6.5)	Liquid Limit = 37, Plastic Limit = 24, Plasticity Index = 13			
clayey, sandy Silt, with gravel				
B-2, S-4 (7.5 - 9.0)	Gravel = 38%,			
gravelly Sand, with silt and clay	Sand = 49%	coarse = 11%	medium = 17%	fine = 21%
	Fines = 13%	Silt = 7%	Clay = 6%	
B-1, S-5 (10.0 – 11.5)	Gravel = 56%			
sandy Gravel, with silt and clay	Sand = 30%	coarse = 10%	medium = 10%	fine = 10%
	Fines = 14%	Silt = 8%	Clay = 6%	

## GEOLOGIC AND SEISMIC SETTING

**Summary of Geology.** Oregon's Willamette Valley Physiographic Province is the basin between the Coastal Range and the Cascade Range. Downward folding of the marine sedimentary and volcanic basalt bedrock occurred simultaneously with the tectonic uplift of the Coastal Range and the Early Western Cascades volcanism, around 40 to 30 million years ago (Ma). Subsequent erosion of both mountain ranges filled the valley with sedimentary deposits. At the project site, the mapped geology consists of Pleistocene aged (deposited between 2.6 Ma and 12,000 years ago) coarse-grained, river terrace deposits. These sediments overlie Eocene to Oligocene aged (deposited 41 to 23 Ma) volcanic and volcanoclastic rock units of the Cascades. Lebanon is located between Peterson Butte and Ridgeway Butte, which are composed of these volcanic deposits.

**Summary of Seismicity.** As with most of western Oregon, the project site may be impacted by the Cascadia Subduction Zone (CSZ) off the Oregon coast which is considered capable of 9.0Mw earthquakes. The surface expression of the CSZ offshore, near the continental shelf, approximately 200 km from the project site, and models suggest that the downdip seismogenic zone of the subducting tectonic plate is approximately 70 km of the surface location of the project site (USGS, 2020). Average recurrence intervals for such great earthquakes, as determined by recent investigations, range between 300-600 years. The last "great" earthquake was interpreted to be approximately 300 years ago (Goldfinger, et al., 2012). The CSZ is the main seismic event for consideration regarding this seismic retrofit project.

In addition to the CSZ, an active Class A fault is located 25 km from the project site. Directly to the west is the Owl Creek fault, which is a reverse fault, 15 km in length, with a north-south strike and very steep (60°) easterly dip. This fault has no surface expression, but is mapped on the floor of the Willamette Valley, with evidence of offset in Pleistocene aged sediments, making the most recent activity along this fault less than 750,000 years ago with no evidence of cutting through Holocene (12,000 years old and younger) sediments (USGS, 2022).

## HAZARD ANALYSIS

**Landslides/Slope Instability.** The project site is located on a relatively flat parcel of land, with the only noticeable slope being the less than 8 foot, fairly steep decent towards Cascade Drive to the northeast. No landslide features are mapped in the area by the State Landslide Information Database for Oregon, and this minor slope is mapped as having moderate susceptibility for a landslide (SLIDO, 2021). As the structure is setback more than 80 feet from this slope, any instability of this minor slope is highly unlikely to cause damage to the structure but may affect the parking area and access roads. Therefore, the risk of landslide/slope instability for the project site is low.

**Liquefaction/Lateral Spread Hazard Potential.** Liquefaction is known to occur in cohesionless soils (coarse-grained sediments and non-plastic silts) that are saturated and loose. Lateral spread is a liquefaction induced ground failure that can occur at or near abrupt downslope areas or free-faces (cut slopes, river banks, etc.). A determination of liquefaction hazards

includes evaluation of the following: seismic source potential to cause liquefaction, historic occurrence of liquefaction, depth to the water table, geologic age, and composition of subsurface material.

See previous section of this report, *Summary of Seismicity*, for details regarding the seismic sources for this site. Earthquakes as small as moment magnitude 5.0 can trigger liquefaction in extremely susceptible soils (Green & Bommer, 2019). A paleo-liquefaction study was completed along 30 km of the South Santiam River, from Lebanon to its confluence with the North Santiam River, in 2002. Bedrock outcrops and low banks containing gravel, cobbles and boulders limited the possibility of sand dikes being formed or exposed, however the study did find evidence of paleo-liquefaction in fine sand and silt layers along other riverbanks within the Willamette Valley (Sims, 2002). A later investigation utilized subsurface exploration methods for evidence of paleo-liquefaction in the Willamette Valley, discovering abundant evidence of paleo-liquefaction occurring in thick (over 6 feet) sand beds above Pleistocene-aged basalt gravel beds (Peterson, 2014). Groundwater in the project area appears to be in a confined aquifer, located over 20 feet deep, with hydraulic heads 10 to 20 feet below the ground surface. Widespread liquefaction from the Christchurch earthquakes in New Zealand show that earthquakes can damage aquitards, with resulting leakage and upwards flow occurring in confined aquifers where the hydraulic head is close to or above ground level (Cox, 2021).

Preliminary analysis of the project site indicates that groundwater and earthquake source criteria required for liquefaction to occur are present at the project site. However, the Pleistocene-aged, coarse-grained terrace deposits at the project site are not covered with the thick silty/sandy layers which have a historic record of liquefaction in the area. Publicly available information from the State of Oregon indicate that the entire town of Lebanon is founded on soil highly susceptible to liquefaction (HazVu, 2018). The State of Oregon has released updated seismic hazard data maps that have not been incorporated to the readily accessible Statewide Geohazards Viewer. Utilizing updated geologic mapping (OGDC-7, 2020), the State of Oregon now assigns the potential for liquefaction at the project site as low; the Holocene aged alluvial deposits that have infilled the present floodplain of the South Santiam River to the northeast of the project site are still classified with high potential (Oregon Department of Geology and Mineral Industries, 2021).

In our professional opinion, the potential for liquefaction at the site is considered **very low** due to the geologic age and composition of the subsurface material. The project site is relatively flat, with a minor free face occurring at the east side of the project site, away from the structure (see the previous *Landslide/Slope Instability* section). **Therefore, in our professional opinion, the potential for lateral spreading of the site soils that could adversely affect the site or have significant adverse impacts on the structures during a seismic event is **very low**.**

**Expansive Soils.** The Atterberg Limits test performed on the collected soil sample from 5.0 to 6.5 feet deep indicates that the soil is not expansive. However, soil surveys indicate that there is a high shrink-well potential for the near-surface soils at the project site. Additional laboratory testing would be necessary for determining the expansion potential of the site soils. In our professional opinion, potential for expansive soils presenting a hazard to the project is **moderate**.

