

Seismic Evaluation Report For:

GRIFFIN CREEK ELEMENTARY SCHOOL

2430 Griffin Creek Rd, Medford, OR 97501
Medford School District



Prepared By:
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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	Library/ Office/ Classroom	No	1970			Yes, 2018 to risk category III
B	Gymnasium	No	1982			
C	Cafeteria	Yes	1950	W2	Yes	No
D	Classrooms	Yes	1953	C2a	Yes	No
E	Classrooms	Yes	1982	W2	Yes	No
F	Classrooms	Yes	1970	RM1	Yes	No
G	Classrooms	No	2018			
H	Classrooms	No	1996			

*** Entries required **ONLY** for building parts included in proposed seismic retrofit. If building part was previously or is currently being retrofit, please list the building part's Risk Category and retrofit design Performance Objective, if known.

Nonstructural deficiencies posing life safety risk **MUST** be included in the scope of work and budget.

Seismic fragility inputs for existing buildings with **previous seismic retrofits MUST** be adjusted to reflect previous seismic retrofit measures completed for a building part.

Total Retrofit Cost	$ 2,499,660.00
Retrofit Square Feet	17,600
Retrofit Cost per Square Foot	**$ 142.03**

Is the campus within a tsunami, FEMA flood zone, landslide/slope instability, liquefaction potential or other high hazard area? **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.**	Yes per DOGAMI, ruled out per geotech report

Note: The hazard level of tsunami, flood zone, landslide/slope instability, and liquefaction must be explicitly answered either via DOGAMI website, DOGAMI consultation, and/or a geotechnical report. If the hazard level is unknown, it must be assumed to exist and be mitigated or otherwise resolved in the conceptual retrofit scope of work.

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1.0 Project Introduction

Griffin Creek Elementary School is located in Medford, Oregon in Jackson County. The District operates 21 schools located within the community including the property of interest, Griffin Creek ES SRG. The District has retained ZCS Engineering and Architecture (ZCS) to perform a seismic evaluation of Griffin Creek ES SRG 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 41-17".

SEISMIC EVALUATION SNAPSHOT	
Street Address	2430 Griffin Creek Rd., Medford, OR 97501
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	W2 C2a RM1
Cost Estimate	$2,499,660.00
Cost/Square Foot	$142.03

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.

Wood Frames, Commercial and Industrial W2

These buildings are commercial or industrial buildings with a floor area of 5,000 ft^2 or more. There are few, if any, interior walls. The floor and roof framing consists of wood or steel trusses, glulam or steel beams, and wood posts or steel columns. The foundation system may consist of a variety of elements. Seismic forces are resisted by wood diaphragms and exterior stud walls sheathed with plywood, oriented strand board, stucco, plaster, or straight or diagonal wood sheathing, or they may be braced with rod bracing. Wall openings for storefronts and garages, where present, are framed by a post-and-beam framing.

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.

Reinforced Masonry Bearing Walls with Flexible Diaphragms RM1

These buildings have bearing walls that consist of reinforced brick or concrete block masonry. The floor and roof framing consists of steel or wood beams and girders or open web joists and are supported by steel, wood, or masonry columns. Seismic forces are resisted by the reinforced brick or concrete block masonry shear walls. Diaphragms consist of straight or diagonal wood sheathing, plywood, or unstopped metal deck and are flexible relative to the walls. The foundation system may consist of a variety of elements.

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.

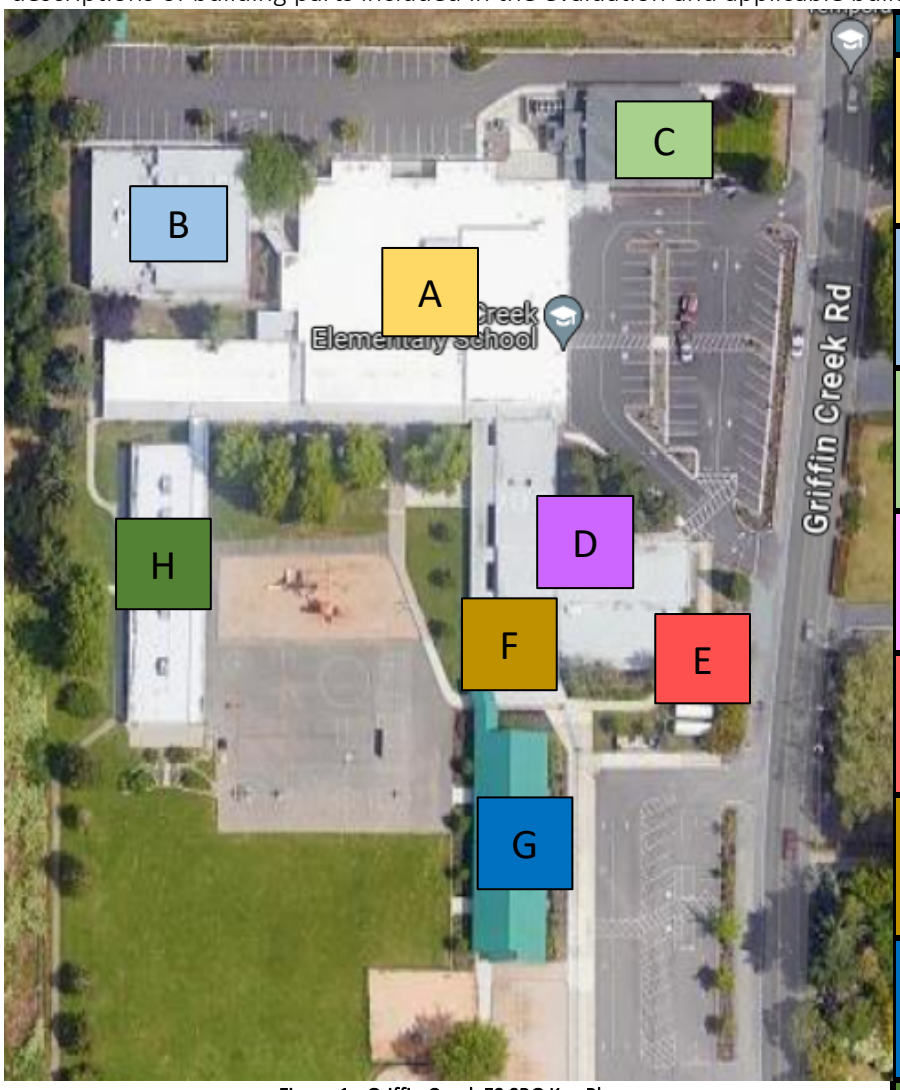


Figure 1 - Griffin Creek ES SRG Key Plan

BUILDING PARTS	
A	Construction Year: 1970 Building Name: Library/ Office/ Classroom ASCE 41-17 Building Type: In Scope?: No Previously Retrofitted: 2018
B	Construction Year: 1982 Building Name: Gymnasium ASCE 41-17 Building Type: In Scope?: No
C	Construction Year: 1950 Building Name: Cafeteria ASCE 41-17 Building Type: W2 In Scope?: Yes
D	Construction Year: 1953 Building Name: Classrooms ASCE 41-17 Building Type: C2a In Scope?: Yes
E	Construction Year: 1982 Building Name: Classrooms ASCE 41-17 Building Type: W2 In Scope?: Yes
F	Construction Year: 1970 Building Name: Classrooms ASCE 41-17 Building Type: RM1 In Scope?: Yes
G	Construction Year: 2018 Building Name: Classrooms ASCE 41-17 Building Type: In Scope?: No
H	Construction Year: 1996 Building Name: Classrooms ASCE 41-17 Building Type: In Scope?: No

Building Part C Construction:

- ASCE 41-17 Building Types:
  - W2
- Roof Structure:
  - Straight sheathed roof diaphragm supported by light timber purlins and glulam arch beams.
- Walls:
  - Dimensional studs with straight sheathing.
- Floor Structure and Foundation:
  - Slab-on-grade with strip footings.
- Notable Structural Features/Concerns:
  - Under designed glue-laminated arches when considering vertical seismic load cases.

Building Part D Construction:

- ASCE 41-17 Building Types:
  - C2a
- Roof Structure:
  - Acoustical roof deck supported by regularly spaced glulam beams.
- Walls:
  - Cast in place concrete walls.
- Floor Structure and Foundation:
  - Slab-on-grade with strip footings.

Building Part E Construction:

- ASCE 41-17 Building Types:
  - W2
- Roof Structure:
  - Unblocked plywood diaphragm supported by roof trusses.
- Walls:
  - Dimensional studs with plywood sheathing.
- Floor Structure and Foundation:
  - Slab-on-grade with strip footings.

Building Part F Construction:

- ASCE 41-17 Building Types:
  - RM1
- Roof Structure:
  - Straight sheathed roof diaphragm supported by glulam timber purlins.
- Walls:
  - Reinforced CMU walls.
- Floor Structure and Foundation:
  - Slab-on-grade with strip footings.

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 the sections C, D, E, and F of this building are categorized as a risk category IV structures 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.

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

[a] For Tier 1 and 2 assessments of Risk Categories I–III, Structural Performance for the BSE-1E is not explicitly evaluated.
[b] Compliance with ASCE 7 provisions for new construction is deemed to comply.
[c] 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.
[d] 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

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
BSE-2E:	
S_{xs}	0.639
S_{x1}	0.524
Soil Condition Amplification Factors (f_a, f_v)	fa = 1.447 | fv = 2.102
BSE-1E:	
S_{xs}	0.227
S_{x1}	0.175
Soil Condition Amplification Factors (F_a, F_v)	Fa = 1.6 | Fv = 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 we located an existing geotechnical report available for a project near the subject site to gather available information with respect to the severity of the hazard. The provided geotechnical report was generated for Medford School District. Per the geotechnical report, attached in Appendix D, liquefaction is considered a low risk for the site. It is our opinion that mitigation is not required to address the risk and is not included in the retrofit scheme.

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
	IO BASIC CHECKLIST		
LOAD PATH	The structure does not contain 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.	Provide a complete, well-defined load path by installing new elements and connections as needed to transfer inertial forces from all elements of the building to the foundation. a.) Provide new in-plane connections. b.) Provide new out-of-plane connections.	S1
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 all new gravity framing and lateral resisting elements as necessary to provide building separation. a.) Provide new wood beam with steel columns and footings. b.) Cut and demolish existing overhang framing to create isolation joint.	S2
	W2: IO CHECKLIST		
SHEAR STRESS CHECK	The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is higher than the following values: Structural panel sheathing 1,000 lb/ft Diagonal sheathing 700 lb/ft Straight sheathing 100 lb/ft All other conditions 100 lb/ft	Install new plywood sheathing over existing walls to ensure adequate shear capacity.	S3
HOLD-DOWN ANCHORS	Not all shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices.	Install new hold-down hardware.	S4

Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
ROOF CHORD CONTINUITY	Chord elements are discontinuous.	Install new drag elements at discontinuous chords. a.) Provide new strapping and blocking at roof step. b.) Provide new drag beam.	S5
STRAIGHT SHEATHING	Not all straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered.	Install new plywood diaphragm sheathing.	S6
SPANS	Not all wood diaphragms with spans greater than 12 ft consist of wood structural panels or diagonal sheathing.	Install new plywood diaphragm sheathing.	S7
WOOD SILL BOLTS	Sill bolts are not spaced at 4ft or less with acceptable edge and end distance provided for wood and concrete.	Provide new anchor bolts from wood sills to the foundation.	S8
	C2a: IO CHECKLIST		
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.	S9
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.	S10
OVERTURNING	Not all shear walls have aspect ratios less than 4-to-1. Wall piers need not be considered.	Infill existing openings with concrete shear wall.	S11
CONFINEMENT REINFORCING	For shear walls with aspect ratios greater than 2-to-1, the boundary elements are not confined with spirals or ties with spacing less than 8db.	Infill existing openings with concrete shear wall.	S12
WALL REINFORCING AT OPENINGS	There is not added trim reinforcement around all wall openings with a dimension greater than three times the thickness of the wall.	Infill existing openings with concrete shear wall.	S13

Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
CROSS TIES	There are not continuous cross ties between diaphragm chords.	Provide subdiaphragms in place of diaphragm cross ties	S14
OTHER DIAPHRAGMS	Diaphragms consist of a system other than wood, metal deck, concrete, or horizontal bracing.	Install new plywood diaphragm.	S15
	RM1: IO CHECKLIST		
WALL ANCHORAGE	Exterior concrete or masonry walls that are dependent on the diaphragm 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 do not 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.	S16
TRANSFER TO SHEAR WALLS	Diaphragms are not connected for transfer of seismic forces 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.	S17
REINFORCING AT WALL OPENINGS	Not all wall openings that interrupt rebar have trim reinforcing on all sides.	Infill existing openings with CMU shear wall.	S18
CROSS TIES	There are not continuous cross ties between diaphragm chords.	Provide subdiaphragms in place of diaphragm cross ties	S19
STRAIGHT SHEATHING	Not all straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered.	Install new plywood diaphragm sheathing.	S20
SPANS	Not all wood diaphragms with spans greater than 12 ft consist of wood structural panels or diagonal sheathing.	Install new plywood diaphragm sheathing.	S21
	VERTICAL SEISMIC COMPONENT DEFICIENCIES		
Timber Arches	The existing arches have been evaluated for gravity loading per section 7.2.2 of ASCE 41-17 equation 7-1 QG =1.1(QD+QL+QS). It has been determined the demands on the arches exceed 80% of the expected capacity. Therefore, vertical seismic effects per section 7.2.5.2 of ASCE 41-17 have been included in the evaluation. It has been determined, when vertical seismic effects are included in the load combination per equation 7-34, Qud = Qg + Qe the arches require strengthening..	Retrofit and strengthen glulam arches to support code required vertical seismic loading.	S22
	NONSTRUCTURAL CHECKLIST		
EMERGENCY LIGHTING	Emergency and egress lighting equipment is not anchored or braced.	Anchor and brace emergency and egress lighting equipment.	N1

Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
SHUTOFF VALVES	Piping containing hazardous material, including natural gas, does not have shut off valves or other devices to limit spills or leaks.	Install shut off valves for piping containing hazardous material, including natural gas.	N2
FLEXIBLE COUPLINGS	Hazardous material ductwork and piping, including natural gas piping, do not have flexible couplings.	Install flexible couplings for ductwork and piping containing hazardous material, including natural gas piping.	N3
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.	N4
INTEGRATED CEILINGS	Integrated suspended ceilings with continuous areas greater than 144 ft2 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.	N5
EDGE CLEARANCE	The free edges of integrated suspended ceilings with continuous areas greater than 144ft.2 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.	N6
EDGE SUPPORT	The free edges of integrated suspended ceilings with continuous areas greater than 144ft.2 are not supported by closure angles or channels not less than 2 in. wide.	Install free edge support for integrated suspended ceilings.	N7
INDEPENDENT SUPPORT	Light fixtures that weigh more per square foot than the ceiling they penetrate are not supported independent of the grid ceiling suspension system by a minimum of two wires at diagonally opposite corners of each fixture.	Provide independent support for light fixtures.	N8
CANOPIES	Canopies at building exits are not anchored to the structure at a spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 10 ft; for Life Safety in High Seismicity and for Position Retention in any seismicity, 6 ft.	Seismically anchor existing canopies. a.) Seismically anchor exisiting canopies to the structure. b.) Provide new steel column and footing to seismically support canopy.	N9

Tier 1 Deficiency Description	Deficiency Statement	Repair Statement	Plan Key Note
APPENDAGES	Cornices, parapets, signs, and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are not reinforced or anchored to the structural system at a spacing equal to or less than 6ft.	Provide anchorage of appendages to the structure.	N10
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.	N11
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.	N12
FLEXIBLE COUPLINGS	Fluid and gas piping does not have flexible couplings.	Install flexible couplings for fluid and gas piping.	N13
FLUID AND GAS PIPING	Fluid and gas piping is not anchored or braced to the structure to limit spills or leaks.	Anchor and brace fluid and gas piping to the structure.	N14
PIPING CROSSING SEISMIC JOINTS	Piping that crosses seismic joints or isolation planes or is connected to independent structures does not have couplings or other details to accommodate the relative seismic displacements.	Install couplings for piping that crosses seismic joints or isolation planes or is connected to independent structures.	N15

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	$	1,782,000.00
Engineering	$	290,200.00
Construction Management	$	61,300.00
Relocation	$	25,500.00
Construction Contingency	$	340,660.00
TOTALS AND SUMMARY		
Total Cost Estimate	**$**	**2,499,660.00**
Match Funds	**$**	**-**
Total Amount Requested from SRGP	**$**	**2,499,660.00**
Total Area		**17,600**
Cost/Square Foot	**$**	**142.03**

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.