**Ground Rupture.** No active fault traces or local faults are mapped within 20 km of the project site (USGS; 2021). Therefore, the risk of damage at the site due to ground rupture is considered very low.

**Ground Shaking.** Predicted ground motions for the anticipated MCE seismic event would produce **strong to very strong** perceived ground shaking.

**Seismic Ground Amplification or Resonance.** No known, unusually hazardous amplification or resonance effects from seismic waves have been associated with the subsurface soil/bedrock conditions in the project area.

## CONCLUSIONS

In our professional opinion, based on the evaluation contained in this letter, the project site could be impacted by a large magnitude CSZ seismic event, with strong to very strong ground shaking and the possibility of structure damage. However, the potential for liquefaction and lateral spread to occur at the site as a result of the design earthquake is considered very low. There is low a potential for co-seismic slope instability along the east side of the project area, which would not have significant adverse impacts on the main structure. In our professional opinion the soils conditions at the site could benefit from a conventional foundation retrofit.

These evaluations and conclusions are only preliminary. If/when a full seismic retrofit, geotechnical design report is needed, additional tasks to be accomplished will be as follows:

1. Subsurface investigation consisting of 2 or 3 additional borings.
2. Laboratory testing and classification for determining strength and settlement characteristics of the site soils.
3. Seismic surveys (refraction and MASW) to determine project site class and to supplement boring information
4. Evaluation of data for developing geotechnical design parameters (excavations, subgrades, cuts/fills, and foundation/slab support, etc.).
5. Ground motion hazard analysis to determine spectral acceleration parameters for the structure.

This information is necessary to provide a full scale Seismic Retrofit Design Report.

## LIMITATIONS

The analyses, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of the study, and assume soils, rock and groundwater conditions exposed and observed in the borings during our investigation are representative of soils and groundwater conditions throughout the site.

This letter was prepared for the use of the School District and their design team for evaluation purposes. It should be made available to others for informational data only. This letter should

not be used for contractual purposes as a warranty of site subsurface conditions. It should also not be used at other sites or for projects other than the one intended.

We have performed these services in accordance with generally accepted geotechnical engineering and professional geology practices in Oregon, at the time the study was accomplished. No other warranties, either expressed or implied, are provided.

**THE GALLI GROUP**  
**GEOTECHNICAL CONSULTING**



Kristen S. Pierce, EIT  
Engineering Associate



Dennis Duru, MS, PE, CEG, RG.  
Senior Engineering Geologist

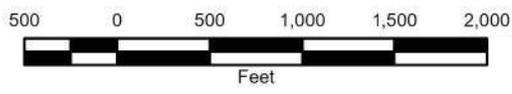
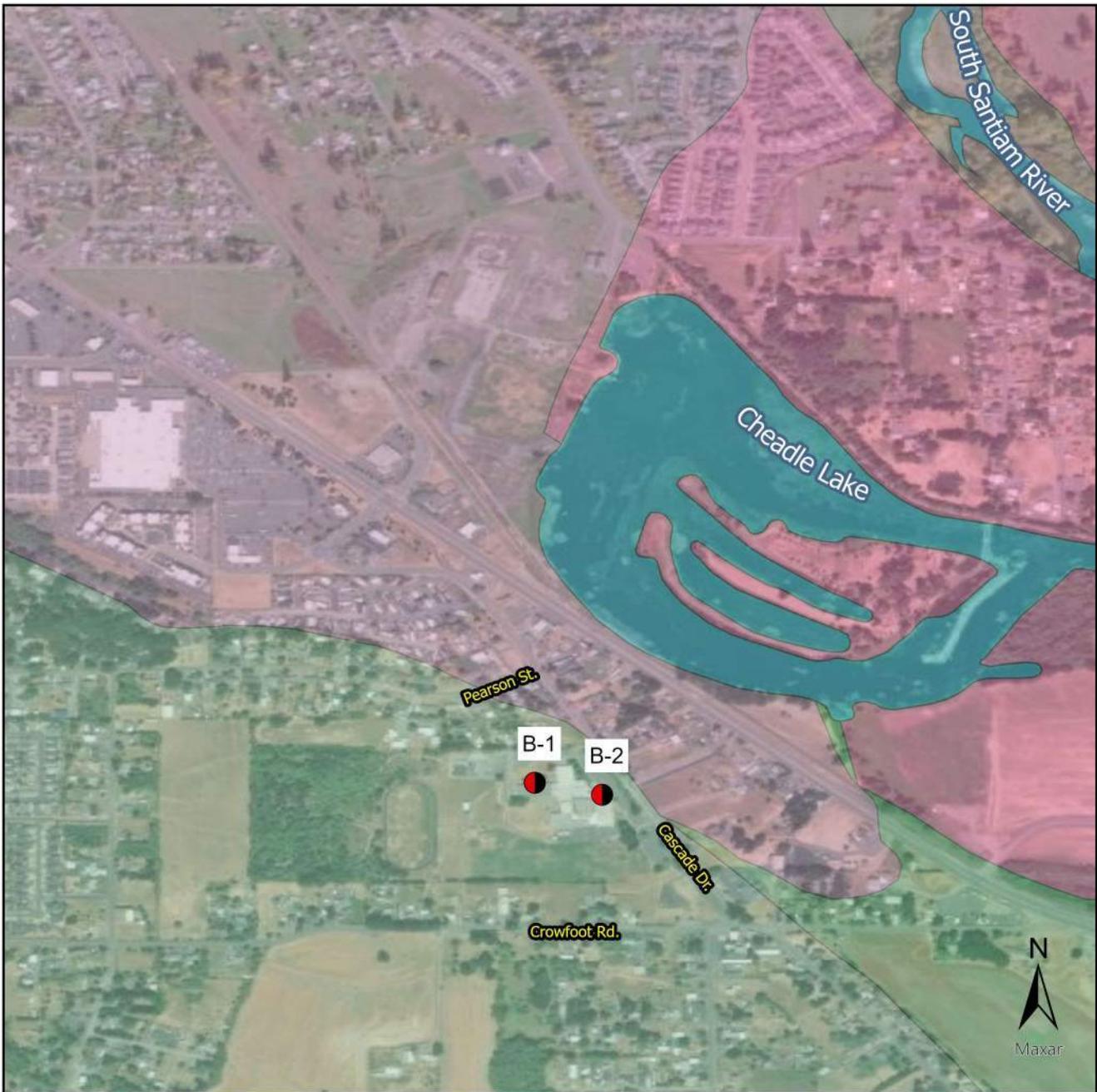


ATTACHMENTS:

- Figure 1: Project Map
- Boring Logs
- Laboratory Test Results

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# LEGEND

**Boring Locations**

Boring Locations

**OGDC7 Geologic Units**

Holocene, Alluvium

Holocene, Near channel gravel  
 Holocene, Older alluvium  
 Holocene, water

Pleistocene, Middle terrace deposits on the South Santiam River  
 Pleistocene, Pleistocene terrace and fan deposits

**GG THE GALLI GROUP**  
 Geotechnical Consulting  
 612 Northwest Third Street,  
 Grants Pass, Oregon 97526

## PROJECT MAP

SEVEN OAK MIDDLE SCHOOL  
 550 CASCADE DRIVE  
 LEBANON, OREGON

DATE: SEPTEMBER, 2024
JOB NO: 02-6451-01
REV: 09/11/2024 3:40 PM
PREPARED BY: KSP
6451-01: Prelim Seismic Eval - 01

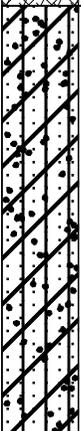
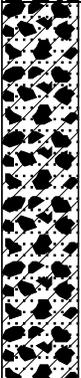
FIGURE:  
1

Attachment 1  
**BORING LOG**  
**B1**

Project: Seven Oak Middle School  
 Client: Lebanon Community School District  
 Location: NW portion of structure, see Figure 2: Site Plan  
 Driller: TGG (Ken/ Nate C.)  
 Drill Rig: ATV mounted 4" diameter SSA  
 Depth To Water> Initial  $\nabla$  : N/a

Project No.: 02-6451-01  
 Date: 08/08/2024  
 Elevation:  
 Logged By: Kristen S. Pierce

At Completion  $\nabla$  :

Graphic Log	USCS	Description	Depth	Sample No. and Type	NMC	Standard Penetration Test	
						N	CURVE
			0				10 30 50
	FILL	Stiff, brown silty Clay; organics, root zone, dry. (topsoil)	0.5				
	CH/MH	Very Stiff, brown, silty Clay, with some orange white, and yellow and coarse sand and trace fine gravel, dry.  ... Stiff	2	S1	12%	20	
			4	S2	12%	13	
			5.0				
	CH	Very stiff, mottled red, gray, brown and clayey Silt; with subrounded to subangular gravel and sand, damp.	6	S3	15%	20	
			7.5				
	GC/SC	Medium dense, red, gray, orange and brown, clayey sandy Gravel; damp.	8	S4	11%	19	
			10				
			11.5	S5	10%	30	
		Auger refusal and bottom of boring at 11.5 ft. No free groundwater encountered.	12				
			14				

Legend of Samplers:  Grab sample  SPT sample  Shelby tube sample





**Attachment J**  
**Atterberg Limits Testing**  
**ASTM D4318**

Client: Lebanon Community School District  
 Project: Lebanon M.S. Preliminary Seismic  
 Job No. 02-6451-01  
 Date Sampled: 8/8/2024  
 Sample Location B-1, S-3  
 Depth of Sample: 5.0-6.5'  
 Description of Soil: **Brown clayey sandy Silt with gravel**  
 Date Tested: 9/4/2024

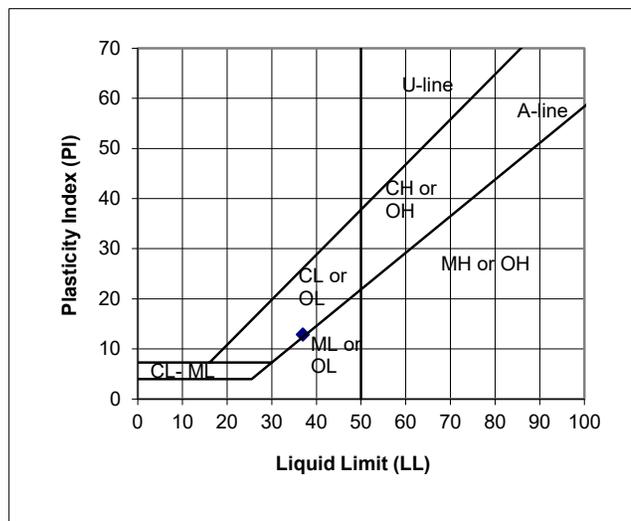
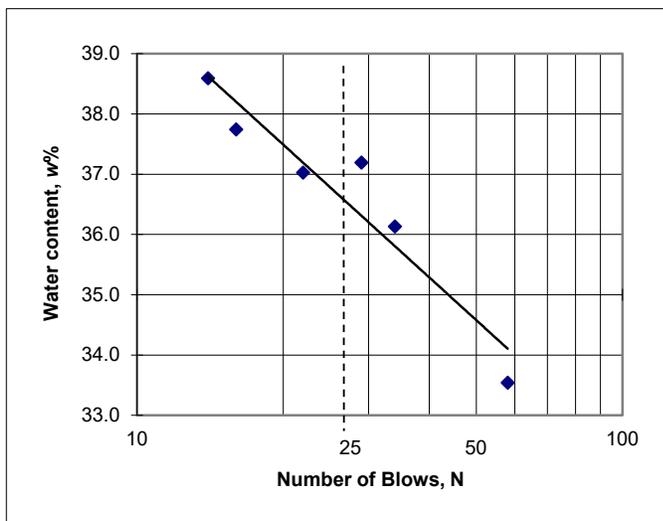
Liquid Limit Determination

Can No.	T-7	T-9	T-106	111	T-10	123
Wt. of wet soil + can (g)	41.07	39.76	31.73	35.13	39.29	36.15
Wt. of dry soil + can (g)	38.37	37.22	29.99	32.49	37.01	33.44
Wt. of can (g)	30.32	30.36	25.38	25.65	30.88	25.94
Wt. of dry soil (g)	8.05	6.86	4.61	6.84	6.13	7.50
Wt. of Moisture (g)	2.70	2.54	1.74	2.64	2.28	2.71
Water content, w%	33.5	37.0	37.7	38.6	37.2	36.1
No. of blows, N	58	22	16	14	29	34