Matthew R. Smith, PE, SE

Appendix A: Figures



Figure 1: Area C Exterior View



Figure 2: Area D Exterior View



Figure 3: Area D Exterior View at Canopy



Figure 4: Area C Interior



Figure 5: Area D Interior View



Figure 6: Area D & E from Exterior

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
Very Low Seismicity							
Building System—General							
C	**NC**	**N/A**	**U**	LOAD PATH: The structure contains a complete, well-defined load path, including structural elements and connections, that serves to transfer the inertial forces associated with the mass of all elements of the building to the foundation.	5.4.1.1	A.2.1.1	No in plane connections observed. No out of plane anchorages observed at building C
☐	☒	☐	☐				
C	**NC**	**N/A**	**U**	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building is greater than 0.5% of the height of the shorter building in low seismicity, 1.0% in moderate seismicity, and 3.0% in high seismicity.	5.4.1.2	A.2.1.2	Building areas C & D are adjacent to building area A.
☐	☒	☐	☐				
C	**NC**	**N/A**	**U**	MEZZANINES: Interior mezzanine levels are braced independently from the main structure or are anchored to the seismic-force-resisting elements of the main structure.	5.4.1.3	A.2.1.3	
☐	☐	☒	☐				
Building System—Building Configuration							
C	**NC**	**N/A**	**U**	WEAK STORY: The sum of the shear strengths of the seismic-force-resisting system in any story in each direction is not less than 80% of the strength in the adjacent story above.	5.4.2.1	A.2.2.2	
☐	☐	☒	☐				
C	**NC**	**N/A**	**U**	SOFT STORY: The stiffness of the seismic-force-resisting system in any story is not less than 70% of the seismic-force-resisting system stiffness in an adjacent story above or less than 80% of the average seismic-force-resisting system stiffness of the three stories above.	5.4.2.2	A.2.2.3	
☐	☐	☒	☐				
C	**NC**	**N/A**	**U**	VERTICAL IRREGULARITIES: All vertical elements in the seismic-force-resisting system are continuous to the foundation.	5.4.2.3	A.2.2.4	
☒	☐	☐	☐				

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

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
Low Seismicity (Complete the Following Items in Addition to the Items for Very Low Seismicity)							
Geologic Site Hazards							
C	**NC**	**N/A**	**U**	LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance do not exist in the foundation soils at depths within 50 ft (15.2 m) under the building.	5.4.3.1	A.6.1.1	Ruled out by geotech report.
☒	☐	☐	☐				
C	**NC**	**N/A**	**U**	SLOPE FAILURE: The building site is located away from potential earthquake-induced slope failures or rockfalls so that it is unaffected by such failures or is capable of accommodating any predicted movements without failure.	5.4.3.1	A.6.1.2	
☒	☐	☐	☐				
C	**NC**	**N/A**	**U**	SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site are not anticipated.	5.4.3.1	A.6.1.3	
☒	☐	☐	☐				

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Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
Moderate and High Seismicity (Complete the Following Items in Addition to the Items for Low Seismicity)							
Foundation Configuration							
C	**NC**	**N/A**	**U**	OVERTURNING: The ratio of the least horizontal dimension of the seismic-force-resisting system at the foundation level to the building height (base/height) is greater than $0.6S_a$.	5.4.3.3	A.6.2.1	
☒	☐	☐	☐				
C	**NC**	**N/A**	**U**	TIES BETWEEN FOUNDATION ELEMENTS: The foundation has ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Site Class A, B, or C.	5.4.3.4	A.6.2.2	
☒	☐	☐	☐				

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Project Name Griffin Creek SRG
Project Number M-0354-23

17.3IO Structural Checklist for Building Type W2: Wood Frames, Commercial and Industrial

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

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
Very Low Seismicity							
Seismic-Force-Resisting System							
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	5.5.1.1	A.3.2.1.1	
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	SHEAR STRESS CHECK: The shear stress in the shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the following values: Structural panel sheathing 1,000 lb/ft (14.6 kN/m) Diagonal sheathing 700 lb/ft (10.2 kN/m) Straight sheathing 100 lb/ft (1.5 kN/m) All other conditions 100 lb/ft (1.5 kN/m)	5.5.3.1.1	A.3.2.7.1	Area C (E) straighted sheathed walls are overstressed.
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	STUCCO (EXTERIOR PLASTER) SHEAR WALLS: Multi-story buildings do not rely on exterior stucco walls as the primary seismic-force-resisting system.	5.5.3.6.1	A.3.2.7.2	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	GYPSUM WALLBOARD OR PLASTER SHEAR WALLS: Interior plaster or gypsum wallboard is not used for shear walls on buildings more than one story high with the exception of the uppermost level of a multi-story building.	5.5.3.6.1	A.3.2.7.3	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 2-to-1 are not used to resist seismic forces.	5.5.3.6.1	A.3.2.7.4	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	WALLS CONNECTED THROUGH FLOORS: Shear walls have an interconnection between stories to transfer overturning and shear forces through the floor.	5.5.3.6.2	A.3.2.7.5	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	HILLSIDE SITE: For structures that are taller on at least one side by more than one-half story because of a sloping site, all shear walls on the downhill slope have an aspect ratio less than 1-to-2.	5.5.3.6.3	A.3.2.7.6	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	CRIPPLE WALLS: Cripple walls below first-floor-level shear walls are braced to the foundation with wood structural panels.	5.5.3.6.4	A.3.2.7.7	

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Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
C	NC	N/A	U	OPENINGS: Walls with openings greater than 80% of the length are braced with wood structural panel shear walls with aspect ratios of not more than 1.5-to-1 or are supported by adjacent construction through positive ties capable of transferring the seismic forces.	5.5.3.6.5	A.3.2.7.8	
C	NC	N/A	U	HOLD-DOWN ANCHORS: All shear walls have hold-down anchors attached to the end studs constructed in accordance with acceptable construction practices.	5.5.3.6.6	A.3.2.7.9	No hold-down anchors present.
Connections							
C	NC	N/A	U	WOOD POSTS: There is a positive connection of wood posts to the foundation.	5.7.3.3	A.5.3.3	
C	NC	N/A	U	WOOD SILLS: All wood sills are bolted to the foundation.	5.7.3.3	A.5.3.4	
C	NC	N/A	U	GIRDER–COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support.	5.7.4.1	A.5.4.1	
Foundation System							
C	NC	N/A	U	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil.		A.6.2.3	
C	NC	N/A	U	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	
Low, Moderate, and High Seismicity (Complete the Following Items in Addition to the Items for Very Low Seismicity)							
Seismic-Force-Resisting System							
C	NC	N/A	U	NARROW WOOD SHEAR WALLS: Narrow wood shear walls with an aspect ratio greater than 1.5-to-1 are not used to resist seismic forces.	5.5.3.6.1	A.3.2.7.4	
Diaphragms							
C	NC	N/A	U	DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints.	5.6.1.1	A.4.1.1	

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C	NC	N/A	U				
☐	☒	☐	☐	ROOF CHORD CONTINUITY: All chord elements are continuous, regardless of changes in roof elevation.	5.6.1.1	A.4.1.3	Roof chords are not continuous at roof steps.
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension.	5.6.1.5	A.4.1.8	
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	STRAIGHT SHEATHING: All straight-sheathed diaphragms have aspect ratios less than 1-to-1 in the direction being considered.	5.6.2	A.4.2.1	Area 'C' has straight sheathed diaphragm with aspect ratios greater than 1:1.
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	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	Area 'C' has straight sheathed wood diaphragm with non compliant spans.
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	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 have aspect ratios less than or equal to 3-to-1.	5.6.2	A.4.2.3	
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	OTHER DIAPHRAGMS: The diaphragms do not consist of a system other than wood, metal deck, concrete, or horizontal bracing.	5.6.5	A.4.7.1	
Connections							
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	WOOD SILL BOLTS: Sill bolts are spaced at 4 ft or less with acceptable edge and end distance provided for wood and concrete.	5.7.3.3	A.5.3.7	Anchor bolts do not have adequate edge distance.

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

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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
Very Low Seismicity							
Seismic-Force-Resisting System							
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	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	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	5.5.1.1	A.3.2.1.1	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than the greater of 100 lb/in.^{2} (0.69 MPa) or $2\sqrt{f'_c}$.	5.5.3.1.1	A.3.2.2.1	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	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	
Connections							
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	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 wall anchorage observed.
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	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 connections observed.

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Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
C	NC	N/A	U	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	
☒	☐	☐	☐				
Foundation System							
C	NC	N/A	U	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil.		A.6.2.3	
☐	☐	☒	☐				
C	NC	N/A	U	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	
☐	☐	☒	☐				
Low, Moderate, and High Seismicity (Complete the Following Items in Addition to the Items for Very Low Seismicity)							
Seismic-Force-Resisting System							
C	NC	N/A	U	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	
☐	☐	☒	☐				
C	NC	N/A	U	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	
☐	☐	☒	☐				
C	NC	N/A	U	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	
☐	☐	☒	☐				
C	NC	N/A	U	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	1953 construction has N-S wall piers with aspect ratios > 4:1.
☐	☒	☐	☐				

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C	NC	N/A	U				
☐	☒	☐	☐	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	No confinement reinforcing in record drawings.
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	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	No trim reinforcement in record drawings.
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	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	
Diaphragms (Stiff or Flexible)							
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	DIAPHRAGM CONTINUITY: The diaphragms are not composed of split-level floors and do not have expansion joints.	5.6.1.1	A.4.1.1	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension.	5.6.1.5	A.4.1.8	
Flexible Diaphragms							
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	CROSS TIES: There are continuous cross ties between diaphragm chords.	5.6.1.2	A.4.1.2	No cross ties observed.
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	

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C	NC	N/A	U				
☐	☐	☒	☐	DIAGONALLY SHEATHED AND UNBLOCKED DIAPHRAGMS: All diagonally sheathed or unblocked wood structural panel diaphragms have horizontal spans less than 30 ft (9.2 m) and aspect ratios less than or equal to 3-to-1.	5.6.2	A.4.2.3	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	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	(E) roof structure consists of acoustical panels.
Connections							
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	

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17.17IO Structural Checklist for Building Types RM1: Reinforced Masonry Bearing Walls with Flexible Diaphragms and RM2: Reinforced Masonry Bearing Walls with Stiff Diaphragms

Table 17-35. Immediate Occupancy Structural Checklist for Building Types RM1 and RM2

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
Very Low Seismicity							
Seismic-Force-Resisting System							
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	REDUNDANCY: The number of lines of shear walls in each principal direction is greater than or equal to 2.	5.5.1.1	A.3.2.1.1	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	SHEAR STRESS CHECK: The shear stress in the reinforced masonry shear walls, calculated using the Quick Check procedure of Section 4.4.3.3, is less than 70 lb/in.^{2} (4.83 MPa).	5.5.3.1.1	A.3.2.4.1	
C ☒	**NC** ☐	**N/A** ☐	**U** ☐	REINFORCING STEEL: The total vertical and horizontal reinforcing steel ratio in reinforced masonry walls is greater than 0.002 of the wall with the minimum of 0.0007 in either of the two directions; the spacing of reinforcing steel is less than 48 in., and all vertical bars extend to the top of the walls.	5.5.3.1.3	A.3.2.4.2	
Connections							
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	WALL ANCHORAGE: Exterior concrete or masonry walls that are dependent on the diaphragm for lateral support are anchored for out-of-plane forces at each diaphragm level with steel anchors, reinforcing dowels, or straps that are developed into the diaphragm. Connections have 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 wall anchorage observed.
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	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	
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	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	No In-plane connections observed.

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

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C	NC	N/A	U			
☒	☐	☐	☐	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
C	NC	N/A	U			
☐	☐	☒	☐	GIRDER–COLUMN CONNECTION: There is a positive connection using plates, connection hardware, or straps between the girder and the column support.	5.7.4.1	A.5.4.1
Stiff Diaphragms						
C	NC	N/A	U			
☐	☐	☒	☐	TOPPING SLAB: Precast concrete diaphragm elements are interconnected by a continuous reinforced concrete topping slab.	5.6.4	A.4.5.1
C	NC	N/A	U			
☐	☐	☒	☐	TOPPING SLAB TO WALLS OR FRAMES: Reinforced concrete topping slabs that interconnect the precast concrete diaphragm elements are doweled for transfer of forces into the shear wall or frame elements.	5.7.2	A.5.2.3
Foundation System						
C	NC	N/A	U			
☐	☐	☒	☐	DEEP FOUNDATIONS: Piles and piers are capable of transferring the lateral forces between the structure and the soil.		A.6.2.3
C	NC	N/A	U			
☒	☐	☐	☐	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

Status				Evaluation Statement	Tier 2 Reference	Commentary Reference	Comments
Low, Moderate, and High Seismicity (Complete the Following Items in Addition to the Items for Very Low Seismicity)							
Seismic-Force-Resisting System							
C	NC	N/A	U				
☐	☒	☐	☐	REINFORCING AT WALL OPENINGS: All wall openings that interrupt rebar have trim reinforcing on all sides.	5.5.3.1.5	A.3.2.4.3	Trim reinforcement not present
C	NC	N/A	U				
☒	☐	☐	☐	PROPORTIONS: The height-to-thickness ratio of the shear walls at each story is less than 30.	5.5.3.1.2	A.3.2.4.4	
Diaphragms (Stiff or Flexible)							
C	NC	N/A	U				
☒	☐	☐	☐	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	

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C	NC	N/A	U				
☒	☐	☐	☐	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	
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	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	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	DIAPHRAGM REINFORCEMENT AT OPENINGS: There is reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension.	5.6.1.5	A.4.1.8	
Flexible Diaphragms							
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	CROSS TIES: There are continuous cross ties between diaphragm chords.	5.6.1.2	A.4.1.2	No cross ties present.
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	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	Diaphragm aspect ratio greater than 1:1.
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	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	Diaphragm is straight sheathed.
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	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	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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	
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	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	
Connections							
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	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. before engagement of the anchors.	5.7.1.2	A.5.1.4	

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Project Name _____
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17.19 Nonstructural Checklist

Table 17-38. Nonstructural Checklist

Status				Evaluation Statement[a,b]	Tier 2 Reference	Commentary Reference	Comments
Life Safety Systems							
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—not required; LS—LMH; PR—LMH**. FIRE SUPPRESSION PIPING: Fire suppression piping is anchored and braced in accordance with NFPA-13.	13.7.4	A.7.13.1	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—not required; LS—LMH; PR—LMH**. FLEXIBLE COUPLINGS: Fire suppression piping has flexible couplings in accordance with NFPA-13.	13.7.4	A.7.13.2	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—not required; LS—LMH; PR—LMH**. EMERGENCY POWER: Equipment used to power or control Life Safety systems is anchored or braced.	13.7.7	A.7.12.1	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—not required; LS—LMH; PR—LMH**. STAIR AND SMOKE DUCTS: Stair pressurization and smoke control ducts are braced and have flexible connections at seismic joints.	13.7.6	A.7.14.1	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—not required; LS—MH; PR—MH**. SPRINKLER CEILING CLEARANCE: Penetrations through panelized ceilings for fire suppression devices provide clearances in accordance with NFPA-13.	13.7.4	A.7.13.3	
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	**HR—not required; LS—not required; PR—LMH.** EMERGENCY LIGHTING: Emergency and egress lighting equipment is anchored or braced.	13.7.9	A.7.3.1	No bracing observed.
Hazardous Materials							
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—LMH; LS—LMH; PR—LMH**. HAZARDOUS MATERIAL EQUIPMENT: Equipment mounted on vibration isolators and containing hazardous material is equipped with restraints or snubbers.	13.7.1	A.7.12.2	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—LMH; LS—LMH; PR—LMH**. HAZARDOUS MATERIAL STORAGE: Breakable containers that hold hazardous material, including gas cylinders, are restrained by latched doors, shelf lips, wires, or other methods.	13.8.3	A.7.15.1	
C ☐	**NC** ☐	**N/A** ☒	**U** ☐	**HR—MH; LS—MH; PR—MH**. HAZARDOUS MATERIAL DISTRIBUTION: Piping or ductwork conveying hazardous materials is braced or otherwise protected from damage that would allow hazardous material release.	13.7.3 13.7.5	A.7.13.4	
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	**HR—MH; LS—MH; PR—MH**. SHUTOFF VALVES: Piping containing hazardous material, including natural gas, has shutoff valves or other devices to limit spills or leaks.	13.7.3 13.7.5	A.7.13.3	No shutoff valves present.
C ☐	**NC** ☒	**N/A** ☐	**U** ☐	**HR—LMH; LS—LMH; PR—LMH**. FLEXIBLE COUPLINGS: Hazardous material ductwork and piping, including natural gas piping, have flexible couplings.	13.7.3 13.7.5	A.7.15.4	No flexible couplings observed.