Plastic Limit Determination

Can No.	103	110	T-115	T-107
Wt. of wet soil + can (g)	31.12	30.71	31.16	30.88
Wt. of dry soil + can (g)	30.02	29.79	30.08	29.90
Wt. of can (g)	25.55	25.75	25.75	25.82
Wt. of dry soil (g)	4.47	4.04	4.33	4.08
Wt. of Moisture (g)	1.10	0.92	1.08	0.98
Water content, w%	24.6	22.8	24.9	24.0

**LIQUID LIMIT (LL)= 37**  
**PLASTIC LIMIT (PL)= 24**  
**PLASTICITY INDEX (PI)= 13**



Tested by: Dakota Kinyon



## Washed Sieve and Hydrometer Analysis (ASTM D1140 and ASTM D7928)

Client: Lebanon Community School District

Project: Lebanon Middle School Seismic

Job No: 02-6451-01

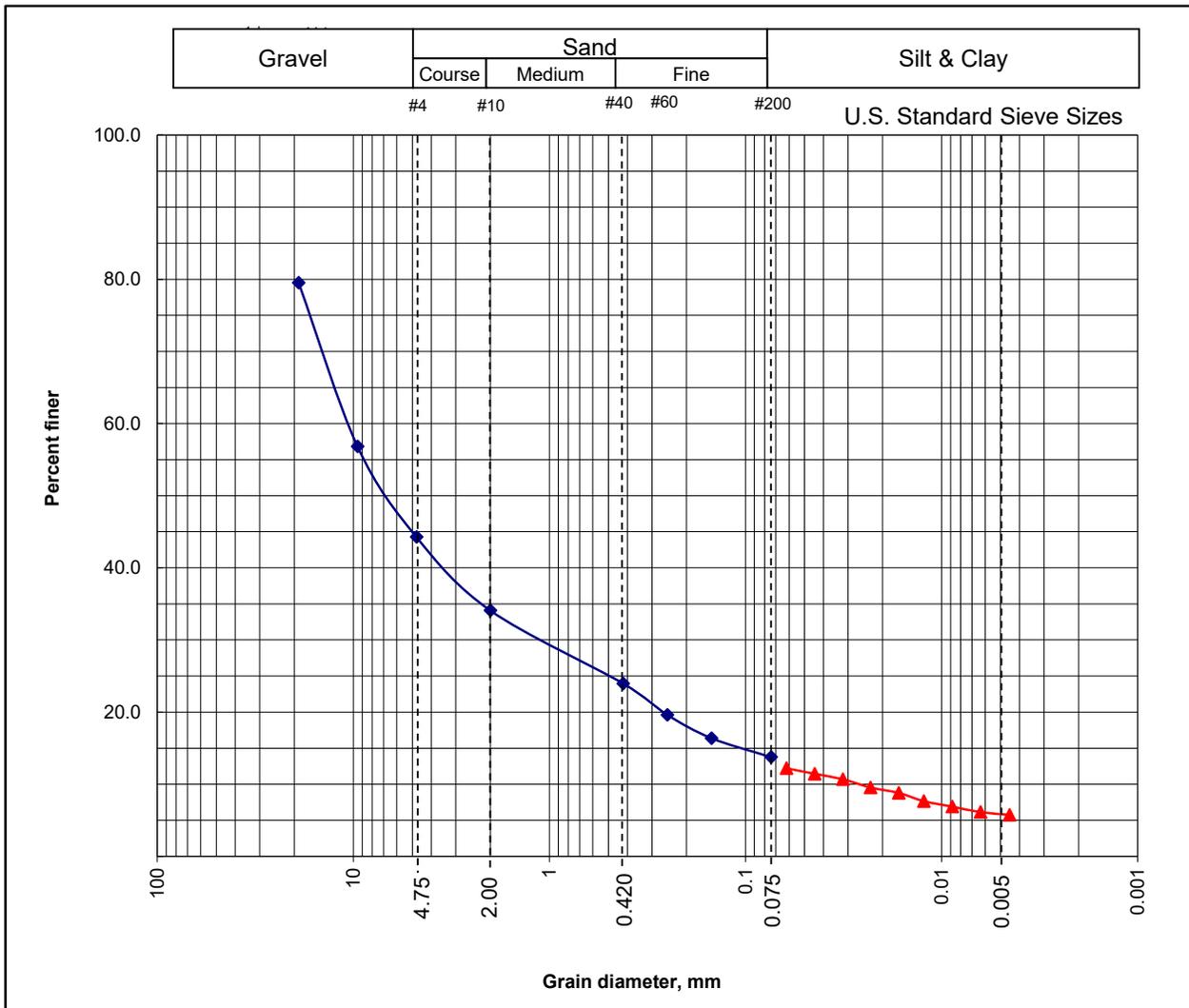
Date Tested: 9/5/2024

Date Sampled: 8/8/2024

Description of Soil: Brown and gray sandy Gravels; trace silt and clay

Boring No / Sample No: B-1 S-5

Depth of Sample: 10.0-11.5'

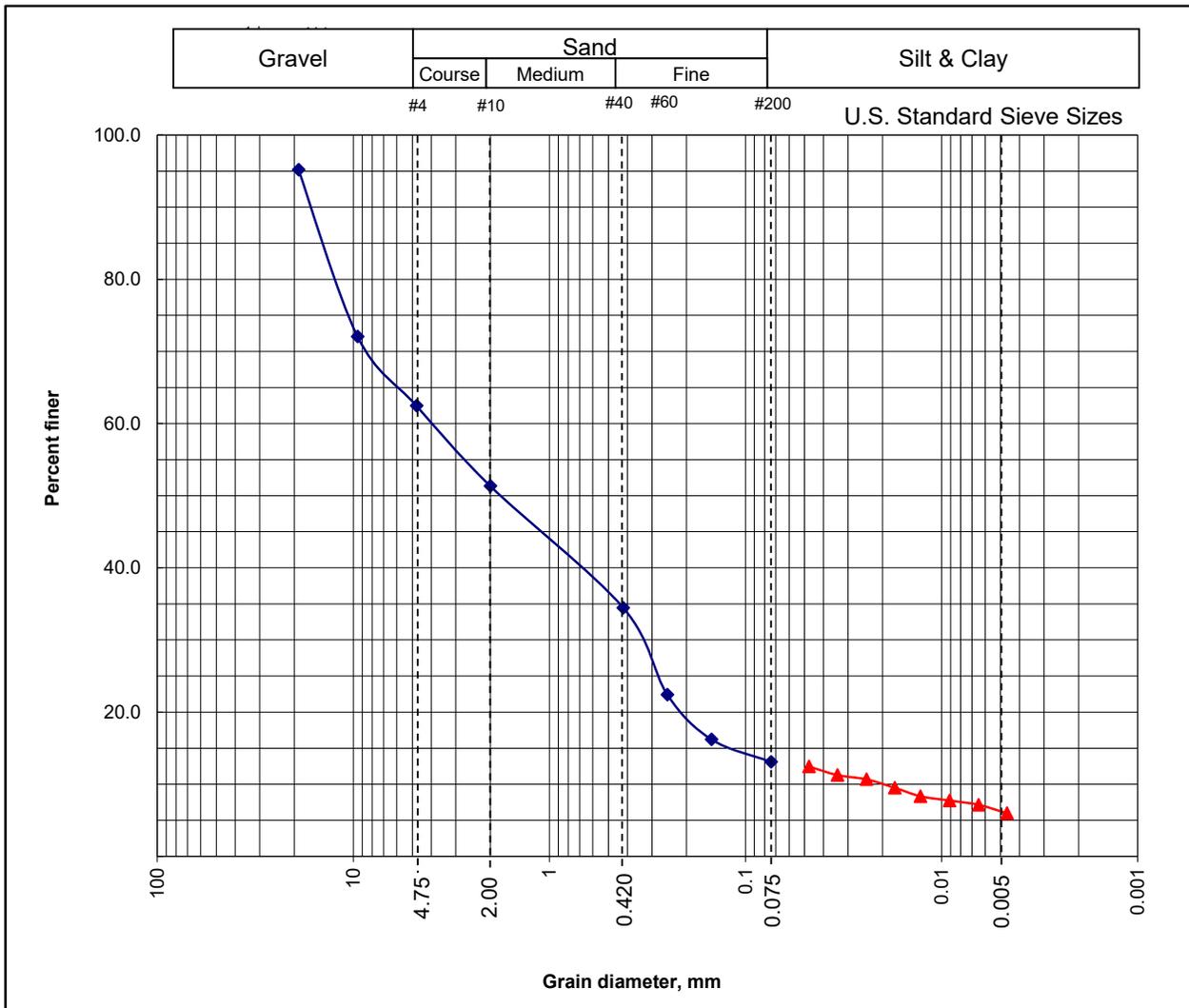


Tested by: Dakota Kinyon



# Washed Sieve and Hydrometer Analysis (ASTM D1140 and ASTM D7928)

Client: Lebanon Community School District  
Project: Lebanon Middle School Seismic  
Job No: 02-6451-01  
Date Tested: 9/5/2024  
Date Sampled: 8/8/2024  
Description of Soil: Brown gravelly Sand; trace silt and clay  
Boring No / Sample No: B-2 S-4  
Depth of Sample: 7.5-9.0'



Tested by: Dakota Kinyon

# Appendix E: Construction Cost Estimate Worksheets

# Attachment J

<b>ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION</b>					
<b>SUMMARY</b>					
Description	Deficiencies <small>(Ref. Seismic Evaluation Report Sec. 6.0)</small>	Quantity	Units	Unit Price	Total Price for Construction Item
<b>GENERAL CONDITIONS</b>					
General Conditions		10%	%		\$ 137,579.00
Preconstruction Services		2%	%		\$ 27,515.80
Escalation		7%	%		\$ 107,861.94
Bonding & Insurance		3%	%		\$ 46,226.54
Contractor Profit & Overhead		5%	%		\$ 77,044.24
General Conditions Subtotal					<b>\$ 396,227.52</b>
<b>Non-Structural Elements</b>					
Misc MEP	N1, N10-N12	1	Lump Sum	\$ 89,500.00	\$ 89,500.00
Misc Non-Structural	N2-N10	1	Lump Sum	\$ 35,800.00	\$ 35,800.00
New Shower Rooms	N2	575	Square Foot	\$ 250.00	\$ 143,750.00
Bracing of Gymnasium Equipment	N2-N10	1	EA	\$ 4,500.00	\$ 4,500.00
Non-Structural Subtotal					<b>\$ 273,550.00</b>
<b>Construction Cost Per Building Part</b>					
BUILDING PART D: Gymnasium Sub-Total					<b>\$ 884,930.00</b>
BUILDING PART E: Locker Rooms Sub-Total					<b>\$ 217,310.00</b>
<b>Sub-Total Construction Cost</b>					<b>\$ 1,772,000.00</b>
<b>Contingency</b>				<b>15%</b>	<b>\$ 265,800.00</b>
<b>Total Construction Cost</b>					<b>\$ 2,037,800.00</b>
<b>Cost Estimate Summary</b>					
<b>Engineering</b>					<b>\$ 289,500.00</b>
Architectural Consulting				\$ 30,600.00	
Structural / Rehabilitation Engineering				\$ 224,200.00	
Geotechnical Consulting				\$ 19,400.00	
Materials Testing for Design				\$ 15,300.00	
<b>Construction Management</b>					<b>\$ 61,100.00</b>
<b>Construction</b>					<b>\$ 1,850,400.00</b>
Sub-Total Construction Cost				\$ 1,772,000.00	
Special Inspection Services for Construction				\$ 17,300.00	
Permitting Fees				\$ 61,100.00	
<b>Relocation of FF&amp;E</b>					<b>\$ 26,600.00</b>
<b>Contingency</b>					<b>\$ 265,800.00</b>
<b>Total Project Funding Requirement</b>					<b>\$ 2,493,400.00</b>