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C	NC	N/A	U				
☐	☐	☒	☐	**HR—MH; LS—MH; PR—MH**. PIPING OR DUCTS CROSSING SEISMIC JOINTS: Piping or ductwork carrying hazardous material that either crosses seismic joints or isolation planes or is connected to independent structures has couplings or other details to accommodate the relative seismic displacements.	13.7.3 13.7.5 13.7.6	A.7.13.6	
Partitions							
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—LMH; LS—LMH; PR—LMH**. UNREINFORCED MASONRY: Unreinforced masonry or hollow-clay tile partitions are braced at a spacing of at most 10 ft (3.0 m) in Low or Moderate Seismicity, or at most 6 ft (1.8 m) in High Seismicity.	13.6.2	A.7.1.1	
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—LMH; LS—LMH; PR—LMH**. HEAVY PARTITIONS SUPPORTED BY CEILINGS: The tops of masonry or hollow-clay tile partitions are not laterally supported by an integrated ceiling system.	13.6.2	A.7.2.1	Area F has partial height CMU walls supported by ceiling.
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—MH; PR—MH**. DRIFT: Rigid cementitious partitions are detailed to accommodate the following drift ratios: in steel moment frame, concrete moment frame, and wood frame buildings, 0.02; in other buildings, 0.005.	13.6.2	A.7.1.2	
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	**HR—not required; LS—not required; PR—MH**. LIGHT PARTITIONS SUPPORTED BY CEILINGS: The tops of gypsum board partitions are not laterally supported by an integrated ceiling system.	13.6.2	A.7.2.1	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—MH**. STRUCTURAL SEPARATIONS: Partitions that cross structural separations have seismic or control joints.	13.6.2	A.7.1.3	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—MH**. TOPS: The tops of ceiling-high framed or panelized partitions have lateral bracing to the structure at a spacing equal to or less than 6 ft (1.8 m).	13.6.2	A.7.1.4	
Ceilings							
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—H; LS—MH; PR—LMH**. SUSPENDED LATH AND PLASTER: Suspended lath and plaster ceilings have attachments that resist seismic forces for every 12 ft^2 (1.1 m^2) of area.	13.6.4	A.7.2.3	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—MH; PR—LMH**. SUSPENDED GYPSUM BOARD: Suspended gypsum board ceilings have attachments that resist seismic forces for every 12 ft^2 (1.1 m^2) of area.	13.6.4	A.7.2.3	

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C	NC	N/A	U				
☐	☒	☐	☐	**HR—not required; LS—not required; PR—MH**. INTEGRATED CEILINGS: Integrated suspended ceilings with continuous areas greater than 144 ft^2 (13.4 m^2) and ceilings of smaller areas that are not surrounded by restraining partitions are laterally restrained at a spacing no greater than 12 ft (3.6 m) with members attached to the structure above. Each restraint location has a minimum of four diagonal wires and compression struts, or diagonal members capable of resisting compression.	13.6.4	A.7.2.2	No splay wire or compression struts observed.
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—not required; LS—not required; PR—MH**. EDGE CLEARANCE: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft^2 (13.4 m^2) have clearances from the enclosing wall or partition of at least the following: in Moderate Seismicity, 1/2 in. (13 mm); in High Seismicity, 3/4 in. (19 mm).	13.6.4	A.7.2.4	No edge clearance observed.
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	**HR—not required; LS—not required; PR—MH**. CONTINUITY ACROSS STRUCTURE JOINTS: The ceiling system does not cross any seismic joint and is not attached to multiple independent structures.	13.6.4	A.7.2.5	
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—not required; LS—not required; PR—H**. EDGE SUPPORT: The free edges of integrated suspended ceilings with continuous areas greater than 144 ft^2 (13.4 m^2) are supported by closure angles or channels not less than 2 in. (51 mm) wide.	13.6.4	A.7.2.6	Edge support not adequate.
C	**NC**	**N/A**	**U**				
☒	☐	☐	☐	**HR—not required; LS—not required; PR—H**. SEISMIC JOINTS: Acoustical tile or lay-in panel ceilings have seismic separation joints such that each continuous portion of the ceiling is no more than 2,500 ft^2 (232.3 m^2) and has a ratio of long-to-short dimension no more than 4-to-1.	13.6.4	A.7.2.7	
Light Fixtures							
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—not required; LS—MH; PR—MH**. INDEPENDENT SUPPORT: Light fixtures that weigh more per square foot than the ceiling they penetrate are supported independent of the grid ceiling suspension system by a minimum of two wires at diagonally opposite corners of each fixture.	13.6.4 13.7.9	A.7.3.2	Light fixtures not independently supported.

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C	NC	N/A	U			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. PENDANT SUPPORTS: Light fixtures on pendant supports are attached at a spacing equal to or less than 6 ft. Unbraced suspended fixtures are free to allow a 360-degree range of motion at an angle not less than 45 degrees from horizontal without contacting adjacent components. Alternatively, if rigidly supported and/or braced, they are free to move with the structure to which they are attached without damaging adjoining components. Additionally, the connection to the structure is capable of accommodating the movement without failure.	13.7.9	A.7.3.3
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. LENS COVERS: Lens covers on light fixtures are attached with safety devices.	13.7.9	A.7.3.4
Cladding and Glazing						
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—MH; LS—MH; PR—MH**. CLADDING ANCHORS: Cladding components weighing more than 10 lb/ft^2 (0.48 kN/m^2) are mechanically anchored to the structure at a spacing equal to or less than the following: for Life Safety in Moderate Seismicity, 6 ft (1.8 m); for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 ft (1.2 m)	13.6.1	A.7.4.1
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—MH; PR—MH**. CLADDING ISOLATION: For steel or concrete moment-frame buildings, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less.	13.6.1	A.7.4.3
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—MH; LS—MH; PR—MH**. MULTI-STORY PANELS: For multi-story panels attached at more than one floor level, panel connections are detailed to accommodate a story drift ratio by the use of rods attached to framing with oversize holes or slotted holes of at least the following: for Life Safety in Moderate Seismicity, 0.01; for Life Safety in High Seismicity and for Position Retention in any seismicity, 0.02, and the rods have a length-to-diameter ratio of 4.0 or less.	13.6.1	A.7.4.4

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C	NC	N/A	U			
☐	☐	☒	☐	**HR—not required; LS—MH; PR—MH**. THREADED RODS: Threaded rods for panel connections detailed to accommodate drift by bending of the rod have a length-to-diameter ratio greater than 0.06 times the story height in inches for Life Safety in Moderate Seismicity and 0.12 times the story height in inches for Life Safety in High Seismicity and Position Retention in any seismicity.	13.6.1	A.7.4.9
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—MH; LS—MH; PR—MH**. PANEL CONNECTIONS: Cladding panels are anchored out of plane with a minimum number of connections for each wall panel, as follows: for Life Safety in Moderate Seismicity, 2 connections; for Life Safety in High Seismicity and for Position Retention in any seismicity, 4 connections.	13.6.1.4	A.7.4.5
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—MH; LS—MH; PR—MH**. BEARING CONNECTIONS: Where bearing connections are used, there is a minimum of two bearing connections for each cladding panel.	13.6.1.4	A.7.4.6
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—MH; LS—MH; PR—MH**. INSERTS: Where concrete cladding components use inserts, the inserts have positive anchorage or are anchored to reinforcing steel.	13.6.1.4	A.7.4.7
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—MH; PR—MH**. OVERHEAD GLAZING: Glazing panes of any size in curtain walls and individual interior or exterior panes more than 16 ft^2 (1.5 m^2) in area are laminated annealed or laminated heat-strengthened glass and are detailed to remain in the frame when cracked.	13.6.1.5	A.7.4.8
Masonry Veneer						
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—LMH; PR—LMH**. TIES: Masonry veneer is connected to the backup with corrosion-resistant ties. There is a minimum of one tie for every 2-2/3 ft^2 (0.25 m^2), and the ties have spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 36 in. (914 mm); for Life Safety in High Seismicity and for Position Retention in any seismicity, 24 in. (610 mm).	13.6.1.2	A.7.5.1
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—LMH; PR—LMH**. SHELF ANGLES: Masonry veneer is supported by shelf angles or other elements at each floor above the ground floor.	13.6.1.2	A.7.5.2
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—LMH; PR—LMH**. WEAKENED PLANES: Masonry veneer is anchored to the backup adjacent to weakened planes, such as at the locations of flashing.	13.6.1.2	A.7.5.3

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C	NC	N/A	U				
☐	☐	☒	☐	**HR—LMH; LS—LMH; PR—LMH**. UNREINFORCED MASONRY BACKUP: There is no unreinforced masonry backup.	13.6.1.1 13.6.1.2	A.7.7.2	
C	**NC**	**N/A**	**U**	**HR—not required; LS—MH; PR—MH**. STUD TRACKS: For veneer with cold-formed steel stud backup, stud tracks are fastened to the structure at a spacing equal to or less than 24 in. (610 mm) on center.	13.6.1.1 13.6.1.2	A.7.6.1	
☐	☐	☒	☐				
C	**NC**	**N/A**	**U**	**HR—not required; LS—MH; PR—MH**. ANCHORAGE: For veneer with concrete block or masonry backup, the backup is positively anchored to the structure at a horizontal spacing equal to or less than 4 ft along the floors and roof.	13.6.1.1 13.6.1.2	A.7.7.1	
☐	☐	☒	☐				
C	**NC**	**N/A**	**U**	**HR—not required; LS—not required; PR—MH**. WEEP HOLES: In veneer anchored to stud walls, the veneer has functioning weep holes and base flashing.	13.6.1.2	A.7.5.6	
☐	☐	☐	☒				
C	**NC**	**N/A**	**U**	**HR—not required; LS—not required; PR—MH**. OPENINGS: For veneer with cold-formed-steel stud backup, steel studs frame window and door openings.	13.6.1.1 13.6.1.2	A.7.6.2	
☐	☐	☒	☐				
Parapets, Cornices, Ornamentation, and Appendages							
C	**NC**	**N/A**	**U**	**HR—LMH; LS—LMH; PR—LMH**. URM PARAPETS OR CORNICES: Laterally unsupported unreinforced masonry parapets or cornices have height-to-thickness ratios no greater than the following: for Life Safety in Low or Moderate Seismicity, 2.5; for Life Safety in High Seismicity and for Position Retention in any seismicity, 1.5.	13.6.5	A.7.8.1	
☐	☐	☒	☐				
C	**NC**	**N/A**	**U**	**HR—not required; LS—LMH; PR—LMH**. CANOPIES: Canopies at building exits are anchored to the structure at a spacing no greater than the following: for Life Safety in Low or Moderate Seismicity, 10 ft (3.0 m); for Life Safety in High Seismicity and for Position Retention in any seismicity, 6 ft (1.8 m).	13.6.6	A.7.8.2	Canopies not anchored or separately braced.
☐	☒	☐	☐				
C	**NC**	**N/A**	**U**	**HR—H; LS—MH; PR—LMH**. CONCRETE PARAPETS: Concrete parapets with height-to-thickness ratios greater than 2.5 have vertical reinforcement.	13.6.5	A.7.8.3	
☐	☐	☒	☐				
C	**NC**	**N/A**	**U**	**HR—MH; LS—MH; PR—LMH**. APPENDAGES: Cornices, parapets, signs, and other ornamentation or appendages that extend above the highest point of anchorage to the structure or cantilever from components are reinforced and anchored to the structural system at a spacing equal to or less than 6 ft (1.8 m). This evaluation statement item does not apply to parapets or cornices covered by other evaluation statements.	13.6.6	A.7.8.4	Parapet not braced.
☐	☒	☐	☐				

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Project Name _____
Project Number _____

C	NC	N/A	U				
Masonry Chimneys							
☐	☐	☐	☒	**HR—LMH; LS—LMH; PR—LMH**. URM CHIMNEYS: Unreinforced masonry chimneys extend above the roof surface no more than the following: for Life Safety in Low or Moderate Seismicity, 3 times the least dimension of the chimney; for Life Safety in High Seismicity and for Position Retention in any seismicity, 2 times the least dimension of the chimney.	13.6.7	A.7.9.1	
☐	☐	☒	☐	**HR—LMH; LS—LMH; PR—LMH**. ANCHORAGE: Masonry chimneys are anchored at each floor level, at the topmost ceiling level, and at the roof.	13.6.7	A.7.9.2	
Stairs							
☐	☐	☒	☐	**HR—not required; LS—LMH; PR—LMH**. STAIR ENCLOSURES: Hollow-clay tile or unreinforced masonry walls around stair enclosures are restrained out of plane and have height-to-thickness ratios not greater than the following: for Life Safety in Low or Moderate Seismicity, 15-to-1; for Life Safety in High Seismicity and for Position Retention in any seismicity, 12-to-1.	13.6.2 13.6.8	A.7.10.1	
☐	☐	☒	☐	**HR—not required; LS—LMH; PR—LMH**. STAIR DETAILS: The connection between the stairs and the structure does not rely on post-installed anchors in concrete or masonry, and the stair details are capable of accommodating the drift calculated using the Quick Check procedure of Section 4.4.3.1 for moment-frame structures or 0.5 in. for all other structures without including any lateral stiffness contribution from the stairs.	13.6.8	A.7.10.2	
Contents and Furnishings							
☐	☐	☐	☒	**HR—LMH; LS—MH; PR—MH**. INDUSTRIAL STORAGE RACKS: Industrial storage racks or pallet racks more than 12 ft high meet the requirements of ANSI/RMI MH 16.1 as modified by ASCE 7, Chapter 15.	13.8.1	A.7.11.1	
☐	☒	☐	☐	**HR—not required; LS—H; PR—MH**. 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	Cabinets not anchored.
☐	☒	☐	☐	**HR—not required; LS—H; PR—H**. 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	Contents not braced.

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C	NC	N/A	U			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—MH**. ACCESS FLOORS: Access floors more than 9 in. (229 mm) high are braced.	13.6.10	A.7.11.4
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—MH**. 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.	13.7.7 13.6.10	A.7.11.5
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. 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.	13.8.2	A.7.11.6
Mechanical and Electrical Equipment						
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—H; PR—H**. FALL-PRONE 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.	13.7.1 13.7.7	A.7.12.4
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—H; PR—H**. IN-LINE 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.	13.7.1	A.7.12.5
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—H; PR—MH**. TALL NARROW 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.	13.7.1 13.7.7	A.7.12.6
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—MH**. MECHANICAL DOORS: Mechanically operated doors are detailed to operate at a story drift ratio of 0.01.	13.6.9	A.7.12.7
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. 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.	13.7.1 13.7.7	A.7.12.8
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. VIBRATION ISOLATORS: Equipment mounted on vibration isolators is equipped with horizontal restraints or snubbers and with vertical restraints to resist overturning.	13.7.1	A.7.12.9
C	**NC**	**N/A**	**U**			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. HEAVY EQUIPMENT: Floor-supported or platform-supported equipment weighing more than 400 lb (181.4 kg) is anchored to the structure.	13.7.1 13.7.7	A.7.12.10

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C	NC	N/A	U				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. ELECTRICAL EQUIPMENT: Electrical equipment is laterally braced to the structure.	13.7.7	A.7.12.11	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. 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.	13.7.8	A.7.12.12	
Piping							
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—not required; LS—not required; PR—H**. FLEXIBLE COUPLINGS: Fluid and gas piping has flexible couplings.	13.7.3 13.7.5	A.7.13.2	No flexible couplings observed.
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—not required; LS—not required; PR—H**. FLUID AND GAS PIPING: Fluid and gas piping is anchored and braced to the structure to limit spills or leaks.	13.7.3 13.7.5	A.7.13.4	Anchorage not observed.
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. C-CLAMPS: One-sided C-clamps that support piping larger than 2.5 in. (64 mm) in diameter are restrained.	13.7.3 13.7.5	A.7.13.5	
C	**NC**	**N/A**	**U**				
☐	☒	☐	☐	**HR—not required; LS—not required; PR—H**. 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 13.7.5	A.7.13.6	No couplings observed.
Ducts							
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. DUCT BRACING: Rectangular ductwork larger than 6 ft^2 (0.56 m^2) 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	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. DUCT SUPPORT: Ducts are not supported by piping or electrical conduit.	13.7.6	A.7.14.3	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. 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	
Elevators							
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—H; PR—H**. RETAINER GUARDS: Sheaves and drums have cable retainer guards.	13.7.11	A.7.16.1	
C	**NC**	**N/A**	**U**				
☐	☐	☒	☐	**HR—not required; LS—H; PR—H**. RETAINER PLATE: A retainer plate is present at the top and bottom of both car and counterweight.	13.7.11	A.7.16.2	

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

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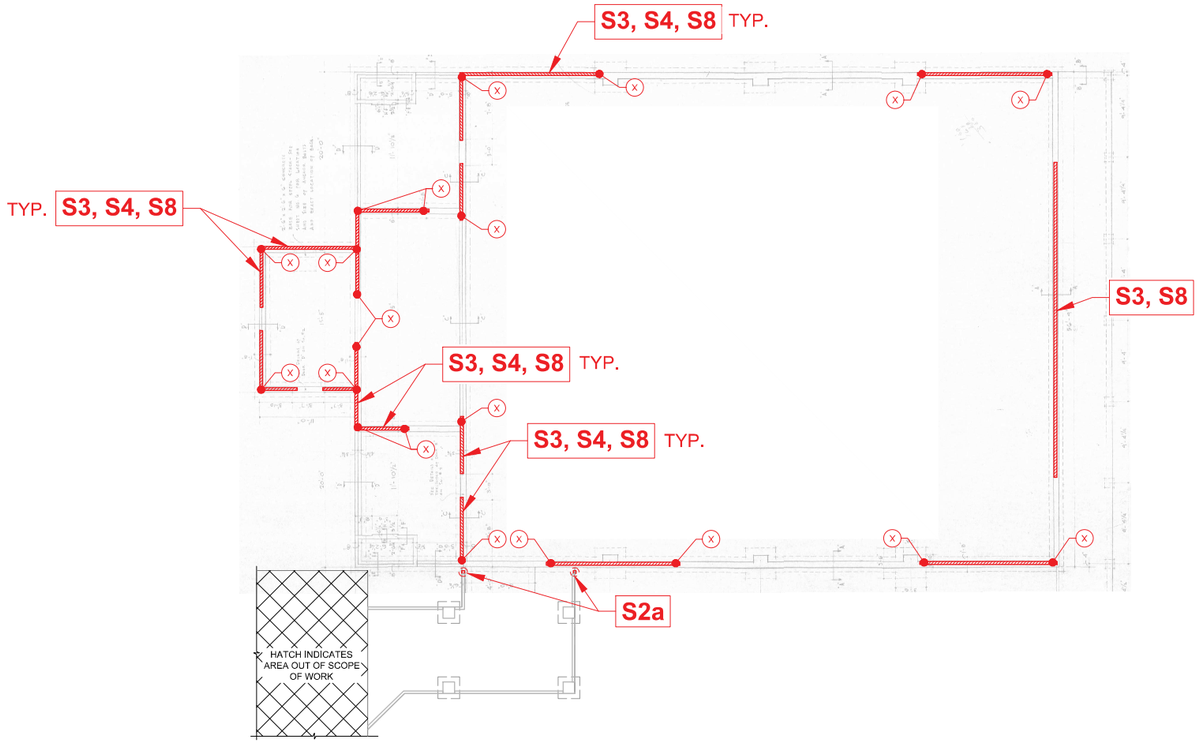
C	NC	N/A	U			
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. ELEVATOR EQUIPMENT: Equipment, piping, and other components that are part of the elevator system are anchored.	13.7.11	A.7.16.3
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. SEISMIC SWITCH: Elevators capable of operating at speeds 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.	13.7.11	A.7.16.4
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. SHAFT WALLS: Elevator shaft walls are anchored and reinforced to prevent toppling into the shaft during strong shaking.	13.7.11	A.7.16.5
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. COUNTERWEIGHT RAILS: All counterweight rails and divider beams are sized in accordance with ASME A17.1.	13.7.11	A.7.16.6
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. BRACKETS: The brackets that tie the car rails and the counterweight rail to the structure are sized in accordance with ASME A17.1.	13.7.11	A.7.16.7
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. SPREADER BRACKET: Spreader brackets are not used to resist seismic forces.	13.7.11	A.7.16.8
☐	☐	☒	☐	**HR—not required; LS—not required; PR—H**. GO-SLOW ELEVATORS: The building has a go-slow elevator system.	13.7.11	A.7.16.9

[a] Performance Level: HR = Hazards Reduced, LS = Life Safety, and PR = Position Retention.

[b] Level of Seismicity: L = Low, M = Moderate, and H = High.

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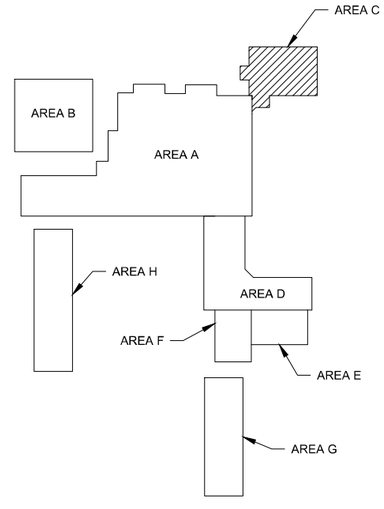
Appendix C: Preliminary Seismic Retrofit Drawings



1 S1.1 **AREA C FOUNDATION PLAN**

1/8"=1'-0"

ONE INCH EQUALS FULL SCALE



0 S1.1 **CAMPUS KEY**

NTS

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45 Hawthorne Street, Suite 5, Medford, Oregon 97504 | 541-500-8588

MEDFORD SCHOOL DISTRICT
900 KENYON STREET
MEDFORD, OR 97501

GRIFFIN CREEK ELEMENTARY SCHOOL SEISMIC RETROFIT

Medford SCHOOL DISTRICT

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON 08, 2014 MATTHEW R. SMITH EXPIRES: 06-30-24

PRELIMINARY NOT FOR CONSTRUCTION

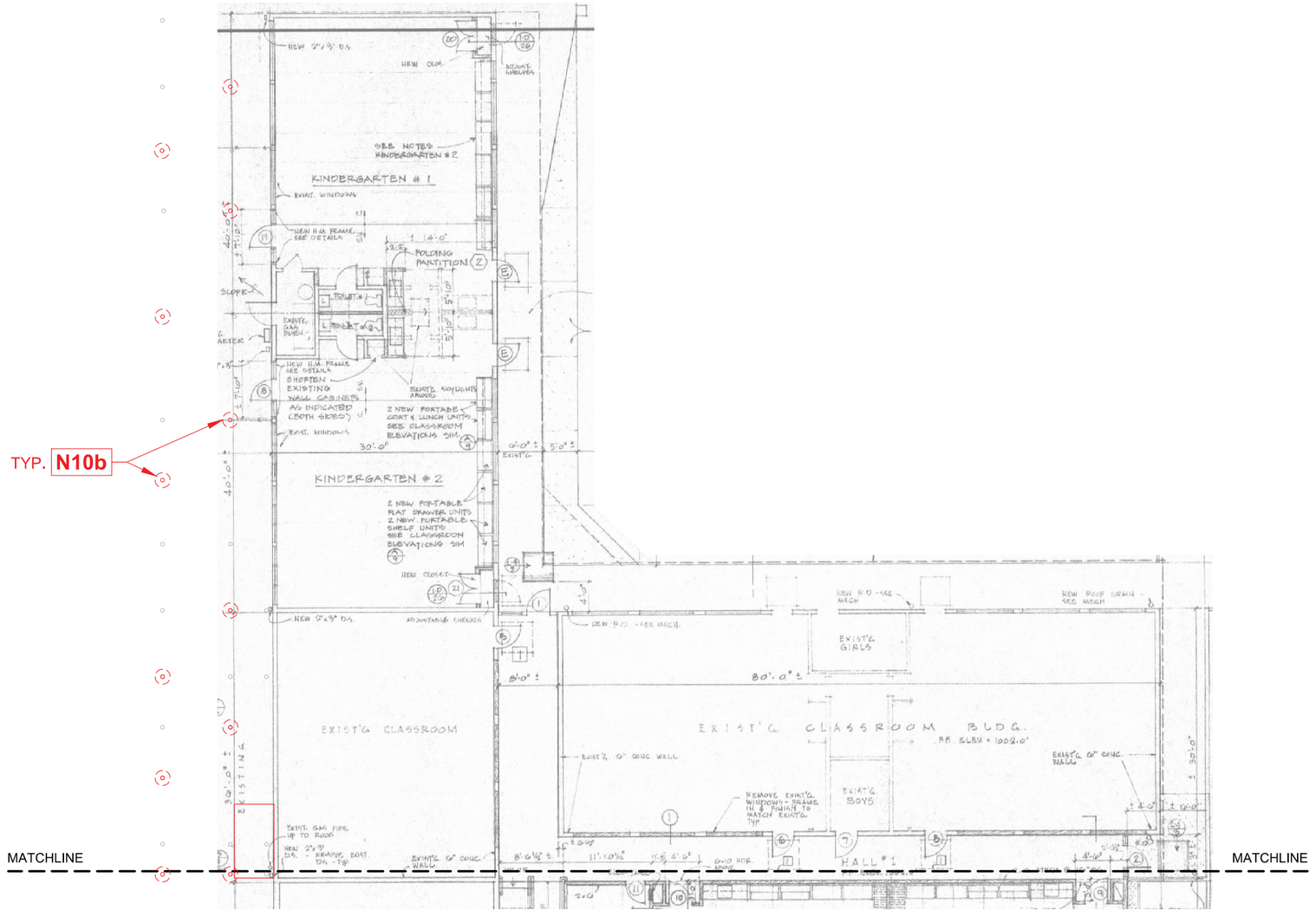
△	DESCRIPTION	DATE:

PROJECT NO:	M-0354-23
DRAWN:	PWJ
CHECKED:	MRS
DATE:	DEC. 2023

AREA C FLOOR PLAN

S1.1

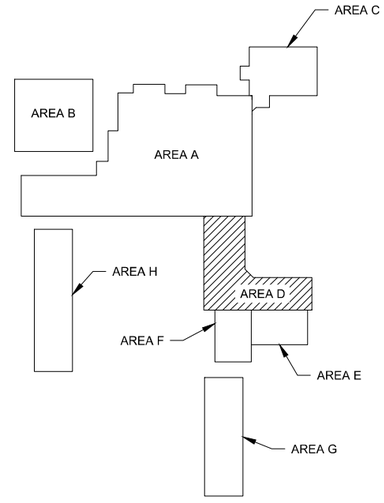
PRELIMINARY DESIGN



1 S1.2 **AREA D FOUNDATION PLAN**

1/8"=1'-0"

ONE INCH EQUALS FULL SCALE



0 S1.2 **CAMPUS KEY**

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MEDFORD SCHOOL DISTRICT
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MEDFORD, OR 97501

GRIFFIN CREEK ELEMENTARY SCHOOL SEISMIC RETROFIT

Griffin Creek

Medford SCHOOL DISTRICT

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
OREGON
DEC. 08, 2014
MATTHEW R. SMITH
EXPIRES: 06-30-24
PRELIMINARY NOT FOR CONSTRUCTION

△	DESCRIPTION	DATE:

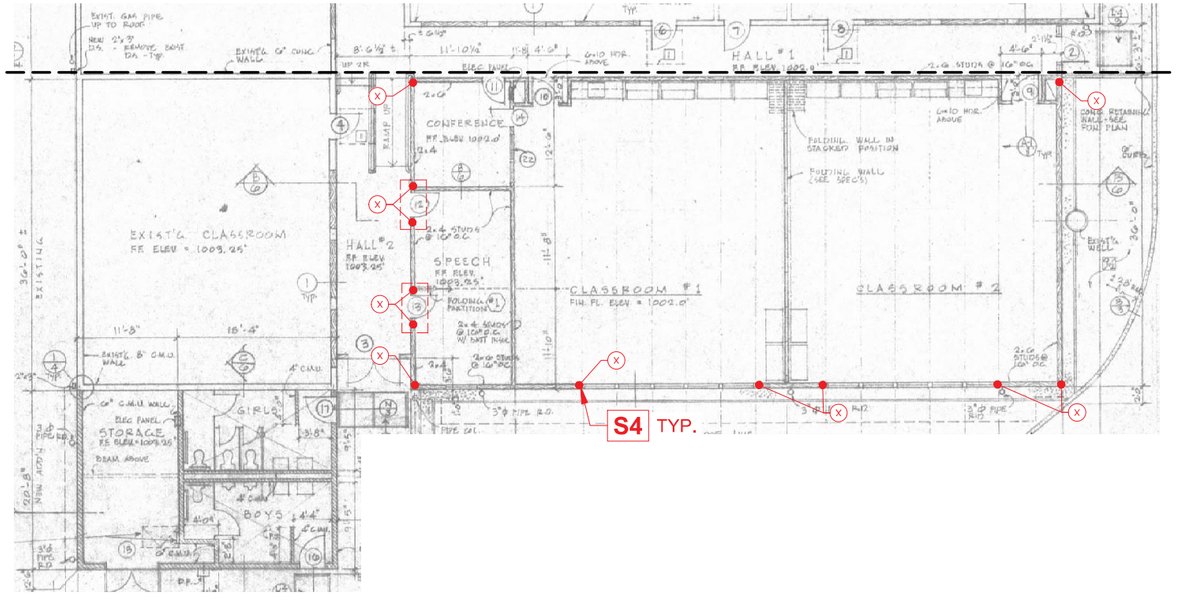
PROJECT NO:	M-0354-23
DRAWN:	PWJ
CHECKED:	MRS
DATE:	DEC. 2023

AREA D
FOUNDATION PLAN

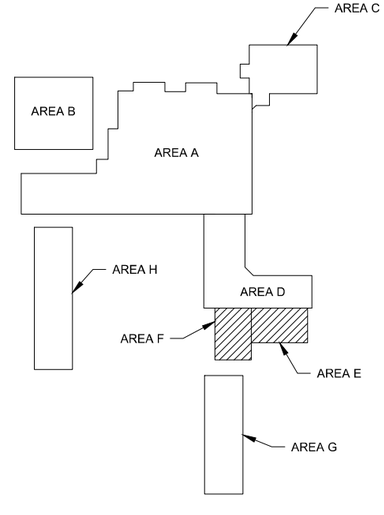
S1.2

PRELIMINARY DESIGN

MATCHLINE



MATCHLINE



ONE INCH EQUALS FULL SCALE

1 / S1.3 **AREA E & F FOUNDATION PLAN** 1/8"=1'-0"

0 / S1.3 **CAMPUS KEY** NTS

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MEDFORD, OR 97501

GRIFFIN CREEK ELEMENTARY SCHOOL SEISMIC RETROFIT

Medford SCHOOL DISTRICT

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
OREGON
08. 2014
MATTHEW R. SMITH
EXPIRES: 06-30-24
PRELIMINARY: NOT FOR CONSTRUCTION

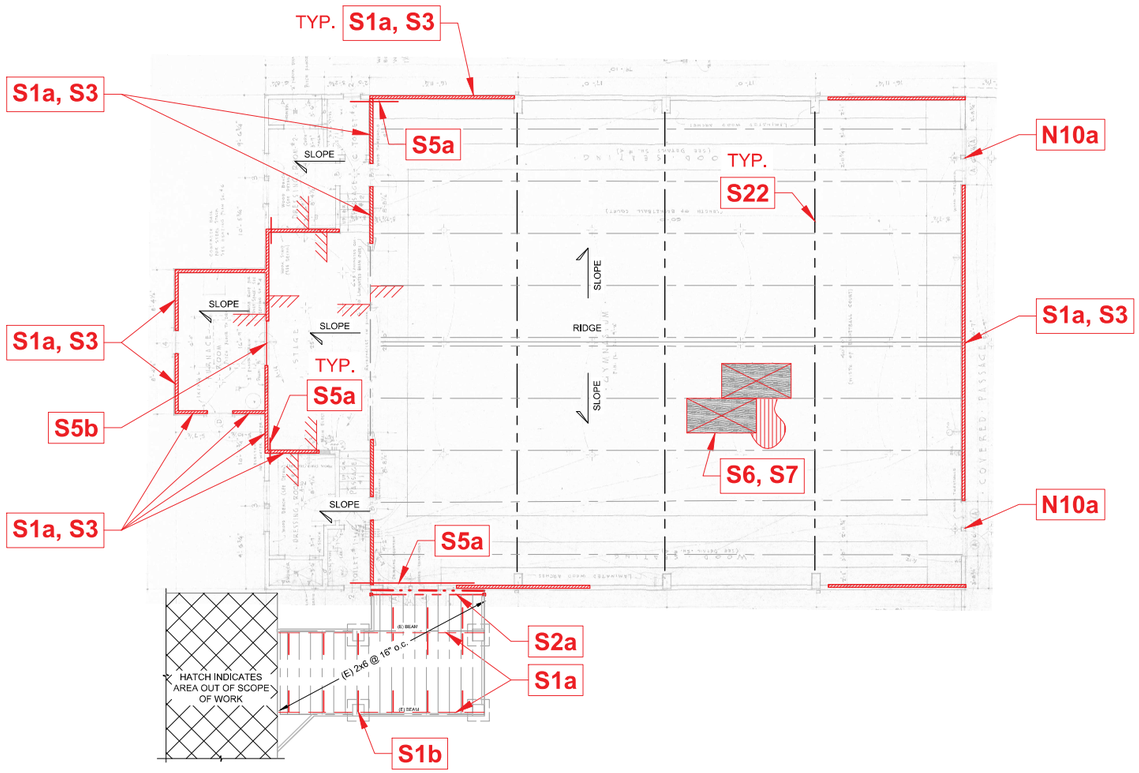
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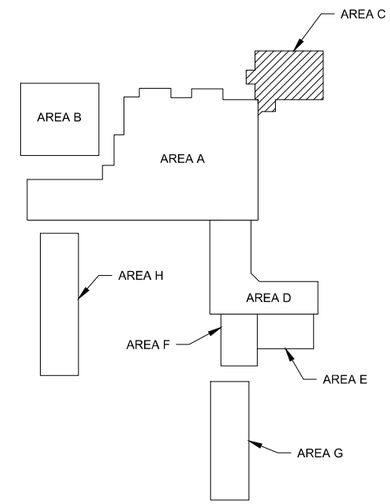
PROJECT NO:	M-0354-23
DRAWN:	PWJ
CHECKED:	MRS
DATE:	DEC. 2023