# Attachment J

## ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION

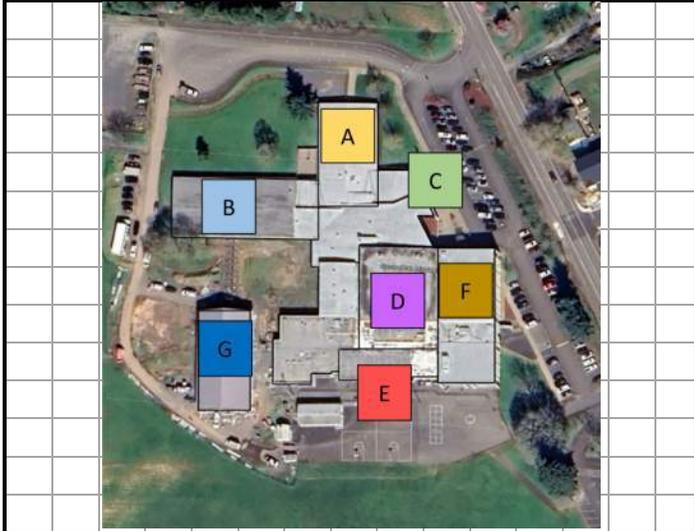
### BUILDING PART D: Gymnasium

Description	Deficiencies <small>(Ref. Seismic Evaluation Report Sec. 6.0)</small>	Quantity	Units	Unit Price	Total Price for Construction Item
<b>Demolition &amp; Asbestos Abatement</b>					
Roof Structure Demolition	S1A	750	Square Foot	\$ 7.00	\$ 5,250.00
Abatement	S2A, S2B, S2C, S2D, S7	1800	Square Foot	\$ 6.00	\$ 10,800.00
Soft Demolition	S1, S1A, S5, S6, S7, S8	14000	Square Foot	\$ 3.00	\$ 42,000.00
Hard Demolition	N2-N4	230	Square Foot	\$ 20.00	\$ 4,600.00
<b>Demolition &amp; Asbestos Subtotal</b>					<b>\$ 62,650.00</b>
<b>Foundation / Floor Strengthening Construction</b>					
Flooring Protection	S1-S8, S10	9090	Square Foot	\$ 7.00	\$ 63,630.00
Diaphragm Attachments - Out-of-Plane	S2A, S4	330	Linear Foot	\$ 60.00	\$ 19,800.00
Diaphragm Attachments - In-Plane Shear	S2B, S2C, S2D	325	Linear Foot	\$ 25.00	\$ 8,125.00
Ceiling Repair	S2A, S2B, S2C, S2D, S4	2200	Square Foot	\$ 4.00	\$ 8,800.00
New Drag Beam	S2C, S2D	30	Linear Foot	\$ 100.00	\$ 3,000.00
Blocking and Strapping Line	S2D	32	Linear Foot	\$ 60.00	\$ 1,920.00
Bolting of Extg Walls to footings	S1C	90	Linear Foot	\$ 40.00	\$ 3,600.00
Shear Wall Footings - Wood Walls	S1F	105	Linear Foot	\$ 350.00	\$ 36,750.00
<b>Foundation Level Subtotal</b>					<b>\$ 145,625.00</b>
<b>Wall Strengthening Construction</b>					
Painting	S1-S10	14000	Square Foot	\$ 4.00	\$ 56,000.00
FRP Wall Strengthening	S3,S8	1160	Square Foot	\$ 60.00	\$ 69,600.00
FRP Wall Finish Repair	S3,S8	1160	Square Foot	\$ 30.00	\$ 34,800.00
New 2x Framed Shear Walls	S1F, S1D	1905	Square Foot	\$ 15.00	\$ 28,575.00
Interior Wall Finish Repair	S1D, N2-N4	2030	Square Foot	\$ 4.00	\$ 8,120.00
<b>Wall Strengthening Subtotal</b>					<b>\$ 197,095.00</b>
<b>Roof Strengthening Construction</b>					
Seismic Isolation from Adjacent Building	S1A	380	Linear Foot	\$ 250.00	\$ 95,000.00
New Ceiling Sheathing	S7	14000	Square Foot	\$ 5.00	\$ 70,000.00
Diaphragm Attachments - Out-of-Plane	S1A, S4, S6, S8	930	Linear Foot	\$ 50.00	\$ 46,500.00
Diaphragm Attachments - In-Plane Shear	S1E, S3, S5, S6, S7	1500	Linear Foot	\$ 20.00	\$ 30,000.00
Blocking and Strapping Line	S4, S5, S6	550	Linear Foot	\$ 50.00	\$ 27,500.00
New Wood Beams	S5, S7	1500	Linear Foot	\$ 30.00	\$ 45,000.00
Ceiling Repair	S1-S9	14000	Square Foot	\$ 3.00	\$ 42,000.00
New Suspended Ceiling	S1,S1A, S4, S5	1800	Square Foot	\$ 6.00	\$ 10,800.00
Existing Beam Strengthening	S10	4	EA	\$ 15,000.00	\$ 60,000.00
New Drag Beam	S5	2	EA	\$ 2,500.00	\$ 5,000.00
New Steel Angle Isolation Joint	S1D	150	Linear Foot	\$ 300.00	\$ 45,000.00
<b>Roof Strengthening Subtotal</b>					<b>\$ 476,800.00</b>
<b>Building Part 'D' - Total Construction Cost</b>					<b>\$ 882,170.00</b>

# Attachment J

<b>ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION</b>					
<b>BUILDING PART E: Locker Rooms</b>					
Description	Deficiencies <small>(Ref. Seismic Evaluation Report Sec. 6.0)</small>	Quantity	Units	Unit Price	Total Price for Construction Item
<b>Demolition &amp; Asbestos Abatement</b>					
Abatement	S4, S5, S6, S9, N6	3800	Square Foot	\$ 6.00	\$ 22,800.00
Soft Demolition	S1A, S1B, S1C, S1E, S5-S7	3550	Square Foot	\$ 3.00	\$ 10,650.00
				Demolition & Asbestos Subtotal	<b>\$ 33,450.00</b>
<b>Foundation / Floor Strengthening Construction</b>					
Bolting of Extg Walls to footings	S1B	60	Linear Foot	\$ 40.00	\$ 2,400.00
				Foundation Level Subtotal	<b>\$ 2,400.00</b>
<b>Wall Strengthening Construction</b>					
Light Steel Columns	N3-N5	37	EA	\$ 1,250.00	\$ 46,250.00
Painting	S1, S1A, S4-S7, S8	5500	Square Foot	\$ 4.00	\$ 22,000.00
Sheathing of Existing Walls	S1C	710	Square Foot	\$ 6.00	\$ 4,260.00
New 2x Partition/Plumbing Wall	N2-N4	230	Square Foot	\$ 12.00	\$ 2,760.00
				Wall Strengthening Subtotal	<b>\$ 75,270.00</b>
<b>Roof Strengthening Construction</b>					
New Ceiling Sheathing	S6, S7	5500	Square Foot	\$ 5.00	\$ 27,500.00
Diaphragm Attachments - Out-of-Plane	S1A, S4, S6, S8	825	Linear Foot	\$ 50.00	\$ 41,250.00
Diaphragm Attachments - In-Plane Shear	S1E, S5, S7	795	Linear Foot	\$ 20.00	\$ 15,900.00
Ceiling Repair	S1, S1A, S4-S7	5500	Square Foot	\$ 3.00	\$ 16,500.00
New Suspended Ceiling	S1A, S1B, S1C, S1E	1300	Square Foot	\$ 6.00	\$ 7,800.00
				Roof Strengthening Subtotal	<b>\$ 108,950.00</b>
<b>Building Part 'E' - Total Construction Cost</b>					<b>\$ 220,070.00</b>