AREA E & F FOUNDATION PLAN

S1.3

PRELIMINARY DESIGN





ONE INCH EQUALS FULL SCALE

1 / S1.4 **AREA C ROOF FRAMING PLAN** 1/8"=1'-0"

0 / S1.4 **CAMPUS KEY** NTS

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MEDFORD SCHOOL DISTRICT
900 KENYON STREET
MEDFORD, OR 97501

GRIFFIN CREEK ELEMENTARY SCHOOL SEISMIC RETROFIT

Griffin Creek

Medford SCHOOL DISTRICT

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
OREGON
JUNE 08, 2014
MATTHEW R. SMITH
EXPIRES: 06-30-24
PRELIMINARY- NOT FOR CONSTRUCTION

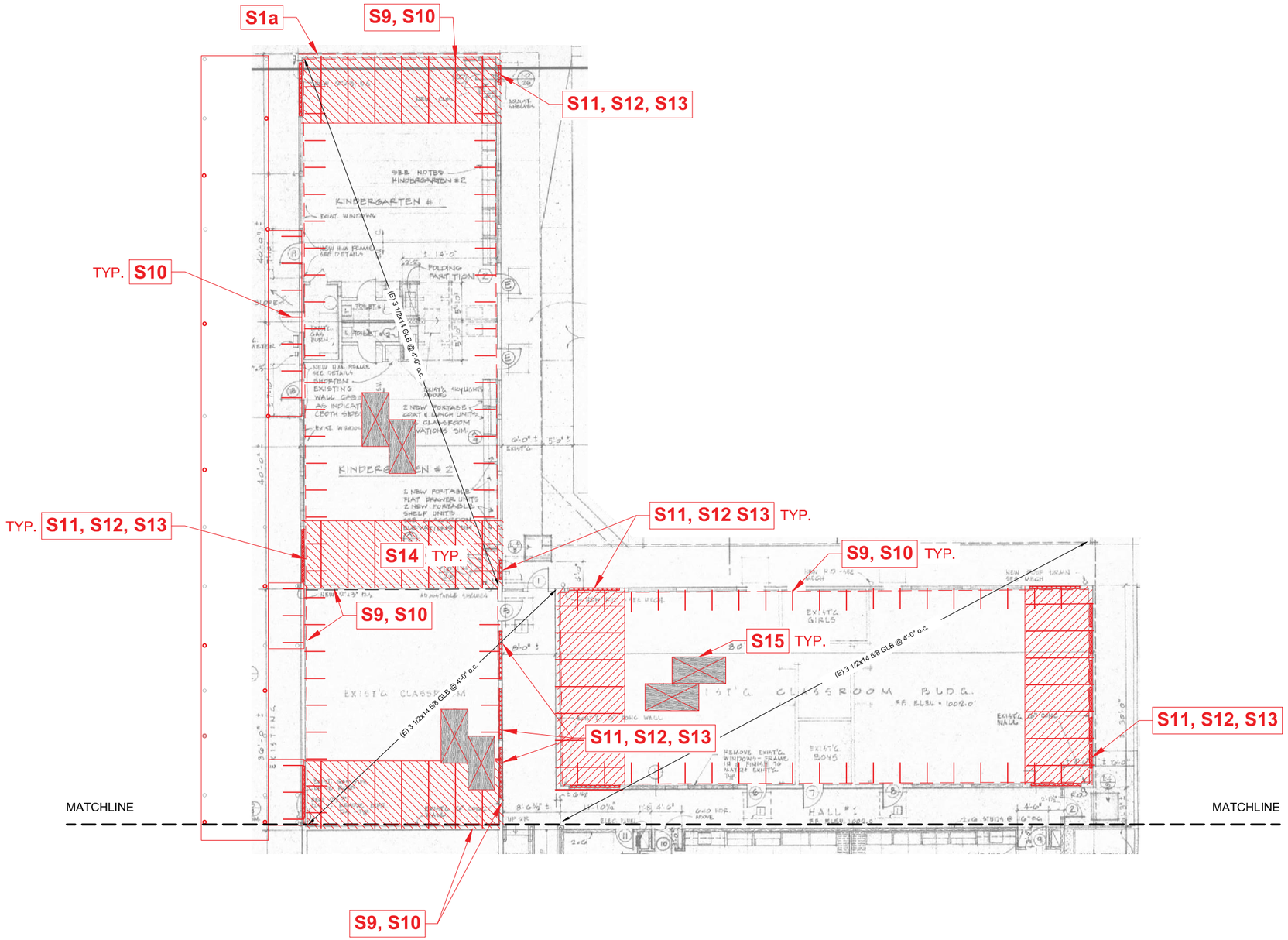
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PROJECT NO:	M-0354-23
DRAWN:	PWJ
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DATE:	DEC. 2023

AREA C
ROOF FRAMING PLAN

S1.4

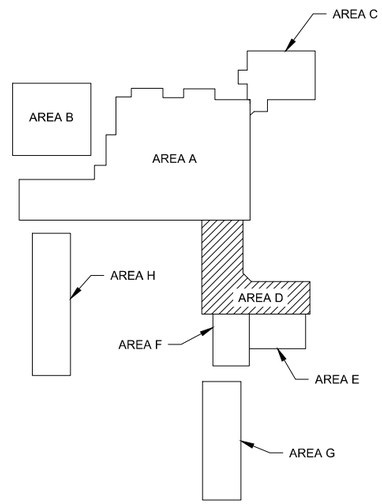
PRELIMINARY DESIGN



ONE INCH EQUALS FULL SCALE

1 / S1.5 **AREA D ROOF FRAMING PLAN**

1/8"=1'-0"



0 / S1.5 **CAMPUS KEY**

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MEDFORD SCHOOL DISTRICT
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GRIFFIN CREEK ELEMENTARY SCHOOL SEISMIC RETROFIT

Medford SCHOOL DISTRICT

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER
OREGON
DEC. 08, 2014
MATTHEW R. SMITH
EXPIRES: 06-30-24
PRELIMINARY - NOT FOR CONSTRUCTION

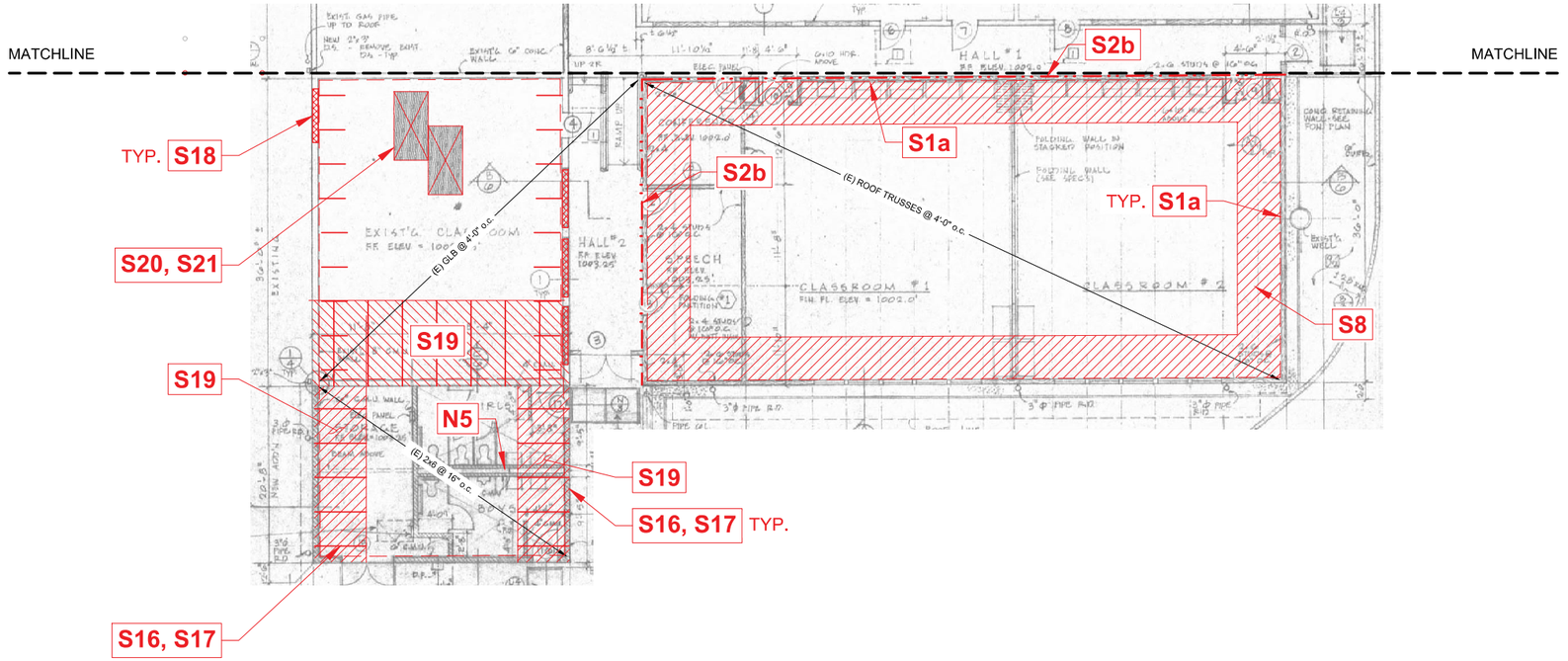
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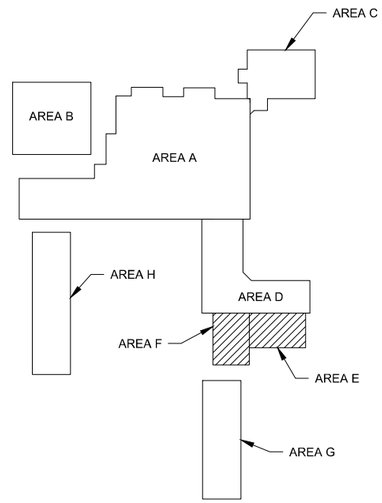
PROJECT NO:	M-0354-23
DRAWN:	PWJ
CHECKED:	MRS
DATE:	DEC. 2023

AREA D
ROOF FRAMING PLAN

S1.5

PRELIMINARY DESIGN





ONE INCH EQUALS FULL SCALE

1 S1.6 **AREA E & F ROOF FRAMING PLAN** 1/8"=1'-0"

0 S1.6 **CAMPUS KEY** NTS

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MEDFORD SCHOOL DISTRICT
900 KENYON STREET
MEDFORD, OR 97501

GRIFFIN CREEK ELEMENTARY SCHOOL SEISMIC RETROFIT

Medford SCHOOL DISTRICT

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON 08, 2014 MATTHEW R. SMITH EXPIRES: 06-30-24
PRELIMINARY: NOT FOR CONSTRUCTION

△	DESCRIPTION	DATE:

PROJECT NO:	M-0354-23
DRAWN:	PWJ
CHECKED:	MRS
DATE:	DEC. 2023

AREA E & F
ROOF FRAMING PLAN

S1.6

PRELIMINARY DESIGN

Appendix D:
Geotechnical Information

Griffin Creek E.S. 100 yr. Flood Hazard



December 14, 2023

Floodway

100-Year Floodplain

1:4,514

0 0.03 0.06 0.11 mi

0 0.04 0.09 0.18 km

Maxar

Active Faults



October 25, 2023

Active_Faults

1:4,514

0 0.03 0.06 0.11 mi

0 0.04 0.09 0.18 km

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Landslide



October 25, 2023

Detailed Susceptibility Reference Maps

Deep Susceptibility

Low susceptibility to deep landslides

Moderate susceptibility to deep landlides

High susceptibility to deep landslides

Shallow Susceptibility

Low susceptibility to shallow landslides

1:4,514

0 0.03 0.06 0.11 mi

0 0.04 0.09 0.18 km

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Liquefaction



October 25, 2023

Liquefaction_Susceptibility_Map

- None
- Very Low
- Low
- Moderate
- High
- Very High

1:4,514

0 0.03 0.06 0.11 mi

0 0.04 0.09 0.18 km

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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.

Griffin Creek ES SRG

2430 Griffin Creek Rd, Medford, OR 97501, USA

Latitude, Longitude: 42.29431090000001, -122.9076837



Date	10/24/2023, 7:37:27 PM
Design Code Reference Document	ASCE41-17
Custom Probability	
Site Class	D - Default (See Section 11.4.3)

Type	Description	Value
Hazard Level		BSE-2N
S_S	spectral response (0.2 s)	0.642
S_1	spectral response (1.0 s)	0.369
S_{XS}	site-modified spectral response (0.2 s)	0.826
S_{X1}	site-modified spectral response (1.0 s)	0.713
F_a	site amplification factor (0.2 s)	1.286
F_v	site amplification factor (1.0 s)	1.931
ssuh	max direction uniform hazard (0.2 s)	0.738
crs	coefficient of risk (0.2 s)	0.87
ssrt	risk-targeted hazard (0.2 s)	0.642
ssd	deterministic hazard (0.2 s)	1.5
s1uh	max direction uniform hazard (1.0 s)	0.432
cr1	coefficient of risk (1.0 s)	0.856
s1rt	risk-targeted hazard (1.0 s)	0.369
s1d	deterministic hazard (1.0 s)	0.605

Type	Description	Value
Hazard Level		BSE-1N
S_{XS}	site-modified spectral response (0.2 s)	0.551
S_{X1}	site-modified spectral response (1.0 s)	0.476

Type	Description	Value
Hazard Level		BSE-2E
S_S	spectral response (0.2 s)	0.442
S_1	spectral response (1.0 s)	0.249
S_{XS}	site-modified spectral response (0.2 s)	0.639
S_{X1}	site-modified spectral response (1.0 s)	0.524
f_a	site amplification factor (0.2 s)	1.447
f_v	site amplification factor (1.0 s)	2.102

Type	Description	Value
Hazard Level		BSE-1E
S_S	spectral response (0.2 s)	0.142
S_1	spectral response (1.0 s)	0.073
S_{XS}	site-modified spectral response (0.2 s)	0.227
S_{X1}	site-modified spectral response (1.0 s)	0.175
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

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P 541-772-7115 F 541-779-4079 1120 EAST JACKSON PO BOX 490 MEDFORD, OR 97501
EMAIL: info@marquess.com WEB: www.marquess.com

August 29, 2017

Ron Havnier
Support Services/Facilities Manager
Medford School District 549C
815 S. Oakdale Avenue
Medford, Oregon 97501

RE: GEOTECHNICAL INVESTIGATION REPORT
ADDITIONS TO GRIFFIN CREEK ELEMENTARY SCHOOL
MEDFORD, OREGON
MAI JOB NO. 17-1085

Dear Mr. Havnier:

We are pleased to present our geotechnical investigation report for the proposed additions to Griffin Creek Elementary School in the Medford 549C School District in Medford, Oregon. Griffin Creek Elementary School is located at 2430 Griffin Creek Road. The purpose of this investigation was to evaluate the subsurface conditions at the site and develop earthwork and foundation engineering recommendations for the project design. The proposed development is shown on Drawing 1, Site Plan.

The proposed additions include 4 (or 3) classrooms and construction of an asphalt-paved parking lot. The classrooms will be single-story, masonry structures with slab floors.

This report has been prepared for the specific use of the Medford 549C School District and their consultants and designers in accordance with generally accepted soil and foundation engineering principles and practices. No other warranty, either expressed or implied, is made. In the event that any substantial changes in the nature, design, or locations of the improvements are planned, the conclusions and recommendations of this report shall not be considered valid unless such changes are reviewed and the conclusions of this report modified or verified in writing.

It should be recognized that changes in the site conditions may occur with the passage of time due to environmental processes or man-made changes. Furthermore, building code or state of the practice changes may require modifications in the recommendations presented herein. Accordingly, the recommendations of this report should not be relied on beyond a period of three years without being reviewed by a geotechnical engineer.

Method of Investigation

One exploratory test pit was excavated on August 8, 2017, with a rubber-tire backhoe at the location approximated on Drawing 1. A key describing the soil classification system and soil

consistency terms used in this report is presented on Drawing 2. The log of the exploratory test pit is presented on Drawing 3.

Samples of the soil materials from the exploration were returned to our laboratory for classification and testing. The results of moisture content and percent finer than No. 200 sieve are shown on the log.

Site Conditions

A. Background

We previously prepared a soil investigation report dated August 9, 1995, for additions to Griffin Creek Elementary School. The locations of two previous exploratory borings for this report are shown on Drawing 1, and the logs of the two borings are attached in the appendix of this report.

B. Surface

The classroom site is a playground area. The proposed new asphaltic pavement area is presently a graveled parking area on the far north edge of the school.

C. Subsurface

The test pit was excavated in the area of the new asphaltic pavement. The test pit encountered 6" of very dense ¾"-0 crushed rock overlying 1.8' dense to medium dense clayey sand fill followed by natural, medium dense clayey sand to the depth explored (4' deep).

Our previous exploratory borings at the school suggest the subsurface materials consist of 5' to 5.5' of medium stiff to stiff, highly expansive sandy clay overlying dense gravelly soils.

The attached logs and related information depict subsurface conditions only at the specific locations shown on Drawing 1 and on the dates excavated/drilled. Subsurface conditions at other locations may differ from conditions occurring at these locations. Also, the passage of time may result in a change of soil conditions at these locations due to environmental changes.

D. Groundwater

Free groundwater was not encountered in the test pit during excavation. Fluctuations in the groundwater level can occur because of variations in rainfall, temperature, runoff, irrigation, and other factors not evident at the time our observations were made and reported herein.

Geology and Seismicity

A. Geology

The school lies within the Rogue Valley which is bounded by the Western Cascades physiographic province on the north and east and the Klamath Mountains province on the west and south.

The geologic map of the area (Wiley and Smith, 1993, Preliminary Geologic Map of the Medford East and Medford West Quadrangles, Jackson County, Oregon, DOGAMI Open-File Report O-93-13) indicates the site is underlain by Holocene and Pleistocene Age alluvial fan gravel.

B. Seismicity

Southern Oregon is in an area of moderate to potentially high seismic activity. As with the entire Oregon coastal belt, the site is in a region that is dominated seismically by the Cascadia Subduction Zone. The subduction zone is formed by the sinking of the offshore Juan de Fuca Plate beneath the onshore North American Plate. Earthquakes are generated within the subducting Juan de Fuca Plate (intraslab), at the frictional contact between the two plates (interface), and within the upper North American Plate (crustal). From an historical perspective, recorded seismicity in the region has been relatively low in comparison to Northern Oregon and Northern California.

The Cascadia Subduction Zone (CSZ) is capable of great earthquakes with Moment Magnitudes (M_w) of 8.5 plus and lies about 110 miles to the west. The potential ground shaking from the CSZ would likely be of greater severity and duration than earthquakes generated from intraslab and crustal faults.

Intraslab earthquakes of M_w 7.0 plus are capable on the seismogenic part of the subducting plate in the CSZ. These earthquakes typically occur at depths of 40 to 60 km.

Crustal earthquakes of up to M_w 6.5 can occur at relatively shallow depths of 25 km or less. Crustal faults typically produce most of the earthquakes in the region. Historically, crustal earthquakes have not exceeded M_w 6.0 and are usually less than M_w 4.5.

All the above types of earthquakes are considered potential "design earthquakes" by the building code.

C. Faulting

The nearest mapped fault (Wiley and Smith, 1993) lies about 2000 feet to the southeast of the school. This fault, and others in the Rogue Valley, offset pre-Quaternary geologic formations and are not considered active or potentially active.

The nearest known active fault (fault displaying movement within the last 10,000 years) system is the Sky Lakes Fault Zone that lies about 35 miles east of the site.

A few miles east of the Sky Lakes Fault Zone lies the active Klamath Graben faults. The Klamath Falls earthquakes of 1993 (M_w 5.9, M_w 6.0, and several small aftershocks) occurred on the Klamath Graben faults.

Geologic and Seismic Hazards Evaluation

A. Design Earthquake

The design earthquake for the project area is based on methodologies in the Code and was determined from on-line USGS seismic design maps (2012/2015 IBC). The site has a Maximum Considered Earthquake (MCE) spectral response acceleration at 0.2 seconds for Site Class D of S_S=0.622g. The site also has an MCE spectral response acceleration at 1.0 second for Site Class D of S_1=0.334g.

Based on the subsurface information and the provisions in the Code, a Site Class D designation may be assumed for this site.

B. Fault Offset

Based on our review of existing geologic information, we conclude that there are no known active or potentially active faults in the vicinity of the project site. Therefore, the hazard resulting from surface rupture or fault offset is considered low.

C. Shaking

Based on on-line USGS seismic design maps and the previous Code (ASCE 7-10 Standard), the expected peak ground acceleration at this site for the Maximum Considered Earthquake is about 0.29g.

Ground amplification effects at the site are expected to be properly accounted for using the Code seismic design methodology.

Moderate to strong ground shaking could occur at the site as a result of an earthquake in the region. The proposed improvements should be designed and constructed in accordance with current standards of earthquake-resistant construction.

Ground shaking during an earthquake could cause objects within the buildings which are not rigidly attached to the structures to undergo some movements with respect to the structures. The buildings should, therefore, include design measures that minimize such potential movements and also minimize the adverse effects of such movements where they cannot be prevented.

D. Soil Liquefaction

Liquefaction is a phenomenon in which saturated cohesionless soils lose strength during strong shaking and experience horizontal and vertical movements. Soils that are most susceptible to liquefaction are clean, loose, saturated, uniformly graded, fine-grained, clay-free sands that lie within 50 feet of the ground surface.

The existing clay soils and granular soils at the site are considered to be resistant to liquefaction. As such, we believe the potential for liquefaction at the building sites is low.

E. Other Hazards

Due to the relatively strong nature of the subsurface materials and the flat topography in the area, the potential for other hazards such as shaking settlement, lateral spreading, landsliding, and lurching are low.

Conclusions and Recommendations

From a soil and foundation engineering standpoint, it is our opinion that the proposed development can be constructed as proposed provided the recommendations contained in this report are incorporated into the design and construction of the project.

Soil Conditions. The site is underlain by expansive clays that can swell (heave) when wetted and shrink (settle) when dried. Building foundation movements can occur many years after building completion due to changes in the moisture content of the underlying clays.

Foundations. Conventional spread footings bearing on structural fill may be used to support the structure. The structural fill will help strengthen the foundations and minimize potential expansive soil heave. Slabs-on-grade should also bear on a layer of structural fill to provide firm support for the slabs.

Previous Sitework Experience. Previous construction of classrooms and pavements at the school has required additional earthwork (change order work in addition to the construction contract) to create stable supporting soil for building footings, slabs, and pavements. This additional earthwork included subexcavation and removal of overly soft subgrade soil and replacement with structural fill.

Detailed recommendations for the project design are presented in the remainder of the report. These recommendations are contingent on our review of the construction drawings and observation of the earthwork, foundation, and drainage installation phases of construction.

Recommendations

A. Earthwork

1. The site should be cleared of play equipment, trees, existing slabs, pavements, etc., and cleared of other obstructions including utilities to be abandoned. Any remaining topsoil or organic-laden soils should also be removed from building and pavement areas. Holes below the finished grades of the structures that result from the removal of underground obstructions should be backfilled with suitable material and compacted to the requirements for structural fill given below. The clearing of holes beneath the proposed finished grades and the backfilling operations should be performed under our observation.

2. Site Excavations. All deleterious soil, such as playground gravel, or soft soil, should be removed from beneath the classroom building pad and these removals should extend a lateral distance of at least 2' beyond the edges of footings. The

building pad should also be excavated deep enough to provide for the minimum required structural fill beneath footings and slabs. After the pad has been excavated to the required depths, we should be called out to the site to observe the exposed soils and make additional recommendations, as necessary, for the construction of the building pad.

There are no minimum excavation depth requirements beneath the proposed pavements except to excavate deep enough to provide for the full pavement section.

Additional excavations within the building pad and pavements may be required, however, if the subgrade soils are too wet or too weak to allow the adequate placement of structural fill or pavement baserock. The adequacy of the existing subgrade soils will need to be evaluated at the time of construction by our field representative.

3. After the site excavations are completed, the exposed subgrade soils in areas to be filled should be recompacted prior to placing fill. The recompaction may be waived by the soil engineer if the subgrade materials are firm, clean of loose materials, and undisturbed. The recompaction may require scarifying the upper six inches, moisture conditioning the soils to approximately three percent above optimum, and compacting them to at least 95 percent relative compaction as determined by ASTM Test Method D698. Compaction should be performed using heavy equipment such as a large vibratory roller.

4. Proofrolling. Prior to placement of fill, the exposed subgrade surfaces in slab and pavement areas should be proofrolled and observed by our field representative. Where the subgrades fail the proofroll test (deflection or rutting exceeding ¼"), the subgrades will require either recompaction or removal and replacement with structural fill.

5. In order to achieve satisfactory compaction in the subgrade and fill soils, it may be necessary to adjust the soil moisture content at the time of construction. Soils which are too dry will require the addition of water while scarification and aeration will be required for soils which are too wet.

6. Structural fill may include high quality 3/4"-0 crushed rock or 4"-0 crushed rock beneath footings, slabs, and pavements. The choice of structural fill materials should be compatible with the method of placement and compaction.

7. Structural fill should be compacted to at least 95 percent relative compaction as determined by ASTM Test Method D698 Method A. Fill materials should be moisture-conditioned and spread in lifts not exceeding eight inches in uncompacted thickness. Where practical, compaction should be performed with a heavy self-propelled vibratory roller capable of producing at least 24,000 pounds dynamic force. Compaction behind retaining walls, if any, should be performed with portable light equipment to prevent overstressing of the wall.

The compaction of the fill, thickness of lifts, and control of the moisture content should be monitored and tested by our field representative. Compaction should be evaluated by the use of nuclear gauge field density testing and, where appropriate, by proofrolling with loaded 10 cy gravel trucks.

8. Utility trenches should be backfilled with compacted fill placed in lifts not exceeding eight inches in uncompacted thickness, except thicker lifts may be used with the approval of the soils engineer provided satisfactory compaction is achieved. The upper three feet of trench backfill should be compacted to at least 95 percent relative compaction (ASTM D698). Jetting of backfill to obtain compaction should not be permitted.

9. Grading and earthwork should be monitored and tested by our representative for conformance with the project plans/specifications and our recommendations. This work includes site preparation, selection of satisfactory fill materials, and placement and compaction of the subgrades and fills. Sufficient notification prior to commencement of earthwork is essential to make certain that the work will be properly observed.

B. Foundations

1. Spread footings should bear on at least 12" of structural fill that is underlain by firm natural soils. All existing weak or deleterious soil should be removed from beneath footings and be replaced with structural fill. The bottoms of all footing excavations should be checked by our field representative for soft or deleterious material prior to placing structural fill.

2. The structural fills beneath footings should extend laterally at least one foot beyond all sides of the footings.

3. Footings should bear at least twelve inches below lowest adjacent finished grade. Footings located adjacent to utility trenches should have their bearing surfaces below an imaginary 1.5:1 (horizontal to vertical) plane projected upward from the edge of the bottom of the trench.

4. Footings constructed in accordance with these recommendations can be designed for an allowable bearing pressure of 2000 psf for dead plus live loads. This pressure may be increased by one-third for total loads including wind or seismic. All footings should be provided with sufficient reinforcement to provide structural continuity.

5. Lateral loads can be resisted by friction between the foundation bottoms and the supporting subgrade. A friction coefficient of 0.3 may be used. In addition, a passive pressure equal to an equivalent fluid pressure of 250 pcf may be used starting at a depth of 0.5 feet below finished grade.

6. Foundation settlements and heave are expected to be less than about 3/4 inch over a horizontal distance of 50 feet.

C. Slabs-On-Grade

1. The building slabs should be underlain by at least 12" of structural fill and firm subgrade as defined in Item A-Earthwork.

2. Where moisture protection is desired beneath building slabs, the slabs should also be underlain by at least four inches of free-draining 3/4" crushed rock (no fines, no round rock) to act as a capillary break. This capillary rock is in addition to the required 12" thick layer of structural fill.

   Where additional protection against moisture vapor is desired, a vapor barrier should also be incorporated into the design. The vapor barrier may be covered with two inches of sand that is lightly moistened just prior to pouring the slab. Factors such as cost, special considerations for construction and floor coverings, indicate that decisions on the use of vapor barriers, sand, and capillary rock should be made by the Owner and Contractor.

3. Exterior slabs should be underlain by at least 8" of structural fill. All weak or deleterious existing soils should be removed from beneath exterior slabs.

4. All slabs should be reinforced in accordance with the anticipated use and loading, but as a minimum, building slabs should be reinforced with at least No. 4 rebars on 16-inch centers, both ways.

D. Retaining Walls

1. We understand no retaining walls are presently anticipated. If they become necessary, retaining walls should be supported on foundations designed in accordance with our previous recommendations. Unrestrained walls with level backslopes and backfilled with well-draining backfill may be designed to resist an equivalent fluid pressure of at least 45 pcf. Where restrained, walls should be designed for an equivalent fluid pressure of 65 pcf. The walls should also be designed for a peak horizontal ground acceleration of 0.13 g. These pressures do not account for any surcharge loadings or undrained backfills. Surcharge loadings and undrained backfills should be evaluated on a case-by-case basis.

2. The preceding pressures assume that sufficient drainage is provided behind the walls to prevent the build-up of hydrostatic pressures from surface or subsurface water infiltration. Adequate drainage may be provided by means of 3/4 inch drain rock material enclosed in a filter fabric and a four inch diameter rigid perforated pipe placed at the base of the wall. The drainrock should extend up the walls to within one foot of finished grade. The drain pipes should be tied into closed pipes that discharge into suitable facilities.

3. The backfill placed behind retaining walls should be granular, free-draining, non-expansive, and compacted to at least 95 percent relative compaction using light compaction equipment. Interior walls should be waterproofed.

E. Flexible Pavements

1. Based on our previous experience with clayey soil conditions, we recommend the following sections:

Recommended Pavement Sections

Traffic Condition	Asphalt Concrete (inches)	3/4"-0 Crushed Rock (inches)	4"-0 Crushed Rock (inches)
Autos	2.0	4.0	12.0
Heavy Vehicle Lanes	3.0	6.0	12.0

2. The 3/4"-0 crushed rock should meet Section 02630, latest ODOT/APWA Standard Specifications. The crushed rock should be placed in a manner to prevent segregation and should be uniformly moisture-conditioned and compacted to at least 95 percent relative compaction (ASTM D698, Method A) to provide a smooth, unyielding surface.

3. The 4"-0 crushed rock should be high quality, processed 4"-0 crushed rock that is approved for use on City and County streets. The crushed rock must be dense after compaction and non-deflecting under proofrolling with a fully loaded ten-yard gravel truck.

   The crushed rock should be underlain by a 5 oz/yd minimum non-woven permeable geotextile fabric.

4. The subgrade beneath the 4"-0 crushed rock should be unyielding under the wheels of a fully loaded 10 cu. yd. dump truck and compacted to at least 95 percent relative compaction (ASTM D698). If the subgrade is not hard and unyielding at the time of construction, and cannot be sufficiently strengthened by recompaction, the weak subgrade will need to be removed and replaced with structural fill such as compacted 4"-0 crushed rock. All fill placed beneath the pavement section should be compacted to at least 95 percent relative compaction (ASTM D698). Grading for pavements should be performed during the dry and warm months of the year.

F. Drainage

1. Positive surface gradients of at least two percent on paved surfaces and five percent in landscaping areas should be maintained away from the buildings so that water does not collect in the vicinity of the foundations. Water from roof downspouts should be collected into closed pipes that discharge the water into approved drainage facilities.

2. A foundation drain should be placed adjacent to the perimeter building footings to help control moisture beneath the buildings.

G. Construction Observation

1. We should be retained to provide monitoring services during the grading, foundation, and drainage installation phases of the project. This will provide the opportunity for correlation of the soil conditions found in our investigation with those actually encountered in the field, and thus permit any necessary modifications in our recommendations resulting from changes in anticipated conditions.

We have provided our findings and recommendations in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, either expressed or implied, is made.