# Appendix F: Rapid Visual Screening



SKETCH

Address: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Other Identifiers: \_\_\_\_\_  
 Building Name: \_\_\_\_\_  
 Use: \_\_\_\_\_  
 Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_  
 Ss: \_\_\_\_\_ S1: \_\_\_\_\_  
 Screener(s): \_\_\_\_\_ Date/Time: \_\_\_\_\_

No. Stories: Above Grade: \_\_\_\_\_ Below Grade: \_\_\_\_\_ Year Built: \_\_\_\_\_  EST  
 Total Floor Area (sq. ft.): \_\_\_\_\_ Code Year: \_\_\_\_\_  
 Additions:  None  Yes, Year(s) Built: \_\_\_\_\_

Occupancy: Assembly  Commercial  Emer. Services  Historic  Shelter  
 Industrial  Office  School  Government  
 Utility  Warehouse  Residential, # Units: \_\_\_\_\_

Soil Type:  A  B  C  D  E  F  DNK  
 Hard Avg Dense Stiff Soft Poor DNK  
 Rock Rock Soil Soil Soil Soil If DNK, assume Type D.

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK  
 Adjacency:  Pounding  Falling Hazards from Taller Adjacent Building  
 Irregularities:  Vertical (type/severity) \_\_\_\_\_  
 Plan (type) \_\_\_\_\_

Exterior Falling Hazards:  Unbraced Chimneys  Heavy Cladding or Heavy Veneer  
 Parapets  Appendages  
 Other: \_\_\_\_\_

COMMENTS:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Additional sketches or comments on separate page

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE,  $S_{L1}$**

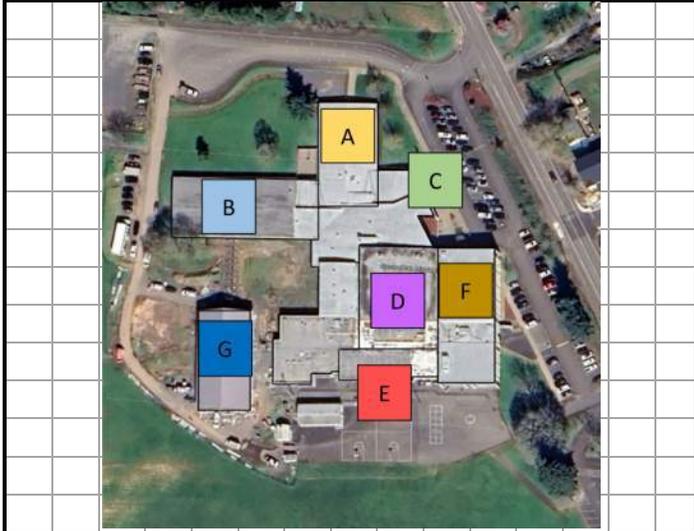
FEMA BUILDING TYPE	Do Not Know	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score		4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, $V_{L1}$		-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, $V_{L1}$		-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, $P_{L1}$		-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code		-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark		1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B		0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)		0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)		-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, $S_{MIN}$		1.6	1.2	0.8	0.5	0.5	0.9	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	1.4

**FINAL LEVEL 1 SCORE,  $S_{L1} \geq S_{MIN}$ :**

<p><b>EXTENT OF REVIEW</b></p> <p>Exterior: <input type="checkbox"/> Partial <input type="checkbox"/> All Sides <input type="checkbox"/> Aerial                  Interior: <input type="checkbox"/> None <input type="checkbox"/> Visible <input type="checkbox"/> Entered                  Drawings Reviewed: <input type="checkbox"/> Yes <input type="checkbox"/> No                  Soil Type Source: _____                  Geologic Hazards Source: _____                  Contact Person: _____</p> <p><b>LEVEL 2 SCREENING PERFORMED?</b></p> <p><input type="checkbox"/> Yes, Final Level 2 Score, <math>S_{L2}</math> _____ <input type="checkbox"/> No                  Nonstructural hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p><b>OTHER HAZARDS</b></p> <p>Are There Hazards That Trigger A Detailed Structural Evaluation?</p> <p><input type="checkbox"/> Pounding potential (unless <math>S_{L2} &gt;</math> cut-off, if known)  <input type="checkbox"/> Falling hazards from taller adjacent building  <input type="checkbox"/> Geologic hazards or Soil Type F  <input type="checkbox"/> Significant damage/deterioration to the structural system</p>	<p><b>ACTION REQUIRED</b></p> <p>Detailed Structural Evaluation Required?</p> <p><input type="checkbox"/> Yes, unknown FEMA building type or other building  <input type="checkbox"/> Yes, score less than cut-off  <input type="checkbox"/> Yes, other hazards present  <input type="checkbox"/> No</p> <p>Detailed Nonstructural Evaluation Recommended? (check one)</p> <p><input type="checkbox"/> Yes, nonstructural hazards identified that should be evaluated  <input type="checkbox"/> No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary  <input type="checkbox"/> No, no nonstructural hazards identified <input type="checkbox"/> DNK</p>
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Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend: MRF = Moment-resisting frame RC = Reinforced concrete URM INF = Unreinforced masonry infill MH = Manufactured Housing FD = Flexible diaphragm  
 BR = Braced frame SW = Shear wall TU = Tilt up LM = Light metal RD = Rigid diaphragm