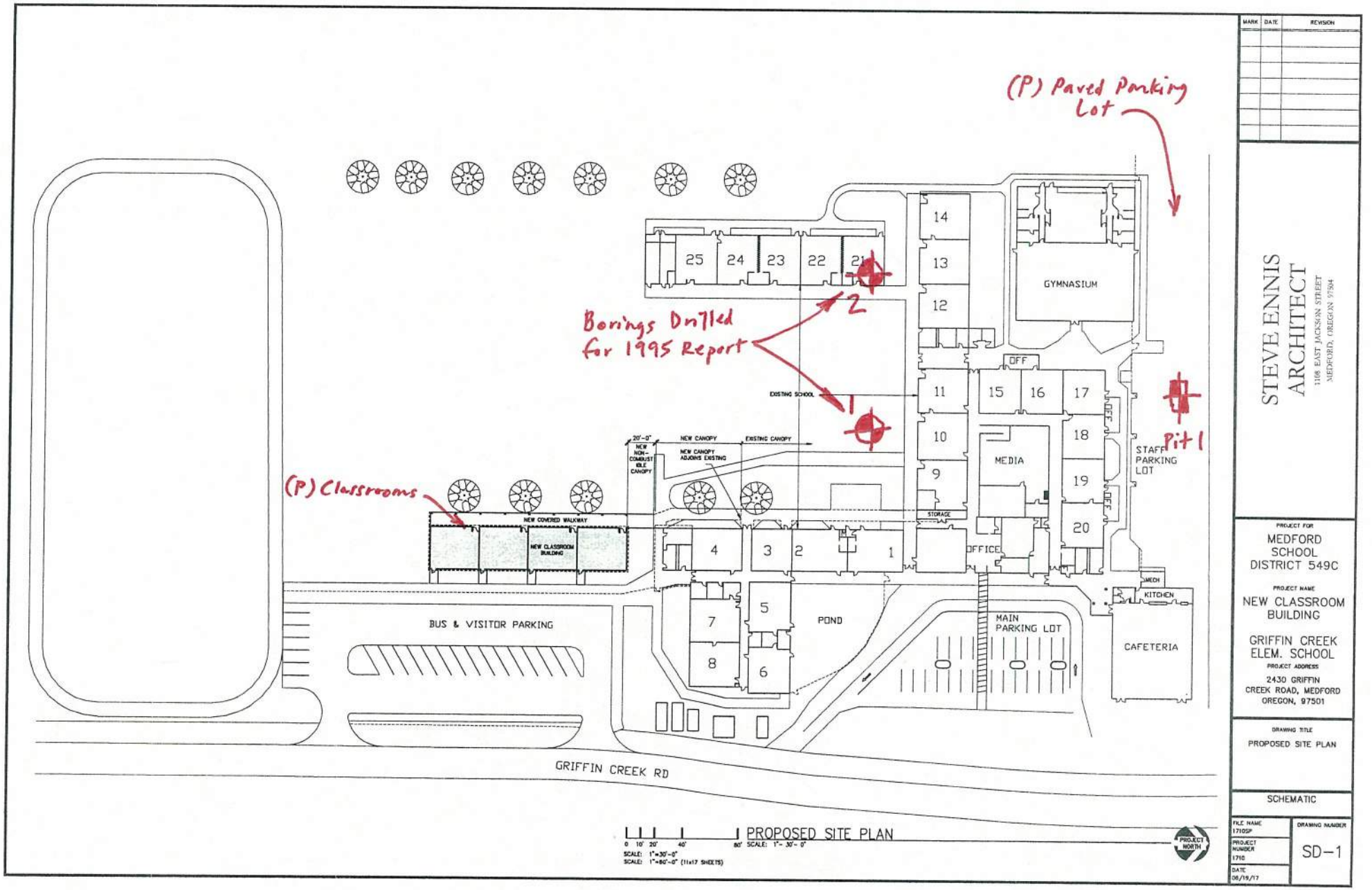


Very truly yours,

MARQUESS & ASSOCIATES, INC.

Rick Swanson, P.E., G.E.
Civil Engineer 16885

RS/ler
Copies: Addressee (1), and by email
Steve Ennis, by email
Attachments: Site Plan, Drawing 1
Key to Boring and Pit Logs, Drawing 2
Laboratory Testing Procedures, Drawing 3
Log of Pit 1, Drawing 4
Appendix A, Logs of Borings 1 and 2 (1995)



MARK	DATE	REVISION

STEVE ENNIS
ARCHITECT
1106 EAST JACKSON STREET
MEDFORD, OREGON 97504

PROJECT FOR
MEDFORD SCHOOL DISTRICT 549C

PROJECT NAME
NEW CLASSROOM BUILDING

GRIFFIN CREEK ELEM. SCHOOL

PROJECT ADDRESS
2430 GRIFFIN CREEK ROAD, MEDFORD OREGON, 97501

DRAWING TITLE
PROPOSED SITE PLAN

SCHEMATIC

FILE NAME 1710SP
PROJECT NUMBER 1710
DATE 06/19/17

DRAWING NUMBER
SD-1

Drawing 1
Site Plan
MAI Job No. 17-1085

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN No. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN No. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel–sand mixtures, little or na fines.
			GP	Paarly graded gravels, or gravel–sand mixtures, little or na fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel–sand–silt mixtures, nan–plastic fines.
			GC	Clayey gravels, gravel–sand–clay mixtures, plastic fines.
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN No. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little ar no fines.
			SP	Paorly graded sands ar gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand–silt mixtures, non–plastic fines
			SC	Clayey sands, sand–clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN No. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inarganic silts and very fine sands, rock flaur, silty ar clayey fine sands ar clayey silts with slight plasticity.
			CL	Inarganic clays af law ta medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and arganic silty clays of law plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous ar diatamaceous fine sandy ar silty sails, elastic silts.
			CH	Inarganic clays af high plasticity, fat clays.
			OH	Organic clays af medium ta high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic sails.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D–2487)

	U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
	200	40	10	4	3/4"	3"	12"	
SILTS AND CLAYS	SAND				GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE		FINE	COARSE		

GRAIN SIZES

SANDS & GRAVELS	BLOWS/FOOT†
VERY LOOSE	0 – 4
LOOSE	4 – 10
MEDIUM DENSE	10 – 30
DENSE	30 – 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS & CLAYS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 – 1/4	0 – 2
SOFT	1/4 – 1/2	2 – 4
FIRM	1/2 – 1	4 – 8
STIFF	1 – 2	8 – 16
VERY STIFF	2 – 4	16 – 32
HARD	OVER 4	OVER 32

CONSISTENCY

† Number af blows af 140 paund hammer falling 30 inches to drive a 2 inch O.D. (1–3/8 inch I.D.) split spoon (ASTM D–1586).

‡ Uncanfined compressive strength in tans/sq. ft. as determined by labaratary testing or appraximated by the standard penetratian test (ASTM D–1586), pocket penetrameter, tarvane, ar visual observation.

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YOUR PROFESSIONAL ENGINEERING TEAM SINCE 1957
STRUCTURAL | MECHANICAL | ELECTRICAL
CIVIL | GEOTECHNICAL | SURVEY | CONSTRUCTION TESTING

KEY TO BORING AND PIT LOGS
Griffin Creek Elementary School
2430 Griffin Creek Road
Medford Oregon

MAI JOB NO.	17-1085	DRAWN	RS
ISSUE DATE	Aug 2017	CHECKED	RS

DRAWING 2
OF 3 DWGS

TEST PIT 1

	0		Fill. Very dense 3/4"–0 crushed rock
*12	1'–2'	X	Fill. CLAYEY SAND (SC), brown, dense to medium dense, dry to moist @1.5': Finer than #200 = 39 %
*12	3'–4'	X	CLAYEY SAND (SC–CL), dark brown, medium dense, moist, very clayey @3': Finer than #200 = 35 %

Bottom of test pit = 4'

*moisture content in percent

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STRUCTURAL | MECHANICAL | ELECTRICAL
CIVIL | GEOTECHNICAL | SURVEY | CONSTRUCTION TESTING

Log of Pit 1
Griffin Creek Elementary School
2430 Griffin Creek Road
Medford Oregon

MAI JOB NO.	17-1085	DRAWN	RS
ISSUE DATE	Aug 2017	CHECKED	RS

DRAWING 3
OF 3 DWGS

EQUIPMENT CME 55	ELEVATION 1551.3'	LOGGED BY RS
DEPTH TO GROUNDWATER NOT ENC.	DEPTH TO BEDROCK Not Enc.	DATE DRILLED 6-30-95

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRENGTH (KSF)
SANDY CLAY, moist, very sandy	Brown	Stiff to Medium Stiff	CL	1			13	103	
@ 1': Finer than #200 = 49% Free Swell = 15%				2		13	11	110	*2.8 @2.5% Strain
@ 1.5': Finer than #200 = 50% Liquid Limit = 28% Plasticity Index = 9% Free Swell = 20%				3	X	6	14		
SANDY CLAY, moist, @ 4.5': Finer than #200 = 61%	Brown	Stiff	CL	4			18	114	
				5		25	17	114	
SANDY GRAVEL, moist, with silt, clayey at 7.5'	Brown	Dense	GP	6					
				7					
			GC	8	X	32/6"	6		
				9					
				10					
			GM	11	X	28/6"	12		
Bottom of Boring = 11'				12					
				13					
*Unconfined Compressive Strength				14					
				15					
				16					
				17					
				18					
				19					
				20					

MARQUESS & ASSOCIATES, INC.
CONSULTING ENGINEERS
1120 East Jackson Street (503) 772-7115
MEDFORD, OREGON 97504

LOG OF BORING 1

GRIFFIN CREEK ELEMENTARY SCHOOL
MEDFORD, OREGON

PROJECT NO.	DATE	DRAWING NO.
1-5655	AUGUST, 1995	8

E:\1-5655\SHT20.DWG

EQUIPMENT CME 55	ELEVATION 1551.5'	LOGGED BY RS
DEPTH TO GROUNDWATER 10'	DEPTH TO BEDROCK Not Enc.	DATE DRILLED 6-30-95

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	SHEAR STRENGTH (KSF)
SANDY CLAY, very moist, variable sand, with gravel	Brown	Medium Stiff	CL	1					
@ 2.5': Liquid Limit = 46% Plasticity Index = 31% Finer than #200 = 50% Free Swell = 50%				2	X	6	15		
							17	110	*1.3 @5% Strain
SANDY CLAY, moist, wet at 4.8'	Brown	Medium Stiff	CL	3		8	17	114	
@ 4.5': Finer than #200 = 50%				4	X	4	16		
				5					
SANDY GRAVEL, moist, with silt, with clay below 8.5'	Brown	Dense	GP-GM	6	X	30/6"	3		
@ 6.5': Finer than #200 = 11%				7					
				8					
			GC	9			(During Drilling)		
				10			▽		
				11	X	35	16		
Bottom of Boring = 11.5'				12					
*Unconfined Compressive Strength				13					
				14					
				15					
				16					
				17					
				18					
				19					
				20					

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MEDFORD, OREGON 97504

LOG OF BORING 2

GRIFFIN CREEK ELEMENTARY SCHOOL
MEDFORD, OREGON

PROJECT NO.	DATE	DRAWING NO.
1-5655	AUGUST, 1995	9

E:\1-5655\SHT21.DWG

Appendix E: Construction Cost Estimate Worksheets

ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION

SUMMARY

Description	Deficiencies (Ref. Seismic Evaluation Report Sec. 6.0)	Quantity	Units	Unit Price	Total Price for Construction Item
GENERAL CONDITIONS					
General Conditions		10%	%		$ 132,247.50
Preconstruction Services		2%	%		$ 26,449.50
Escalation		7%	%		$ 103,682.04
Bonding & Insurance		3%	%		$ 44,435.16
Contractor Profit & Overhead		5%	%		$ 74,058.60
			General Conditions Subtotal		$ 380,872.80
Non-Structural Elements					
Misc MEP	N1-N16	1	Lump Sum	$ 85,200.00	$ 85,200.00
Misc Non-Structural	N1-N16	1	Lump Sum	$ 34,100.00	$ 34,100.00
			Non-Structural Subtotal		$ 119,300.00
Construction Cost Per Building Part					
			BUILDING PART C: Cafeteria Sub-Total		$ 353,800.00
			BUILDING PART D: Classrooms Sub-Total		$ 545,100.00
			BUILDING PART E: Classrooms Sub-Total		$ 144,025.00
			BUILDING PART F: Classrooms Sub-Total		$ 160,250.00
			Sub-Total Construction Cost		**$ 1,703,300.00**
			Contingency	**20%**	**$ 340,660.00**
			Total Construction Cost		**$ 2,043,960.00**
Cost Estimate Summary					
Engineering					$ 290,200.00
Architectural Consulting				$ 30,700.00	
Structural / Rehabilitation Engineering				$ 224,800.00	
Geotechnical Consulting				$ 19,400.00	
Materials Testing for Design				$ 15,300.00	
Construction Management					$ 61,300.00
Construction					$ 1,782,000.00
Sub-Total Construction Cost				$ 1,703,300.00	
Special Inspection Services for Construction				$ 17,400.00	
Permitting Fees				$ 61,300.00	
Relocation of FF&E					$ 25,500.00
Contingency					$ 340,660.00
			Total Project Funding Requirement		**$ 2,499,660.00**

ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION

BUILDING PART C: Cafeteria

Description	Deficiencies (Ref. Seismic Evaluation Report Sec. 6.0)	Quantity	Units	Unit Price	Total Price for Construction Item
Demolition & Asbestos Abatement					
Soft Demolition	S1a, S5a, S5b	3200	Square Foot	$ 2.00	$ 6,400.00
TPO / Comp / Metal Roof Demo	S6, S7	4800	Square Foot	$ 2.00	$ 9,600.00
Abatement	S6, S7	4800	Square Foot	$ 5.00	$ 24,000.00
			Demolition & Asbestos Subtotal		$ 40,000.00
Foundation / Floor Strengthening Construction					
Flooring Protection	S1a, S6, S7, S23	1500	Square Foot	$ 6.00	$ 9,000.00
Bolting of Extg Walls to footings	S8	285	Linear Foot	$ 35.00	$ 9,975.00
Holdowns	S4	20	Each	$ 1,500.00	$ 30,000.00
Spread Footings for Columns / Holdown	S2a	2	Each	$ 4,000.00	$ 8,000.00
Concrete Repair & Patching	S2a	75	Square Foot	$ 15.00	$ 1,125.00
			Foundation Level Subtotal		$ 58,100.00
Wall Strengthening Construction					
Sheathing of Existing Walls	S3	3200	Square Foot	$ 5.00	$ 16,000.00
Interior Wall Finish Repair	S3	3200	Square Foot	$ 2.00	$ 6,400.00
Painting	S3	4800	Square Foot	$ 3.00	$ 14,400.00
Light Steel Columns	S2a	2	EA	$ 1,600.00	$ 3,200.00
			Wall Strengthening Subtotal		$ 40,000.00
Roof Strengthening Construction					
Diaphragm Attachments - In-Plane Shear	S1a	490	Linear Foot	$ 20.00	$ 9,800.00
New Roof Sheathing	S6, S7	4800	Square Foot	$ 4.00	$ 19,200.00
New Composite Roof Shingles	S6, S7	4800	Square Foot	$ 10.00	$ 48,000.00
Existing Beam Strengthening	S22	3	EA	$ 15,000.00	$ 45,000.00
New Drag Beam	S5b	1	EA	$ 2,500.00	$ 2,500.00
Ceiling Repair	S1	1500	Square Foot	$ 3.00	$ 4,500.00
Blocking and Strapping Line	S5a	65	Linear Foot	$ 50.00	$ 3,250.00
Seismic Isolation from Adjacent Building	S2a	20	Linear Foot	$ 400.00	$ 8,000.00
New 6" polyisociurinate rigid insulation	S6, S7	4800	Square Foot	$ 15.00	$ 72,000.00
New Wood Beams	S2a	15	Linear Foot	$ 30.00	$ 450.00
Diaphragm Attachments - Out-of-Plane	S1b	60	Linear Foot	$ 50.00	$ 3,000.00
			Roof Strengthening Subtotal		$ 215,700.00
			Building Part 'C' - Total Construction Cost		$ 353,800.00

ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION

BUILDING PART D: Classrooms

Description	Deficiencies (Ref. Seismic Evaluation Report Sec. 6.0)	Quantity	Units	Unit Price	Total Price for Construction Item
Demolition & Asbestos Abatement					
Soft Demolition	S11, S12, S13	3500	Square Foot	$ 2.00	$ 7,000.00
TPO / Comp / Metal Roof Demo	S16	6800	Square Foot	$ 2.00	$ 13,600.00
Abatement	S16	6800	Square Foot	$ 5.00	$ 34,000.00
Acoustical Roof Structure Demolition	S16	6800	Square Foot	$ 4.00	$ 27,200.00
			Demolition & Asbestos Subtotal		$ 81,800.00
Foundation / Floor Strengthening Construction					
Spread Footings for Columns / Holdown	N10	12	Each	$ 4,000.00	$ 48,000.00
Concrete Repair & Patching	N10	300	Square Foot	$ 15.00	$ 4,500.00
			Foundation Level Subtotal		$ 52,500.00
Wall Strengthening Construction					
New CMU / Concrete Shear Walls	S11, S12, S13	950	Square Foot	$ 30.00	$ 28,500.00
Interior Wall Finish Repair	S11, S12, S13	3200	Square Foot	$ 2.00	$ 6,400.00
Painting	S11, S12, S13	6800	Square Foot	$ 3.00	$ 20,400.00
Light Steel Columns	N10	12	EA	$ 1,600.00	$ 19,200.00
Exterior Finish Repair / Installation	S11, S12, S13	400	Square Foot	$ 25.00	$ 10,000.00
			Wall Strengthening Subtotal		$ 84,500.00
Roof Strengthening Construction					
New Roof Sheathing	S15	6800	Square Foot	$ 4.00	$ 27,200.00
New 6" polyisociurinate rigid insulation	S15	6800	Square Foot	$ 15.00	$ 102,000.00
New 3-ply Built Up Roof	S15	6800	Square Foot	$ 17.00	$ 115,600.00
Diaphragm Attachments - Out-of-Plane	S9, S14	680	Linear Foot	$ 50.00	$ 34,000.00
Diaphragm Attachments - In-Plane Shear	S1, S10	530	Linear Foot	$ 20.00	$ 10,600.00
Ceiling Repair	S1, S9, S10, S14	6800	Square Foot	$ 3.00	$ 20,400.00
Blocking and Strapping Line	S14	330	Linear Foot	$ 50.00	$ 16,500.00
			Roof Strengthening Subtotal		$ 326,300.00
			Building Part 'D' - Total Construction Cost		$ 545,100.00

ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION

BUILDING PART E: Classrooms

Description	Deficiencies (Ref. Seismic Evaluation Report Sec. 6.0)	Quantity	Units	Unit Price	Total Price for Construction Item
Demolition & Asbestos Abatement					
Soft Demolition	S8	3800	Square Foot	$ 2.00	$ 7,600.00
Built-Up Roof Demo	S8	2800	Square Foot	$ 4.00	$ 11,200.00
				Demolition & Asbestos Subtotal	$ 18,800.00
Foundation / Floor Strengthening Construction					
Holdowns	S4	12	Each	$ 1,500.00	$ 18,000.00
Spread Footings for Columns / Holdown	S4	2	Each	$ 4,000.00	$ 8,000.00
Concrete Repair & Patching	S4	75	Square Foot	$ 15.00	$ 1,125.00
				Foundation Level Subtotal	$ 27,125.00
Wall Strengthening Construction					
Interior Wall Finish Repair	S4	1000	Square Foot	$ 2.00	$ 2,000.00
Painting	S4	2800	Square Foot	$ 3.00	$ 8,400.00
				Wall Strengthening Subtotal	$ 10,400.00
Roof Strengthening Construction					
Parapet Bracing	N11	140	Linear Foot	$ 65.00	$ 9,100.00
Repair Existing Roofing	S8	2800	Square Foot	$ 4.00	$ 11,200.00
Diaphragm Attachments - In-Plane Shear	S1	230	Linear Foot	$ 20.00	$ 4,600.00
New Suspended Ceiling	N6, N7, N8	2800	Square Foot	$ 6.00	$ 16,800.00
Seismic Isolation from Adjacent Building	S2b	115	Linear Foot	$ 400.00	$ 46,000.00
				Roof Strengthening Subtotal	$ 87,700.00
				Building Part 'E' - Total Construction Cost	**$ 144,025.00**

ENGINEER'S OPINION OF PROBABLE COST - SEISMIC REHABILITATION

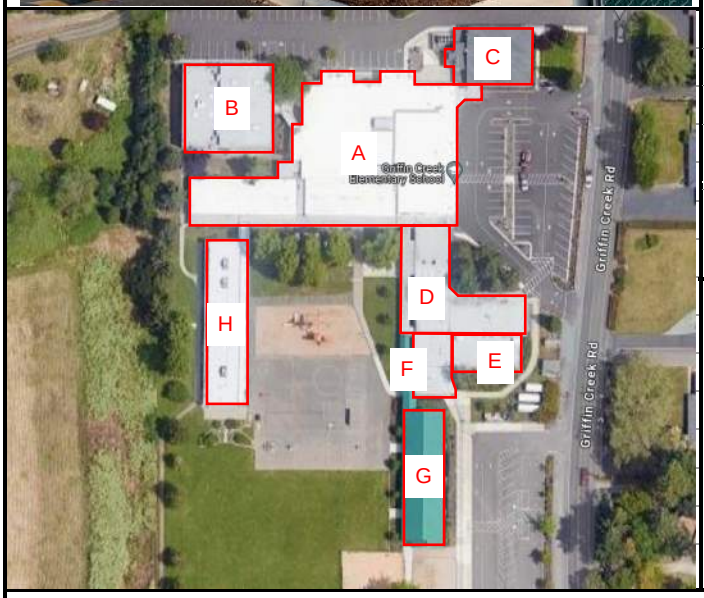
BUILDING PART F: Classrooms

Description	Deficiencies (Ref. Seismic Evaluation Report Sec. 6.0)	Quantity	Units	Unit Price	Total Price for Construction Item
Demolition & Asbestos Abatement					
Soft Demolition	S18	2800	Square Foot	$ 2.00	$ 5,600.00
Built-Up Roof Demo	S20, S21	2500	Square Foot	$ 4.00	$ 10,000.00
Abatement	S20, S21	2500	Square Foot	$ 5.00	$ 12,500.00
			Demolition & Asbestos Subtotal		$ 28,100.00
Foundation / Floor Strengthening Construction					
			Foundation Level Subtotal		$ -
Wall Strengthening Construction					
New CMU / Concrete Shear Walls	S18	175	Square Foot	$ 30.00	$ 5,250.00
Interior Wall Finish Repair	S18	1200	Square Foot	$ 2.00	$ 2,400.00
Painting	S18	2500	Square Foot	$ 3.00	$ 7,500.00
			Wall Strengthening Subtotal		$ 15,150.00
Roof Strengthening Construction					
Ceiling Repair	S1, S17, S20, S21	2500	Square Foot	$ 3.00	$ 7,500.00
Re-Nail Existing Plywood	S8	900	Square Foot	$ 3.00	$ 2,700.00
New Roof Sheathing	S20, S21	1600	Square Foot	$ 4.00	$ 6,400.00
New 6" polyisociurinate rigid insulation	S20, S21	2500	Square Foot	$ 15.00	$ 37,500.00
New 3-ply Built Up Roof	S20, S21	2500	Square Foot	$ 17.00	$ 42,500.00
Diaphragm Attachments - Out-of-Plane	S16, S19	170	Linear Foot	$ 50.00	$ 8,500.00
Diaphragm Attachments - In-Plane Shear	S1, S17	170	Linear Foot	$ 20.00	$ 3,400.00
Blocking and Strapping Line	S19	140	Linear Foot	$ 50.00	$ 7,000.00
New Wood Beams	N5	50	Linear Foot	$ 30.00	$ 1,500.00
			Roof Strengthening Subtotal		$ 117,000.00
			Building Part 'F' - Total Construction Cost		**$ 160,250.00**

Appendix F:
Rapid Visual Screening

Rapid Visual Screening of Buildings for Potential Seismic Hazards — **Level 1**
FEMA P-154 Data Collection Form — **MODERATELY HIGH Seismicity**





Address: 2430 Griffin Creek Rd., Medford, OR
Zip: 97501
Other Identifiers:
Building Name: Griffin Creek Elementary School Area 'C'
Use: School
Latitude: 42.294 **Longitude:** -122.907
S_S: 0.642 **S_1:** 0.369
Screener(s): DKS **Date/Time:** 11/30/2023

No. Stories: Above Grade: 1 Below Grade: N/A **Year Built:** 1950 ☐ EST
Total Floor Area (sq. ft.): 4,800 **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 Hard Rock ☐B Avg Rock ☐C Dense Soil ■D Stiff Soil ☐E Soft Soil ☐F Poor Soil **DNK** *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:
Liquefaction ruled out per previous geotechnical report.

☐ Additional sketches or comments on separate page

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

FEMA BUILDING TYPE W2 ☐ 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, $S_{L1} \geq S_{MIN}$: 2.3, FEMA P-154: W2 COLLAPSE POTENTIAL: LOW (<1%)

EXTENT OF REVIEW

Exterior: ☐ Partial ■ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ■ Entered
Drawings Reviewed: ■ Yes ☐ No
Soil Type Source: Geotech Report/ DOGAMI
Geologic Hazards Source: Marquess & Associates
Contact Person:

LEVEL 2 SCREENING PERFORMED?

☐ Yes, Final Level 2 Score, S_{L2} _____ ■ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

■ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
■ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

■ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

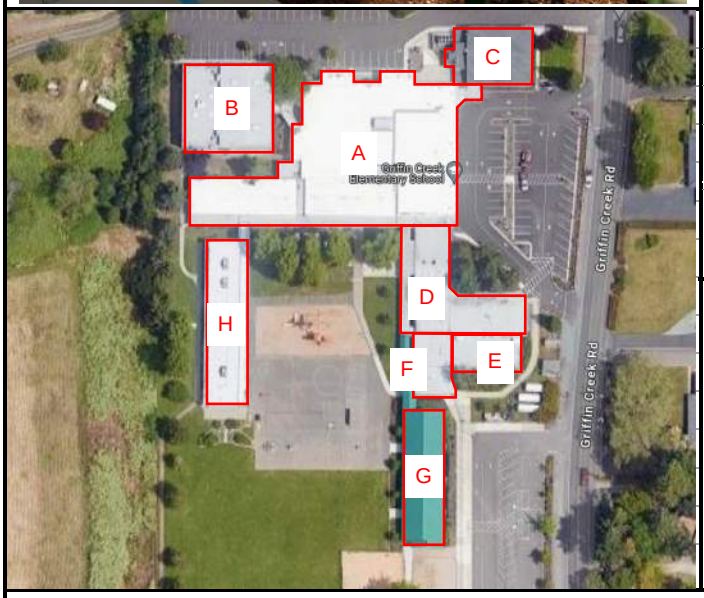
Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

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

Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
MODERATELY HIGH Seismicity





Address: 2430 Griffin Creek Rd., Medford, OR
Zip: 97501
Other Identifiers:
Building Name: Griffin Creek Elementary School Area 'D'
Use: School
Latitude: 42.294 **Longitude:** -122.907
S_S: 0.642 **S_1:** 0.369
Screener(s): DKS **Date/Time:** 11/30/2023

No. Stories: Above Grade: 1 Below Grade: N/A **Year Built:** 1953-55 ☐ EST
Total Floor Area (sq. ft.): 7,500 **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 Hard Rock ☐ B Avg Rock ☐ C Dense Soil ■ D Stiff Soil ☐ E Soft Soil ☐ F Poor Soil **DNK** *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:
Liquefaction ruled out per previous geotechnical report.

☐ Additional sketches or comments on separate page

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

FEMA BUILDING TYPE C2 ☐ 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, $S_{L1} \geq S_{MIN}$: 0.5, FEMA P-154: C2 COLLAPSE POTENTIAL: HIGH (>10%)

EXTENT OF REVIEW

Exterior: ☐ Partial ■ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ■ Entered
Drawings Reviewed: ■ Yes ☐ No
Soil Type Source: Geotech Report/ DOGAMI
Geologic Hazards Source: Marquess & Associates
Contact Person:

LEVEL 2 SCREENING PERFORMED?

☐ Yes, Final Level 2 Score, S_{L2} _____ ■ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

■ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
■ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

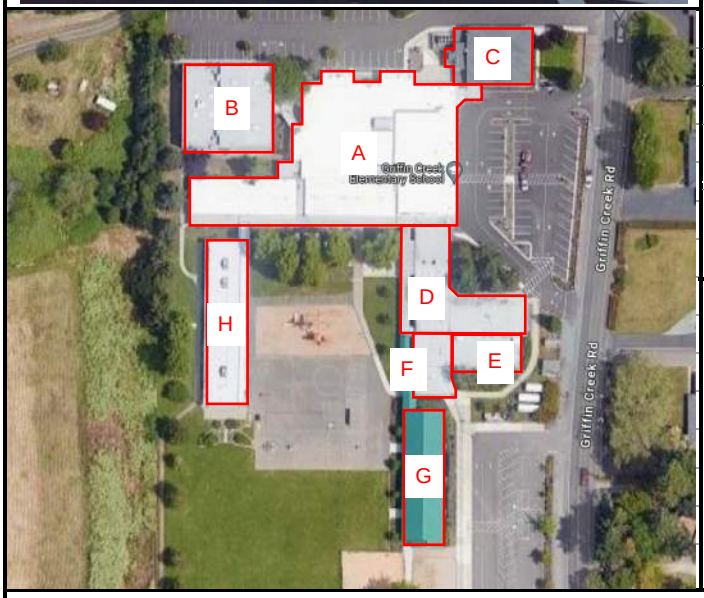
■ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

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

Rapid Visual Screening of Buildings for Potential Seismic Hazards — **Level 1**
FEMA P-154 Data Collection Form — **MODERATELY HIGH Seismicity**





Address: 2430 Griffin Creek Rd., Medford, OR
Zip: 97501
Other Identifiers:
Building Name: Griffin Creek Elementary School Area 'E'
Use: School
Latitude: 42.294 **Longitude:** -122.907
S_S: 0.642 **S_1:** 0.369
Screener(s): DKS **Date/Time:** 11/30/2023

No. Stories: Above Grade: 1 Below Grade: N/A **Year Built:** 1982 ☐ EST
Total Floor Area (sq. ft.): 2,800 **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 Hard Rock ☐ B Avg Rock ☐ C Dense Soil ■ D Stiff Soil ☐ E Soft Soil ☐ F Poor Soil **DNK** *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:
Liquefaction ruled out per previous geotechnical report.

☐ Additional sketches or comments on separate page

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

FEMA BUILDING TYPE W2 ☐ 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, $S_{L1} \geq S_{MIN}$: 2.3, FEMA P-154: W2 COLLAPSE POTENTIAL: LOW (<1%)

EXTENT OF REVIEW

Exterior: ☐ Partial ■ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ■ Entered
Drawings Reviewed: ■ Yes ☐ No
Soil Type Source: Geotech Report/ DOGAMI
Geologic Hazards Source: Marquess & Associates
Contact Person:

LEVEL 2 SCREENING PERFORMED?

☐ Yes, Final Level 2 Score, S_{L2} _____ ■ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

■ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
■ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

■ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified ☐ DNK

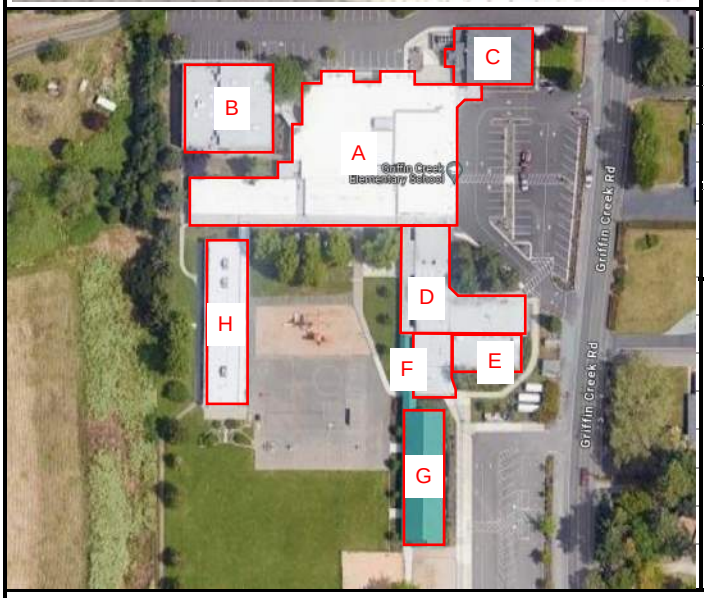
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Legend: MRF = Moment-resisting frame; BR = Braced frame; RC = Reinforced concrete; SW = Shear wall; URM INF = Unreinforced masonry infill; TU = Tilt up; MH = Manufactured Housing; LM = Light metal; FD = Flexible diaphragm; RD = Rigid diaphragm

Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
MODERATELY HIGH Seismicity





Address: 2430 Griffin Creek Rd., Medford, OR
Zip: 97501
Other Identifiers:
Building Name: Griffin Creek Elementary School Area 'E'
Use: School
Latitude: 42.294 **Longitude:** -122.907
S_S: 0.642 **S_1:** 0.369
Screener(s): DKS **Date/Time:** 11/30/2023

No. Stories: Above Grade: 1 Below Grade: N/A **Year Built:** 1982 ☐ EST
Total Floor Area (sq. ft.): 2,500 **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 Hard Rock ☐ B Avg Rock ☐ C Dense Soil ■ D Stiff Soil ☐ E Soft Soil ☐ F Poor Soil **DNK** *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:
Liquefaction ruled out per previous geotechnical report.

☐ Additional sketches or comments on separate page

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

FEMA BUILDING TYPE RM1 ☐ 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, $S_{L1} \geq S_{MIN}$: 1.3, FEMA P-154: RM1 COLLAPSE POTENTIAL: MODERATE (<10%)

EXTENT OF REVIEW

Exterior: ☐ Partial ■ All Sides ☐ Aerial
Interior: ☐ None ☐ Visible ■ Entered
Drawings Reviewed: ■ Yes ☐ No
Soil Type Source: Geotech Report/ DOGAMI
Geologic Hazards Source: Marquess & Associates
Contact Person:

LEVEL 2 SCREENING PERFORMED?

☐ Yes, Final Level 2 Score, S_{L2} _____ ■ No
Nonstructural hazards? ☐ Yes ☐ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

■ Pounding potential (unless S_{L2} > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
■ No

Detailed Nonstructural Evaluation Recommended? *(check one)*

■ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
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