SKETCH

Address: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Other Identifiers: \_\_\_\_\_  
 Building Name: \_\_\_\_\_  
 Use: \_\_\_\_\_  
 Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_  
 Ss: \_\_\_\_\_ S1: \_\_\_\_\_  
 Screener(s): \_\_\_\_\_ Date/Time: \_\_\_\_\_

No. Stories: Above Grade: \_\_\_\_\_ Below Grade: \_\_\_\_\_ Year Built: \_\_\_\_\_  EST  
 Total Floor Area (sq. ft.): \_\_\_\_\_ Code Year: \_\_\_\_\_  
 Additions:  None  Yes, Year(s) Built: \_\_\_\_\_

Occupancy: Assembly  Commercial  Emer. Services  Historic  Shelter  
 Industrial  Office  School  Government  
 Utility  Warehouse Residential, # Units: \_\_\_\_\_

Soil Type:  A  B  C  D  E  F  DNK  
 Hard Avg Dense Stiff Soft Poor DNK  
 Rock Rock Soil Soil Soil Soil If DNK, assume Type D.

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK  
 Adjacency:  Pounding  Falling Hazards from Taller Adjacent Building  
 Irregularities:  Vertical (type/severity) \_\_\_\_\_  
 Plan (type) \_\_\_\_\_

Exterior Falling Hazards:  Unbraced Chimneys  Heavy Cladding or Heavy Veneer  
 Parapets  Appendages  
 Other: \_\_\_\_\_

COMMENTS:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Additional sketches or comments on separate page

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE,  $S_{L1}$**

FEMA BUILDING TYPE	Do Not Know	W1	W1A	W2	S1 (MRF)	S2 (BR)	S3 (LM)	S4 (RC SW)	S5 (URM INF)	C1 (MRF)	C2 (SW)	C3 (URM INF)	PC1 (TU)	PC2	RM1 (FD)	RM2 (RD)	URM	MH
Basic Score		4.1	3.7	3.2	2.3	2.2	2.9	2.2	2.0	1.7	2.1	1.4	1.8	1.5	1.8	1.8	1.2	2.2
Severe Vertical Irregularity, $V_{L1}$		-1.3	-1.3	-1.3	-1.1	-1.0	-1.2	-1.0	-0.9	-1.0	-1.1	-0.8	-1.0	-0.9	-1.0	-1.0	-0.8	NA
Moderate Vertical Irregularity, $V_{L1}$		-0.8	-0.8	-0.8	-0.7	-0.6	-0.8	-0.6	-0.6	-0.6	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	NA
Plan Irregularity, $P_{L1}$		-1.3	-1.2	-1.1	-0.9	-0.8	-1.0	-0.8	-0.7	-0.7	-0.9	-0.6	-0.8	-0.7	-0.7	-0.7	-0.5	NA
Pre-Code		-0.8	-0.9	-0.9	-0.5	-0.5	-0.7	-0.6	-0.2	-0.4	-0.7	-0.1	-0.4	-0.3	-0.5	-0.5	-0.1	-0.3
Post-Benchmark		1.5	1.9	2.3	1.4	1.4	1.0	1.9	NA	1.9	2.1	NA	2.1	2.4	2.1	2.1	NA	1.2
Soil Type A or B		0.3	0.6	0.9	0.6	0.9	0.3	0.9	0.9	0.6	0.8	0.7	0.9	0.7	0.8	0.8	0.6	0.9
Soil Type E (1-3 stories)		0.0	-0.1	-0.3	-0.4	-0.5	0.0	-0.4	-0.5	-0.2	-0.2	-0.4	-0.5	-0.3	-0.4	-0.4	-0.3	-0.5
Soil Type E (> 3 stories)		-0.5	-0.8	-1.2	-0.7	-0.7	NA	-0.7	-0.6	-0.6	-0.8	-0.4	NA	-0.5	-0.6	-0.7	-0.3	NA
Minimum Score, $S_{MIN}$		1.6	1.2	0.8	0.5	0.5	0.9	0.5	0.5	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	1.4

**FINAL LEVEL 1 SCORE,  $S_{L1} \geq S_{MIN}$ :**

<p><b>EXTENT OF REVIEW</b></p> <p>Exterior: <input type="checkbox"/> Partial <input type="checkbox"/> All Sides <input type="checkbox"/> Aerial                  Interior: <input type="checkbox"/> None <input type="checkbox"/> Visible <input type="checkbox"/> Entered                  Drawings Reviewed: <input type="checkbox"/> Yes <input type="checkbox"/> No                  Soil Type Source: _____                  Geologic Hazards Source: _____                  Contact Person: _____</p> <p><b>LEVEL 2 SCREENING PERFORMED?</b></p> <p><input type="checkbox"/> Yes, Final Level 2 Score, <math>S_{L2}</math> _____ <input type="checkbox"/> No                  Nonstructural hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p><b>OTHER HAZARDS</b></p> <p>Are There Hazards That Trigger A Detailed Structural Evaluation?</p> <p><input type="checkbox"/> Pounding potential (unless <math>S_{L2} &gt;</math> cut-off, if known)  <input type="checkbox"/> Falling hazards from taller adjacent building  <input type="checkbox"/> Geologic hazards or Soil Type F  <input type="checkbox"/> Significant damage/deterioration to the structural system</p>	<p><b>ACTION REQUIRED</b></p> <p>Detailed Structural Evaluation Required?</p> <p><input type="checkbox"/> Yes, unknown FEMA building type or other building  <input type="checkbox"/> Yes, score less than cut-off  <input type="checkbox"/> Yes, other hazards present  <input type="checkbox"/> No</p> <p>Detailed Nonstructural Evaluation Recommended? (check one)</p> <p><input type="checkbox"/> Yes, nonstructural hazards identified that should be evaluated  <input type="checkbox"/> No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary  <input type="checkbox"/> No, no nonstructural hazards identified <input type="checkbox"/> DNK</p>
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Legend: MRF = Moment-resisting frame RC = Reinforced concrete URM INF = Unreinforced masonry infill MH = Manufactured Housing FD = Flexible diaphragm  
 BR = Braced frame SW = Shear wall TU = Tilt up LM = Light metal RD = Rigid diaphragm



Company: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_

Company: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_

Company: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_

Company: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_

Company: \_\_\_\_\_ Contact: \_\_\_\_\_

Address: \_\_\_\_\_

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